

**SURFACE MOUNT GPP  
TRANSIENT VOLTAGE SUPPRESSOR  
400 WATT PEAK POWER 1.0 WATTS STEADY STATE**

**FEATURES**

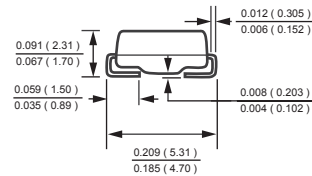
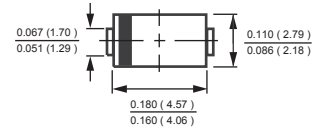
- \* Plastic package has underwriters laboratory
- \* Glass passivated chip construction
- \* 400 watt surge capability at 1ms
- \* Excellent clamping capability
- \* Low zener impedance
- \* Fast response time

**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS**

Ratings at 25 °C ambient temperature unless otherwise specified.  
Single phase, half wave, 60 Hz, resistive or inductive load,  
For capacitive load, derate current by 20%.



**DO-214AC**



Dimensions in inches and (millimeters)

**MAXIMUM RATINGS (@ TA=25 °C unless otherwise noted)**

| RATINGS  | SYMBOL           | VALUE        | UNITS               |
|--|------------------|--------------|---------------------|
| Peak Power Dissipation at TA = 25°C, TP = 1mS (Note 1)   | PPPM             | Minimum 400  | W                   |
| Peak Pulse Current with a 10/1000uS waveform ( Note 1, Fig.3 )   | IPPM             | SEE TABLE 1  | A                   |
| Steady State Power Dissipation at TL = 75°C lead length, .375" (9.5 mm) (Note 2)                             | PM(AV)           | 1.0          | W                   |
| Peak Forward Surge Current, 8.3ms single half sine wave-superimposed on rated load ( JEDEC METHOD ) (Note 3) | IFSM             | 40           | A                   |
| Typical Current Squared Time   | I <sup>2</sup> t | 6.64         | A <sup>2</sup> /Sec |
| Maximum Instantaneous Forward Voltage @25A for unidirectional only ( Note 5 )                                | VF               | 3.5/6.5      | V                   |
| Operating and Storage Temperature Range  | TJ, TSTG         | -55 to + 150 | °C                  |

- NOTES : 1. Non-repetitive current pulse, per Fig.3 and derated above TA = 25°C per Fig.2.  
2. Mounted on 0.2 X 0.2" (5.0 X 5.0mm) copper pad to each terminal.  
3. Measured on 8.3mS single half Sine-Wave or equivalent wave, duty cycle = 4 pulses per minute maximum.  
4. "Fully ROHS compliant", "100% Sn plating (Pb-free)".  
5. VF = 3.5V max. for devices of V(BR) ≤ 200V and VF = 6.5V max. for devices of V(BR) ≥ 200V.

