

# Semiconductor Product Catalog





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# 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 JEITA Code House Name	Fig.	IF (AV) [A]	VRRM [V]			Remarks
				400	600	800	
 3.9 × 1.8 × 1.4(mm)	DO-219AA similar M1F	B2	1		M1F60 M1FE60	M1F80	
			2	M1FE40			
 5.0 × 2.5 × 2.0(mm)	DO-214AC 1F	B3-1	1		D1F60 D1FE60		
			1.1		LN1F60		
			1.2		D1F60A		
 4.7 × 2.4 × 0.98(mm)	SC-110B CE	B5-1	3		D3CE60V		
			3.5		D3CE60VE		①— <—②
 5.1 × 3.75 × 2.0(mm)	DO-214AA similar M2F	B6	1.2		M2F60		
			3	M3FE40	M3F60 M3FE60		
 7.6 × 4.0 × 2.8(mm)	DO-214AA similar 2F	B9-1	1.4		D2F60		
			3		D3F60 D3FE60		
			4		D4F60		
			5		D5FE60		
 9.5 × 6.6 × 2.65(mm)	SC-63 E-pack	G1-5	5	DE5VE40			①④ ② N.C. ③
 6.5 × 4.5 × 1.1(mm)	TO-277A similar FY	G4	10		D10FY60VE		① ②③
 9.6 × 6.6 × 2.3(mm)	TO-252AA similar FR	G5	10		D10FR60V		① ②④ ③ N.C.
			15		D15FR60V		
 13.2 × 10.2 × 4.7(mm)	SC-83 similar STO-220	H1-2	25		DF25V60		①②④ ③
 13.2 × 10.2 × 4.6(mm)	SC-83 similar FD	H2-1	25		D25FD60V		① ②④ ③ N.C.

■ : New product

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

## Single

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


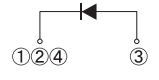
■ : New product \*1 : Tl \*2 : Tc \*3 : trr(max)=3.5μs ■ : Please contact us.

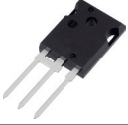
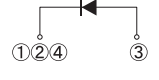
Axial													
JEDEC Code JEITA Code House Name	Fig.	Type No.	Absolute Maximum Ratings					Electrical Characteristics				Based on AEC-Q101	Automotive
			IF (AV) [A]	Conditions Ta [°C]	IFSM [A]	VRRM [V]	Tj [°C]	Vf (max) [V]	Conditions IF [A]	Ir (max) VR=VRRM [μA]	VESD (typ) [kV]		
AX057	A1	D1N60	1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

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

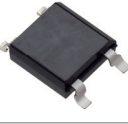
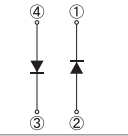

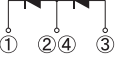
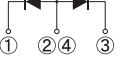
# GENERAL RECTIFYING DIODES

## Single


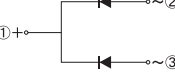
Two Terminal Type							
Package	JEDEC Code JEITA Code House Name	Fig.	I <sub>F(AV)</sub> [A]	V <sub>RRM</sub> [V]			Remarks
				400	600	800	
 41.0 × 16.0 × 5.0(mm)	TO-247AD — MTO-3PT	K2	30		S30V60T		

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

## Array

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

## Diode Module

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

## Single

Two Terminal Type													
Package		Type No.	Absolute Maximum Ratings					Electrical Characteristics				Based on AEC-Q101	Automotive
JEDEC Code JEITA Code House Name	Fig.		I <sub>F(AV)</sub> [A]	Conditions T <sub>C</sub> [°C]	I <sub>FSM</sub> [A]	V <sub>RRM</sub> [V]	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 — MTO-3PT	K2	S30V60T	30	119	360	600	150	1.1	30	10	—	—	—

Three Terminal Type													
Package		Type No.	Absolute Maximum Ratings					Electrical Characteristics				Based on AEC-Q101	Automotive
JEDEC Code JEITA Code House Name	Fig.		I <sub>F(AV)</sub> [A]	Conditions T <sub>C</sub> [°C]	I <sub>FSM</sub> [A]	V <sub>RRM</sub> [V]	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 — MTO-3PV	K6	S30V80V	30	131	450	800	150	1.1	30	10	—	—	○

## Array

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

\* : Tl

## Diode Module


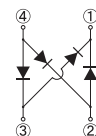






Package		Type No.	Absolute Maximum Ratings					Electrical Characteristics				Based on AEC-Q101	Automotive
JEDEC Code JEITA Code House Name	Fig.		I <sub>F(AV)</sub> [A]	Conditions T <sub>C</sub> [°C]	I <sub>FSM</sub> [A]	V <sub>RRM</sub> [V]	T <sub>J</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RRM</sub> [μA]	V <sub>ESD</sub> (typ) [kV]		
— — D30VC	E2	D30VC60	30	124	300	600	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 JEITA Code House Name	Fig.	IF(AV) [A]	VRRM [V]			Remarks
				600	800	1000	
 7.0 × 4.7 × 2.6(mm)	TO-269AA — 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 S1WB(A)60B	S1WB(A)80		
 10.6 × 10.2 × 3.1(mm)	— 1W	C8	2		S2WB(A)80		

## THD (Through Hole Device)

THD (Through Hole Device)							
Package	JEDEC Code JEITA Code 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 S1WB(A)60B	S1WB(A)80		
 6.2 × 10.2 × 3.0(mm)	— 1W	C9	2		S2WB(A)80		

## Small Bridge Diodes

Surface Mount													
Package		Type No.	Spec. Code	Absolute Maximum Ratings					Electrical Characteristics			UL	Automotive
JEDEC Code JEITA Code House Name	Fig.			IF (AV) [A]	Conditions Ta [°C]	IFSM [A]	VRRM [V]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRRM [μA]		
— TO-269AA	C2-1	S1ZB60	-7072	0.8	25	30	600	150	1.05	0.4	10	—	—
— 1Z		S1ZB80	-7072	0.8	25	30	800	150	1.05	0.4	10	—	—
— SOPA-4	C1	D1UBA80	-7062	1	25	30	800	150	0.95	0.4	10	—	—
— 1N	C4	S1NB60	-7062	1	25	30	600	150	1.05	0.5	10	—	—
— 1N		S1NB80	-7062	1	25	30	800	150	1.05	0.5	10	—	—
— 1NA	C6-1	S1NBB80	-7062	1	26	50	800	150	1.05	0.5	10	—	—
— 1NA		S1NBC60	-7062	1.5	105 *	60	600	150	1.05	0.75	10	—	—
— 1NA		S1NBC80	-7062	1.5	105 *	60	800	150	1.05	0.75	10	—	—
— 1W	C8	S1WB(A)60	-7062	1	25	30	600	150	1.00	0.5	10	—	—
— 1W		S1WB(A)60B	-7062	1	25	50	600	150	1.00	0.5	10	—	—
— 1W		S1WB(A)80	-7062	1	25	30	800	150	1.00	0.5	10	—	—
— 1W		S2WB(A)80	-7062	2	112 *	50	800	-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			UL	Automotive
JEDEC Code JEITA Code House Name	Fig.			IF (AV) [A]	Conditions Ta [°C]	IFSM [A]	VRRM [V]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRRM [μA]		
— 1Z	C3	S1ZB60	-7101	0.8	25	30	600	150	1.05	0.4	10	—	—
— 1Z		S1ZB80	-7101	0.8	25	30	800	150	1.05	0.4	10	—	—
— 1N	C5	S1NB60	-7101	1	25	30	600	150	1.05	0.5	10	—	—
— 1N		S1NB80	-7101	1	25	30	800	150	1.05	0.5	10	—	—
— 1NA	C7	S1NBB80	-7101	1	26	50	800	150	1.05	0.5	10	—	—
— 1NA		S1NBC60	-7101	1.5	105 *	60	600	150	1.05	0.75	10	—	—
— 1NA		S1NBC80	-7101	1.5	105 *	60	800	150	1.05	0.75	10	—	—
— 1W	C9	S1WB(A)60	-7101	1	25	30	600	150	1.00	0.5	10	—	—
— 1W		S1WB(A)60B	-7101	1	25	50	600	150	1.00	0.5	10	—	—
— 1W		S1WB(A)80	-7101	1	25	30	800	150	1.00	0.5	10	—	—
— 1W		S2WB(A)80	-7101	2	112 *	50	800	-40 to 150	1.05	1	10	—	—


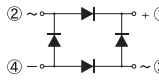


\* : TL




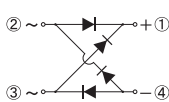





# BRIDGE DIODES

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


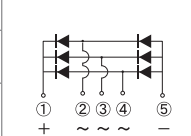




Package	JEDEC Code JEITA Code House Name	Fig.	IF (AV) [A]	VRRM [V]			Remarks
				600	800	1000	
 13.0 × 13.0 × 27.5(mm)	— S2VB	E3	2	S2VB60			
 17.0 × 17.0 × 32.5(mm)	— S4VB	E4	4	S4VB60			
 25.0 × 25.0 × 32.5(mm)	— S5VB	E5	6	S5VB60			
 22.0 × 22.0 × 32.5(mm)	— S10VB	E6	10	S10VB60			
 26.5 × 26.5 × 25.0(mm)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

## Input/Output In-line Terminal Type

Package	JEDEC Code JEITA Code House Name	Fig.	IF (AV) [A]	VRRM [V]			Remarks
				600	800	1000	
 17.0 × 17.0 × 31.0(mm)	— S3WB	E10	2.3	S3WB60			
 22.5 × 22.5 × 32.5(mm)	— S10WB	E11	10	S10WB60			
 26.5 × 26.5 × 32.5(mm)	— S15WB	E12	15	S15WB60			
 32.5 × 32.5 × 32.5(mm)	— S20WB	E13	20	S20WB60	S20WB80		


## 3 Phase Bridge Diodes

### THD (Through Hole Device)

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


 : New product

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

Package		Type No.	Absolute Maximum Ratings				Electrical Characteristics			UL	Automotive	
JEDEC Code JEITA Code House Name	Fig.		IF (AV) [A]	Conditions Tc [°C]	IFSM [A]	VRRM [V]	Tj [°C]	Vf (max) [V]	Conditions IF [A]			Ir (max) Vr=VRRM [μA]
— S2VB	E3	S2VB60	2 *1	40	40	600	150	1.05	1	10	—	—
— S4VB	E4	S4VB60	4	40	80	600	150	1.05	2	10	—	—
— S5VB	E5	S5VB60	6	40	200	600	150	1.05	3	10	—	—
— S10VB	E6	S10VB60	10	40	200	600	150	1.05	5	10	—	—
— S15VB	E7	S15VB60	15	83 *2	200	600	150	1.05	7.5	10	—	—
— S25VB	E8	S25VB60	25	85 *2	400	600	150	1.05	12.5	10	—	—
— S25VB		S25VB80	25	85 *2	400	800	150	1.05	12.5	10	—	—
— S50VB	E9	S50VB60	50	95 *2	500	600	150	1.05	25	10	—	—
— S50VB		S50VB80	50	95 *2	500	800	150	1.05	25	10		—

\*1 : Without heatsink \*2 : Tc  : UL recognized (UL File No. E142422)











## Input/Output In-line Terminal Type

Package		Type No.	Absolute Maximum Ratings				Electrical Characteristics			UL	Automotive	
JEDEC Code JEITA Code House Name	Fig.		IF (AV) [A]	Conditions Tc [°C]	IFSM [A]	VRRM [V]	Tj [°C]	Vf (max) [V]	Conditions IF [A]			Ir (max) Vr=VRRM [μA]
— S3WB	E10	S3WB60	2.3	40 *	120	600	150	1.05	2	10	—	—
— S10WB	E11	S10WB60	10	74	170	600	150	1.05	5	10	—	—
— S15WB	E12	S15WB60	15	77	200	600	150	1.05	7.5	10	—	—
— S20WB	E13	S20WB60	20	76	500	600	150	1.05	10	10	—	—
— S20WB		S20WB80	20	76	500	800	150	1.05	10	10		—

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

## 3 Phase Bridge Diodes

### THD (Through Hole Device)





Package		Type No.	Absolute Maximum Ratings				Electrical Characteristics			UL	Automotive	
JEDEC Code JEITA Code House Name	Fig.		IF (AV) [A]	Conditions Tc [°C]	IFSM [A]	VRRM [V]	Tj [°C]	Vf (max) [V]	Conditions IF [A]			Ir (max) Vr=VRRM [μA]
— TSB(5pin)	D8	D30XT80	30	117	300	800	150	1.05	10	10		—
		D45XT80	45	101	400	800	150	1.05	15	10		—
		D45XT160	45	97	330	1600	150	1.05	15	100		—
		D30JCT120V	30	116	300	1200	150	1.05	10	10		—
— JC(5pin)	D8	D45JCT120V	45	99	450	1200	150	1.05	15	10		—
		D45JCT160V	45	97	450	1600	150	1.05	15	10		—
— JF	D9	D75JFT80V	75	109	400	800	150	1.05	25	10	—	—
— JH	D10-2	D100JHT80V	100	99	500	800	-55 to 150	1.10	35	10		—
		D100JHT120V	100	92	450	1200	-55 to 150	1.17	35	10		—
— JH	D10-2	 D100JHT160V	100	92	540	1600	-55 to 150	1.15	35	10		—

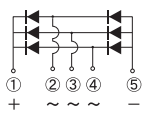
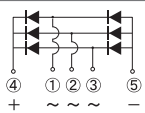
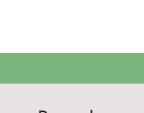
 : New product  : UL recognized (UL File No. E142422)

# BRIDGE DIODES

Series	Feature
S	Evenly balanced $V_f$ and $I_r$
N	Low $V_f$ , High Voltage
K	Low $V_f$

## 3 Phase Bridge Diodes



Package	JEDEC Code JEITA Code House Name	Fig.	$I_F$ (AV) [A]	$V_{RRM}$ [V]			Remarks
				600	800	1600	
 36.0 × 36.0 × 24.0(mm)	-	SVT	E15	10	S10VT60	S10VT80	
				15	S15VT60	S15VT80	
				20	S20VT60	S20VT80	
				30	S30VT60	S30VT80	S30VT160
				10	S10VTA60	S10VTA80	
				15	S15VTA60	S15VTA80	
 36.0 × 36.0 × 23.0(mm)	-	SVTA	E14	20	S20VTA60	S20VTA80	
				30	S30VTA60	S30VTA80	S30VTA160
				150	 MG038B150080A	★ MG038D150160A	
				200	 MG038A200080A	★ MG038C200160A	

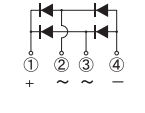
  
  


: New product   ★ : Under development

## High Speed Bridge Diodes (SBD)



THD (Through Hole Device)

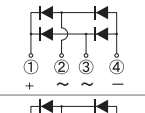
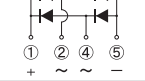
Package	JEDEC Code JEITA Code House Name	Fig.	$I_F$ (AV) [A]	$V_{RRM}$ [V]			Remarks
				40	60	200	
 32.5 × 25.0 × 4.6(mm)	-	D3	4	D4SBS4	D4SBS6	D4SBN20	
			10	D10SBS4			
			15		D15XBS6		
 37.5 × 30.0 × 4.6(mm)	-	D4	6			D6SBN20	
			15			D15XBN20	
			20		D20XBS6		
			30			D30XBN20	





## High Speed Bridge Diodes (FRD)

THD (Through Hole Device)

Package	JEDEC Code JEITA Code House Name	Fig.	$I_F$ (AV) [A]	$V_{RRM}$ [V]			Remarks
				200	400	1000	
 32.5 × 25.0 × 4.6(mm)	-	D3	4	D4SBL20U			
 47.0 × 45.7 × 7.5(mm)	-	D7	30			D30JCB100K	

## 3 Phase Bridge Diodes

Package		Type No.	Absolute Maximum Ratings				Electrical Characteristics				UL	Automotive	
JEDEC Code JEITA Code House Name	Fig.		$I_F$ (AV) [A]	Conditions $T_c$ [°C]	$I_{FSM}$ [A]	$V_{RRM}$ [V]	$T_j$ [°C]	$V_f$ (max) [V]	Conditions $I_f$ [A]	$I_r$ (max) $V_R=V_{RM}$ [ $\mu$ A]			
-	SVT	E15	S10VT60	10	137	170	600	150	1.05	3.5	10	-	-
		S10VT80	10	137	150	800	150	1.05	3.5	10	-	-	
		S15VT60	15	132	200	600	150	1.05	5	10	-	-	
		S15VT80	15	132	200	800	150	1.05	5	10	-	-	
		S20VT60	20	128	300	600	150	1.05	7	10	-	-	
		S20VT80	20	128	300	800	150	1.05	7	10	-	-	
		S30VT60	30	121	400	600	150	1.05	10	10	-	-	
		S30VT80	30	121	400	800	150	1.05	10	10	UL	-	
-	SVTA	E14	S10VTA60	10	137	170	600	150	1.05	3.5	10	-	-
		S10VTA80	10	137	150	800	150	1.05	3.5	10	-	-	
		S15VTA60	15	132	200	600	150	1.05	5	10	-	-	
		S15VTA80	15	132	200	800	150	1.05	5	10	-	-	
		S20VTA60	20	128	300	600	150	1.05	7	10	-	-	
		S20VTA80	20	128	300	800	150	1.05	7	10	-	-	
		S30VTA60	30	121	400	600	150	1.05	10	10	-	-	
		S30VTA80	30	121	400	800	150	1.05	10	10	-	-	
-	MG038	F7	 MG038B150080A	150	125	2350	800	150	1.05	67	10	UL	-
		★ MG038D150160A	150	125	2350	1600	150	1.05	50	10	to be certified	-	
		 MG038A200080A	200	125	2750	800	150	1.05	67	10	UL	-	
		★ MG038C200160A	200	125	2750	1600	150	1.05	50	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		Type No.	Absolute Maximum Ratings				Electrical Characteristics				UL	Automotive	Remarks	
JEDEC Code JEITA Code House Name	Fig.		$I_F$ (AV) [A]	Conditions $T_c$ [°C]	$I_{FSM}$ [A]	$V_{RRM}$ [V]	$T_j$ [°C]	$V_f$ (max) [V]	Conditions $I_f$ [A]	$I_r$ (max) $V_R=V_{RM}$ [ $\mu$ A]				
-	3S	D3	D4SBS4	4	116	60	40	150	0.55	2	2mA	-	-	S series
		D4SBS6	4	114	60	60	150	0.62	2	2mA	-	-	S series	
		D4SBN20	4	103	60	200	150	0.90	2	1.5	-	-	N series	
		D10SBS4	10	67	100	40	150	0.55	5	3.5mA	-	-	S series	
		D15XBS6	15	59	150	60	150	0.63	7.5	6.0mA	-	-	S series	
-	5S	D4	D6SBN20	6	110	120	200	150	0.90	3	2	-	-	N series
		D15XBN20	15	106	200	200	150	0.90	7.5	5	-	-	N series	
		D20XBS6	20	100	200	60	150	0.63	10	8.0mA	-	-	S series	
		D30XBN20	30	91	350	200	150	0.90	15	10	-	-	N series	

## High Speed Bridge Diodes (FRD)

THD (Through Hole Device)

Package		Type No.	Absolute Maximum Ratings				Electrical Characteristics				UL	Automotive	Remarks	
JEDEC Code JEITA Code House Name	Fig.		$I_F$ (AV) [A]	Conditions $T_c$ [°C]	$I_{FSM}$ [A]	$V_{RRM}$ [V]	$T_j$ [°C]	$V_f$ (max) [V]	Conditions $I_f$ [A]	$I_r$ (max) $V_R=V_{RM}$ [ $\mu$ A]				
-	3S	D3	D4SBL20U	4	108	80	200	150	0.98	2	10	-	-	
-	JC(4pin)	D7	D30JCB100K	30	90	450	1000	150	1.90	15	10	UL	○	K series


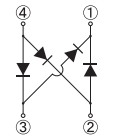
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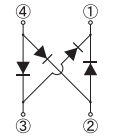

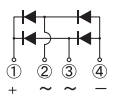

# BRIDGE DIODES

## Low Vf Bridge Diodes

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

## Low Noise Bridge Diodes

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

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

## Low Vf Bridge Diodes

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

■ : 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	Automotive	Remarks
JEDEC Code JEITA Code House Name	Fig.		If (AV) [A]	Conditions Tc [°C]	IfSM [A]	VRRM [V]	Tj [°C]	Vf (max) [V]	Conditions If [A]	Ir (max) Vr=VRRM [μA]	trr (max) [μs]				
—	C8(SMD) C9(DIP)	LN1WBA60	1.1	25 *	50	600	150	1.00	0.55	10	5	—	—	SMD-7072 DIP-7101	
1W		LN4SB60	4	111	150	600	150	0.95	2	10	5	UL	—		
—	D4	LN6SB60	6	111	170	600	150	1.05	3	10	5	UL	—		
—		LN15XB60	15	100	200	600	150	1.10	7.5	10	5	—	—		
—		LN15XB60H	15	106	290	600	150	1.05	7.5	10	5	—	—		
5S		LN25XB60	25	85	350	600	150	1.05	12.5	10	5	—	—		

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





# SCHOTTKY BARRIER DIODES


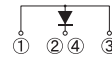
## Single

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

## Two Terminal Type

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

## Three Terminal Type

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

## Single

Axial														
Package		Type No.	Absolute Maximum Ratings					Electrical Characteristics				Based on AEC-Q101	Automotive	Series
JEDEC Code JEITA Code House Name	Fig.		V <sub>RRM</sub> [V]	I <sub>F(AV)</sub> [A]	Conditions T <sub>a</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> [mA]	C <sub>t</sub> (typ) [pF]			
— — AX057	A1	D1NS4	40	1	59	30	150	0.55	1	0.8	50	—	—	S series
		D1NS6	60	1	46	30	150	0.58	1	1	53	—	—	S series
— — AX078	A4-1	D2S4M	40	2	122 *1	60	150	0.55	2	2	95	—	—	S series
		D2S6M	60	2	119 *1	60	150	0.58	2	2	90	—	—	S series
— — AX14	A7	D3S4M	40	3	63	80	150	0.55	3	3.5	150	—	—	S series
		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				Based on AEC-Q101	Automotive	Series
JEDEC Code JEITA Code 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> [mA]	C <sub>t</sub> (typ) [pF]			
— SC-91 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




