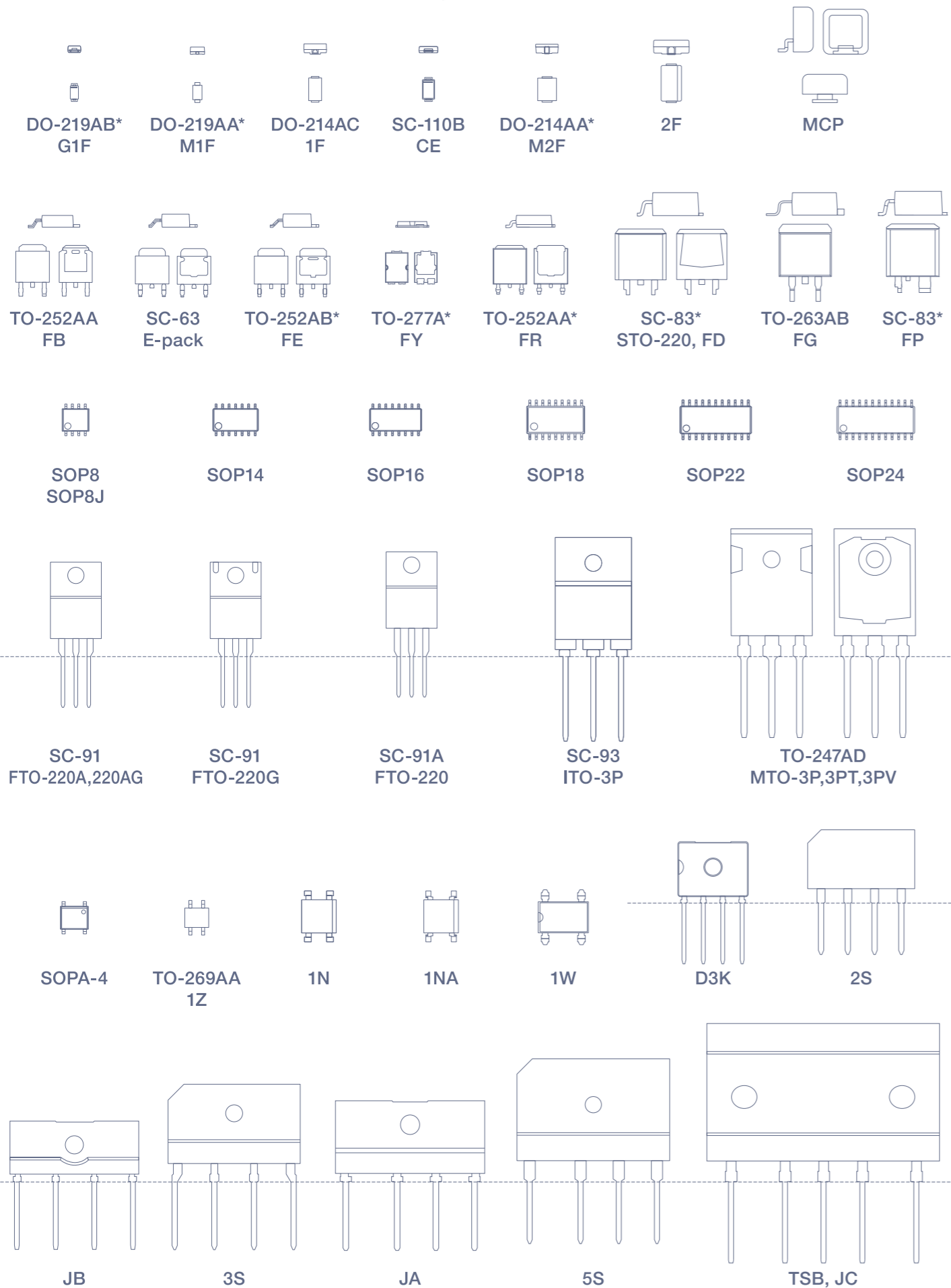
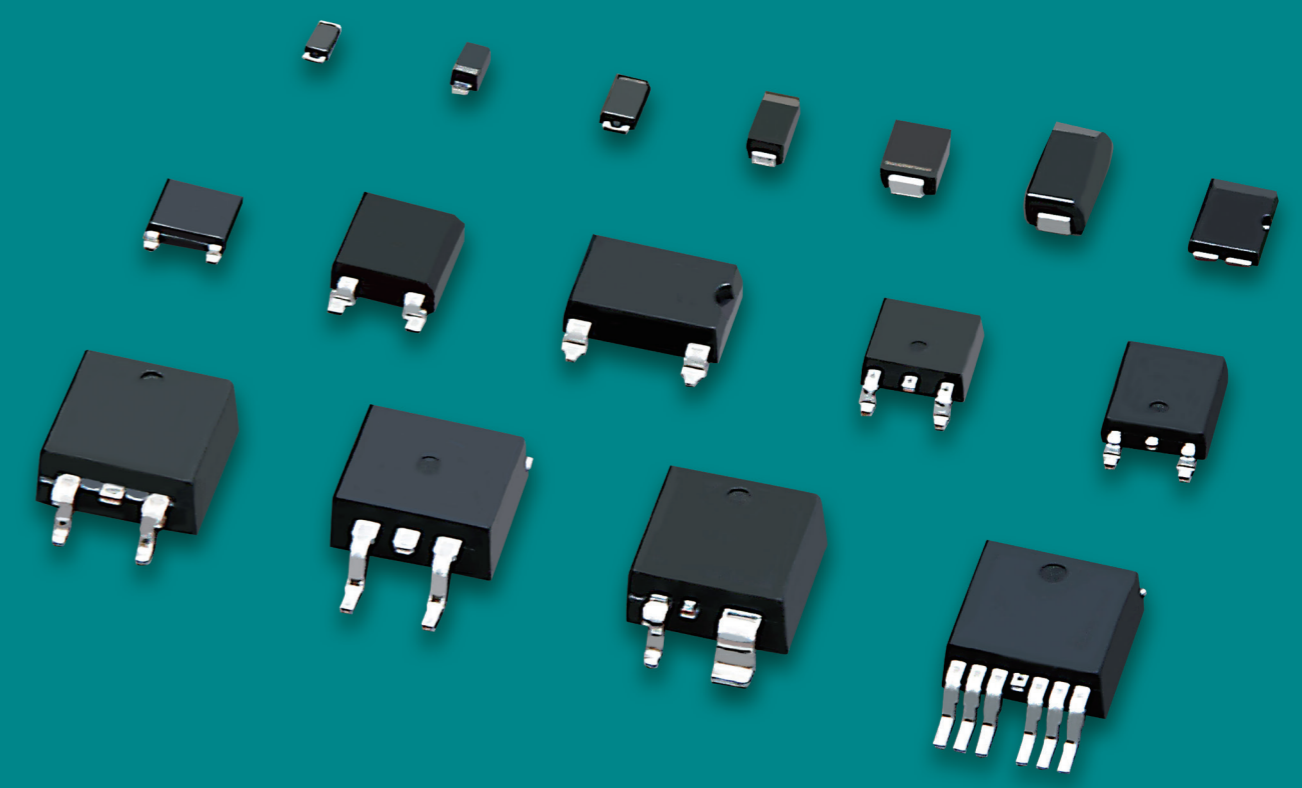


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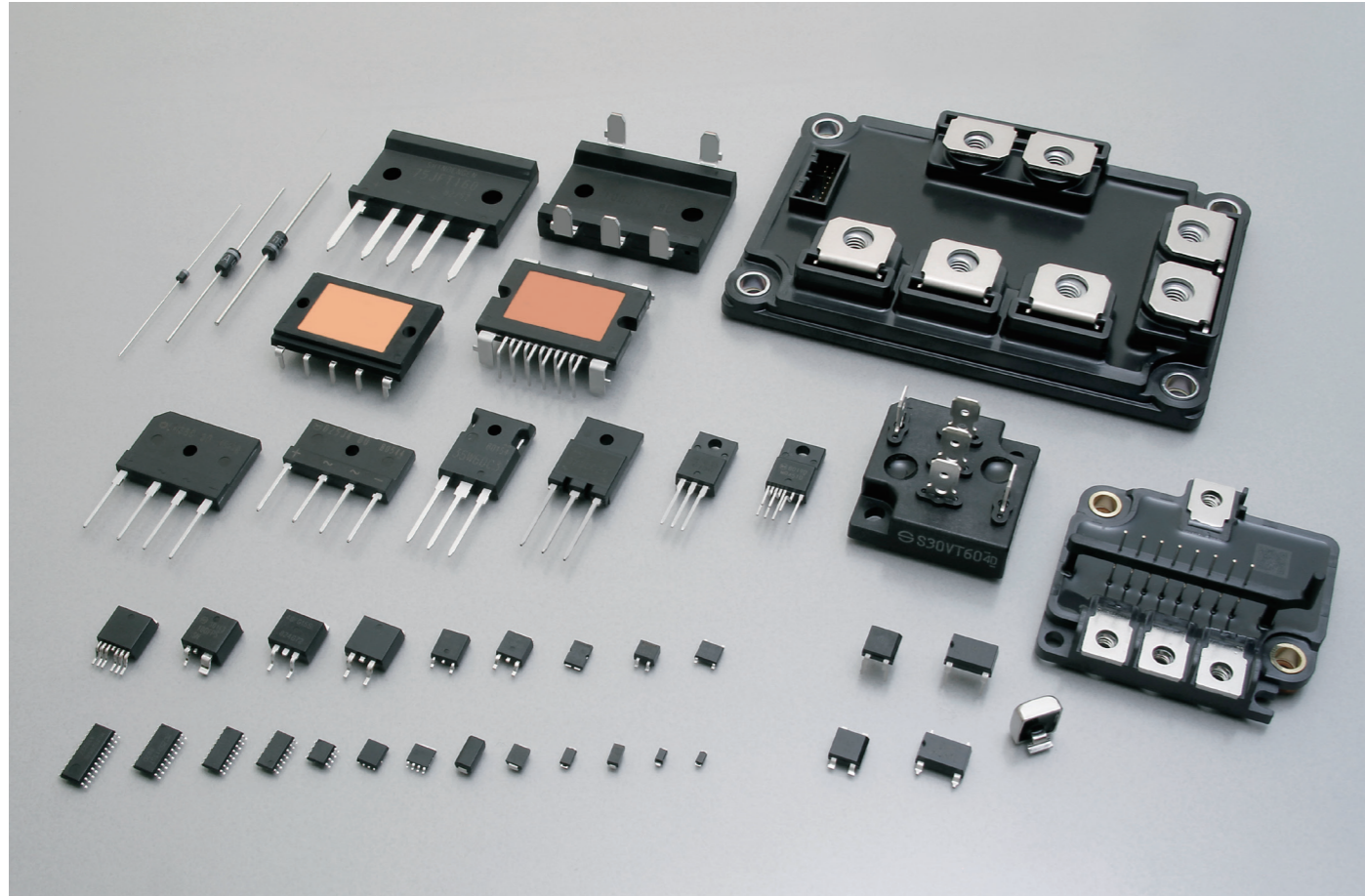
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| P8B28HP2    | 54   | P30FE7R5SLK | 52   | P70FP12SNK  | 52   | S1NB80       | 12   | S20VT80    | 18   | SF20L60U    | 34   | ST02-58G1   | 46   | ST60-40MF | 46   |
| P8B30HP2    | 54   | P30LA10SL   | 50   | P70LF4QLK   | 50   | S1NBB80      | 12   | S20VTA60   | 18   | SF20L60MSM  | 34   | ST02-75F1   | 46   | ST60-48MF | 46   |
| P8F28HP2    | 54   | P30W60HP2V  | 54   | P70LF4QNK   | 50   | S1NBC60      | 12   | S20VTA80   | 18   | SF20L60MVM  | 34   | ST02-82F1   | 46   | ST70-27F  | 46   |
| P8F50HP2    | 54   | P32B12SN    | 50   | P72LF7R5SL  | 50   | S1NBC80      | 12   | S20WB60    | 16   | SF20LC30M   | 36   | ST02-100F1  | 46   | ST70-27FZ | 46   |
| P8FE10SBK   | 52   | P32F12SN    | 52   | P72LF7R5SLK | 50   | S1WB(A)60    | 12   | S20WB80    | 16   | SG5L20USM   | 34   | ST02-120F1  | 46   | ST70-27MF | 46   |
| P9B30HP2F   | 54   | P32FG15SL   | 52   | P72LF7R5SN  | 50   | S1WB(A)60B   | 12   | S25VB60    | 16   | SG5LC20USM  | 36   | ST02-140F1  | 46   | ST70-30MF | 46   |
| P9B40HP2    | 54   | P32LF10SL   | 50   | P72LF7R5SNK | 50   | S1WB(A)80    | 12   | S25VB80    | 16   | SG5S4M      | 24   | ST02-170F1  | 46   | ST80-14MF | 46   |
| P10B28HP2   | 54   | P32LF10SLK  | 50   | P80FG6EAL   | 52   | S1ZAS4       | 30   | S30K60T    | 34   | SG5S6M      | 24   | ST02-200F1  | 46   | UD2KB80   | 14   |
| P10F50HP2   | 54   | P32LF10SN   | 50   | P80FG7R5EN  | 52   | S1ZB60       | 12   | S30K60V    | 34   | SG5S9M      | 24   | ST02-280F1  | 46   | UD3KB80   | 14   |
| P10F60HP2   | 54   | P32LF10SNK  | 50   | P80FH5ENK   | 52   | S1ZB80       | 12   | S30K100V   | 34   | SG8SC4M     | 28   | ST02-320F1  | 46   | UD4KB80   | 14   |
| P12F60HP2   | 54   | P34F6EL     | 52   | P82F7R5SN   | 52   | S2K100       | 32   | S30SC4MT   | 28   | SG10L20USM  | 34   | ST02D-82    | 48   | UD6KBA80  | 14   |
| P12FE7R5SBK | 52   | P36F28HP2   | 54   | P85FG6EAL   | 52   | S2L20U       | 32   | S30SC6MT   | 28   | SG10LC20USM | 36   | ST02D-140   | 48   | UD8KBA80  | 14   |
| P13F28HP2   | 54   | P38LF6QLK   | 50   | P86F6SN     | 52   | S2L40U       | 32   | S30TC15T   | 28   | SG10SC3LM   | 28   | ST02D-140F2 | 48   | VR61F1    | 44   |
| P13F50HP2   | 54   | P38LF6QNK   | 50   | P88FP10SN   | 52   | S2L60        | 32   | S30V60T    | 10   | SG10SC4M    | 28   | ST02D-170   | 48   |           |      |
| P14FE6SBK   | 52   | P40B10SL    | 50   | P88FP10SNK  | 52   | S2V60        | 8    | S30V80V    | 10   | SG10SC6M    | 28   | ST02D-170F2 | 48   |           |      |
| P15F50HP2   | 54   | P40B10SN    | 50   | P90FG5R5SL  | 52   | S2V80        | 8    | S30VT60    | 18   | SG10SC9M    | 28   | ST02D-200   | 48   |           |      |
| P15F60HP2   | 54   | P40B6SL     | 50   | P94FG5R5SL  | 52   | S2VB60       | 16   | S30VT80    | 18   | SG10TC15M   | 28   | ST02DH-280  | 48   |           |      |
| P15F60HP2F  | 54   | P40F10SN    | 52   | P98LF6QL    | 50   | S2WB(A)80    | 12   | S30VT160   | 18   | SG15SC4M    | 28   | ST02DH-320  | 48   |           |      |
| P15LA12SL   | 50   | P40F12SN    | 52   | P98LF6QLK   | 50   | S3K60        | 32   | S30VTA60   | 18   | SG15SC6M    | 28   | ST03-43F1   | 46   |           |      |
| P16B6SB     | 50   | P40LF12SL   | 50   | P98LF6QN    | 50   | S3L20U       | 32   | S30VTA80   | 18   | SG20JC6M    | 28   | ST03-47F1   | 46   |           |      |
| P17F28HP2   | 54   | P40LF12SLK  | 50   | P98LF6QNK   | 50   | S3L40U       | 32   | S30VTA160  | 18   | SG20LC20USM | 36   | ST03-58F1   | 46   |           |      |
| P18LA12SL   | 50   | P40LF12SN   | 50   | P100FA7R5EN | 52   | S3L60        | 32   | S40HC1R5T  | 28   | SG20SC3LM   | 28   | ST03-68F1   | 46   |           |      |
| P18LF6QLK   | 50   | P40LF12SNK  | 50   | P100FH4ENK  | 52   | S3V60        | 8    | S40T15V    | 24   | SG20SC4M    | 28   | ST03-240F1  | 46   |           |      |
| P18LF6QNK   | 50   | P42F6EN     | 52   | P100FP12SN  | 52   | S3V80        | 8    | S50VB60    | 16   | SG20SC6M    | 28   | ST03D-82    | 48   |           |      |
| P19LA10SL   | 50   | P46LF7R5SL  | 50   | P100FP12SNK | 52   | S3V100D      | 8    | S50VB80    | 16   | SG20SC9M    | 28   | ST03D-140   | 48   |           |      |
| P20B12SL    | 50   | P46LF7R5SLK | 50   | P105LF4QL   | 50   | S3WB60       | 16   | S60HC1R5T  | 28   | SG20TC10M   | 28   | ST03D-170   | 48   |           |      |
| P20B12SN    | 50   | P46LF7R5SN  | 50   | P105LF4QLK  | 50   | S4VB60       | 16   | S60HC3T    | 28   | SG20TC12M   | 28   | ST03D-200   | 48   |           |      |
| P20F50HP2   | 54   | P46LF7R5SNK | 50   | P105LF4QN   | 50   | S5VB60       | 16   | S60JC10V   | 28   | SG20TC15M   | 28   | ST03DH-240  | 48   |           |      |
| P20FE12SLK  | 52   | P50F10SN    | 52   | P105LF4QNK  | 50   | S10VB60      | 16   | S60SC3LT   | 28   | SG30JC6M    | 28   | ST04-12F1   | 46   |           |      |
| P21F28HP2   | 54   | P50LF10SL   | 50   | P126FP10SN  | 52   | S10VT60      | 18   | S60SC4MT   | 28   | SG30SC3LM   | 28   | ST04-14F1   | 46   |           |      |
| P22F10SN    | 52   | P50LF10SLK  | 50   | P126FP10SNK | 52   | S10VT80      | 18   | S60SC6MT   | 28   | SG30SC4M    | 28   | ST04-16F1   | 46   |           |      |
| P22FE4SBK   | 52   | P50LF10SN   | 50   | P140LF4QL   | 50   | S10VTA60     | 18   | S90T15V    | 24   | SG30SC6M    | 28   | ST04-18F1   | 46   |           |      |
| P23F40HP2FM | 54   | P50LF10SNK  | 50   | P140LF4QLK  | 50   | S10VTA80     | 18   | SF3K60M    | 34   | SG30TC10M   | 28   | ST04-20F1   | 46   |           |      |
| P23LA10SL   | 50   | P54B4SN     | 50   | P140LF4QN   | 50   | S10WB60      | 16   | SF3L60U    | 34   | SG30TC12M   | 28   | ST04-24F1   | 46   |           |      |
| P24B4SB     | 50   | P55F6EN     | 52   | P140LF4QNK  | 50   | S15VB60      | 16   | SF5K60M    | 34   | SG30TC15M   | 28   | ST04-27F1   | 46   |           |      |
| P24LF4QLK   | 50   | P56LA4SN    | 50   | P153FP6SN   | 52   | S15VT60      | 18   | SF5L40UM   | 34   | SG40TC10M   | 28   | ST04-30F1   | 46   |           |      |




# GENERAL RECTIFYING DIODES

General Rectifying Diodes are defined as high-voltage and PN junction type devices.

These devices utilize our original glass passivation which is physically stable with a superior structure for resistance against heat and humidity. Variations are available for breakdown voltage up to 800V and output current from 1 to 30A.

## Single

| Surface Mount   |  |      |             |          |                 |       |            |              |
|---|--|------|-------------|----------|-----------------|-------|------------|--------------|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V] |                 |       | Remarks    |              |
|   |  |      |             | 400      | 600             | 800   |            |              |
|  3.9 × 1.8 × 1.4(mm)     | DO-219AA similar<br>M1F                | B2   | 1           |          | M1F60<br>M1FE60 | M1F80 | ① — >— ②   |              |
|   |  |      | 2           | M1FE40   |                 |       |            |              |
|  5.0 × 2.5 × 2.0(mm)     | DO-214AC<br>1F                         | B3-1 | 1           |          | D1F60<br>D1FE60 |       |            |              |
|   |  |      | 1.1         |          | LN1F60          |       |            |              |
|   |  |      | 1.2         |          | D1F60A          |       |            |              |
|  4.7 × 2.4 × 0.98(mm)    | SC-110B<br>CE                          | B5-1 | 3           |          | D3CE60V         |       |            |              |
|   |  |      | 3.5         |          | D3CE60VE        |       |            |              |
|  5.1 × 3.75 × 2.0(mm)    | DO-214AA similar<br>M2F                | B6   | 1.2         |          | M2F60           |       |            |              |
|   |  |      | 3           | M3FE40   | M3F60<br>M3FE60 |       |            |              |
|  7.6 × 4.0 × 2.8(mm)     | DO-214AA similar<br>2F                 | B9-1 | 1.4         |          | D2F60           |       |            |              |
|   |  |      | 3           |          | D3F60<br>D3FE60 |       |            |              |
|   |  |      | 4           |          | D4F60           |       |            |              |
|   |  |      | 5           |          | D5FE60          |       |            |              |
|  9.5 × 6.6 × 2.65(mm)    | SC-63<br>E-pack                        | G1-5 | 5           | DE5VE40  |                 |       |            | ① ④ ② N.C. ③ |
|  6.5 × 4.5 × 1.1(mm)    | TO-277A similar<br>FY                  | G4   | 10          |          | D10FY60VE       |       |            | ① ② ③        |
|  9.6 × 6.6 × 2.3(mm)   | TO-252AA similar<br>FR                 | G5   | 10          |          | D10FR60V        |       | ① NC ② ④ ③ |              |
|   |  |      | 15          |          | D15FR60V        |       |            |              |
|  13.2 × 10.2 × 4.7(mm) | SC-83 similar<br>STO-220               | H1-2 | 25          |          | DF25V60         |       | ① ② ④ ③    |              |
|  13.2 × 10.2 × 4.6(mm) | SC-83 similar<br>FD                    | H2-1 | 25          |          | D25FD60V        |       | ① NC ② ④ ③ |              |

| Axial   |  |      |             |          |       |         |          |
|---|--|------|-------------|----------|-------|---------|----------|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V] |       |         | Remarks  |
|   |  |      |             | 400      | 600   | 800     |          |
|  3.0 × φ 2.6(mm) | AX057                                  | A1   | 1           |          | D1N60 | D1N80   | ① — >— ② |
|  7.0 × φ 4.4(mm) | AX10                                   | A5-1 | 1.7         |          | S2V60 | S2V80   |          |
|  7.0 × φ 4.4(mm) | AX14                                   | A7   | 3           |          |       | S3V100D |          |
|   |  |      | 3.5         |          | S3V60 | S3V80   |          |

## Single

| Surface Mount                          |      |           |                          |             |                    |          |            |                            |                   |                       |                 |   |              |                   |            |
|--|------|-----------|--------------------------|-------------|--------------------|----------|------------|----------------------------|-------------------|-----------------------|-----------------|---|--------------|-------------------|------------|
| Package                                |      | Type No.  | Absolute Maximum Ratings |             |                    |          |            | Electrical Characteristics |                   |                       |                 |   | Halogen free | Based on AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |           | VRRM [V]                 | IF (AV) [A] | Conditions Ta [°C] | IFSM [A] | Tj [°C]    | Vf (max) [V]               | Conditions IF [A] | Ir (max) Vr=VRRM [μA] | VESD (typ) [kV] |   |              |                   |            |
| DO-219AA similar<br>M1F                | B2   | M1F60     | 600                      | 1           | 25                 | 25       | 150        | 1.10                       | 1                 | 10                    | —               | — | —            | ○                 |            |
|  |      | M1FE60    | 600                      | 1           | 129 *1             | 30       | 150        | 1.10                       | 1                 | 10                    | 25              | — | ○            | ○                 |            |
|  |      | M1F80     | 800                      | 1           | 25                 | 25       | 150        | 1.10                       | 1                 | 10                    | —               | — | —            | ○                 |            |
|  |      | M1FE40    | 400                      | 2           | 103 *2             | 25       | 150        | 1.10                       | 1                 | 10                    | —               | — | —            | ○                 |            |
| DO-214AC<br>1F                         | B3-1 | D1F60     | 600                      | 1           | 25                 | 25       | 150        | 1.10                       | 1                 | 10                    | —               | — | —            | ○                 |            |
|  |      | D1FE60    | 600                      | 1           | 126 *1             | 30       | 150        | 1.10                       | 1                 | 10                    | 25              | — | ○            | ○                 |            |
|  |      | LN1F60 *3 | 600                      | 1.1         | 25                 | 25       | 150        | 1.05                       | 0.8               | 10                    | —               | — | —            | ○                 |            |
|  |      | D1F60A    | 600                      | 1.2         | 25                 | 45       | 150        | 0.97                       | 1.2               | 10                    | —               | — | —            | ○                 |            |
| SC-110B<br>CE                          | B5-1 | D3CE60V   | 600                      | 3           | 101 *1             | 50       | 150        | 1.10                       | 3                 | 10                    | —               | — | —            | ○                 |            |
|  |      | D3CE60VE  | 600                      | 3.5         | 93 *1              | 60       | -55 to 150 | 1.10                       | 3.5               | 10                    | 25              | — | ○            | ■                 |            |
| DO-214AA similar<br>M2F                | B6   | M2F60     | 600                      | 1.2         | 51                 | 50       | 150        | 0.97                       | 1.2               | 10                    | —               | — | —            | ○                 |            |
|  |      | M3FE40    | 400                      | 3           | 76 *1              | 75       | 150        | 1.10                       | 3                 | 10                    | 30              | — | ○            | ○                 |            |
|  |      | M3F60     | 600                      | 3           | 100 *1             | 90       | 150        | 1.05                       | 3                 | 10                    | —               | — | —            | ○                 |            |
|  |      | M3FE60    | 600                      | 3           | 76 *1              | 90       | 150        | 1.05                       | 3                 | 10                    | 25              | — | ○            | ○                 |            |
| DO-214AA similar<br>2F                 | B9-1 | D2F60     | 600                      | 1.4         | 25                 | 60       | 150        | 1.05                       | 1.4               | 10                    | —               | — | —            | ○                 |            |
|  |      | D3F60     | 600                      | 3           | 80 *1              | 150      | 150        | 1.05                       | 3                 | 10                    | —               | — | —            | ○                 |            |
|  |      | D3FE60    | 600                      | 3           | 105 *1             | 150      | 150        | 1.05                       | 3                 | 10                    | 25              | — | ○            | ○                 |            |
|  |      | D4F60     | 600                      | 4           | 68 *1              | 200      | 150        | 0.95                       | 4                 | 10                    | —               | — | —            | ○                 |            |
|  |      | D5FE60    | 600                      | 5           | 82 *1              | 300      | 150        | 0.95                       | 5                 | 10                    | 25              | — | ○            | ○                 |            |
| SC-63<br>E-pack                        | G1-5 | DE5VE40   | 400                      | 5           | 130 *2             | 80       | 150        | 1.00                       | 5                 | 10                    | 30              | — | —            | ■                 |            |
| TO-277A similar<br>FY                  | G4   | D10FY60VE | 600                      | 10          | 120 *1             | 220      | -55 to 150 | 1.10                       | 10                | 10                    | 25              | ○ | ○            | ○                 |            |
| TO-252AA similar<br>FR                 | G5   | D10FR60V  | 600                      | 10          | 130 *2             | 200      | -55 to 150 | 1.05                       | 10                | 10                    | —               | — | —            | ■                 |            |
|  |      | D15FR60V  | 600                      | 15          | 125 *2             | 300      | -55 to 150 | 1.05                       | 15                | 10                    | —               | — | —            | ■                 |            |
| SC-83 similar<br>STO-220               | H1-2 | DF25V60   | 600                      | 25          | 136 *2             | 400      | 150        | 1.10                       | 25                | 10                    | —               | — | —            | —                 |            |
| SC-83 similar<br>FD                    | H2-1 | D25FD60V  | 600                      | 25          | 113 *2             | 450      | 150        | 1.10                       | 25                | 10                    | —               | — | ○            | ○                 |            |


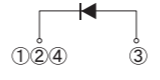
\*1 : Tl \*2 : Tc \*3 : trr(max)=3.5μs ■ : Please contact us.

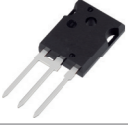
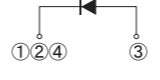
| Axial                                  |      |          |                          |             |                    |          |         |                            |                   |                       |                 |   |              |                   |            |
|--|------|----------|--------------------------|-------------|--------------------|----------|---------|----------------------------|-------------------|-----------------------|-----------------|---|--------------|-------------------|------------|
| Package                                |      | Type No. | Absolute Maximum Ratings |             |                    |          |         | Electrical Characteristics |                   |                       |                 |   | Halogen free | Based on AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | VRRM [V]                 | IF (AV) [A] | Conditions Ta [°C] | IFSM [A] | Tj [°C] | Vf (max) [V]               | Conditions IF [A] | Ir (max) Vr=VRRM [μA] | VESD (typ) [kV] |   |              |                   |            |
| AX057                                  | A1   | D1N60    | 600                      | 1           | 25                 | 30       | 150     | 1.05                       | 1                 | 10                    | —               | — | —            | —                 |            |
|  |      | D1N80    | 800                      | 1           | 25                 | 30       | 150     | 1.05                       | 1                 | 10                    | —               | — | —            | —                 |            |
| AX10                                   | A5-1 | S2V60    | 600                      | 1.7         | 40                 | 60       | 150     | 1.05                       | 1.7               | 10                    | —               | — | —            | —                 |            |
|  |      | S2V80    | 800                      | 1.7         | 40                 | 60       | 150     | 1.05                       | 1.7               | 10                    | —               | — | —            | —                 |            |
| AX14                                   | A7   | S3V100D  | 800                      | 3           | 130 *1             | 150      | 150     | 1.05                       | 3                 | 10 *2                 | —               | — | —            | —                 |            |
|  |      | S3V60    | 600                      | 3.5         | 40                 | 120      | 150     | 1.05                       | 2.6               | 10                    | —               | — | —            | —                 |            |
|  |      | S3V80    | 800                      | 3.5         | 40                 | 120      | 150     | 1.05                       | 2.6               | 10                    | —               | — | —            | —                 |            |

\*1 : Tl \*2 : Vr=1000V

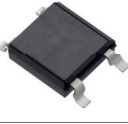
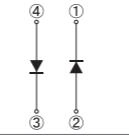


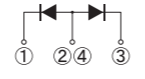
# GENERAL RECTIFYING DIODES

## Single


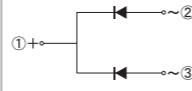
| Two Terminal Type  |  |      |                        |                      |         |     |   |
|--|--|------|------------------------|----------------------|---------|-----|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |         |     | Remarks   |
|  |  |      |                        | 400                  | 600     | 800 |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PT               | K2   | 30                     |                      | S30V60T |     |  |

| Three Terminal Type  |  |      |                        |                      |         |     |   |
|--|--|------|------------------------|----------------------|---------|-----|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |         |     | Remarks   |
|  |  |      |                        | 400                  | 600     | 800 |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PV               | K6   | 30                     |                      | S30V80V |     |  |

## Array

| Surface Mount  |  |      |                        |                      |           |     |   |
|--|--|------|------------------------|----------------------|-----------|-----|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |           |     | Remarks   |
|  |  |      |                        | 400                  | 600       | 800 |   |
| <br>10.0 × 6.8 × 2.6(mm)  | —<br>—<br>1NA                          | C6-2 | 3                      |                      | S1NAD80   |     |  |
| <br>13.2 × 10.2 × 4.7(mm) | —<br>SC-83 similar<br>STO-220          | H1-5 | 5                      |                      | DF5VD60   |     |  |
|  |  |      | 15                     |                      | DF15VD60  |     |   |
|  |  | H1-7 | 16                     |                      | DF16VC60R |     |  |

## Diode Module

| Diode Module  |  |      |                        |                      |         |     |   |
|---|--|------|------------------------|----------------------|---------|-----|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |         |     | Remarks   |
|   |  |      |                        | 400                  | 600     | 800 |   |
| <br>22.3 × 22.3 × 25.0(mm) | —<br>—<br>D30VC                        | E2   | 30                     |                      | D30VC60 |     |  |

## Single

| Two Terminal Type                      |      |          |                          |                        |                                |                      |                     |                            |                               |  |                             |              |                   |            |
|--|------|----------|--------------------------|------------------------|--------------------------------|----------------------|---------------------|----------------------------|-------------------------------|--|-----------------------------|--------------|-------------------|------------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                        |                                |                      |                     | Electrical Characteristics |                               |  |                             | Halogen free | Based on AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub> [V]     | I <sub>F(AV)</sub> [A] | Conditions T <sub>C</sub> [°C] | I <sub>FSM</sub> [A] | T <sub>J</sub> [°C] | V <sub>F</sub> (max) [V]   | Conditions I <sub>F</sub> [A] | I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RRM</sub> [μA] | V <sub>ESD</sub> (typ) [kV] |              |                   |            |
| TO-247AD<br>—<br>MTO-3PT               | K2   | S30V60T  | 600                      | 30                     | 119                            | 360                  | 150                 | 1.1                        | 30                            | 10   | —                           | —            | —                 | —          |

| Three Terminal Type                    |      |          |                          |                        |                                |                      |                     |                            |                               |  |                             |              |                   |            |
|--|------|----------|--------------------------|------------------------|--------------------------------|----------------------|---------------------|----------------------------|-------------------------------|--|-----------------------------|--------------|-------------------|------------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                        |                                |                      |                     | Electrical Characteristics |                               |  |                             | Halogen free | Based on AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub> [V]     | I <sub>F(AV)</sub> [A] | Conditions T <sub>C</sub> [°C] | I <sub>FSM</sub> [A] | T <sub>J</sub> [°C] | V <sub>F</sub> (max) [V]   | Conditions I <sub>F</sub> [A] | I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RRM</sub> [μA] | V <sub>ESD</sub> (typ) [kV] |              |                   |            |
| TO-247AD<br>—<br>MTO-3PV               | K6   | S30V80V  | 800                      | 30                     | 131                            | 450                  | 150                 | 1.1                        | 30                            | 10   | —                           | —            | —                 | ○          |

## Array

| Surface Mount                          |      |           |                          |                        |                                |                      |                     |                            |                               |  |                             |              |                   |            |
|--|------|-----------|--------------------------|------------------------|--------------------------------|----------------------|---------------------|----------------------------|-------------------------------|--|-----------------------------|--------------|-------------------|------------|
| Package                                |      | Type No.  | Absolute Maximum Ratings |                        |                                |                      |                     | Electrical Characteristics |                               |  |                             | Halogen free | Based on AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |           | V <sub>RRM</sub> [V]     | I <sub>F(AV)</sub> [A] | Conditions T <sub>C</sub> [°C] | I <sub>FSM</sub> [A] | T <sub>J</sub> [°C] | V <sub>F</sub> (max) [V]   | Conditions I <sub>F</sub> [A] | I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RRM</sub> [μA] | V <sub>ESD</sub> (typ) [kV] |              |                   |            |
| —<br>—<br>1NA                          | C6-2 | S1NAD80   | 800                      | 3                      | 102 *                          | 110                  | 150                 | 1.05                       | 0.75                          | 10   | —                           | —            | —                 | —          |
| —<br>SC-83 similar<br>STO-220          | H1-5 | DF5VD60   | 600                      | 5                      | 140                            | 140                  | 150                 | 1.05                       | 2.50                          | 10   | —                           | —            | —                 | —          |
|  |      | DF15VD60  | 600                      | 15                     | 127                            | 190                  | 150                 | 1.05                       | 7.50                          | 10   | —                           | —            | —                 | —          |
|  | H1-7 | DF16VC60R | 600                      | 16                     | 124                            | 190                  | 150                 | 1.05                       | 8.00                          | 10   | —                           | —            | —                 | —          |

\* : T<sub>L</sub>

## Diode Module


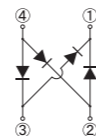





| Diode Module                           |      |          |                          |                        |                                |                      |                     |                            |                               |  |                             |              |                   |            |
|--|------|----------|--------------------------|------------------------|--------------------------------|----------------------|---------------------|----------------------------|-------------------------------|--|-----------------------------|--------------|-------------------|------------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                        |                                |                      |                     | Electrical Characteristics |                               |  |                             | Halogen free | Based on AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub> [V]     | I <sub>F(AV)</sub> [A] | Conditions T <sub>C</sub> [°C] | I <sub>FSM</sub> [A] | T <sub>J</sub> [°C] | V <sub>F</sub> (max) [V]   | Conditions I <sub>F</sub> [A] | I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RRM</sub> [μA] | V <sub>ESD</sub> (typ) [kV] |              |                   |            |
| —<br>—<br>D30VC                        | E2   | D30VC60  | 600                      | 30                     | 124                            | 300                  | 150                 | 1.05                       | 15                            | 10   | —                           | —            | —                 | —          |

# BRIDGE DIODES


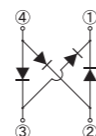




Bridge Diodes are suitable for the rectification of commercial voltage.

Variations are available for various packaging as well as high voltage (Max 1600V), high IFSM, low VF, and low noise.