# RATING AND CHARACTERISTIC CURVES ( P4FMAJ6.8 THRU P4FMAJ400CA )

FIG. 1 - PEAK PULSE POWER RATING CURVE

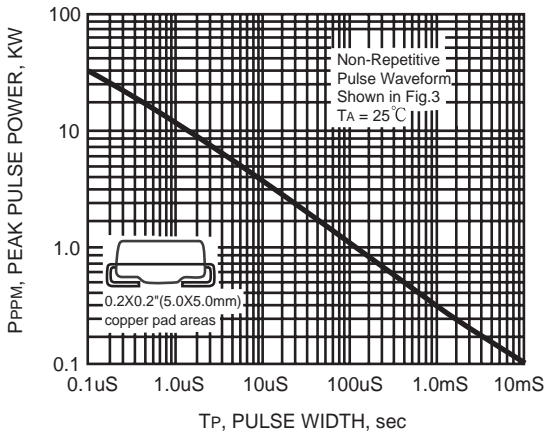


FIG. 2 - PULSE DERATING CURVE

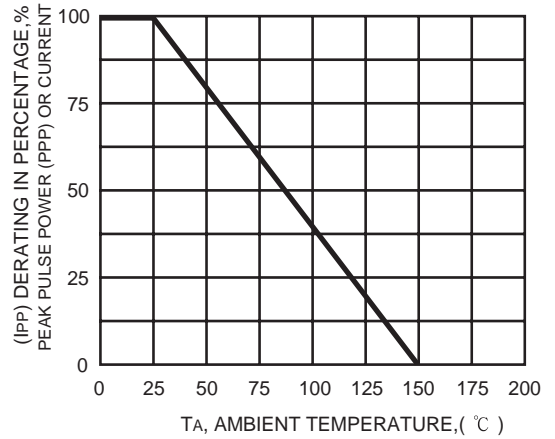


FIG. 3 - PULSE WAVEFORM

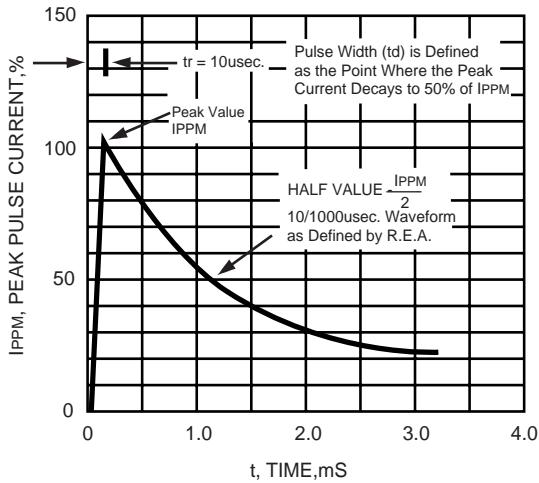
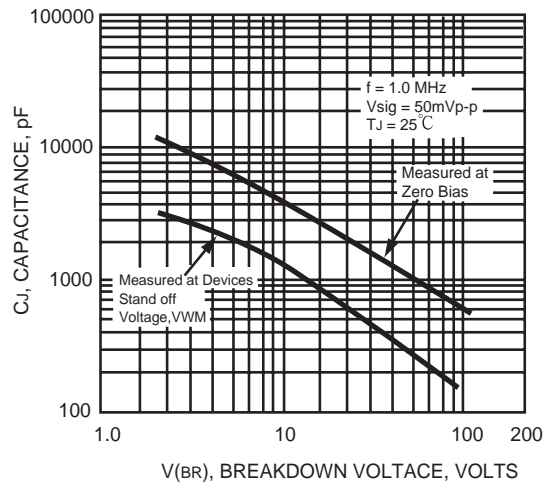


