


|   |                |
|---|----------------|
|  | <b>E480232</b> |
|---|----------------|

### Features

- Fully Automotive Qualified to AEC-Q101
- For Surface Mount Applications
- Excellent Clamping Capability
- High Temp Soldering: 260°C / 10 Seconds At Terminals
- Halogen Free. "Green" Device (Note 1)
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note2) ("P" Suffix Designates RoHS Compliant. See Ordering Information)
- ESD protection of data lines in accordance with IEC 61000-4-2, ±30kV(Air), ±30kV (Contact)

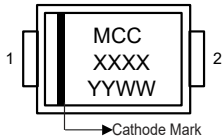
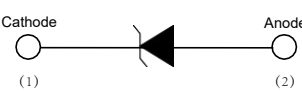


### Maximum Ratings

| Parameter  | Symbol    | Value          | Unit |
|--|-----------|----------------|------|
| Peak Pulse Power Surge Current with a 10/1000µs Waveform (Note 3)  | $I_{PPM}$ | See Next Table | A    |
| Peak Pulse Power Dissipation (Note 3)                              | $P_{PPM}$ | 600            | W    |
| Power Dissipation on Infinite Heatsink at $T_L = 75^\circ\text{C}$ | $P_D$     | 5.0            | W    |
| Peak Forward Surge Current Unidirectional Only (Note 4)            | $I_{FSM}$ | 100            | A    |

#### Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemption Applied, see EU Directive Annex 7a.
3. Non-repetitive current pulse, per Fig.3 and derated above  $T_A = 25^\circ\text{C}$  per Fig.4.
4. 8.3ms, single half sine wave duty cycle = 4 pulses per Minutes maximum.

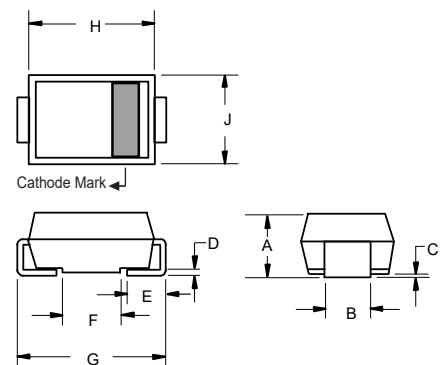
### Internal Structure

| Description     | Simplified outline  | Graphic symbol  |
|-----------------|---|---|
| Uni-directional |  |  |
| Bi-directional  |  |  |

XXXX = Marking code YYWW = Date Code

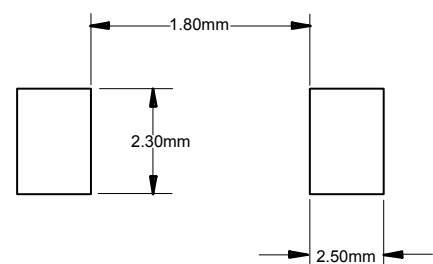
## 600Watt TVS 5.0 to 190 Volts

### SMB (DO-214AA) (LEAD FRAME)



| DIM | INCHES |       | MM   |      | NOTE |
|-----|--------|-------|------|------|------|
|     | MIN    | MAX   | MIN  | MAX  |      |
| A   | 0.079  | 0.103 | 2.00 | 2.62 |      |
| B   | 0.075  | 0.087 | 1.91 | 2.21 |      |
| C   | 0.002  | 0.008 | 0.05 | 0.20 |      |
| D   | 0.006  | 0.012 | 0.15 | 0.31 |      |
| E   | 0.030  | 0.060 | 0.76 | 1.52 |      |
| F   | 0.065  | 0.091 | 1.65 | 2.32 |      |
| G   | 0.200  | 0.220 | 5.08 | 5.59 |      |
| H   | 0.160  | 0.191 | 4.06 | 4.85 |      |
| J   | 0.130  | 0.155 | 3.30 | 3.94 |      |