## Small Bridge Diodes

| Surface Mount   |  |      |             |                         |           |      |   |
|---|--|------|-------------|-------------------------|-----------|------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V]                |           |      | Remarks   |
|   |  |      |             | 600                     | 800       | 1000 |   |
|  7.0 × 4.7 × 2.6(mm)   | TO-269AA<br>1Z                         | C2-1 | 0.8         | S1ZB60                  | S1ZB80    |      |  |
|  6.2 × 5.15 × 1.45(mm) | SOPA-4                                 | C1   | 1           |                         | D1UBA80   |      |   |
|  10.0 × 6.8 × 2.6(mm)  | 1N                                     | C4   | 1           | S1NB60                  | S1NB80    |      |   |
|  10.0 × 6.8 × 2.6(mm)  | 1NA                                    | C6-1 | 1           |                         | S1NBB80   |      |   |
|  10.0 × 6.8 × 2.6(mm)  | 1NA                                    | C6-1 | 1.5         | S1NBC60                 | S1NBC80   |      |   |
|  10.6 × 10.2 × 3.1(mm) | 1W                                     | C8   | 1           | S1WB(A)60<br>S1WB(A)60B | S1WB(A)80 |      |   |
|   |  |      | 2           |                         | S2WB(A)80 |      |   |

## THD (Through Hole Device)

| THD (Through Hole Device)  |  |      |             |                         |           |      |   |
|--|--|------|-------------|-------------------------|-----------|------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V]                |           |      | Remarks   |
|  |  |      |             | 600                     | 800       | 1000 |   |
|  3.8 × 4.7 × 2.5(mm)    | 1Z                                     | C3   | 0.8         | S1ZB60                  | S1ZB80    |      |  |
|  6.5 × 6.8 × 2.5(mm)  | 1N                                     | C5   | 1           | S1NB60                  | S1NB80    |      |   |
|  6.5 × 6.8 × 2.5(mm)  | 1NA                                    | C7   | 1           |                         | S1NBB80   |      |   |
|  6.5 × 6.8 × 2.5(mm)  | 1NA                                    | C7   | 1.5         | S1NBC60                 | S1NBC80   |      |   |
|  6.2 × 10.2 × 3.0(mm) | 1W                                     | C9   | 1           | S1WB(A)60<br>S1WB(A)60B | S1WB(A)80 |      |   |
|  |  |      | 2           |                         | S2WB(A)80 |      |   |

## Small Bridge Diodes

| Surface Mount                          |      |            |            |                          |             |                    |          |            |                            |                   |                       |              |    |            |
|--|------|------------|------------|--------------------------|-------------|--------------------|----------|------------|----------------------------|-------------------|-----------------------|--------------|----|------------|
| Package                                |      | Type No.   | Spec. Code | Absolute Maximum Ratings |             |                    |          |            | Electrical Characteristics |                   |                       | Halogen free | UL | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |            |            | VRRM [V]                 | IF (AV) [A] | Conditions Ta [°C] | IFSM [A] | Tj [°C]    | VF (max) [V]               | Conditions IF [A] | IR (max) VR=VRRM [μA] |              |    |            |
| TO-269AA                               | C2-1 | S1ZB60     | -7072      | 600                      | 0.8         | 25                 | 30       | 150        | 1.05                       | 0.4               | 10                    | -            | -  | -          |
| 1Z                                     |      | S1ZB80     | -7072      | 800                      | 0.8         | 25                 | 30       | 150        | 1.05                       | 0.4               | 10                    | -            | -  | -          |
| SOPA-4                                 | C1   | D1UBA80    | -7062      | 800                      | 1           | 25                 | 30       | 150        | 0.95                       | 0.4               | 10                    | -            | -  | -          |
| 1N                                     | C4   | S1NB60     | -7062      | 600                      | 1           | 25                 | 30       | 150        | 1.05                       | 0.5               | 10                    | -            | -  | -          |
|  |      | S1NB80     | -7062      | 800                      | 1           | 25                 | 30       | 150        | 1.05                       | 0.5               | 10                    | -            | -  | -          |
| 1NA                                    | C6-1 | S1NBB80    | -7062      | 800                      | 1           | 26                 | 50       | 150        | 1.05                       | 0.5               | 10                    | -            | -  | -          |
|  |      | S1NBC60    | -7062      | 600                      | 1.5         | 105 *              | 60       | 150        | 1.05                       | 0.75              | 10                    | -            | -  | -          |
|  |      | S1NBC80    | -7062      | 800                      | 1.5         | 105 *              | 60       | 150        | 1.05                       | 0.75              | 10                    | -            | -  | -          |
| 1W                                     | C8   | S1WB(A)60  | -7062      | 600                      | 1           | 25                 | 30       | 150        | 1.00                       | 0.5               | 10                    | -            | -  | -          |
|  |      | S1WB(A)60B | -7062      | 600                      | 1           | 25                 | 50       | 150        | 1.00                       | 0.5               | 10                    | -            | -  | -          |
|  |      | S1WB(A)80  | -7062      | 800                      | 1           | 25                 | 30       | 150        | 1.00                       | 0.5               | 10                    | -            | -  | -          |
|  |      | S2WB(A)80  | -7062      | 800                      | 2           | 112 *              | 50       | -40 to 150 | 1.05                       | 1                 | 10                    | -            | -  | -          |

\* : TL

## THD (Through Hole Device)





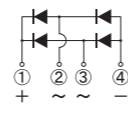



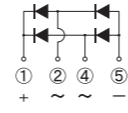

| THD (Through Hole Device)              |      |            |            |                          |             |                    |          |            |                            |                   |                       |              |    |            |
|--|------|------------|------------|--------------------------|-------------|--------------------|----------|------------|----------------------------|-------------------|-----------------------|--------------|----|------------|
| Package                                |      | Type No.   | Spec. Code | Absolute Maximum Ratings |             |                    |          |            | Electrical Characteristics |                   |                       | Halogen free | UL | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |            |            | VRRM [V]                 | IF (AV) [A] | Conditions Ta [°C] | IFSM [A] | Tj [°C]    | VF (max) [V]               | Conditions IF [A] | IR (max) VR=VRRM [μA] |              |    |            |
| 1Z                                     | C3   | S1ZB60     | -7101      | 600                      | 0.8         | 25                 | 30       | 150        | 1.05                       | 0.4               | 10                    | -            | -  | -          |
|  |      | S1ZB80     | -7101      | 800                      | 0.8         | 25                 | 30       | 150        | 1.05                       | 0.4               | 10                    | -            | -  | -          |
| 1N                                     | C5   | S1NB60     | -7101      | 600                      | 1           | 25                 | 30       | 150        | 1.05                       | 0.5               | 10                    | -            | -  | -          |
|  |      | S1NB80     | -7101      | 800                      | 1           | 25                 | 30       | 150        | 1.05                       | 0.5               | 10                    | -            | -  | -          |
| 1NA                                    | C7   | S1NBB80    | -7101      | 800                      | 1           | 26                 | 50       | 150        | 1.05                       | 0.5               | 10                    | -            | -  | -          |
|  |      | S1NBC60    | -7101      | 600                      | 1.5         | 105 *              | 60       | 150        | 1.05                       | 0.75              | 10                    | -            | -  | -          |
|  |      | S1NBC80    | -7101      | 800                      | 1.5         | 105 *              | 60       | 150        | 1.05                       | 0.75              | 10                    | -            | -  | -          |
| 1W                                     | C9   | S1WB(A)60  | -7101      | 600                      | 1           | 25                 | 30       | 150        | 1.00                       | 0.5               | 10                    | -            | -  | -          |
|  |      | S1WB(A)60B | -7101      | 600                      | 1           | 25                 | 50       | 150        | 1.00                       | 0.5               | 10                    | -            | -  | -          |
|  |      | S1WB(A)80  | -7101      | 800                      | 1           | 25                 | 30       | 150        | 1.00                       | 0.5               | 10                    | -            | -  | -          |
|  |      | S2WB(A)80  | -7101      | 800                      | 2           | 112 *              | 50       | -40 to 150 | 1.05                       | 1                 | 10                    | -            | -  | -          |

\* : TL




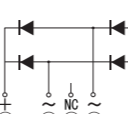
# BRIDGE DIODES

## SIP (Single In-line Package) Bridge Diodes

| THD (Through Hole Device)  |  |      |                        |                              |                  |          |   |
|--|--|------|------------------------|------------------------------|------------------|----------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V]         |                  |          | Remarks   |
|  |  |      |                        | 600                          | 800              | 1000     |   |
| <br>24.0 × 13.8 × 3.1(mm)   | —<br>—<br>D3K                          | D1   | 2                      |                              | UD2KB80          |          |   |
|  |  |      | 3                      |                              | UD3KB80          |          |   |
|  |  |      | 4                      |                              | UD4KB80          |          |   |
|  |  |      | 6                      |                              | UD6KBA80         |          |   |
|  |  |      | 8                      |                              | UD8KBA80         |          |   |
| <br>24.5 × 20.0 × 3.5(mm)   | —<br>—<br>2S                           | D2   | 1.5                    | D2SBA60<br>D2SB60            |                  |          |   |
|  |  |      | 2                      | D2SB60A                      |                  |          |   |
| <br>25.2 × 25.0 × 4.2(mm)   | —<br>—<br>JB                           | D5   | 6                      | D6JBB60V                     | D6JBB80V         |          |   |
|  |  |      | 8                      | D8JBB60V                     | D8JBB80V         |          |   |
|  |  |      | 10                     | D10JBB60V                    | D10JBB80V        |          |   |
| <br>32.5 × 25.0 × 4.6(mm)   | —<br>—<br>3S                           | D3   | 4                      | D3SBA60<br>D3SB60<br>D4SB60L | D3SB80<br>D4SB80 |          |    |
|  |  |      | 10                     | D10XB60<br>D10XB60H          | D10XB80          |          |   |
| <br>29.4 × 29.0 × 4.6(mm)   | —<br>—<br>JA                           | D6   | 15                     | D15JAB60V                    | D15JAB80V        |          |   |
|  |  |      | 25                     | D25JAB60V                    | D25JAB80V        |          |   |
| <br>37.5 × 30.0 × 4.6(mm) | —<br>—<br>5S                           | D4   | 6                      | D5SBA60<br>D5SB60<br>D6SB60L | D5SB80<br>D6SB80 |          |   |
|  |  |      | 15                     | D15XB60<br>D15XB60H          | D15XB80          | D15XB100 |   |
|  |  |      | 20                     | D20XB60                      | D20XB80          |          |   |
|  |  |      | 25                     | D25XB60                      | D25XB80          | D25XB100 |   |
| <br>47.0 × 45.7 × 7.5(mm) | —<br>—<br>TSB(4pin)                    | D7   | 50                     |                              | D50XB80          |          |  |
|  |  |      | 50                     |                              | D50JCB80V        |          |   |
| <br>47.0 × 45.7 × 7.5(mm) | —<br>—<br>JC(4pin)                     | D7   | 50                     |                              | D50JCB80V        |          |   |
|  |  |      | 50                     |                              | D50JCB80V        |          |   |

■ : New product

## DIP (Dual In-line Package) Bridge Diode

| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig.  | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |           |      | Remarks   |
|--|--|-------|------------------------|----------------------|-----------|------|---|
|  |  |       |                        | 600                  | 800       | 1000 |   |
| <br>47.0 × 45.7 × 7.5(mm) | —<br>—<br>JH                           | D10-1 | 70                     |                      | D70JHB80V |      |  |

## SIP (Single In-line Package) Bridge Diodes

| THD (Through Hole Device)              |      |           |                          |                           |                                      |                         |                        |                                |                                     |   |              |    |            |
|--|------|-----------|--------------------------|---------------------------|--------------------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|--------------|----|------------|
| Package                                |      | Type No.  | Absolute Maximum Ratings |                           |                                      |                         |                        | Electrical Characteristics     |                                     |   | Halogen free | UL | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |           | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] |              |    |            |
| —<br>—<br>D3K                          | D1   | UD2KB80   | 800                      | 2                         | 143                                  | 62                      | 150                    | 1.05                           | 1                                   | 10  | —            | UL | —          |
|  |      | UD3KB80   | 800                      | 3                         | 140                                  | 90                      | 150                    | 1.05                           | 1.5                                 | 10  | —            | UL | —          |
|  |      | UD4KB80   | 800                      | 4                         | 138                                  | 135                     | 150                    | 1.00                           | 2                                   | 10  | —            | UL | —          |
|  |      | UD6KBA80  | 800                      | 6                         | 131                                  | 135                     | 150                    | 1.05                           | 3                                   | 10  | —            | UL | —          |
|  |      | UD8KBA80  | 800                      | 8                         | 126                                  | 165                     | 150                    | 1.05                           | 4                                   | 10  | —            | UL | —          |
| —<br>—<br>2S                           | D2   | D2SBA60   | 600                      | 1.5                       | 25 *1                                | 60                      | 150                    | 1.05                           | 0.75                                | 10  | —            | —  | —          |
|  |      | D2SB60    | 600                      | 1.5                       | 25 *1                                | 80                      | 150                    | 1.05                           | 0.75                                | 10  | —            | —  | —          |
|  |      | D2SB60A   | 600                      | 2                         | 115 *2                               | 120                     | 150                    | 0.95                           | 1                                   | 10  | —            | —  | —          |
| —<br>—<br>JB                           | D5   | D6JBB60V  | 600                      | 6                         | 131                                  | 100                     | 150                    | 1.05                           | 3                                   | 10  | —            | UL | —          |
|  |      | D6JBB80V  | 800                      | 6                         | 131                                  | 100                     | 150                    | 1.05                           | 3                                   | 10  | —            | UL | —          |
|  |      | D8JBB60V  | 600                      | 8                         | 130                                  | 130                     | 150                    | 1.05                           | 4                                   | 10  | —            | UL | —          |
|  |      | D8JBB80V  | 800                      | 8                         | 130                                  | 130                     | 150                    | 1.05                           | 4                                   | 10  | —            | UL | —          |
|  |      | D10JBB60V | 600                      | 10                        | 129                                  | 150                     | 150                    | 1.05                           | 5                                   | 10  | —            | UL | —          |
| —<br>—<br>3S                           | D3   | D3SBA60   | 600                      | 4                         | 108                                  | 80                      | 150                    | 1.05                           | 2                                   | 10  | —            | UL | —          |
|  |      | D3SB60    | 600                      | 4                         | 108                                  | 120                     | 150                    | 1.05                           | 2                                   | 10  | —            | UL | —          |
|  |      | D4SB60L   | 600                      | 4                         | 111                                  | 150                     | 150                    | 0.95                           | 2                                   | 10  | —            | UL | —          |
|  |      | D3SB80    | 800                      | 4                         | 108                                  | 120                     | 150                    | 1.05                           | 2                                   | 10  | —            | UL | —          |
|  |      | D4SB80    | 800                      | 4                         | 108                                  | 150                     | 150                    | 0.95                           | 2                                   | 10  | —            | UL | —          |
|  |      | D10XB60   | 600                      | 10                        | 100                                  | 120                     | 150                    | 1.10                           | 5                                   | 10  | —            | UL | —          |
|  |      | D10XB60H  | 600                      | 10                        | 112                                  | 170                     | 150                    | 1.05                           | 5                                   | 10  | —            | UL | —          |
|  |      | D10XB80   | 800                      | 10                        | 100                                  | 120                     | 150                    | 1.10                           | 5                                   | 10  | —            | UL | —          |
|  |      | D15JAB60V | 600                      | 15                        | 110                                  | 200                     | 150                    | 1.05                           | 7.5                                 | 10  | —            | UL | —          |
|  |      | D15JAB80V | 800                      | 15                        | 110                                  | 200                     | 150                    | 1.05                           | 7.5                                 | 10  | —            | UL | —          |
| —<br>—<br>JA                           | D6   | D25JAB60V | 600                      | 25                        | 107                                  | 350                     | 150                    | 1.05                           | 12.5                                | 10  | —            | UL | —          |
|  |      | D25JAB80V | 800                      | 25                        | 107                                  | 350                     | 150                    | 1.05                           | 12.5                                | 10  | —            | UL | —          |
|  |      | D5SBA60   | 600                      | 6                         | 111                                  | 120                     | 150                    | 1.05                           | 3                                   | 10  | —            | UL | —          |
|  |      | D5SB60    | 600                      | 6                         | 110                                  | 170                     | 150                    | 1.05                           | 3                                   | 10  | —            | UL | —          |
|  |      | D6SB60L   | 600                      | 6                         | 112                                  | 170                     | 150                    | 1.05                           | 3                                   | 10  | —            | UL | —          |
|  |      | D5SB80    | 800                      | 6                         | 110                                  | 170                     | 150                    | 1.05                           | 3                                   | 10  | —            | UL | —          |
|  |      | D6SB80    | 800                      | 6                         | 110                                  | 170                     | 150                    | 1.05                           | 3                                   | 10  | —            | UL | —          |
|  |      | D15XB60   | 600                      | 15                        | 100                                  | 200                     | 150                    | 1.10                           | 7.5                                 | 10  | —            | UL | —          |
|  |      | D15XB60H  | 600                      | 15                        | 107                                  | 240                     | 150                    | 1.05                           | 7.5                                 | 10  | —            | UL | —          |
|  |      | D15XB80   | 800                      | 15                        | 100                                  | 200                     | 150                    | 1.10                           | 7.5                                 | 10  | —            | UL | —          |
|  |      | D15XB100  | 1000                     | 15                        | 110                                  | 200                     | 150                    | 1.10                           | 7.5                                 | 10  | —            | UL | —          |
|  |      | D20XB60   | 600                      | 20                        | 87                                   | 240                     | 150                    | 1.10                           | 10                                  | 10  | —            | UL | —          |
|  |      | D20XB80   | 800                      | 20                        | 87                                   | 240                     | 150                    | 1.10                           | 10                                  | 10  | —            | UL | —          |
|  |      | D25XB60   | 600                      | 25                        | 98                                   | 350                     | 150                    | 1.05                           | 12.5                                | 10  | —            | UL | ■          |
|  |      | D25XB80   | 800                      | 25                        | 98                                   | 350                     | 150                    | 1.05                           | 12.5                                | 10  | —            | UL | ■          |
|  |      | D25XB100  | 1000                     | 25                        | 106                                  | 350                     | 150                    | 1.05                           | 12.5                                | 10  | —            | UL | —          |
| ■ D35XB80                              | 800  | 35        | 93                       | 603 *3                    | -55 to 150                           | 1.05                    | 17.5                   | 10                             | —                                   | UL  | —            |    |            |
| —<br>—<br>TSB(4pin)                    | D7   | D50XB80   | 800                      | 50                        | 95                                   | 600                     | 150                    | 1.05                           | 25                                  | 10  | —            | UL | —          |
|  |      | D50JCB80V | 800                      | 50                        | 94                                   | 600                     | 150                    | 1.05                           | 25                                  | 10  | —            | UL | ■          |


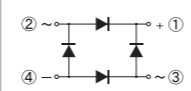






■ : New product \*1 : T<sub>a</sub> \*2 : T<sub>l</sub> \*3 : 60Hz ■ : Please contact us. UL : UL recognized (UL File No. E142422)

## DIP (Dual In-line Package) Bridge Diode


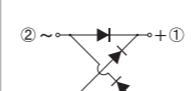



| THD (Through Hole Device)              |       |           |                          |                           |                                      |                         |                        |                                |                                     |   |              |    |            |
|--|-------|-----------|--------------------------|---------------------------|--------------------------------------|-------------------------|------------------------|--------------------------------|-------------------------------------|---|--------------|----|------------|
| Package                                |       | Type No.  | Absolute Maximum Ratings |                           |                                      |                         |                        | Electrical Characteristics     |                                     |   | Halogen free | UL | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig.  |           | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>FSM</sub><br>[A] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] |              |    |            |
| —<br>—<br>JH                           | D10-1 | D70JHB80V | 800                      | 70                        | 99                                   | 500                     | -55 to 150             | 1.1                            | 35                                  | 10  | —            | —  | —          |

# BRIDGE DIODES


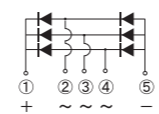




## SQIP (Square In-line Package) Bridge Diodes

| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |         |      | Remarks   |
|--|--|------|------------------------|----------------------|---------|------|---|
|  |  |      |                        | 600                  | 800     | 1000 |   |
|  13.0 × 13.0 × 27.5(mm) | —<br>S2VB                              | E3   | 2                      | S2VB60               |         |      |  |
|  17.0 × 17.0 × 32.5(mm) | —<br>S4VB                              | E4   | 4                      | S4VB60               |         |      |   |
|  25.0 × 25.0 × 32.5(mm) | —<br>S5VB                              | E5   | 6                      | S5VB60               |         |      |   |
|  22.0 × 22.0 × 32.5(mm) | —<br>S10VB                             | E6   | 10                     | S10VB60              |         |      |   |
|  26.5 × 26.5 × 25.0(mm) | —<br>S15VB                             | E7   | 15                     | S15VB60              |         |      |   |
|  32.0 × 32.0 × 25.0(mm) | —<br>S25VB                             | E8   | 25                     | S25VB60              | S25VB80 |      |   |
|  36.0 × 36.0 × 24.0(mm) | —<br>S50VB                             | E9   | 50                     | S50VB60              | S50VB80 |      |   |

## Input/Output In-line Terminal Type

| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |         |      | Remarks   |
|--|--|------|------------------------|----------------------|---------|------|---|
|  |  |      |                        | 600                  | 800     | 1000 |   |
|  17.0 × 17.0 × 31.0(mm) | —<br>S3WB                              | E10  | 2.3                    | S3WB60               |         |      |  |
|  22.5 × 22.5 × 32.5(mm) | —<br>S10WB                             | E11  | 10                     | S10WB60              |         |      |   |
|  26.5 × 26.5 × 32.5(mm) | —<br>S15WB                             | E12  | 15                     | S15WB60              |         |      |   |
|  32.5 × 32.5 × 32.5(mm) | —<br>S20WB                             | E13  | 20                     | S20WB60              | S20WB80 |      |   |

## 3 Phase Bridge Diodes

| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig.  | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |             |   | Remarks   |
|---|--|-------|------------------------|----------------------|-------------|---|---|
|   |  |       |                        | 800                  | 1200        | 1600  |   |
|  47.0 × 45.7 × 7.5(mm) | —<br>TSB(5pin)                         | D8    | 30                     | D30XT80              |             |   |  |
|   |  |       | 45                     | D45XT80              |             | D45XT160  |   |
|  47.0 × 45.7 × 7.5(mm) | —<br>JC(5pin)                          |       | 30                     |                      | D30JCT120V  |   |   |
|   |  |       | 45                     |                      | D45JCT120V  | D45JCT160V  |   |
|  47.0 × 45.7 × 7.5(mm) | —<br>JF                                | D9    | 75                     | D75JFT80V            |             |   |   |
|  47.0 × 45.7 × 7.5(mm) | —<br>JH                                | D10-2 | 100                    | D100JHT80V           | D100JHT120V |  D100JHT160V |   |

 : New product


## SQIP (Square In-line Package) Bridge Diodes

| Package                                |      | Type No. | Absolute Maximum Ratings |                        |                                   |                      |                     | Electrical Characteristics |                                  |   | Halogen free | UL | Automotive |
|--|------|----------|--------------------------|------------------------|-----------------------------------|----------------------|---------------------|----------------------------|----------------------------------|---|--------------|----|------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub> [V]     | I <sub>F(AV)</sub> [A] | Conditions<br>T <sub>C</sub> [°C] | I <sub>FSM</sub> [A] | T <sub>J</sub> [°C] | V <sub>F</sub> (max) [V]   | Conditions<br>I <sub>F</sub> [A] | I <sub>R</sub> (max)<br>V <sub>R</sub> =V <sub>RRM</sub> [μA] |              |    |            |
| —<br>S2VB                              | E3   | S2VB60   | 600                      | 2 *1                   | 40                                | 40                   | 150                 | 1.05                       | 1                                | 10  | —            | —  | —          |
| —<br>S4VB                              | E4   | S4VB60   | 600                      | 4                      | 40                                | 80                   | 150                 | 1.05                       | 2                                | 10  | —            | —  | —          |
| —<br>S5VB                              | E5   | S5VB60   | 600                      | 6                      | 40                                | 200                  | 150                 | 1.05                       | 3                                | 10  | —            | —  | —          |
| —<br>S10VB                             | E6   | S10VB60  | 600                      | 10                     | 40                                | 200                  | 150                 | 1.05                       | 5                                | 10  | —            | —  | —          |
| —<br>S15VB                             | E7   | S15VB60  | 600                      | 15                     | 83 *2                             | 200                  | 150                 | 1.05                       | 7.5                              | 10  | —            | —  | —          |
| —<br>S25VB                             | E8   | S25VB60  | 600                      | 25                     | 85 *2                             | 400                  | 150                 | 1.05                       | 12.5                             | 10  | —            | —  | —          |
| —                                      |      | S25VB80  | 800                      | 25                     | 85 *2                             | 400                  | 150                 | 1.05                       | 12.5                             | 10  | —            | —  | —          |
| —<br>S50VB                             | E9   | S50VB60  | 600                      | 50                     | 95 *2                             | 500                  | 150                 | 1.05                       | 25                               | 10  | —            | —  | —          |
| —                                      |      | S50VB80  | 800                      | 50                     | 95 *2                             | 500                  | 150                 | 1.05                       | 25                               | 10  | —            | —  | —          |











\*1 : Without heatsink \*2 : T<sub>C</sub>  : UL recognized (UL File No. E142422)

## Input/Output In-line Terminal Type

| Package                                |      | Type No. | Absolute Maximum Ratings |                        |                                   |                      |                     | Electrical Characteristics |                                  |   | Halogen free | UL | Automotive |
|--|------|----------|--------------------------|------------------------|-----------------------------------|----------------------|---------------------|----------------------------|----------------------------------|---|--------------|----|------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub> [V]     | I <sub>F(AV)</sub> [A] | Conditions<br>T <sub>C</sub> [°C] | I <sub>FSM</sub> [A] | T <sub>J</sub> [°C] | V <sub>F</sub> (max) [V]   | Conditions<br>I <sub>F</sub> [A] | I <sub>R</sub> (max)<br>V <sub>R</sub> =V <sub>RRM</sub> [μA] |              |    |            |
| —<br>S3WB                              | E10  | S3WB60   | 600                      | 2.3                    | 40 *                              | 120                  | 150                 | 1.05                       | 2                                | 10  | —            | —  | —          |
| —<br>S10WB                             | E11  | S10WB60  | 600                      | 10                     | 74                                | 170                  | 150                 | 1.05                       | 5                                | 10  | —            | —  | —          |
| —<br>S15WB                             | E12  | S15WB60  | 600                      | 15                     | 77                                | 200                  | 150                 | 1.05                       | 7.5                              | 10  | —            | —  | —          |
| —<br>S20WB                             | E13  | S20WB60  | 600                      | 20                     | 76                                | 500                  | 150                 | 1.05                       | 10                               | 10  | —            | —  | —          |
| —                                      |      | S20WB80  | 800                      | 20                     | 76                                | 500                  | 150                 | 1.05                       | 10                               | 10  | —            | —  | —          |

\* : T<sub>a</sub>  : UL recognized (UL File No. E142422)

## 3 Phase Bridge Diodes


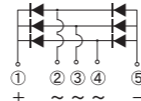


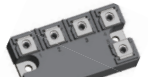
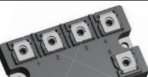
| Package                                |            | Type No.  | Absolute Maximum Ratings |                        |                                   |                      |                     | Electrical Characteristics |                                  |   | Halogen free  | UL  | Automotive |
|--|------------|---|--------------------------|------------------------|-----------------------------------|----------------------|---------------------|----------------------------|----------------------------------|---|---|---|------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig.       |   | V <sub>RRM</sub> [V]     | I <sub>F(AV)</sub> [A] | Conditions<br>T <sub>C</sub> [°C] | I <sub>FSM</sub> [A] | T <sub>J</sub> [°C] | V <sub>F</sub> (max) [V]   | Conditions<br>I <sub>F</sub> [A] | I <sub>R</sub> (max)<br>V <sub>R</sub> =V <sub>RRM</sub> [μA] |   |   |            |
| —<br>TSB(5pin)                         | D8         | D30XT80   | 800                      | 30                     | 117                               | 300                  | 150                 | 1.05                       | 10                               | 10  | —   |  | —          |
|  |            | D45XT80   | 800                      | 45                     | 101                               | 400                  | 150                 | 1.05                       | 15                               | 10  | —   |  | —          |
|  |            | D45XT160  | 1600                     | 45                     | 97                                | 360 *                | 150                 | 1.05                       | 15                               | 100   | —   |  | —          |
| —<br>JC(5pin)                          |            | D30JCT120V  | 1200                     | 30                     | 116                               | 300                  | 150                 | 1.05                       | 10                               | 10  | —   |  | —          |
|  |            | D45JCT120V  | 1200                     | 45                     | 99                                | 450                  | 150                 | 1.05                       | 15                               | 10  | —   |  | —          |
|  | D45JCT160V | 1600  | 45                       | 97                     | 450                               | 150                  | 1.05                | 15                         | 10                               | —   |  | —   |            |
| —<br>JF                                | D9         | D75JFT80V   | 800                      | 75                     | 109                               | 400                  | 150                 | 1.05                       | 25                               | 10  | —   | —   | —          |
| —<br>JH                                | D10-2      | D100JHT80V  | 800                      | 100                    | 99                                | 500                  | -55 to 150          | 1.10                       | 35                               | 10  | —   |  | —          |
|  |            | D100JHT120V   | 1200                     | 100                    | 92                                | 450                  | -55 to 150          | 1.17                       | 35                               | 10  | —   |  | —          |
|  |            |  D100JHT160V | 1600                     | 100                    | 92                                | 540                  | -55 to 150          | 1.15                       | 35                               | 10  | —   |  | —          |

 : New product \* : 60Hz  : UL recognized (UL File No. E142422)

# BRIDGE DIODES

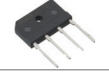
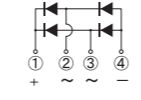

| Series | Feature                   |
|--------|---------------------------|
| S      | Evenly balanced Vf and Ir |
| N      | Low Vf, High Voltage      |
| K      | Low Vf                    |

## 3 Phase Bridge Diodes


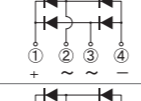

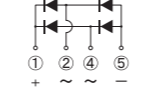
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V] |                 |                 | Remarks   |
|---|--|------|-------------|----------|-----------------|-----------------|---|
|   |  |      |             | 600      | 800             | 1600            |   |
| <br>36.0 × 36.0 × 24.0(mm) | —<br>—<br>SVT                          | E15  | 10          | S10VT60  | S10VT80         |                 |  |
|   |  |      | 15          | S15VT60  | S15VT80         |                 |   |
|   |  |      | 20          | S20VT60  | S20VT80         |                 |   |
|   |  |      | 30          | S30VT60  | S30VT80         | S30VT160        |   |
| <br>36.0 × 36.0 × 23.0(mm) | —<br>—<br>SVTA                         | E14  | 10          | S10VTA60 | S10VTA80        |                 |   |
|   |  |      | 15          | S15VTA60 | S15VTA80        |                 |   |
|   |  |      | 20          | S20VTA60 | S20VTA80        |                 |   |
|   |  |      | 30          | S30VTA60 | S30VTA80        | S30VTA160       |   |
| <br>89.0 × 50.0 × 16.6(mm)  | —<br>—<br>MG038                        | F7   | 150         |          | MG038B150080A   | ★ MG038D150160A |   |
|   |  |      | 200         |          | MG038A200080A   | ★ MG038C200160A |   |
| <br>84.5 × 46.0 × 17.0(mm)  | —<br>—<br>MG060                        | F9   | 100         |          | ★ MG060C100080A |                 |   |
| <br>91.0 × 52.0 × 17.0(mm)  | —<br>—<br>MG061                        | F10  | 150         |          | ★ MG061A150080A |                 |   |
|   |  |      | 200         |          | ★ MG061B200080A |                 |   |

■ : New product ★ : Under development

## High Speed Bridge Diodes (SBD)

| THD (Through Hole Device)  |  |      |             |          |         |          |   |
|--|--|------|-------------|----------|---------|----------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V] |         |          | Remarks   |
|  |  |      |             | 40       | 60      | 200      |   |
| <br>32.5 × 25.0 × 4.6(mm) | —<br>—<br>3S                           | D3   | 4           | D4SBS4   | D4SBS6  | D4SBN20  |  |
|  |  |      | 10          | D10SBS4  |         |          |   |
|  |  |      | 15          |          | D15XBS6 |          |   |
| <br>37.5 × 30.0 × 4.6(mm) | —<br>—<br>5S                           | D4   | 6           |          |         | D6SBN20  |   |
|  |  |      | 15          |          |         | D15XBN20 |   |
|  |  |      | 20          |          | D20XBS6 |          |   |
|  |  |      | 30          |          |         | D30XBN20 |   |

## High Speed Bridge Diodes (FRD)

| THD (Through Hole Device)  |  |      |             |          |     |            |   |
|--|--|------|-------------|----------|-----|------------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM [V] |     |            | Remarks   |
|  |  |      |             | 200      | 400 | 1000       |   |
| <br>32.5 × 25.0 × 4.6(mm) | —<br>—<br>3S                           | D3   | 4           | D4SBL20U |     |            |  |
| <br>47.0 × 45.7 × 7.5(mm) | —<br>—<br>JC(4pin)                     | D7   | 30          |          |     | D30JCB100K |  |

## 3 Phase Bridge Diodes

| Package                                |      | Fig.            | Type No. | Absolute Maximum Ratings |             |                    |          | Electrical Characteristics |              |                   | Halogen free | UL              | Automotive |
|--|------|-----------------|----------|--------------------------|-------------|--------------------|----------|----------------------------|--------------|-------------------|--------------|-----------------|------------|
| JEDEC Code<br>JEITA Code<br>House Name |      |                 |          | VRRM [V]                 | IF (AV) [A] | Conditions Tc [°C] | IFSM [A] | Tj [°C]                    | Vf (max) [V] | Conditions IF [A] |              |                 |            |
| —<br>—<br>SVT                          | E15  | S10VT60         | 600      | 10                       | 137         | 170                | 150      | 1.05                       | 3.5          | 10                | —            | —               | —          |
|  |      | S10VT80         | 800      | 10                       | 137         | 150                | 150      | 1.05                       | 3.5          | 10                | —            | —               | —          |
|  |      | S15VT60         | 600      | 15                       | 132         | 200                | 150      | 1.05                       | 5            | 10                | —            | —               | —          |
|  |      | S15VT80         | 800      | 15                       | 132         | 200                | 150      | 1.05                       | 5            | 10                | —            | —               | —          |
|  |      | S20VT60         | 600      | 20                       | 128         | 300                | 150      | 1.05                       | 7            | 10                | —            | —               | —          |
|  |      | S20VT80         | 800      | 20                       | 128         | 300                | 150      | 1.05                       | 7            | 10                | —            | —               | —          |
|  |      | S30VT60         | 600      | 30                       | 121         | 400                | 150      | 1.05                       | 10           | 10                | —            | —               | —          |
|  |      | S30VT80         | 800      | 30                       | 121         | 400                | 150      | 1.05                       | 10           | 10                | —            | UL              | —          |
|  |      | S30VT160        | 1600     | 30                       | 116         | 350                | 150      | 1.05                       | 10           | 100               | —            | —               | —          |
|  |      | —<br>—<br>SVTA  | E14      | S10VTA60                 | 600         | 10                 | 137      | 170                        | 150          | 1.05              | 3.5          | 10              | —          |
| S10VTA80                               | 800  |                 |          | 10                       | 137         | 150                | 150      | 1.05                       | 3.5          | 10                | —            | —               | —          |
| S15VTA60                               | 600  |                 |          | 15                       | 132         | 200                | 150      | 1.05                       | 5            | 10                | —            | —               | —          |
| S15VTA80                               | 800  |                 |          | 15                       | 132         | 200                | 150      | 1.05                       | 5            | 10                | —            | —               | —          |
| S20VTA60                               | 600  |                 |          | 20                       | 128         | 300                | 150      | 1.05                       | 7            | 10                | —            | —               | —          |
| S20VTA80                               | 800  |                 |          | 20                       | 128         | 300                | 150      | 1.05                       | 7            | 10                | —            | —               | —          |
| S30VTA60                               | 600  |                 |          | 30                       | 121         | 400                | 150      | 1.05                       | 10           | 10                | —            | —               | —          |
| S30VTA80                               | 800  |                 |          | 30                       | 121         | 400                | 150      | 1.05                       | 10           | 10                | —            | —               | —          |
| S30VTA160                              | 1600 |                 |          | 30                       | 116         | 350                | 150      | 1.05                       | 10           | 100               | —            | —               | —          |
| —<br>—<br>MG038                        | F7   |                 |          | ■ MG038B150080A          | 800         | 150                | 125      | 2350                       | 150          | 1.05              | 50           | 10              | ○          |
|  |      | ★ MG038D150160A | 1600     | 150                      | 125         | 2350               | 150      | 1.05                       | 50           | 10                | ○            | UL              | —          |
|  |      | ■ MG038A200080A | 800      | 200                      | 125         | 2750               | 150      | 1.05                       | 67           | 10                | ○            | UL              | —          |
|  |      | ★ MG038C200160A | 1600     | 200                      | 125         | 2750               | 150      | 1.05                       | 67           | 10                | ○            | UL              | —          |
| —<br>—<br>MG060                        | F9   | ★ MG060C100080A | 800      | 100                      | 125         | 1700               | 150      | 1.05                       | 34           | 10                | ○            | to be certified | —          |
| —<br>—<br>MG061                        | F10  | ★ MG061A150080A | 800      | 150                      | 125         | 2350               | 150      | 1.05                       | 50           | 10                | ○            | to be certified | —          |
|  |      | ★ MG061B200080A | 800      | 200                      | 124         | 2750               | 150      | 1.05                       | 67           | 10                | ○            | to be certified | —          |

■ : New product ★ : Under development UL : UL recognized (UL File No. E142422)

## High Speed Bridge Diodes (SBD)

| THD (Through Hole Device)              |    |          |          |                          |             |                    |          |                            |              |                   |              |    |            |          |
|--|----|----------|----------|--------------------------|-------------|--------------------|----------|----------------------------|--------------|-------------------|--------------|----|------------|----------|
| Package                                |    | Fig.     | Type No. | Absolute Maximum Ratings |             |                    |          | Electrical Characteristics |              |                   | Halogen free | UL | Automotive | Remarks  |
| JEDEC Code<br>JEITA Code<br>House Name |    |          |          | VRRM [V]                 | IF (AV) [A] | Conditions Tc [°C] | IFSM [A] | Tj [°C]                    | Vf (max) [V] | Conditions IF [A] |              |    |            |          |
| —<br>—<br>3S                           | D3 | D4SBS4   | 40       | 4                        | 116         | 60                 | 150      | 0.55                       | 2            | 2mA               | —            | —  | —          | S series |
|  |    | D4SBS6   | 60       | 4                        | 114         | 60                 | 150      | 0.62                       | 2            | 2mA               | —            | —  | —          | S series |
|  |    | D4SBN20  | 200      | 4                        | 103         | 60                 | 150      | 0.90                       | 2            | 1.5               | —            | —  | —          | N series |
|  |    | D10SBS4  | 40       | 10                       | 67          | 100                | 150      | 0.55                       | 5            | 3.5mA             | —            | —  | —          | S series |
|  |    | D15XBS6  | 60       | 15                       | 59          | 150                | 150      | 0.63                       | 7.5          | 6.0mA             | —            | —  | —          | S series |
|  |    | D6SBN20  | 200      | 6                        | 110         | 120                | 150      | 0.90                       | 3            | 2                 | —            | —  | —          | N series |
| —<br>—<br>5S                           | D4 | D15XBN20 | 200      | 15                       | 106         | 200                | 150      | 0.90                       | 7.5          | 5                 | —            | —  | —          | N series |
|  |    | D20XBS6  | 60       | 20                       | 100         | 200                | 150      | 0.63                       | 10           | 8.0mA             | —            | —  | —          | S series |
|  |    | D30XBN20 | 200      | 30                       | 91          | 350                | 150      | 0.90                       | 15           | 10                | —            | —  | —          | N series |


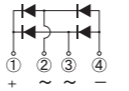
## High Speed Bridge Diodes (FRD)

| THD (Through Hole Device)              |    |            |          |                          |             |                    |          |                            |              |                   |              |    |            |          |
|--|----|------------|----------|--------------------------|-------------|--------------------|----------|----------------------------|--------------|-------------------|--------------|----|------------|----------|
| Package                                |    | Fig.       | Type No. | Absolute Maximum Ratings |             |                    |          | Electrical Characteristics |              |                   | Halogen free | UL | Automotive | Remarks  |
| JEDEC Code<br>JEITA Code<br>House Name |    |            |          | VRRM [V]                 | IF (AV) [A] | Conditions Tc [°C] | IFSM [A] | Tj [°C]                    | Vf (max) [V] | Conditions IF [A] |              |    |            |          |
| —<br>—<br>3S                           | D3 | D4SBL20U   | 200      | 4                        | 108         | 80                 | 150      | 0.98                       | 2            | 10                | —            | —  | —          |          |
| —<br>—<br>JC(4pin)                     | D7 | D30JCB100K | 1000     | 30                       | 90          | 450                | 150      | 1.90                       | 15           | 10                | —            | UL | ○          | K series |

UL : UL recognized (UL File No. E142422)


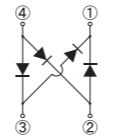
# BRIDGE DIODES


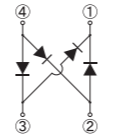

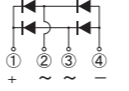

## Low Vf Bridge Diodes

| THD (Through Hole Device)  |  |      |             |                        |     |      |   |
|--|--|------|-------------|------------------------|-----|------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | If (AV) [A] | VRRM [V]               |     |      | Remarks   |
|  |  |      |             | 600                    | 800 | 1000 |   |
| <br>37.5 × 30.0 × 4.6(mm) | —<br>—<br>5S                           | D4   | 15          | LL15XB60               |     |      |  |
|  |  |      | 25          | LL25XB60<br>★ LK25XB60 |     |      |   |

★ : Under development

## Low Noise Bridge Diodes

| Surface Mount  |  |      |             |          |     |      |   |
|--|--|------|-------------|----------|-----|------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | If (AV) [A] | VRRM [V] |     |      | Remarks   |
|  |  |      |             | 600      | 800 | 1000 |   |
| <br>10.6 × 10.2 × 3.1(mm) | —<br>—<br>1W                           | C8   | 1.1         | LN1WBA60 |     |      |  |

| THD (Through Hole Device)  |  |      |             |                       |     |      |   |
|--|--|------|-------------|-----------------------|-----|------|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | If (AV) [A] | VRRM [V]              |     |      | Remarks   |
|  |  |      |             | 600                   | 800 | 1000 |   |
| <br>6.2 × 10.2 × 3.0(mm)  | —<br>—<br>1W                           | C9   | 1.1         | LN1WBA60              |     |      |  |
| <br>32.5 × 25.0 × 4.6(mm) | —<br>—<br>3S                           | D3   | 4           | LN4SB60               |     |      |  |
| <br>37.5 × 30.0 × 4.6(mm) | —<br>—<br>5S                           | D4   | 6           | LN6SB60               |     |      |   |
|  |  |      | 15          | LN15XB60<br>LN15XB60H |     |      |   |
|  |  |      | 25          | LN25XB60              |     |      |   |

## Low Vf Bridge Diodes

| THD (Through Hole Device)              |      |            |                          |             |                    |          |                            |              |                   |                       |              |    |            |                |
|--|------|------------|--------------------------|-------------|--------------------|----------|----------------------------|--------------|-------------------|-----------------------|--------------|----|------------|----------------|
| Package                                |      | Type No.   | Absolute Maximum Ratings |             |                    |          | Electrical Characteristics |              |                   |                       | Halogen free | UL | Automotive |                |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |            | VRRM [V]                 | If (AV) [A] | Conditions Tc [°C] | IfSM [A] | Tj [°C]                    | Vf (max) [V] | Conditions If [A] | Ir (max) Vr=VRRM [μA] |              |    |            | trr (max) [μs] |
| —<br>—<br>5S                           | D4   | LL15XB60   | 600                      | 15          | 124                | 200      | 150                        | 0.90         | 7.5               | 10                    | 3            | —  | UL         | —              |
|  |      | LL25XB60   | 600                      | 25          | 113                | 300      | 150                        | 0.92         | 12.5              | 10                    | 3            | —  | UL         | ■              |
|  |      | ★ LK25XB60 | 600                      | 25          | 114                | 603 *    | -55 to 150                 | 0.95         | 12.5              | 10                    | 5            | —  | UL         | —              |

★ : Under development \* : 60Hz ■ : Please contact us. UL : UL recognized (UL File No. E142422)

## Low Noise Bridge Diodes





| Surface Mount-THD (Through Hole Device) |                    |           |                          |             |                    |          |                            |              |                   |                       |    |              |            |         |                      |
|---|--------------------|-----------|--------------------------|-------------|--------------------|----------|----------------------------|--------------|-------------------|-----------------------|----|--------------|------------|---------|----------------------|
| Package                                 |                    | Type No.  | Absolute Maximum Ratings |             |                    |          | Electrical Characteristics |              |                   |                       | UL | Halogen free | Automotive | Remarks |                      |
| JEDEC Code<br>JEITA Code<br>House Name  | Fig.               |           | VRRM [V]                 | If (AV) [A] | Conditions Tc [°C] | IfSM [A] | Tj [°C]                    | Vf (max) [V] | Conditions If [A] | Ir (max) Vr=VRRM [μA] |    |              |            |         | trr (max) [μs]       |
| —<br>—<br>1W                            | C8(SMD)<br>C9(DIP) | LN1WBA60  | 600                      | 1.1         | 25 *               | 50       | 150                        | 1.00         | 0.55              | 10                    | 5  | —            | —          | —       | SMD-7072<br>DIP-7101 |
| —<br>—<br>3S                            | D3                 | LN4SB60   | 600                      | 4           | 111                | 150      | 150                        | 0.95         | 2                 | 10                    | 5  | UL           | —          | —       |                      |
| —<br>—<br>5S                            | D4                 | LN6SB60   | 600                      | 6           | 111                | 170      | 150                        | 1.05         | 3                 | 10                    | 5  | UL           | —          | —       |                      |
|   |                    | LN15XB60  | 600                      | 15          | 100                | 200      | 150                        | 1.10         | 7.5               | 10                    | 5  | —            | —          | —       |                      |
|   |                    | LN15XB60H | 600                      | 15          | 106                | 290      | 150                        | 1.05         | 7.5               | 10                    | 5  | —            | —          | —       |                      |
|   |                    | LN25XB60  | 600                      | 25          | 85                 | 350      | 150                        | 1.05         | 12.5              | 10                    | 5  | —            | —          | —       |                      |

\* : Ta UL : UL recognized (UL File No. E142422)


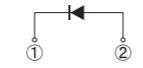


# SCHOTTKY BARRIER DIODES


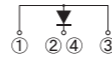
## Single

| Axial   |  |      |             |         |       |   |
|---|--|------|-------------|---------|-------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM[V] |       | Remarks   |
|   |  |      |             | 40      | 60    |   |
|  3.0 × φ 2.6(mm) | —<br>—<br>AX057                        | A1   | 1           | D1NS4   | D1NS6 |  |
|  5.0 × φ 4.0(mm) | —<br>—<br>AX078                        | A4-1 | 2           | D2S4M   | D2S6M |   |
|  7.0 × φ 4.4(mm) | —<br>—<br>AX14                         | A7   | 3           | D3S4M   | D3S6M |   |

## Two Terminal Type

| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM[V] |        |        |     | Remarks   |
|---|--|------|-------------|---------|--------|--------|-----|---|
|   |  |      |             | 40      | 60     | 90     | 150 |   |
|  28.5 × 10.0 × 4.5(mm) | —<br>SC-91<br>FTO-220G                 | J4   | 5           | SG5S4M  | SG5S6M | SG5S9M |     |  |

