

# **MDE Semiconductor, Inc.**

78-150 Calle Tampico, Unit 210, La Quinta, CA., USA 92253 Tel : 760-564-8656 • Fax : 760-564-2414  
1-800-831-4881 Email: sales@mdesemiconductor.com Web: www.mdesemiconductor.com

## **SMBJ SERIES**

### **SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSOR VOLTAGE-5.0 TO 440 Volts 600 Watt Peak Pulse Power**

#### **FEATURES**

- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- Repetition rate (duty cycle):0.01%
- Fast response time: typically less than 1.0 ps from 0 volts to BV for unidirectional types
- Typical IR less than 1 $\mu$ A above 10V
- High temperature soldering:  
250°C/10 seconds at terminals
- Plastic package has Underwriters Laboratory Flammability Classification 94 V-O

#### **MECHANICAL DATA**

Case: JEDEC DO214AA. Molded plastic over glass passivated junction

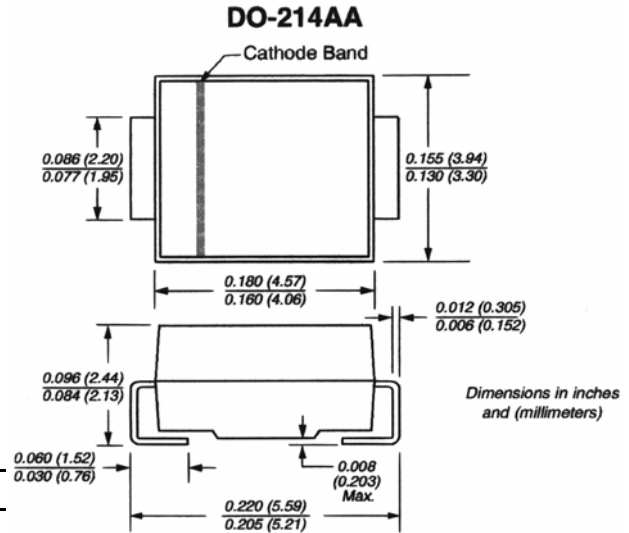
Terminals: Solder plated, solderable per

MIL-STD-750, Method 2026

Polarity: Color band denoted positive end (cathode) except Bidirectional

Standard Packaging: 12mm tape (EIA STD RS-481)

Weight: 0.003 ounces, 0.093 grams)



Dimensions in inches (millimeters)

#### **DEVICES FOR BIPOLAR APPLICATIONS**

For Bidirectional use C or CA Suffix for types SMBJ5.0 thru types SMBJ440 (e.g. SMBJ5.0C, SMBJ440CA)  
Electrical characteristics apply in both directions.

#### **MAXIMUM RATINGS AND CHARACTERISTICS**

Ratings at 25°C ambient temperature unless otherwise specified.

| RATING                                                                                                       | SYMBOL                            | VALUE       | UNITS |
|--------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------|-------|
| Peak Pulse Power Dissipation on 10/1000 $\mu$ s waveform (NOTE 1, 2, Fig.1)                                  | P <sub>PPM</sub>                  | Minimum 600 | Watts |
| Peak Pulse Current of on 10/1000 $\mu$ s waveform (Note 1, Fig 3)                                            | I <sub>PPM</sub>                  | SEE TABLE 1 | Amps  |
| Peak Forward Surge Current, 8.3ms Single Half Sine-wave Superimposed on Rated Load, (JEDEC Method)(Note2, 3) | I <sub>FSM</sub>                  | 100         | Amps  |
| Operatings and Storage Temperature Range                                                                     | T <sub>J</sub> , T <sub>STG</sub> | -55 +150    | °C    |

#### **NOTES:**

1. Non-repetitive current pulse, per Fig.3 and derated above Ta=25 °C per Fig.2.
2. Mounted on Copper Pad area of 0.8x0.8" (20x20mm) per Fig.5.
3. 8.3ms single half sine-wave, or equivalent square wave, Duty cycle=4 pulses per minutes maximum.