#### Suggested Solder Pad Layout



## Thermal Characteristics

| Parameter                                      | Symbol          | Value       | Unit |
|--|-----------------|-------------|------|
| Operating Junction Temperature Range           | $T_J$           | -55 to +175 | °C   |
| Storage Temperature Range                      | $T_{STG}$       | -55 to +175 | °C   |
| Typical Thermal Resistance Junction to Lead    | $R_{\theta JL}$ | 20          | °C/W |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 100         | °C/W |
| Typical Thermal Resistance Junction to Case    | $R_{\theta JC}$ | 15          | °C/W |

**Note:**

5. Mounted on 0.2 x 0.2" (5.0 x 5.0 mm) copper pads to each terminal.

**Electrical Characteristics @ 25°C Unless Otherwise Specified**

| MCC Part Number |            | Working Peak Reverse Voltage | Breakdown Voltage $V_{BR}$ @ $I_T$ |         |            | Maximum Clamping Voltage @ $I_{PP}$ | Maximum Reverse Surge Current | Maximum Reverse Leakage @ $V_{RWM}$ | Device Marking Code |              |
|-----------------|------------|------------------------------|------------------------------------|---------|------------|-------------------------------------|-------------------------------|-------------------------------------|---------------------|--------------|
| (Uni)           | (Bi)       |                              | Min (V)                            | Max (V) | $I_T$ (mA) |                                     |                               |                                     | $V_C$ (V)           | $I_{PP}$ (A) |
| SMBJ5.0AQ       | SMBJ5.0CAQ | 5.0                          | 6.40                               | 7.07    | 10         | 9.2                                 | 65.2                          | 800                                 | KE                  | AE           |
| SMBJ6.0AQ       | SMBJ6.0CAQ | 6.0                          | 6.67                               | 7.37    | 10         | 10.3                                | 58.3                          | 800                                 | KG                  | AG           |
| SMBJ6.5AQ       | SMBJ6.5CAQ | 6.5                          | 7.22                               | 7.98    | 10         | 11.2                                | 53.6                          | 500                                 | KK                  | AK           |
| SMBJ7.0AQ       | SMBJ7.0CAQ | 7.0                          | 7.78                               | 8.60    | 10         | 12.0                                | 50.0                          | 200                                 | KM                  | AM           |
| SMBJ7.5AQ       | SMBJ7.5CAQ | 7.5                          | 8.33                               | 9.21    | 1          | 12.9                                | 46.5                          | 100                                 | KP                  | AP           |
| SMBJ8.0AQ       | SMBJ8.0CAQ | 8.0                          | 8.89                               | 9.83    | 1          | 13.6                                | 44.1                          | 50                                  | KR                  | AR           |
| SMBJ8.5AQ       | SMBJ8.5CAQ | 8.5                          | 9.44                               | 10.40   | 1          | 14.4                                | 41.7                          | 10                                  | KT                  | AT           |
| SMBJ9.0AQ       | SMBJ9.0CAQ | 9.0                          | 10.00                              | 11.10   | 1          | 15.4                                | 39.0                          | 5                                   | KV                  | AV           |
| SMBJ10AQ        | SMBJ10CAQ  | 10.0                         | 11.10                              | 12.30   | 1          | 17.0                                | 35.3                          | 5                                   | KX                  | AX           |
| SMBJ11AQ        | SMBJ11CAQ  | 11.0                         | 12.20                              | 13.50   | 1          | 18.2                                | 33.0                          | 5                                   | KZ                  | AZ           |
| SMBJ12AQ        | SMBJ12CAQ  | 12.0                         | 13.30                              | 14.70   | 1          | 19.9                                | 30.2                          | 5                                   | LE                  | BE           |
| SMBJ13AQ        | SMBJ13CAQ  | 13.0                         | 14.40                              | 15.90   | 1          | 21.5                                | 27.9                          | 1                                   | LG                  | BG           |
| SMBJ14AQ        | SMBJ14CAQ  | 14.0                         | 15.60                              | 17.20   | 1          | 23.2                                | 25.9                          | 1                                   | LK                  | BK           |