## Three Terminal Type

| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF (AV) [A] | VRRM[V] |    |    |         | Remarks   |
|--|--|------|-------------|---------|----|----|---------|---|
|  |  |      |             | 40      | 60 | 90 | 150     |   |
|  41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PV               | K7-2 | 40          |         |    |    | S40T15V |  |
|  |  |      | 90          |         |    |    | S90T15V |   |

## Single

| Axial                                  |      |          |                          |             |                    |          |         |                            |                   |                       |               |              |                   |            |          |
|--|------|----------|--------------------------|-------------|--------------------|----------|---------|----------------------------|-------------------|-----------------------|---------------|--------------|-------------------|------------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |             |                    |          |         | Electrical Characteristics |                   |                       |               | Halogen free | Based on AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | VRRM [V]                 | IF (AV) [A] | Conditions Ta [°C] | IFSM [A] | Tj [°C] | Vf (max) [V]               | Conditions IF [A] | Ir (max) Vr=VRRM [mA] | Ct (typ) [pF] |              |                   |            |          |
| —<br>—<br>AX057                        | A1   | D1NS4    | 40                       | 1           | 59                 | 30       | 150     | 0.55                       | 1                 | 0.8                   | 50            | —            | —                 | —          | S series |
| —<br>—<br>AX078                        | A4-1 | D1NS6    | 60                       | 1           | 46                 | 30       | 150     | 0.58                       | 1                 | 1                     | 53            | —            | —                 | —          | S series |
| —<br>—<br>—                            | A7   | D2S4M    | 40                       | 2           | 122 *1             | 60       | 150     | 0.55                       | 2                 | 2                     | 95            | —            | —                 | —          | S series |
| —<br>—<br>—                            |      | D2S6M    | 60                       | 2           | 119 *1             | 60       | 150     | 0.58                       | 2                 | 2                     | 90            | —            | —                 | —          | S series |
| —<br>—<br>—                            | A7   | D3S4M    | 40                       | 3           | 63                 | 80       | 150     | 0.55                       | 3                 | 3.5                   | 150           | —            | —                 | —          | S series |
| —<br>—<br>AX14                         |      | D3S6M    | 60                       | 3           | 133 *1             | 80       | 150     | 0.58                       | 3                 | 2.5                   | 130           | —            | —                 | —          | S series |

\*1 : TL

## Two Terminal Type




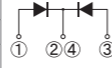

| Two Terminal Type                      |      |          |                          |             |                    |          |         |                            |                   |                       |               |              |                   |            |          |
|--|------|----------|--------------------------|-------------|--------------------|----------|---------|----------------------------|-------------------|-----------------------|---------------|--------------|-------------------|------------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |             |                    |          |         | Electrical Characteristics |                   |                       |               | Halogen free | Based on AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | VRRM [V]                 | IF (AV) [A] | Conditions Tc [°C] | IFSM [A] | Tj [°C] | Vf (max) [V]               | Conditions IF [A] | Ir (max) Vr=VRRM [mA] | Ct (typ) [pF] |              |                   |            |          |
| —<br>SC-91<br>FTO-220G                 | J4   | SG5S4M   | 40                       | 5           | 131                | 150      | 150     | 0.52                       | 5                 | 0.5                   | 157           | —            | —                 | —          | S series |
|  |      | SG5S6M   | 60                       | 5           | 130                | 120      | 150     | 0.56                       | 5                 | 0.5                   | 165           | —            | —                 | —          | S series |
|  |      | SG5S9M   | 90                       | 5           | 124                | 90       | 150     | 0.75                       | 5                 | 0.5                   | 140           | —            | —                 | —          | S series |

## Three Terminal Type

| Three Terminal Type                    |      |          |                          |             |                    |          |         |                            |                   |                       |               |              |                   |            |          |
|--|------|----------|--------------------------|-------------|--------------------|----------|---------|----------------------------|-------------------|-----------------------|---------------|--------------|-------------------|------------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |             |                    |          |         | Electrical Characteristics |                   |                       |               | Halogen free | Based on AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | VRRM [V]                 | IF (AV) [A] | Conditions Tc [°C] | IFSM [A] | Tj [°C] | Vf (max) [V]               | Conditions IF [A] | Ir (max) Vr=VRRM [mA] | Ct (typ) [pF] |              |                   |            |          |
| TO-247AD<br>—<br>MTO-3PV               | K7-2 | S40T15V  | 150                      | 40          | 131                | 700      | 150     | 0.92                       | 40                | 0.12                  | 595           | —            | —                 | ○          | N series |
|  |      | S90T15V  | 150                      | 90          | 122                | 1400     | 150     | 0.95                       | 90                | 0.35                  | 1690          | —            | —                 | ○          | N series |

# SCHOTTKY BARRIER DIODES

## Center Tap, Common Cathode

| Surface Mount   |  |      |                   |           |                     |          |          |            |           |            | Remarks  |   |
|---|--|------|-------------------|-----------|---------------------|----------|----------|------------|-----------|------------|----------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF<br>(AV)<br>[A] | VRRM[V]   |                     |          |          |            |           |            |          |   |
|   |  |      |                   | 30        | 40                  | 60       | 90       | 100        | 120       | 150        |          |   |
| <br>9.5 × 6.6 × 2.65(mm)  | —<br>SC-63<br>E-pack                   | G1-1 | 5                 | DE5SC3ML  | DE5SC4M             | DE5SC6M  |          |            |           |            |          |   |
|   |  |      | 10                | DE10SC3L  | DE10SC4             |          |          |            |           |            |          |   |
| <br>9.5 × 6.6 × 2.65(mm)  | TO-252AB similar<br>SC-63<br>FE        | G3-1 | 6                 |           | D6FEC4ST            |          |          | D6FEC10ST  | D6FEC12ST | D6FEC15ST  |          |   |
|   |  |      |                   |           |                     |          |          |            |           |            |          |   |
| <br>13.2 × 10.2 × 4.7(mm) | —<br>SC-83 similar<br>STO-220          | H1-1 | 10                |           | DF10SC4M            | DF10SC6  | DF10SC9  |            |           |            | DF10NC15 |  |
|   |  |      | 15                |           | DF15SC4M            |          |          | DF15JC10   |           | DF15NC15   |          |   |
|   |  |      | 20                |           | DF20SC4M            |          | DF20SC9M | DF20JC10   |           | DF20NC15   |          |   |
|   |  |      | 25                |           |                     | DF25SC6M |          |            |           |            |          |   |
|   |  |      | 30                | DF30SC3ML | DF30JC4<br>DF30SC4M | DF30JC6  |          | DF30JC10   |           | DF30NC15   |          |   |
| <br>13.2 × 10.2 × 4.6(mm) | —<br>SC-83 similar<br>FD               | H2-2 | 10                |           |                     |          |          | D10FDC10ST |           |            |          |   |
|   |  |      | 20                |           |                     |          |          | D20FDC10ST |           | D20FDC15ST |          |   |
|   |  |      | 30                |           | D30FDC4S            |          |          | D30FDC10ST |           | D30FDC15ST |          |   |
|   |  |      | 40                |           |                     |          |          | D40FDC10ST |           | D40FDC15ST |          |   |


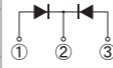

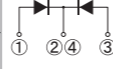

## Center Tap, Common Cathode

| Surface Mount                          |      |                          |                          |             |                    |          |         |                            |                   |                       |               |      |              |                   |            |        |           |
|--|------|--------------------------|--------------------------|-------------|--------------------|----------|---------|----------------------------|-------------------|-----------------------|---------------|------|--------------|-------------------|------------|--------|-----------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.                 | Absolute Maximum Ratings |             |                    |          |         | Electrical Characteristics |                   |                       |               |      | Halogen free | Based on AEC-Q101 | Automotive | Series |           |
|  |      |                          | VRRM [V]                 | IF (AV) [A] | Conditions Tc [°C] | IFSM [A] | Tj [°C] | Vf (max) [V]               | Conditions IF [A] | Ir (max) Vr=VRRM [mA] | Ct (typ) [pF] |      |              |                   |            |        |           |
| —<br>SC-63<br>E-pack                   | G1-1 | DE5SC3ML                 | 30                       | 5           | 110                | 90       | 150     | 0.45                       | 2.5               | 3.5                   | 190           | —    | —            | ■                 | S series   |        |           |
|  |      | DE5SC4M                  | 40                       | 5           | 101                | 80       | 150     | 0.55                       | 2.5               | 3.5                   | 150           | —    | —            | ■                 | S series   |        |           |
|  |      | DE5SC6M                  | 60                       | 5           | 92                 | 80       | 150     | 0.58                       | 2.5               | 2.5                   | 130           | —    | —            | ■                 | S series   |        |           |
|  |      | DE10SC3L                 | 30                       | 10          | 124                | 100      | 150     | 0.45                       | 4                 | 5                     | 290           | —    | —            | ■                 | S series   |        |           |
| TO-252AB similar<br>SC-63<br>FE        | G3-1 | DE10SC4                  | 40                       | 10          | 132                | 100      | 150     | 0.55                       | 5                 | 3.5                   | 210           | —    | —            | ■                 | S series   |        |           |
|  |      | D6FEC4ST                 | 40                       | 6           | 158                | 90       | 175     | 0.74                       | 3                 | 8μA                   | 93            | —    | ○            | ○                 | SL series  |        |           |
|  |      | D6FEC12ST                | 120                      | 6           | 154                | 100      | 175     | 0.87                       | 3                 | 8μA                   | 60            | —    | ○            | ○                 | SL series  |        |           |
|  |      | D6FEC15ST                | 150                      | 6           | 154                | 100      | 175     | 0.88                       | 3                 | 8μA                   | 52            | —    | ○            | ○                 | SL series  |        |           |
|  |      | DF10SC4M                 | 40                       | 10          | 125                | 100      | 150     | 0.55                       | 5                 | 3.5                   | 180           | —    | —            | —                 | S series   |        |           |
|  |      | DF10SC6                  | 60                       | 10          | 132                | 150      | 150     | 0.58                       | 5                 | 4.5                   | 260           | —    | —            | —                 | S series   |        |           |
| —<br>SC-83 similar<br>STO-220          | H1-1 | DF10SC9                  | 90                       | 10          | 131                | 150      | 150     | 0.75                       | 5                 | 3                     | 185           | —    | —            | —                 | S series   |        |           |
|  |      | DF10NC15                 | 150                      | 10          | 123                | 100      | 150     | 0.88                       | 5                 | 0.2                   | 110           | —    | —            | —                 | N series   |        |           |
|  |      | DF15SC4M                 | 40                       | 15          | 129                | 150      | 150     | 0.55                       | 7.5               | 5                     | 340           | —    | —            | —                 | S series   |        |           |
|  |      | DF15JC10                 | 100                      | 15          | 126                | 150      | 150     | 0.86                       | 7.5               | 0.6                   | 200           | —    | —            | —                 | J series   |        |           |
|  |      | DF15NC15                 | 150                      | 15          | 126                | 150      | 150     | 0.88                       | 7.5               | 0.3                   | 155           | —    | —            | —                 | N series   |        |           |
|  |      | DF20SC4M                 | 40                       | 20          | 122                | 230      | 150     | 0.55                       | 10                | 7.5                   | 390           | —    | —            | —                 | S series   |        |           |
|  |      | DF20SC9M                 | 90                       | 20          | 111                | 200      | 150     | 0.75                       | 10                | 10                    | 370           | —    | —            | —                 | S series   |        |           |
|  |      | DF20JC10                 | 100                      | 20          | 121                | 200      | 150     | 0.86                       | 10                | 0.7                   | 260           | —    | —            | —                 | J series   |        |           |
|  |      | DF20NC15                 | 150                      | 20          | 121                | 200      | 150     | 0.88                       | 10                | 0.4                   | 200           | —    | —            | —                 | N series   |        |           |
|  |      | DF25SC6M                 | 60                       | 25          | 115                | 300      | 150     | 0.58                       | 12.5              | 10                    | 490           | —    | —            | —                 | S series   |        |           |
|  |      | DF30SC3ML                | 30                       | 30          | 119                | 350      | 150     | 0.48                       | 15                | 10                    | 820           | —    | —            | —                 | S series   |        |           |
|  |      | DF30JC4                  | 40                       | 30          | 115                | 250      | 150     | 0.61                       | 15                | 0.7                   | 560           | —    | —            | —                 | J series   |        |           |
|  |      | DF30SC4M                 | 40                       | 30          | 112                | 360      | 150     | 0.55                       | 15                | 10                    | 590           | —    | —            | —                 | S series   |        |           |
|  |      | DF30JC6                  | 60                       | 30          | 108                | 250      | 150     | 0.69                       | 15                | 0.7                   | 490           | —    | —            | —                 | J series   |        |           |
|  |      | DF30JC10                 | 100                      | 30          | 116                | 300      | 150     | 0.86                       | 15                | 1                     | 390           | —    | —            | —                 | J series   |        |           |
|  |      | DF30NC15                 | 150                      | 30          | 115                | 300      | 150     | 0.88                       | 15                | 0.5                   | 300           | —    | —            | —                 | N series   |        |           |
|  |      | DF40SC3L                 | 30                       | 40          | 112                | 400      | 150     | 0.45                       | 15                | 17                    | 1200          | —    | —            | —                 | S series   |        |           |
|  |      | DF40SC4                  | 40                       | 40          | 106                | 350      | 150     | 0.55                       | 20                | 14                    | 860           | —    | —            | —                 | S series   |        |           |
|  |      | —<br>SC-83 similar<br>FD | H2-2                     | D10FDC10ST  | 100                | 10       | 158     | 150                        | 175               | 0.86                  | 5             | 15μA | 104          | —                 | ○          | ○      | SL series |
|  |      |                          |                          | D20FDC10ST  | 100                | 20       | 119     | 250                        | 150               | 0.86                  | 10            | 30μA | 185          | —                 | ○          | ○      | N series  |
| D20FDC15ST                             | 150  |                          |                          | 20          | 118                | 250      | 150     | 0.88                       | 10                | 30μA                  | 159           | —    | —            | ○                 | N series   |        |           |
| D30FDC4S                               | 40   |                          |                          | 30          | 114                | 300      | 150     | 0.55                       | 15                | 1.5                   | 415           | —    | ○            | ○                 | S series   |        |           |
| D30FDC10ST                             | 100  |                          |                          | 30          | 108                | 300      | 150     | 0.86                       | 15                | 40μA                  | 242           | —    | —            | ○                 | N series   |        |           |
| D30FDC15ST                             | 150  |                          |                          | 30          | 107                | 300      | 150     | 0.88                       | 15                | 40μA                  | 209           | —    | —            | ○                 | N series   |        |           |
| D40FDC10ST                             | 100  |                          |                          | 40          | 105                | 400      | 150     | 0.86                       | 20                | 60μA                  | 360           | —    | —            | ○                 | N series   |        |           |
| D40FDC15ST                             | 150  |                          |                          | 40          | 103                | 400      | 150     | 0.88                       | 20                | 60μA                  | 315           | —    | —            | ○                 | N series   |        |           |

■ : Please contact us.

# SCHOTTKY BARRIER DIODES

## Center Tap, Common Cathode

| Three Terminal Type  |  |      |                   |           |                     |          |                      |          |           |           |           | Remarks   |   |
|--|--|------|-------------------|-----------|---------------------|----------|----------------------|----------|-----------|-----------|-----------|---|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF<br>(AV)<br>[A] | VRRM[V]   |                     |          |                      |          |           | Remarks   |           |   |   |
|  |  |      |                   | 15        | 30                  | 40       | 60                   | 90       | 100       |           | 120       |   | 150   |
| <br>28.5 × 10.0 × 4.5(mm) | SC-91<br>FTO-220G                      | J9   | 8                 |           |                     | SG8SC4M  |                      |          |           |           |           |   |  |
|  |  |      | 10                |           | SG10SC3LM           | SG10SC4M | SG10SC6M             | SG10SC9M |           |           | SG10TC15M |   |   |
|  |  |      | 15                |           | SG15SC4M            | SG15SC6M |                      |          |           |           |           |   |   |
|  |  |      | 20                |           | SG20SC3LM           | SG20SC4M | SG20JC6M<br>SG20SC6M | SG20SC9M | SG20TC10M | SG20TC12M | SG20TC15M |   |   |
|  |  |      | 30                |           | SG30SC3LM           | SG30SC4M | SG30JC6M<br>SG30SC6M |          | SG30TC10M | SG30TC12M | SG30TC15M |   |   |
|  |  |      | 40                |           |                     |          |                      |          | SG40TC10M | SG40TC12M |           |   |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>MTO-3PT                    | K5-2 | 20                |           |                     |          |                      | S20SC9MT |           |           |           |  |   |
|  |  |      | 30                |           |                     | S30SC4MT | S30SC6MT             |          |           | S30TC15T  |           |   |   |
|  |  |      | 40                | S40HC1R5T |                     |          |                      |          |           |           |           |   |   |
|  |  |      | 60                | S60HC1R5T | S60HC3T<br>S60SC3LT | S60SC4MT | S60SC6MT             |          |           |           |           |   |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>MTO-3PV                    | K7-1 | 60                |           |                     |          |                      |          |           | S60JC10V  |           |   |   |


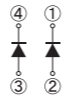
## Center Tap, Common Cathode

| Three Terminal Type                    |         |      |                     |                          |             |                    |          |         |                            |                   |                       |               |          |              |                   |            |        |   |          |
|--|---------|------|---------------------|--------------------------|-------------|--------------------|----------|---------|----------------------------|-------------------|-----------------------|---------------|----------|--------------|-------------------|------------|--------|---|----------|
| JEDEC Code<br>JEITA Code<br>House Name | Package | Fig. | Type No.            | Absolute Maximum Ratings |             |                    |          |         | Electrical Characteristics |                   |                       |               |          | Halogen free | Based on AEC-Q101 | Automotive | Series |   |          |
|  |         |      |                     | VRRM [V]                 | IF (AV) [A] | Conditions Tc [°C] | IFSM [A] | Tj [°C] | Vf (max) [V]               | Conditions IF [A] | Ir (max) Vr=VRRM [mA] | Ct (typ) [pF] |          |              |                   |            |        |   |          |
| SC-91<br>FTO-220G                      | J9      |      | SG8SC4M             | 40                       | 8           | 155                | 80       | 175     | 0.56                       | 4.0               | 0.3                   | 100           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG10SC3LM           | 30                       | 10          | 136                | 150      | 150     | 0.45                       | 4.0               | 5                     | 310           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG10SC4M            | 40                       | 10          | 150                | 150      | 175     | 0.52                       | 5.0               | 0.5                   | 157           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG10SC6M            | 60                       | 10          | 145                | 140      | 175     | 0.56                       | 5.0               | 0.5                   | 165           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG10SC9M            | 90                       | 10          | 139                | 150      | 175     | 0.75                       | 5.0               | 0.5                   | 140           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG10TC15M           | 150                      | 10          | 153                | 120      | 175     | 0.88                       | 5.0               | 15μA                  | 92            | -        | -            | -                 | SL series  |        |   |          |
|  |         |      | SG15SC4M            | 40                       | 15          | 117                | 150      | 150     | 0.52                       | 7.5               | 0.8                   | 230           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG15SC6M            | 60                       | 15          | 113                | 180      | 150     | 0.61                       | 7.5               | 0.6                   | 185           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG20SC3LM           | 30                       | 20          | 124                | 250      | 150     | 0.45                       | 8.0               | 9                     | 570           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG20SC4M            | 40                       | 20          | 115                | 200      | 150     | 0.52                       | 10.0              | 1.1                   | 315           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG20JC6M            | 60                       | 20          | 106                | 200      | 150     | 0.69                       | 10.0              | 0.1                   | 250           | -        | -            | -                 | J series   |        |   |          |
|  |         |      | SG20SC6M            | 60                       | 20          | 107                | 200      | 150     | 0.61                       | 10.0              | 0.8                   | 250           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG20SC9M            | 90                       | 20          | 112                | 200      | 150     | 0.75                       | 10.0              | 1                     | 245           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG20TC10M           | 100                      | 20          | 140                | 200      | 175     | 0.86                       | 10.0              | 30μA                  | 185           | -        | -            | -                 | SL series  |        |   |          |
|  |         |      | SG20TC12M           | 120                      | 20          | 137                | 200      | 175     | 0.87                       | 10.0              | 30μA                  | 175           | -        | -            | -                 | SL series  |        |   |          |
|  |         |      | SG20TC15M           | 150                      | 20          | 136                | 200      | 175     | 0.88                       | 10.0              | 30μA                  | 159           | -        | -            | -                 | SL series  |        |   |          |
|  |         |      | SG30SC3LM           | 30                       | 30          | 117                | 350      | 150     | 0.45                       | 12.5              | 15                    | 960           | -        | -            | -                 | M series   |        |   |          |
|  |         |      | SG30SC4M            | 40                       | 30          | 101                | 300      | 150     | 0.55                       | 15.0              | 1.5                   | 415           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG30JC6M            | 60                       | 30          | 90                 | 250      | 150     | 0.69                       | 15.0              | 0.15                  | 325           | -        | -            | -                 | J series   |        |   |          |
|  |         |      | SG30SC6M            | 60                       | 30          | 100                | 300      | 150     | 0.61                       | 15.0              | 1.2                   | 385           | -        | -            | -                 | S series   |        |   |          |
|  |         |      | SG30TC10M           | 100                      | 30          | 126                | 300      | 175     | 0.86                       | 15.0              | 40μA                  | 242           | -        | -            | -                 | SL series  |        |   |          |
|  |         |      | SG30TC12M           | 120                      | 30          | 122                | 300      | 175     | 0.87                       | 15.0              | 40μA                  | 228           | -        | -            | -                 | SL series  |        |   |          |
|  |         |      | SG30TC15M           | 150                      | 30          | 122                | 300      | 175     | 0.88                       | 15.0              | 40μA                  | 209           | -        | -            | -                 | SL series  |        |   |          |
|  |         |      | SG40TC10M           | 100                      | 40          | 116                | 350      | 175     | 0.86                       | 20.0              | 60μA                  | 362           | -        | -            | -                 | SL series  |        |   |          |
|  |         |      | SG40TC12M           | 120                      | 40          | 112                | 350      | 175     | 0.87                       | 20.0              | 60μA                  | 336           | -        | -            | -                 | SL series  |        |   |          |
|  |         |      | TO-247AD<br>MTO-3PT | K5-2                     |             | S20SC9MT           | 90       | 20      | 136                        | 200               | 150                   | 0.75          | 10.0     | 1            | 245               | -          | -      | - | S series |
|  |         |      |                     |                          |             | S30SC4MT           | 40       | 30      | 132                        | 300               | 150                   | 0.55          | 15.0     | 1.5          | 410               | -          | -      | - | S series |
|  |         |      |                     |                          |             | S30SC6MT           | 60       | 30      | 129                        | 300               | 150                   | 0.61          | 15.0     | 1.2          | 385               | -          | -      | - | S series |
|  |         |      |                     |                          |             | S30TC15T           | 150      | 30      | 128                        | 300               | 150                   | 0.88          | 15.0     | 40μA         | 209               | -          | -      | - | N series |
|  |         |      |                     |                          |             | S40HC1R5T          | 15       | 40      | 111                        | 450               | 125                   | 0.41          | 20.0     | 10           | 960               | -          | -      | - | H series |
| S60HC1R5T                              | 15      | 60   |                     |                          |             | 110                | 600      | 125     | 0.41                       | 30.0              | 15                    | 1400          | -        | -            | -                 | H series   |        |   |          |
| S60HC3T                                | 30      | 60   |                     |                          |             | 112                | 650      | 125     | 0.40                       | 30.0              | 20                    | 1100          | -        | -            | -                 | H series   |        |   |          |
| S60SC3LT                               | 30      | 60   |                     |                          |             | 138                | 650      | 150     | 0.48                       | 30.0              | 25                    | 1600          | -        | -            | -                 | S series   |        |   |          |
| S60SC4MT                               | 40      | 60   |                     |                          |             | 127                | 500      | 150     | 0.55                       | 30.0              | 3                     | 790           | -        | -            | -                 | S series   |        |   |          |
| S60SC6MT                               | 60      | 60   | 121                 | 470                      | 150         | 0.67               | 30.0     | 2       | 640                        | -                 | -                     | -             | S series |              |                   |            |        |   |          |
| TO-247AD<br>MTO-3PV                    | K7-1    |      | S60JC10V            | 100                      | 60          | 118                | 500      | 150     | 0.95                       | 30.0              | 0.2                   | 695           | -        | -            | ○                 | J series   |        |   |          |


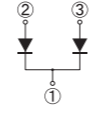

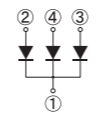


# SCHOTTKY BARRIER DIODES

## Array

| Surface Mount  |  |      |                        |                      |    |   |
|--|--|------|------------------------|----------------------|----|---|
| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |    | Remarks   |
|  |  |      |                        | 40                   | 60 |   |
| <br>7.0 × 4.7 × 2.6(mm) | TO-269AA<br>—<br>1Z                    | C2-2 | 1.2                    | S1ZAS4               |    |  |

## Diode Module

| Diode Module  |  |      |                        |                      |          |   |
|---|--|------|------------------------|----------------------|----------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub> [A] | V <sub>RRM</sub> [V] |          | Remarks   |
|   |  |      |                        | 40                   | 60       |   |
| <br>43.0 × 27.0 × 21.0(mm) | —<br>—<br>Module                       | F1   | 120                    | D120SC4M             | D120SC6M |  |
|   |  |      | 240                    | D240SC4M             | D240SC6M |   |
| <br>43.0 × 27.0 × 21.0(mm) |  | F3-1 | 180                    | D180SC4M             | D180SC6M |  |
|   |  |      |                        | 360                  | D360SC4M |   |

## Array

| Surface Mount                          |      |          |                          |                        |                                   |                      |                     |                            |                                  |   |                           |              |                   |            |          |
|--|------|----------|--------------------------|------------------------|-----------------------------------|----------------------|---------------------|----------------------------|----------------------------------|---|---------------------------|--------------|-------------------|------------|----------|
| Package                                |      | Type No. | Absolute Maximum Ratings |                        |                                   |                      |                     | Electrical Characteristics |                                  |   |                           | Halogen free | Based on AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | V <sub>RRM</sub> [V]     | I <sub>F(AV)</sub> [A] | Conditions<br>T <sub>a</sub> [°C] | I <sub>FSM</sub> [A] | T <sub>j</sub> [°C] | V <sub>F</sub> (max) [V]   | Conditions<br>I <sub>F</sub> [A] | I <sub>R</sub> (max)<br>V <sub>R</sub> =V <sub>RRM</sub> [mA] | C <sub>t</sub> (typ) [pF] |              |                   |            |          |
| TO-269AA<br>—<br>1Z                    | C2-2 | S1ZAS4   | 40                       | 1.2                    | 47                                | 40                   | 150                 | 0.55                       | 1                                | 1   | 65                        | —            | —                 | —          | S series |


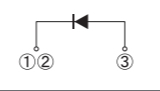

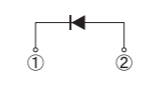




## Diode Module

| Diode Module                           |          |          |                          |                        |                                   |                      |                     |                            |                                  |   |                           |              |                   |            |          |
|--|----------|----------|--------------------------|------------------------|-----------------------------------|----------------------|---------------------|----------------------------|----------------------------------|---|---------------------------|--------------|-------------------|------------|----------|
| Package                                |          | Type No. | Absolute Maximum Ratings |                        |                                   |                      |                     | Electrical Characteristics |                                  |   |                           | Halogen free | Based on AEC-Q101 | Automotive | Series   |
| JEDEC Code<br>JEITA Code<br>House Name | Fig.     |          | V <sub>RRM</sub> [V]     | I <sub>F(AV)</sub> [A] | Conditions<br>T <sub>c</sub> [°C] | I <sub>FSM</sub> [A] | T <sub>j</sub> [°C] | V <sub>F</sub> (max) [V]   | Conditions<br>I <sub>F</sub> [A] | I <sub>R</sub> (max)<br>V <sub>R</sub> =V <sub>RRM</sub> [mA] | C <sub>t</sub> (typ) [pF] |              |                   |            |          |
| —<br>—<br>Module                       | F1       | D120SC4M | 40                       | 120                    | 90                                | 800                  | 125                 | 0.58                       | 60                               | 40  | 2.1                       | —            | —                 | —          | S series |
|  |          | D120SC6M | 60                       | 120                    | 85                                | 800                  | 125                 | 0.67                       | 60                               | 40  | 2.2                       | —            | —                 | —          | S series |
|  |          | D240SC4M | 40                       | 240                    | 77                                | 1600                 | 125                 | 0.6                        | 120                              | 80  | 4.2                       | —            | —                 | —          | S series |
|  | F3-1     | D240SC6M | 60                       | 240                    | 71                                | 1600                 | 125                 | 0.67                       | 120                              | 80  | 4.4                       | —            | —                 | —          | S series |
|  |          | D180SC4M | 40                       | 180                    | 83                                | 800                  | 125                 | 0.58                       | 60                               | 40  | 2.1                       | —            | —                 | —          | S series |
|  |          | D180SC6M | 60                       | 180                    | 78                                | 800                  | 125                 | 0.67                       | 60                               | 40  | 2.2                       | —            | —                 | —          | S series |
|  | D360SC4M | 40       | 360                      | 64                     | 1600                              | 125                  | 0.6                 | 120                        | 80                               | 4.2   | —                         | —            | —                 | S series   |          |
|  | D360SC6M | 60       | 360                      | 58                     | 1600                              | 125                  | 0.67                | 120                        | 80                               | 4.4   | —                         | —            | —                 | S series   |          |


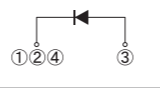


# FAST RECOVERY DIODES




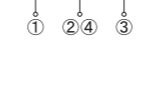
## Single

| Two Terminal Type   |  |      |   |                     |          |   |   |            |  |         |   |
|---|--|------|---|---------------------|----------|---|---|------------|--|---------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF(AV)<br>[A]   | VRRM[V]             |          |   | Remarks   |            |  |         |   |
|   |  |      |   | 200                 | 400      | 600   |   |            |  |         |   |
| <br>28.5 × 10.0 × 4.5(mm) | SC-91A<br>FTO-220                      | J1   | 3   |                     |          | SF3L60U   |  |            |  |         |   |
|   |  |      | 5   |                     |          | SF5L60U   |   |            |  |         |   |
|   |  |      | 10  |                     |          | SF10L60U  |   |            |  |         |   |
|   |  |      | 20  |                     |          | SF20L60U  |   |            |  |         |   |
|   |  |      | 3   |                     |          | SF3K60M   |   |            |  |         |   |
| <br>28.5 × 10.0 × 4.5(mm) | SC-91<br>FTO-220AG                     | J3   | 5   |                     | SF5L40UM | SF5K60M   |  |            |  |         |   |
|   |  |      | 8   |                     |          | SF8K60USM<br>SF8K60M                              |   |            |  |         |   |
|   |  |      | 10  |                     |          | SF10K60M<br>SF10L60MVM<br>SF10L60MSM<br>SF10L60AM |   |            |  |         |   |
|   |  |      | 20  |                     |          | SF20K60M<br>SF20L60MVM<br>SF20L60MSM<br>SF20L60AM |   |            |  |         |   |
|   |  |      | <br>28.5 × 10.0 × 4.5(mm) | SC-91<br>FTO-220G   | J4       | 5   |   | SG5L20USM  |  |         |  |
|   |  |      |   |                     |          | 10  |   | SG10L20USM |  |         |   |
|   |  |      | <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>MTO-3PT | K2       | 20  |   |            |  | S20K60T |  |
|   |  |      |   |                     |          | 30  |   |            |  | S30K60T |   |

■ : New product

| Three Terminal Type   |  |      |               |         |          |      |   |
|---|--|------|---------------|---------|----------|------|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF(AV)<br>[A] | VRRM[V] |          |      | Remarks   |
|   |  |      |               | 600     | 1000     | 1200 |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>MTO-3PV                    | K6   | 20            |         | S20K100V |      |  |
|   |  |      | 30            | S30K60V | S30K100V |      |   |

## Center Tap, Common Cathode

| Surface Mount   |  |      |               |                          |          |     |     |   |
|---|--|------|---------------|--------------------------|----------|-----|-----|---|
| Package   | JEDEC Code<br>JEITA Code<br>House Name | Fig. | IF(AV)<br>[A] | VRRM[V]                  |          |     |     | Remarks   |
|   |  |      |               | 200                      | 300      | 400 | 600 |   |
| <br>9.5 × 6.6 × 2.65(mm)  | SC-63<br>E-pack                        | G1-1 | 5             | DE5LC20U                 |          |     |     |  |
|   |  |      | 10            | DF10LC20U                | DF10LC30 |     |     |   |
| <br>13.2 × 10.2 × 4.7(mm) | SC-83 similar<br>STO-220               | H1-1 | 20            | DF20LC20US               | DF20LC30 |     |     |  |
|   |  |      | 20            | D20FDC20L<br>D20FDC20LUS |          |     |     |   |

## Single

| Two Terminal Type                      |      |            |                          |             |                    |          |            |                            |                   |                       |                |              |                   |            |           |
|--|------|------------|--------------------------|-------------|--------------------|----------|------------|----------------------------|-------------------|-----------------------|----------------|--------------|-------------------|------------|-----------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.   | Absolute Maximum Ratings |             |                    |          |            | Electrical Characteristics |                   |                       |                | Halogen free | Based on AEC-Q101 | Automotive | Series    |
|  |      |            | VRRM [V]                 | IF (AV) [A] | Conditions Tc [°C] | IFSM [A] | Tj [°C]    | Vf (max) [V]               | Conditions IF [A] | Ir (max) Vr=VRRM [μA] | ttr (max) [ns] |              |                   |            |           |
| SC-91A<br>FTO-220                      | J1   | SF3L60U    | 600                      | 3           | 115                | 40       | 150        | 3.00                       | 3                 | 25                    | 20             | -            | -                 | -          | -         |
|  |      | SF5L60U    | 600                      | 5           | 96                 | 60       | 150        | 3.00                       | 5                 | 25                    | 25             | -            | -                 | -          | -         |
|  |      | SF10L60U   | 600                      | 10          | 85                 | 120      | 150        | 3.00                       | 10                | 25                    | 25             | -            | -                 | ■          | -         |
|  |      | SF20L60U   | 600                      | 20          | 68                 | 180      | 150        | 3.00                       | 20                | 25                    | 35             | -            | -                 | ■          | -         |
| SC-91<br>FTO-220AG                     | J3   | SF3K60M    | 600                      | 3           | 132                | 90       | 150        | 1.45                       | 3                 | 10                    | 80             | -            | -                 | -          | K series  |
|  |      | SF5L40UM   | 400                      | 5           | 121                | 100      | 150        | 1.25                       | 5                 | 10                    | 30             | -            | -                 | ■          | -         |
|  |      | SF5K60M    | 600                      | 5           | 119                | 120      | 150        | 1.50                       | 5                 | 10                    | 85             | -            | -                 | ■          | K series  |
|  |      | SF8K60USM  | 600                      | 8           | 70                 | 60       | 150        | 3.60                       | 8                 | 50                    | 25             | -            | -                 | -          | US series |
|  |      | SF8K60M    | 600                      | 8           | 108                | 150      | 150        | 1.50                       | 8                 | 10                    | 90             | -            | -                 | ■          | K series  |
|  |      | SF10K60M   | 600                      | 10          | 106                | 180      | 150        | 1.50                       | 10                | 10                    | 95             | -            | -                 | -          | K series  |
|  |      | SF10L60MVM | 600                      | 10          | 119                | 200      | 150        | 1.10                       | 10                | 10                    | 115            | -            | -                 | ■          | ML series |
|  |      | SF10L60MSM | 600                      | 10          | 110                | 160      | 150        | 1.37                       | 10                | 10                    | 60             | -            | -                 | ■          | ML series |
|  |      | SF10L60AM  | 600                      | 10          | 106                | 180      | -55 to 150 | 2.10                       | 10                | 10                    | 28             | -            | -                 | -          | A series  |
|  |      | SF20K60M   | 600                      | 20          | 96                 | 240      | 150        | 1.50                       | 20                | 10                    | 95             | -            | -                 | -          | K series  |
|  |      | SF20L60MVM | 600                      | 20          | 106                | 250      | 150        | 1.10                       | 20                | 10                    | 130            | -            | -                 | ■          | ML series |
|  |      | SF20L60MSM | 600                      | 20          | 96                 | 220      | 150        | 1.37                       | 20                | 10                    | 70             | -            | -                 | ■          | ML series |
| SF20L60AM                              | 600  | 20         | 77                       | 260         | -55 to 150         | 2.10     | 20         | 10                         | 35                | -                     | -              | -            | A series          |            |           |
| SC-91<br>FTO-220G                      | J4   | SG5L20USM  | 200                      | 5           | 125                | 90       | 150        | 0.96                       | 5                 | 10                    | 25             | -            | -                 | -          | -         |
|  |      | SG10L20USM | 200                      | 10          | 101                | 200      | 150        | 0.96                       | 10                | 10                    | 25             | -            | -                 | -          | -         |
| TO-247AD<br>MTO-3PT                    | K2   | S20K60T    | 600                      | 20          | 121                | 300      | 150        | 1.50                       | 20                | 10                    | 95             | -            | -                 | -          | K series  |
|  |      | S30K60T    | 600                      | 30          | 123                | 450      | 150        | 1.50                       | 30                | 10                    | 100            | -            | -                 | -          | K series  |

■ : New product ■ : Please contact us.

| Three Terminal Type                    |      |          |                          |             |                    |          |         |                            |                   |                       |                |              |                   |            |          |
|--|------|----------|--------------------------|-------------|--------------------|----------|---------|----------------------------|-------------------|-----------------------|----------------|--------------|-------------------|------------|----------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No. | Absolute Maximum Ratings |             |                    |          |         | Electrical Characteristics |                   |                       |                | Halogen free | Based on AEC-Q101 | Automotive | Series   |
|  |      |          | VRRM [V]                 | IF (AV) [A] | Conditions Tc [°C] | IFSM [A] | Tj [°C] | Vf (max) [V]               | Conditions IF [A] | Ir (max) Vr=VRRM [μA] | ttr (max) [ns] |              |                   |            |          |
| TO-247AD<br>MTO-3PV                    | K6   | S20K100V | 1000                     | 20          | 127                | 550      | 150     | 2.10                       | 20                | 10                    | 120            | -            | -                 | ○          | K series |
|  |      | S30K60V  | 600                      | 30          | 108                | 450      | 150     | 1.50                       | 30                | 10                    | 100            | -            | -                 | ○          | K series |
|  |      | S30K100V | 1000                     | 30          | 116                | 600      | 150     | 2.10                       | 30                | 10                    | 120            | -            | -                 | ○          | K series |

## Center Tap, Common Cathode


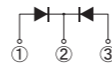


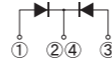

| Surface Mount                          |      |             |                          |             |                    |          |         |                            |                   |                       |                |              |                   |            |        |
|--|------|-------------|--------------------------|-------------|--------------------|----------|---------|----------------------------|-------------------|-----------------------|----------------|--------------|-------------------|------------|--------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.    | Absolute Maximum Ratings |             |                    |          |         | Electrical Characteristics |                   |                       |                | Halogen free | Based on AEC-Q101 | Automotive | Series |
|  |      |             | VRRM [V]                 | IF (AV) [A] | Conditions Tc [°C] | IFSM [A] | Tj [°C] | Vf (max) [V]               | Conditions IF [A] | Ir (max) Vr=VRRM [μA] | ttr (max) [ns] |              |                   |            |        |
| SC-63<br>E-pack                        | G1-1 | DE5LC20U    | 200                      | 5           | 81                 | 50       | 150     | 0.98                       | 2.5               | 10                    | 35             | -            | -                 | ■          | -      |
| SC-83 similar<br>STO-220               | H1-1 | DF10LC20U   | 200                      | 10          | 127                | 80       | 150     | 0.98                       | 5                 | 10                    | 35             | -            | -                 | -          | -      |
|  |      | DF10LC30    | 300                      | 10          | 124                | 80       | 150     | 1.30                       | 5                 | 25                    | 30             | -            | -                 | -          | -      |
|  |      | DF20LC20US  | 200                      | 20          | 125                | 180      | 150     | 0.96                       | 10                | 10                    | 25             | -            | -                 | -          | -      |
|  |      | DF20LC30    | 300                      | 20          | 124                | 180      | 150     | 1.30                       | 10                | 25                    | 30             | -            | -                 | -          | -      |
| SC-83 similar<br>FD                    | H2-2 | D20FDC20L   | 200                      | 20          | 113                | 100      | 175     | 1.20                       | 10                | 10                    | 30             | -            | ○                 | ○          | -      |
|  |      | D20FDC20LUS | 200                      | 20          | 125                | 180      | 150     | 0.96                       | 10                | 10                    | 25             | -            | -                 | ○          | -      |

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# FAST RECOVERY DIODES

## Center Tap, Common Cathode

### Three Terminal Type

| Package  | JEDEC Code<br>JEITA Code<br>House Name | Fig. | I <sub>F(AV)</sub><br>[A] | V <sub>RRM</sub> [V] |            |            |            | Remarks   |
|--|--|------|---------------------------|----------------------|------------|------------|------------|---|
|  |  |      |                           | 200                  | 300        | 400        | 600        |   |
| <br>28.5 × 10.0 × 4.5(mm) | —<br>SC-91<br>FTO-220AG                | J8-1 | 5                         |                      |            | SF5LC40UM  |            |  |
|  |  |      | 10                        |                      |            | SF10LC40UM | SF10KC60M  |   |
|  |  |      | 20                        |                      | SF20LC30M  |            | SF20KC60M  |   |
| <br>28.5 × 10.0 × 4.5(mm) | —<br>SC-91<br>FTO-220G                 | J9   | 5                         | SG5LC20USM           |            |            |            |   |
|  |  |      | 10                        | SG10LC20USM          |            |            |            |   |
|  |  |      | 20                        | SG20LC20USM          |            |            |            |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PT               | K5-2 | 20                        | S20LC20UST           | S20LC30T   | S20LC40UT  | S20LC60UST |  |
|  |  |      |                           | S20LC40UV            | S20LC60USV |            |            |   |
| <br>41.0 × 16.0 × 5.0(mm) | TO-247AD<br>—<br>MTO-3PV               | K7-1 | 20                        |                      |            | S20LC40UV  | S20LC60USV |   |
|  |  |      |                           |                      |            |            |            |   |

## Center Tap, Common Cathode

### Three Terminal Type



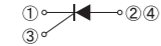



| JEDEC Code<br>JEITA Code<br>House Name | Package | Fig. | Type No.    | Absolute Maximum Ratings |                           |                                      |                           | Electrical Characteristics |                                |                                     |   | Halogen free | Based on AEC-Q101 | Automotive | Series |                                  |
|--|---------|------|-------------|--------------------------|---------------------------|--------------------------------------|---------------------------|----------------------------|--------------------------------|-------------------------------------|---|--------------|-------------------|------------|--------|----------------------------------|
|  |         |      |             | V <sub>RRM</sub><br>[V]  | I <sub>F(AV)</sub><br>[A] | Conditions<br>T <sub>C</sub><br>[°C] | I <sub>F(SM)</sub><br>[A] | T <sub>J</sub><br>[°C]     | V <sub>F</sub><br>(max)<br>[V] | Conditions<br>I <sub>F</sub><br>[A] | I <sub>R</sub><br>(max)<br>V <sub>R</sub> =V <sub>RRM</sub><br>[μA] |              |                   |            |        | t <sub>rr</sub><br>(max)<br>[ns] |
| —<br>SC-91<br>FTO-220AG                | J8-1    |      | SF5LC40UM   | 400                      | 5                         | 132                                  | 80                        | 150                        | 1.25                           | 2.5                                 | 10  | 30           | —                 | —          | —      | —                                |
|  |         |      | SF10LC40UM  | 400                      | 10                        | 120                                  | 100                       | 150                        | 1.25                           | 5                                   | 10  | 30           | —                 | —          | —      | —                                |
|  |         |      | SF10KC60M   | 600                      | 10                        | 109                                  | 120                       | 150                        | 1.50                           | 5                                   | 10  | 85           | —                 | —          | ■      | K series                         |
|  |         |      | SF20LC30M   | 300                      | 20                        | 107                                  | 250                       | 150                        | 1.30                           | 10                                  | 25  | 30           | —                 | —          | —      | —                                |
| —<br>SC-91<br>FTO-220G                 | J9      |      | SF20KC60M   | 600                      | 20                        | 97                                   | 180                       | 150                        | 1.50                           | 10                                  | 10  | 95           | —                 | —          | ■      | K series                         |
|  |         |      | SG5LC20USM  | 200                      | 5                         | 133                                  | 70                        | 150                        | 0.96                           | 2.5                                 | 10  | 25           | —                 | —          | —      | —                                |
|  |         |      | SG10LC20USM | 200                      | 10                        | 122                                  | 90                        | 150                        | 0.96                           | 5                                   | 10  | 25           | —                 | —          | —      | —                                |
| TO-247AD<br>—<br>MTO-3PT               | K5-2    |      | SG20LC20USM | 200                      | 20                        | 95                                   | 150                       | 150                        | 0.96                           | 10                                  | 10  | 25           | —                 | —          | —      | —                                |
|  |         |      | S20LC20UST  | 200                      | 20                        | 126                                  | 120                       | 150                        | 0.96                           | 10                                  | 10  | 25           | —                 | —          | —      | —                                |
|  |         |      | S20LC30T    | 300                      | 20                        | 124                                  | 220                       | 150                        | 1.30                           | 10                                  | 25  | 30           | —                 | —          | —      | —                                |
| TO-247AD<br>—<br>MTO-3PV               | K7-1    |      | S20LC40UT   | 400                      | 20                        | 123                                  | 130                       | 150                        | 1.25                           | 10                                  | 10  | 30           | —                 | —          | —      | —                                |
|  |         |      | S20LC60UST  | 600                      | 20                        | 63                                   | 60                        | 150                        | 3.60                           | 10                                  | 50  | 25           | —                 | —          | —      | —                                |
|  |         |      | S20LC40UV   | 400                      | 20                        | 123                                  | 200                       | 150                        | 1.25                           | 10                                  | 10  | 30           | —                 | —          | ○      | —                                |
| S20LC60USV                             | 600     | 20   | 65          | 60                       | 150                       | 3.60                                 | 10                        | 50                         | 25                             | —                                   | —   | ○            | —                 |            |        |                                  |


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# THYRISTORS



The Thyristor, in its normal state, will block an applied voltage in either direction, but when an appropriate current pulse is applied to the gate, current will flow through the anode to the cathode thus turning on power to the load circuit. The Thyristor has a planar passivation, and is available in both the general reverse-blocking type and the type without reverse voltage. The Thyristor without reverse voltage is suitable for a circuit limiting inrush current.

