

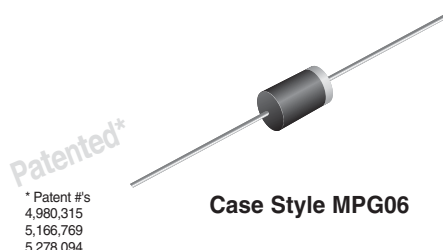


## Automotive Transient Voltage Suppressors

### High Temperature Stability & High Reliability Conditions

#### Major Ratings and Characteristics

|            |               |
|------------|---------------|
| $V_{(BR)}$ | 6.8 V to 43 V |
| $P_{PPM}$  | 400 W         |
| $P_D$      | 1.0 W         |
| $I_{FSM}$  | 40 A          |
| $T_J$ max. | 185 °C        |



#### Features

- Patented PAR<sup>®</sup> construction
- Available in Unidirectional polarity only
- 400 W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetitive rate (duty cycle): 0.01 %
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Typical  $I_D$  less than 1.0  $\mu$ A above 10 V rating
- Solder Dip 260 °C, 40 seconds
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



#### Typical Applications

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, automotive and Telecommunication.

#### Mechanical Data

**Case:** MPG06, molded epoxy over passivated junction  
Epoxy meets UL 94V-0 flammability rating

**Terminals:** Matte tin plated leads, solderable per J-STD-002B and JESD22-B102D  
E3 suffix for commercial grade, HE3 suffix for high reliability grade (AEC Q101 qualified)

**Polarity:** Color band denotes cathode end

#### Maximum Ratings

( $T_A = 25$  °C unless otherwise noted)

| Parameter                                                                      | Symbol         | Limit          | Unit |
|--------------------------------------------------------------------------------|----------------|----------------|------|
| Peak power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)</sup> (Fig. 1) | $P_{PPM}$      | Minimum 400    | W    |
| Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)(2)</sup> (Fig. 3)  | $I_{PPM}$      | see next table | A    |
| Power dissipation on infinite heatsink at $T_L = 75$ °C (Fig. 5)               | $P_D$          | 1.0            | W    |
| Peak forward surge current 8.3 ms single half sine-wave <sup>(2)</sup>         | $I_{FSM}$      | 40             | A    |
| Maximum instantaneous forward voltage at 25 A <sup>(2)</sup>                   | $V_F$          | 3.5            | V    |
| Operating junction and storage temperature range                               | $T_J, T_{STG}$ | - 65 to + 185  | °C   |

Notes:

(1) Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25$  °C per Fig. 2

(2) Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

# TMPG06-6.8 thru TMPG06-43A

Vishay General Semiconductor



## Electrical Characteristics

( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| Device Type | Maximum Breakdown Voltage $V_{(BR)}^{(1)}$ at $I_T$ (V) |      | Test Current $I_T$ (mA) | Stand-off Voltage $V_{WM}$ (V) | Maximum Reverse Leakage at $V_{WM}$ $I_D$ ( $\mu\text{A}$ ) | Reverse Leakage at $V_{WM}$ $T_J = 150\text{ }^{\circ}\text{C}$ $I_D$ ( $\mu\text{A}$ ) | Peak Pulse Current $I_{PPM}^{(2)}$ (A) | Maximum Clamping Voltage at $I_{PPM}$ $V_C$ (Volts) | Maximum Temp. Coefficient of $V_{(BR)}$ (% / $^{\circ}\text{C}$ ) |
|-------------|---------------------------------------------------------|------|-------------------------|--------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------|
|             | MIN                                                     | MAX  |                         |                                |                                                             |                                                                                         |                                        |                                                     |                                                                   |
| TMPG06-6.8  | 6.12                                                    | 7.48 | 10.0                    | 5.50                           | 300                                                         | 1000                                                                                    | 27.8                                   | 10.8                                                | 0.057                                                             |
| TMPG06-6.8A | 6.45                                                    | 7.14 | 10.0                    | 5.80                           | 300                                                         | 1000                                                                                    | 28.6                                   | 10.5                                                | 0.057                                                             |
| TMPG06-7.5  | 6.75                                                    | 8.25 | 10.0                    | 6.05                           | 150                                                         | 500                                                                                     | 25.6                                   | 11.7                                                | 0.060                                                             |
| TMPG06-7.5A | 7.13                                                    | 7.88 | 10.0                    | 6.40                           | 150                                                         | 500                                                                                     | 26.5                                   | 11.3                                                | 0.061                                                             |
| TMPG06-8.2  | 7.38                                                    | 9.02 | 10.0                    | 6.63                           | 50.0                                                        | 200                                                                                     | 24.0                                   | 12.5                                                | 0.065                                                             |
| TMPG06-8.2A | 7.79                                                    | 8.61 | 10.0                    | 7.02                           | 50.0                                                        | 200                                                                                     | 24.8                                   | 12.1                                                | 0.065                                                             |
| TMPG06-9.1  | 8.19                                                    | 10.0 | 1.0                     | 7.37                           | 10.0                                                        | 50.0                                                                                    | 21.7                                   | 13.8                                                | 0.068                                                             |
| TMPG06-9.1A | 8.65                                                    | 9.55 | 1.0                     | 7.78                           | 10.0                                                        | 50.0                                                                                    | 22.4                                   | 13.4                                                | 0.068                                                             |
| TMPG06-10   | 9.00                                                    | 11.0 | 1.0                     | 8.10                           | 5.0                                                         | 20.0                                                                                    | 26.7                                   | 15.0                                                | 0.073                                                             |
| TMPG06-10A  | 9.50                                                    | 10.5 | 1.0                     | 8.55                           | 5.0                                                         | 20.0                                                                                    | 27.6                                   | 14.5                                                | 0.073                                                             |
| TMPG06-11   | 9.90                                                    | 12.1 | 1.0                     | 8.92                           | 2.0                                                         | 10.0                                                                                    | 24.7                                   | 16.2                                                | 0.075                                                             |
| TMPG06-11A  | 10.5                                                    | 11.6 | 1.0                     | 9.40                           | 2.0                                                         | 10.0                                                                                    | 25.6                                   | 15.6                                                | 0.075                                                             |
| TMPG06-12   | 10.8                                                    | 13.2 | 1.0                     | 9.72                           | 1.0                                                         | 5.0                                                                                     | 23.1                                   | 17.3                                                | 0.076                                                             |
| TMPG06-12A  | 11.4                                                    | 12.6 | 1.0                     | 10.2                           | 1.0                                                         | 5.0                                                                                     | 24.0                                   | 16.7                                                | 0.078                                                             |
| TMPG06-13   | 11.7                                                    | 14.3 | 1.0                     | 10.5                           | 1.0                                                         | 5.0                                                                                     | 21.1                                   | 19.0                                                | 0.081                                                             |
| TMPG06-13A  | 12.4                                                    | 13.7 | 1.0                     | 11.1                           | 1.0                                                         | 5.0                                                                                     | 22.0                                   | 18.2                                                | 0.081                                                             |
| TMPG06-15   | 13.5                                                    | 16.3 | 1.0                     | 12.1                           | 1.0                                                         | 5.0                                                                                     | 18.2                                   | 22.0                                                | 0.084                                                             |
| TMPG06-15A  | 14.3                                                    | 15.8 | 1.0                     | 12.8                           | 1.0                                                         | 5.0                                                                                     | 18.9                                   | 21.2                                                | 0.084                                                             |