| SMBJ15AQ        | SMBJ15CAQ  | 15.0                         | 16.70                              | 18.50   | 1          | 24.4                                | 24.6                          | 1                                   | LM                  | BM           |
| SMBJ16AQ        | SMBJ16CAQ  | 16.0                         | 17.80                              | 19.70   | 1          | 26.0                                | 23.1                          | 1                                   | LP                  | BP           |
| SMBJ17AQ        | SMBJ17CAQ  | 17.0                         | 18.90                              | 20.90   | 1          | 27.6                                | 21.7                          | 1                                   | LR                  | BR           |
| SMBJ18AQ        | SMBJ18CAQ  | 18.0                         | 20.00                              | 22.10   | 1          | 29.2                                | 20.6                          | 1                                   | LT                  | BT           |
| SMBJ19AQ        | SMBJ19CAQ  | 19.0                         | 21.10                              | 23.30   | 1          | 30.8                                | 19.5                          | 1                                   | LU                  | BU           |
| SMBJ20AQ        | SMBJ20CAQ  | 20.0                         | 22.20                              | 24.50   | 1          | 32.4                                | 18.5                          | 1                                   | LV                  | BV           |
| SMBJ22AQ        | SMBJ22CAQ  | 22.0                         | 24.40                              | 26.90   | 1          | 35.5                                | 16.9                          | 1                                   | LX                  | BX           |
| SMBJ24AQ        | SMBJ24CAQ  | 24.0                         | 26.70                              | 29.50   | 1          | 38.9                                | 15.4                          | 1                                   | LZ                  | BZ           |
| SMBJ26AQ        | SMBJ26CAQ  | 26.0                         | 28.90                              | 31.90   | 1          | 42.1                                | 14.3                          | 1                                   | ME                  | CE           |
| SMBJ28AQ        | SMBJ28CAQ  | 28.0                         | 31.10                              | 34.40   | 1          | 45.4                                | 13.2                          | 1                                   | MG                  | CG           |
| SMBJ30AQ        | SMBJ30CAQ  | 30.0                         | 33.30                              | 36.80   | 1          | 48.4                                | 12.4                          | 1                                   | MK                  | CK           |
| SMBJ33AQ        | SMBJ33CAQ  | 33.0                         | 36.70                              | 40.60   | 1          | 53.3                                | 11.3                          | 1                                   | MM                  | CM           |
| SMBJ36AQ        | SMBJ36CAQ  | 36.0                         | 40.00                              | 44.20   | 1          | 58.1                                | 10.3                          | 1                                   | MP                  | CP           |
| SMBJ40AQ        | SMBJ40CAQ  | 40.0                         | 44.40                              | 49.10   | 1          | 64.5                                | 9.3                           | 1                                   | MR                  | CR           |
| SMBJ43AQ        | SMBJ43CAQ  | 43.0                         | 47.80                              | 52.80   | 1          | 69.4                                | 8.7                           | 1                                   | MT                  | CT           |
| SMBJ45AQ        | SMBJ45CAQ  | 45.0                         | 50.00                              | 55.30   | 1          | 72.7                                | 8.3                           | 1                                   | MV                  | CV           |
| SMBJ48AQ        | SMBJ48CAQ  | 48.0                         | 53.30                              | 58.90   | 1          | 77.4                                | 7.8                           | 1                                   | MX                  | CX           |
| SMBJ51AQ        | SMBJ51CAQ  | 51.0                         | 56.70                              | 62.70   | 1          | 82.4                                | 7.3                           | 1                                   | MZ                  | CZ           |
| SMBJ54AQ        | SMBJ54CAQ  | 54.0                         | 60.00                              | 66.30   | 1          | 87.1                                | 6.9                           | 1                                   | NE                  | DE           |
