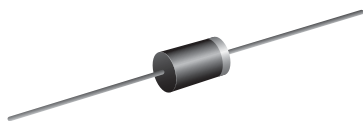


# **PAR® Transient Voltage Suppressors**

High Temperature Stability and High Reliability Conditions



**MPG06**

## **FEATURES**

- Available in uni-directional 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 resistance
- Solder dip 275 °C max. 10 s, per JESD 22-B106
- AEC-Q101 qualified
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

## **PRIMARY CHARACTERISTICS**

|            |                  |
|------------|------------------|
| $V_{BR}$   | 10 V to 43 V     |
| $V_{WM}$   | 8.10 V to 36.8 V |
| $P_{PPM}$  | 400 W            |
| $P_D$      | 1.0 W            |
| $I_{FSM}$  | 40 A             |
| $T_J$ max. | 185 °C           |
| Polarity   | Uni-directional  |
| Package    | MPG06            |

## **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  
Molding compound meets UL 94 V-0 flammability rating

Base P/NHE3 - RoHS-compliant, AEC-Q101 qualified

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

HE3 suffix meets JESD 201 class 2 whisker test

**Polarity:** Color band denotes cathode end

## **MAXIMUM RATINGS** ( $T_A = 25$ °C unless otherwise noted)

| PARAMETER                                                                            | SYMBOL         | VALUE          | UNIT |
|--------------------------------------------------------------------------------------|----------------|----------------|------|
| Peak pulse power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)</sup> (fig. 1) | $P_{PPM}$      | 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**

<sup>(1)</sup> Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25$  °C per fig. 2

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

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

| DEVICE TYPE | BREAKDOWN VOLTAGE $V_{BR}$ AT $I_T$ <sup>(1)</sup> (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 $V_{WM}$ $T_J = 150\text{ }^{\circ}\text{C}$ (A) | MAXIMUM PEAK PULSE CURRENT $I_{PPM}$ <sup>(2)</sup> (A) | MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V) | MAXIMUM TEMPERATURE COEFFICIENT OF $V_{BR}$ ( $\%/^{\circ}\text{C}$ ) |
|-------------|--------------------------------------------------------|------|-------------------------|--------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------|
|             | MIN.                                                   | MAX. |                         |                                |                                                             |                                                                     |                                                         |                                                 |                                                                       |
| 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**<sup>(1)</sup> Pulse test:  $t_p \leq 50\text{ ms}$ <sup>(2)</sup> Surge current waveform per fig. 3 and derated per fig. 2<sup>(3)</sup> All terms and symbols are consistent with ANSI/IEEE CA62.35**ORDERING INFORMATION** (Example)

| PREFERRED PIN                    | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                    |
|----------------------------------|-----------------|------------------------|---------------|----------------------------------|
| TMPG06-10BAHE3/54 <sup>(1)</sup> | 0.218           | 54                     | 5500          | 13" diameter paper tape and reel |