## Thyristors

| Package                                |  10.0 × 6.6 × 2.3(mm) |  28.5 × 10.0 × 4.5(mm) |                                     |  |
|--|--|---|-------------------------------------|--|
| JEDEC Code<br>JEITA Code<br>House Name | TO-252AA<br>—<br>FB  | —<br>SC-91<br>FTO-220AG   |                                     |  |
| Fig.                                   | G2-2   | J8-5  |                                     |  |
| Internal Circuit                       |                       |                        |                                     |  |
| $I_T(AV)$ [A]                          | 3  | 5   | 5                                   | 8  |
| $V_{DRM}$ [V]                          | 400  | KC3FB40H  | KC5FB40H                            |  |
|  | 600  |   | KC5FB60H<br>KC5FB60HR<br>KC5FB60HRT |  KC5SF60HRT |
|  | 800  |   |                                     |  KC8SF80  |

 : New product

## Thyristors

| Package                                |      | Type No.   | Absolute Maximum Ratings |               |               |                          |               |            | Electrical Characteristics |                            |                   |                    |                 | Halogen free | Based on AEC-Q101 | Automotive |
|--|------|--|--------------------------|---------------|---------------|--------------------------|---------------|------------|----------------------------|----------------------------|-------------------|--------------------|-----------------|--------------|-------------------|------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |  | $V_{DRM}$ [V]            | $V_{RRM}$ [V] | $I_T(AV)$ [A] | Conditions<br>$T_C$ [°C] | $I_{TSM}$ [A] | $T_J$ [°C] | $V_{TM(max)}$ [V]          | Conditions<br>$I_{TM}$ [A] | $V_{GT(max)}$ [V] | $I_{GT(max)}$ [μA] | $I_H(max)$ [mA] |              |                   |            |
| TO-252AA<br>—<br>FB                    | G2-2 | KC3FB40H   | 400                      | 400           | 3             | 111                      | 40            | -40 to 125 | 1.4                        | 4                          | 0.8               | 100                | 5               | —            | —                 | —          |
|  |      | KC5FB40H   | 400                      | 400           | 5             | 101                      | 65            | -40 to 125 | 1.6                        | 10                         | 0.8               | 200                | typ.1           | —            | —                 | —          |
|  |      | KC5FB60H   | 600                      | 600           | 5             | 98                       | 90            | -40 to 125 | 1.8                        | 15                         | 0.8               | 100                | 5               | —            | —                 | —          |
|  |      | KC5FB60HRT   | 600                      | —             | 5             | 98                       | 90            | -40 to 125 | 1.8                        | 15                         | 0.8               | 100                | 5               | —            | —                 | —          |
| —<br>SC-91<br>FTO-220AG                | J8-5 |  KC5SF60HRT | 600                      | —             | 5             | 127                      | 82            | -40 to 150 | 1.8                        | 15                         | 0.8               | 100                | 5               | —            | —                 | —          |
|  |      |  KC8SF80    | 800                      | 800           | 8             | 130                      | 120           | -40 to 150 | 1.5                        | 20                         | 1.0               | 15mA               | 100             | —            | —                 | —          |

 : New product




# SIDACs

SIDAC series are semiconductor devices energized by the addition of a specific voltage. They are commonly used for switching devices or pulse generating devices.

## Bi-directional (K1V series)

- Features
  1. Symmetrical characteristics.
  2. Operating directly from the AC mains, and can be used in all kinds of pulse generating circuits.
  3. The glass passivation ensures high reliability.




- Applications
  1. Pulse generation : gas igniters,HID(high intensity discharge)lamp drive circuit,etc.
  2. AC switching : drive circuit for switching power supplies,voltage detecting circuits,etc.
  3. Over voltage protection : AC line surge protection,capacitor rupture prevention,etc.

| Package              |  |  |  |
|----------------------|---|---|---|
| JEDEC Code           | DO-214AC  | -   | -   |
| JEITA Code           | -   | -   | -   |
| House Name           | 1F  | AX06  | AX10  |
| Fig.                 | B4-3  | A2-1  | A5-3  |
| Internal Circuit     | ①—N—②   |   |   |
| V <sub>DRM</sub> [V] | 5   | K1VZL09   |   |
|                      | 15  | K1VZL20   |   |
|                      | 90  | K1V(A)10<br>K1V(A)11<br>K1V(A)12  | K1V10<br>K1V11<br>K1V12   |
|                      | 115   | K1V(A)16  | K1V14   |
|                      | 180   |   | K1V22<br>K1V24<br>K1V26   |
|                      | 270   |   | K1V36(W)<br>K1V38(W)  |

## Uni-directional (G1V series)

- Features
  1. Uni-directional characteristics.
  2. Smaller package than bi-directional SIDAC.
  3. Switching operation from DC power for pulse generation.
  4. The glass passivation ensures high reliability.

- Applications
  1. Pulse generation : gas igniters,negative ion generators, HID(high intensity discharge) lamp drive circuit,etc.
  2. Over voltage protection : DC line surge protection.

| Package                 |  |  |  |
|-------------------------|---|---|---|
| JEDEC Code              | DO-214AC  | -   | -   |
| JEITA Code              | -   | -   | -   |
| House Name              | 1F  | AX06  | AX078   |
| Fig.                    | B3-3  | A2-3  | A4-3  |
| Internal Circuit        | ①—N—②   |   |   |
| V <sub>DRM(A)</sub> [V] | 70  | G1VL8C  | G1V(A)8C  |
|                         | 90  | G1VL10C   | G1V(A)10C   |
|                         | 100   |   | G1V(A)12C   |
|                         | 110   |   | G1V(A)13C   |
|                         | 115   |   | G1V(A)15C   |
|                         | 120   | G1VL15C   | G1V(A)14C   |
|                         | 170   | G1VL20C   | G1V(A)20C   |
|                         | 210   | G1VL22C<br>G1VL24C  |   |

## Bi-directional (K1V series)

| Surface Mount |            | Type No. | Absolute Maximum Ratings |                |                           |                  |                | Electrical Characteristics |                        |                           |                       |                      | Halogen free | Automotive |                      |                           |
|---------------|------------|----------|--------------------------|----------------|---------------------------|------------------|----------------|----------------------------|------------------------|---------------------------|-----------------------|----------------------|--------------|------------|----------------------|---------------------------|
| JEDEC Code    | Fig.       |          | V <sub>DRM</sub>         | I <sub>T</sub> | Conditions T <sub>L</sub> | T <sub>stg</sub> | T <sub>j</sub> | V <sub>BO</sub>            | I <sub>DRM</sub> (max) | Conditions V <sub>D</sub> | I <sub>BO</sub> (max) | I <sub>H</sub> (typ) |              |            | V <sub>T</sub> (max) | Conditions I <sub>T</sub> |
| JEITA Code    | House Name | [V]      | [A]                      | [°C]           | [°C]                      | [°C]             | [V]            | [μA]                       | [V]                    | [mA]                      | [mA]                  | [V]                  | [A]          |            |                      |                           |
| DO-214AC      | B4-3       | K1VZL09  | 5                        | 0.5            | 110                       | -40 to 125       | 125            | 8 to 12                    | 5                      | 5                         | 20                    | 20                   | 1.2          | 0.5        | -                    | -                         |
| 1F            |            | K1VZL20  | 15                       | 0.5            | 110                       | -40 to 125       | 125            | 18 to 22                   | 5                      | 15                        | 20                    | 20                   | 1.2          | 0.5        | -                    | -                         |

| Axial      |            | Type No. | Absolute Maximum Ratings |                |                           |                  |                  |              |        | Electrical Characteristics |                 |                      |                      |                           | Halogen free | Automotive |
|------------|------------|----------|--------------------------|----------------|---------------------------|------------------|------------------|--------------|--------|----------------------------|-----------------|----------------------|----------------------|---------------------------|--------------|------------|
| JEDEC Code | Fig.       |          | V <sub>DRM</sub>         | I <sub>T</sub> | Conditions T <sub>L</sub> | I <sub>TRM</sub> | I <sub>TRM</sub> | Conditions f | diT/dt | T <sub>j</sub>             | V <sub>BO</sub> | I <sub>H</sub> (typ) | V <sub>T</sub> (max) | Conditions I <sub>T</sub> |              |            |
| JEITA Code | House Name | [V]      | [A]                      | [°C]           | [A]                       | [A]              | [Hz]             | [A/μs]       | [°C]   | [V]                        | [mA]            | [V]                  | [A]                  |                           |              |            |
| -          | AX06       | K1V(A)10 | 90                       | 1              | 109                       | 16               | 60               | 60           | 50     | 125                        | 95 to 113       | 50                   | 1.6                  | 1                         | -            | -          |
|            |            | K1V(A)11 | 90                       | 1              | 109                       | 16               | 60               | 60           | 50     | 125                        | 104 to 118      | 50                   | 1.6                  | 1                         | -            | -          |
|            |            | K1V(A)12 | 90                       | 1              | 109                       | 16               | 60               | 60           | 50     | 125                        | 110 to 125      | 50                   | 1.6                  | 1                         | -            | -          |
|            |            | K1V(A)16 | 115                      | 1              | 98                        | 16               | 60               | 60           | 50     | 125                        | 145 to 170      | 50                   | 1.6                  | 1                         | -            | -          |
| -          | A5-3       | K1V10    | 90                       | 1              | 112                       | 20               | 80               | 60           | 80     | 125                        | 95 to 113       | 50                   | 1.5                  | 1                         | -            | -          |
|            |            | K1V11    | 90                       | 1              | 112                       | 20               | 80               | 60           | 80     | 125                        | 104 to 118      | 50                   | 1.5                  | 1                         | -            | -          |
|            |            | K1V12    | 90                       | 1              | 112                       | 20               | 80               | 60           | 80     | 125                        | 110 to 125      | 50                   | 1.5                  | 1                         | -            | -          |
|            |            | K1V14    | 115                      | 1              | 109                       | 20               | 80               | 60           | 80     | 125                        | 125 to 150      | 30                   | 1.5                  | 1                         | -            | -          |
|            |            | K1V22    | 180                      | 1              | 108                       | 20               | 50               | 60           | 80     | 125                        | 200 to 230      | 20                   | 1.5                  | 1                         | -            | -          |
|            |            | K1V24    | 180                      | 1              | 108                       | 20               | 50               | 60           | 80     | 125                        | 220 to 250      | 20                   | 1.5                  | 1                         | -            | -          |
|            | AX10       | K1V26    | 180                      | 1              | 108                       | 20               | 50               | 60           | 80     | 125                        | 240 to 270      | 20                   | 1.5                  | 1                         | -            | -          |
|            |            | K1V22(W) | 180                      | 1              | 91                        | 16               | 50               | 60           | 80     | 125                        | 200 to 230      | 50                   | 3                    | 1                         | -            | -          |
|            |            | K1V24(W) | 180                      | 1              | 91                        | 16               | 50               | 60           | 80     | 125                        | 220 to 250      | 50                   | 3                    | 1                         | -            | -          |
|            |            | K1V26(W) | 180                      | 1              | 91                        | 16               | 50               | 60           | 80     | 125                        | 240 to 265      | 50                   | 3                    | 1                         | -            | -          |
|            |            | K1V36(W) | 270                      | 1              | 92                        | 13               | 40               | 60           | 50     | 125                        | 340 to 380      | 50                   | 3                    | 1                         | -            | -          |
|            |            | K1V38(W) | 270                      | 1              | 92                        | 13               | 40               | 60           | 80     | 125                        | 360 to 400      | 50                   | 3                    | 1                         | -            | -          |

## Uni-directional (G1V series)

| Surface Mount |            | Type No. | Absolute Maximum Ratings |                |                           |                  |              | Electrical Characteristics |                |                    |                             |                             | Halogen free | Automotive |                           |
|---------------|------------|----------|--------------------------|----------------|---------------------------|------------------|--------------|----------------------------|----------------|--------------------|-----------------------------|-----------------------------|--------------|------------|---------------------------|
| JEDEC Code    | Fig.       |          | V <sub>DRM(A)</sub>      | I <sub>T</sub> | Conditions T <sub>L</sub> | I <sub>TRM</sub> | Conditions f | diT/dt                     | T <sub>j</sub> | V <sub>BO(A)</sub> | I <sub>H(A),(K)</sub> (max) | V <sub>T(A),(K)</sub> (max) |              |            | Conditions I <sub>T</sub> |
| JEITA Code    | House Name | [V]      | [A]                      | [°C]           | [A]                       | [Hz]             | [A/μs]       | [°C]                       | [V]            | [mA]               | [V]                         | [A]                         |              |            |                           |
| DO-214AC      | 1F         | G1VL8C   | 70                       | 1              | 98                        | 80               | 60           | 150                        | 125            | 75 to 90           | 100                         | 1.5                         | 1            | -          | -                         |
|               |            | G1VL10C  | 90                       | 1              | 98                        | 150              | 60           | 150                        | 125            | 95 to 110          | 100                         | 1.5                         | 1            | -          | -                         |
|               |            | G1VL15C  | 120                      | 1              | 98                        | 120              | 60           | 150                        | 125            | 142 to 157         | 60                          | 1.5                         | 1            | -          | -                         |
|               |            | G1VL20C  | 170                      | 1              | 98                        | 120              | 60           | 150                        | 125            | 190 to 210         | 60                          | 1.5                         | 1            | -          | -                         |
|               |            | G1VL22C  | 190                      | 1              | 98                        | 280              | 5            | 150                        | 125            | 210 to 230         | 60                          | 1.5                         | 1            | -          | -                         |
|               |            | G1VL24C  | 190                      | 1              | 98                        | 280              | 5            | 150                        | 150            | 230 to 250         | 60                          | 1.5                         | 1            | -          | -                         |

| Axial      |            | Type No.  | Absolute Maximum Ratings |                |                           |                  |              | Electrical Characteristics |                |                    |                             |                             | Halogen free | Automotive |                           |
|------------|------------|-----------|--------------------------|----------------|---------------------------|------------------|--------------|----------------------------|----------------|--------------------|-----------------------------|-----------------------------|--------------|------------|---------------------------|
| JEDEC Code | Fig.       |           | V <sub>DRM(A)</sub>      | I <sub>T</sub> | Conditions T <sub>L</sub> | I <sub>TRM</sub> | Conditions f | diT/dt                     | T <sub>j</sub> | V <sub>BO(A)</sub> | I <sub>H(A),(K)</sub> (max) | V <sub>T(A),(K)</sub> (max) |              |            | Conditions I <sub>T</sub> |
| JEITA Code | House Name | [V]       | [A]                      | [°C]           | [A]                       | [Hz]             | [A/μs]       | [°C]                       | [V]            | [mA]               | [V]                         | [A]                         |              |            |                           |
| -          | AX06       | G1V(A)8C  | 70                       | 1              | 98                        | 80               | 60           | 80                         | 125            | 75 to 90           | 100                         | 1.5                         | 1            | -          | -                         |
|            |            | G1V(A)10C | 90                       | 1              | 98                        | 80               | 60           | 80                         | 125            | 95 to 110          | 60                          | 1.5                         | 1            | -          | -                         |
|            |            | G1V(A)12C | 100                      | 1              | 98                        | 80               | 60           | 80                         | 125            | 110 to 130         | 60                          | 1.5                         | 1            | -          | -                         |
|            |            | G1V(A)13C | 110                      | 1              | 98                        | 80               | 60           | 80                         | 125            | 120 to 138         | 60                          | 1.5                         | 1            | -          | -                         |
|            |            | G1V(A)14C | 120                      | 1              | 98                        | 80               | 60           | 80                         | 125            | 130 to 150         | 60                          | 1.5                         | 1            | -          | -                         |
|            |            | G1V(A)15C | 115                      | 1              | 98                        | 80               | 60           | 80                         | 125            | 142 to 157         | 60                          | 1.5                         | 1            | -          | -                         |
| -          | AX078      | G1V(A)20C | 170                      | 1              | 98                        | 80               | 60           | 80                         | 125            | 190 to 210         | 60                          | 1.5                         | 1            | -          | -                         |
|            |            | G1V(B)20C | 170                      | 1              | 102                       | 120              | 60           | 220                        | 150            | 190 to 210         | 60                          | 1.5                         | 1            | -          | -                         |
|            |            | G1V(B)22C | 190                      | 1              | 98                        | 160              | 60           | 220                        | 125            | 210 to 230         | 60                          | 1.5                         | 1            | -          | -                         |
|            |            | G1V(B)24C | 210                      | 1              | 102                       | 120              | 60           | 220                        | 150            | 230 to 250         | 60                          | 1.5                         | 1            | -          | -                         |



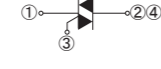
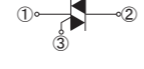








# TRIACs

TRIACs are bidirectional Thyristors.

Our TRIACs are easy to use for motor and heater controls due to balanced gate sensitivity and (di/dt)<sub>c</sub>.


Our lineup ranges from V<sub>DRM</sub>=600 to 800V, I<sub>T(RMS)</sub>=3 to 20A.

## TRIACs (Triode for Alternating Current)








| Package                                |  10.0 × 6.6 × 2.3(mm) |  28.5 × 10.0 × 4.5(mm)  |
|--|--|--|
| JEDEC Code<br>JEITA Code<br>House Name | TO-252AA<br>—<br>FB  | —<br>SC-91<br>FTO-220AG  |
| Fig.                                   | G2-3   | J8-4   |
| Internal Circuit                       |                       |   |
| V <sub>DRM</sub> [V]                   | 600  |  |
| I <sub>T(RMS)</sub> [A]                | 3  |  KD3FB60  |
|  | 5  |  KD3SF60E<br> KD3SF60  |
|  | 8  |  KD5SF60  |
|  | 12   |  KD8SF60  |
|  | 16   |  KD12SF60   |
|  | 20   |  KD16SF60<br> KD20SF60 |


 : New product

## TRIACs (Triode for Alternating Current)

| Surface Mount                          |      |   |                          |                                |                        |                                 |                                      |  |   |  |  |              |                   |            |
|--|------|---|--------------------------|--------------------------------|------------------------|---------------------------------|--------------------------------------|--|---|--|--|--------------|-------------------|------------|
| Package                                |      | Type No.  | Absolute Maximum Ratings |                                |                        | Electrical Characteristics      |                                      |  |   |  |  | Halogen free | Based on AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |   | V <sub>DRM</sub><br>[V]  | I <sub>T</sub><br>(RMS)<br>[A] | T <sub>J</sub><br>[°C] | V <sub>TM</sub><br>(max)<br>[V] | Conditions<br>I <sub>TM</sub><br>[A] | V <sub>GT</sub><br>(max)<br>(I, II, III)*<br>[V] | I <sub>GT</sub><br>(max)<br>(I, II, III)*<br>[mA] | (dv/dt) <sub>c</sub><br>(min)<br>(T <sub>j</sub> =150°C, V <sub>D</sub> =2/3V <sub>DRM</sub> )<br>[V/μs] | Conditions<br>(di/dt) <sub>c</sub><br>[A/ms] |              |                   |            |
| TO-252AA<br>—<br>FB                    | G2-3 |  KD3FB60 | 600                      | 3                              | -40 to 150             | 1.7                             | 4.5                                  | 1.5  | 15  | 1  | -1.5   | —            | —                 | —          |

 : New product \* : Operation mode IV is not guaranteed.

| Two Terminal Type  |      |  |                          |                                |                        |                                 |                                      |  |   |  |  |              |                   |            |
|--|------|--|--------------------------|--------------------------------|------------------------|---------------------------------|--------------------------------------|--|---|--|--|--------------|-------------------|------------|
| Package  |      | Type No.   | Absolute Maximum Ratings |                                |                        | Electrical Characteristics      |                                      |  |   |  |  | Halogen free | Based on AEC-Q101 | Automotive |
| JEDEC Code<br>JEITA Code<br>House Name   | Fig. |  | V <sub>DRM</sub><br>[V]  | I <sub>T</sub><br>(RMS)<br>[A] | T <sub>J</sub><br>[°C] | V <sub>TM</sub><br>(max)<br>[V] | Conditions<br>I <sub>TM</sub><br>[A] | V <sub>GT</sub><br>(max)<br>(I, II, III)*<br>[V] | I <sub>GT</sub><br>(max)<br>(I, II, III)*<br>[mA] | (dv/dt) <sub>c</sub><br>(min)<br>(T <sub>j</sub> =150°C, V <sub>D</sub> =2/3V <sub>DRM</sub> )<br>[V/μs] | Conditions<br>(di/dt) <sub>c</sub><br>[A/ms] |              |                   |            |
| —<br>SC-91<br>FTO-220AG  | J8-4 |  KD3SF60E | 600                      | 3                              | -40 to 150             | 1.5                             | 4.5                                  | 1.5  | 10  | —  | —  | —            | —                 | —          |
|  |      |  KD3SF60  | 600                      | 3                              | -40 to 150             | 1.5                             | 4.5                                  | 1.5  | 20  | 1  | -1.5   | —            | —                 | —          |
|  |      |  KD5SF60  | 600                      | 5                              | -40 to 150             | 1.8                             | 7                                    | 1.5  | 20  | 1  | -2.5   | —            | —                 | —          |
|  |      |  KD8SF60  | 600                      | 8                              | -40 to 150             | 1.6                             | 12                                   | 1.5  | 30  | 1  | -4.0   | —            | —                 | —          |
|  |      |  KD12SF60 | 600                      | 12                             | -40 to 150             | 1.6                             | 20                                   | 1.5  | 30  | 1  | -6.0   | —            | —                 | —          |
|  |      |  KD16SF60 | 600                      | 16                             | -40 to 150             | 1.5                             | 25                                   | 1.5  | 30  | 1  | -8.0   | —            | —                 | —          |
|  KD20SF60 | 600  | 20   | -40 to 150               | 1.4                            | 30                     | 1.5                             | 30                                   | 1  | -10.0   | —  | —  | —            |                   |            |

 : New product \* : Operation mode IV is not guaranteed.

| Terminal Characteristics |      |       |     |
|--------------------------|------|-------|-----|
| Operation Mode           | ① T1 | ②④ T2 | ③ G |
| I                        | —    | +     | +   |
| II                       | —    | +     | —   |
| III                      | +    | —     | —   |
| IV                       | +    | —     | +   |




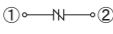
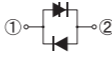
# SURGE ABSORBERS

Surge Absorbers are semiconductor devices of the Thyristor type that turns on when triggered by their rated voltage. They are commonly used for lightning surge protection in communications equipment.

## Thyristor Surge Suppressors

- Features**
1. Bi-directional or uni-directional characteristics.
  2. High speed response.
  3. Large surge current capacity.
  4. Repetitive use against surges is possible.


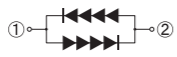
- Applications**
1. Lightning surge adsorption for communications circuits.
  2. Lightning surge adsorption for transmitters and switchboards.
  3. Surge protection for ISDN terminals.

| Series                                  | KL Series  | KU Series   | KP Series  |
|---|--|---|--|
| Package                                 | <br>5.0 × 2.5 × 2.0(mm) | <br>5.1 × 3.75 × 2.0(mm) | <br>7.6 × 4.0 × 2.8(mm) |
| JEDEC Code<br>JEITA Code<br>House Name  | DO-214AC<br>-<br>1F  | DO-214AA similar<br>-<br>M2F  | -<br>-<br>2F   |
| Fig.                                    | B4-3   | B7<br>B8  | B9-4   |
| Internal Circuit                        |                         |   |                         |
| Off-state Voltage<br>V <sub>D</sub> [V] | 5  | KL3Z07  |  |
|   | 15   | KL3Z18  |  |
|   | 58   | KL3L07  |  |
|   | 63   |   | KU10L08  |
|   | 70   |   | KU4F8  |
|   | 90   |   | KU10NU11   |
|   | 92   |   | KP20NU11<br>KP40NU11   |
|   | 100  |   | KU4F12   |
|   | 115  |   | KU10NU13   |
|   | 120  | KL3N14  | KU10N14<br>KU15N14   |
|   | 175  | KL3R20  |  |
|   | 180  |   | KP40RU22   |
|   | 190  |   | KU10R23NS  |
|   | 220  |   | KU10R27NS  |
| 250                                     |  | KU10R29NS   |  |
| 275                                     |  | KU5S31NS<br>KU10S31NS<br>KU10S35NS  |  |

## Varistor

- Features**
1. Bi-directional surge absorption is possible.
  2. Low junction capacitance.

- Applications**
1. Telephone set surge absorption.
  2. Digital communications circuit surge absorption.
  3. ISDN terminal surge absorption.

|  |  |
|--|--|
| Package                                | <br>5.0 × 2.5 × 2.0(mm) |
| JEDEC Code<br>JEITA Code<br>House Name | DO-214AC<br>-<br>1F  |
| Fig.                                   | B4-1   |
| Internal Circuit                       |                         |
| V <sub>F</sub> [V]                     | 2.3 ± 0.25   |
|  | VR61F1   |

## Thyristor Surge Suppressors

| Package                                |      | Type No.  | Absolute Maximum Ratings |                         |                    |                        | Electrical Characteristics      |                                 |                                 | Halogen free | UL | Automotive |
|--|------|-----------|--------------------------|-------------------------|--------------------|------------------------|---------------------------------|---------------------------------|---------------------------------|--------------|----|------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |           | V <sub>BRM</sub><br>[V]  | I <sub>TSM</sub><br>[A] | Conditions<br>[μs] | T <sub>J</sub><br>[°C] | V <sub>BO</sub><br>(min)<br>[V] | I <sub>H</sub><br>(min)<br>[mA] | C <sub>t</sub><br>(max)<br>[pF] |              |    |            |
| DO-214AC<br>-<br>1F                    | B4-3 | KL3Z07    | 5                        | 30                      | 10/1000            | 125                    | 5.5 *1                          | 50                              | -                               | -            | -  |            |
|  |      | KL3Z18    | 15                       | 30                      | 10/1000            | 125                    | 15.5 *1                         | 50                              | -                               | -            | -  |            |
|  |      | KL3L07    | 58                       | 30                      | 10/1000            | 125                    | 65                              | 100                             | 90                              | -            | -  |            |
|  |      | KL3N14    | 120                      | 30                      | 10/1000            | 125                    | 130                             | 100                             | 50                              | -            | -  |            |
|  |      | KL3R20    | 175                      | 30                      | 10/1000            | 125                    | 180                             | 100                             | 30                              | -            | -  |            |
| DO-214AA similar<br>-<br>M2F           | B7   | KU10L08   | 63                       | 100                     | 10/1000            | 125                    | 70                              | 100                             | 180                             | -            | UL | -          |
|  |      | KU4F8     | 70                       | 40                      | 10/1000            | 125                    | 75                              | 100                             | 100                             | -            | -  | -          |
|  | B7   | KU10NU11  | 60                       | 100                     | 10/1000            | 125                    | 100                             | 150                             | -                               | -            | -  | -          |
|  |      | KU4F12    | 100                      | 40                      | 10/1000            | 125                    | 110                             | 100                             | 100                             | -            | -  | -          |
|  |      | KU10NU13  | 60                       | 100                     | 10/1000            | 125                    | 120                             | 100                             | -                               | -            | -  | -          |
|  |      | KU10N14   | 120                      | 100                     | 10/1000            | 125                    | 125                             | 100                             | 140                             | -            | UL | -          |
|  |      | KU15N14   | 120                      | 150                     | 10/1000            | 125                    | 125                             | 100                             | 110                             | -            | UL | -          |
|  |      | KU10R23NS | 190                      | 100                     | 10/1000            | 125                    | 290 *2                          | 100                             | 90                              | -            | -  | -          |
|  |      | KU10R27NS | 220                      | 100                     | 10/1000            | 125                    | 320 *2                          | 100                             | 70                              | -            | UL | -          |
|  |      | KU10R29NS | 250                      | 100                     | 10/1000            | 125                    | 400 *2                          | 100                             | 70                              | -            | UL | -          |
| -                                      | B9-4 | KU5S31NS  | 275                      | 50                      | 10/1000            | 125                    | 420 *2                          | 150                             | 70                              | -            | -  | -          |
|  |      | KU10S31NS | 275                      | 100                     | 10/1000            | 125                    | 420 *2                          | 100                             | 90                              | -            | UL | -          |
|  |      | KU10S35NS | 275                      | 100                     | 10/1000            | 125                    | 450 *2                          | 100                             | 90                              | -            | -  | -          |
|  |      | KP20NU11  | 60                       | 325                     | 10/700             | 125                    | 100                             | 150                             | 295 *3                          | -            | -  | -          |
|  |      | KP40NU11  | 60                       | 500                     | 10/700             | 125                    | 100                             | 150                             | 485 *3                          | -            | -  | -          |
|  |      | KP40RU22  | 60                       | 500                     | 10/700             | 125                    | 195                             | 100                             | 285 *3                          | -            | -  | -          |

\*1 : V<sub>BR</sub> \*2 : V<sub>CL</sub>(max) \*3 : typ.  : UL497B recognized (UL File No.E183905)

## Varistor

| Package                                |      | Type No. | Absolute Maximum Ratings   |                                |                        | Electrical Characteristics |                                      | Halogen free | Automotive |
|--|------|----------|----------------------------|--------------------------------|------------------------|----------------------------|--------------------------------------|--------------|------------|
| JEDEC Code<br>JEITA Code<br>House Name | Fig. |          | I <sub>F(RMS)</sub><br>[A] | I <sub>FSM(R.M.S)</sub><br>[A] | T <sub>J</sub><br>[°C] | V <sub>F</sub><br>[V]      | Conditions<br>I <sub>F</sub><br>[mA] |              |            |
| DO-214AC<br>-<br>1F                    | B4-1 | VR61F1   | 0.37(*1)/0.28(*2)          | 7.5                            | -55 to 150             | 2.3 ± 0.25                 | 1                                    | -            | -          |

\*1 : On alumina substrate \*2 : On glass-epoxy substrate










# TVS (Transient Surge Suppressor)

## Power Clampers

- Features
  - 1.High speed response.
  - 2.Absorption energy tolerance capacity.
  - 3.Narrow clampingvoltage width.
  - 4.Reverse blocking type.

- Application 1.Snubber circuit in the primary side of switch-mode power supplies.

| Package                      | <br>7.6 × 4.0 × 2.8(mm) | <br>5.0 × φ 4.0(mm) | <br>7.0 × φ 4.4(mm) |              |
|------------------------------|--|--|--|--------------|
| JEDEC Code                   | —  | —  | —  |              |
| JEITA Code                   | —  | —  | —  |              |
| House Name                   | 2F   | AX078  | AX10   |              |
| Fig.                         | B9-3   | A4-2   | A5-2   |              |
| Internal Circuit             |                         |                    |  |              |
| V <sub>BR</sub> (typ)<br>[V] | 82   |  | ST02D-82   | ST03D-82     |
|                              | 145  | ST02D-140F2  | ST02D-140  | ST03D-140    |
|                              | 170  | ST02D-170F2  | ST02D-170  | ST03D-170    |
|                              | 200  |  | ST02D-200  | ST03D-200    |
|                              | 240  |  |  | ST03DH-240   |
|                              | 280  |  |  | ★ ST02DH-280 |
| 320                          |  |  | ★ ST02DH-320   |              |

★ : Under development

## Power Clampers

| Surface Mount |      | Type No.    | Absolute Maximum Ratings |      |        |            | Electrical Characteristics |           |           |                           |                      |                      | Halogen free | Automotive |                           |
|---------------|------|-------------|--------------------------|------|--------|------------|----------------------------|-----------|-----------|---------------------------|----------------------|----------------------|--------------|------------|---------------------------|
| Package       |      |             | PrSM                     | ZD   |        | Di         | Tj                         | ZD        |           |                           | Di                   |                      |              |            |                           |
| JEDEC Code    | Fig. |             |                          | VRRM | VR(DC) |            |                            | VBR (min) | VBR (max) | Conditions I <sub>R</sub> | I <sub>R</sub> (max) | I <sub>R</sub> (max) |              |            | Conditions V <sub>R</sub> |
| —             | B9-3 | ST02D-140F2 | 200                      | 120  | 600    | -40 to 150 | 130                        | 160       | 1         | 5                         | 5                    | 600                  | —            | —          |                           |
| 2F            |      | ST02D-170F2 | 200                      | 145  | 600    | -40 to 150 | 155                        | 185       | 1         | 5                         | 5                    | 600                  | —            | —          |                           |

| Axial        |      | Type No.     | Absolute Maximum Ratings |            |        |            | Electrical Characteristics |           |           |                           |                      |                      | Halogen free | Automotive |                           |
|--------------|------|--------------|--------------------------|------------|--------|------------|----------------------------|-----------|-----------|---------------------------|----------------------|----------------------|--------------|------------|---------------------------|
| Package      |      |              | PrSM                     | ZD         |        | Di         | Tj                         | ZD        |           |                           | Di                   |                      |              |            |                           |
| JEDEC Code   | Fig. |              |                          | VRRM       | VR(DC) |            |                            | VBR (min) | VBR (max) | Conditions I <sub>R</sub> | I <sub>R</sub> (max) | I <sub>R</sub> (max) |              |            | Conditions V <sub>R</sub> |
| —<br>AX078   | A4-2 | ST02D-82     | 200                      | 67         | 600    | -40 to 150 | 74                         | 90        | 1         | 5                         | 5                    | 600                  | —            | —          |                           |
|              |      | ST02D-140    | 200                      | 120        | 600    | -40 to 150 | 130                        | 160       | 1         | 5                         | 5                    | 600                  | —            | —          |                           |
|              |      | ST02D-170    | 200                      | 145        | 600    | -40 to 150 | 155                        | 185       | 1         | 5                         | 5                    | 600                  | —            | —          |                           |
|              |      | ST02D-200    | 200                      | 170        | 600    | -40 to 150 | 185                        | 215       | 1         | 5                         | 5                    | 600                  | —            | —          |                           |
| —<br>AX10    | A5-2 | ST03D-82     | 300                      | 67         | 600    | -40 to 150 | 74                         | 90        | 1         | 5                         | 5                    | 600                  | —            | —          |                           |
|              |      | ST03D-140    | 300                      | 120        | 600    | -40 to 150 | 130                        | 160       | 1         | 5                         | 5                    | 600                  | —            | —          |                           |
|              |      | ST03D-170    | 300                      | 145        | 600    | -40 to 150 | 155                        | 185       | 1         | 5                         | 5                    | 600                  | —            | —          |                           |
|              |      | ST03D-200    | 300                      | 170        | 600    | -40 to 150 | 185                        | 215       | 1         | 5                         | 5                    | 600                  | —            | —          |                           |
|              |      | ST03DH-240   | 300                      | 200        | 1000   | -40 to 150 | 220                        | 250       | 1         | 5                         | 10                   | 1000                 | —            | —          |                           |
|              |      | ★ ST02DH-280 | 300                      | 230        | 1000   | -40 to 150 | 250                        | 300       | 1         | 5                         | 10                   | 1000                 | —            | —          |                           |
| ★ ST02DH-320 | 300  | 260          | 1000                     | -40 to 150 | 300    | 350        | 1                          | 5         | 10        | 1000                      | —                    | —                    |              |            |                           |

★ : Under development







# POWER MODULES

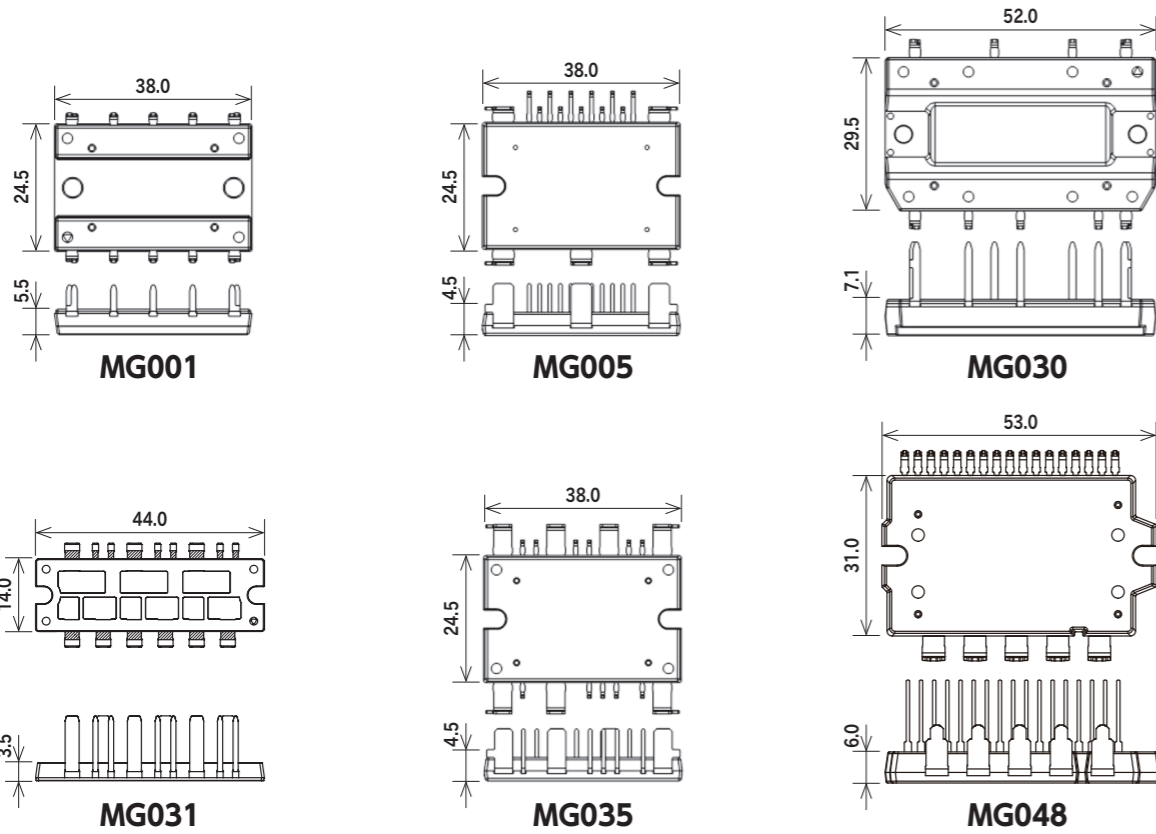
Power Modules include combinations of various power semiconductors.

They are easy to design, reduce the number of components needed in the device, are suitable for device downsizing, and mitigate heat-dissipation concerns.

