

**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

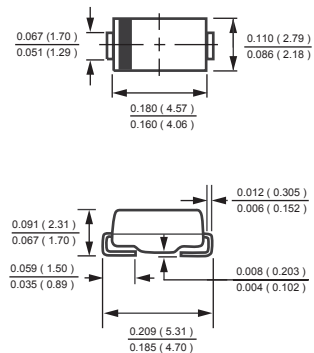
**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS**

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**



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

| RATINGS                                                                                                    | SYMBOL         | VALUE        | UNITS              |
|------------------------------------------------------------------------------------------------------------|----------------|--------------|--------------------|
| Peak Power Dissipation at $T_A = 25^{\circ}\text{C}$ , $T_P = 1\text{mS}$ (Note 1)                         | $P_{PPM}$      | Minimum 400  | W                  |
| Peak Pulse Current with a 10/1000uS waveform (Note 1, Fig.3)                                               | $I_{PPM}$      | SEE TABLE 1  | A                  |
| Steady State Power Dissipation at $T_L = 75^{\circ}\text{C}$ lead length, .375" (9.5 mm) (Note 2)          | $P_{M(AV)}$    | 1.0          | W                  |
| Peak Forward Surge Current, 8.3ms single half sine wave-superimposed on rated load (JEDEC METHOD) (Note 3) | $I_{FSM}$      | 40           | A                  |
| Maximum Instantaneous Forward Voltage @25A for unidirectional only (Note 5)                                | $V_F$          | 3.5/6.5      | V                  |
| Operating and Storage Temperature Range                                                                    | $T_J, T_{STG}$ | -55 to + 150 | $^{\circ}\text{C}$ |

- NOTES : 1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A = 25^{\circ}\text{C}$  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.  $V_F = 3.5\text{V}$  max. for devices of  $V(BR) \leq 200\text{V}$  and  $V_F = 6.5\text{V}$  max. for devices of  $V(BR) \geq 200\text{V}$ .

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

FIG. 1 - PEAK PULSE POWER RATING CURVE

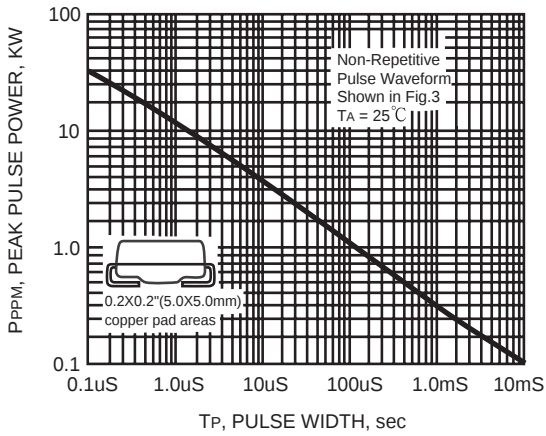


FIG. 2 - PULSE DERATING CURVE

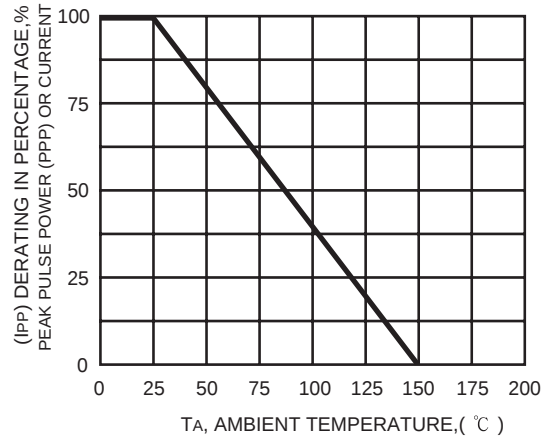


FIG. 3 - PULSE WAVEFORM

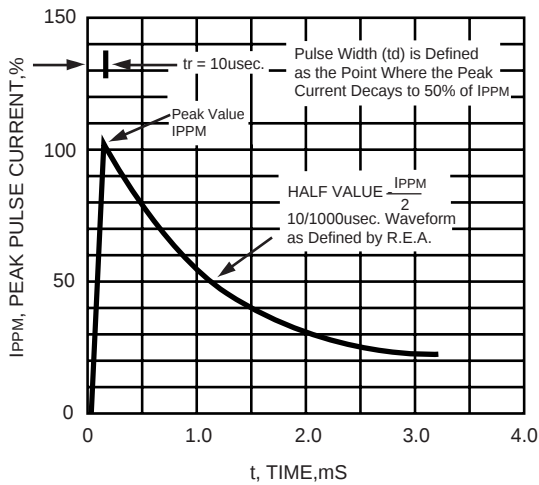
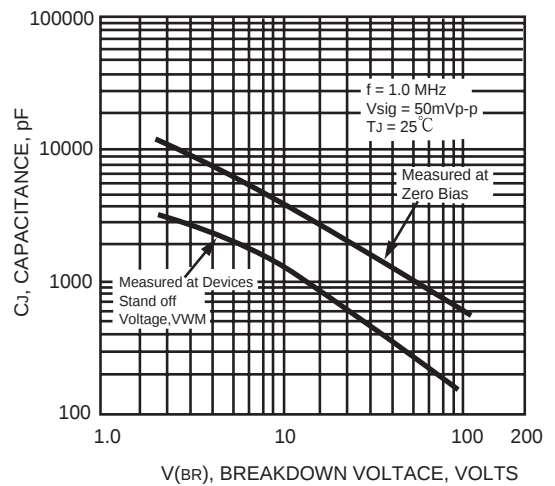