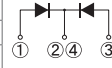

## Three Terminal Type

Three Terminal Type														
Package		Type No.	Absolute Maximum Ratings					Electrical Characteristics				Based on AEC-Q101	Automotive	Series
JEDEC Code JEITA Code 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> [mA]	C <sub>t</sub> (typ) [pF]			
TO-247AD — 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

# SCHOTTKY BARRIER DIODES

## Center Tap, Common Cathode

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

## Center Tap, Common Cathode

Surface Mount															
JEDEC Code JEITA Code House Name	Package	Fig.	Type No.	Absolute Maximum Ratings					Electrical Characteristics				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-63 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
			DE10SC4	40	10	132	100	150	0.55	5	3.5	210	—	■	S series
TO-252AB similar SC-63 FE	G3-1		D6FEC4ST	40	6	158	90	175	0.74	3	8μA	93	○	○	SL series
			D6FEC10ST	100	6	154	100	175	0.86	3	8μA	60	○	○	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
— SC-83 similar STO-220	H1-1		DF10SC6	60	10	132	150	150	0.58	5	4.5	260	—	—	S series
			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
			— SC-83 similar FD	H2-2		D10FDC10ST	100	10	158	150	175	0.86	5	15μA	104
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 JEITA Code House Name	Fig.	IF (AV) [A]	VRRM[V]									
				15	30	40	60	90	100	120	150	600	
 28.5 × 10.0 × 4.5(mm)	SC-91 FTO-220G	J9	8		SG8SC4M								
			10	SG10SC3LM	SG10SC4M	SG10SC6M	SG10SC9M				SG10TC15M		
			15		SG15SC4M	SG15SC6M							
			20		SG20SC3LM	SG20SC4M	SG20JC6M SG20SC6M	SG20SC9M	SG20TC10M	SG20TC12M	SG20TC15M		
			30		SG30SC3LM	SG30SC4M	SG30JC6M SG30SC6M		SG30TC10M	SG30TC12M	SG30TC15M		
 41.0 × 16.0 × 5.0(mm)	TO-247AD MTO-3PT	K5-2	20					S20SC9MT					
			30			S30SC4MT	S30SC6MT			S30TC15T			
			40	S40HC1R5T									
			60	S60HC1R5T	S60HC3T S60SC3LT	S60SC4MT	S60SC6MT						
			60							S60JC10V			
 41.0 × 16.0 × 5.0(mm)	TO-247AD MTO-3PV	K7-1	60										

## Center Tap, Common Cathode

Three Terminal Type													Based on AEC-Q101	Automotive	Series	
Package	Fig.	Type No.	Absolute Maximum Ratings					Electrical Characteristics								
JEDEC Code JEITA Code House Name			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 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 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		
TO-247AD 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 JEITA Code House Name	Fig.	I <sub>F(AV)</sub> [A]	V <sub>RRM</sub> [V]		Remarks
				40	60	
 7.0 × 4.7 × 2.6(mm)	TO-269AA — 1Z	C2-2	1.2	S1ZAS4		

## Diode Module

Diode Module						
Package	JEDEC Code JEITA Code House Name	Fig.	I <sub>F(AV)</sub> [A]	V <sub>RRM</sub> [V]		Remarks
				40	60	
 43.0 × 27.0 × 21.0(mm)	— — Module	F1	120	D120SC4M	D120SC6M	
			240	D240SC4M	D240SC6M	
 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				Based on AEC-Q101	Automotive	Series
JEDEC Code JEITA Code House Name	Fig.		V <sub>RRM</sub> [V]	I <sub>F(AV)</sub> [A]	Conditions T <sub>a</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> [mA]	C <sub>t</sub> (typ) [pF]			
TO-269AA — 1Z	C2-2	S1ZAS4	40	1.2	47	40	150	0.55	1	1	65	—	—	S series


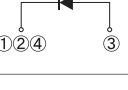
## Diode Module

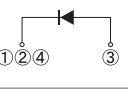
Diode Module														
Package		Type No.	Absolute Maximum Ratings					Electrical Characteristics				Based on AEC-Q101	Automotive	Series
JEDEC Code JEITA Code House Name	Fig.		V <sub>RRM</sub> [V]	I <sub>F(AV)</sub> [A]	Conditions T <sub>c</sub> [°C]	I <sub>FSM</sub> [A]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RRM</sub> [mA]	C <sub>t</sub> (typ) [pF]			
— — 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




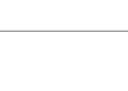
# FAST RECOVERY DIODES

## Single

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

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

## Center Tap, Common Cathode

Surface Mount								
Package	JEDEC Code JEITA Code House Name	Fig.	I <sub>F(AV)</sub> [A]	V <sub>RRM</sub> [V]				Remarks
				200	300	400	600	
 9.5 × 6.6 × 2.65(mm)	— SC-63 E-pack	G1-1	5	DE5LC20U				
			10	DF10LC20U	DF10LC30			
 13.2 × 10.2 × 4.7(mm)	— SC-83 similar STO-220	H1-1	20	DF20LC20US	DF20LC30			
			20	D20FDC20L	D20FDC20LUS			
 13.2 × 10.2 × 4.6(mm)	— SC-83 similar FD	H2-2	20	D20FDC20L	D20FDC20LUS			
			20	D20FDC20LUS				

## Single

Two Terminal Type														
Package		Type No.	Absolute Maximum Ratings					Electrical Characteristics				Based on AEC-Q101	Automotive	Series
JEDEC Code JEITA Code 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]	t <sub>rr</sub> (max) [ns]			
— SC-91A 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 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
		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
		— SC-91 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 — 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

■ : Please contact us.

Three Terminal Type														
Package		Type No.	Absolute Maximum Ratings					Electrical Characteristics				Based on AEC-Q101	Automotive	Series
JEDEC Code JEITA Code 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]	t <sub>rr</sub> (max) [ns]			
TO-247AD — 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														
Package		Type No.	Absolute Maximum Ratings					Electrical Characteristics				Based on AEC-Q101	Automotive	Series
JEDEC Code JEITA Code 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]	t <sub>rr</sub> (max) [ns]			
— SC-63 E-pack	G1-1	DE5LC20U	200	5	81	50	150	0.98	2.5	10	35	—	■	—
		DF10LC20U	200	10	127	80	150	0.98	5	10	35	—	—	—
— SC-83 similar STO-220	H1-1	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 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 JEITA Code House Name	Fig.	I <sub>F(AV)</sub> [A]	V <sub>RRM</sub> [V]				Remarks
				200	300	400	600	
 28.5 × 10.0 × 4.5(mm)	SC-91 FTO-220AG	J8-1	5			SF5LC40UM		
			10			SF10LC40UM	SF10KC60M	
			20		SF20LC30M		SF20KC60M	
 28.5 × 10.0 × 4.5(mm)	SC-91 FTO-220G	J9	5	SG5LC20USM				
			10	SG10LC20USM				
			20	SG20LC20USM				
 41.0 × 16.0 × 5.0(mm)	TO-247AD MTO-3PT	K5-2	20	S20LC20UST	S20LC30T	S20LC40UT	S20LC60UST	
				S20LC40UV	S20LC60USV			
 41.0 × 16.0 × 5.0(mm)	TO-247AD MTO-3PV	K7-1	20			S20LC40UV	S20LC60USV	

## Center Tap, Common Cathode

### Three Terminal Type


JEDEC Code JEITA Code House Name	Package	Fig.	Type No.	Absolute Maximum Ratings				Electrical Characteristics				Based on AEC-Q101	Automotive	Series	
				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]				t <sub>rr</sub> (max) [ns]
SC-91 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	-	-	-
SC-91 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 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	-	-	-
			S20LC40UT	400	20	123	130	150	1.25	10	10	30	-	-	-
TO-247AD MTO-3PV	K7-1		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 JEITA Code House Name	TO-252AA — FB	— SC-91 FTO-220AG		
Fig.	G2-2	J8-5		
Internal Circuit				
IT (AV) [A]	3	5	5	8
V <sub>DRM</sub> [V]	400	KC3FB40H	KC5FB40H	
	600		KC5FB60H KC5FB60HR KC5FB60HRT	 KC5SF60HRT
	800			 KC8SF80

 : New product

## Thyristors

Package JEDEC Code JEITA Code House Name	Fig.	Type No.	Absolute Maximum Ratings						Electrical Characteristics					Based on AEC-Q101	Automotive
			V <sub>DRM</sub> [V]	V <sub>RRM</sub> [V]	I <sub>T</sub> (AV) [A]	Conditions T <sub>c</sub> [°C]	I <sub>TSM</sub> [A]	T <sub>j</sub> [°C]	V <sub>TM</sub> (max) [V]	Conditions I <sub>TM</sub> [A]	V <sub>GT</sub> (max) [V]	I <sub>GT</sub> (max) [μA]	I <sub>H</sub> (max) [mA]		
TO-252AA — 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	—	—
		KC5FB60HR	600	—	5	98	90	-40 to 125	1.8	15	0.8	100	5	—	—
— SC-91 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			
	5.0 × 2.5 × 2.0(mm)	5.0 × φ 2.6(mm)	7.0 × φ 4.4(mm)
JEDEC Code JEITA Code House Name	DO-214AC — 1F	— — AX06	— — AX10
Fig.	B4-3	A2-1	A5-3 A6
Internal Circuit	①—N—②		
V <sub>DRM</sub> [V]	5	K1VZL09	
	15	K1VZL20	
	90	K1V(A)10 K1V(A)11 K1V(A)12	K1V10 K1V11 K1V12
	115	K1V(A)16	K1V14
	180		K1V22 K1V24 K1V26
	270		K1V22(W) K1V24(W) K1V26(W) K1V36(W) 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				
	5.0 × 2.5 × 2.0(mm)	5.0 × φ 2.6(mm)	5.0 × φ 4.0(mm)	
JEDEC Code JEITA Code House Name	DO-214AC — 1F	— — AX06	— — AX078	
Fig.	B3-3	A2-3	A4-3	
Internal Circuit	①—M—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	G1V(B)20C
	190	G1VL22C G1VL24C		G1V(B)22C
	210			G1V(B)24C

## Bi-directional (K1V series)

Surface Mount		Type No.	Absolute Maximum Ratings						Electrical Characteristics						Automotive
JEDEC Code JEITA Code House Name	Fig.		V <sub>DRM</sub> [V]	I <sub>T</sub> [A]	Conditions T <sub>L</sub> [°C]	T <sub>stg</sub> [°C]	T <sub>J</sub> [°C]	V <sub>BO</sub> [V]	I <sub>DRM</sub> (max) [μA]	Conditions V <sub>D</sub> [V]	I <sub>BO</sub> (max) [mA]	I <sub>H</sub> (typ) [mA]	V <sub>T</sub> (max) [V]	Conditions I <sub>T</sub> [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					Automotive	
JEDEC Code JEITA Code House Name	Fig.		V <sub>DRM</sub> [V]	I <sub>T</sub> [A]	Conditions T <sub>L</sub> [°C]	I <sub>TSM</sub> [A]	I <sub>TRM</sub> [A]	Conditions f [Hz]	dit/dt [A/μs]	T <sub>J</sub> [°C]	V <sub>BO</sub> [V]	I <sub>H</sub> (typ) [mA]	V <sub>T</sub> (max) [V]	Conditions I <sub>T</sub> [A]		R <sub>s</sub> (min) [kΩ]
— AX06	A2-1	K1V(A)10	90	1	109	16	60	60	50	125	95 to 113	50	1.6	1	0.1	—
		K1V(A)11	90	1	109	16	60	60	50	125	104 to 118	50	1.6	1	0.1	—
		K1V(A)12	90	1	109	16	60	60	50	125	110 to 125	50	1.6	1	0.1	—
		K1V(A)16	115	1	98	16	60	60	50	125	145 to 170	50	1.6	1	0.1	—
— AX10	A5-3	K1V10	90	1	112	20	80	60	80	125	95 to 113	50	1.5	1	0.1	—
		K1V11	90	1	112	20	80	60	80	125	104 to 118	50	1.5	1	0.1	—
		K1V12	90	1	112	20	80	60	80	125	110 to 125	50	1.5	1	0.1	—
		K1V14	115	1	109	20	80	60	80	125	125 to 150	30	1.5	1	0.1	—
		K1V22	180	1	108	20	50	60	80	125	200 to 230	20	1.5	1	0.1	—
	A6	K1V24	180	1	108	20	50	60	80	125	220 to 250	20	1.5	1	0.1	—
		K1V26	180	1	108	20	50	60	80	125	240 to 270	20	1.5	1	0.1	—
		K1V22(W)	180	1	91	16	50	60	80	125	200 to 230	50	3	1	0.1	—
		K1V24(W)	180	1	91	16	50	60	80	125	220 to 250	50	3	1	0.1	—
		K1V26(W)	180	1	91	16	50	60	80	125	240 to 265	50	3	1	0.1	—
		K1V36(W)	270	1	92	13	40	60	50	125	340 to 380	50	3	1	0.1	—
		K1V38(W)	270	1	92	13	40	60	80	125	360 to 400	50	3	1	0.1	—

## Uni-directional (G1V series)

Surface Mount		Type No.	Absolute Maximum Ratings						Electrical Characteristics				Automotive	
JEDEC Code JEITA Code House Name	Fig.		V <sub>DRM(A)</sub> [V]	I <sub>T</sub> [A]	Conditions T <sub>L</sub> [°C]	I <sub>TRM</sub> [A]	Conditions f [Hz]	dit/dt [A/μs]	T <sub>J</sub> [°C]	V <sub>BO</sub> [V]	I <sub>H</sub> (max) [mA]	V <sub>T</sub> (max) [V]		Conditions I <sub>T</sub> [A]
DO-214AC 1F	B3-3	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				Automotive	
JEDEC Code JEITA Code House Name	Fig.		V <sub>DRM(A)</sub> [V]	I <sub>T</sub> [A]	Conditions T <sub>L</sub> [°C]	I <sub>TRM</sub> [A]	Conditions f [Hz]	dit/dt [A/μs]	T <sub>J</sub> [°C]	V <sub>BO</sub> [V]	I <sub>H</sub> (max) [mA]	V <sub>T</sub> (max) [V]		Conditions I <sub>T</sub> [A]
— AX06	A2-3	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	A4-3	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	—



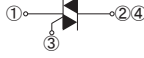
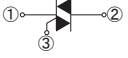








# TRIACs

TRIACs are bidirectional Thyristors.

Our TRIACs are easy to use for motor and heater controls due to balanced gate sensitivity and  $(di/dt)_c$ .

Our lineup ranges from  $V_{DRM}=600$  to 800V,  $I_{T(RMS)}=3$  to 20A.

## TRIACs (Triode for Alternating Current)








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

 : New product

## TRIACs (Triode for Alternating Current)

Surface Mount		Type No.	Absolute Maximum Ratings			Electrical Characteristics						Based on AEC-Q101	Automotive
JEDEC Code JEITA Code House Name	Fig.		$I_T$ (RMS) [A]	$V_{DRM}$ [V]	$T_J$ [°C]	$V_{TM}$ (max) [V]	Conditions $I_{TM}$ [A]	$V_{GT}$ (max) (I, II, III)* [V]	$I_{GT}$ (max) (I, II, III)* [mA]	$(dv/dt)_c$ ( $T_J=150^\circ C, V_D=2/3V_{DRM}$ ) [V/ $\mu s$ ]	Conditions $(di/dt)_c$ [A/ms]		
TO-252AA — FB	G2-3	 KD3FB60	3	600	-40 to 150	1.7	4.5	1.5	15	1	-1.5	—	—

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

Two Terminal Type		Type No.	Absolute Maximum Ratings			Electrical Characteristics						Based on AEC-Q101	Automotive
JEDEC Code JEITA Code House Name	Fig.		$I_T$ (RMS) [A]	$V_{DRM}$ [V]	$T_J$ [°C]	$V_{TM}$ (max) [V]	Conditions $I_{TM}$ [A]	$V_{GT}$ (max) (I, II, III)* [V]	$I_{GT}$ (max) (I, II, III)* [mA]	$(dv/dt)_c$ ( $T_J=150^\circ C, V_D=2/3V_{DRM}$ ) [V/ $\mu s$ ]	Conditions $(di/dt)_c$ [A/ms]		
— SC-91 FTO-220AG	J8-4	 KD3SF60E	3	600	-40 to 150	1.5	4.5	1.5	10	—	—	—	—
		 KD3SF60	3	600	-40 to 150	1.5	4.5	1.5	20	1	-1.5	—	—
		 KD5SF60	5	600	-40 to 150	1.8	7	1.5	20	1	-2.5	—	—
		 KD8SF60	8	600	-40 to 150	1.6	12	1.5	30	1	-4.0	—	—
		 KD12SF60	12	600	-40 to 150	1.6	20	1.5	30	1	-6.0	—	—
		 KD16SF60	16	600	-40 to 150	1.5	25	1.5	30	1	-8.0	—	—
 KD20SF60	20	600	-40 to 150	1.4	30	1.5	30	1	-10.0	—	—		

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

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




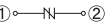

# SURGE ABSORBERS

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.


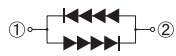
- **Applications**
  1. Lightning surge adsorption for communications circuits.
  2. Lightning surge adsorption for transmitters and switchboards.
  3. Surge protection for ISDN terminals.

Series	KL Series	KU Series	KP Series	
Package	 5.0 × 2.5 × 2.0(mm)	 5.1 × 3.75 × 2.0(mm)	 7.6 × 4.0 × 2.8(mm)	
JEDEC Code JEITA Code House Name	DO-214AC - 1F	DO-214AA similar - M2F	- - 2F	
Fig.	B4-3	B7 B8	B9-4	
Internal Circuit				
Off-state Voltage V <sub>D</sub> [V]	5	KL3Z07		
	15	KL3Z18		
	58	KL3L07		
	63		KU10L08	
	70		KU4F8	
	90		KU10NU11	
	92		KP20NU11 KP40NU11	
	100		KU4F12	
	115		KU10NU13	
	120	KL3N14	KU10N14 KU15N14	
	175	KL3R20		
	180			KP40RU22
	190		KU10R23NS	
	220		KU10R27NS	
250		KU10R29NS		
275		KU5S31NS KU10S31NS 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	 5.0 × 2.5 × 2.0(mm)
JEDEC Code JEITA Code House Name	DO-214AC - 1F
Fig.	B4-1
Internal Circuit	
V <sub>F2</sub> [V]	2.75 ± 0.25
	VR-61F1

## Thyristor Surge Suppressors

JEDEC Code JEITA Code House Name	Fig.	Type No.	Absolute Maximum Ratings				Electrical Characteristics			UL	Automotive	
			I <sub>TSM</sub> [A]	Conditions [μs]	V <sub>DRM</sub> [V]	T <sub>J</sub> [°C]	V <sub>BO</sub> (min) [V]	I <sub>H</sub> (min) [mA]	C <sub>t</sub> (max) [pF]			
DO-214AC - 1F	B4-3	KL3Z07	30	10/1000	5	125	5.5 *1	50	-	-	-	
		KL3Z18	30	10/1000	15	125	15.5 *1	50	-	-	-	
		KL3L07	30	10/1000	58	125	65	100	90	-	-	
		KL3N14	30	10/1000	120	125	130	100	50	-	-	
		KL3R20	30	10/1000	175	125	180	100	30	-	-	
DO-214AA similar - M2F	B7	KU10L08	100	10/1000	63	125	70	100	180	UL	-	
		KU4F8	40	10/1000	70	125	75	100	100	-	-	
	B8	KU10NU11	100	10/1000	60	125	100	150	-	-	-	
		B7	KU4F12	40	10/1000	100	125	110	100	100	-	-
		B8	KU10NU13	100	10/1000	60	125	120	100	-	-	-
	B7	KU10N14	100	10/1000	120	125	125	100	140	UL	-	
		KU15N14	150	10/1000	120	125	125	100	110	UL	-	
		KU10R23NS	100	10/1000	190	125	290 *2	100	90	-	-	
		KU10R27NS	100	10/1000	220	125	320 *2	100	70	UL	-	
		KU10R29NS	100	10/1000	250	125	400 *2	100	70	UL	-	
		KU5S31NS	50	10/1000	275	125	420 *2	150	70	-	-	
	-	B9-4	KU10S31NS	100	10/1000	275	125	420 *2	100	90	UL	-
KU10S35NS			100	10/1000	275	125	450 *2	100	90	-	-	
KP20NU11			325	10/700	60	125	100	150	295 *3	-	-	
KP40NU11			500	10/700	60	125	100	150	485 *3	-	-	
-	-	KP40RU22	500	10/700	60	125	195	100	285 *3	-	-	

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

## Varistor

JEDEC Code JEITA Code House Name	Fig.	Type No.	Absolute Maximum Ratings			Electrical Characteristics		Automotive
			I <sub>F(RMS)</sub> [mA]	I <sub>FSM</sub> [A]	T <sub>J</sub> [°C]	V <sub>F1</sub> [V]	Conditions I <sub>F</sub> [mA]	
DO-214AC - 1F	B4-1	VR-61F1	370	7.5	150	2.3 ± 0.25	1	-





# 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	 7.6 × 4.0 × 2.8(mm)	 5.0 × φ 4.0(mm)	 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) [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						Automotive
Package			PrSM [W]	T <sub>J</sub> [°C]	V <sub>RM</sub> (max) [V]		ZD			Di			
JEDEC Code	Fig.				ZD	Di	V <sub>BR</sub> (min) [V]	V <sub>BR</sub> (max) [V]	Conditions I <sub>R</sub> [mA]	I <sub>R</sub> (max) [μA]	I <sub>R</sub> (max) [μA]	Conditions V <sub>R</sub> [V]	
—	B9-3	ST02D-140F2	200	-40 to 150	120	600	130	160	1	5	5	600	—
2F		ST02D-170F2	200	-40 to 150	145	600	155	185	1	5	5	600	—