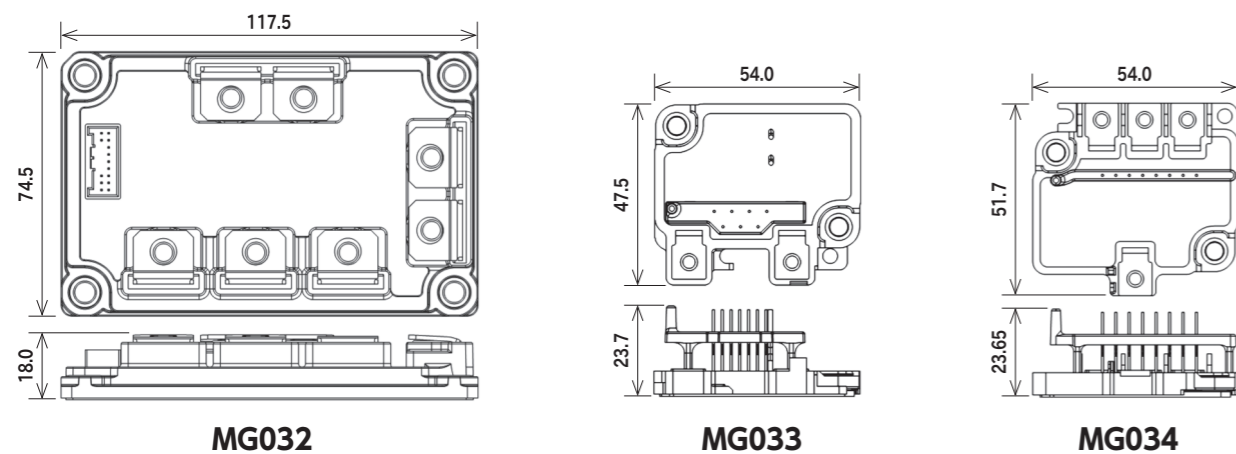
At Shindengen, a multitude of packages allow us to meet customer needs of MOSFET, diodes, and other products.

Semi customizable support and customizable package design support are available.

## Transfer Type Package Sample



## Potting Type Package Sample



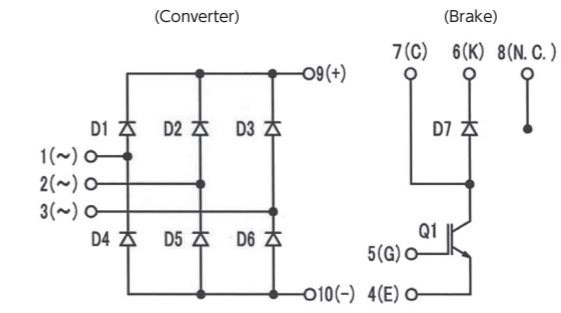
## CB Module Series

### Converter + Brake Modules

| Package | JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.       | Converter Diode          |                            |                                   |                             | Brake IGBT                       |                         |                          |                                       | Brake FRD                        |                         |                            |                                   | Halogen free | UL | Automotive |                             |                                  |                               |
|---------|--|------|----------------|--------------------------|----------------------------|-----------------------------------|-----------------------------|----------------------------------|-------------------------|--------------------------|---------------------------------------|----------------------------------|-------------------------|----------------------------|-----------------------------------|--------------|----|------------|-----------------------------|----------------------------------|-------------------------------|
|         |  |      |                | Absolute Maximum Ratings |                            | Electric Characteristics          |                             | Absolute Maximum Ratings         |                         | Electric Characteristics |                                       | Absolute Maximum Ratings         |                         | Electric Characteristics   |                                   |              |    |            |                             |                                  |                               |
|         |  |      |                | V <sub>RRM</sub><br>[V]  | I <sub>F</sub> (AV)<br>[A] | Conditions<br>T <sub>c</sub> [°C] | V <sub>F</sub> (max)<br>[V] | Conditions<br>I <sub>F</sub> [A] | V <sub>CEs</sub><br>[V] | I <sub>c</sub><br>[A]    | V <sub>CE</sub> (sat)<br>(typ)<br>[V] | Conditions<br>I <sub>c</sub> [A] | V <sub>RRM</sub><br>[V] | I <sub>F</sub> (AV)<br>[A] | Conditions<br>T <sub>c</sub> [°C] |              |    |            | V <sub>F</sub> (max)<br>[V] | Conditions<br>I <sub>F</sub> [A] | t <sub>rr</sub> (max)<br>[ns] |
| -       | -                                      | F4   | MG001AK028060A | 600                      | 20                         | 137                               | 1.05                        | 7                                | 600                     | 28                       | 1.70                                  | 28                               | 600                     | 3                          | 137                               | 1.65         | 3  | 50         | ○                           | UL                               | -                             |
| -       | -                                      | F4   | MG001AL030060A | 600                      | 30                         | 136                               | 1.05                        | 10                               | 600                     | 30                       | 1.5                                   | 30                               | 600                     | 3                          | 137                               | 1.65         | 3  | 50         | ○                           | UL                               | -                             |

■ : New product    UL : UL recognized (UL File No. E142422)

### Equivalent Circuit Schematic



MG001

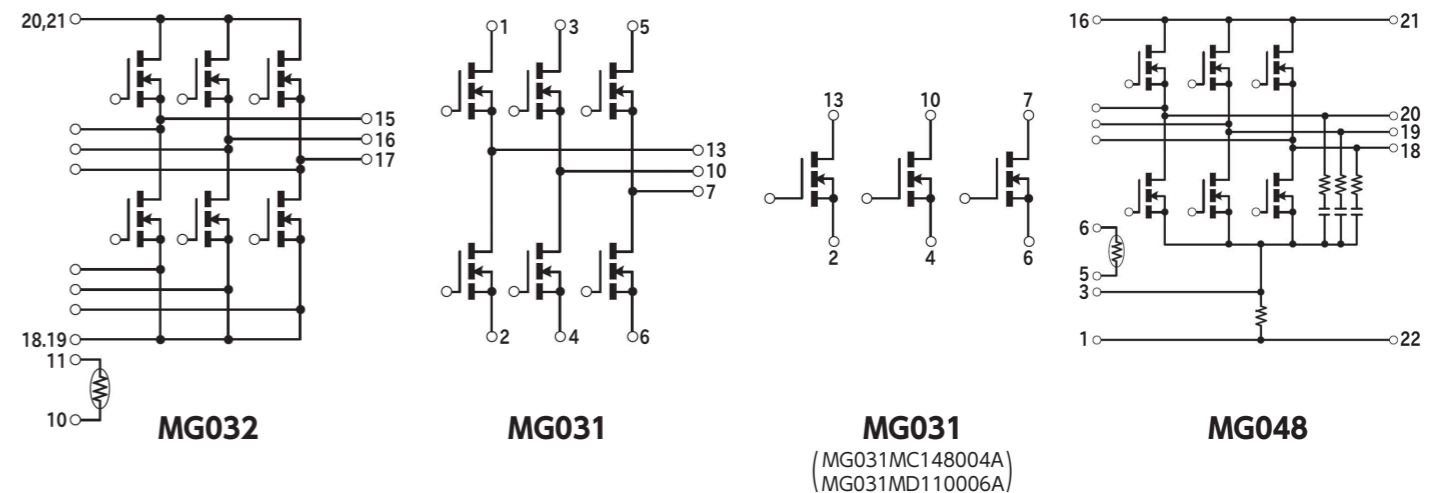
## INV Module Series

### Inverter Modules

| Package | JEDEC Code<br>JEITA Code<br>House Name | Fig. | Type No.        | Absolute Maximum Ratings |                       |                        |                       |                         | Electrical Characteristics        |                                   |                                |                              |                              | Halogen free | UL | Automotive |                                      |
|---------|--|------|-----------------|--------------------------|-----------------------|------------------------|-----------------------|-------------------------|-----------------------------------|-----------------------------------|--------------------------------|------------------------------|------------------------------|--------------|----|------------|--------------------------------------|
|         |  |      |                 | V <sub>DSS</sub><br>[V]  | I <sub>D</sub><br>[A] | I <sub>DP</sub><br>[A] | P <sub>T</sub><br>[W] | T <sub>ch</sub><br>[°C] | R <sub>DS(ON)</sub> (typ)<br>[mΩ] | R <sub>DS(ON)</sub> (max)<br>[mΩ] | C <sub>iss</sub> (typ)<br>[pF] | Q <sub>g</sub> (typ)<br>[nC] | V <sub>th</sub> (typ)<br>[V] |              |    |            | R <sub>th(j-c)</sub> (max)<br>[°C/W] |
| -       | -                                      | F6   | MG032A4207R5A   | 75                       | 420                   | 840                    | 500                   | 150                     | -                                 | 0.98                              | 80120                          | 505                          | 3.0                          | 0.25         | -  | -          | ○                                    |
| -       | -                                      | F6   | MG032B420010A   | 100                      | 420                   | 840                    | 500                   | 150                     | 0.99                              | 1.37                              | 91800                          | 500                          | 3.0                          | 0.25         | -  | -          | ○                                    |
| -       | -                                      | F5   | MG031B090004A   | 40                       | 90                    | 360                    | 125                   | 175                     | 2.34                              | 3.2                               | 4180                           | 76                           | 2.0                          | 1.2          | ○  | -          | ○                                    |
| -       | -                                      | F5   | ★MG031E120004A  | 40                       | 120                   | 480                    | 104                   | 150                     | 2.5                               | 3.1                               | TBD                            | TBD                          | 3.0                          | 1.2          | ○  | -          | ■                                    |
| -       | -                                      | F5   | ★MG031G148004A  | 40                       | 148                   | 592                    | 154                   | 175                     | 1.75                              | 2.2                               | 5330                           | 96                           | 3.0                          | 0.97         | ○  | -          | ○                                    |
| -       | -                                      | F5   | ★MG031L080006A  | 60                       | 80                    | 320                    | 104                   | 150                     | 4.5                               | 5.6                               | 3390                           | 58                           | 3.0                          | 1.2          | ○  | -          | ■                                    |
| -       | -                                      | F5   | ★MG031N110006A  | 60                       | 110                   | 440                    | 128                   | 150                     | 3.0                               | 3.8                               | 5430                           | 89                           | 3.0                          | 0.97         | ○  | -          | ■                                    |
| -       | -                                      | F5   | ★MG031MC148004A | 40                       | 148                   | 592                    | 128                   | 150                     | 1.75                              | 2.2                               | 5330                           | 96                           | 3.0                          | 0.97         | ○  | -          | ■                                    |
| -       | -                                      | F5   | ★MG031MD110006A | 60                       | 110                   | 440                    | 128                   | 150                     | 3.0                               | 3.8                               | 5430                           | 89                           | 3.0                          | 0.97         | ○  | -          | ■                                    |
| -       | -                                      | F8   | ★MG048A150004A  | 40                       | 150                   | 600                    | 147                   | 150                     | 2.1                               | 2.7                               | 5900                           | 111                          | 3.0                          | 0.85         | ○  | -          | ■                                    |
| -       | -                                      | F8   | ★MG048B100006A  | 60                       | 100                   | 400                    | 147                   | 150                     | 2.92                              | 3.65                              | 8100                           | 129                          | 3.0                          | 0.85         | ○  | -          | ■                                    |

■ : New product    ★ : Under development    ■ : Please contact us.

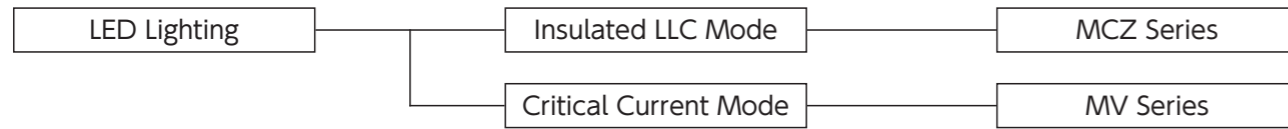
### Equivalent Circuit Schematic



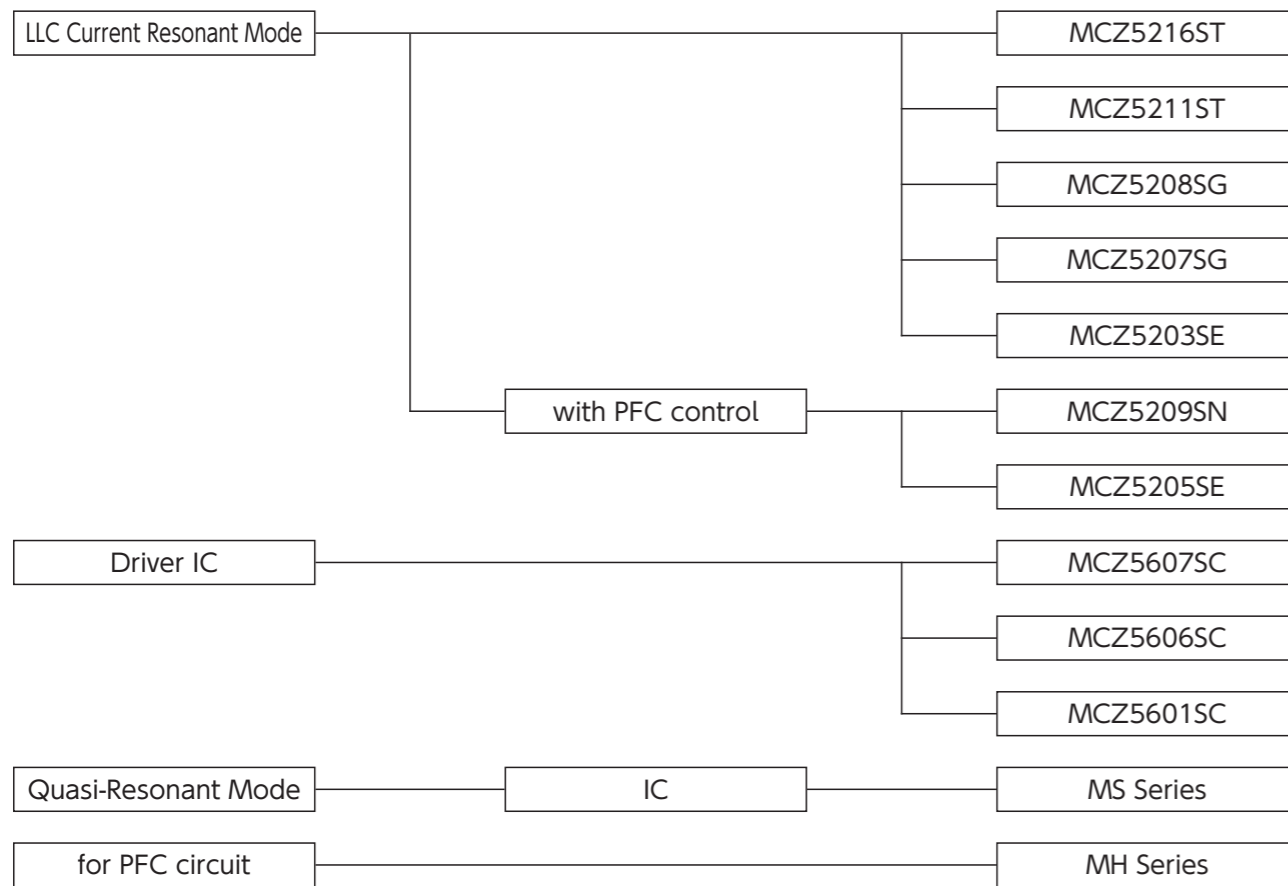
# POWER ICs

## Line up

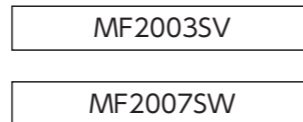
### IC for LED Lighting



### IC for Power Supply



### Ideal Diode IC





## IC for LED Lighting

### Current Mode Power Supply ICs for LED Lighting : MV Series

- Outline The MV series has a specialized function for LED lighting with PWM & Linear dimming that operates critical current mode without auxiliary winding. On and off width modulation function allows for smooth deep dimming of 1% or less.

## MV Series

### Critical Current Mode Power Supply ICs for LED Lighting

| Package   |      | Type No. | HV Startup | Vcc [V]  | Output | ON/OFF   | Built-in Regulator Voltage [V] | Linear Dimming       | PWM Dimming | Halogen free | Automotive |   |   |
|---|------|----------|------------|----------|--------|----------|--------------------------------|----------------------|-------------|--------------|------------|---|---|
| JEDEC Code<br>JEITA Code<br>House Name  | Fig. |          |            |          |        |          |                                |                      |             |              |            |   |   |
|  | -    | SOP8J    | L2         | MV1001SC | Yes    | 9 to 16  | 1ch                            | -                    | -           | Yes          | Yes        | - | - |
|   |      |          | MV1002SC   | No       | -      |          |                                |                      |             |              |            | - |   |
|   |      |          | MV1011SC   | Yes      | -      |          |                                |                      |             |              |            | - |   |
|   |      |          | MV1012SC   | No       | -      |          |                                |                      |             |              |            | - |   |
|  | -    | SOP16    | L5         | MV2002SG | No     | 10 to 16 | 2ch                            | Cont. by REF Voltage | 3.3         | -            | -          | - | - |
|   |      |          | MV2052SG   | No       | 5      |          |                                |                      |             |              |            | - | - |

# POWER ICs

## IC for Power Supply

### LLC Current Resonant Mode Controller ICs for Bridge Converter : MCZ Series

- Outline** The MCZ series is an advanced symmetric LLC current resonant mode controller for bridge converters. Symmetric LLC resonant converter applications are greatly expanding due to their extremely high efficiency and low noise characteristics.

### High/Low Side Driver IC

- Outline** A driving IC for MOSFET and IGBT power devices. With built-in high-withstand voltage components, it can be used for a variety of uses such as inverter and power supply, etc.

### Low Power Standby Quasi-Resonant Power Supply ICs : MS Series

- Outline** The MS series consumes much less power in standby mode than conventional MR series. The ICs incorporate various functions to make it more user-friendly and easier to design a power supply with fewer external components.

### PFC ICs : MH Series

- Outline** The MH series is a PFC circuit control IC which enables multistage interleave. An efficient, high power operation is possible by utilizing a follower IC composed of multistage interleave and a leader IC that can be used alone.






## Ideal Diode IC

### Ideal Diode IC V-Diode™ MF Series

- Outline** This is an ideal diode IC with a built-in reverse connection and reverse current protection it is used for electronic units with batteries as input sources. By using a built-in or a separate MOSFET to control the IC, it allows reducing the size of the circuit board as well as lowering loss and increasing heat dissipation.


## MCZ Series

### LLC Current Resonant Mode Controller ICs for Bridge Converter

| Package   |       | Type No. | Type      | HV Startup                                 | High-side Drive | Vcc (max) [V] | Vin Sensing | Burst Mode | Maximum Frequency [kHz] | X-cap. discharge | Capacitive Mode Protection | Over Voltage Protection | Over Current Protection | Halogen free | Automotive |     |       |             |       |             |     |       |             |   |   |
|---|-------|----------|-----------|--|-----------------|---------------|-------------|------------|-------------------------|------------------|----------------------------|-------------------------|-------------------------|--------------|------------|-----|-------|-------------|-------|-------------|-----|-------|-------------|---|---|
| JEDEC Code<br>JEITA Code<br>House Name  | Fig.  |          |           |  |                 |               |             |            |                         |                  |                            |                         |                         |              |            |     |       |             |       |             |     |       |             |   |   |
|  | —     | L6       | MCZ5216ST | LLC Current Resonant Mode                  | Yes             | 35            | Yes         | Yes        | 500                     | Yes              | Yes                        | Latch                   | Timer Latch             | ○            | —          |     |       |             |       |             |     |       |             |   |   |
|   | SOP18 |          | MCZ5211ST | LLC Current Resonant Mode                  | Yes             |               |             | Yes        | 500                     | No               |                            |                         |                         | ○            | —          |     |       |             |       |             |     |       |             |   |   |
|  | —     | L8       | MCZ5209SN | LLC Current Resonant Mode with PFC Control | Yes             |               |             | 35         | Yes                     | Yes              |                            |                         |                         | 300          | No         | Yes | Latch | Timer Latch | ○     | —           |     |       |             |   |   |
|   | SOP24 |          | MCZ52075G | LLC Current Resonant Mode                  | No              |               |             |            |                         | Yes              |                            |                         |                         | 300          | No         |     |       |             | —     | —           |     |       |             |   |   |
|  | —     | L5       | MCZ5208SG | LLC Current Resonant Mode                  | No              |               |             |            |                         | 35               |                            |                         |                         | Yes          | Yes        |     |       |             | 500   | No          | Yes | Latch | Timer Latch | ○ | — |
|   | SOP16 |          | MCZ5205SE | LLC Current Resonant Mode with PFC Control | No              |               |             |            |                         |                  |                            |                         |                         |              | No         |     |       |             | 300   | No          |     |       |             | — | — |
|  | —     | L7       | MCZ5205SE | LLC Current Resonant Mode with PFC Control | No              | 35            | Yes         |            |                         |                  | No                         | 300                     | No                      |              | Yes        |     |       |             | Latch | Timer Latch |     |       |             | — | — |
|   | SOP22 |          | MCZ5203SE | LLC Current Resonant Mode                  | No              |               |             |            |                         |                  | No                         | 300                     | No                      |              |            |     |       |             |       |             |     |       |             | — | — |
|  | —     | L7       | MCZ5203SE | LLC Current Resonant Mode                  | No              |               |             | 35         | Yes                     |                  | No                         | 300                     | No                      |              |            | Yes | Latch | Timer Latch |       |             |     |       |             | — | — |
|   | SOP22 |          | MCZ5203SE | LLC Current Resonant Mode                  | No              |               |             |            |                         |                  | No                         | 300                     | No                      |              |            |     |       |             |       |             |     |       |             | — | — |

■ : New product



### High/Low Side Driver ICs

| Package   |       | Type No. | Output                 | High-side Floating Supply Voltage [V] | Vcc (max) [V] | Input/Output Channel | Vcc_UVLO [V] | VBS_UVLO [V] | Source [mA] | Sink [mA] | Halogen free   | Automotive     |   |  |  |
|---|-------|----------|------------------------|---------------------------------------|---------------|----------------------|--------------|--------------|-------------|-----------|----------------|----------------|---|--|--|
| JEDEC Code<br>JEITA Code<br>House Name  | Fig.  |          |                        |                                       |               |                      |              |              |             |           |                |                |   |  |  |
|  | —     | L2       | High-side/<br>Low-side | 622                                   | 22            | 2/2                  | 8.2 to 8.9   | 8.2 to 8.9   | 220         | 450       | Not identified | —              |   |  |  |
|   | SOP8J |          |                        | ★ MCZ5607SC                           | 622           | 22                   | 2/2          | 8.2 to 8.9   | 8.2 to 8.9  | 220       | 450            | Not identified | — |  |  |
|   |       |          |                        | ★ MCZ5606SC                           | 600           | 22                   | 2/2          | 8.2 to 9.0   | 7.2 to 8.0  | 400       | 400            | ○              | — |  |  |
|   |       |          |                        |                                       |               |                      |              |              |             |           |                |                |   |  |  |

■ : New product ★ : Under development

## MS Series


### Low Power Standby Quasi-Resonant Power Supply ICs

| Package   |         | Type No. | Vin [V]   | Vcc [V]  | Over Voltage Protection | Over Current Protection | Stand-by Operation               | Bottom Skip                     | Halogen free | Automotive |   |
|---|---------|----------|-----------|----------|-------------------------|-------------------------|----------------------------------|---------------------------------|--------------|------------|---|
| JEDEC Code<br>JEITA Code<br>House Name  | Fig.    |          |           |          |                         |                         |                                  |                                 |              |            |   |
|  | —       | L3       | 95 to 450 | 11 to 21 | Auto restart            | Auto restart            | Auto Burst Mode                  | 1 skip                          | —            | —          |   |
|   | SOP8/7J |          |           | MS1004SH | 11 to 24                | Vcc Latch               | Timer Latch 2sec. (typ)          | Auto Burst Mode/<br>S-Stby Mode | 2 skip       | —          | — |
|   |         |          |           | MS1003SH |                         |                         |                                  | 1 skip                          | —            | —          |   |
|  | —       | L4       | 95 to 450 | 11 to 24 | Vcc Latch               | Timer Latch 2sec. (typ) | Auto Burst Mode/<br>UT-Stby Mode | 2 skip                          | —            | —          |   |
|   | SOP14   |          |           |          |                         |                         | MS1005SK                         | 1 skip                          | —            | —          |   |

★ : Under development



## MH Series

### PFC ICs

| Package   |       | Type No. | Type     | Operation Mode              | Vin Sensing | Vcc [V]  | Zero Current Detection | Diodes Short Protection | FB Open Short Protection | Over Voltage Protection | Halogen free | Automotive |
|---|-------|----------|----------|-----------------------------|-------------|----------|------------------------|-------------------------|--------------------------|-------------------------|--------------|------------|
| JEDEC Code<br>JEITA Code<br>House Name  | Fig.  |          |          |                             |             |          |                        |                         |                          |                         |              |            |
|  | —     | L2       | MH2501SC | Critical Current Mode       | Leader      | 13 to 23 | Auxiliary Winding      | Yes                     | Yes                      | Yes                     | —            | —          |
|   | SOP8J |          | MH2511SC | Synchronizes with Leader IC | Follower    |          | Unnecessary            | —                       | No                       | No                      | No           | —          |

## MF Series








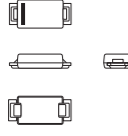
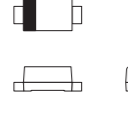
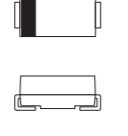
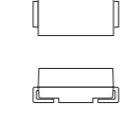
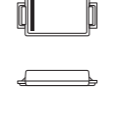
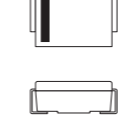
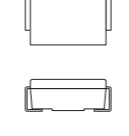
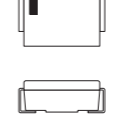
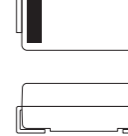
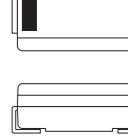
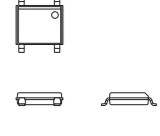
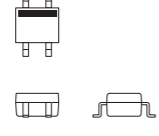
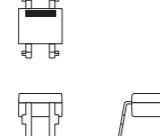
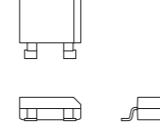
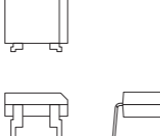
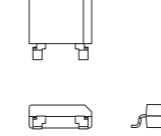
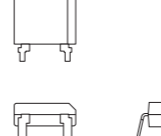
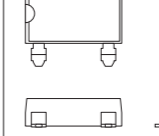
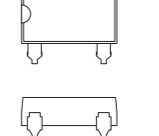
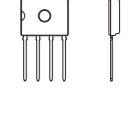
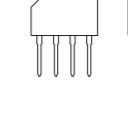
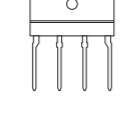
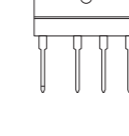
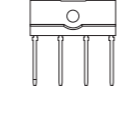
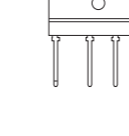
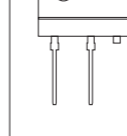
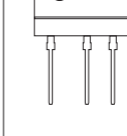
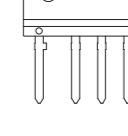
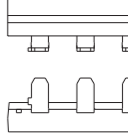
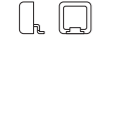
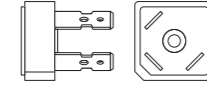
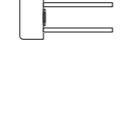
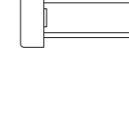
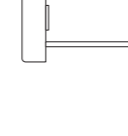
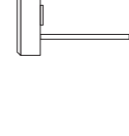
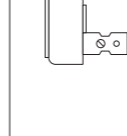
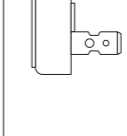
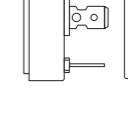
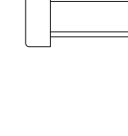
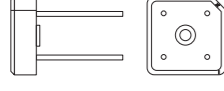


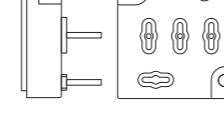

### Ideal Diode IC

| Package   |         | Type No. | Featured Type                     | Operating Voltage [V] | Reverse Connection Protection | Reverse Current Prevention | Ron (typ.) [mΩ] | Quiescent Current/<br>Shutdown Supply Current | Halogen free   | Automotive |
|---|---------|----------|-----------------------------------|-----------------------|-------------------------------|----------------------------|-----------------|---|----------------|------------|
| JEDEC Code<br>JEITA Code<br>House Name  | Fig.    |          |                                   |                       |                               |                            |                 |   |                |            |
|  | —       | L9       | Built-in Pch MOSFET               | 2.5 to 40             | Yes                           | Yes                        | 57              | Quiescent Current = 3μA                       | Not identified | ○          |
|   | WSOP8   |          |                                   |                       |                               |                            |                 |   |                |            |
|  | —       | L10      | Driver IC for Separate Nch MOSFET | 3.5 to 70             | Yes                           | Yes                        | —               | Shutdown Supply Current = 10μA                | Not identified | ○          |
|   | TSSOP10 |          |                                   |                       |                               |                            |                 |   |                |            |

★ : Under development



# PACKAGE LIST

|   | 1  | 2   | 3   | 4  | 5  | 6 | 7  | 8  | 9  | 10   |   |
|---|--|---|---|--|--|---|--|--|--|--|---|
| A | A1 Package:AX057<br>                | A2 Package:AX06<br>              | A3 Package:AX06<br>        | A4 Package:AX078<br>       | A5 Package:AX10<br>       |   | A6 Package:AX10<br>                 | A7 Package:AX14<br>                 |  |  |   |
|   |  |   |   |  |  |   |  |  |  |  |   |
| B | B1 Package:DO-219AB similar G1E<br> | B2 Package:DO-219AA M1E<br>      | B3 Package:DO-214AC 1E<br> | B4 Package:DO-214AC 1E<br> | B5 Package:SC-110B CE<br> |   | B6 Package:DO-214AA similar M2E<br> | B7 Package:DO-214AA similar M2E<br> | B8 Package:DO-214AA similar M2E<br> | B9 Package:2F<br>       | B10 Package:2F<br>     |
|   |  |   |   |  |  |   |  |  |  |  |   |
| C | C1 Package:SOPA-4<br>              | C2 Package:TO-269AA 1Z(SMD)<br> | C3 Package:1Z(DIP)<br>    | C4 Package:1N(SMD)<br>     | C5 Package:1N(DIP)<br>   |   | C6 Package:1NA(SMD)<br>            | C7 Package:1NA(DIP)<br>            | C8 Package:1W(SMD)<br>             | C9 Package:1W(DIP)<br> |   |
|   |  |   |   |  |  |   |  |  |  |  |   |
| D | D1 Package:D3K<br>                | D2 Package:2S<br>              | D3 Package:3S<br>        | D4 Package:5S<br>         | D5 Package:JB<br>       |   | D6 Package:JA<br>                 | D7 Package:TSB(4pin),JC(4pin)<br> | D8 Package:TSB(5pin),JC(5pin)<br> | D9 Package:JF<br>     | D10 Package:JH<br>   |
|   |  |   |   |  |  |   |  |  |  |  |   |
| E | E1 Package:MCP<br>                | E2 Package:D30VC<br>           | E3 Package:S2VB<br>      | E4 Package:S4VB<br>       | E5 Package:S5VB<br>     |   | E6 Package:S10VB<br>              | E7 Package:S15VB<br>              | E8 Package:S25VB<br>              | E9 Package:S50VB<br>  | E10 Package:S3WB<br> |
|   |  |   |   |  |  |   |  |  |  |  |   |
|   | 11   | 12  | 13  | 14   | 15   |   |  |  |  |  |   |
| E | E11 Package:S10WB<br>             | E12 Package:S15WB<br>          | E13 Package:S20WB<br>    | E14 Package:SVTA<br>     | E15 Package:SVT<br>     |   |  |  |  |  |   |
|   |  |   |   |  |  |   |  |  |  |  |   |

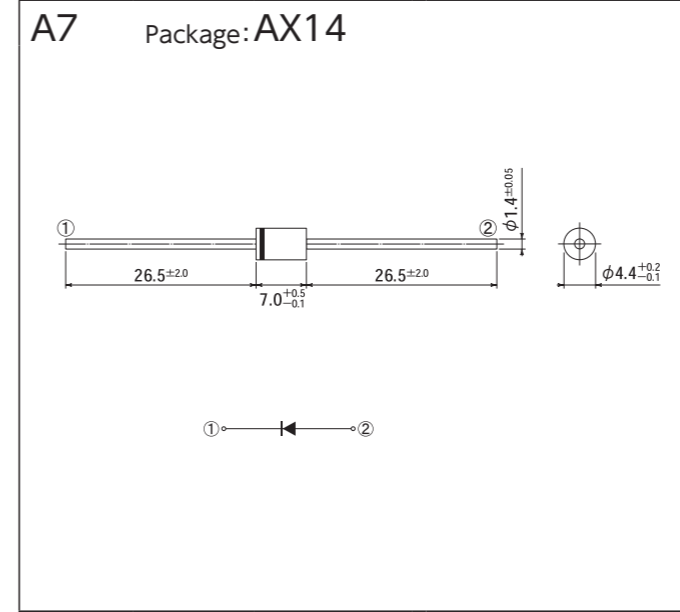
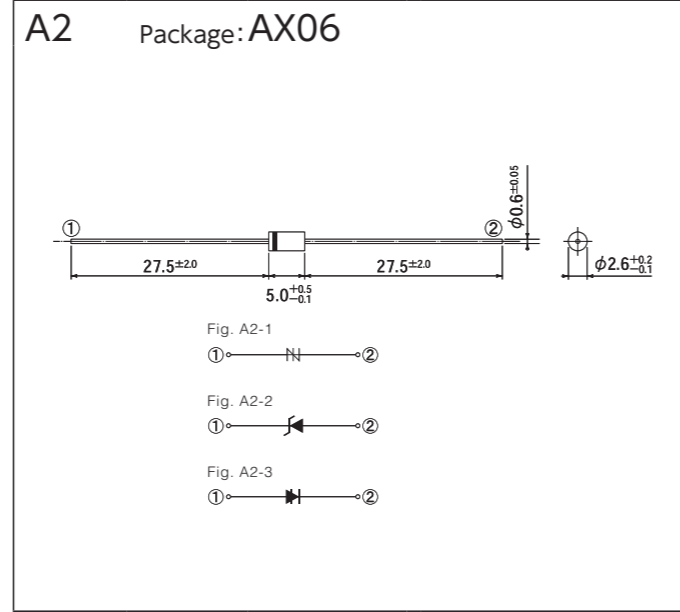
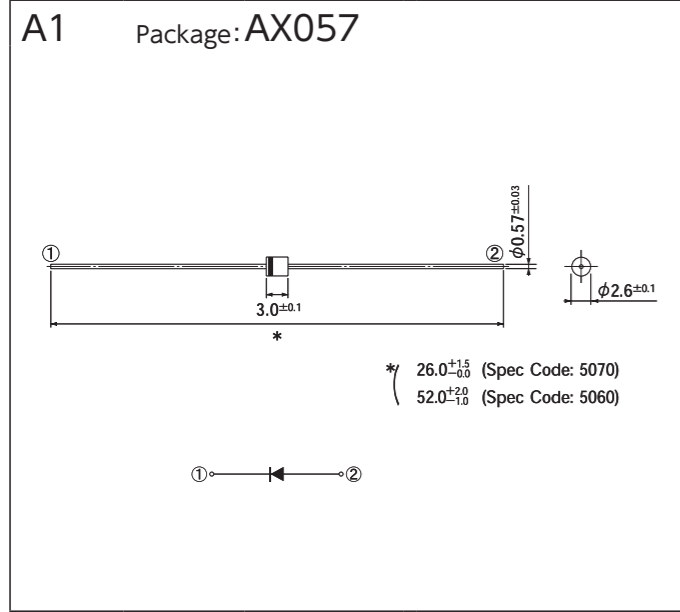
PACKAGE LIST