| SMBJ58AQ        | SMBJ58CAQ  | 58.0                         | 64.40                              | 71.20   | 1          | 93.6                                | 6.4                           | 1                                   | NG                  | DG           |
| SMBJ60AQ        | SMBJ60CAQ  | 60.0                         | 66.70                              | 73.70   | 1          | 96.8                                | 6.2                           | 1                                   | NK                  | DK           |
| SMBJ64AQ        | SMBJ64CAQ  | 64.0                         | 71.10                              | 78.60   | 1          | 103.0                               | 5.8                           | 1                                   | NM                  | DM           |
| SMBJ70AQ        | SMBJ70CAQ  | 70.0                         | 77.80                              | 86.00   | 1          | 113.0                               | 5.3                           | 1                                   | NP                  | DP           |
| SMBJ75AQ        | SMBJ75CAQ  | 75.0                         | 83.30                              | 92.10   | 1          | 121.0                               | 5.0                           | 1                                   | NR                  | DR           |
| SMBJ78AQ        | SMBJ78CAQ  | 78.0                         | 86.70                              | 95.80   | 1          | 126.0                               | 4.8                           | 1                                   | NT                  | DT           |
| SMBJ80AQ        | SMBJ80CAQ  | 80.0                         | 88.80                              | 97.60   | 1          | 129.6                               | 4.6                           | 1                                   | NU                  | DU           |
| SMBJ85AQ        | SMBJ85CAQ  | 85.0                         | 94.40                              | 104.00  | 1          | 137.0                               | 4.4                           | 1                                   | NV                  | DV           |
| SMBJ90AQ        | SMBJ90CAQ  | 90.0                         | 100.00                             | 111.00  | 1          | 146.0                               | 4.1                           | 1                                   | NX                  | DX           |
| SMBJ100AQ       | SMBJ100CAQ | 100.0                        | 111.00                             | 123.00  | 1          | 162.0                               | 3.7                           | 1                                   | NZ                  | DZ           |
| SMBJ110AQ       | SMBJ110CAQ | 110.0                        | 122.00                             | 135.00  | 1          | 177.0                               | 3.4                           | 1                                   | PE                  | EE           |
| SMBJ120AQ       | SMBJ120CAQ | 120.0                        | 133.00                             | 147.00  | 1          | 193.0                               | 3.1                           | 1                                   | PG                  | EG           |
| SMBJ130AQ       | SMBJ130CAQ | 130.0                        | 144.00                             | 159.00  | 1          | 209.0                               | 2.9                           | 1                                   | PK                  | EK           |
| SMBJ140AQ       | SMBJ140CAQ | 140.0                        | 155.00                             | 171.00  | 1          | 226.8                               | 2.7                           | 1                                   | PL                  | EL           |
| SMBJ150AQ       | SMBJ150CAQ | 150.0                        | 167.00                             | 185.00  | 1          | 243.0                               | 2.5                           | 1                                   | PM                  | EM           |
| SMBJ160AQ       | SMBJ160CAQ | 160.0                        | 178.00                             | 197.00  | 1          | 259.0                               | 2.3                           | 1                                   | PP                  | EP           |
| SMBJ170AQ       | SMBJ170CAQ | 170.0                        | 189.00                             | 209.00  | 1          | 275.0                               | 2.2                           | 1                                   | PR                  | ER           |
| SMBJ180AQ       | SMBJ180CAQ | 180.0                        | 200.00                             | 220.00  | 1          | 291.6                               | 2.1                           | 1                                   | PT                  | ET           |
| SMBJ190AQ       | SMBJ190CAQ | 190.0                        | 211.00                             | 232.00  | 1          | 307.8                               | 2.0                           | 1                                   | PU                  | EU           |

