

**FEATURES**

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- Available in uni-directional and bi-directional
- 600 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
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHE3 or P/NHM3

**MECHANICAL DATA****Case:** SMB (DO-214AA)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS-compliant, commercial grade

Base P/N-M3 - halogen-free, RoHS-compliant, commercial grade

Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified

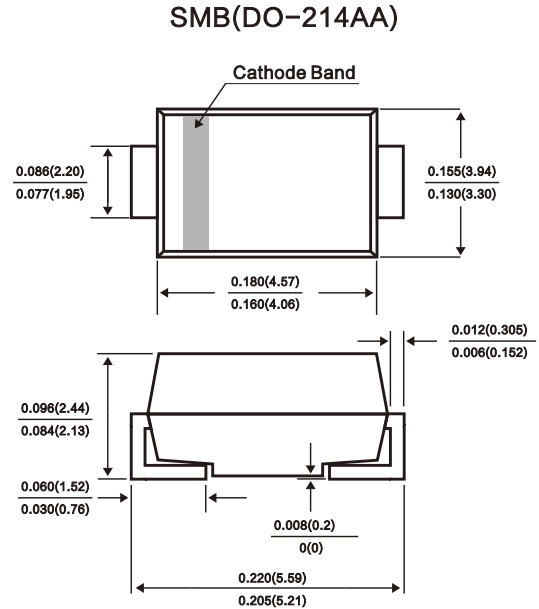
Base P/NHM3\_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B, ..... and only available for 250 V to 540 V type)

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

E3, M3, HE3, and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** for uni-directional types the band denotes cathode end, no marking on bi-directional types



Dimensions in inches and (millimeters)

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

| PARAMETER                                                                                   | SYMBOL         | VALUE       | UNIT               |
|---------------------------------------------------------------------------------------------|----------------|-------------|--------------------|
| Peak power dissipation with a 10/1000 $\mu$ s waveform <sup>(1)(2)</sup> (fig. 1)           | $P_{PPM}$      | 600         | W                  |
| Maximum Instantaneous Forward Voltage at 50.0A for Unidirectional Only (Note 4)             | $V_F$          | 3.5         | Volts              |
| Power dissipation on infinite heatsink at $T_A = 50\text{ }^{\circ}\text{C}$                | $P_D$          | 5.0         | W                  |
| Peak forward surge current 8.3 ms single half sine-wave uni-directional only <sup>(2)</sup> | $I_{FSM}$      | 100         | A                  |
| Operating junction and storage temperature range                                            | $T_J, T_{STG}$ | -65 to +150 | $^{\circ}\text{C}$ |

**Notes**

<sup>(1)</sup> Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25\text{ }^{\circ}\text{C}$  per fig. 2

<sup>(2)</sup> Mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pads to each terminal