# PACKAGE LIST

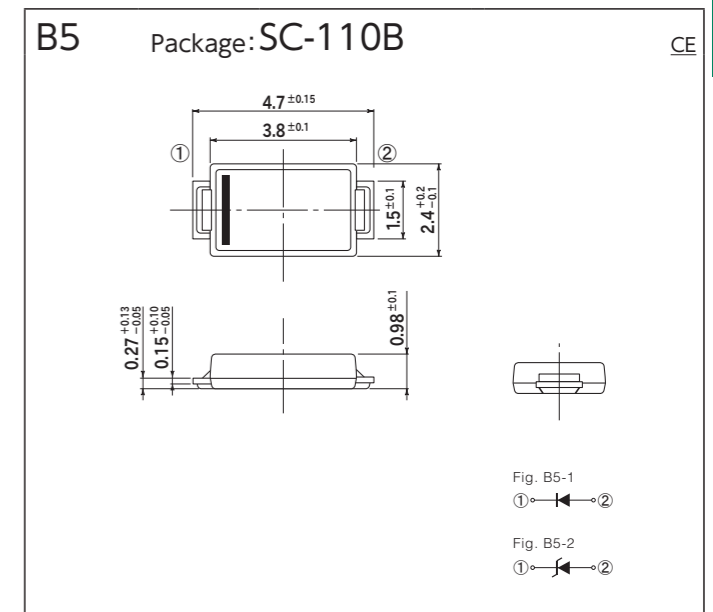
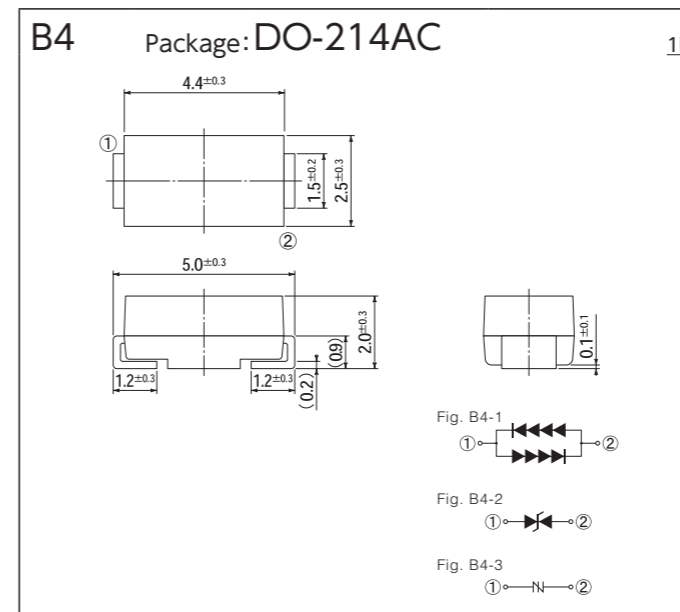
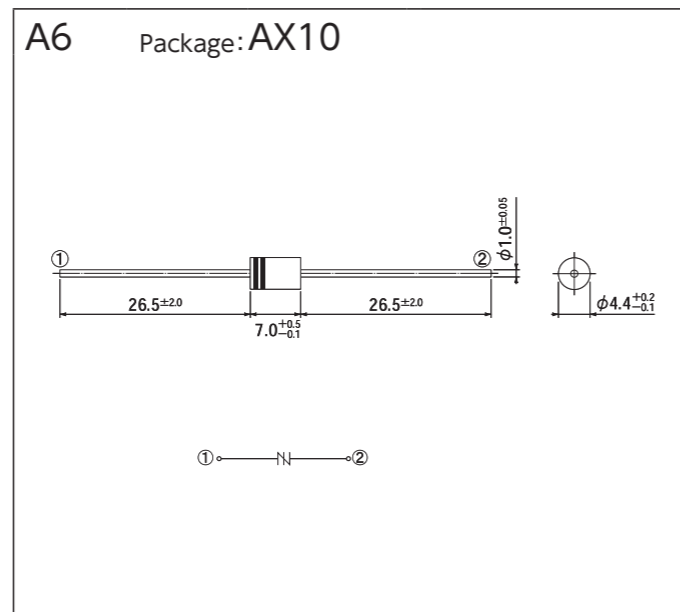
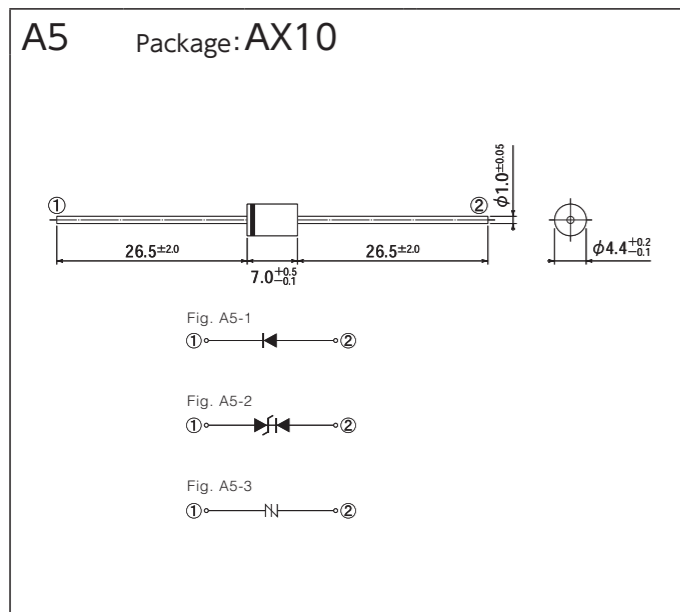
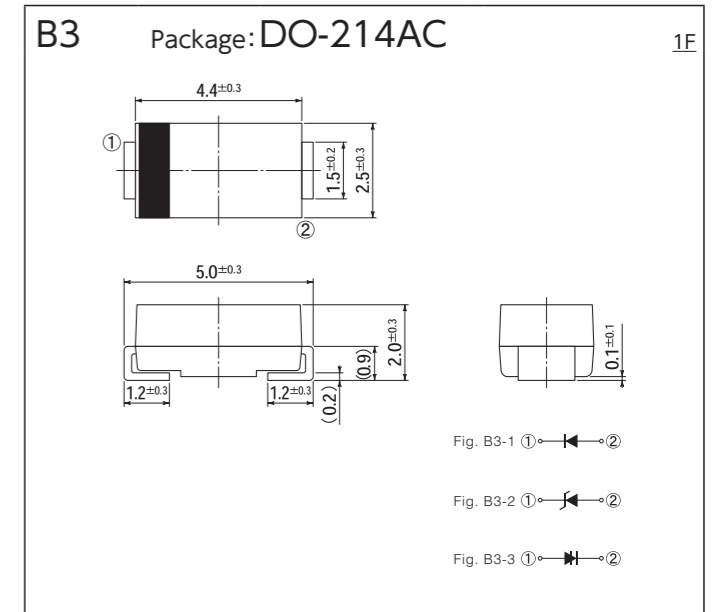
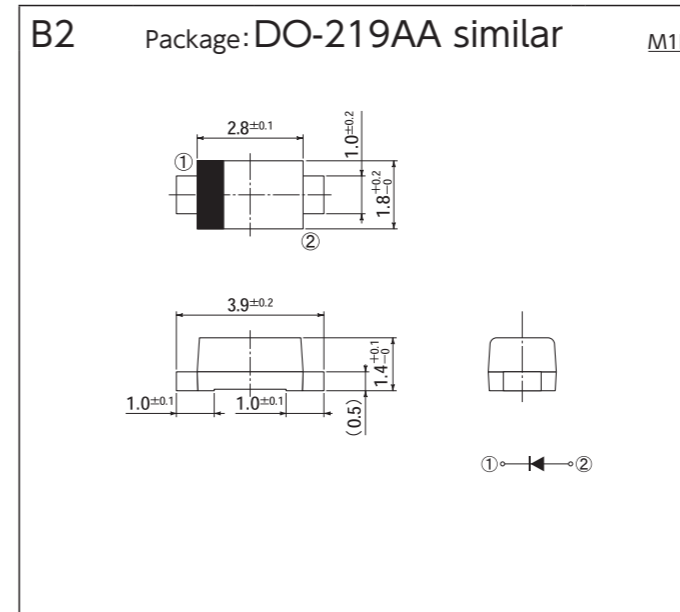
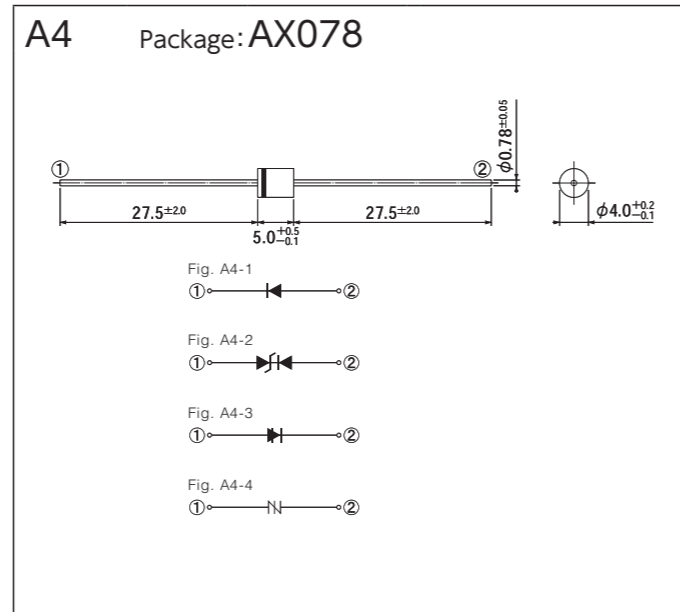
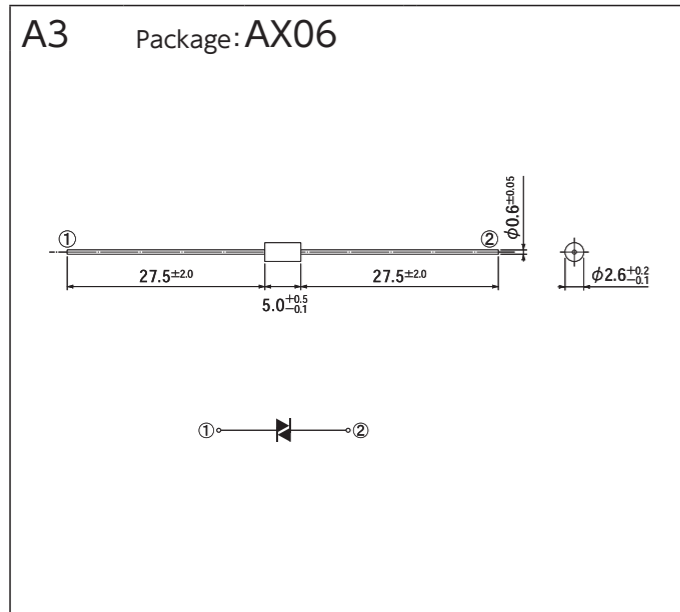
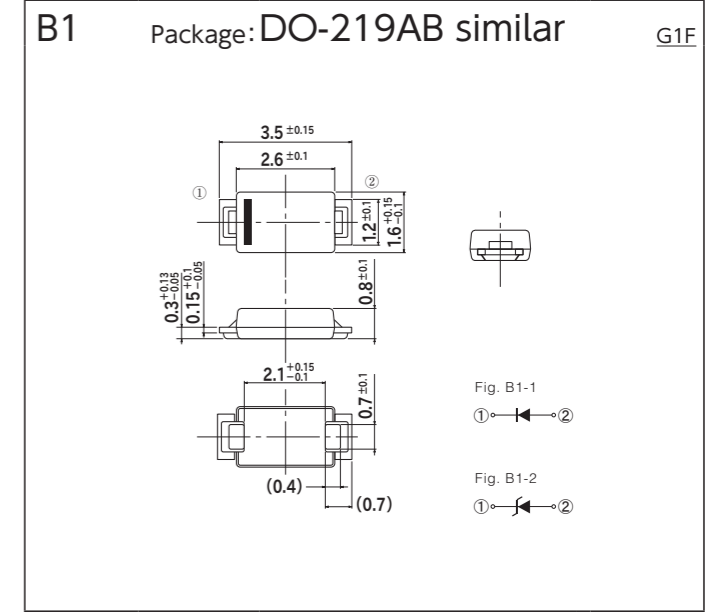
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|---|--------------------------------------|---------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|-------------------------|
| F | F1 Package:Module<br>                | F2 Package:Module<br>                 | F3 Package:Module<br>                | F4 Package:MG001<br>                  | F5 Package:MG031<br>                  | F6 Package:MG032<br>                | F7 Package:MG038<br>                | F8 Package:MG048<br>                 | F9 Package:MG060<br>                | F10 Package:MG061<br>   |
| G | G1 Package:SC-63 E-pack<br>          | G2 Package:TO-252AA EB<br>            | G3 Package:TO-252AB similar EB<br>   | G4 Package:DO-277A similar EY<br>     | G5 Package:TO-252AA similar EB<br>    | G6 Package:LA<br>                   | G7 Package:MO-235B similar LE<br>   |                                      |                                     |                         |
| H | H1 Package:SC-83 similar ETO-220<br> | H2 Package:SC-83 similar EB<br>       | H3 Package:TO-263AB-1 EB<br>         | H4 Package:TO-263AB EB<br>            | H5 Package:SC-83 similar EB<br>       | H6 Package:TO-263AB EZ<br>          | H7 Package:TO-263-SC EZ-7P<br>      |                                      |                                     |                         |
| J | J1 Package:SC-91A ETO-220(2pin)<br>  | J2 Package:SC-91 ETO-220A(2pin)<br>   | J3 Package:SC-91 ETO-220AG(2pin)<br> | J4 Package:SC-91 ETO-220G(2pin)<br>   | J5 Package:TO-220AB EA<br>            | J6 Package:SC-91A ETO-220(3pin)<br> | J7 Package:SC-91 ETO-220A(3pin)<br> | J8 Package:SC-91 ETO-220AG(3pin)<br> | J9 Package:SC-91 ETO-220G(3pin)<br> |                         |
| K | K1 Package:SC-93 ITO-3P(2pin)<br>    | K2 Package:TO-247AD MTO-3PT(2pin)<br> | K3 Package:SC-93 ITO-3P(3pin)<br>    | K4 Package:TO-247AD MTO-3PT(2pin)<br> | K5 Package:TO-247AD MTO-3PT(3pin)<br> | K6 Package:TO-247AD MTO-3PV<br>     | K7 Package:TO-247AD MTO-3PV<br>     |                                      |                                     |                         |
| L | L1 Package:SOP8<br>                  | L2 Package:SOP8J<br>                  | L3 Package:SOP8/7J<br>               | L4 Package:SOP14<br>                  | L5 Package:SOP16<br>                  | L6 Package:SOP18<br>                | L7 Package:SOP22<br>                | L8 Package:SOP24<br>                 | L9 Package:WSON8<br>                | L10 Package:TSSOP10<br> |

# OUTLINE DIMENSIONS

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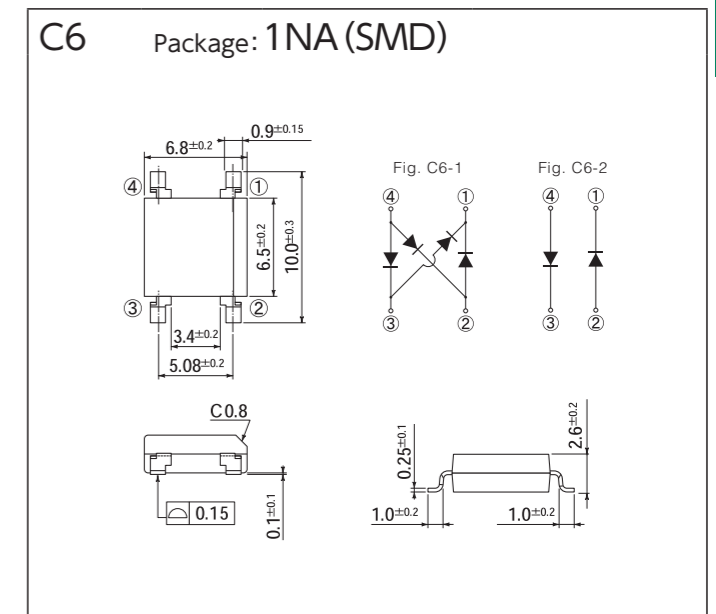
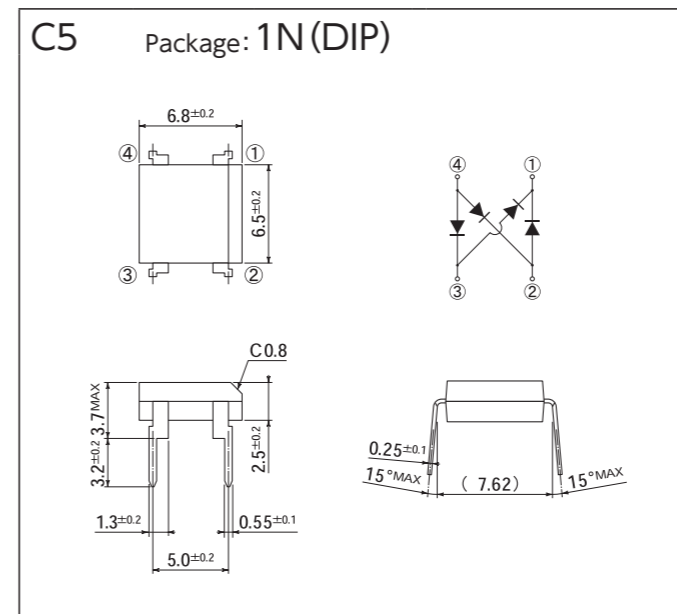
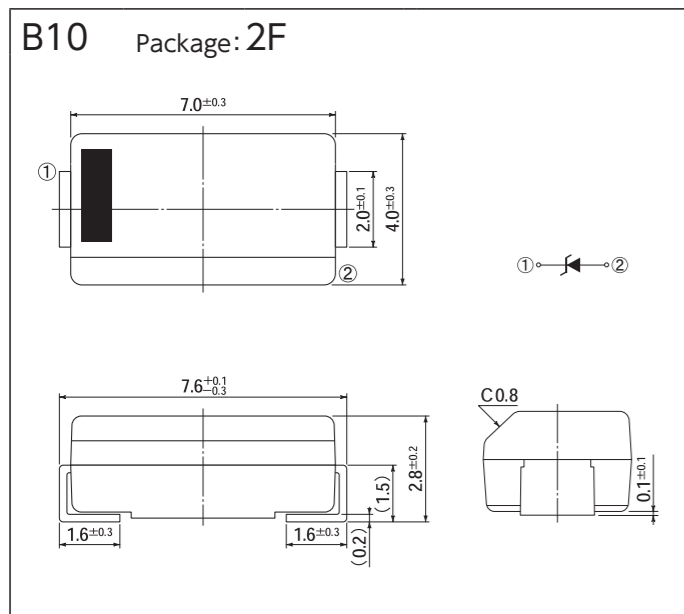
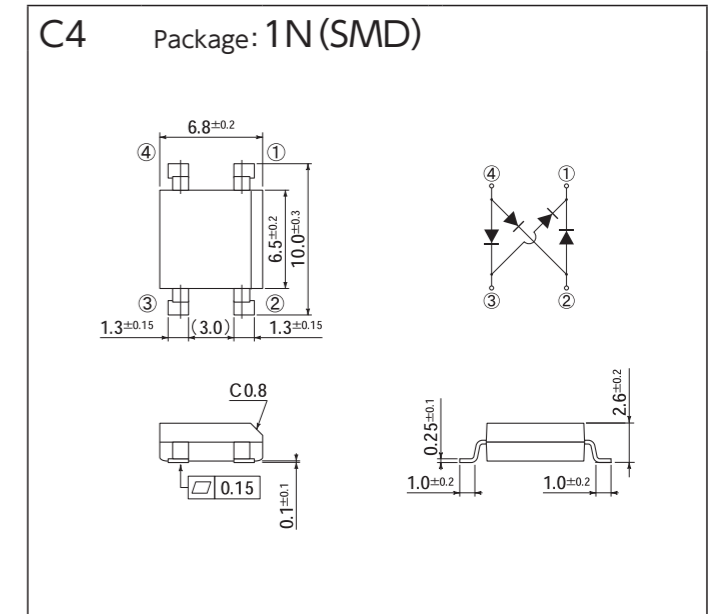
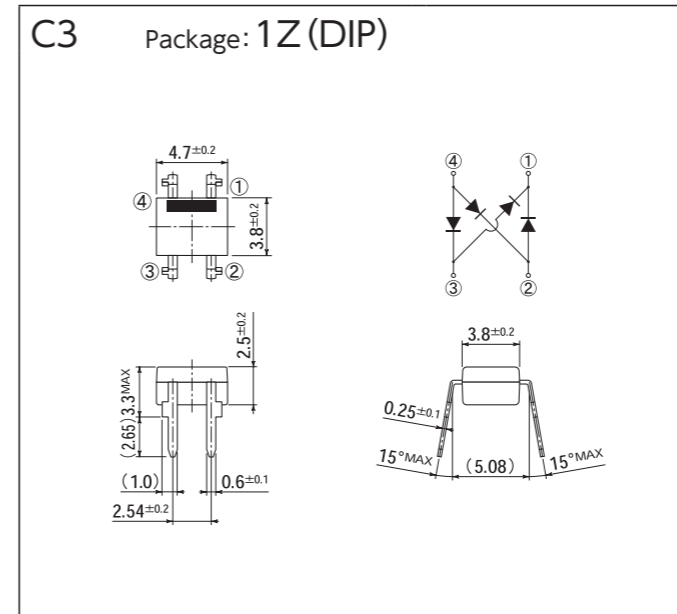
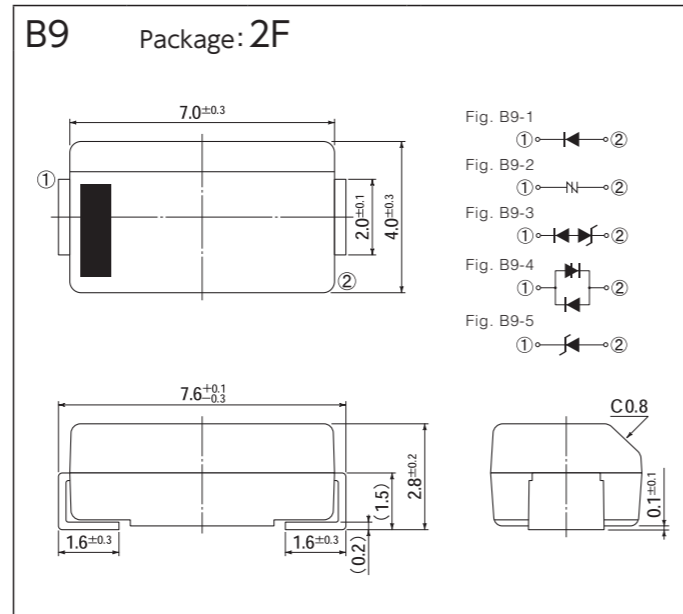
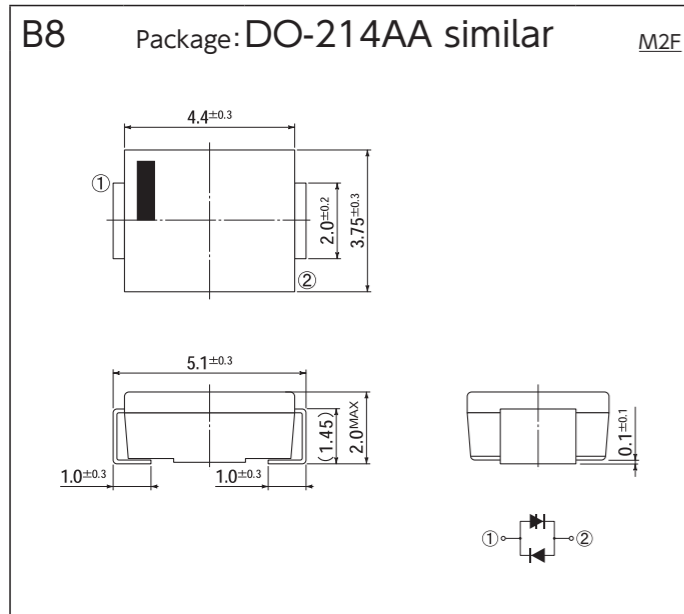
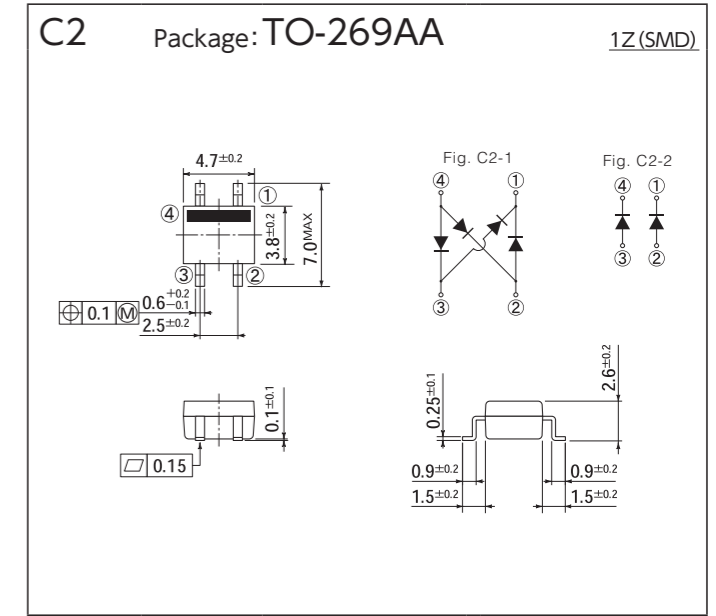
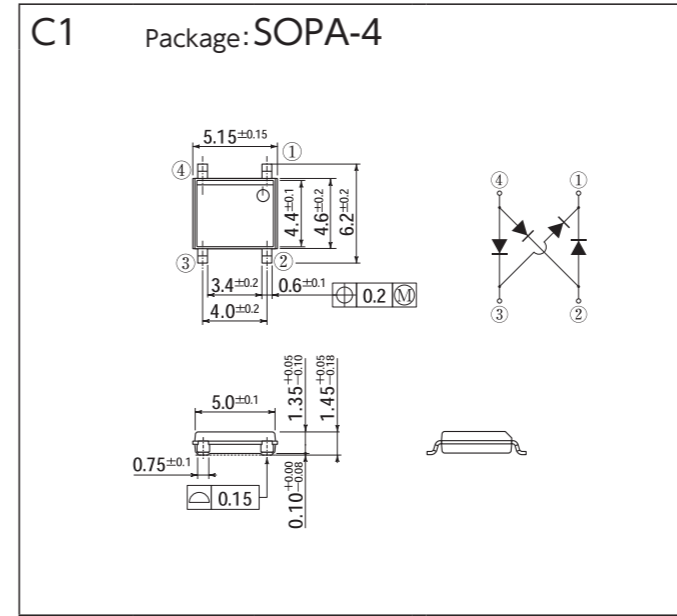
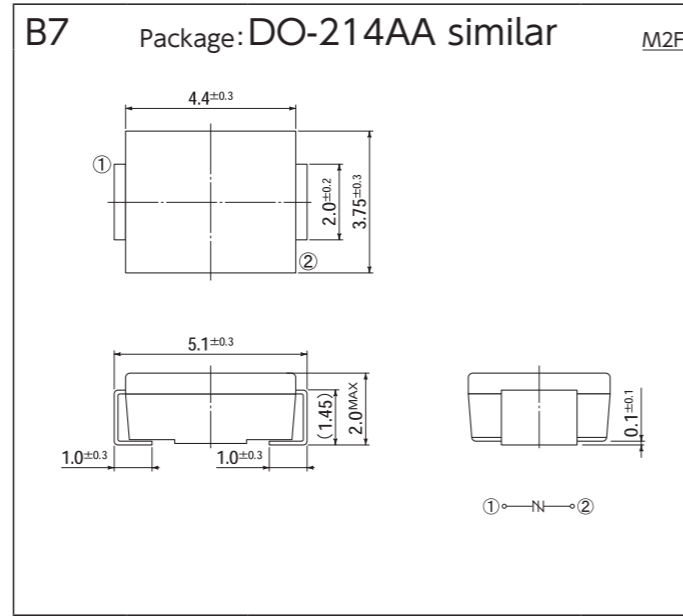
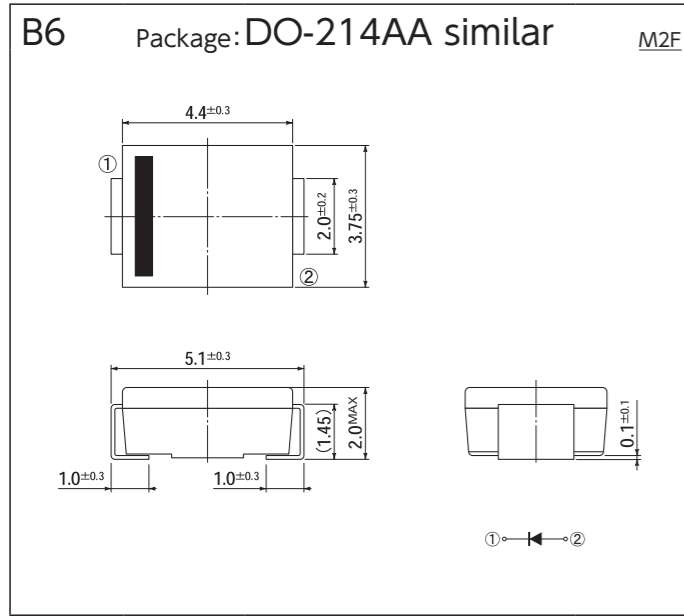


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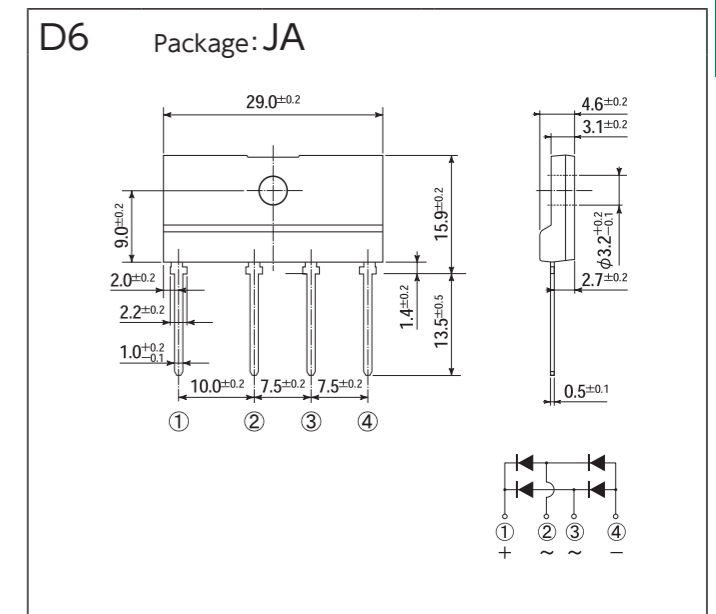
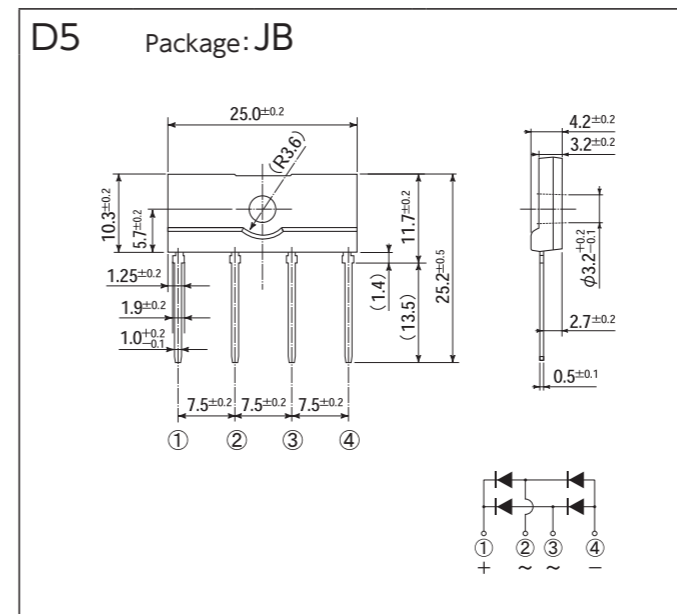
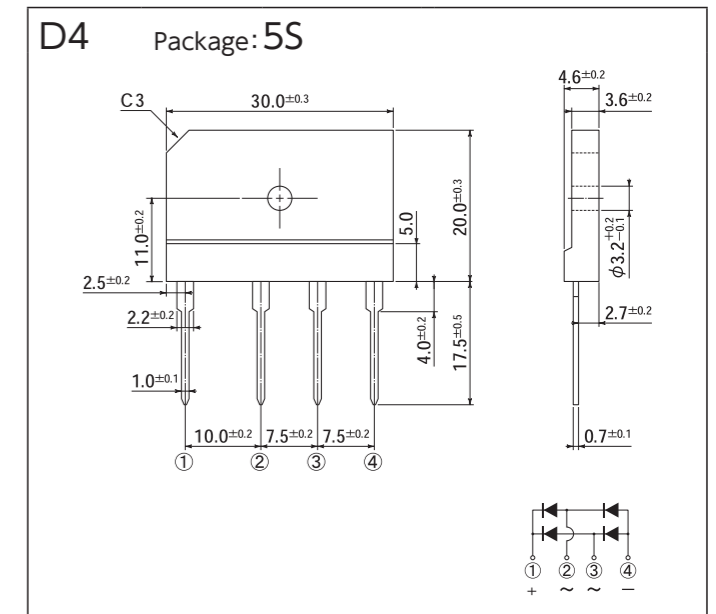
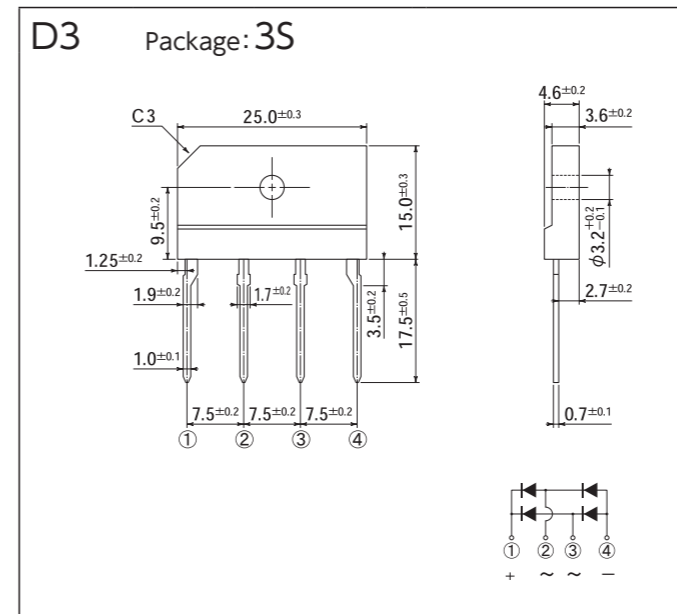
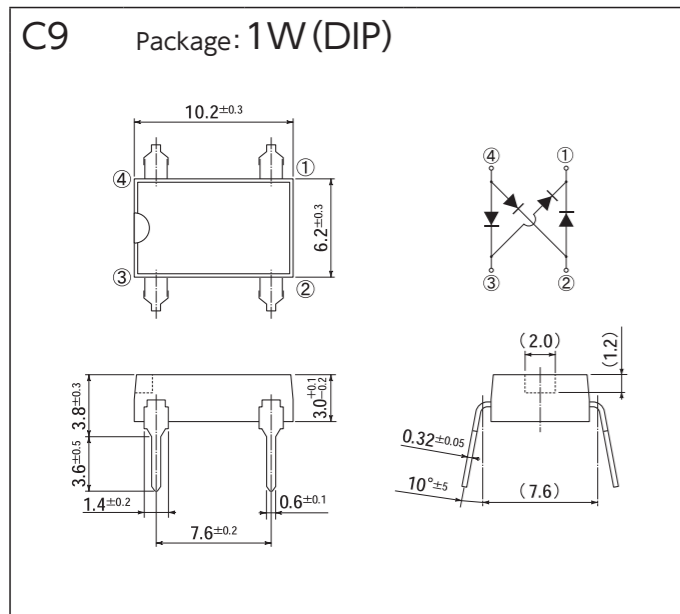
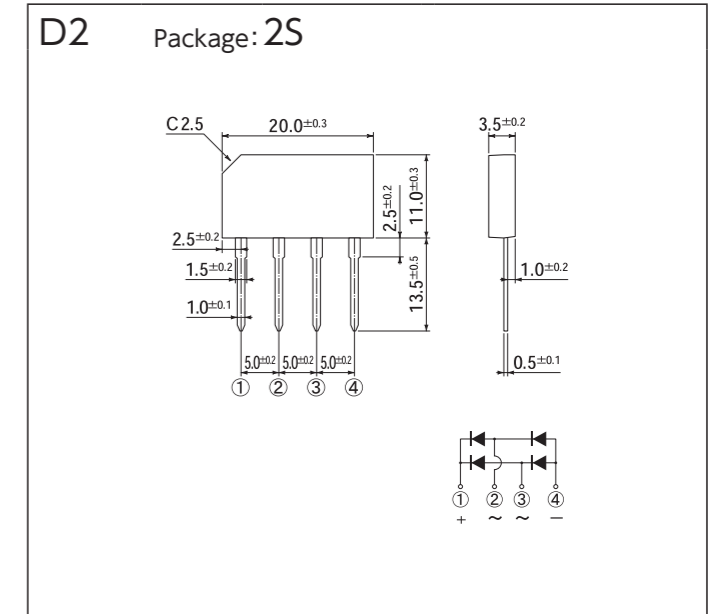
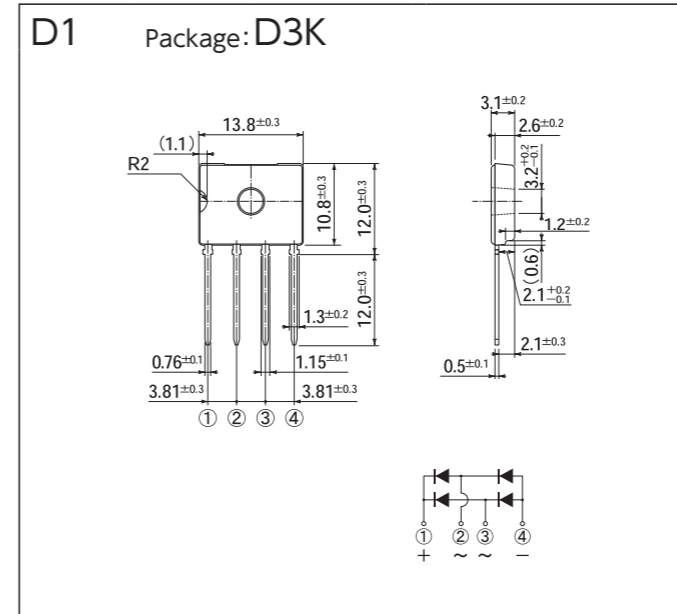
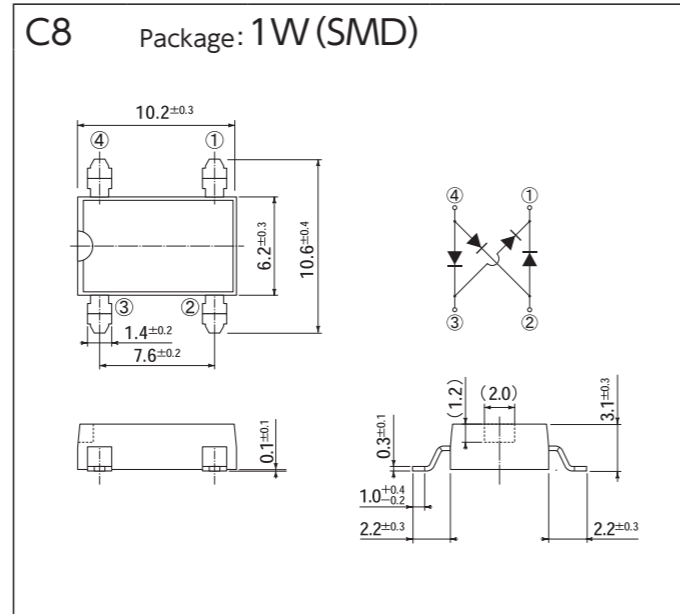
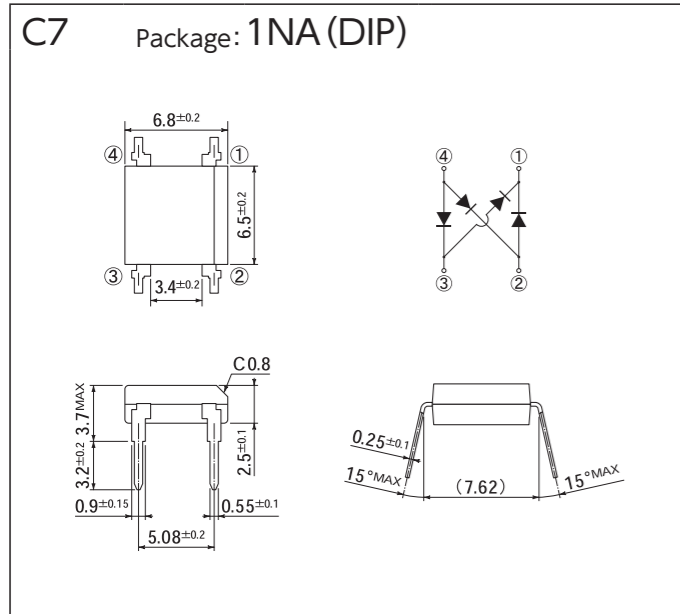
# OUTLINE DIMENSIONS

[Unit:mm]



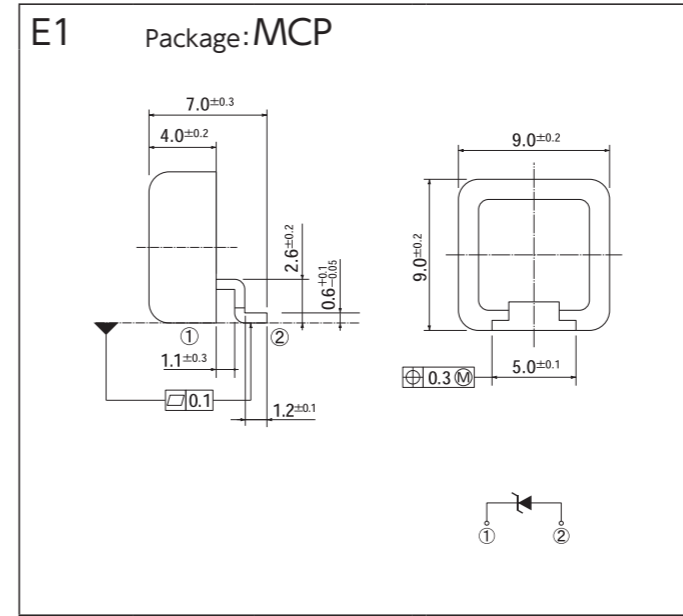
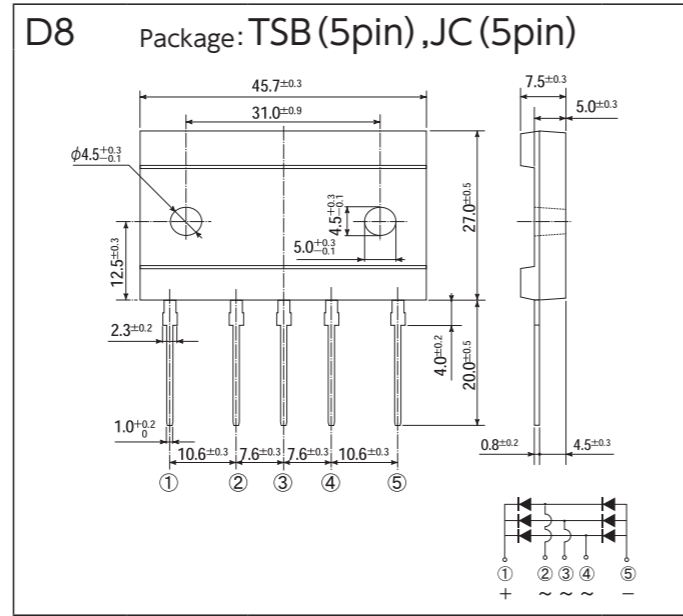
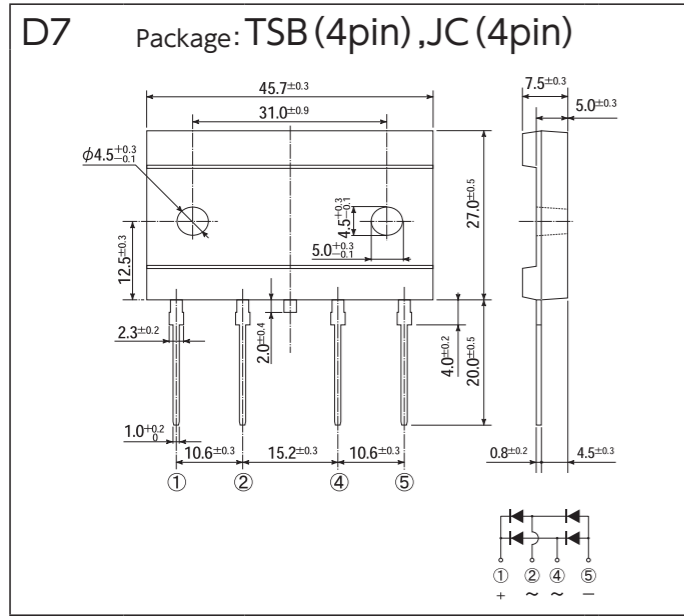
# OUTLINE DIMENSIONS