**Note**<sup>(1)</sup> AEC-Q101 qualified



**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

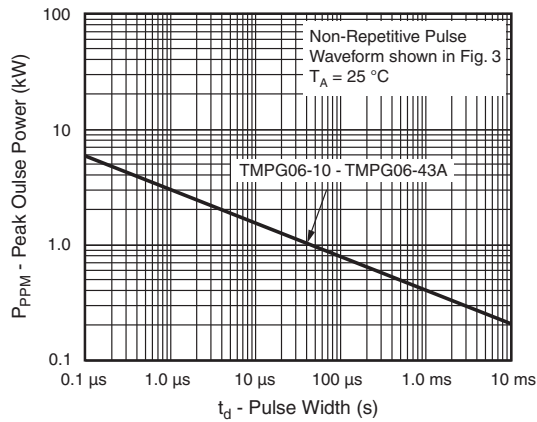


Fig. 1 - Peak Pulse Power Rating Curve

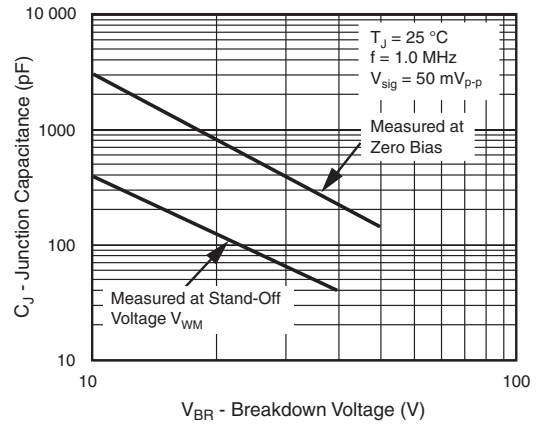


Fig. 4 - Typical Junction Capacitance

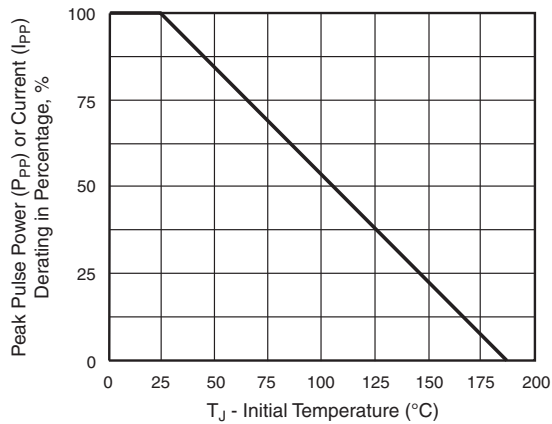


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

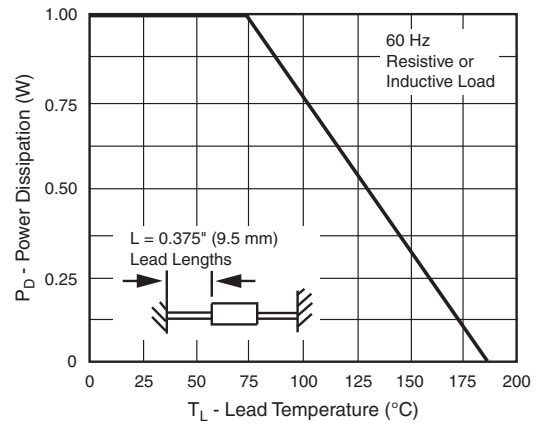


Fig. 5 - Power Derating Curve

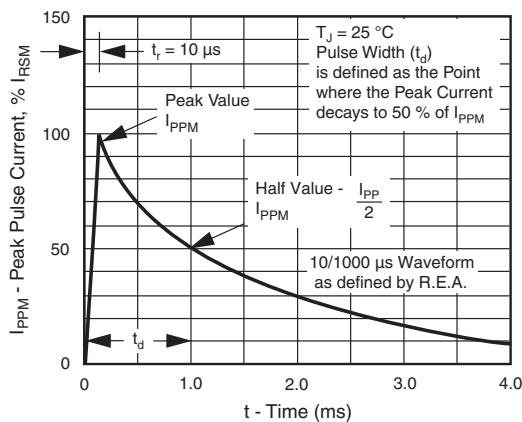


Fig. 3 - Pulse Waveform

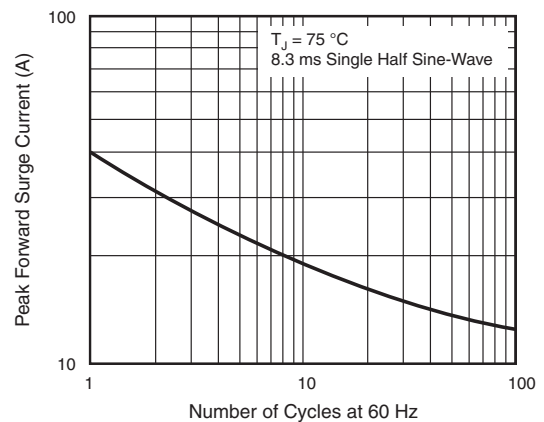
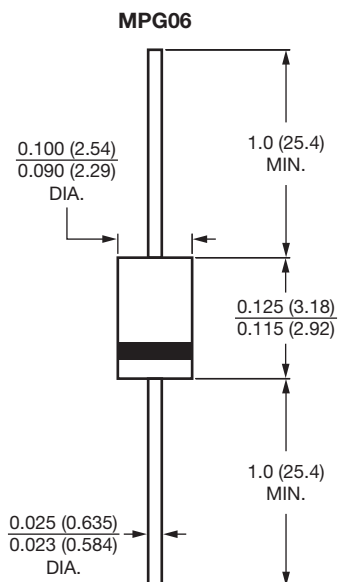


Fig. 6 - Maximum Non-Repetitive Forward Surge Current



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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