| TMPG06-16   | 14.4                                                    | 17.6 | 1.0                     | 12.9                           | 1.0                                                         | 5.0                                                                                     | 17.0                                   | 23.5                                                | 0.086                                                             |
| TMPG06-16A  | 15.2                                                    | 16.8 | 1.0                     | 13.6                           | 1.0                                                         | 5.0                                                                                     | 17.8                                   | 22.5                                                | 0.086                                                             |
| TMPG06-18   | 16.2                                                    | 19.8 | 1.0                     | 14.5                           | 1.0                                                         | 5.0                                                                                     | 15.1                                   | 26.5                                                | 0.088                                                             |
| TMPG06-18A  | 17.1                                                    | 18.9 | 1.0                     | 15.3                           | 1.0                                                         | 5.0                                                                                     | 15.9                                   | 25.5                                                | 0.088                                                             |
| TMPG06-20   | 18.0                                                    | 22.0 | 1.0                     | 16.2                           | 1.0                                                         | 5.0                                                                                     | 13.7                                   | 29.1                                                | 0.090                                                             |
| TMPG06-20A  | 19.0                                                    | 21.0 | 1.0                     | 17.0                           | 1.0                                                         | 5.0                                                                                     | 14.4                                   | 27.7                                                | 0.090                                                             |
| TMPG06-22   | 19.8                                                    | 24.2 | 1.0                     | 17.8                           | 1.0                                                         | 5.0                                                                                     | 12.5                                   | 31.9                                                | 0.092                                                             |
| TMPG06-22A  | 20.9                                                    | 23.1 | 1.0                     | 18.8                           | 1.0                                                         | 5.0                                                                                     | 13.1                                   | 30.6                                                | 0.092                                                             |
| TMPG06-24   | 21.6                                                    | 26.4 | 1.0                     | 19.4                           | 1.0                                                         | 5.0                                                                                     | 11.5                                   | 34.2                                                | 0.094                                                             |
| TMPG06-24A  | 22.8                                                    | 25.2 | 1.0                     | 20.5                           | 1.0                                                         | 5.0                                                                                     | 12.0                                   | 33.2                                                | 0.094                                                             |
| TMPG06-27   | 24.3                                                    | 29.7 | 1.0                     | 21.8                           | 1.0                                                         | 5.0                                                                                     | 10.2                                   | 39.1                                                | 0.096                                                             |
| TMPG06-27A  | 25.7                                                    | 28.4 | 1.0                     | 23.1                           | 1.0                                                         | 5.0                                                                                     | 10.7                                   | 37.5                                                | 0.096                                                             |
| TMPG06-30   | 27.0                                                    | 33.0 | 1.0                     | 24.3                           | 1.0                                                         | 5.0                                                                                     | 9.2                                    | 43.5                                                | 0.097                                                             |
| TMPG06-30A  | 28.5                                                    | 31.5 | 1.0                     | 25.6                           | 1.0                                                         | 5.0                                                                                     | 9.7                                    | 41.4                                                | 0.097                                                             |
| TMPG06-33   | 29.7                                                    | 36.3 | 1.0                     | 26.8                           | 1.0                                                         | 5.0                                                                                     | 8.4                                    | 47.7                                                | 0.098                                                             |
| TMPG06-33A  | 31.4                                                    | 34.7 | 1.0                     | 28.2                           | 1.0                                                         | 5.0                                                                                     | 8.8                                    | 45.7                                                | 0.098                                                             |
| TMPG06-36   | 32.4                                                    | 39.6 | 1.0                     | 29.1                           | 1.0                                                         | 5.0                                                                                     | 7.7                                    | 52.0                                                | 0.099                                                             |
| TMPG06-36A  | 34.2                                                    | 37.8 | 1.0                     | 30.8                           | 1.0                                                         | 5.0                                                                                     | 8.0                                    | 49.9                                                | 0.099                                                             |
| TMPG06-39   | 35.1                                                    | 42.9 | 1.0                     | 31.6                           | 1.0                                                         | 5.0                                                                                     | 7.1                                    | 56.4                                                | 0.100                                                             |
| TMPG06-39A  | 37.1                                                    | 41.0 | 1.0                     | 33.3                           | 1.0                                                         | 5.0                                                                                     | 7.4                                    | 53.9                                                | 0.100                                                             |
| TMPG06-43   | 38.7                                                    | 47.3 | 1.0                     | 34.8                           | 1.0                                                         | 5.0                                                                                     | 6.5                                    | 61.9                                                | 0.101                                                             |
| TMPG06-43A  | 40.9                                                    | 45.2 | 1.0                     | 36.8                           | 1.0                                                         | 5.0                                                                                     | 6.7                                    | 59.3                                                | 0.101                                                             |