FIG. 4 - TYPICAL JUNCTION CAPACITANCE



# RATING AND CHARACTERISTIC CURVES ( P4FMAJ6.8 THRU P4FMAJ400CA )

FIG. 5 - STEADY STATE POWER DERATING CURVE

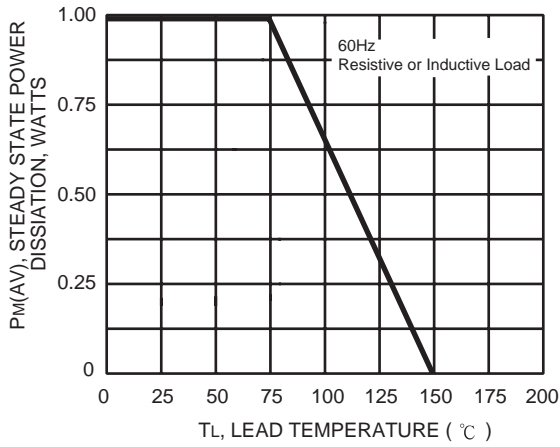


FIG. 6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL

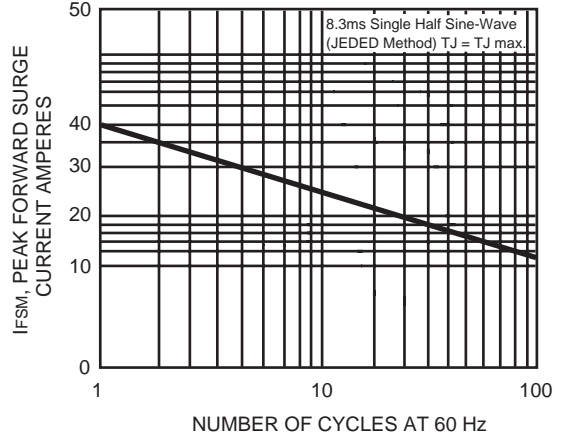
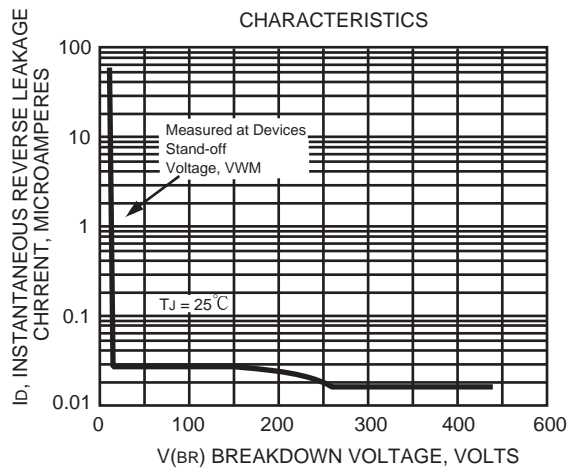