Axial		Type No.	Absolute Maximum Ratings				Electrical Characteristics						Automotive
Package			PrSM [W]	T <sub>J</sub> [°C]	V <sub>RM</sub> (max) [V]		ZD			Di			
JEDEC Code	Fig.				ZD	Di	V <sub>BR</sub> (min) [V]	V <sub>BR</sub> (max) [V]	Conditions I <sub>R</sub> [mA]	I <sub>R</sub> (max) [μA]	I <sub>R</sub> (max) [μA]	Conditions V <sub>R</sub> [V]	
— AX078	A4-2	ST02D-82	200	-40 to 150	67	600	74	90	1	5	5	600	—
		ST02D-140	200	-40 to 150	120	600	130	160	1	5	5	600	—
		ST02D-170	200	-40 to 150	145	600	155	185	1	5	5	600	—
		ST02D-200	200	-40 to 150	170	600	185	215	1	5	5	600	—
— AX10	A5-2	ST03D-82	300	-40 to 150	67	600	74	90	1	5	5	600	—
		ST03D-140	300	-40 to 150	120	600	130	160	1	5	5	600	—
		ST03D-170	300	-40 to 150	145	600	155	185	1	5	5	600	—
		ST03D-200	300	-40 to 150	170	600	185	215	1	5	5	600	—
		ST03DH-240	300	-40 to 150	200	1000	220	250	1	5	10	1000	—
		★ ST02DH-280	300	-40 to 150	230	1000	250	300	1	5	10	1000	—
		★ ST02DH-320	300	-40 to 150	260	1000	300	350	1	5	10	1000	—

★ : Under development







# POWER MODULES

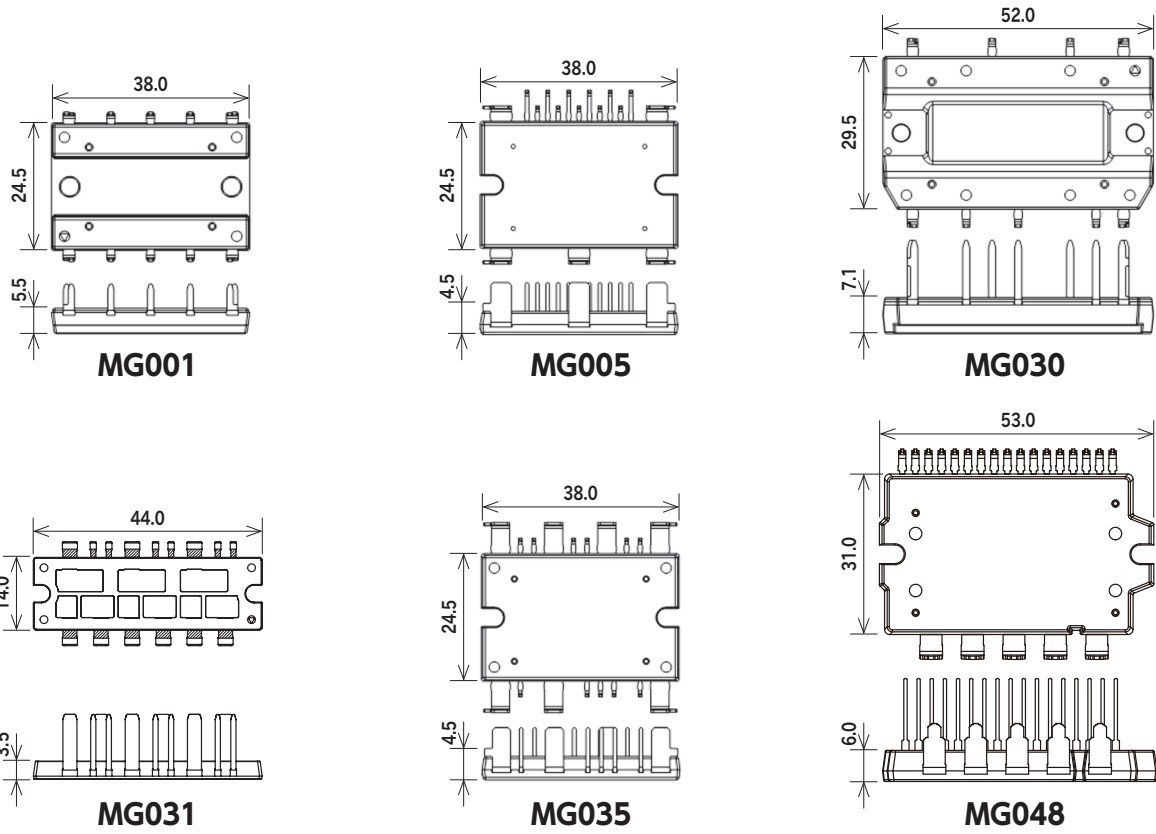
Power Modules include combinations of various power semiconductors.

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

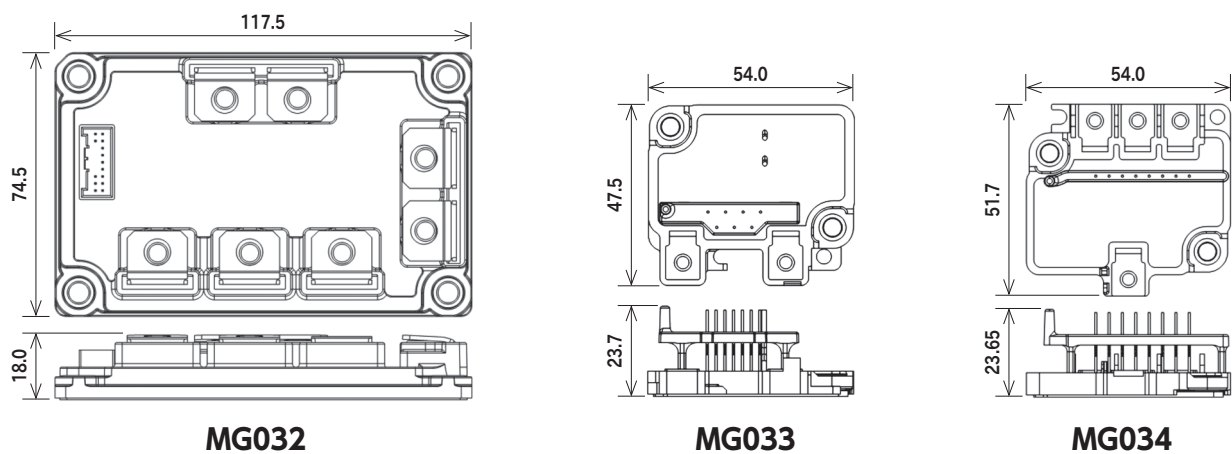
At Shindengen, a multitude of packages allow us to meet customer needs of MOSFET, diodes, and other products.

Semi customizable support and customizable package design support are available.

## Transfer Type Package Sample



## Potting Type Package Sample



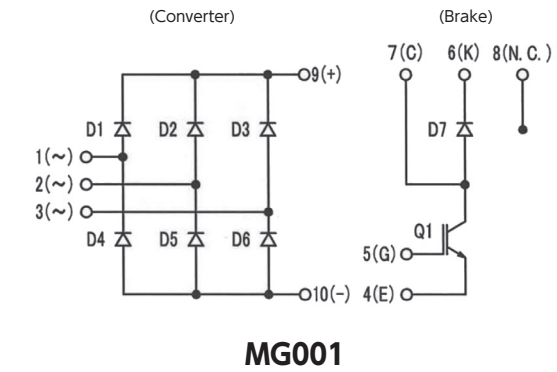
## CB Module Series

### Converter + Brake Modules

Type No.	Package		Converter Diode				Brake IGBT				Brake FRD				UL	Automotive				
			Absolute Maximum Ratings		Electric Characteristics		Absolute Maximum Ratings		Electric Characteristics		Absolute Maximum Ratings		Electric Characteristics							
	JEDEC Code	JEITA Code	Fig.	VRRM	IF (AV)	Conditions Tc	Vf (max)	Conditions IF	VCEs	Ic	VCE (sat) (typ)	Conditions Ic	VRRM	IF (AV)			Conditions Tc	Vf (max)	Conditions IF	trr (max)
MG020200	-	-	F4	600	20.0	137	1.05	7.0	600	28.0	2.10	15.0	600	3.0	137	1.65	3.0	50	UL	-
MG020201	MG001	-	F4	600	30.0	136	1.05	10.0	600	30.0	2.00	30.0	600	3.0	137	1.65	3.0	50	UL	-

UL : UL recognize(UL File No.E142422)

### Equivalent Circuit Schematic



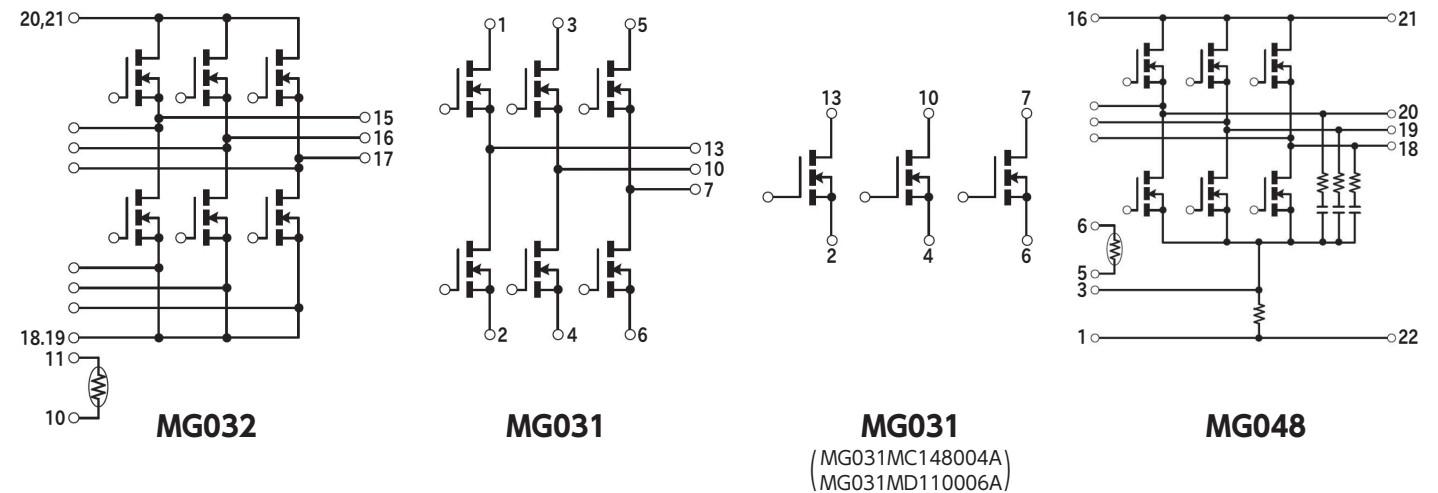
## INV Module Series

### Inverter Modules

Type No.	Package		Absolute Maximum Ratings					Electrical Characteristics						UL	Automotive	
			Vbss	Id	IdP	Pt	Tch	Rds(on) (typ)	Rds(on) (max)	Ciss (typ)	Qg (typ)	Vth (typ)	Rth(j-c) (max)			
MG032A4207R5A	-	-	F6	75	420	840	500	150	-	0.98	80120	505	3.0	0.25	-	○
MG032B420010A	MG032	-	F6	100	420	840	500	150	0.99	1.37	91800	500	3.0	0.25	-	○
MG031B090004A	-	-	F5	40	90	360	125	175	2.34	3.20	4180	76	2.0	1.2	-	○
MG031E120004A	-	-		40	120	480	125	175	2.44	3.10	3540	68	3.0	1.2	-	■
MG031G148004A	-	-		40	148	592	154	175	1.75	2.20	5330	96	3.0	0.97	-	○
MG031L080006A	MG031	-		60	80	320	125	175	4.47	5.60	3570	65	3.0	1.2	-	■
MG031N110006A	MG031	-		60	110	440	154	175	3.0	3.8	5630	94	3.0	0.97	-	■
MG031MC148004A	MG031	-		40	148	592	154	175	1.75	2.20	5330	96	3.0	0.97	-	■
MG031MD110006A	MG031	-	60	110	440	154	175	3.1	3.9	5630	94	3.0	0.97	-	■	
MG048A150004A	-	-	F8	40	150	600	147	150	2.1	2.7	5900	111	3.0	0.85	-	■
MG048B100006A	MG048	-		60	100	400	147	150	2.82	3.92	8186	136	3.0	0.85	-	■

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

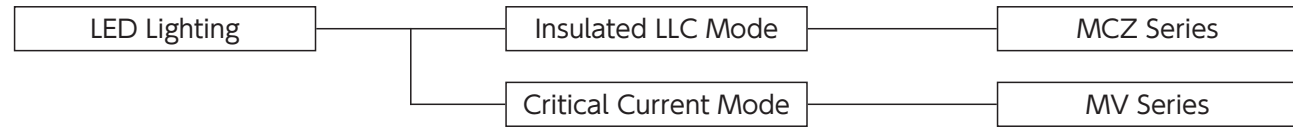
### Equivalent Circuit Schematic



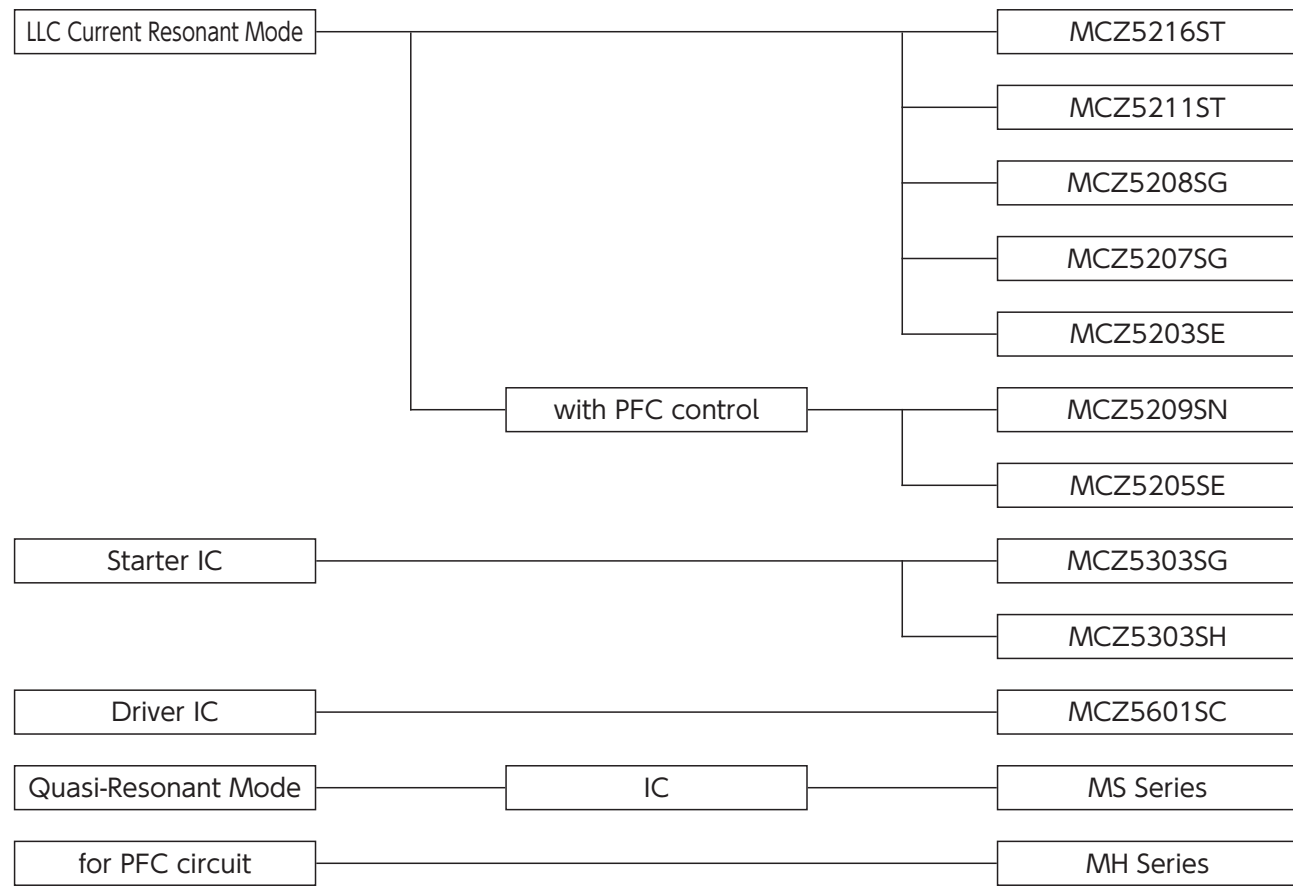
# POWER ICs

## Line up

### IC for LED Lighting



### IC for Power Supply





## IC for LED Lighting

### Critical 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	Automotive		
JEDEC Code JEITA Code House Name	Fig.											
	-	SOP8J	L2	MV1001SC	Yes	9 to 16	1ch	-	-	-	-	
			MV1002SC	No								
			MV1011SC	Yes								
			MV1012SC	No								
	-	SOP16	L5	MV2002SG	No	10 to 16	2ch	Cont. by REF Voltage	3.3	Yes	Yes	-
			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.

### Starter ICs with Built-in Burst Function : MCZ5303

**Outline** A dedicated IC that provides a low power consumption start-up for circuits without an IC. Low power consumption standby is possible due to the ON/OFF Control IC with burst function. It is especially effective when used in conjunction with the LLC current resonance power supply.

### High/Low Side Driving 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 slave IC composed of multistage interleave and a master IC that can be used alone.

## 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	Automotive
JEDEC Code JEITA Code House Name	Fig.													
	— SOP18	MCZ5216ST	LLC Current Resonant Mode	Yes	Yes	35	Yes	Yes	500	Yes	Yes	Latch	Timer Latch	—
		MCZ5211ST	LLC Current Resonant Mode	Yes				Yes	500	No				—
	— SOP24	MCZ5209SN	LLC Current Resonant Mode with PFC Control	Yes				Yes	300	No				—
		MCZ5207SG	LLC Current Resonant Mode	No				Yes	300	No				—
		MCZ5208SG	LLC Current Resonant Mode	No				Yes	500	No				—
	— SOP22	MCZ5205SE	LLC Current Resonant Mode with PFC Control	No				No	300	No				—
		MCZ5203SE	LLC Current Resonant Mode	No	No	300	No	—						

 : New product

### Starter ICs with Built-in Burst Function

Package		Type No.	Vin Applied Voltage [V]	Vcc Output Voltage [V]	HV Startup	Vin Sensing	Burst Mode	Automotive
JEDEC Code JEITA Code House Name	Fig.							
	— SOP16	MCZ5303SG	95 to 450	18.5(typ)	Yes	Yes	Yes	—
		MCZ5303SH				No	No	—



### 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]	Typ. Output Current		Automotive
JEDEC Code JEITA Code House Name	Fig.								Source [mA]	Sink [mA]	
	— SOP8J	MCZ5601SC	High-side/ Low-side	600	22	2/2	8.2 to 9.0	7.2 to 8.0	400	400	—

 : New product

## 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	Automotive			
JEDEC Code JEITA Code House Name	Fig.											
	— SOP8/7J	★ MS1007SH	95 to 450	11 to 21	Auto restart	Auto restart	Auto Burst Mode	1 skip	—			
		MS1004SH					Auto Burst Mode/S-Stby Mode	2 skip	—			
		MS1003SH					1 skip	—				
	— SOP14	MS1006SK					11 to 24	Vcc Latch	Timer Latch 2sec. (typ)	Auto Burst Mode/ UT-Stby Mode	2 skip	—
		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	Automotive
JEDEC Code JEITA Code House Name	Fig.										
	— SOP8J	MH2501SC	Critical Current Mode	Master	Unnecessary	13 to 23	Auxiliary Winding	Yes	Yes	Yes	—
		MH2511SC	Synchronizes with Master IC	Slave		11 to 23	—	No	No	No	—



# PACKAGE LIST

	1	2	3	4	5	6	7	8	9	10	
A	A1 Package:AX057 	A2 Package:AX06 	A3 Package:AX06 	A4 Package:AX078 	A5 Package:AX10 		A6 Package:AX10 	A7 Package:AX14 			
B	B1 Package:DO-219AB similar <small>5LF</small> 	B2 Package:DO-219AA <small>M1F</small> 	B3 Package:DO-214AC <small>1F</small> 	B4 Package:DO-214AC <small>1F</small> 	B5 Package:SC-110B <small>CE</small> 		B6 Package:DO-214AA similar <small>M2F</small> 	B7 Package:DO-214AA similar <small>M2F</small> 	B8 Package:DO-214AA similar <small>M2F</small> 	B9 Package:2F 	B10 Package:2F 
C	C1 Package:SOPA-4 	C2 Package:TO-269AA <small>1Z(SMD)</small> 	C3 Package:1Z (DIP) 	C4 Package:1N (SMD) 	C5 Package:1N (DIP) 		C6 Package:1NA (SMD) 	C7 Package:1NA (DIP) 	C8 Package:1W (SMD) 	C9 Package:1W (DIP) 	
D	D1 Package:D3K 	D2 Package:2S 	D3 Package:3S 	D4 Package:5S 	D5 Package:JB 		D6 Package:JA 	D7 Package:TSB (4pin) ,JC (4pin) 	D8 Package:TSB (5pin) ,JC (5pin) 	D9 Package:JF 	D10 Package:JH 
E	E1 Package:MCP 	E2 Package:D30VC 	E3 Package:S2VB 	E4 Package:S4VB 	E5 Package:S5VB 		E6 Package:S10VB 	E7 Package:S15VB 	E8 Package:S25VB 	E9 Package:S50VB 	E10 Package:S3WB 
	11	12	13	14	15						
E	E11 Package:S10WB 	E12 Package:S15WB 	E13 Package:S20WB 	E14 Package:SVTA 	E15 Package:SVT 						