**Curve Characteristics**

Fig. 1 - Peak Pulse Power Rating Curve

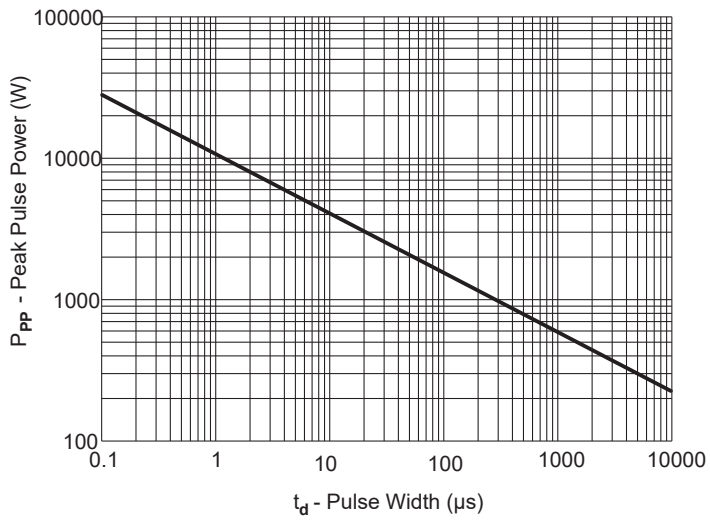


Fig. 2 - Typical Junction Capacitance

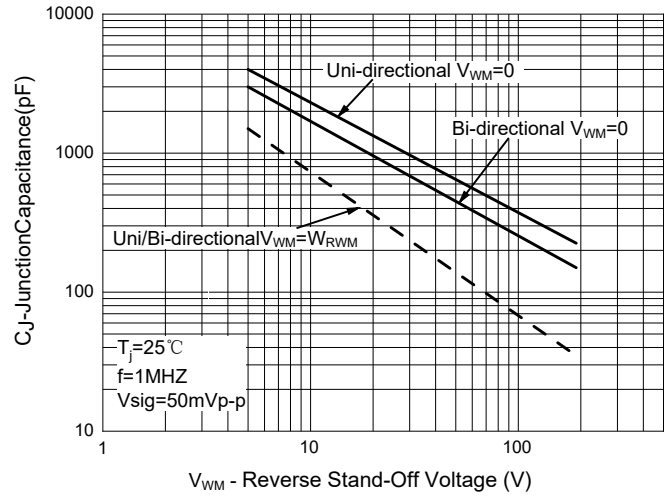


Fig. 3 - Pulse Waveform

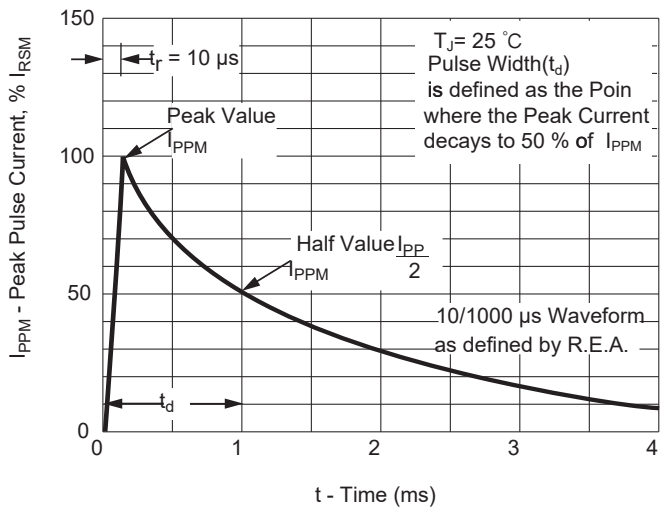
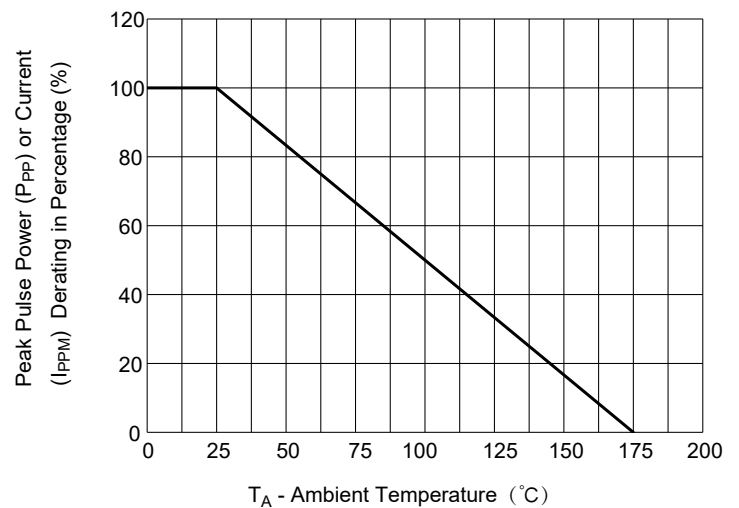


Fig. 4 - Pulse Derating Curve



## Ordering Information

| Device         | Packing              |
|----------------|----------------------|
| Part Number-TP | Tape&Reel:3Kpcs/Reel |

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