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

| PART NUMBER   | DEVICE MARKING CODE |      | BREAKDOWN VOLTAGE VBR AT IT (1) |      | TEST CURRENT $I_T$ (mA) | STAND-OFF VOLTAGE $V_{WM}$ (V) | MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D^{(3)}$ ( $\mu\text{A}$ ) | MAXIMUM PEAK PULSE CURRENT $I_{PPM}^{(2)}$ (A) | MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V) | MAXIMUM TEMPERATURE OF $V_{BR}$ ( $^{\circ}\text{C}$ ) |
|---------------|---------------------|------|---------------------------------|------|-------------------------|--------------------------------|-------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------|--------------------------------------------------------|
|               | UNI                 | BI   | MIN.                            | MAX. |                         |                                |                                                                   |                                                |                                                 |                                                        |
| P6SMB6.8A(CA) | 6V8A                | 6V8C | 6.45                            | 7.14 | 10                      | 5.8                            | 1000                                                              | 57.1                                           | 10.5                                            | 0.057                                                  |
| P6SMB7.5A(CA) | 7V5A                | 7V5C | 7.13                            | 7.88 | 10                      | 6.4                            | 500                                                               | 53.1                                           | 11.3                                            | 0.061                                                  |
| P6SMB8.2A(CA) | 8V2A                | 8V2C | 7.79                            | 8.61 | 10                      | 7.02                           | 200                                                               | 49.6                                           | 12.1                                            | 0.065                                                  |
| P6SMB9.1A(CA) | 9V1A                | 9V1C | 8.65                            | 9.55 | 1                       | 7.78                           | 50                                                                | 44.8                                           | 13.4                                            | 0.068                                                  |
| P6SMB10A(CA)  | 10A                 | 10C  | 9.5                             | 10.5 | 1                       | 8.55                           | 10                                                                | 41.4                                           | 14.5                                            | 0.073                                                  |
| P6SMB11A(CA)  | 11A                 | 11C  | 10.5                            | 11.6 | 1                       | 9.4                            | 5                                                                 | 38.5                                           | 15.6                                            | 0.075                                                  |
| P6SMB12A(CA)  | 12A                 | 12C  | 11.4                            | 12.6 | 1                       | 10.2                           | 5                                                                 | 35.9                                           | 16.7                                            | 0.078                                                  |
| P6SMB13A(CA)  | 13A                 | 13C  | 12.4                            | 13.7 | 1                       | 11.1                           | 5                                                                 | 33                                             | 18.2                                            | 0.081                                                  |
| P6SMB15A(CA)  | 15A                 | 15C  | 14.3                            | 15.8 | 1                       | 12.8                           | 1                                                                 | 28.3                                           | 21.2                                            | 0.084                                                  |
| P6SMB16A(CA)  | 16A                 | 16C  | 15.2                            | 16.8 | 1                       | 13.6                           | 1                                                                 | 26.7                                           | 22.5                                            | 0.086                                                  |
| P6SMB18A(CA)  | 18A                 | 18C  | 17.1                            | 18.9 | 1                       | 15.3                           | 1                                                                 | 23.8                                           | 25.2                                            | 0.088                                                  |
| P6SMB20A(CA)  | 20A                 | 20C  | 19                              | 21   | 1                       | 17.1                           | 1                                                                 | 21.7                                           | 27.7                                            | 0.09                                                   |
| P6SMB22A(CA)  | 22A                 | 22C  | 20.9                            | 23.1 | 1                       | 18.8                           | 1                                                                 | 19.6                                           | 30.6                                            | 0.092                                                  |
| P6SMB24A(CA)  | 24A                 | 24C  | 22.8                            | 25.2 | 1                       | 20.5                           | 1                                                                 | 18.1                                           | 33.2                                            | 0.094                                                  |
| P6SMB27A(CA)  | 27A                 | 27C  | 25.7                            | 28.4 | 1                       | 23.1                           | 1                                                                 | 16                                             | 37.5                                            | 0.096                                                  |
| P6SMB30A(CA)  | 30A                 | 30C  | 28.5                            | 31.5 | 1                       | 25.6                           | 1                                                                 | 14.5                                           | 41.4                                            | 0.097                                                  |
| P6SMB33A(CA)  | 33A                 | 33C  | 31.4                            | 34.7 | 1                       | 28.2                           | 1                                                                 | 13.1                                           | 45.7                                            | 0.098                                                  |
| P6SMB36A(CA)  | 36A                 | 36C  | 34.2                            | 37.8 | 1                       | 30.8                           | 1                                                                 | 12                                             | 49.9                                            | 0.099                                                  |
| P6SMB39A(CA)  | 39A                 | 39C  | 37.1                            | 41   | 1                       | 33.3                           | 1                                                                 | 11.1                                           | 53.9                                            | 0.1                                                    |
| P6SMB43A(CA)  | 43A                 | 43C  | 40.9                            | 45.2 | 1                       | 36.8                           | 1                                                                 | 10.1                                           | 59.3                                            | 0.101                                                  |
| P6SMB47A(CA)  | 47A                 | 47C  | 44.7                            | 49.4 | 1                       | 40.2                           | 1                                                                 | 9.3                                            | 64.8                                            | 0.101                                                  |
| P6SMB51A(CA)  | 51A                 | 51C  | 48.5                            | 53.6 | 1                       | 43.6                           | 1                                                                 | 8.6                                            | 70.1                                            | 0.102                                                  |