# PACKAGE LIST

	1	2	3	4	5		6	7	8	9	10
F	F1 Package:Module 	F2 Package:Module 	F3 Package:Module 	F4 Package:MG001 	F5 Package:MG031 		F6 Package:MG032 	F7 Package:MG038 	F8 Package:MG048 		
G	G1 Package:SC-63 E-pack 	G2 Package:TO-252AA EB 	G3 Package:TO-252AB similar EE 	G4 Package:DO-277A similar EY 	G5 Package:TO-252AA similar EB 		G6 Package:LA 	G7 Package:MO-235B similar LE 			
H	H1 Package:SC-83 similar STO-220 	H2 Package:SC-83 similar ED 	H3 Package:TO-263AB-1 EH 	H4 Package:TO-263AB EG 	H5 Package:SC-83 similar EF 		H6 Package:TO-263AB EZ 	H7 Package:TO-263-SC FZ-7b 			
J	J1 Package:SC-91A FTO-220(2pin) 	J2 Package:SC-91 FTO-220A(2pin) 	J3 Package:SC-91 FTO-220AG(2pin) 	J4 Package:SC-91 FTO-220G(2pin) 	J5 Package:TO-220AB EA 		J6 Package:SC-91A FTO-220(3pin) 	J7 Package:SC-91 FTO-220A(3pin) 	J8 Package:SC-91 FTO-220AG(3pin) 	J9 Package:SC-91 FTO-220G(3pin) 	
K	K1 Package:SC-93 ITO-3P(3pin) 	K2 Package:TO-247AD MTO-3PT(3pin) 	K3 Package:SC-93 ITO-3P(3pin) 	K4 Package:TO-247AD MTO-3PT(3pin) 	K5 Package:TO-247AD MTO-3PT(3pin) 		K6 Package:TO-247AD MTO-3PV 	K7 Package:TO-247AD MTO-3PV 			
L	L1 Package:SOP8 	L2 Package:SOP8J 	L3 Package:SOP8/7J 	L4 Package:SOP14 	L5 Package:SOP16 		L6 Package:SOP18 	L7 Package:SOP22 	L8 Package:SOP24 		

# OUTLINE DIMENSIONS

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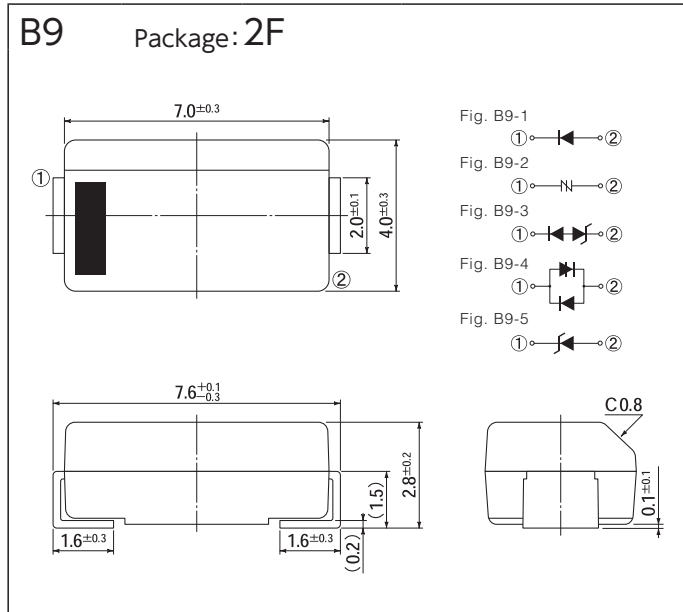
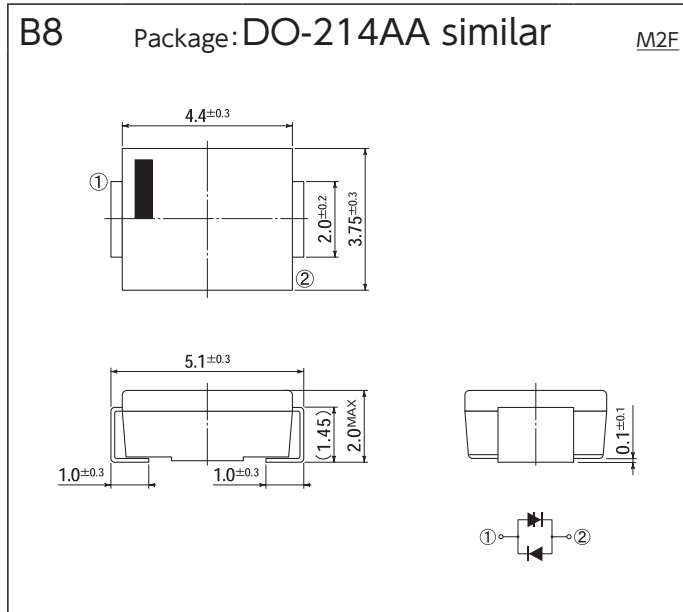


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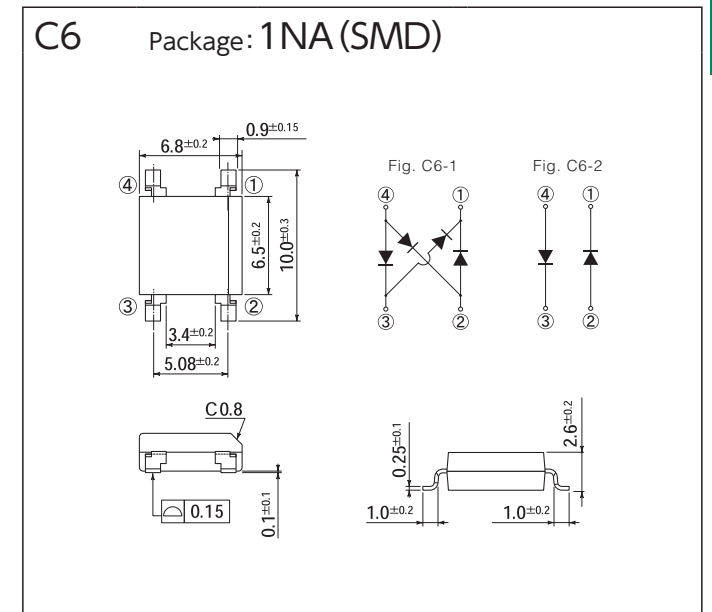
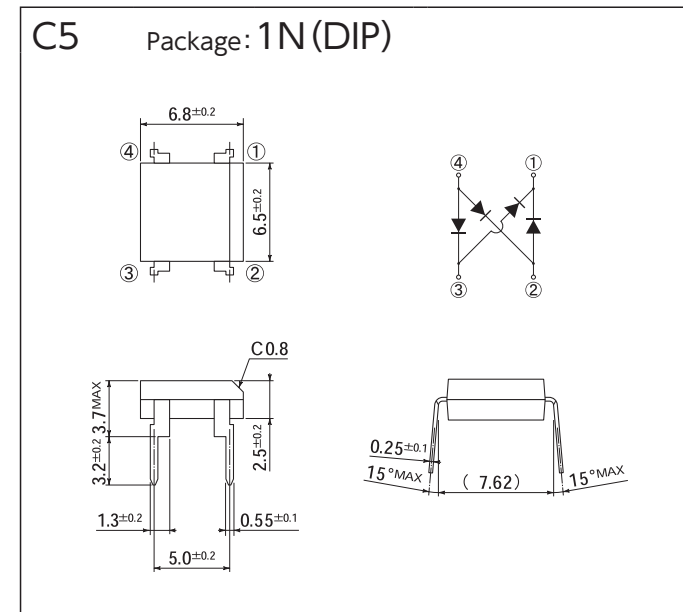
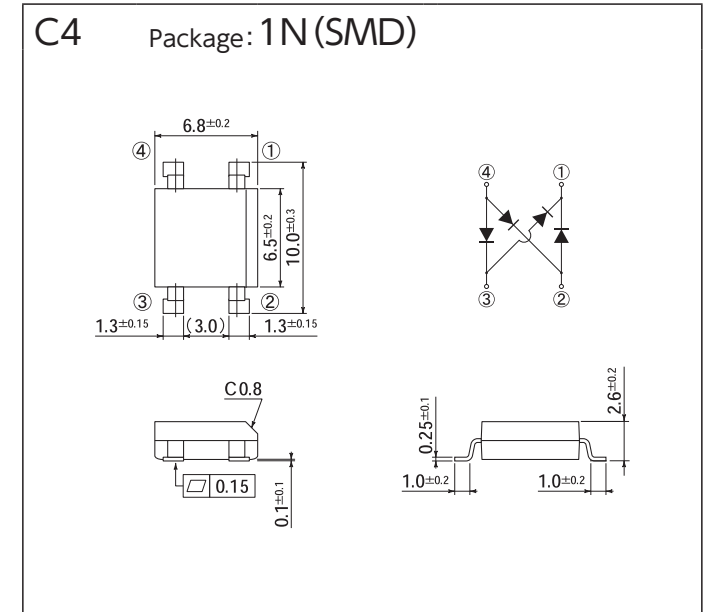
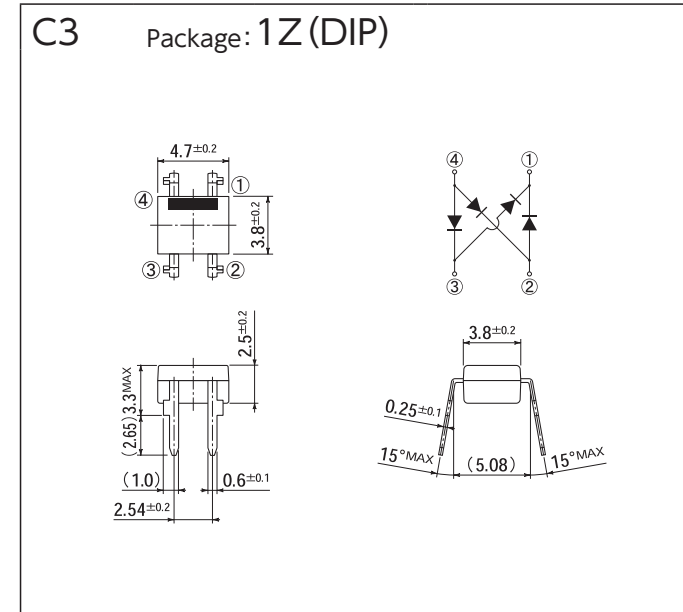
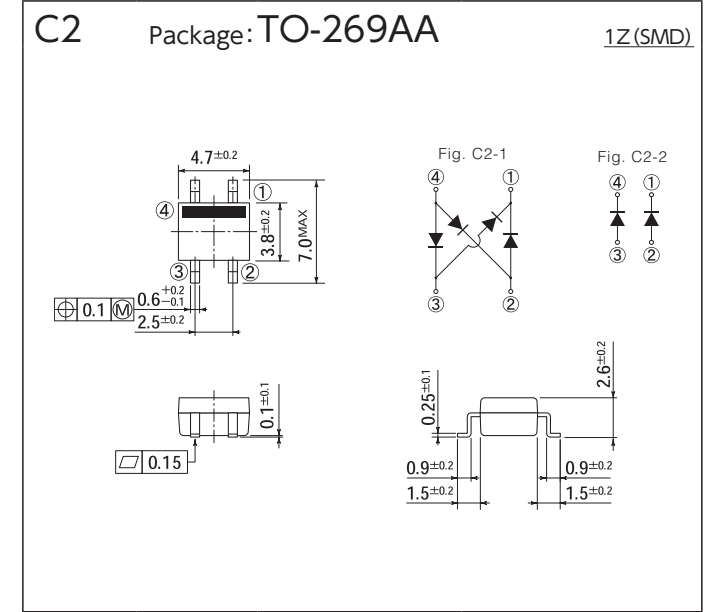


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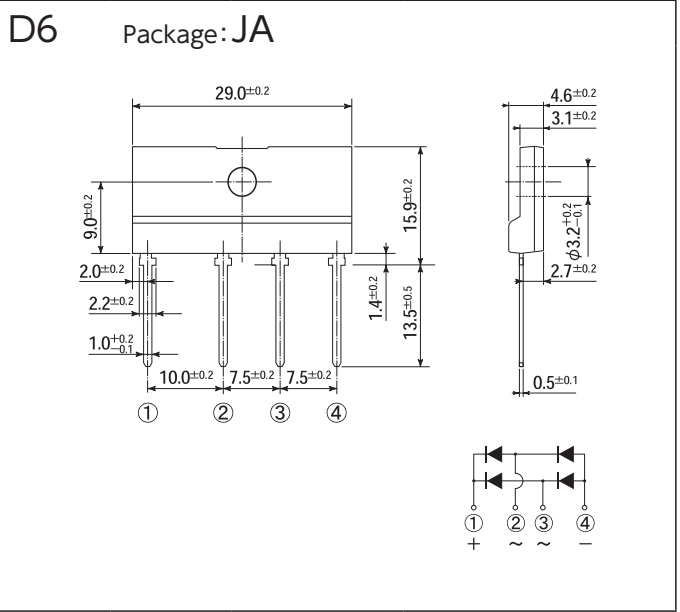
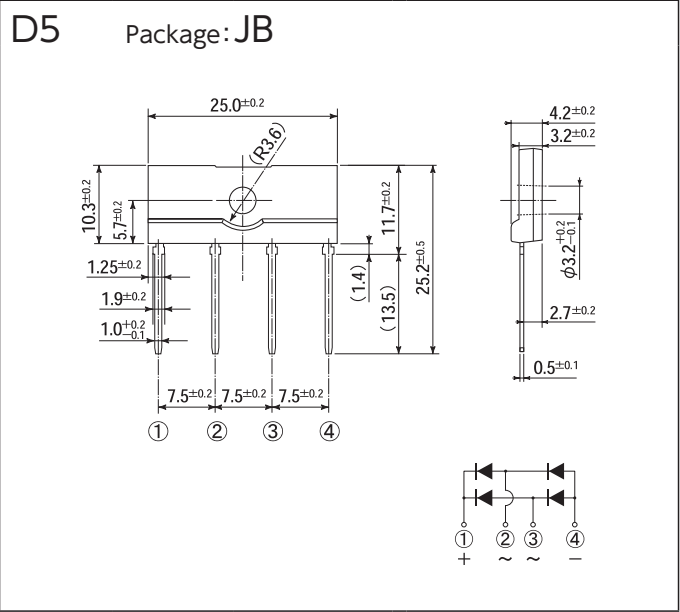
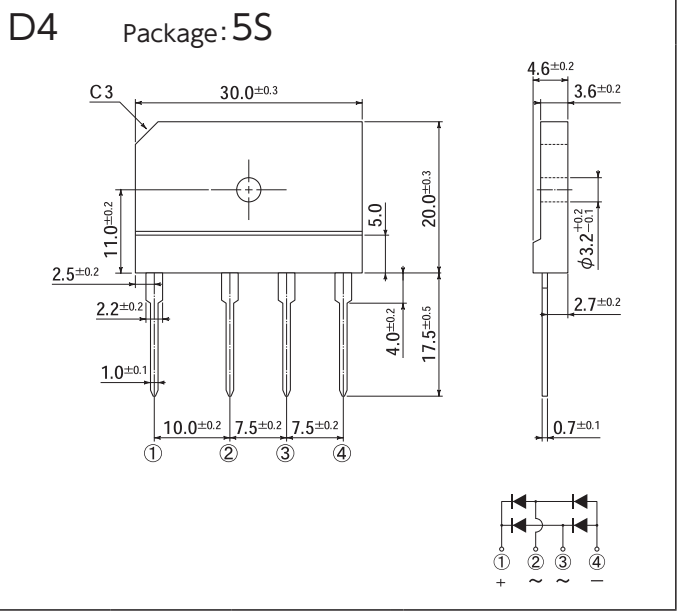
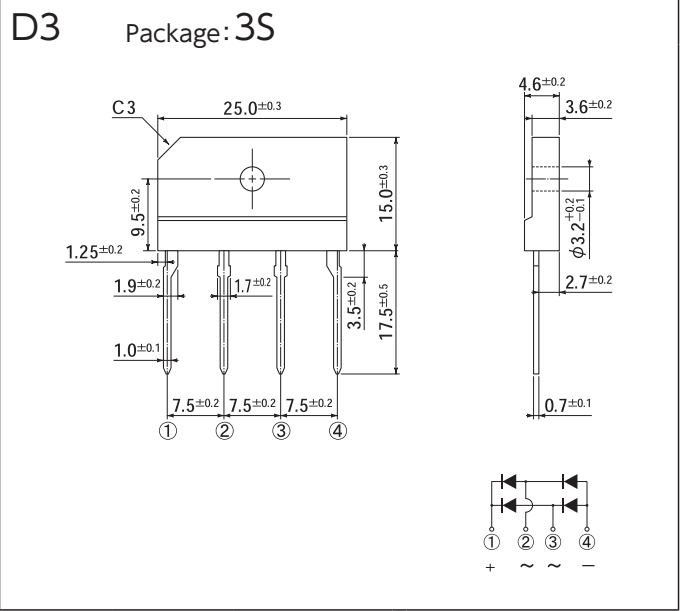
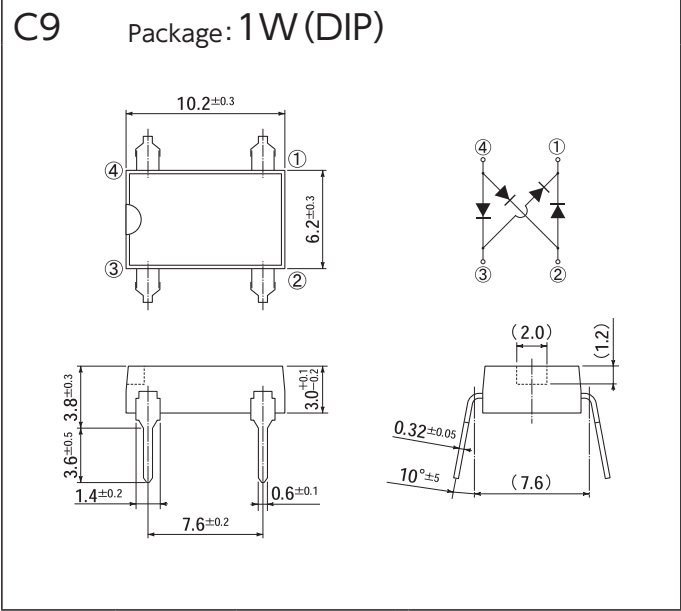
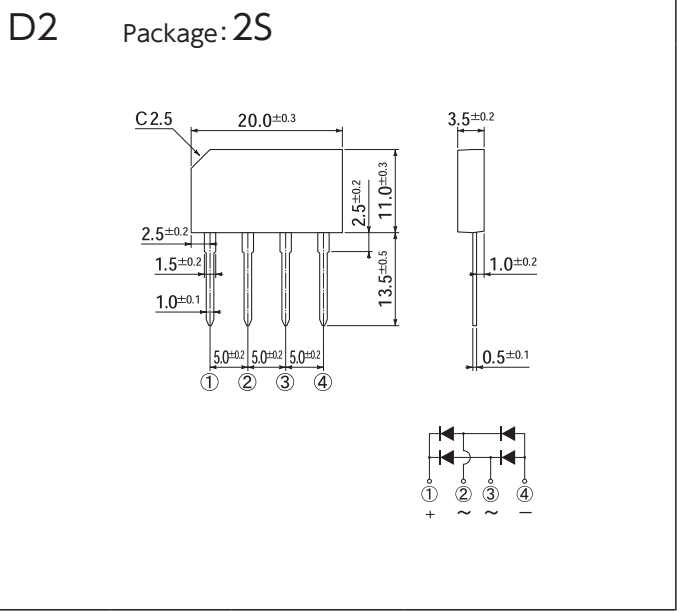
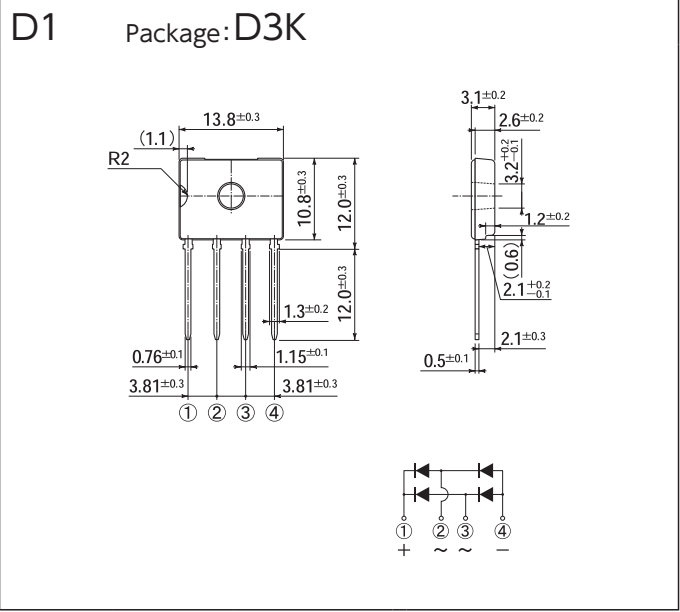
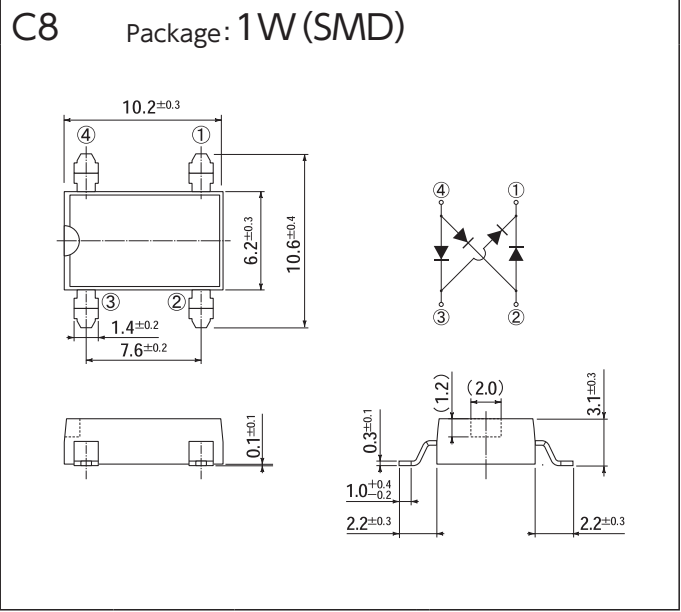
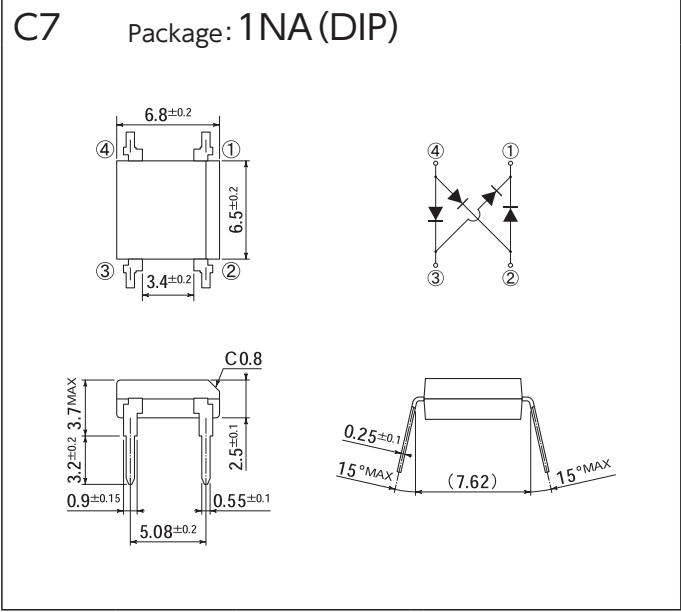