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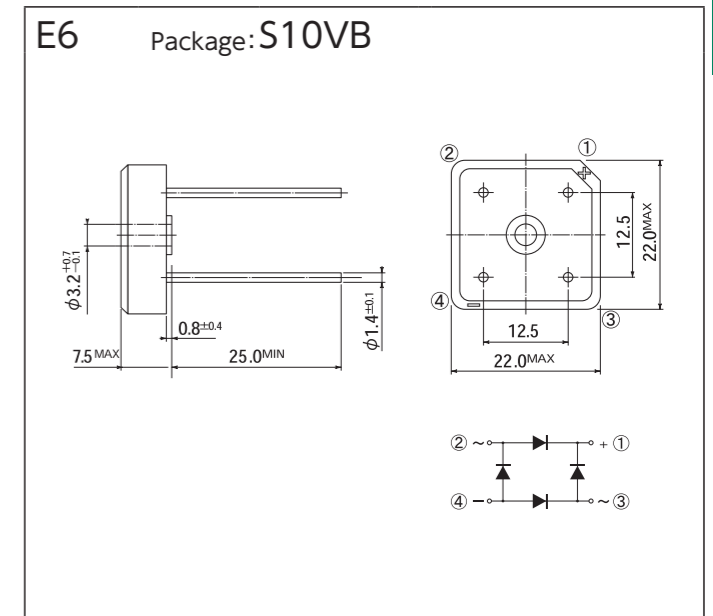
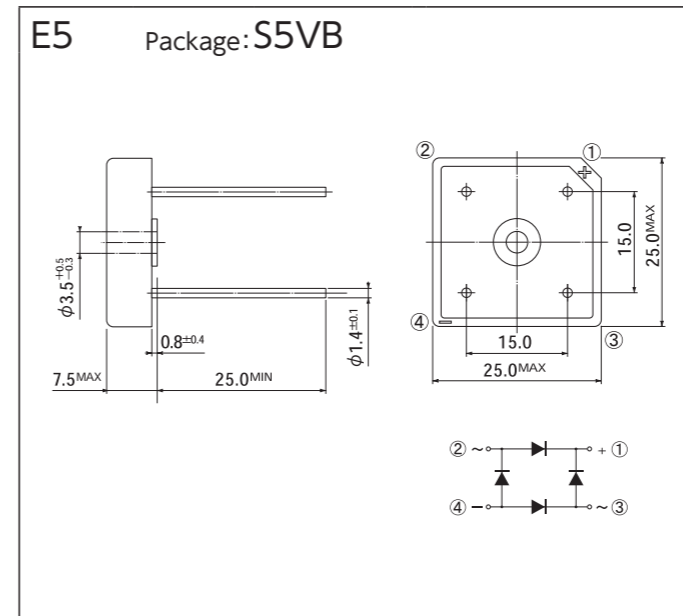
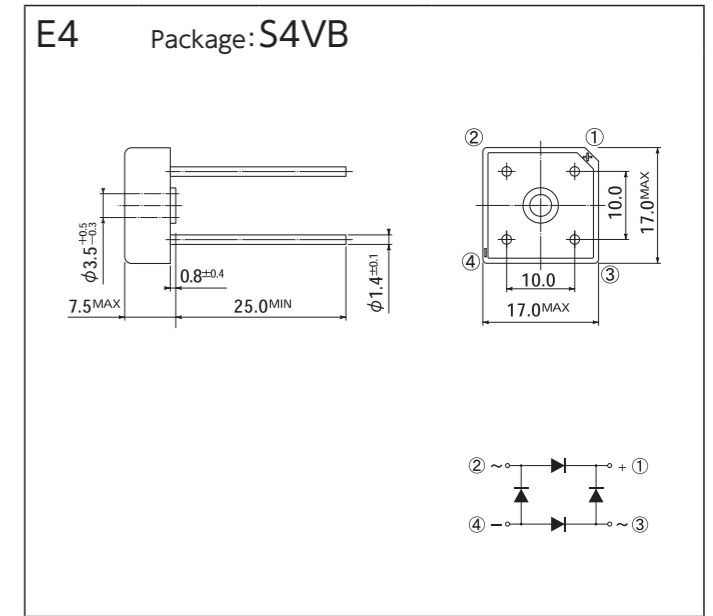
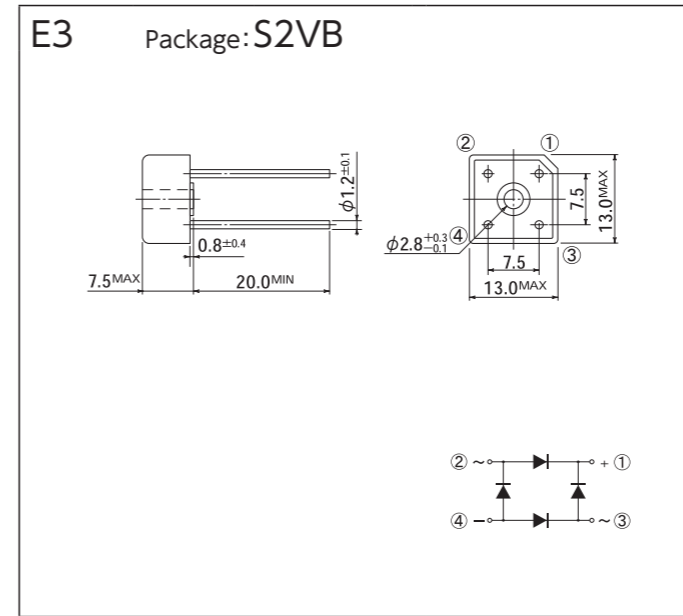
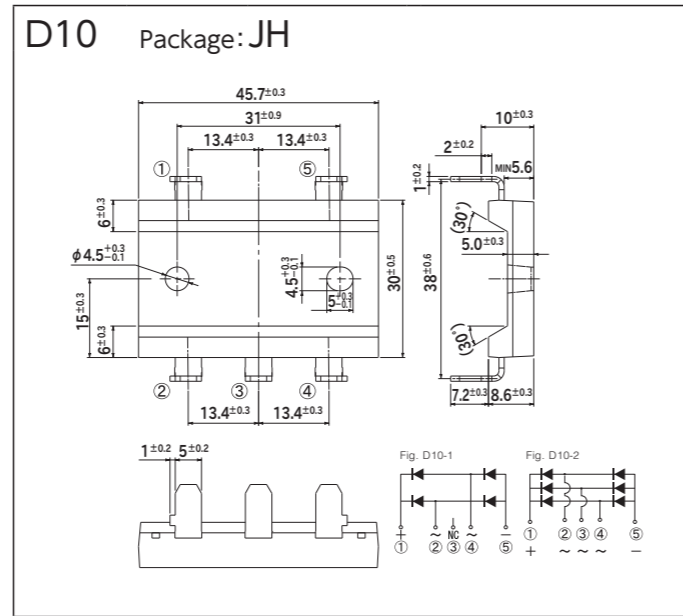
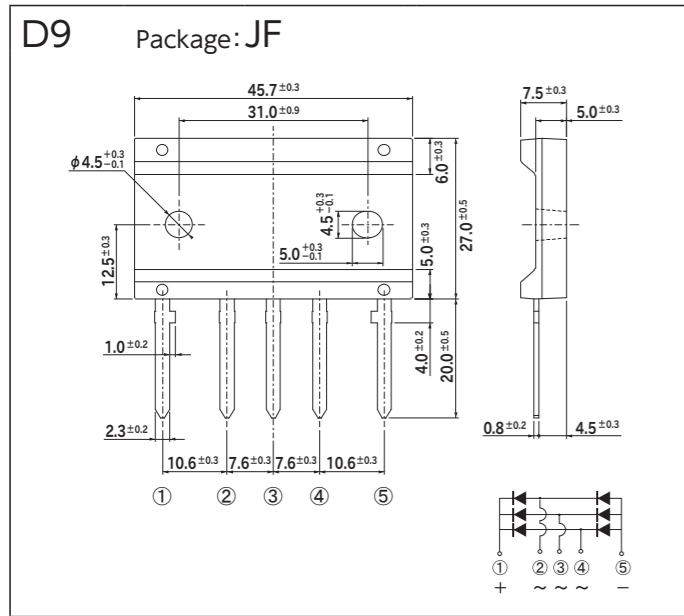
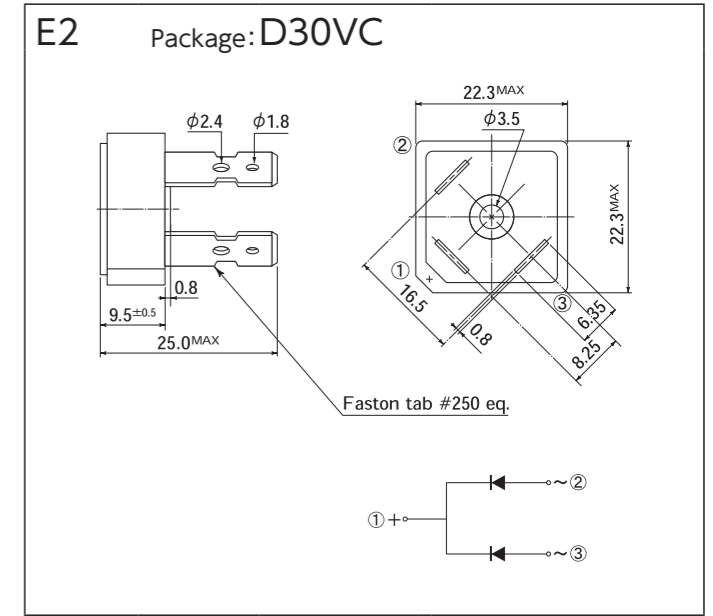


# OUTLINE DIMENSIONS

[Unit:mm]



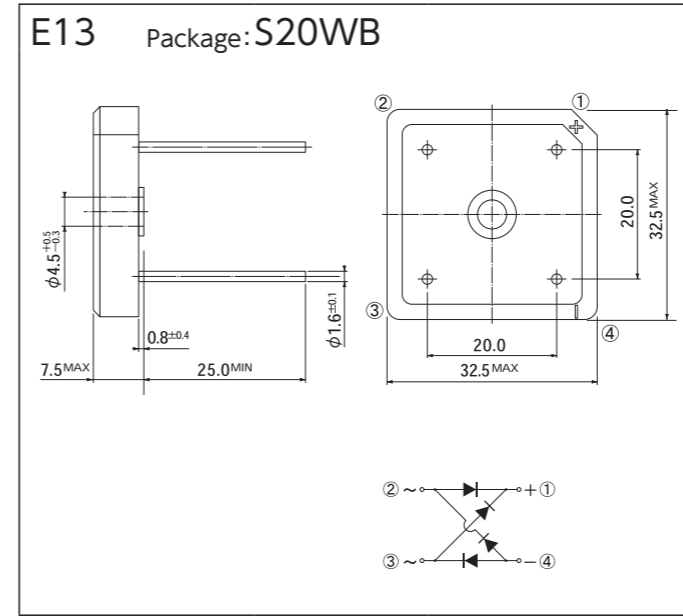
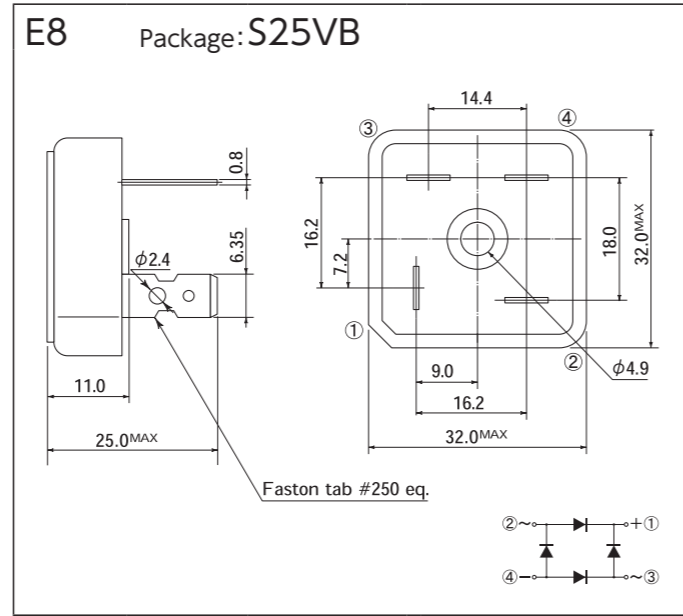
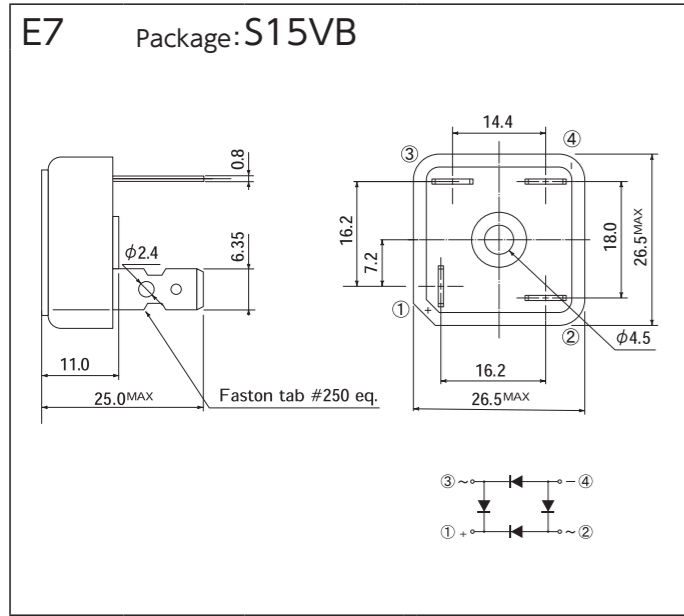
[Unit:mm]



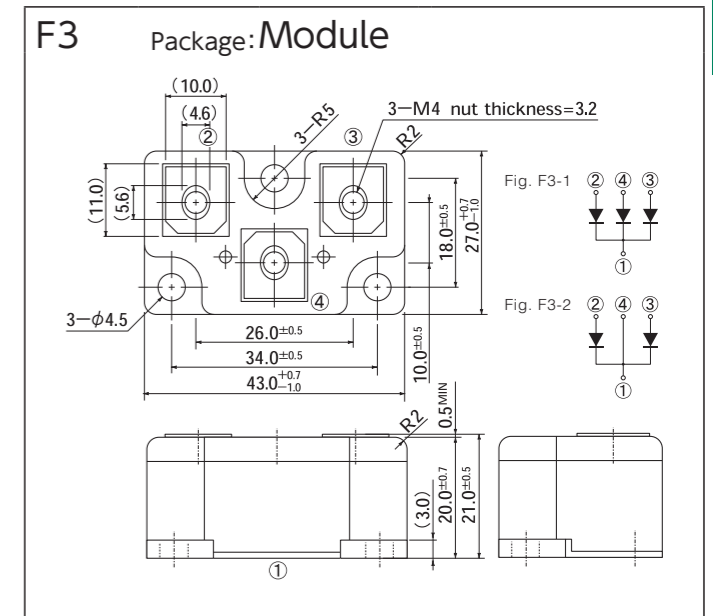
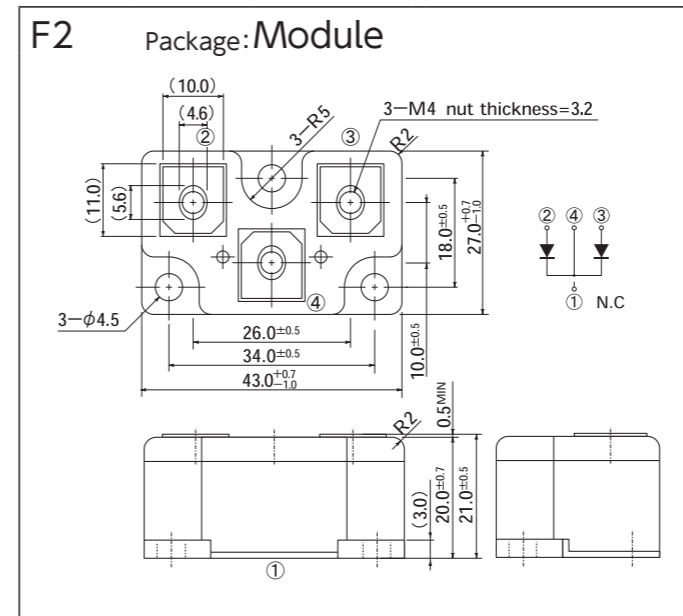
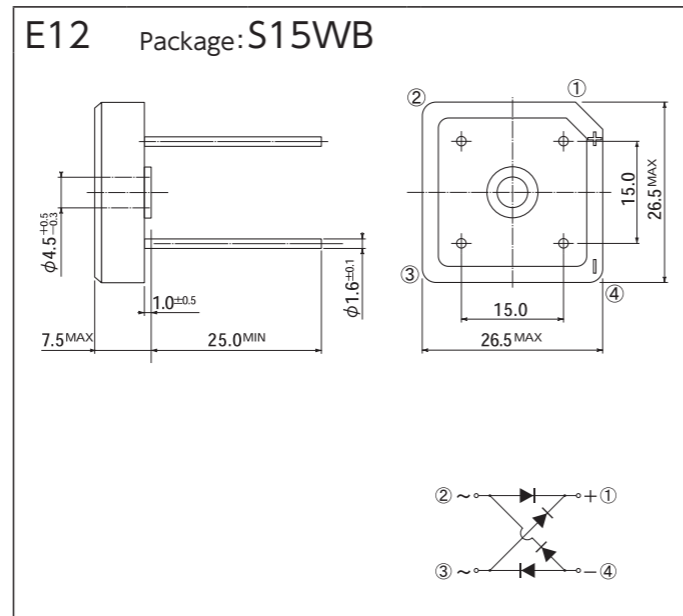
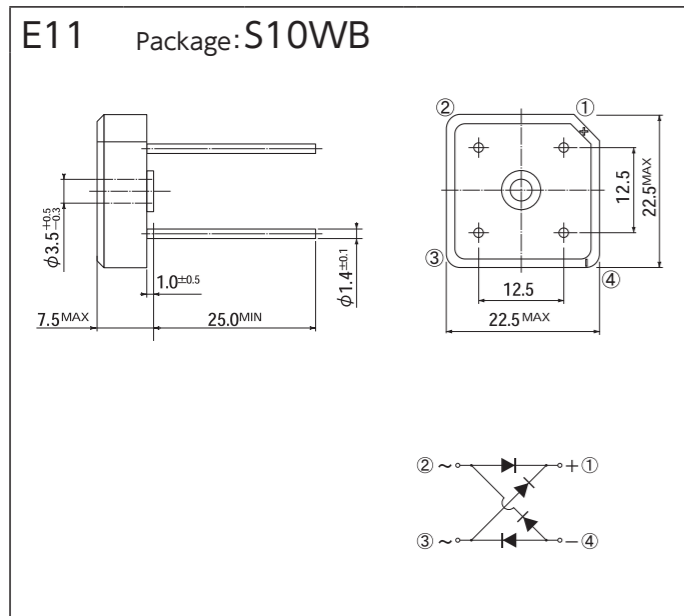
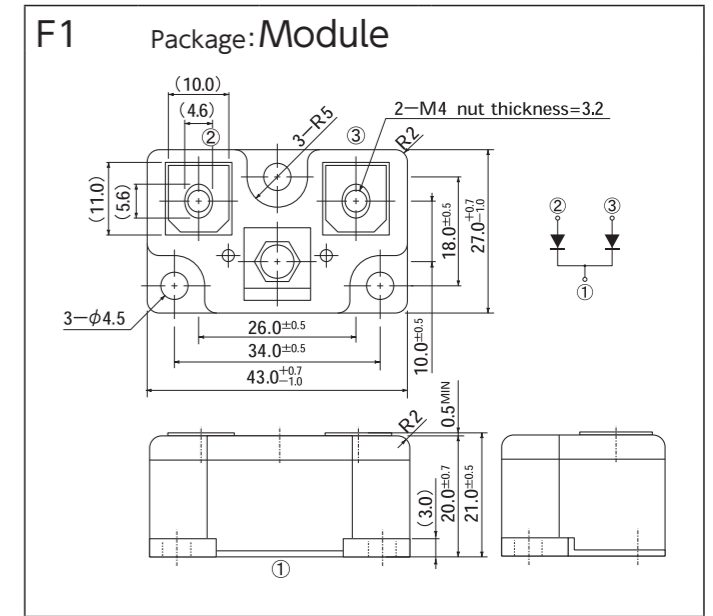
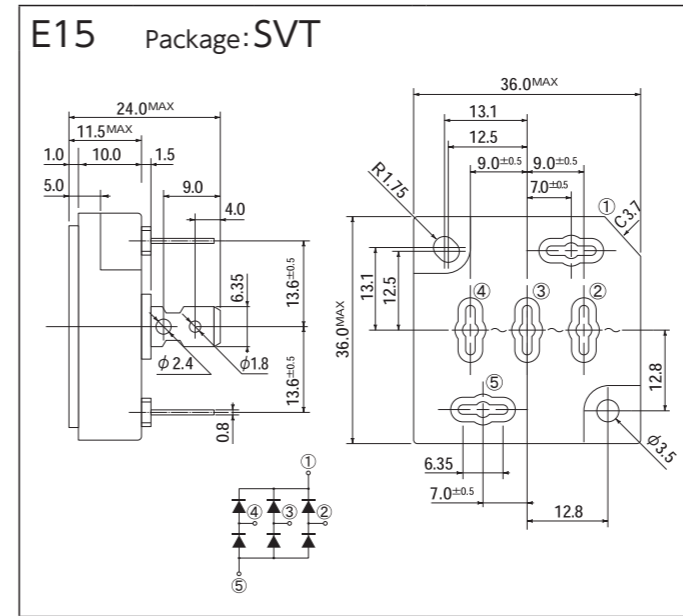
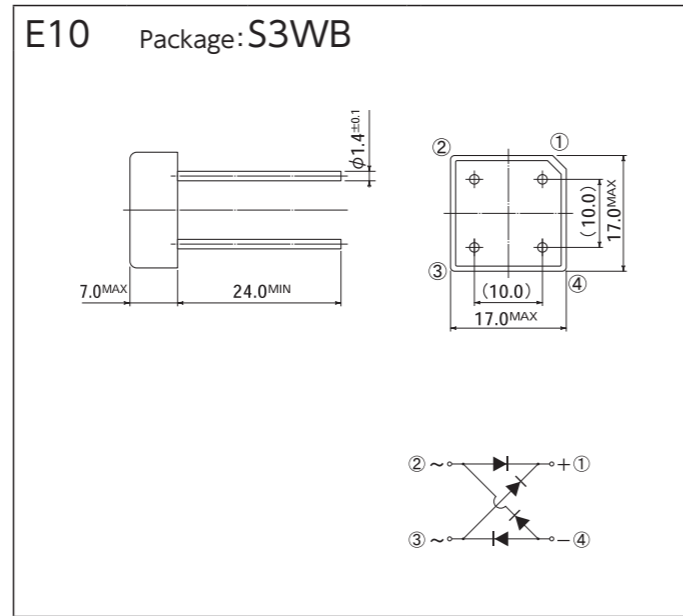
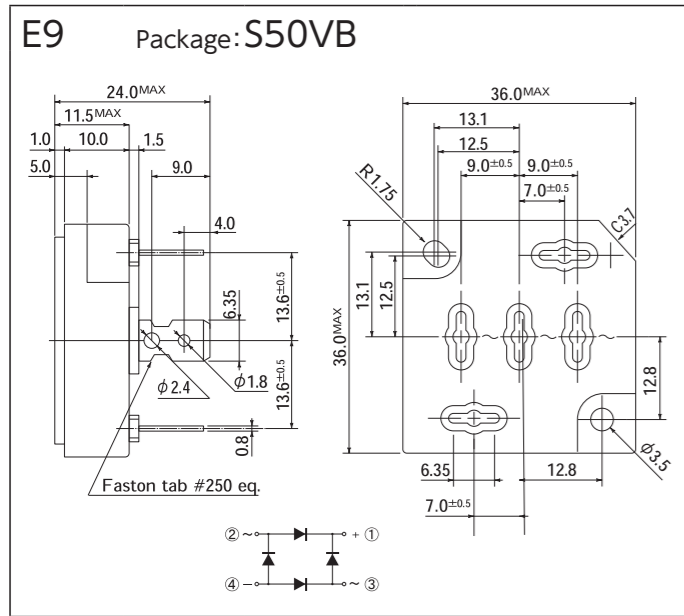
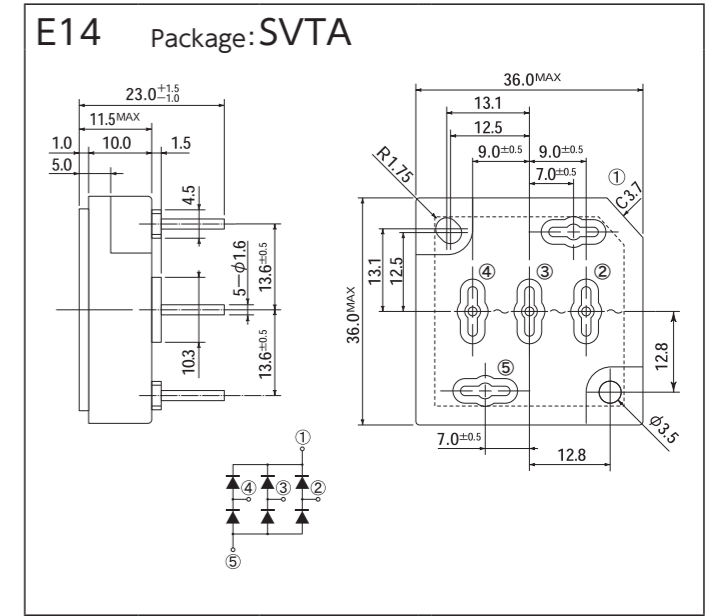
OUTLINE DIMENSIONS

# OUTLINE DIMENSIONS

[Unit:mm]



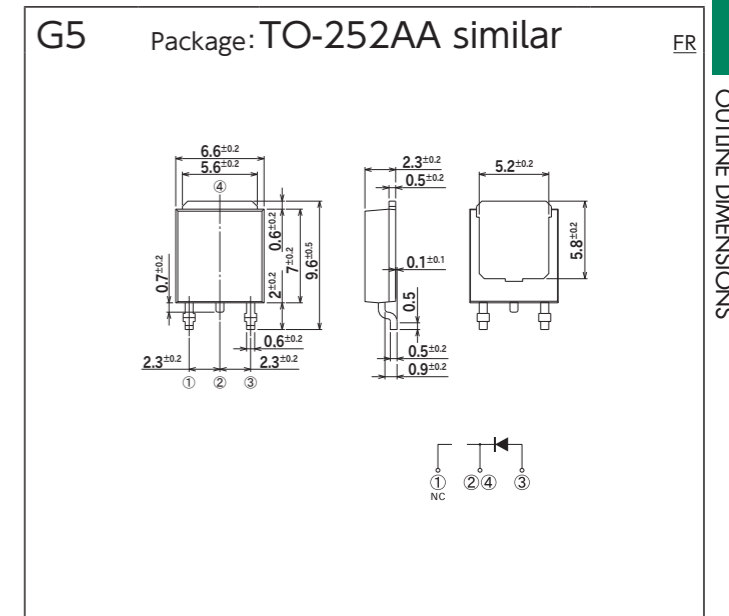
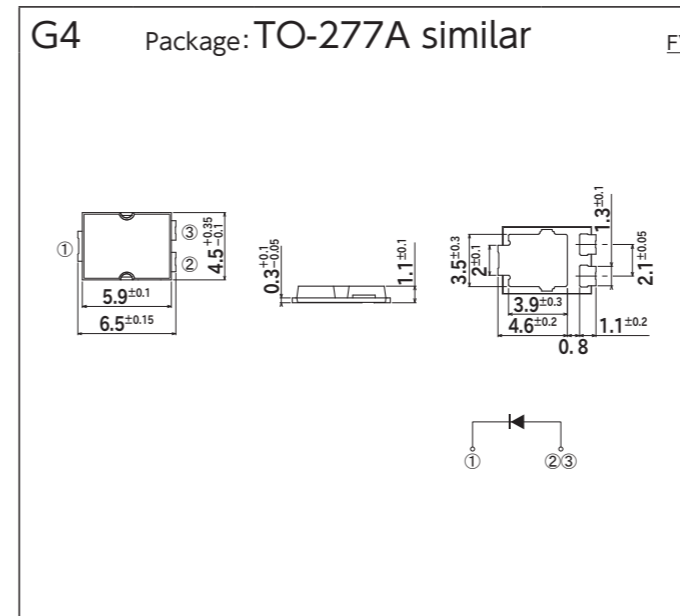
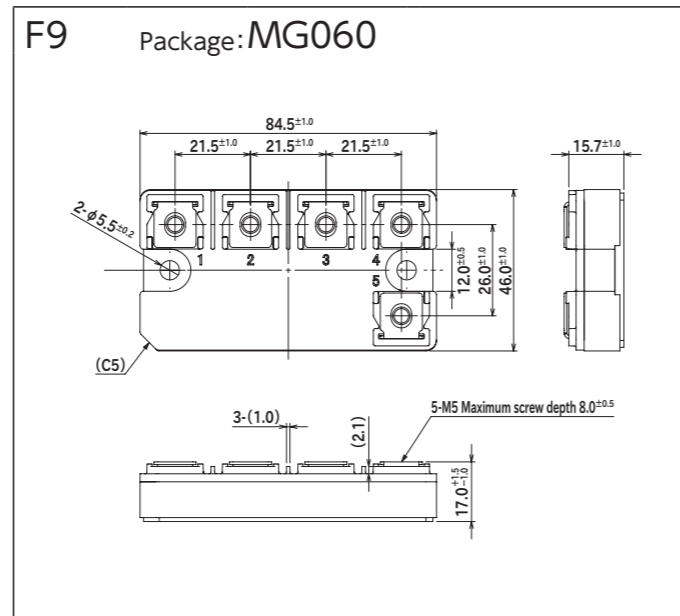
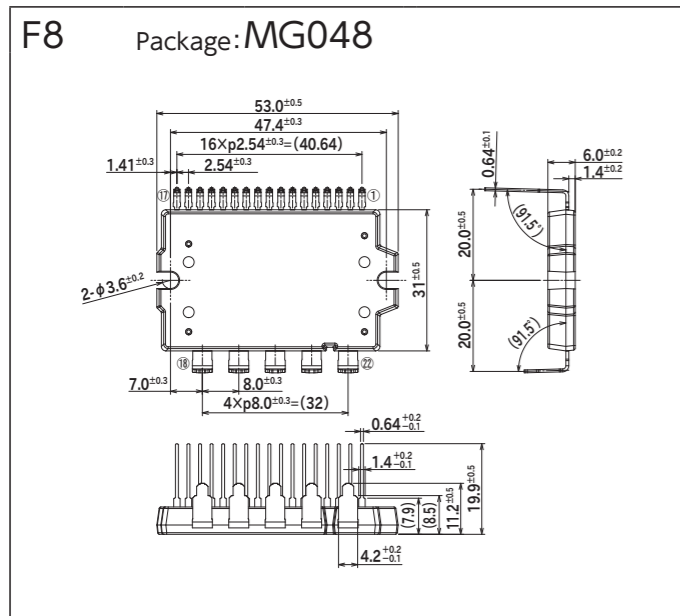
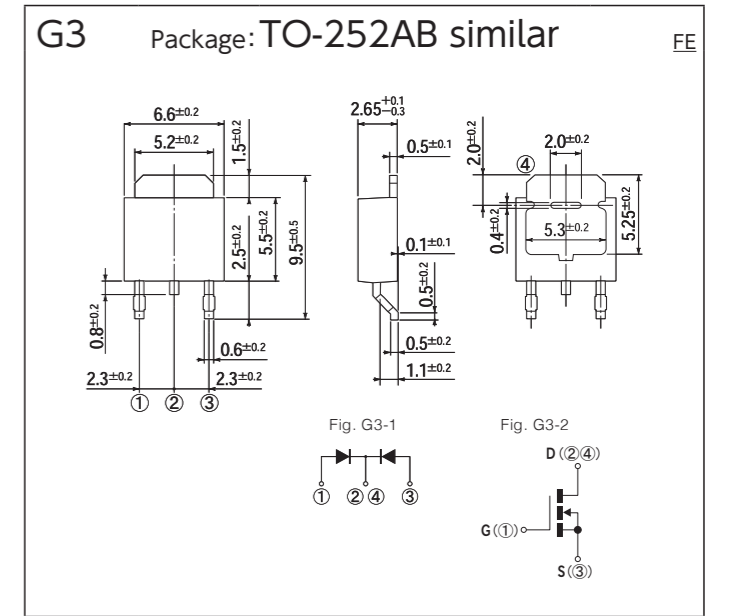
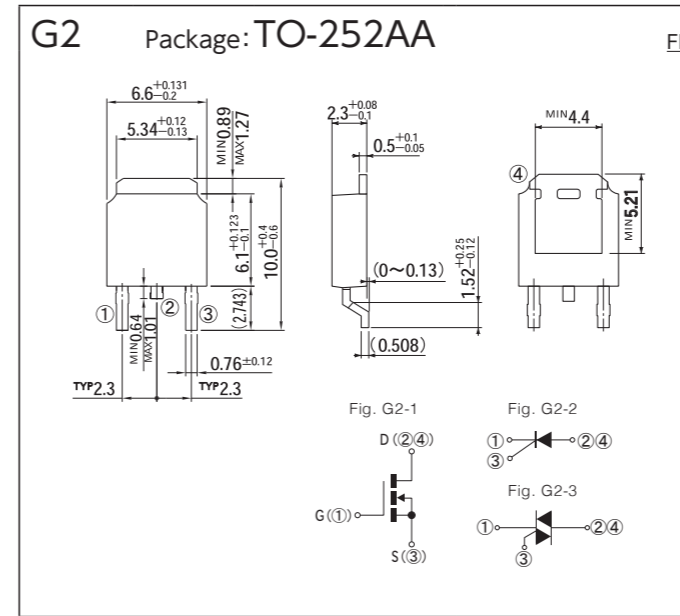
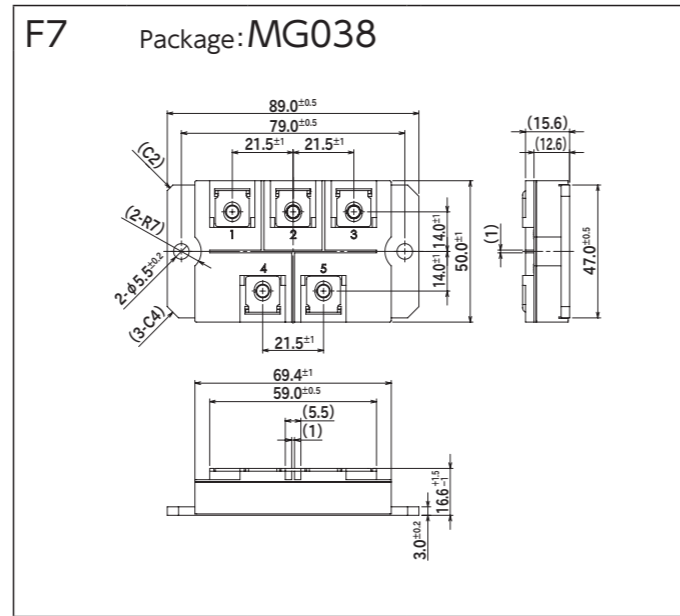
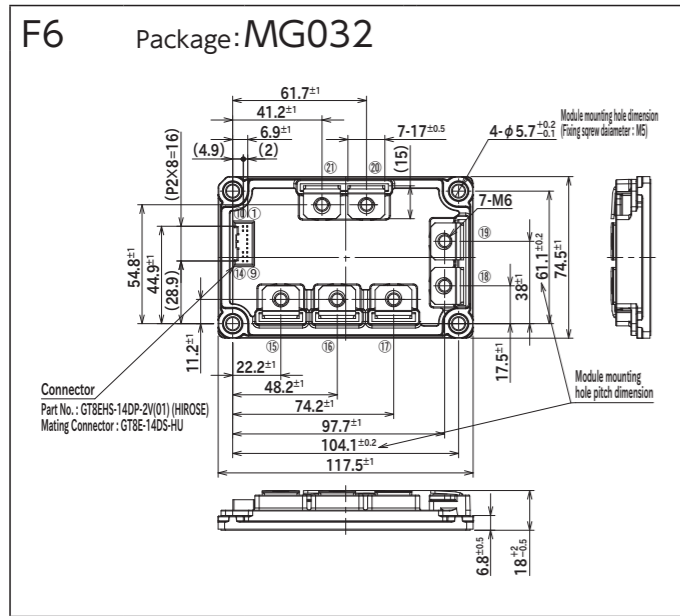
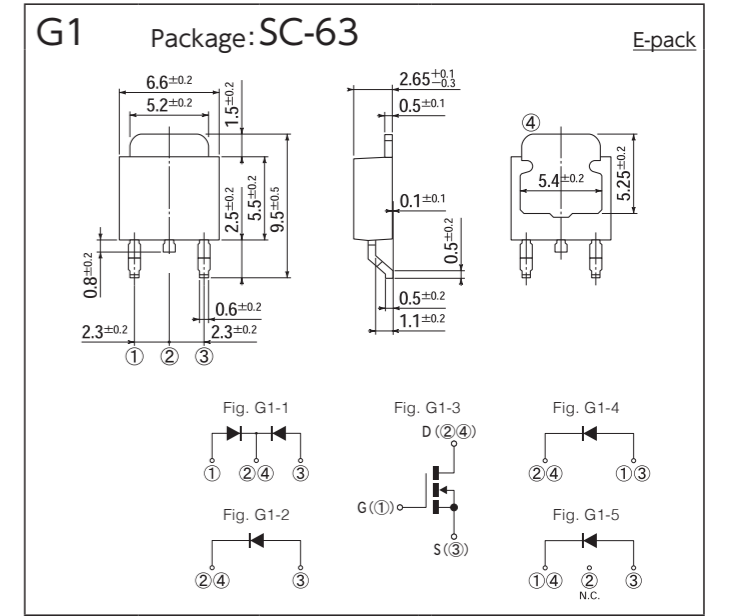
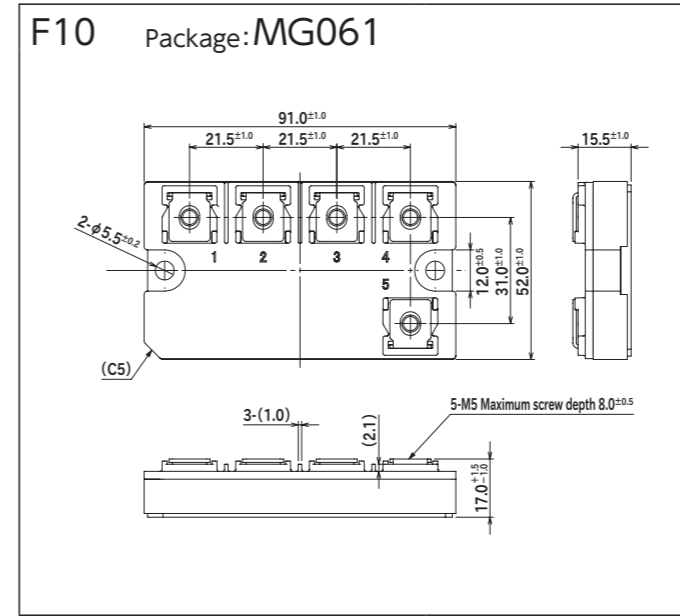
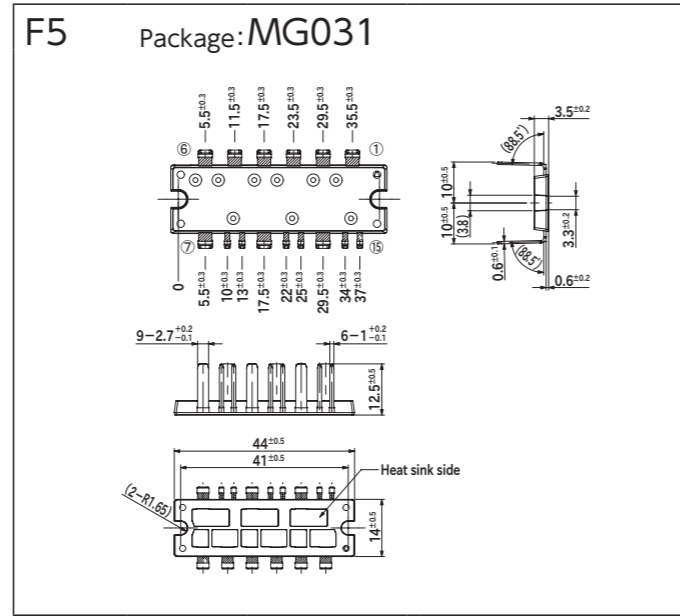
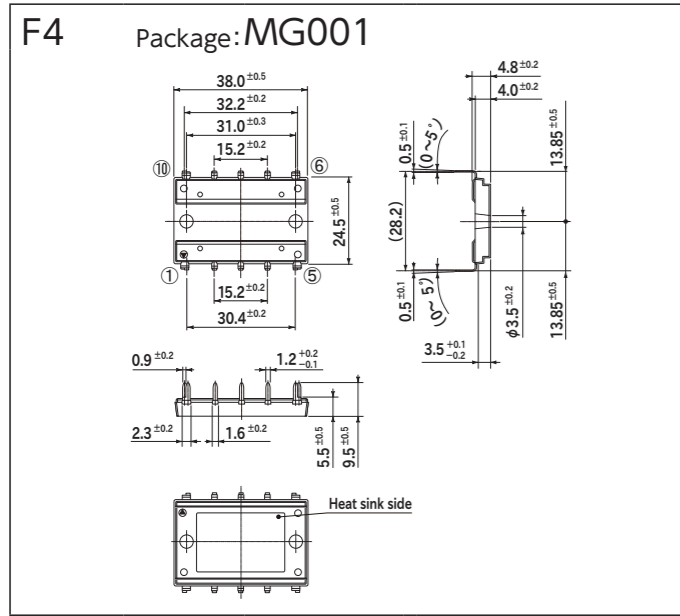
[Unit:mm]



# OUTLINE DIMENSIONS

[Unit:mm]

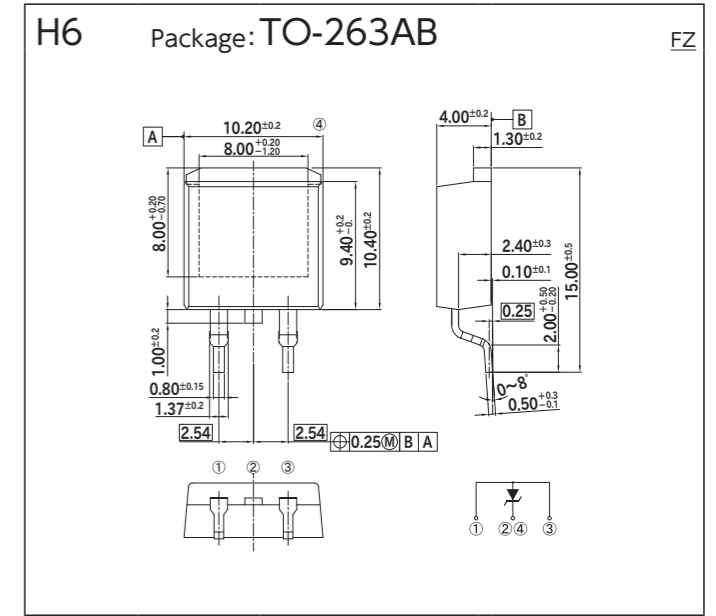
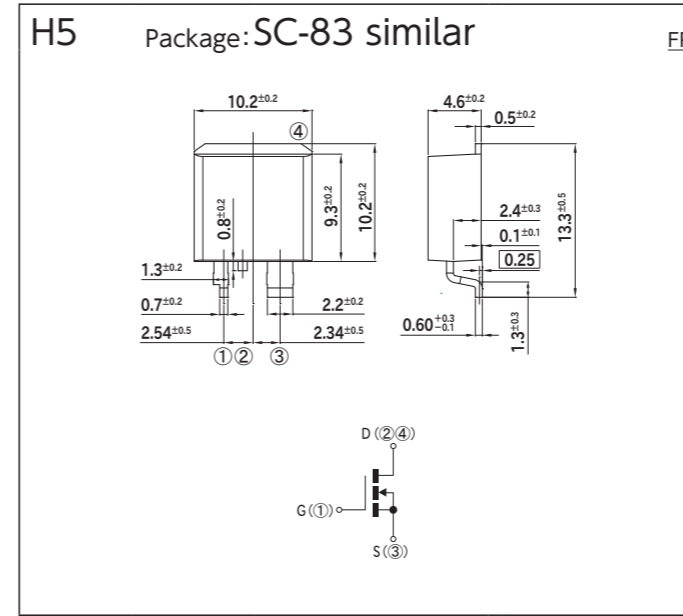
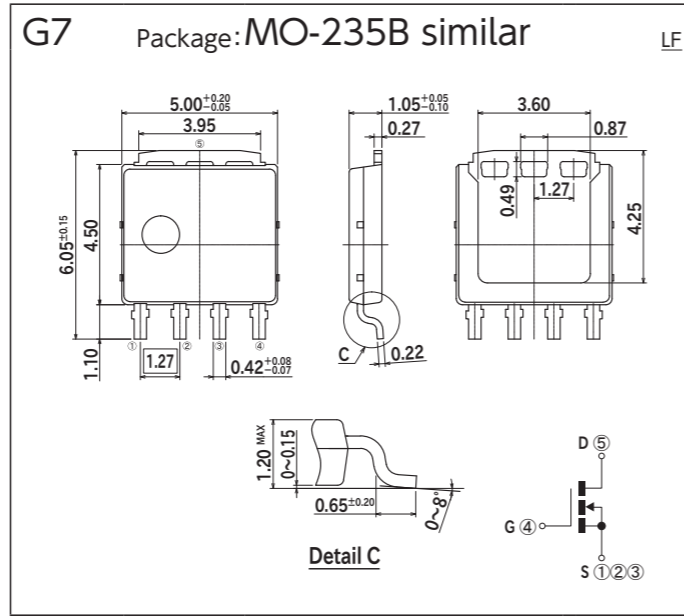
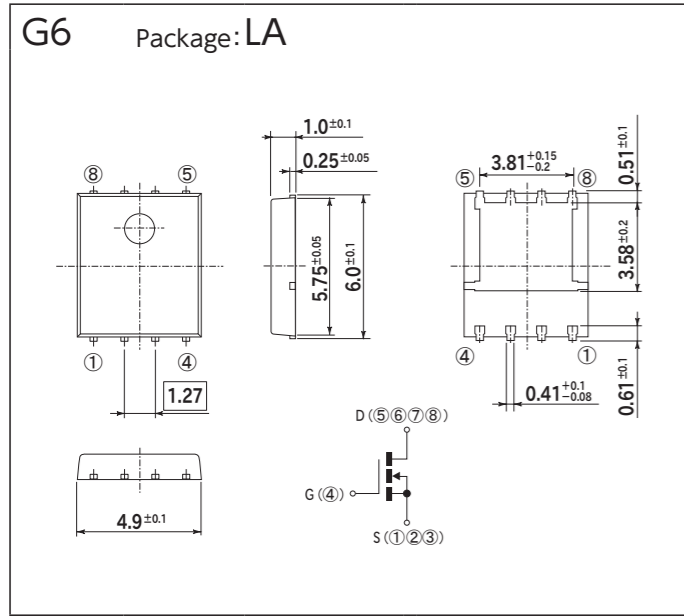
[Unit:mm]