| P6SMB56A(CA)  | 56A                 | 56C  | 53.2                            | 58.8 | 1                       | 47.8                           | 1                                                                 | 7.8                                            | 77                                              | 0.103                                                  |
| P6SMB62A(CA)  | 62A                 | 62C  | 58.9                            | 65.1 | 1                       | 53                             | 1                                                                 | 7.1                                            | 85                                              | 0.104                                                  |
| P6SMB68A(CA)  | 68A                 | 68C  | 64.6                            | 71.4 | 1                       | 58.1                           | 1                                                                 | 6.5                                            | 92                                              | 0.104                                                  |
| P6SMB75A(CA)  | 75A                 | 75C  | 71.3                            | 78.8 | 1                       | 64.1                           | 1                                                                 | 5.8                                            | 103                                             | 0.105                                                  |
| P6SMB82A(CA)  | 82A                 | 82C  | 77.9                            | 86.1 | 1                       | 70.1                           | 1                                                                 | 5.3                                            | 113                                             | 0.105                                                  |
| P6SMB91A(CA)  | 91A                 | 91C  | 86.5                            | 95.5 | 1                       | 77.8                           | 1                                                                 | 4.8                                            | 125                                             | 0.106                                                  |
| P6SMB100A(CA) | 100A                | 100C | 95                              | 105  | 1                       | 85.5                           | 1                                                                 | 4.4                                            | 137                                             | 0.106                                                  |
| P6SMB110A(CA) | 110A                | 110C | 105                             | 116  | 1                       | 94                             | 1                                                                 | 3.9                                            | 152                                             | 0.107                                                  |
| P6SMB120A(CA) | 120A                | 120C | 114                             | 126  | 1                       | 102                            | 1                                                                 | 3.6                                            | 165                                             | 0.107                                                  |
| P6SMB130A(CA) | 130A                | 130C | 124                             | 137  | 1                       | 111                            | 1                                                                 | 3.4                                            | 179                                             | 0.107                                                  |
| P6SMB150A(CA) | 150A                | 150C | 143                             | 158  | 1                       | 128                            | 1                                                                 | 2.9                                            | 207                                             | 0.108                                                  |
| P6SMB160A(CA) | 160A                | 160C | 152                             | 168  | 1                       | 136                            | 1                                                                 | 2.7                                            | 219                                             | 0.108                                                  |
| P6SMB170A(CA) | 170A                | 170C | 162                             | 179  | 1                       | 145                            | 1                                                                 | 2.6                                            | 234                                             | 0.108                                                  |
| P6SMB180A(CA) | 180A                | 180C | 171                             | 189  | 1                       | 154                            | 1                                                                 | 2.4                                            | 246                                             | 0.108                                                  |
| P6SMB200A(CA) | 200A                | 200C | 190                             | 210  | 1                       | 171                            | 1                                                                 | 2.2                                            | 274                                             | 0.108                                                  |
| P6SMB220A(CA) | 220A                | 220C | 209                             | 231  | 1                       | 185                            | 1                                                                 | 1.8                                            | 328                                             | 0.108                                                  |
| P6SMB250A(CA) | 250A                | -    | 237                             | 263  | 1                       | 214                            | 1                                                                 | 1.74                                           | 344                                             | 0.11                                                   |
| P6SMB300A(CA) | 300A                | -    | 285                             | 315  | 1                       | 256                            | 1                                                                 | 1.45                                           | 414                                             | 0.11                                                   |
| P6SMB350A(CA) | 350A                | -    | 333                             | 368  | 1                       | 300                            | 1                                                                 | 1.24                                           | 482                                             | 0.11                                                   |
| P6SMB400A(CA) | 400A                | -    | 380                             | 420  | 1                       | 342                            | 1                                                                 | 1.1                                            | 548                                             | 0.11                                                   |
| P6SMB440A(CA) | 440A                | -    | 418                             | 462  | 1                       | 376                            | 1                                                                 | 1                                              | 602                                             | 0.11                                                   |
| P6SMB480A(CA) | 480A                | -    | 456                             | 504  | 1                       | 408                            | 1                                                                 | 0.91                                           | 658                                             | 0.11                                                   |
| P6SMB510A(CA) | 510A                | -    | 485                             | 535  | 1                       | 434                            | 1                                                                 | 0.86                                           | 698                                             | 0.11                                                   |
| P6SMB540A(CA) | 540A                | -    | 513                             | 567  | 1                       | 459                            | 1                                                                 | 0.81                                           | 740                                             | 0.11                                                   |