Notes:

(1) Pulse test:  $t_p \leq 50\text{ ms}$

(2) Surge current waveform per Fig. 3 and derated per Fig. 2

(3) All terms and symbols are consistent with ANSI/IEEE C62.35



## Ordering Information

| Preferred P/N     | Unit Weight (g) | Preferred Package Code | Base Quantity | Delivery Mode                  |
|-------------------|-----------------|------------------------|---------------|--------------------------------|
| TMPG06-6.8A-E3/54 | 0.218           | 54                     | 5500          | 13" Diameter Paper Tape & Reel |

## Ratings and Characteristics Curves

( $T_A = 25^\circ\text{C}$  unless otherwise specified)

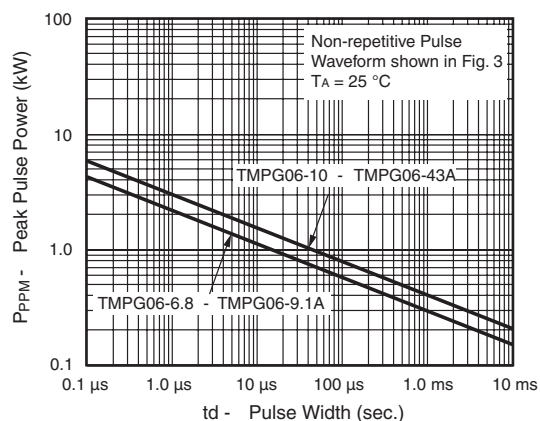


Figure 1. Peak Pulse Power Rating Curve

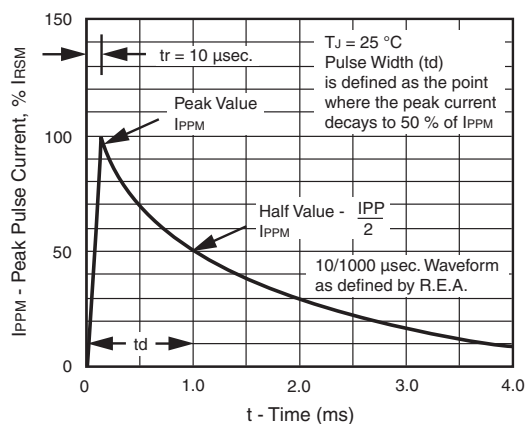


Figure 3. Pulse Waveform

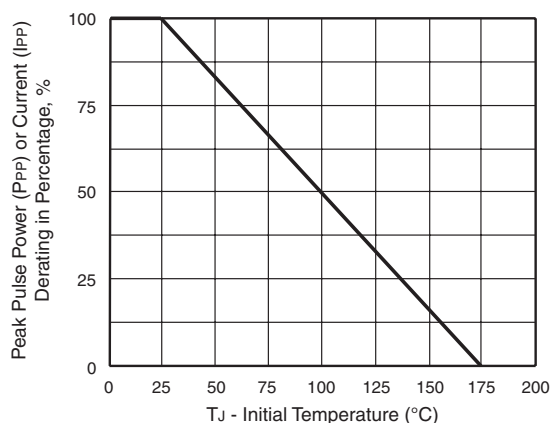


Figure 2. Pulse Power or Current versus Initial Junction Temperature

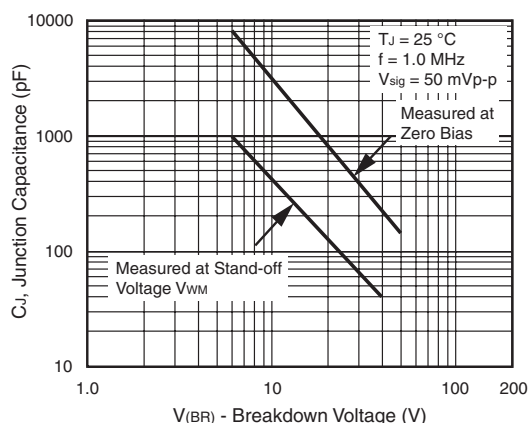


Figure 4. Typical Junction Capacitance

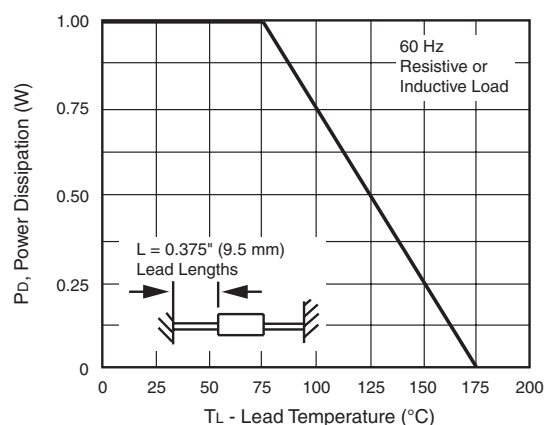


Figure 5. Power Derating Curve

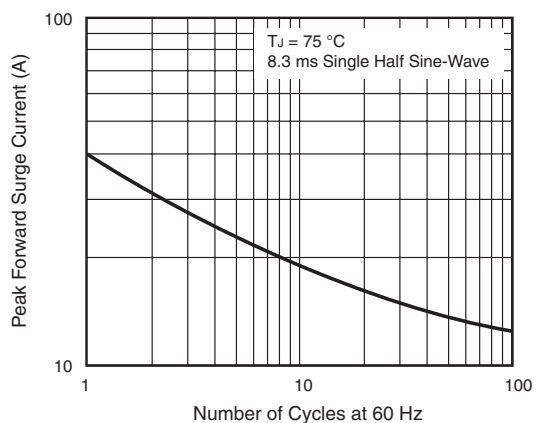
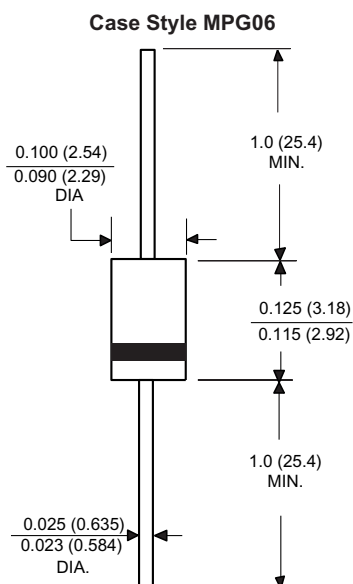


Figure 6. Maximum Non-Repetitive Forward Surge Current

## Package outline dimensions in inches (millimeters)





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