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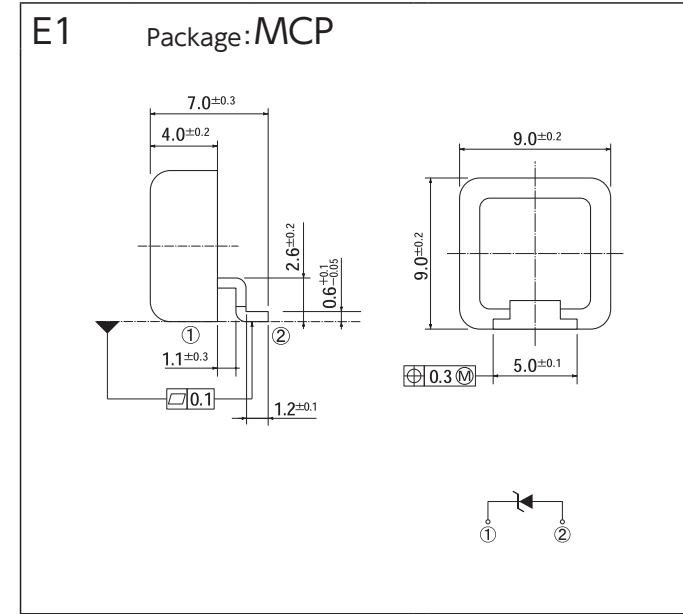
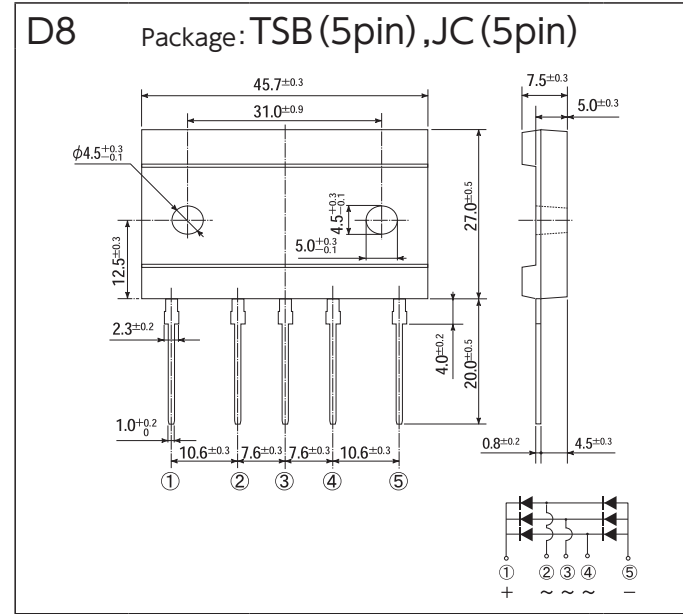
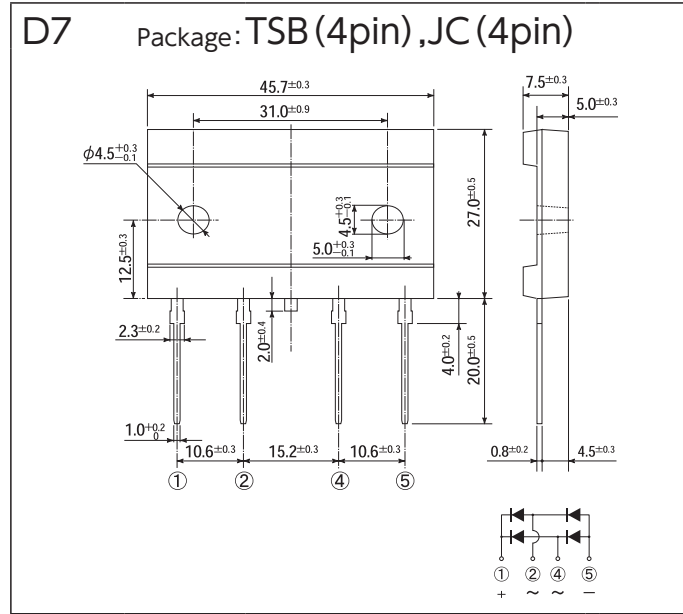
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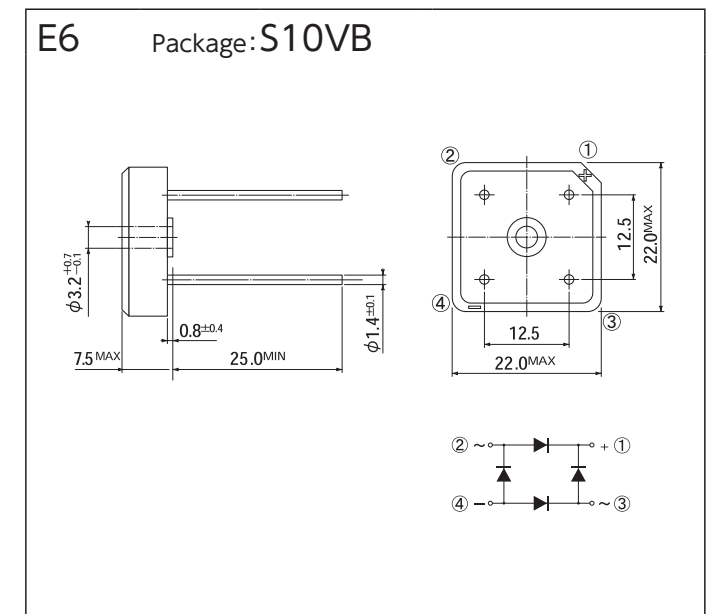
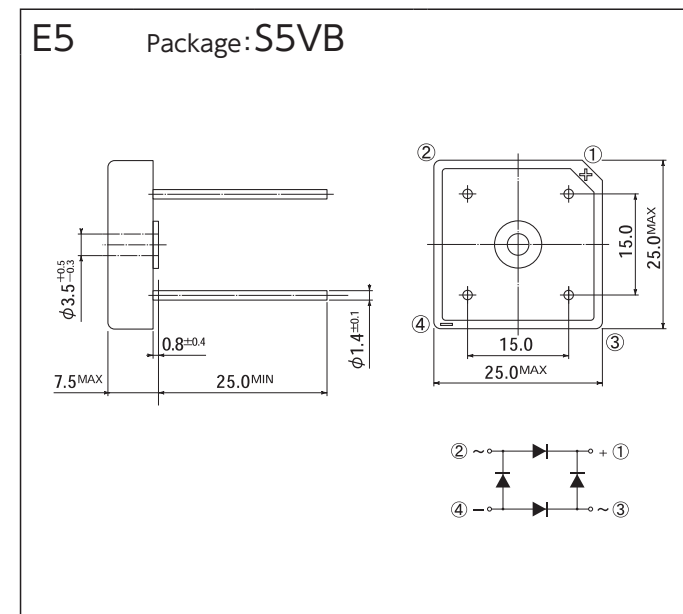
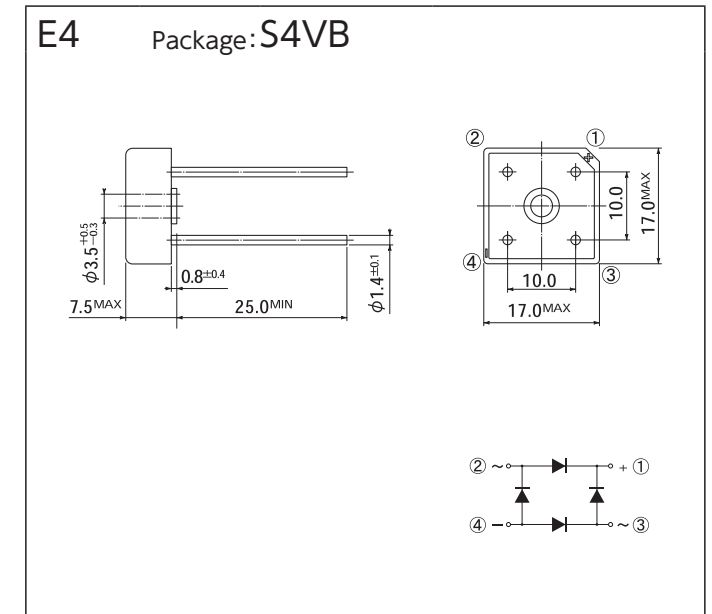
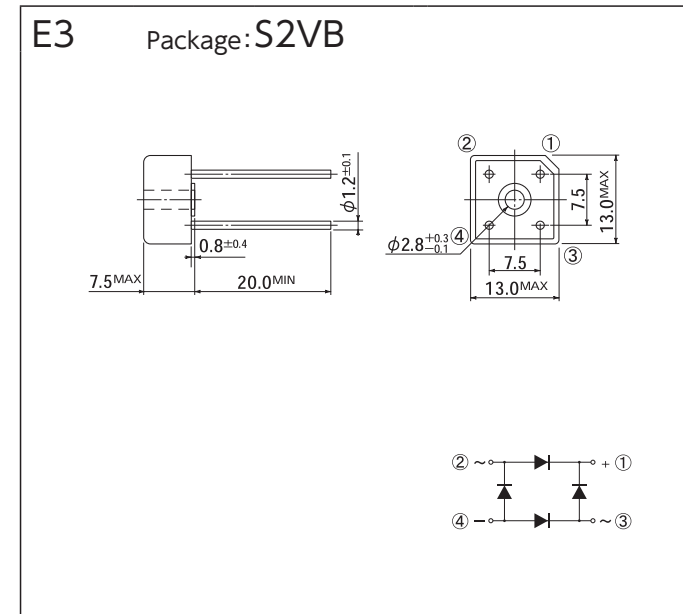
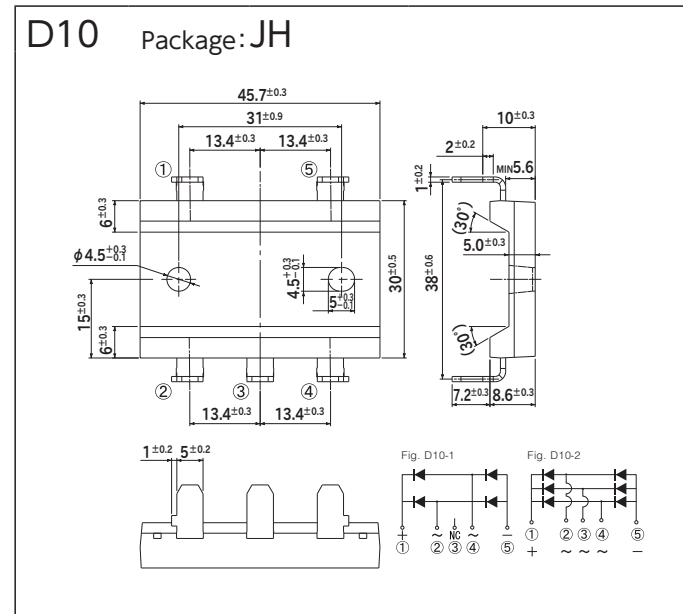
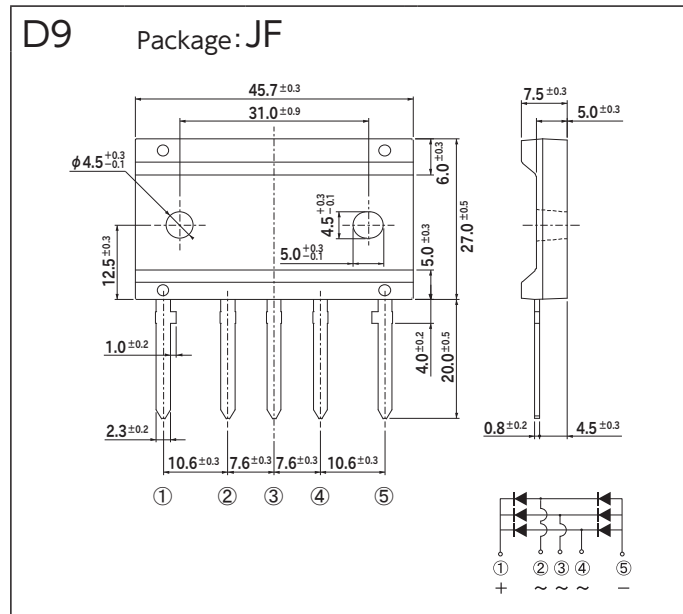
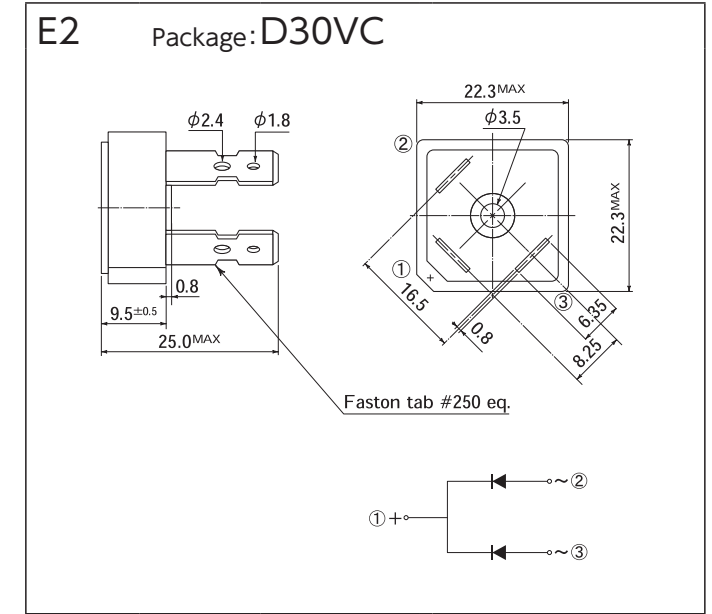
OUTLINE DIMENSIONS