FIG. 7 - TYPICAL REVERSE LEAKAGE CHARACTERISTICS



# TRANSIENT VOLTAGE SUPPRESSORS

400W SERIES TVS DIODES / DO-214AC ( CASE 2 ) 400W

| TYPE       | Breakdown Voltage          |      | @I <sub>T</sub><br>(mA) | Reverse Stand off Voltage<br>V <sub>WM</sub><br>(Volts) | Maximum Reverse Leakage at V <sub>WM</sub><br>I <sub>D</sub> (uA) | Maximum Peak Pulse Current<br>I <sub>PPM</sub><br>(Amps) | Maximum Clamping Voltage at I <sub>PPM</sub><br>V <sub>C</sub> (Volts) |
|------------|----------------------------|------|-------------------------|---|---|--|--|
|            | V <sub>BR</sub><br>(Volts) |      |                         |   |   |  |  |
|            | MIN.                       | MAX. |                         |   |   |  |  |
| P4FMAJ6.8  | 6.12                       | 7.48 | 10                      | 5.50  | 1000  | 37   | 10.8   |
| P4FMAJ6.8A | 6.45                       | 7.14 | 10                      | 5.80  | 1000  | 38.1   | 10.5   |
| P4FMAJ7.5  | 6.75                       | 8.25 | 10                      | 6.05  | 500   | 34.2   | 11.7   |
| P4FMAJ7.5A | 7.13                       | 7.88 | 10                      | 6.40  | 500   | 35.4   | 11.3   |
| P4FMAJ8.2  | 7.38                       | 9.02 | 10                      | 6.63  | 200   | 32   | 12.5   |
| P4FMAJ8.2A | 7.79                       | 8.61 | 10                      | 7.02  | 200   | 33.1   | 12.1   |
| P4FMAJ9.1  | 8.19                       | 10.0 | 1.0                     | 7.37  | 50  | 29   | 13.8   |
| P4FMAJ9.1A | 8.65                       | 9.55 | 1.0                     | 7.78  | 50  | 29.9   | 13.4   |
| P4FMAJ10   | 9.00                       | 11.0 | 1.0                     | 8.10  | 10  | 26.7   | 15.0   |
| P4FMAJ10A  | 9.50                       | 10.5 | 1.0                     | 8.55  | 10  | 27.6   | 14.5   |
| P4FMAJ11   | 9.90                       | 12.1 | 1.0                     | 8.92  | 5.0   | 24.7   | 16.2   |
| P4FMAJ11A  | 10.5                       | 11.6 | 1.0                     | 9.40  | 5.0   | 25.6   | 15.6   |
| P4FMAJ12   | 10.8                       | 13.2 | 1.0                     | 9.72  | 5.0   | 23.1   | 17.3   |
| P4FMAJ12A  | 11.4                       | 12.6 | 1.0                     | 10.2  | 5.0   | 24   | 16.7   |
| P4FMAJ13   | 11.7                       | 14.3 | 1.0                     | 10.5  | 5.0   | 21.1   | 19.0   |
| P4FMAJ13A  | 12.4                       | 13.7 | 1.0                     | 11.1  | 5.0   | 22   | 18.2   |
| P4FMAJ15   | 13.5                       | 16.3 | 1.0                     | 12.1  | 5.0   | 18.2   | 22.0   |
| P4FMAJ15A  | 14.3                       | 15.8 | 1.0                     | 12.8  | 5.0   | 18.9   | 21.2   |
| P4FMAJ16   | 14.4                       | 17.6 | 1.0                     | 12.9  | 5.0   | 17   | 23.5   |
| P4FMAJ16A  | 15.2                       | 16.8 | 1.0                     | 13.6  | 5.0   | 17.8   | 22.5   |
| P4FMAJ18   | 16.2                       | 19.8 | 1.0                     | 14.5  | 5.0   | 15.1   | 26.5   |
| P4FMAJ18A  | 17.1                       | 18.9 | 1.0                     | 15.3  | 5.0   | 15.9   | 25.2   |
| P4FMAJ20   | 18.0                       | 22.0 | 1.0                     | 16.2  | 5.0   | 13.7   | 29.1   |
| P4FMAJ20A  | 19.0                       | 21.0 | 1.0                     | 17.1  | 5.0   | 14.4   | 27.7   |
| P4FMAJ22   | 19.8                       | 24.2 | 1.0                     | 17.8  | 5.0   | 12.5   | 31.9   |
| P4FMAJ22A  | 20.9                       | 23.1 | 1.0                     | 18.8  | 5.0   | 13.1   | 30.6   |
| P4FMAJ24   | 21.6                       | 26.4 | 1.0                     | 19.4  | 5.0   | 11.5   | 34.7   |
| P4FMAJ24A  | 22.8                       | 25.2 | 1.0                     | 20.5  | 5.0   | 12   | 33.2   |
| P4FMAJ27   | 24.3                       | 29.7 | 1.0                     | 21.8  | 5.0   | 10.2   | 39.1   |
| P4FMAJ27A  | 25.7                       | 28.4 | 1.0                     | 23.1  | 5.0   | 10.7   | 37.5   |
| P4FMAJ30   | 27.0                       | 33.0 | 1.0                     | 24.3  | 5.0   | 9.2  | 43.5   |
| P4FMAJ30A  | 28.5                       | 31.5 | 1.0                     | 25.6  | 5.0   | 9.7  | 41.4   |
| P4FMAJ33   | 29.7                       | 36.3 | 1.0                     | 26.8  | 5.0   | 8.4  | 47.7   |
| P4FMAJ33A  | 31.4                       | 34.7 | 1.0                     | 28.2  | 5.0   | 8.8  | 45.7   |
| P4FMAJ36   | 32.4                       | 39.6 | 1.0                     | 29.1  | 5.0   | 7.7  | 52.0   |
| P4FMAJ36A  | 34.2                       | 37.8 | 1.0                     | 30.8  | 5.0   | 8  | 49.9   |
| P4FMAJ39   | 35.1                       | 42.9 | 1.0                     | 31.6  | 5.0   | 7.1  | 56.4   |
| P4FMAJ39A  | 37.1                       | 41.0 | 1.0                     | 33.3  | 5.0   | 7.4  | 53.9   |
| P4FMAJ43   | 38.7                       | 47.3 | 1.0                     | 34.8  | 5.0   | 6.5  | 61.9   |
| P4FMAJ43A  | 40.9                       | 45.2 | 1.0                     | 36.8  | 5.0   | 6.7  | 59.3   |
| P4FMAJ47   | 42.3                       | 51.7 | 1.0                     | 38.1  | 5.0   | 5.9  | 67.8   |
| P4FMAJ47A  | 44.7                       | 49.4 | 1.0                     | 40.2  | 5.0   | 6.2  | 64.8   |
| P4FMAJ51   | 45.9                       | 56.1 | 1.0                     | 41.3  | 5.0   | 5.4  | 73.5   |
| P4FMAJ51A  | 48.5                       | 53.6 | 1.0                     | 43.6  | 5.0   | 5.7  | 70.1   |
| P4FMAJ56   | 50.4                       | 61.6 | 1.0                     | 45.4  | 5.0   | 5.0  | 80.5   |
| P4FMAJ56A  | 53.2                       | 58.8 | 1.0                     | 47.8  | 5.0   | 5.2  | 77.0   |