FIG. 4 - TYPICAL JUNCTION CAPACITANCE



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

FIG. 5 - STEADY STATE POWER DERATING CURVE

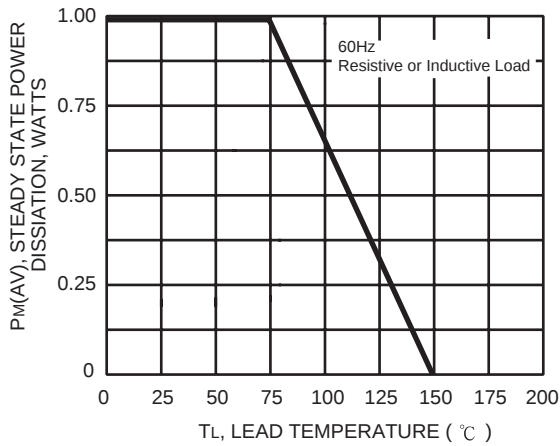


FIG. 6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT UNIDIRECTIONAL

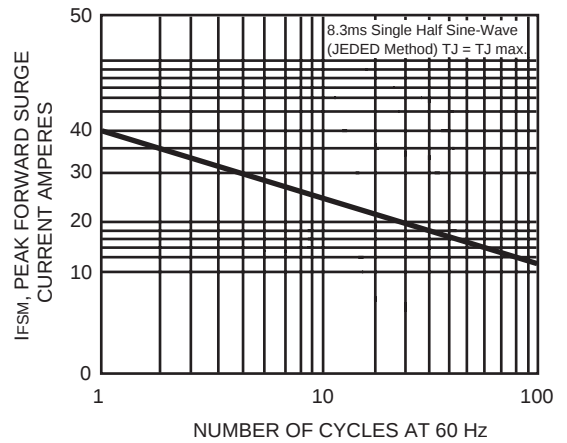
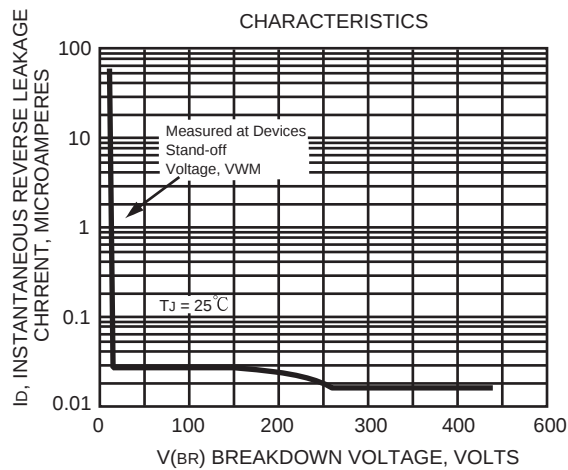


FIG. 7 - TYPICAL REVERSE LEAKAGE CHARACTERISTICS



# TRANSIENT VOLTAGE SUPPRESSORS

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

| TYPE       | Breakdown Voltage          |      |                         | 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) |      | @I <sub>T</sub><br>(mA) |                                                         |                                                                   |                                                          |                                                                        |
|            | 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                                                                   |

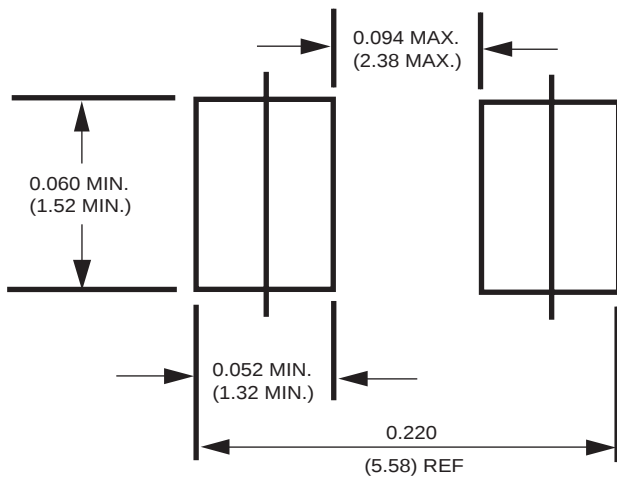
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|--------------|----------------------------|------|-------------------------|---------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------|
|              | V <sub>BR</sub><br>(Volts) |      | @I <sub>T</sub><br>(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)