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OUTLINE DIMENSIONS

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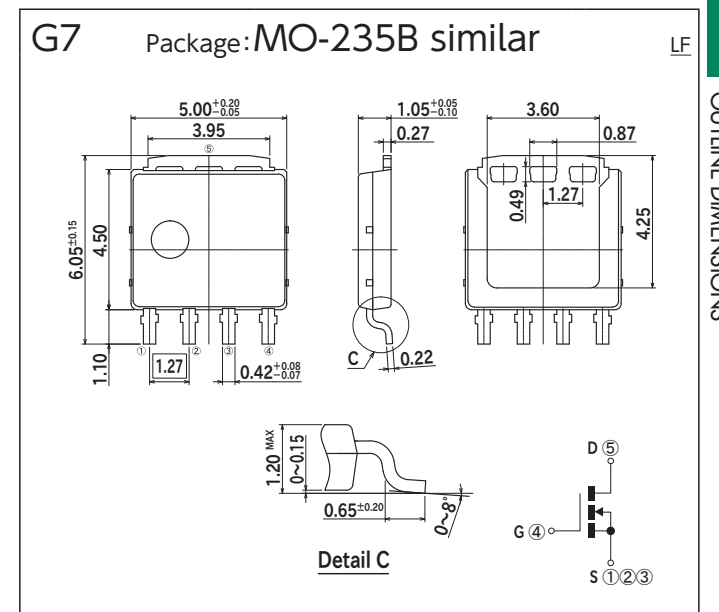
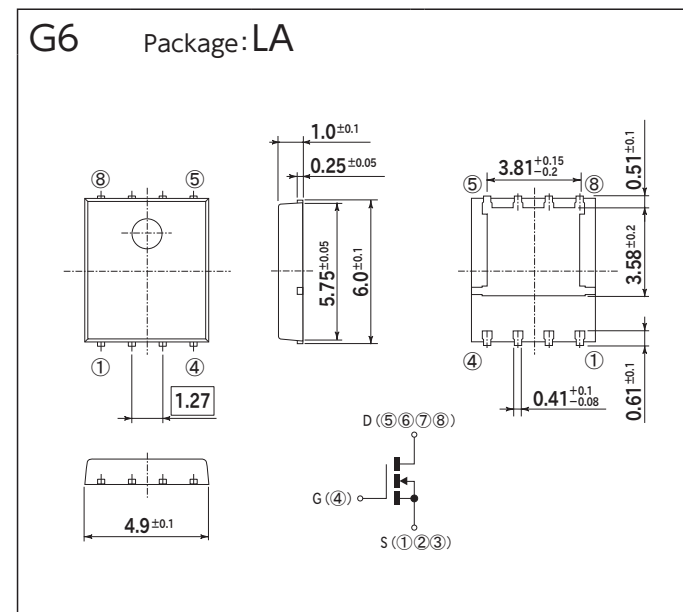
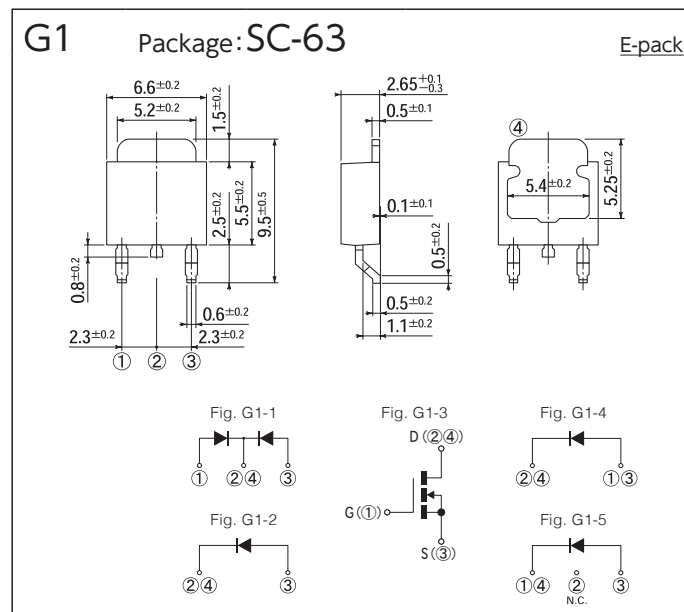
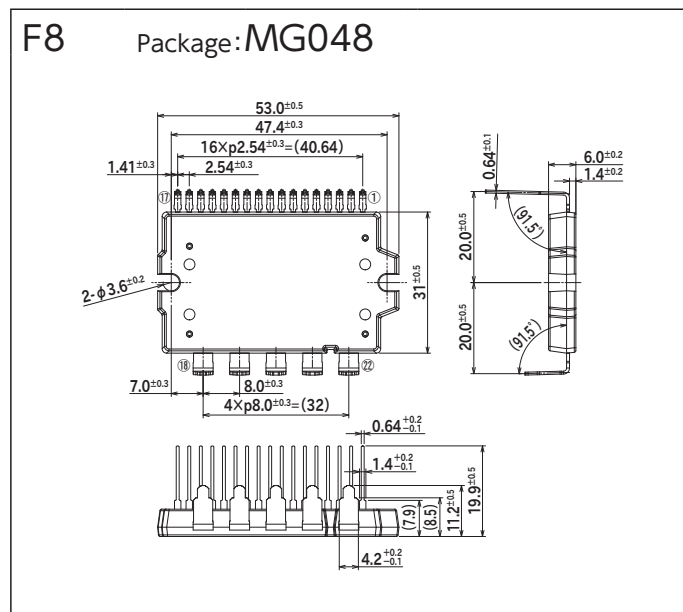
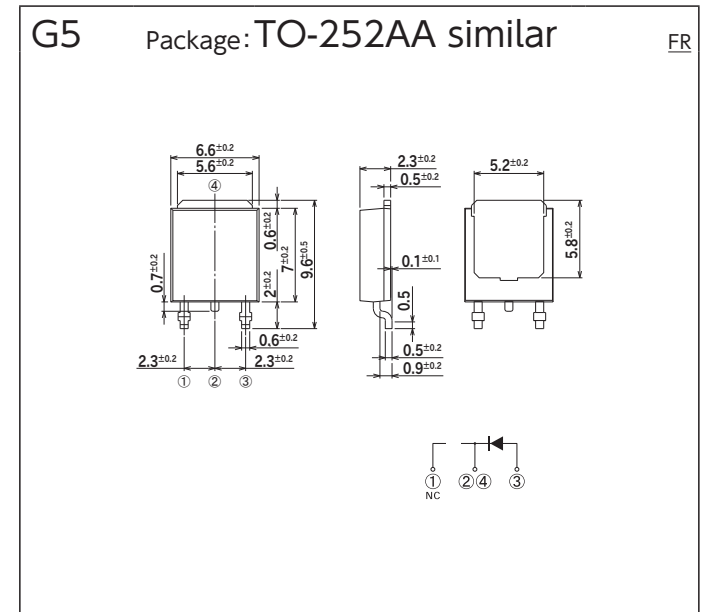
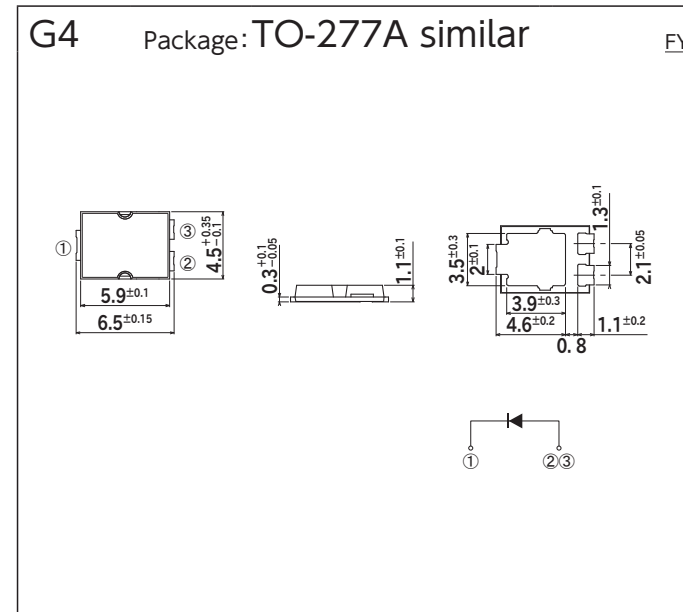
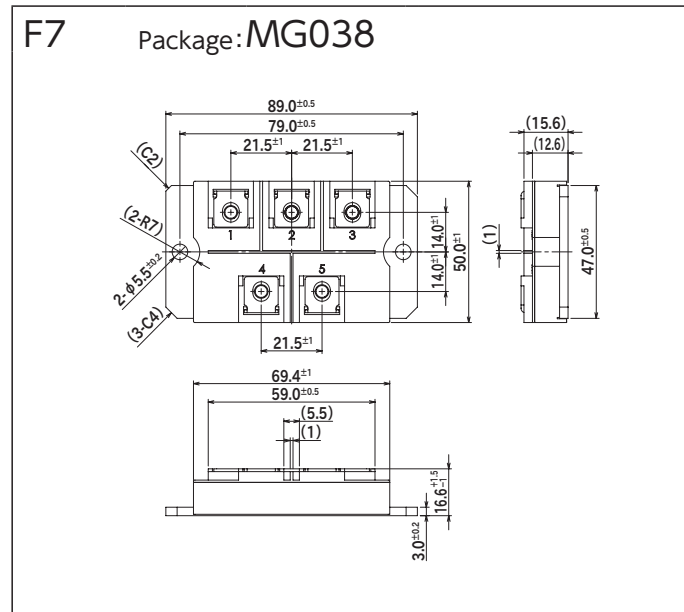
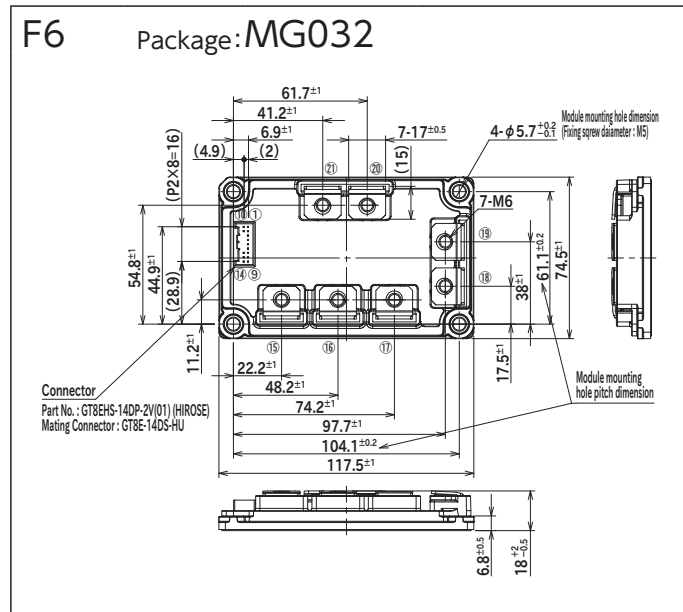
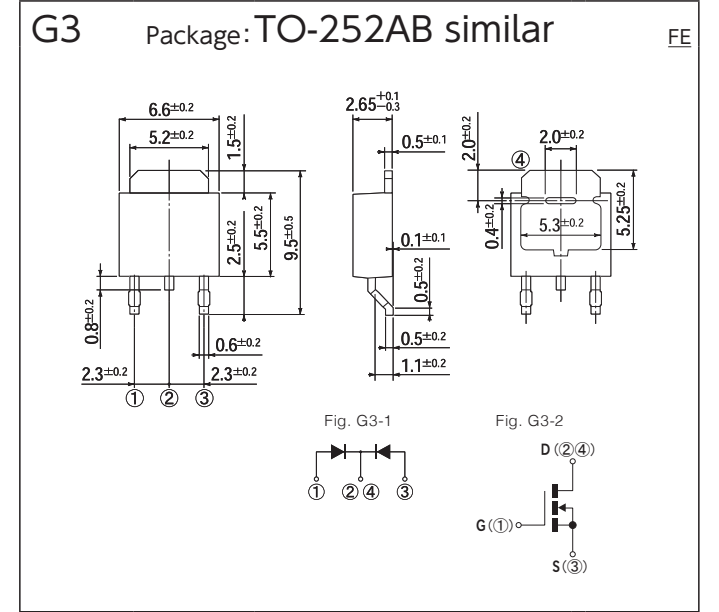
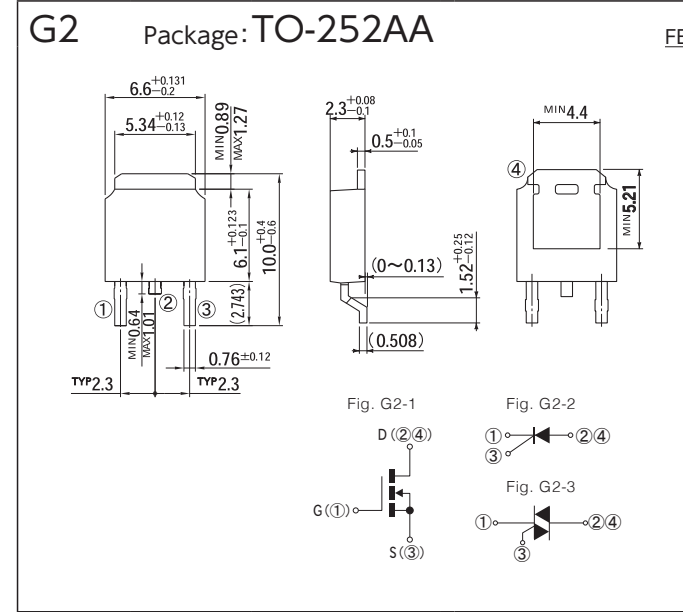
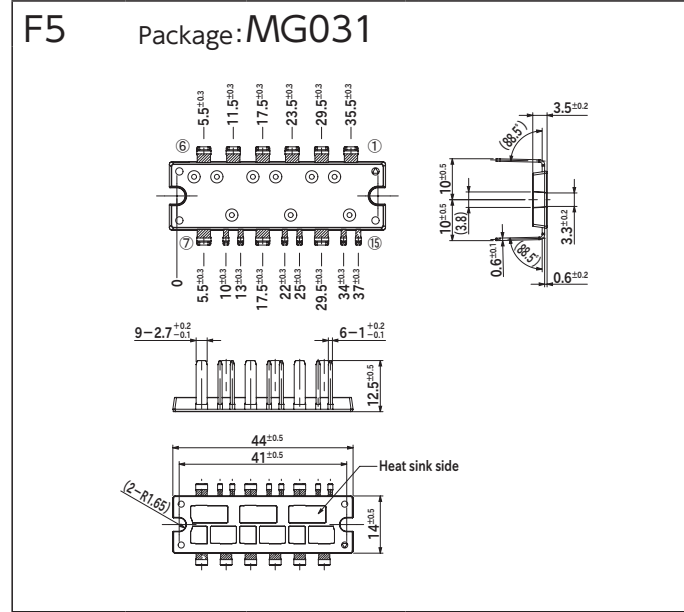
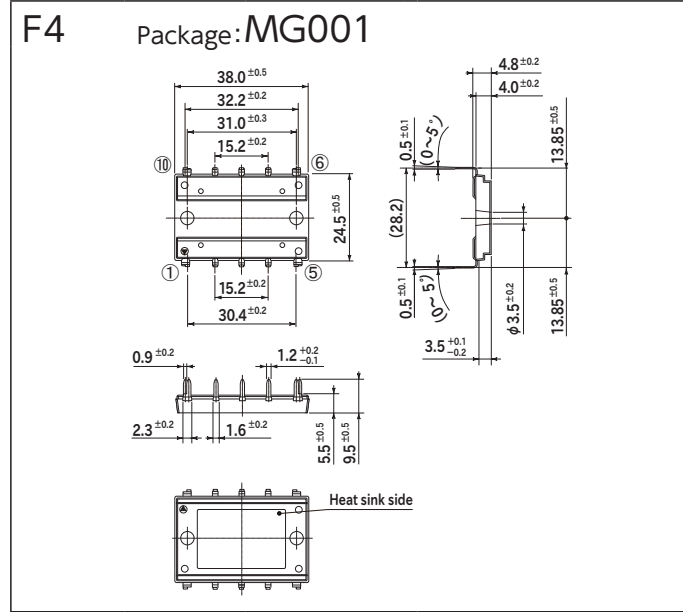


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# OUTLINE DIMENSIONS

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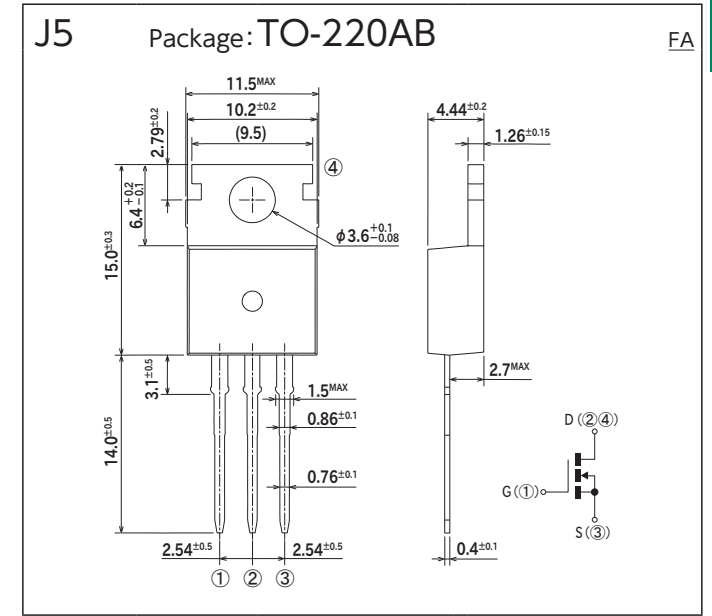
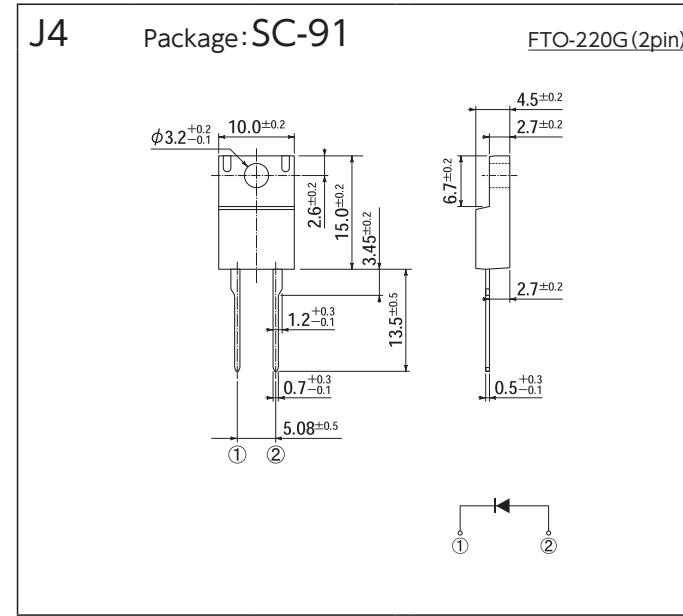
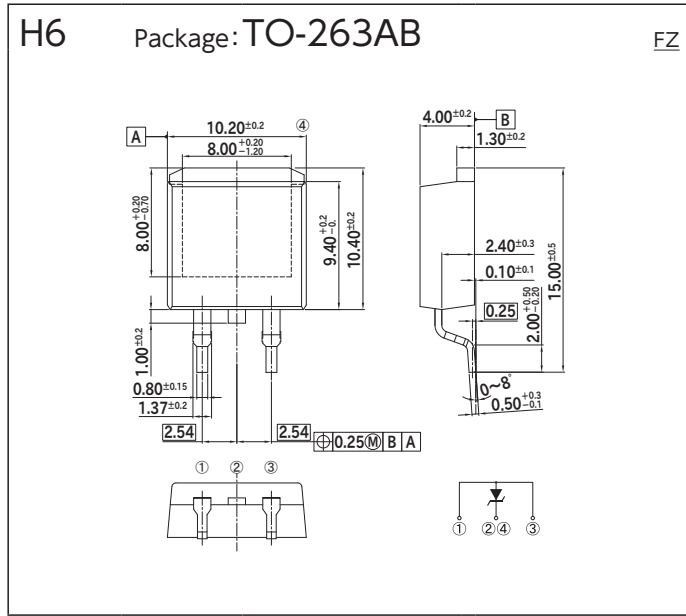
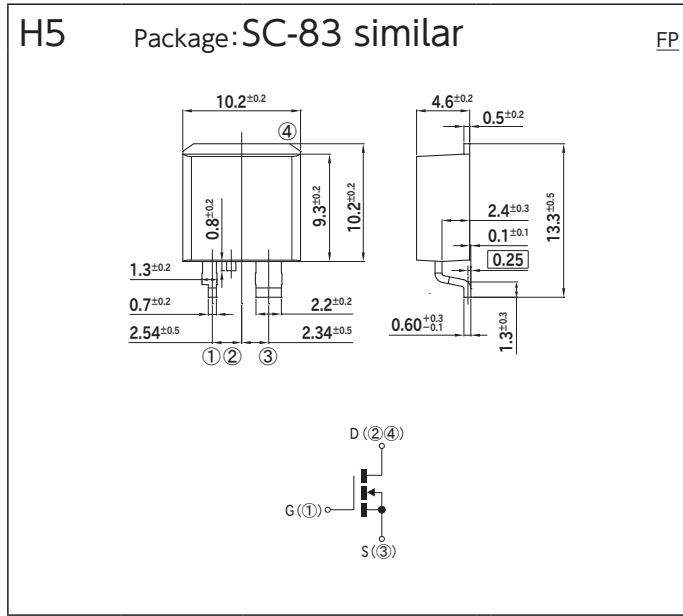
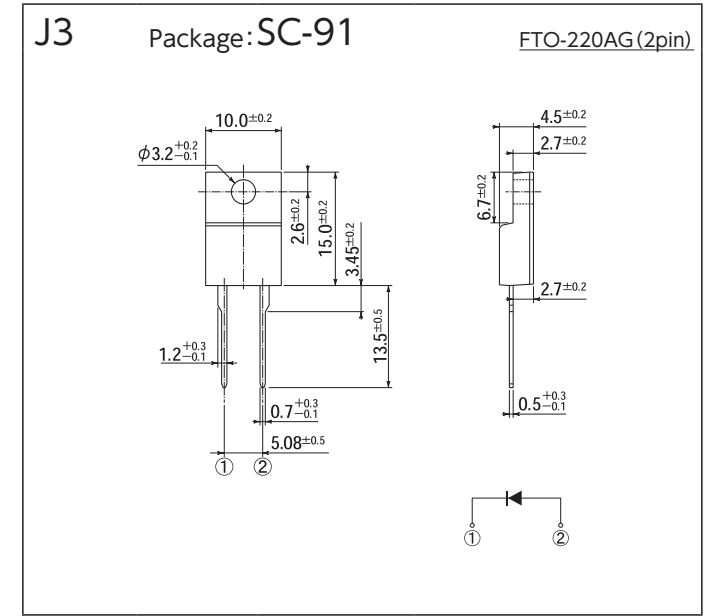
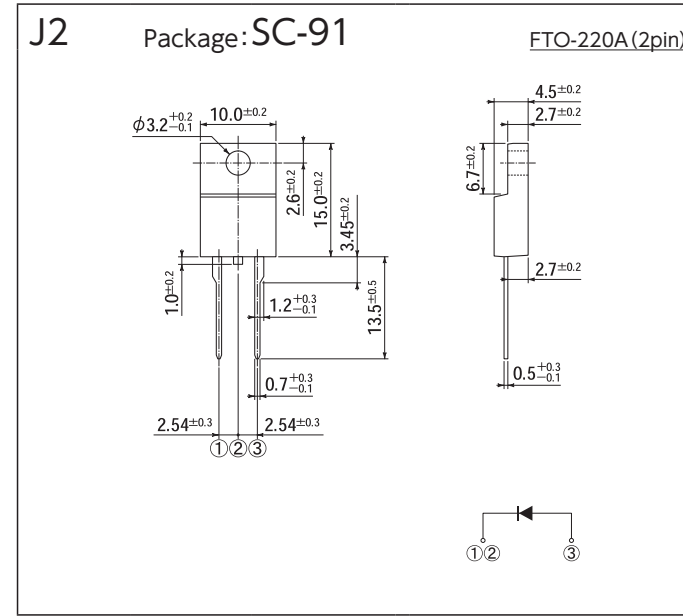
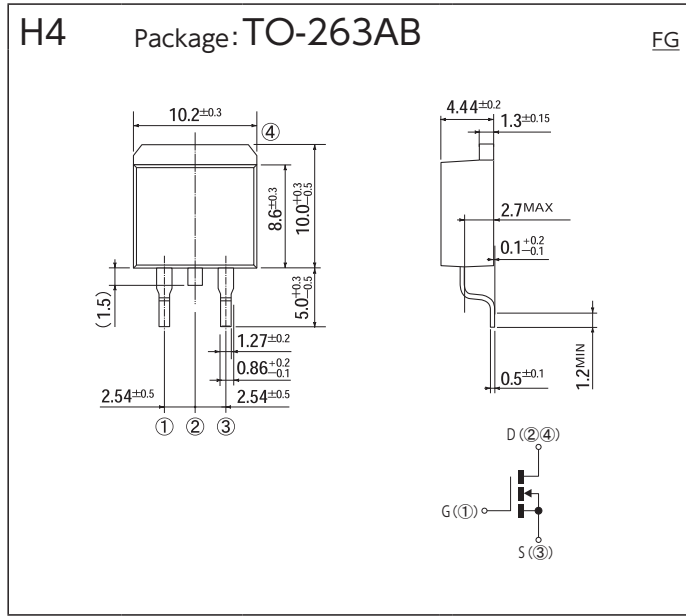
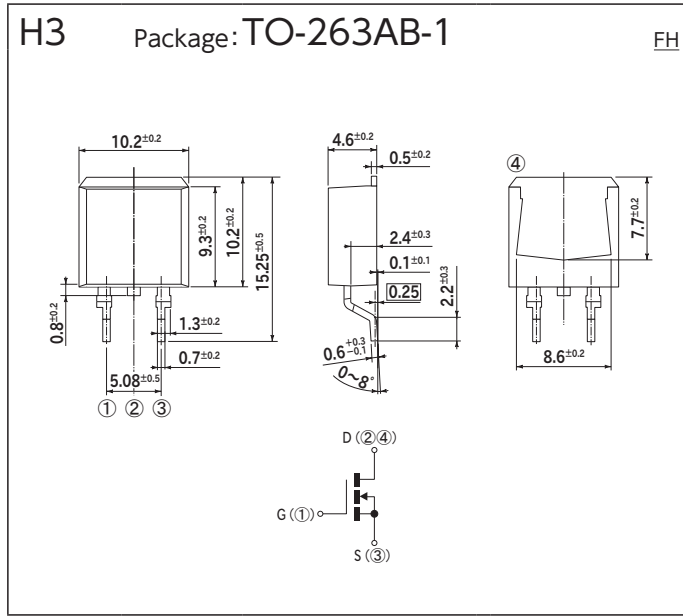
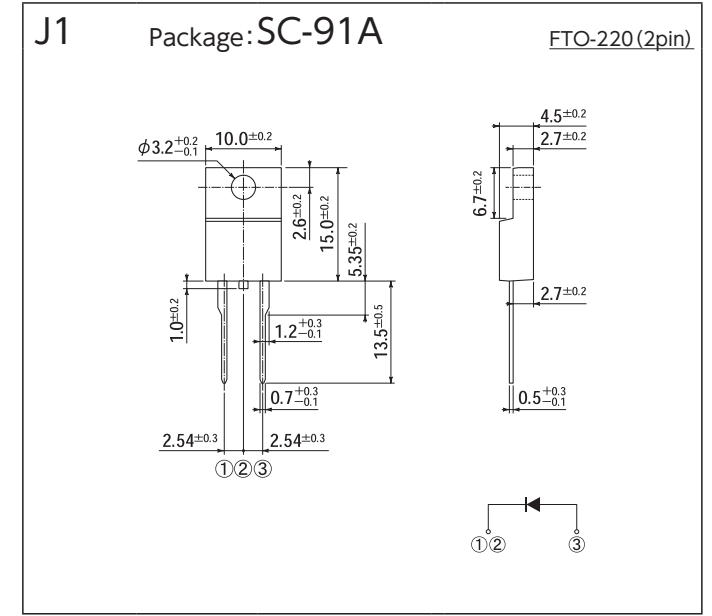
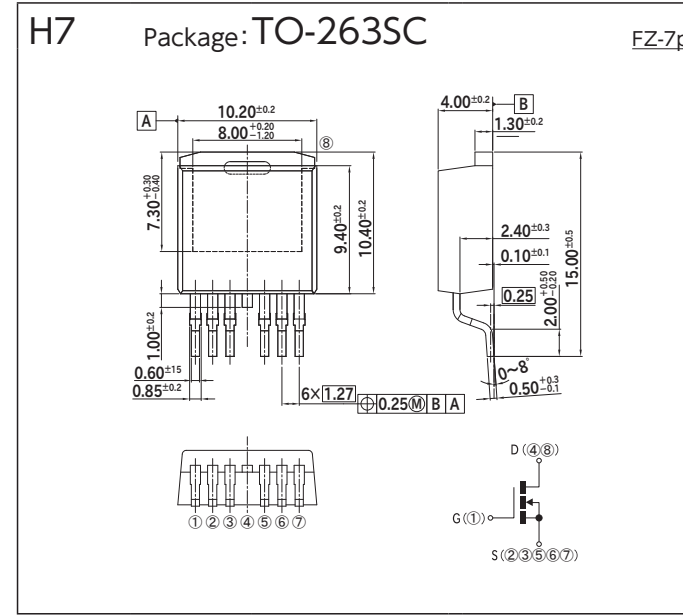
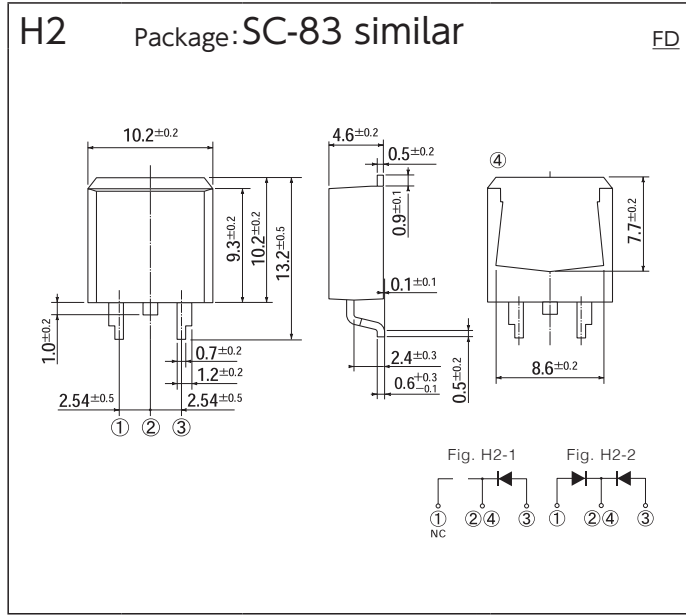
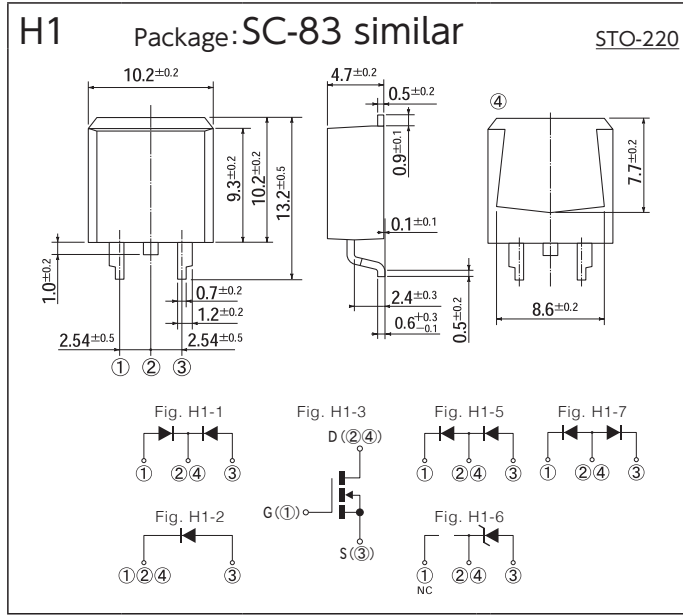