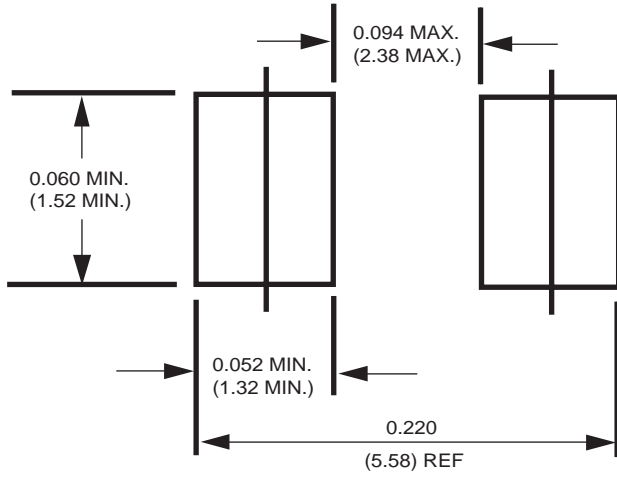
# TRANSIENT VOLTAGE SUPPRESSORS

400W SERIES TVS DIODES / DO-214AC ( CASE 2 ) 400W

| TYPE        | Breakdown Voltage |      |              | Reverse Stand off Voltage $V_{WM}$ (Volts) | Maximum Reverse Leakage at $V_{WM}$ $I_D$ ( $\mu$ A) | Maximum Peak Pulse Current IPPM (Amps) | Maximum Clamping Voltage at IPPM $V_C$ (Volts) |
|-------------|-------------------|------|--------------|--|--|--|--|
|             | $V_{BR}$ (Volts)  |      | @ $I_T$ (mA) |  |  |  |  |
|             | MIN.              | MAX. |              |  |  |  |  |
| P4FMAJ62    | 55.8              | 68.2 | 1.0          | 50.2                                       | 5.0  | 4.7                                    | 89.0   |
| P4FMAJ62A   | 58.9              | 65.1 | 1.0          | 53.0                                       | 5.0  | 5.0                                    | 85.0   |
| P4FMAJ68    | 61.2              | 74.8 | 1.0          | 55.1                                       | 5.0  | 4.2                                    | 98.0   |
| P4FMAJ68A   | 64.6              | 71.4 | 1.0          | 58.1                                       | 5.0  | 4.5                                    | 92.0   |
| P4FMAJ75    | 67.5              | 82.5 | 1.0          | 60.7                                       | 5.0  | 3.8                                    | 108  |
| P4FMAJ75A   | 71.3              | 78.8 | 1.0          | 64.1                                       | 5.0  | 4.0                                    | 103  |
| P4FMAJ82    | 73.8              | 90.2 | 1.0          | 66.4                                       | 5.0  | 3.5                                    | 118  |
| P4FMAJ82A   | 77.9              | 86.1 | 1.0          | 70.1                                       | 5.0  | 3.7                                    | 113  |
| P4FMAJ91    | 81.9              | 100  | 1.0          | 73.7                                       | 5.0  | 3.2                                    | 131  |
| P4FMAJ91A   | 86.5              | 95.5 | 1.0          | 77.8                                       | 5.0  | 3.3                                    | 125  |
| *P4FMAJ100  | 90.0              | 110  | 1.0          | 81.0                                       | 5.0  | 2.1                                    | 144  |
| *P4FMAJ100A | 95.0              | 105  | 1.0          | 85.5                                       | 5.0  | 2.2                                    | 137  |
| *P4FMAJ110  | 99.0              | 121  | 1.0          | 89.2                                       | 5.0  | 1.9                                    | 158  |
| *P4FMAJ110A | 105               | 116  | 1.0          | 94.0                                       | 5.0  | 2.0                                    | 152  |
| *P4FMAJ120  | 108               | 132  | 1.0          | 97.2                                       | 5.0  | 1.7                                    | 173  |
| *P4FMAJ120A | 114               | 126  | 1.0          | 102  | 5.0  | 1.8                                    | 165  |
| *P4FMAJ130  | 117               | 143  | 1.0          | 105  | 5.0  | 1.6                                    | 187  |
| *P4FMAJ130A | 124               | 137  | 1.0          | 111  | 5.0  | 1.7                                    | 179  |
| *P4FMAJ150  | 135               | 165  | 1.0          | 121  | 5.0  | 1.4                                    | 215  |