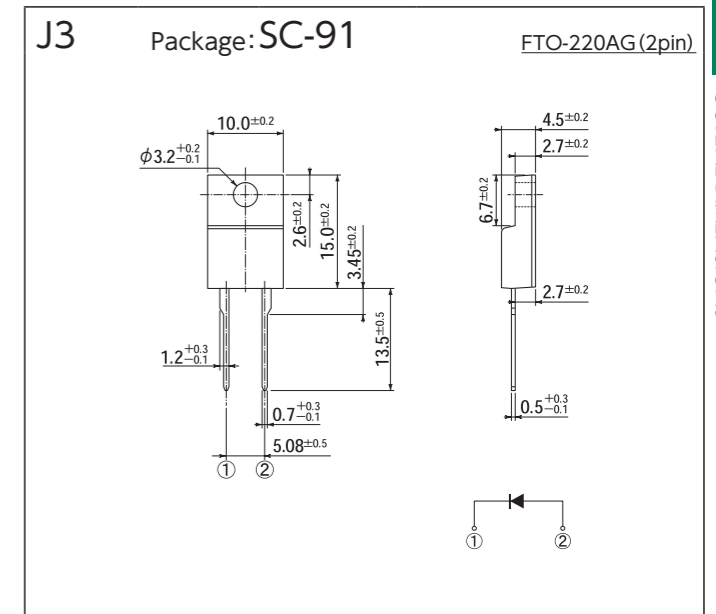
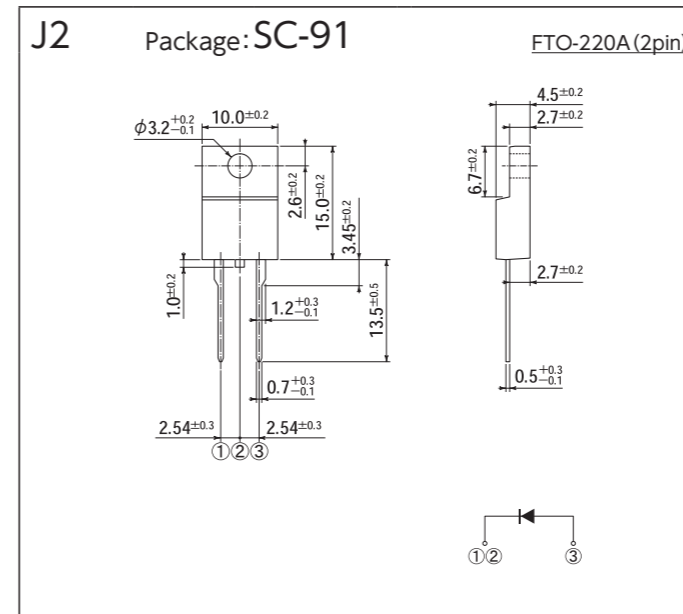
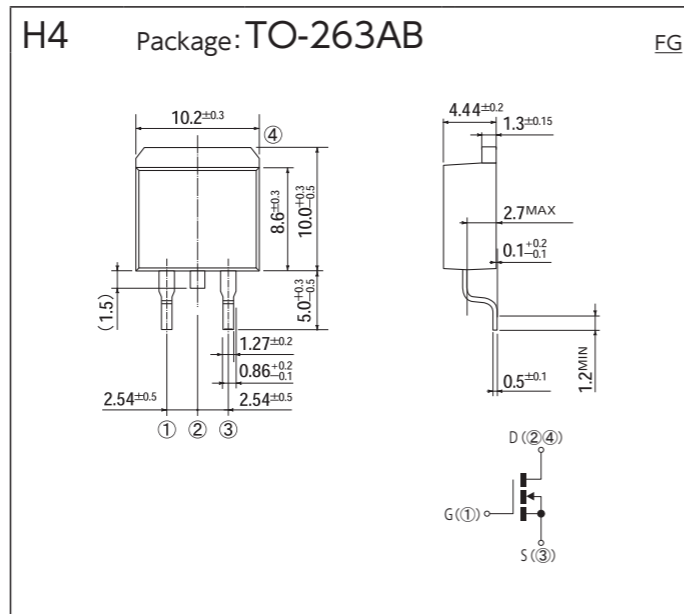
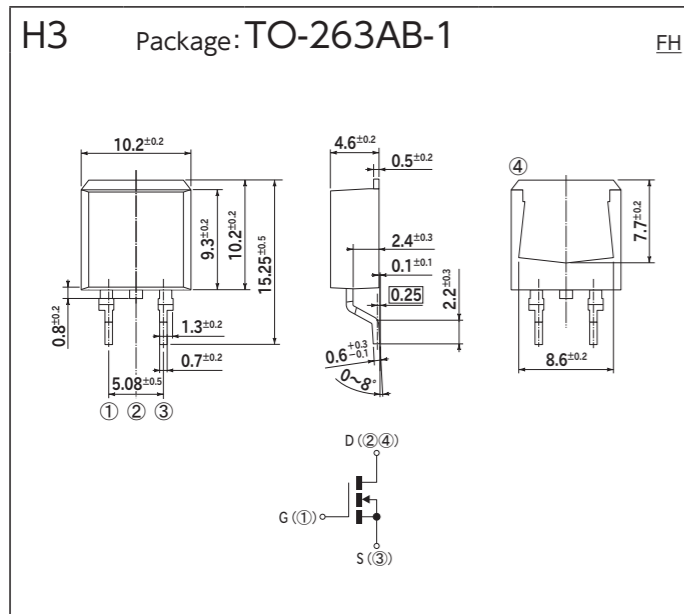
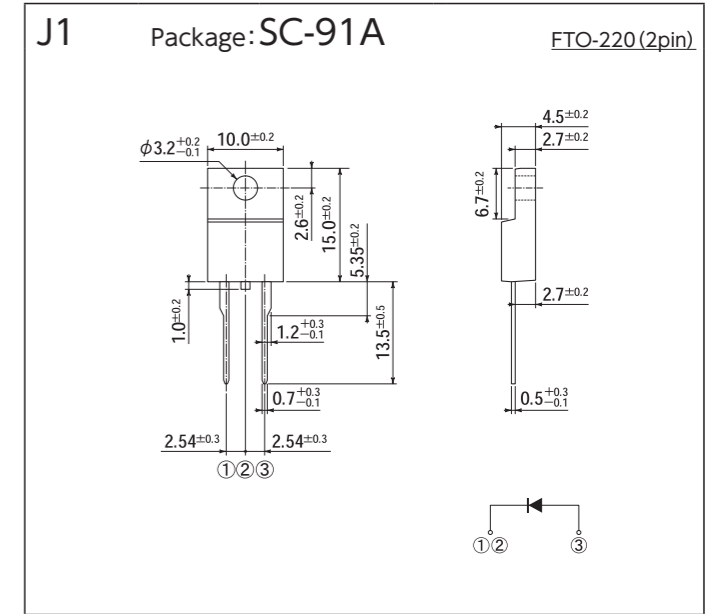
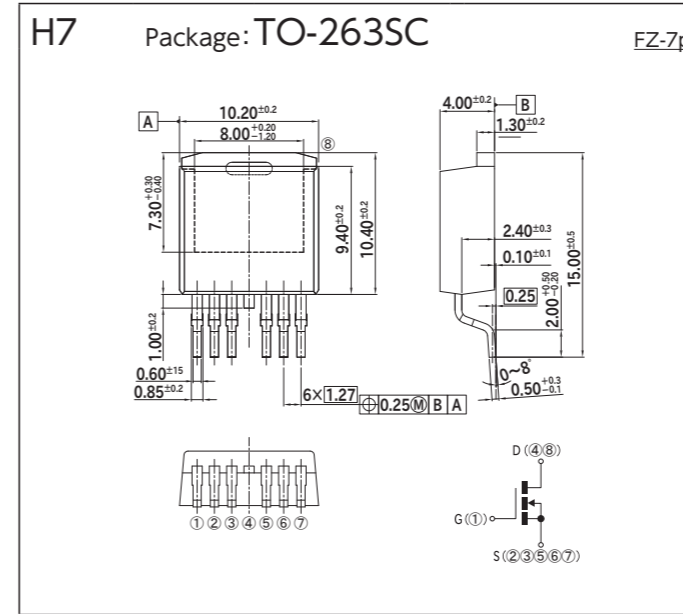
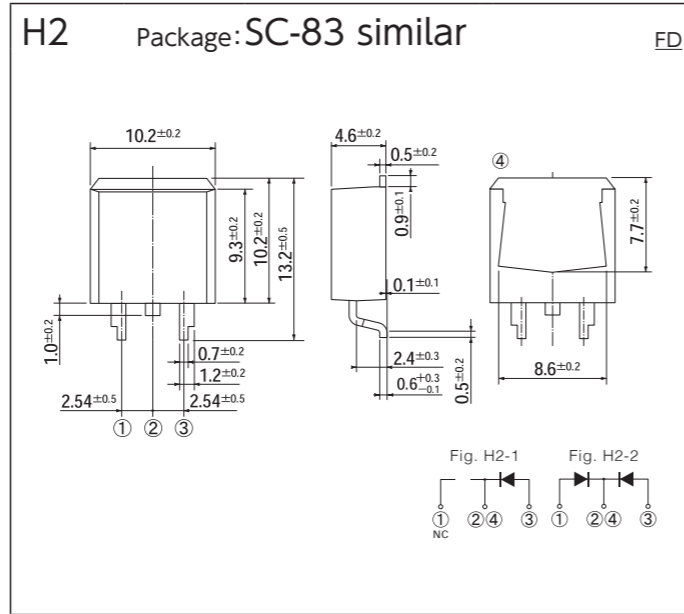
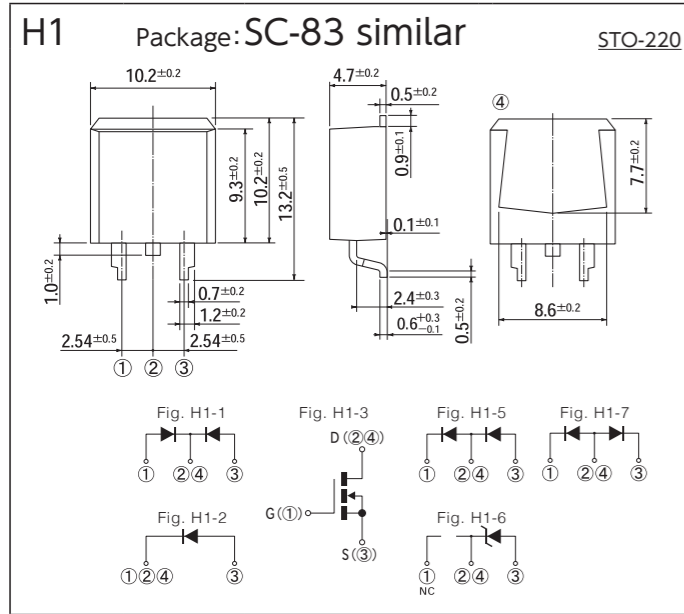


# OUTLINE DIMENSIONS

[Unit: mm]



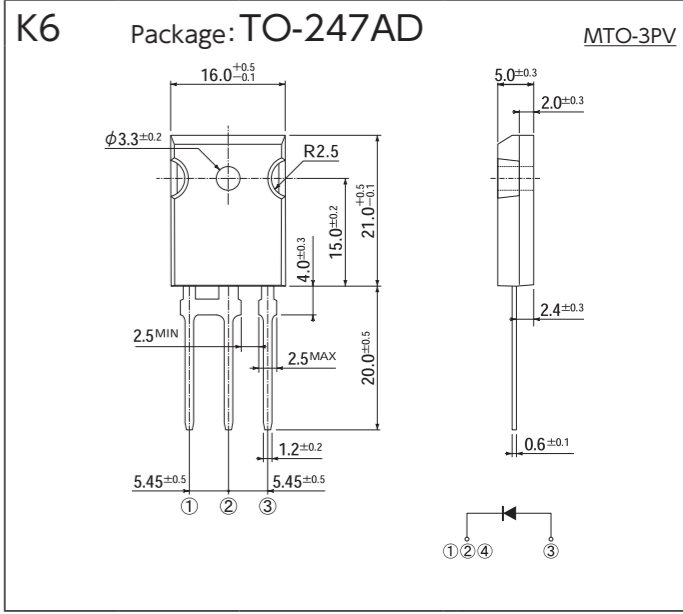
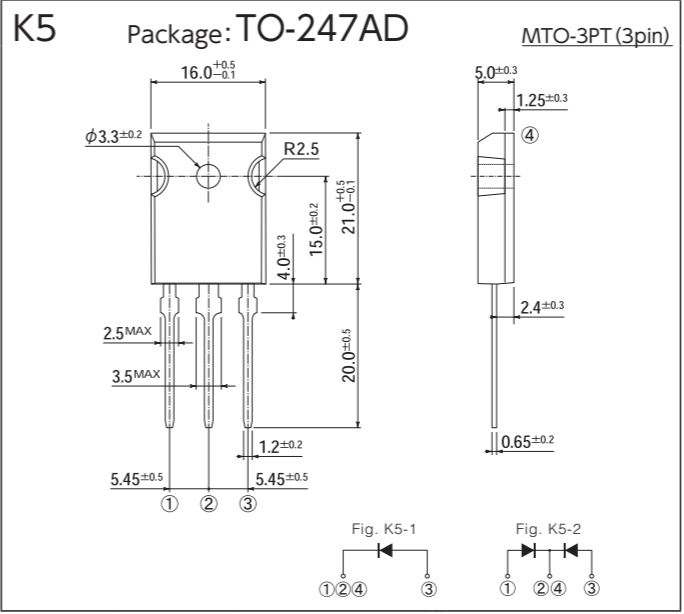
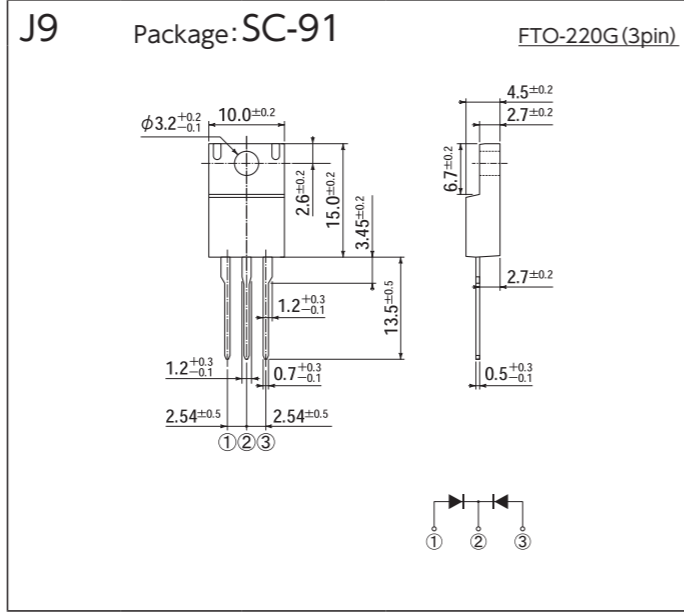
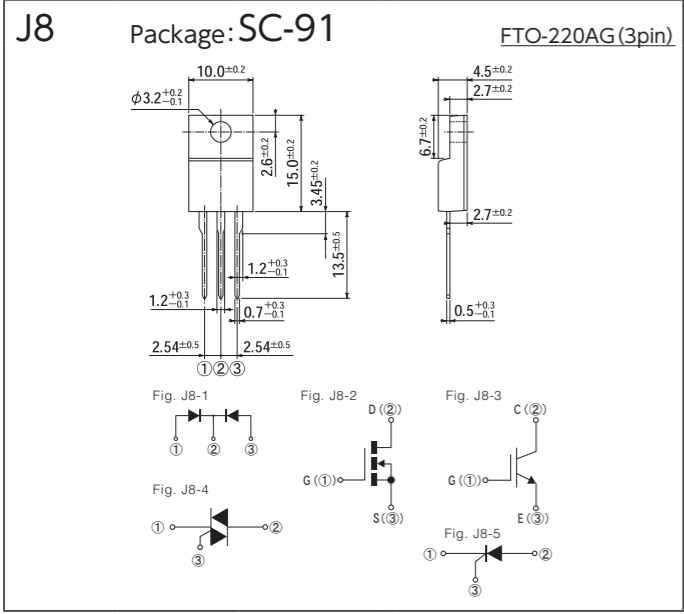
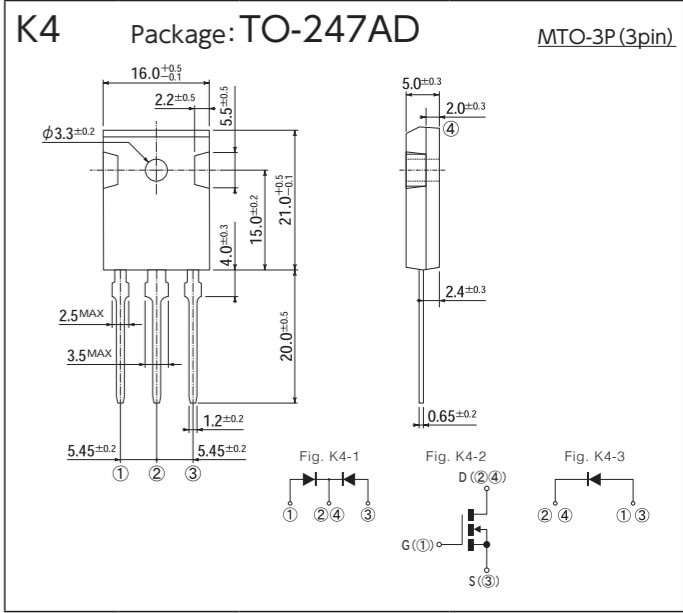
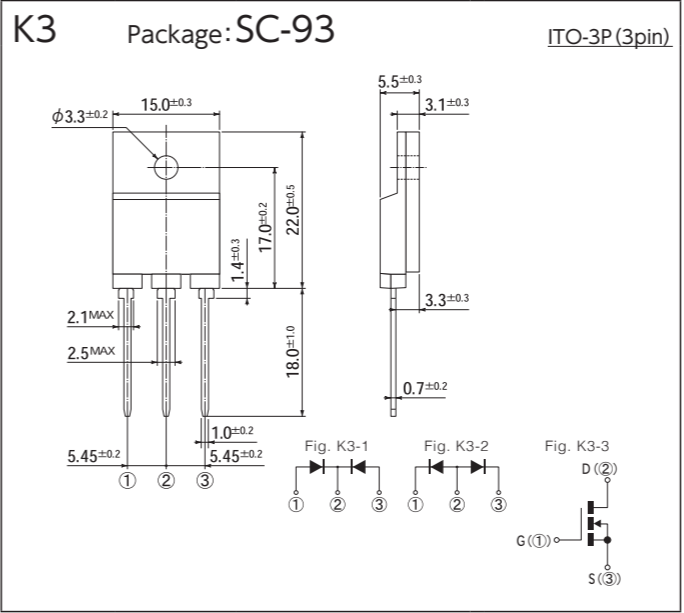
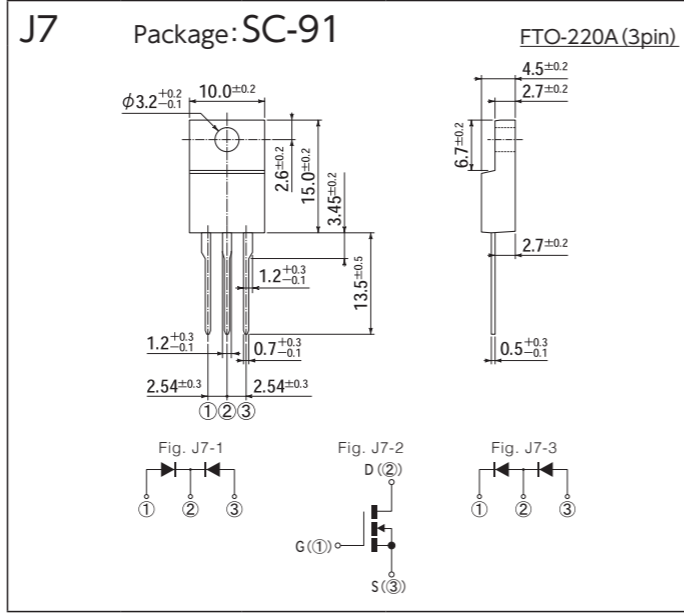
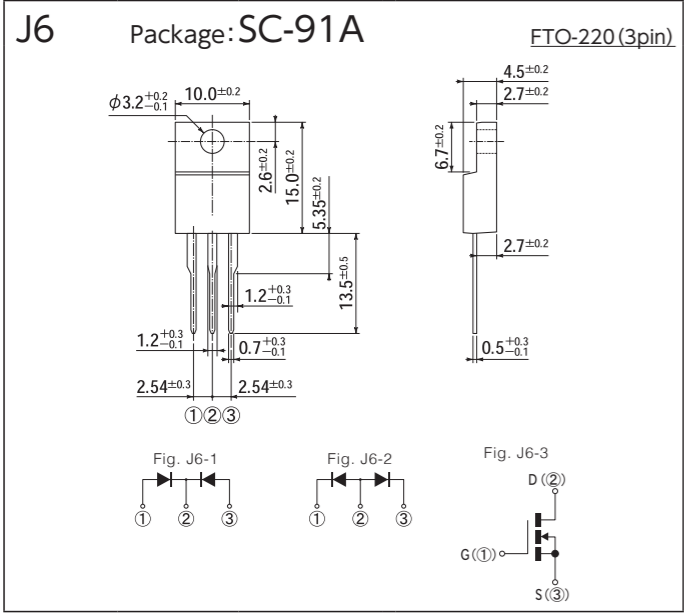
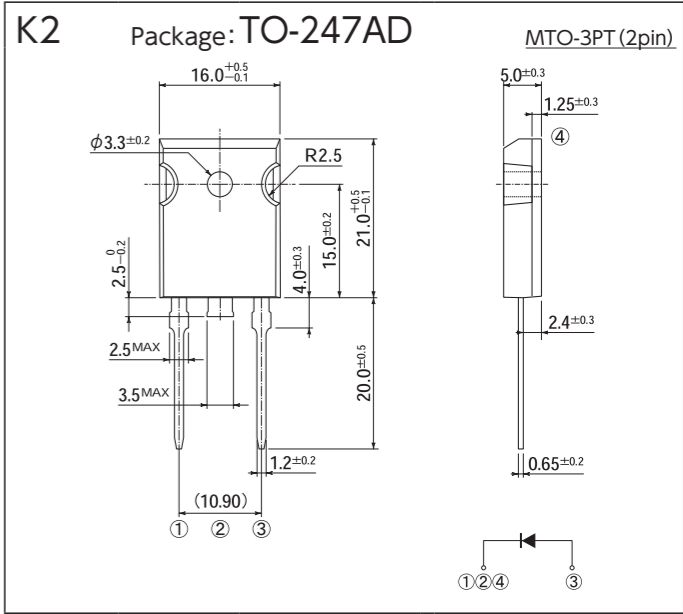
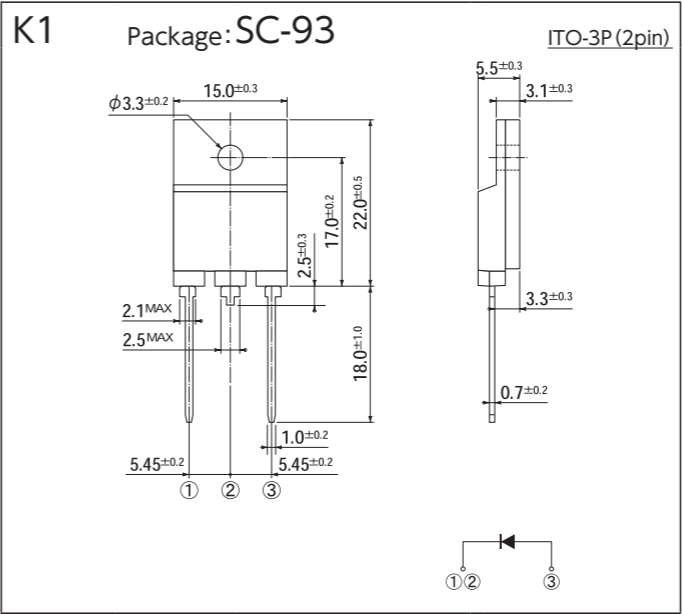
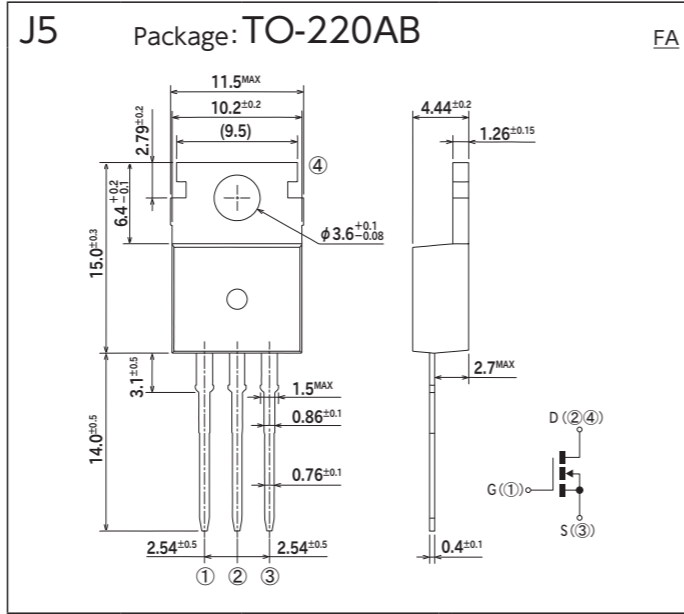
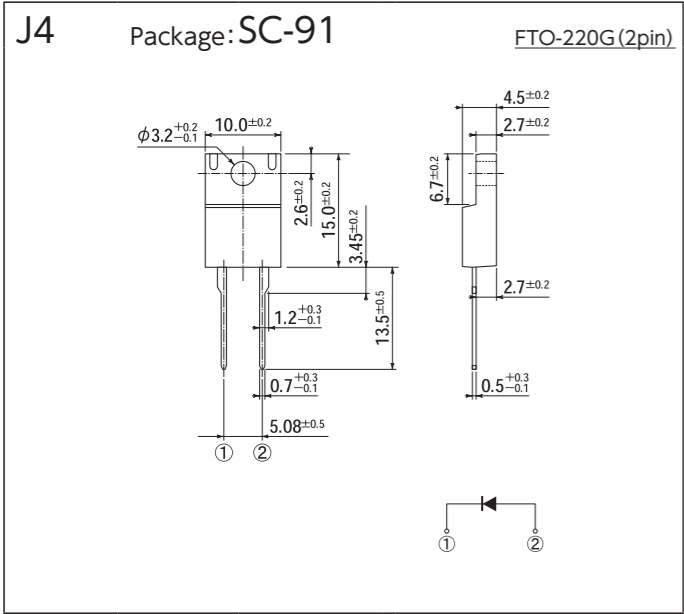
[Unit: mm]



OUTLINE DIMENSIONS

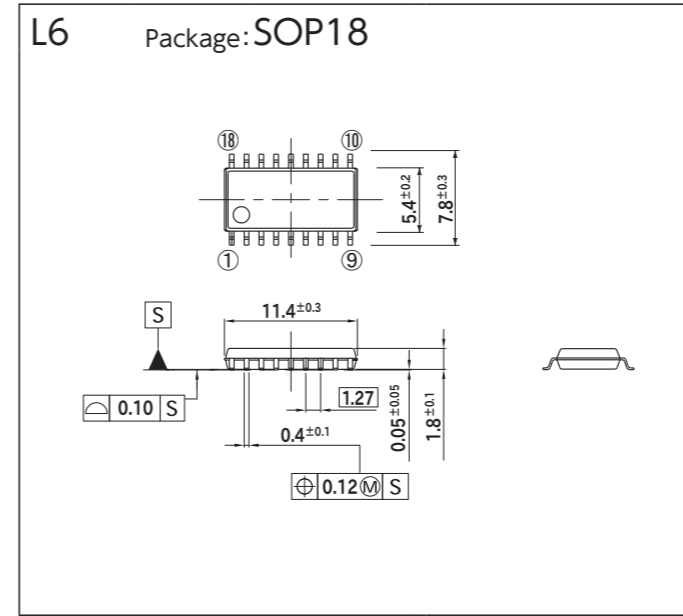
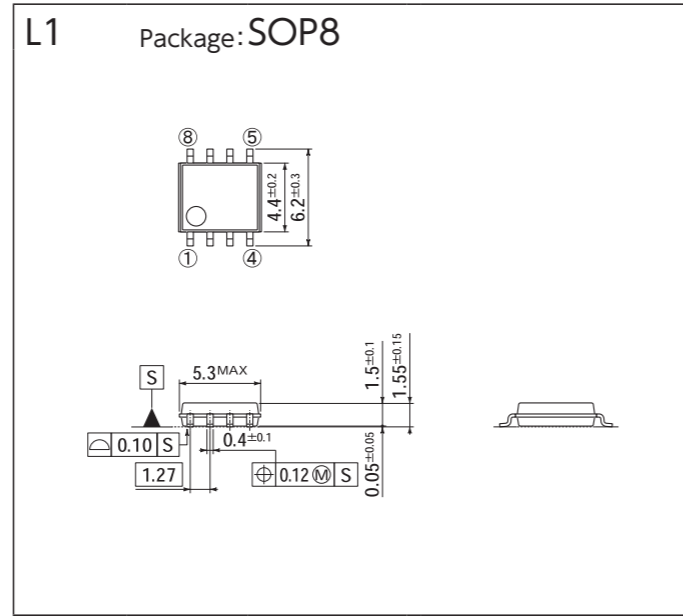
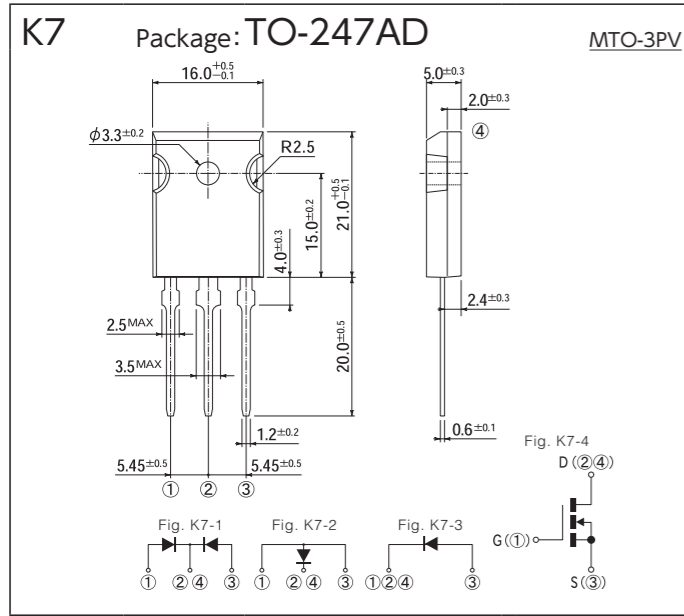
# OUTLINE DIMENSIONS

[Unit:mm]

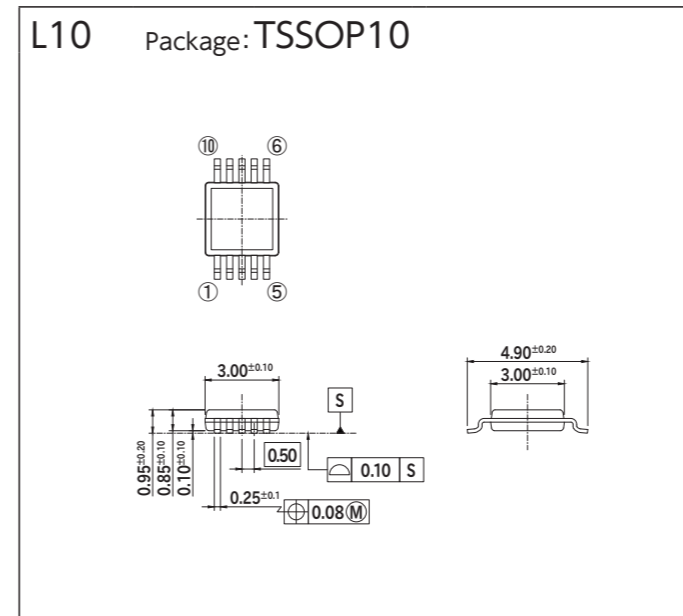
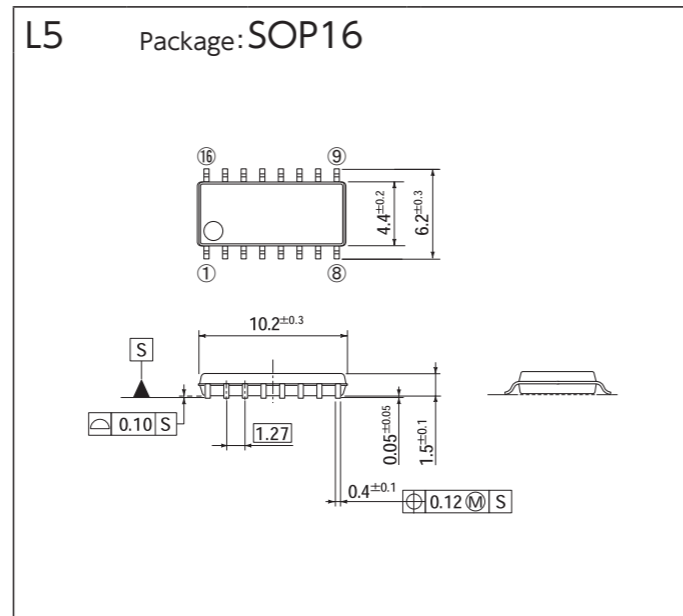
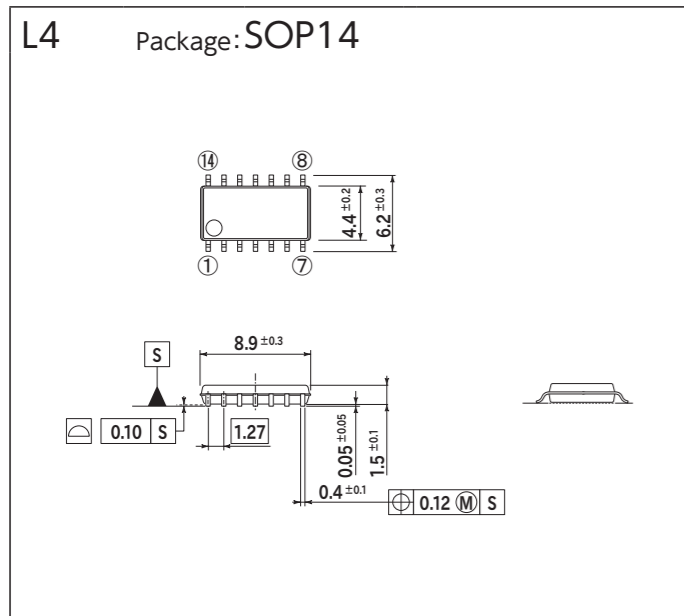
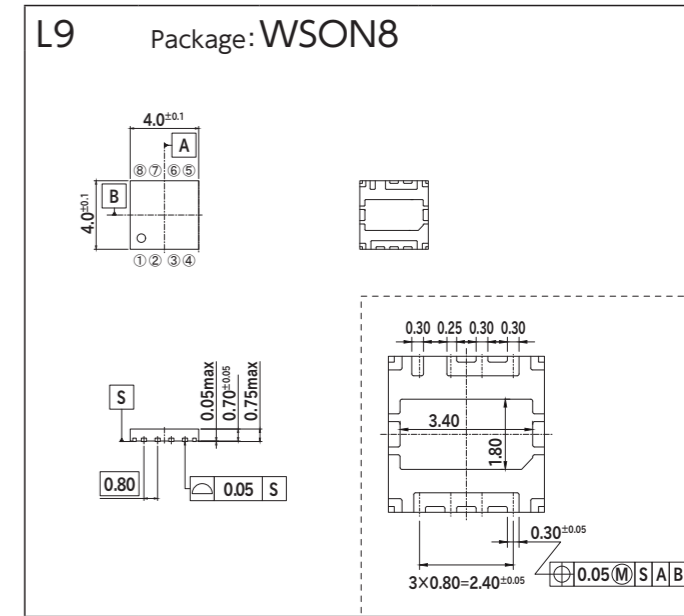
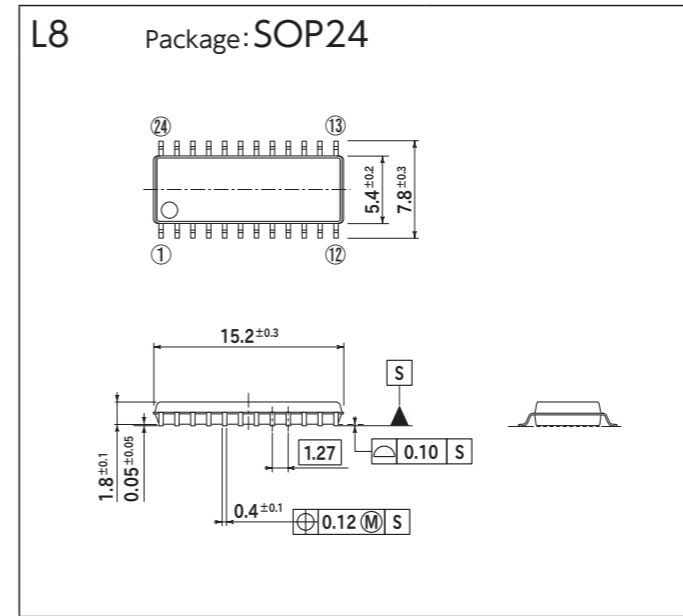
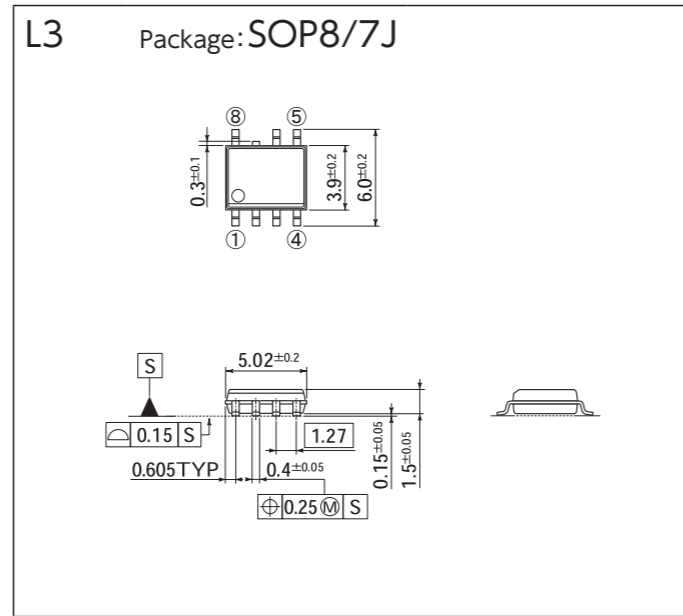
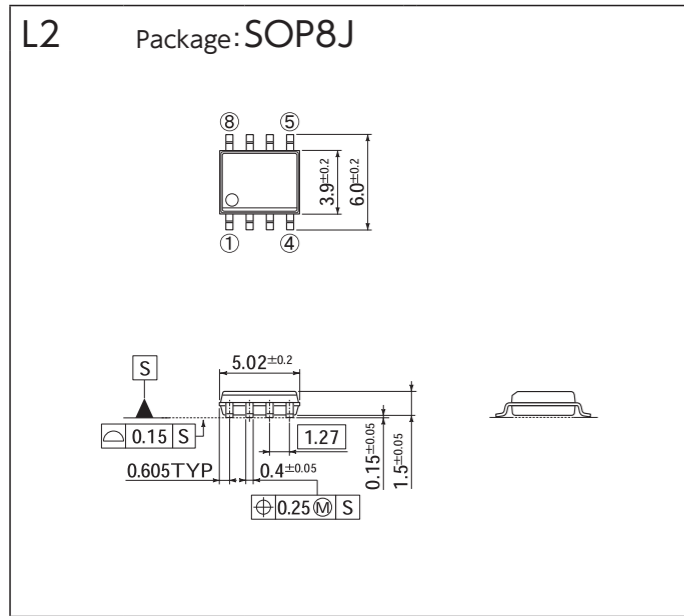
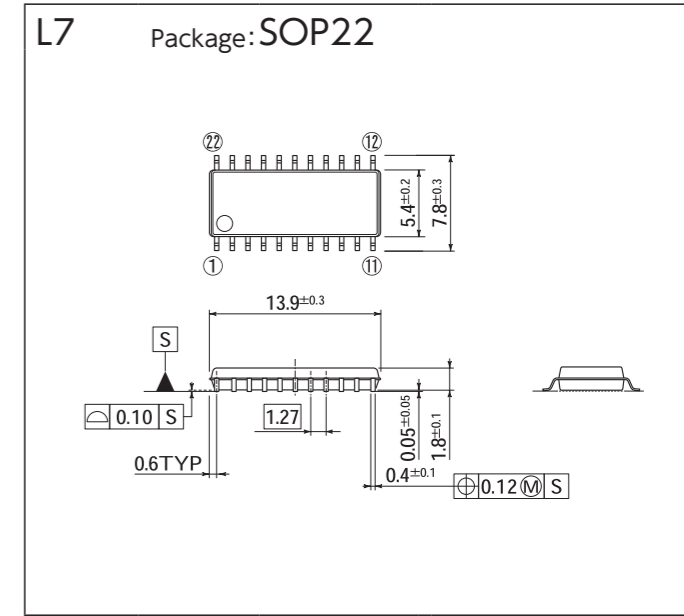


# OUTLINE DIMENSIONS

[Unit:mm]



[Unit:mm]



OUTLINE DIMENSIONS