OUTLINE DIMENSIONS



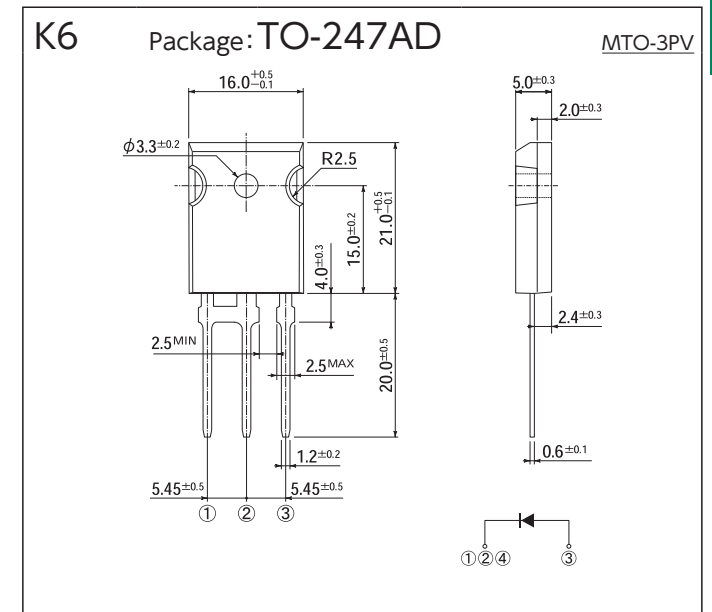
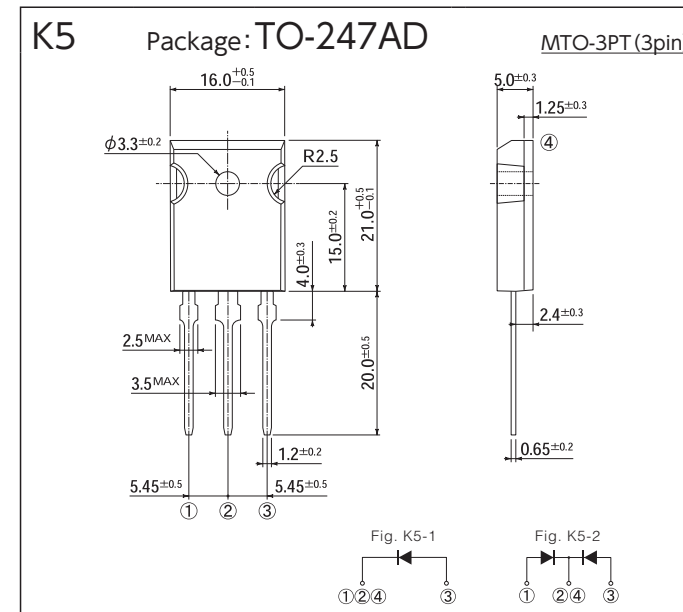
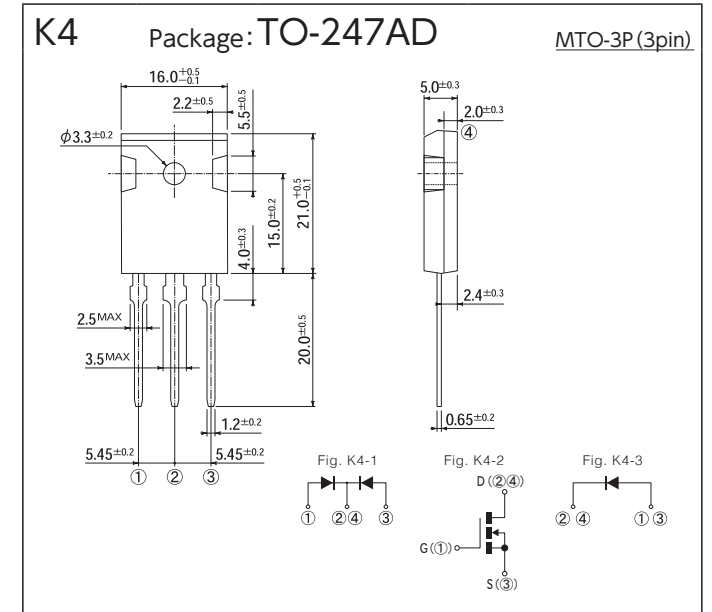
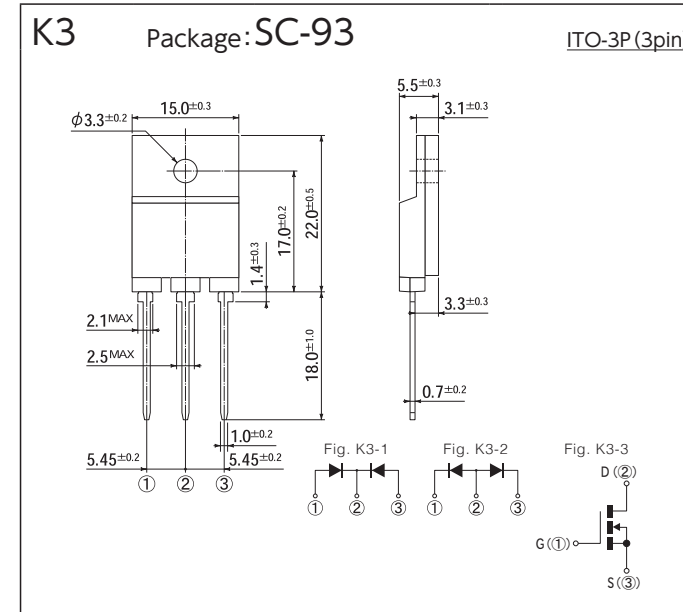
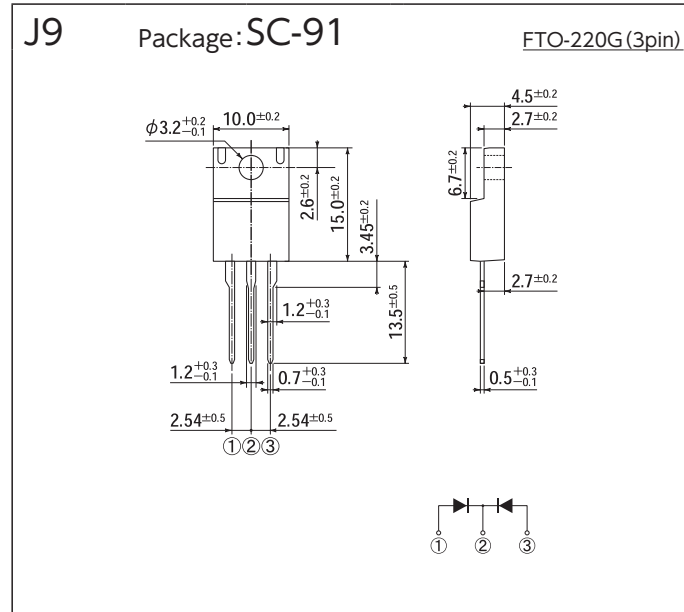
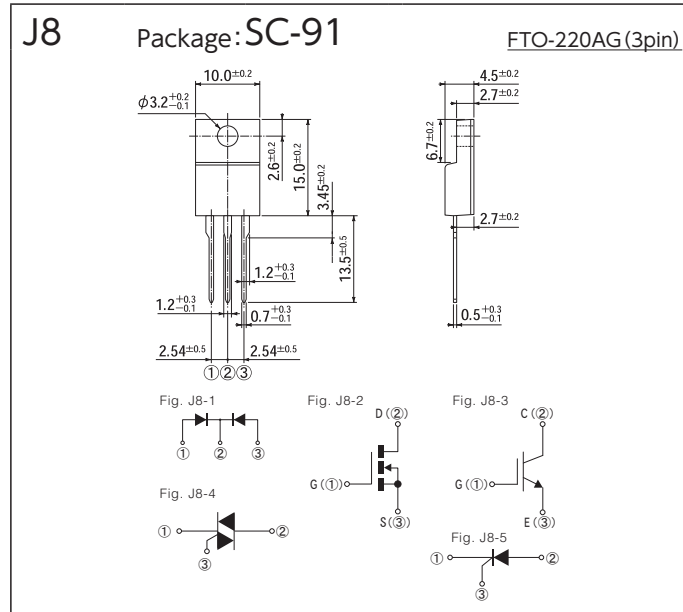
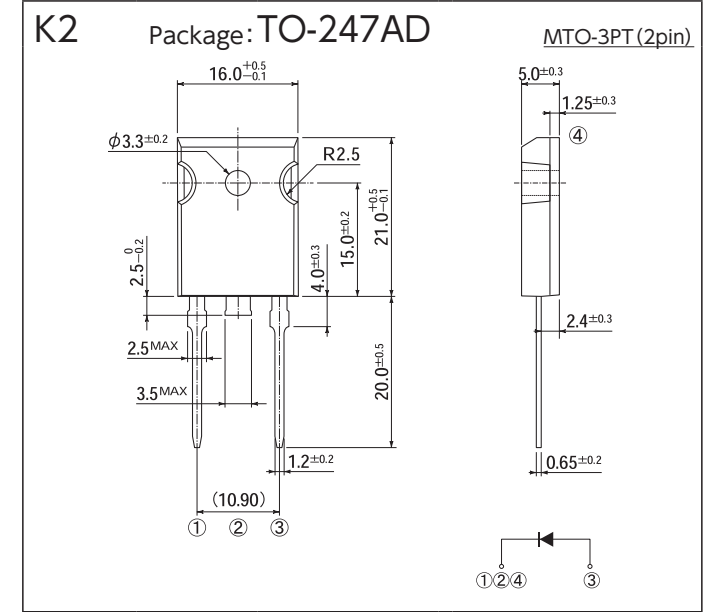
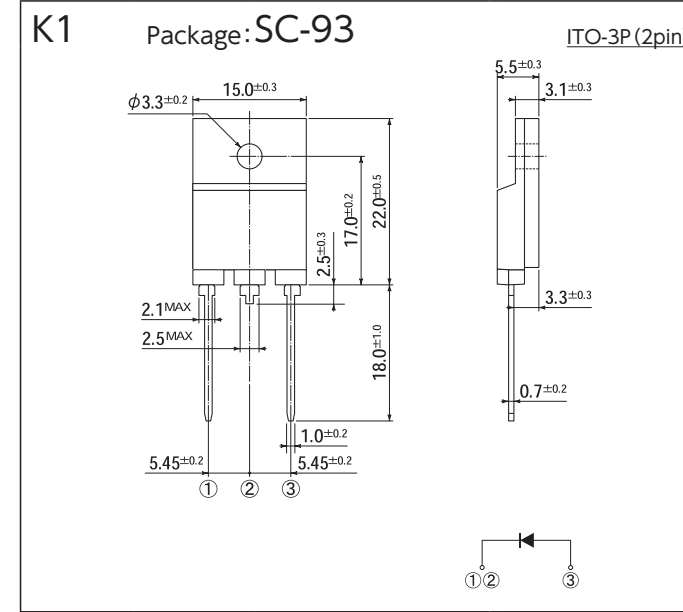
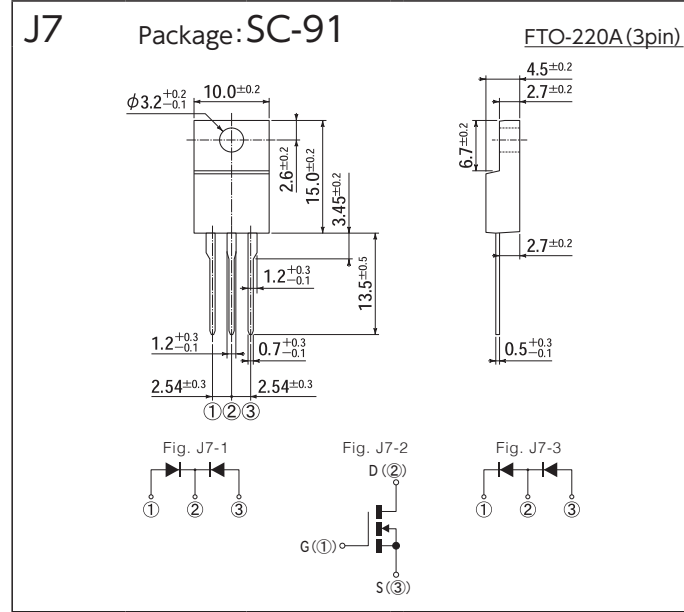
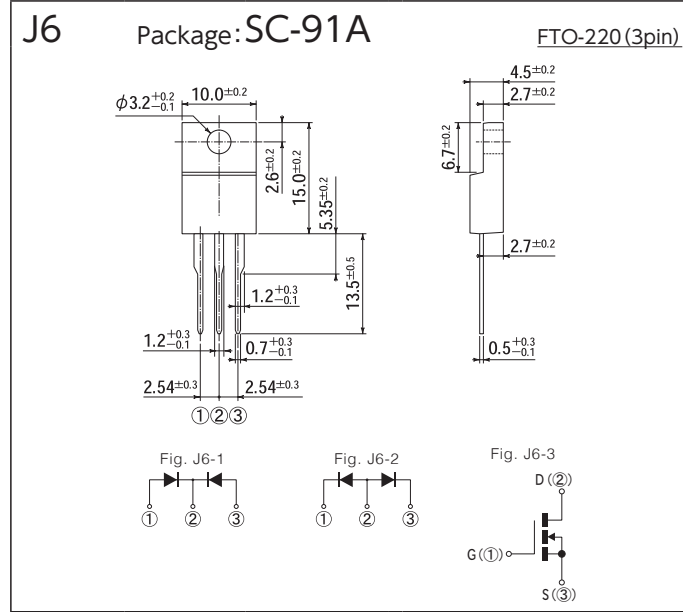
# OUTLINE DIMENSIONS

[Unit:mm]