**Notes**

- (1) Pulse test:  $t_p \leq 50\text{ ms}$   
(2) Surge current waveform per fig. 3 and derate per fig. 2  
(3) For bi-directional types with  $V_{WM}$  of 10 V and less, the  $I_D$  limit is doubled  
(4) All terms and symbols are consistent with ANSI/IEEE CA62.35  
(5)  $V \neq 3.5\text{ V}$  at  $I \neq 50\text{ A}$  (uni-directional only)

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

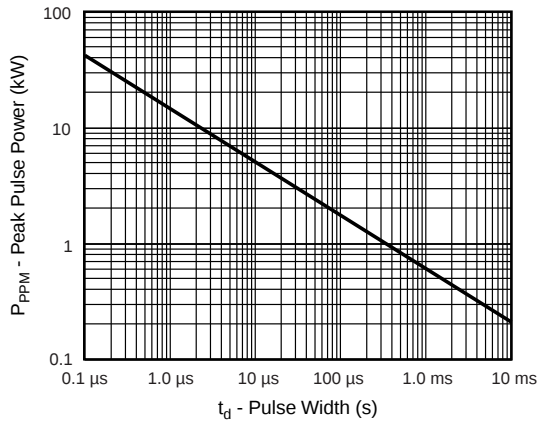


Fig. 1 - Peak Pulse Power Rating Curve

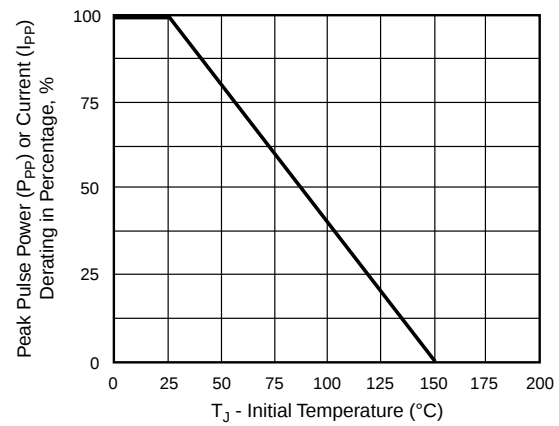


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

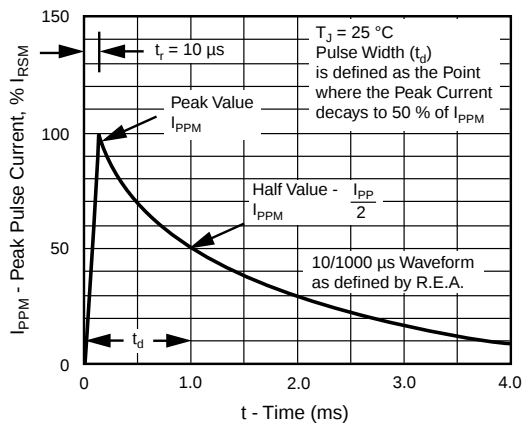


Fig. 3 - Pulse Waveform

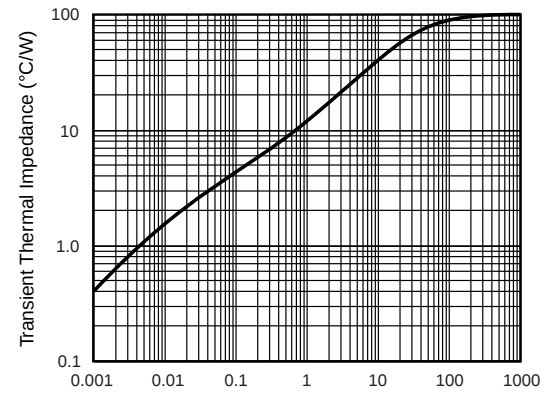


Fig. 5 - Typical Transient Thermal Impedance

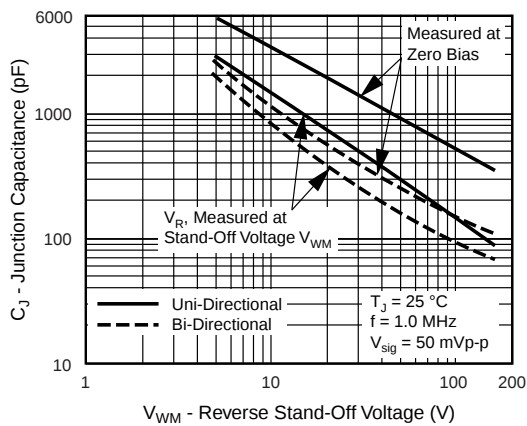


Fig. 4 - Typical Junction Capacitance

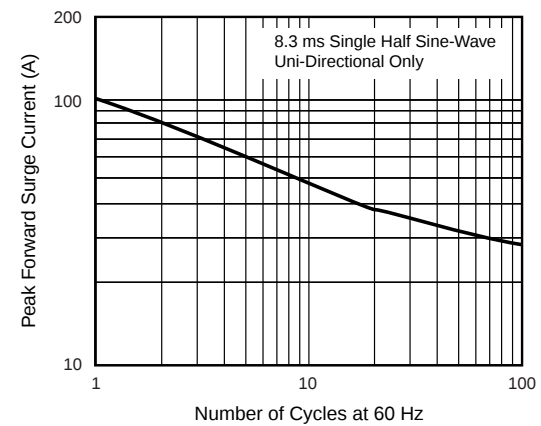


Fig. 6 - Maximum Non-Repetitive Peak Forward Surge Current