| *P4FMAJ150A | 143               | 158  | 1.0          | 128  | 5.0  | 1.4                                    | 207  |
| *P4FMAJ160  | 144               | 176  | 1.0          | 130  | 5.0  | 1.3                                    | 230  |
| *P4FMAJ160A | 152               | 168  | 1.0          | 136  | 5.0  | 1.4                                    | 219  |
| *P4FMAJ170  | 153               | 187  | 1.0          | 138  | 5.0  | 1.2                                    | 244  |
| *P4FMAJ170A | 162               | 179  | 1.0          | 145  | 5.0  | 1.3                                    | 234  |
| *P4FMAJ180  | 162               | 198  | 1.0          | 146  | 5.0  | 1.2                                    | 258  |
| *P4FMAJ180A | 171               | 189  | 1.0          | 154  | 5.0  | 1.2                                    | 246  |
| *P4FMAJ200  | 180               | 220  | 1.0          | 162  | 5.0  | 1.0                                    | 287  |
| *P4FMAJ200A | 190               | 210  | 1.0          | 171  | 5.0  | 1.1                                    | 274  |
| *P4FMAJ220  | 198               | 242  | 1.0          | 175  | 5.0  | 0.9                                    | 344  |
| *P4FMAJ220A | 209               | 231  | 1.0          | 185  | 5.0  | 0.9                                    | 328  |
| *P4FMAJ250  | 225               | 275  | 1.0          | 202  | 5.0  | 0.83                                   | 360  |
| *P4FMAJ250A | 237               | 263  | 1.0          | 214  | 5.0  | 0.87                                   | 344  |
| *P4FMAJ300  | 270               | 330  | 1.0          | 243  | 5.0  | 0.70                                   | 430  |
| *P4FMAJ300A | 285               | 315  | 1.0          | 256  | 5.0  | 0.73                                   | 414  |
| *P4FMAJ350  | 315               | 385  | 1.0          | 284  | 5.0  | 0.60                                   | 504  |
| *P4FMAJ350A | 332               | 368  | 1.0          | 300  | 5.0  | 0.62                                   | 482  |
| *P4FMAJ400  | 360               | 440  | 1.0          | 324  | 5.0  | 0.53                                   | 574  |
| *P4FMAJ400A | 380               | 420  | 1.0          | 342  | 5.0  | 0.55                                   | 548  |

- Notes :
1.  $V_{BR}$  measured after  $I_T$  applied for 300ms.  $I_T$  = square pulse or equivalent.
  2. For bidirectional use C or CA suffixs for all types (ex. P4FMAJ6.8C,P4FMAJ400CA) electrical characteristics apply in both directions.
  3. For bidirectional types having  $V_{WM}$  of 10 volts and less, the  $I_D$  limit is doubled.
  4. Mark "\*" reverse power rating are 300w .

## Mounting Pad Layout



Dimensions in inches and (millimeters)

## PACKAGING OF DIODE AND BRIDGE RECTIFIERS

### REEL PACK

| PACKAGE | PACKING CODE | EA PER REEL | EA PER INNER BOX | COMPONENT SPACE (mm) | TAPE SPACE (mm) | REEL DIA (mm) | CARTON SIZE (mm) | EA PER CARTON | GROSS WEIGHT(Kg) |
|---------|--------------|-------------|------------------|----------------------|-----------------|---------------|------------------|---------------|------------------|
| SMA     | -T           | 1,500       | 6,000            | ---                  | ---             | 178           | 390*205*310      | 48,000        | 8.40             |
| SMA     | -W           | 5,000       | 10,000           | ---                  | ---             | 330           | 360*355*360      | 80,000        | 14.20            |