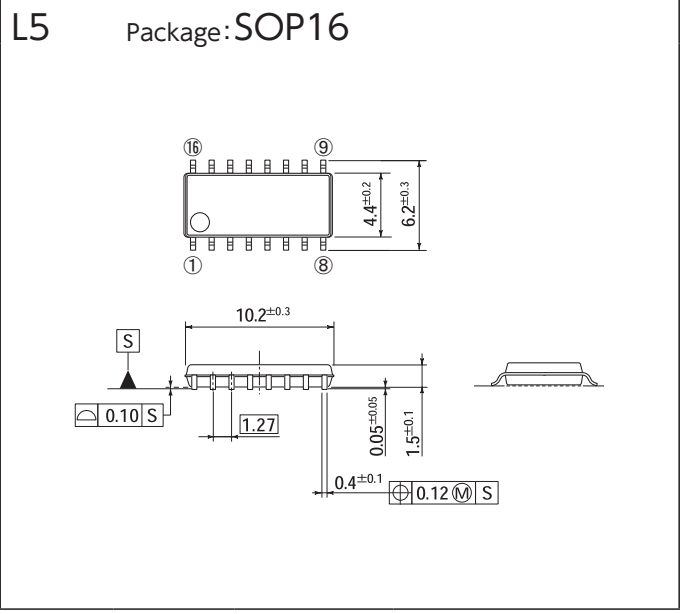
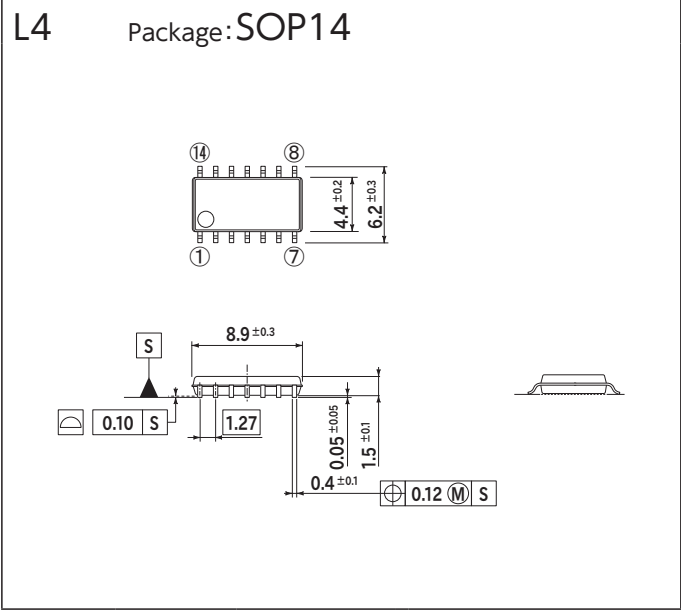
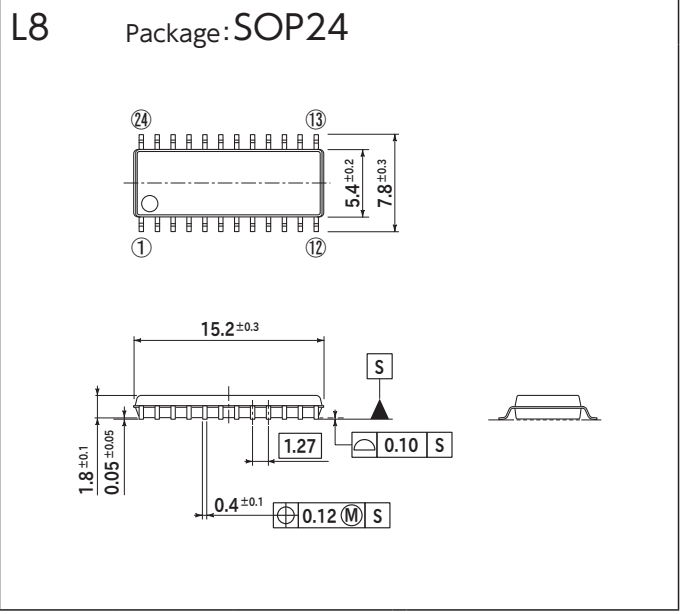
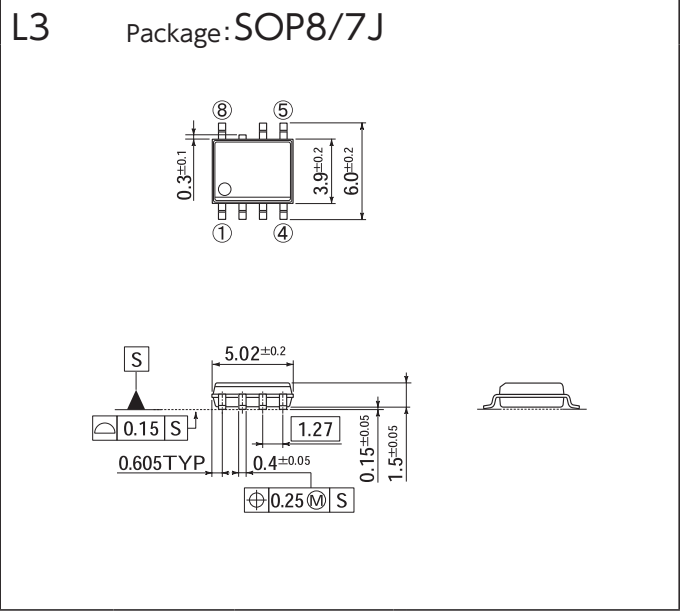
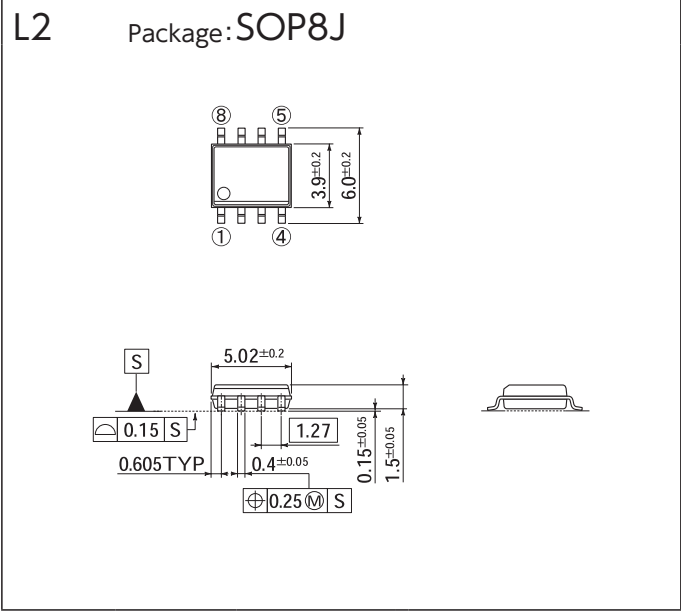
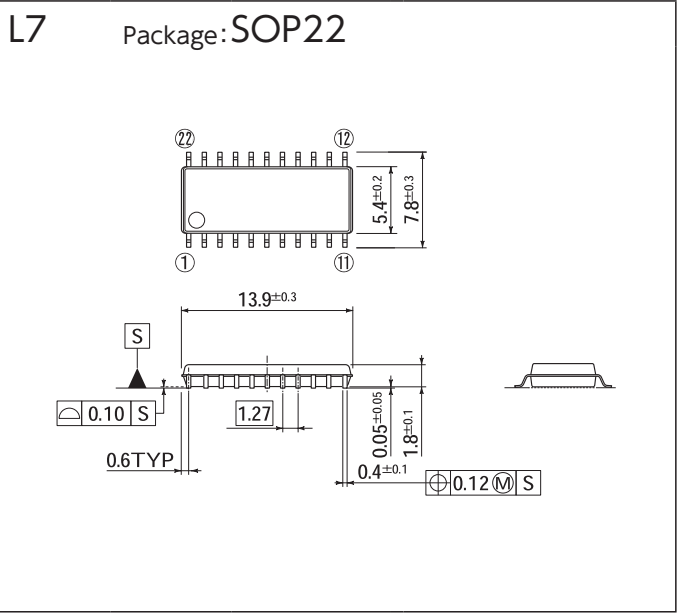
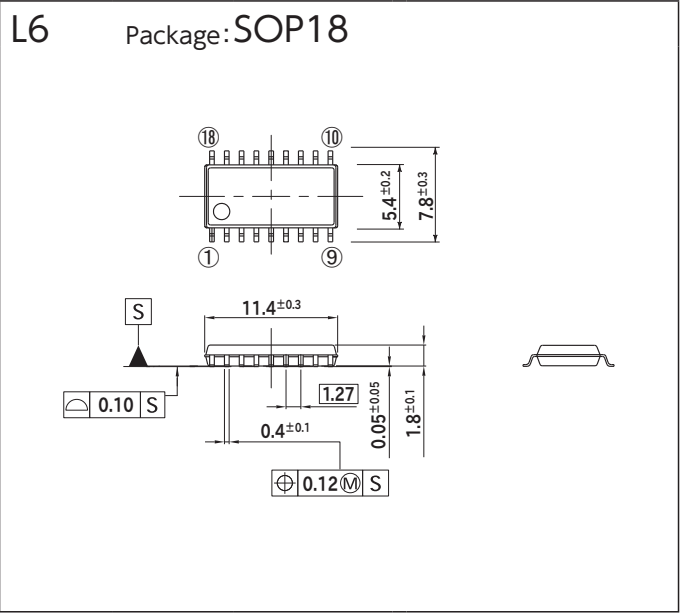
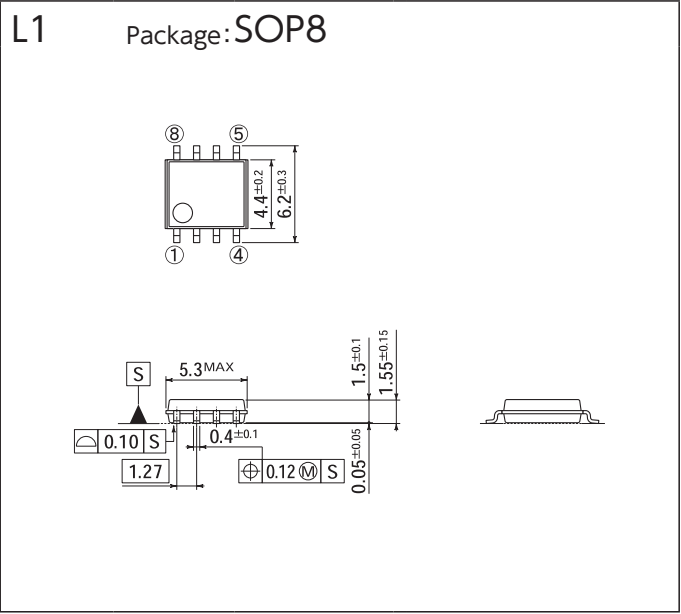
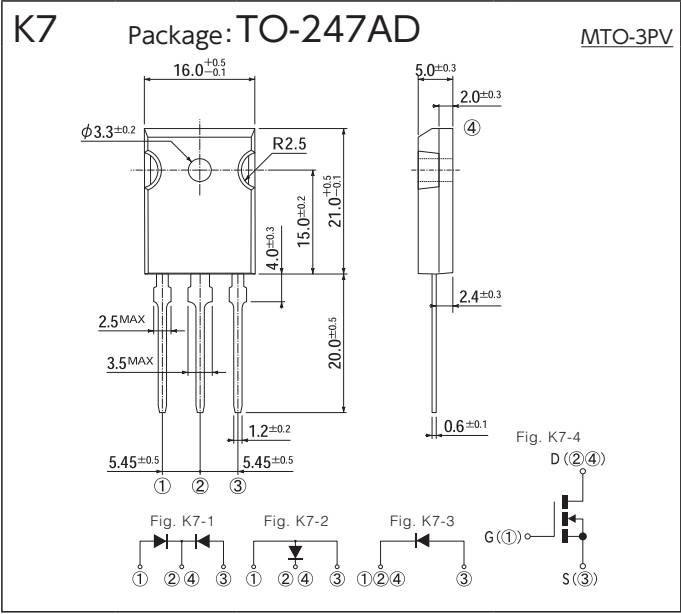
# OUTLINE DIMENSIONS

[Unit:mm]



# OUTLINE DIMENSIONS

[Unit:mm]



OUTLINE DIMENSIONS

# PACKING SPECIFICATION

Please make your order: 'more than Inner Box Quantities' and 'a multiple of each Packing Unit'

## Order Quantity & Packing Dimensions List

Please make your order: 'more than Inner Box Quantities' and 'a multiple of each Packing Unit'

Package				JEDEC Package Code	JEITA Code	House Name	Fig.	Spec Code	Terminal Plating	Weight (aprx.)	MSL	Remarks	Quantity	Inner Box			Standard Packing		Packing Box (mm)					
JEDEC Package Code	JEITA Code	House Name	Method											Quantity (Pcs./Box)	Pcs./Box	Weight (kg)	L	W	H	Pcs./Box	Weight (kg)	L	W	H
-	-	AX057	A1	-5060	Sn	190mg	-						4,000	Tape, Ammo-Pack 52mm	4,000	32,000	7.5	330	280	270				
-	-	AX06	SIDAC	A2 A3	Sn-Bi	210mg	-	-7000					Standard	3,000	Tape, Ammo-Pack 26mm	3,000	36,000	6.2	340	275	230			
-	-	AX06						A2 A3	-7060				Standard	4,000	Tape, Ammo-Pack 52mm	4,000	64,000	14.0	325	325	420			
-	-	AX06						A2 A3	-7061					4,000	Tape&Reel, Diameter 300 φ 52mm	4,000	20,000	6.3	325	325	420			
-	-	AX06						A2 A3	-7070					3,000	Tape, Ammo-Pack 26mm	3,000	72,000	15.7	325	325	420			
-	-	AX078	TVS SIDAC	A4	Sn-Bi	390mg	-	-7000					Standard	2,000	Tape, Ammo-Pack 52mm	2,000	32,000	14.7	325	325	420			
-	-	AX078						A4	-7070					1,500	Tape, Ammo-Pack 26mm	1,500	18,000	7.2	325	325	260			
-	-	AX078						A4	-5000					200	Bulk	200	16,000	7.9	480	355	230			
-	-	AX078						A4	-5060	Sn			Standard	2,000	Tape, Ammo-Pack 52mm	2,000	16,000	7.5	325	325	260			
-	-	AX078	Diodes	-5070					1,500	Tape, Ammo-Pack 26mm	1,500	18,000	7.2	325	325	260								
-	-	AX10	TVS SIDAC	A5 A6	Sn-Bi	640mg	-	-7000					Standard	1,200	Tape, Ammo-Pack 52mm	1,200	18,000	14.4	325	325	420			
-	-	AX10						A5 A6	-7061					2,500	Tape&Reel, Diameter 300 φ 52mm	2,500	12,500	10.8	325	325	420			
-	-	AX10						A5 A6	-5000					200	Bulk	200	16,000	11.1	480	355	230			
-	-	AX10						A5 A6	-5060	Sn			Standard	1,200	Tape, Ammo-Pack 52mm	1,200	9,600	7.3	325	325	260			
-	-	AX10	Diodes	-5061					2,500	Tape&Reel, Diameter 300 φ 52mm	2,500	12,500	10.8	325	325	420								
-	-	AX14	A7	-5000					200	Bulk	200	16,000	17.5	480	355	230								
-	-	AX14		A7	-5060	Sn	1.1g		Standard	1,200	Tape, Ammo-Pack 52mm	1,200	9,600	11.2	325	325	260							
-	-	AX14		A7	-5061					2,500	Tape&Reel, Diameter 300 φ 52mm	2,500	10,000	13.0	350	355	350							
DO-219AB similar	SC-109	G1F	SMD	B1	-5063R	Sn	12mg	1					4,000	Tape&Reel, Diameter 180 φ	24,000	48,000	1.6	180	205	210				
DO-219AA similar	-	M1F	SMD	B2	-6063	Sn	25mg	1					2,500	Tape&Reel, Diameter 180 φ	15,000	75,000	4.5	405	210	220				
-	-	1F	SMD	B3 B4	-5103					100	Magazine	100	15,000	2.3	545	145	110							
DO-214AC	-	1F			B3 B4	-5053	Sn	60mg	1	Standard	2,000	Tape&Reel, Diameter 180 φ	8,000	40,000	4.1	340	195	205						
-	-	1F			B3 B4	-5073					7,500	Tape&Reel, Diameter 330 φ	45,000	90,000	10.8	395	245	395						
-	SC-110B	CE	SMD	B5	-5063R	Sn	30mg						3,000	Tape&Reel, Diameter 180 φ	12,000	24,000	1.6	180	205	210				
DO-214AA similar	-	M2F	SMD	B6 B7 B8	-5063	Sn	75mg	1	Standard	1,000	Tape&Reel, Diameter 180 φ	4,000	20,000	3.4	340	195	205							
-	-	M2F			B6 B7 B8	-5073					4,000	Tape&Reel, Diameter 330 φ	4,000	48,000	8.6	395	245	395						
-	-	M2F			B6 B7 B8	-5103					60	Magazine	60	18,000	5.2	545	145	110						
-	-	2F	SMD	B9 B10	-5063	Sn	180mg	1	Standard	750	Tape&Reel, Diameter 180 φ	3,000	15,000	4.2	340	195	205							
-	-	2F			B9 B10	-5073					3,000	Tape&Reel, Diameter 330 φ	3,000	36,000	9.2	395	245	395						
-	-	2F			B9 B10	-5103					1,000	Tape&Reel, Diameter 180 φ	1,000	20,000	3.6	340	195	205						
-	-	SOPA-4	SMD	C1	-7062	Sn-Bi	90mg	1					1,000	Tape&Reel, Diameter 180 φ	1,000	20,000	3.6	340	195	205				
-	-	1Z	SMD	C2	-7102					100	Magazine	100	15,000	3.2	545	145	110							
-	-	1Z			C2	-7062	Sn-Bi	130mg	1	S1ZA	750	Tape&Reel, Diameter 180 φ	3,000	15,000	4.0	340	195	205						
-	-	1Z			C2	-7062				S1ZB	750	Tape&Reel, Diameter 180 φ	3,000	15,000	4.0	405	210	220						
-	-	1Z			C2	-7072				Standard	3,000	Tape&Reel, Diameter 330 φ	3,000	15,000	4.6	340	340	120						
-	-	1N	THD	C3	-7101					100	Magazine	100	10,000	2.1	545	145	110							
-	-	1N	SMD	C4	-7102	Sn-Bi	290mg	1					70	Magazine	70	5,600	4.1	545	145	100				
-	-	1N			C4	-7062					1,000	Tape&Reel, Diameter 250 φ	1,000	10,000	5.5	275	285	295						
-	-	1NA	THD	C5	-7101	Sn-Bi		1					70	Magazine	70	5,600	4.1	545	145	100				
-	-	1NA	SMD	C6	-7102								Standard	1,000	Tape&Reel, Diameter 250 φ	1,000	10,000	5.5	275	285	295			
-	-	1NA			C6	-7062	Sn-Bi	290mg	1						70	Magazine	70	5,600	4.1	545	145	100		
-	-	1NA			C6	-7101									70	Magazine	70	5,600	4.1	545	145	100		
-	-	1W	SMD	C8	-7102								50	Magazine	50	4,000	4.4	545	145	110				
-	-	1W			C8	-7062	Sn-Bi	500mg	1						1,000	Tape&Reel, Diameter 330 φ	3,000	6,000	5.5	395	245	395		
-	-	1W			C8	-7072									2,000	Tape&Reel, Diameter 380 φ	2,000	10,000	7.8	395	245	395		
-	-	1W			C8	-7072									50	Magazine	50	4,000	4.4	545	145	110		
-	-	D3K	THD	D1	-7000	Sn-Bi	1.5g	-					500	Bulk	500	2,500	4.0	210	188	200				
-	-	2S	THD	D2	-7000	Sn-Bi	2.1g	-					100	Bulk	100	500	6,000	14.4	410	380	170			
-	-	3S	THD	D3	-7000	Sn-Bi	3.9-4.5g	-					50	Bulk	250	2,000	9.5	310	285	196				
-	-	5S	THD	D4	-7000	Sn-Bi	6.3-7.5g	-					50	Bulk	250	2,000	14.5	330	330	215				
-	-	JB	THD	D5	-7000	Sn-Bi	2.7g	-					250	Bulk	250	2,000	7.4	287	301	169				
-	-	JA	THD	D6	-7000	Sn-Bi	4.5g	-					250	Bulk	250	2,000	9.0	327	329	185				
-	-	TSB	THD (4pin) THD (5pin)	D7	-7000	Sn-Bi	20g	-					100	Bulk	100	400	9.8	351	269	164				
-	-	TSB		D8	-7000									100	Bulk	100	400	9.8	351	269	164			
-	-	JC	THD (4pin) THD (5pin)	D7 D8	-7500	Sn-Bi	20g	-					40	Tray	40	200	5.6	503	356	135				
-	-	JF	THD	D9	-7500	Sn-Bi	25g	-					40	Tray	40	200	5.6	503	356	135				
-	-	JH	THD	D10	-7501	Sn-Bi	31g	-					40	Tray	40	200	5.6	503	356	135				
-	-	MCP	SMD	E1	-4062	Ni	1.9g	1					300	Tape&Reel, Diameter 255 φ	300	1,500	5.0	280	275	190				
-	-	MCP			E1	-4072				Standard	600	Tape&Reel, Diameter 330 φ	600	1,800	5.5	335	345	110						

Exterior packaging is an example. Depending on the quantity ordered, the number of incoming, outline and weight may change.

Package											Inner Box						Standard Packing			Packing Box (mm)						
JEDEC Package Code	JEITA Code	House Name	Fig.	Spec Code	Terminal Plating	Weight (aprx.)	MSL	Remarks	Quantity	Method	Quantity (Pcs./Box)	Pcs./Box	Weight (kg)	L	W	H										
-	-	D30VC	THD	E2	-4000	Ag	12g	-									100	Tray	100	500	7.0	375	285	160		
-	-	S2VB	THD	E3	-5000	Sn-Ag-Cu	3.0g	-										100	Tray	100	1,000	3.6	265	255	170	
-	-	S4VB	THD	E4	-5000	Sn-Ag-Cu	5.2g	-										100	Tray	100	1,000	5.9	315	285	220	
-	-	S5VB	THD	E5	-5000	Sn-Ag-Cu	9.1g	-										100	Tray	100	1,000	10.4	415	285	300	
-	-	S10VB	THD	E6	-5000	Sn-Ag-Cu	8.0g	-										100	Tray	100	1,000	9.3	375	285	270	
-	-	S15VB	THD	E7	-4000	Ag	16g	-										100	Tray	100	500	9.0	415	285	180	
-	-	S25VB	THD	E8	-4000	Ag	21g	-										60	Bulk	60	300	7.0	335	205	165	
-	-	S50VB	THD	E9	-4000	Ag	28g	-										50	Tray	50	200	6.2	335	205	165	
-	-	S3WB	THD	E10	-5000	Sn-Ag-Cu	5.1g	-										100	Tray	100	1,000	6.1	315	285	220	
-	-	S10WB	THD	E11	-5000	Sn-Ag-Cu	9.0g	-										100	Tray	100	1,000	9.3	375	285	270	
-	-	S15WB	THD	E12	-5000	Sn-Ag-Cu	16g	-										100	Tray	100	1,000	15.1	415	285	300	
-	-	S20WB	THD	E13	-5000	Sn-Ag-Cu	20g	-										100	Tray	100	700	15.0	415	285	300	
-	-	SVTA	THD	E14	-5000	Sn-Ag-Cu	30g	-										50	Tray	50	250	8.7	460	295	240	
-	-	SVT	THD	E15	-4000	Ag	31g	-										45	Bulk	45	200	200	13.6	335	205	165
-	-	MODULE	-	F1 F2 F3	-4000	Ni	42-66g	-										25	Tray	100	200	13.4	480	330	210	
-	-	MG001	THD	F4	-7101	Sn-Bi	10g	-										15	Magazine	15	450	7.1	623	232	144	
-	-	MG031	THD	F5	-7101	Sn-Bi	7.7g	-										12	Magazine	12	600	8.5	57			

# NOTES

## How to Order

### 1. Indication of Spec. Code when ordering

Please specify the Spec. Code when ordering semiconductors.  
For the Spec. Code, Please refer to as follows and "PACKING SPECIFICATION".

**Example** Ordering THD type of S1ZB60  
S1ZB60-7101

### 2. Spec Code

The code specifies each packing form, lead forming and terminal plate material.

Please refer to "PACKING SPECIFICATION".

**Example** 5 0 0 0

- Terminal forming
  - 0 : Straight terminal
  - 1 to 9 : Each number shows type of form
- Packing form
  - 0 : Standard
  - In case of surface mounting devices
    - 5, 6 : Small reel
    - 7 : Large reel
  - In case of axial device
    - 6 : Lead length 52mm (T52)
    - 7 : Lead length 26mm (T26)
- Minimum packing unit
  - 0 : Bulk, tray or taping
  - 1 : Magazine
  - 5 : Tray
  - 6 : Packed (FTO-220 Package)
- Terminal plate material
  - 3 : Ni/Pd/Au, Sn-Ag
  - 4 : Ni, Ag
  - 5 : Sn-Ag-Cu, Sn, Ag, Sn-Cu
  - 6 : Sn
  - 7 : Sn-Bi

## Outline of Packing Form

### 1. Minimum packing unit

- Bulk : The form in which parts are inserted into plastic bags or cardboard boxes.
- Tray : The form in which parts are inserted in to containers made of resin.



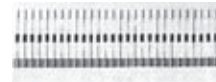
- Magazine : The form in which parts are inserted into resin cartridges designated for automatic inserters.



- Taping
  - Reel (Surface mounting devices)

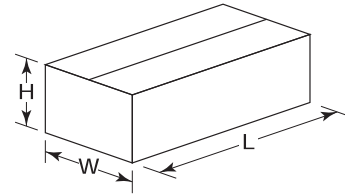


- Box (Axial devices)



### 2. Packing Box Dimensions

See the following pages for the dimensions of each cardboard box.



## About AEC-Q101 & Automotive Grade

### 1. AEC-Q101

These products are AEC-Q101 compliant.

### 2. Automotive Grade

These products are produced on a designated production line qualified for internal automotive standards.

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- All specifications are subject to change without notice.
- Please consult us for the latest specifications before you order.
- Please use this products after reading manual well.

• Printed January 2020

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