Certified RoHS Compliant

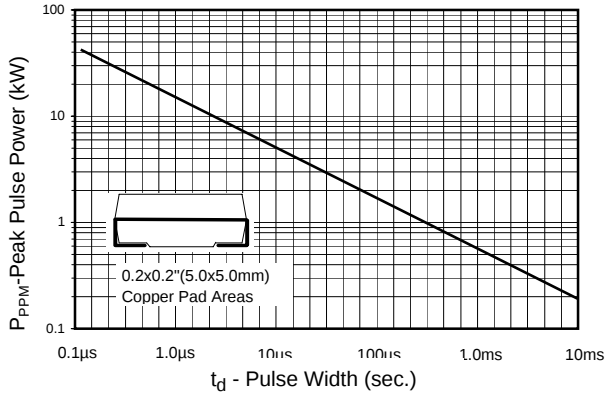
UL File # E223026

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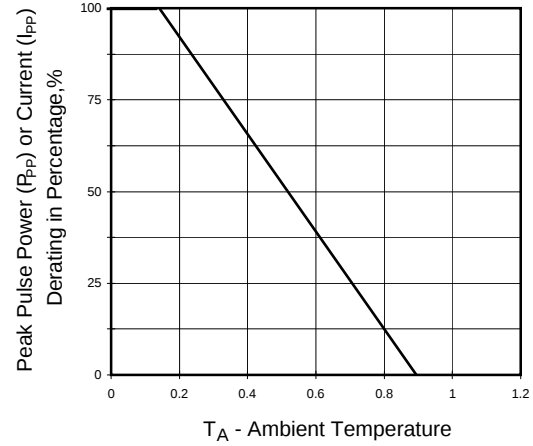
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## **RATING AND CHARACTERISTIC CURVES SMBJ SERIES**

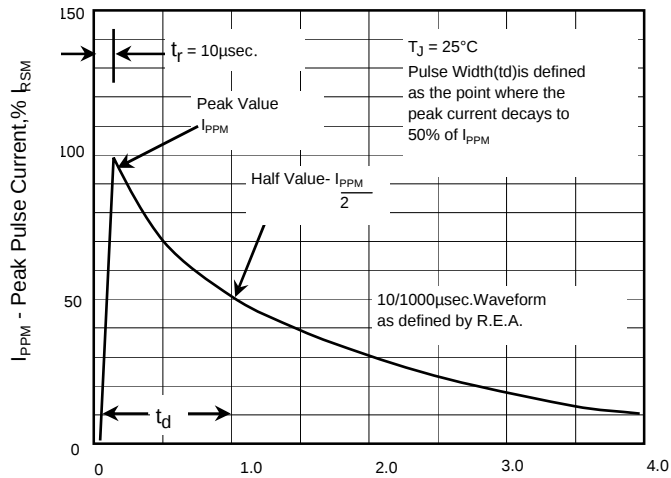
**Fig. 1 - Peak Pulse Power Rating Curve**



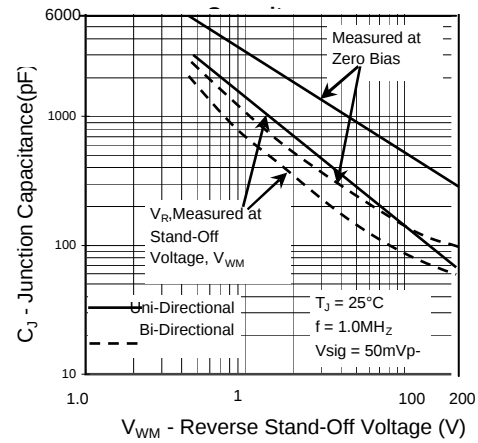
**Fig.2 - Pulse Derating**



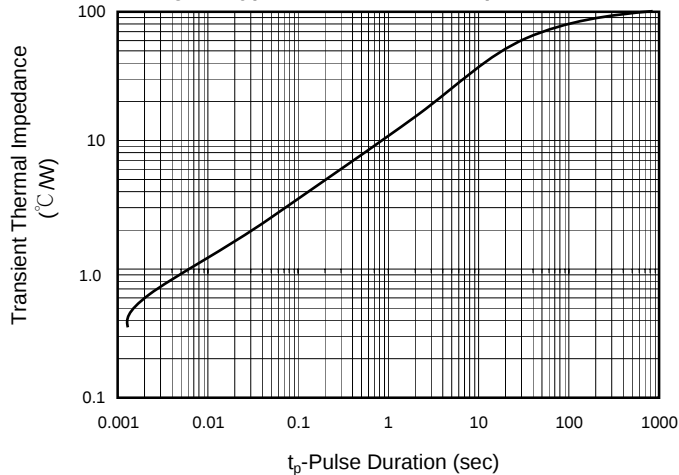
**Fig.3 - Pulse Waveform**



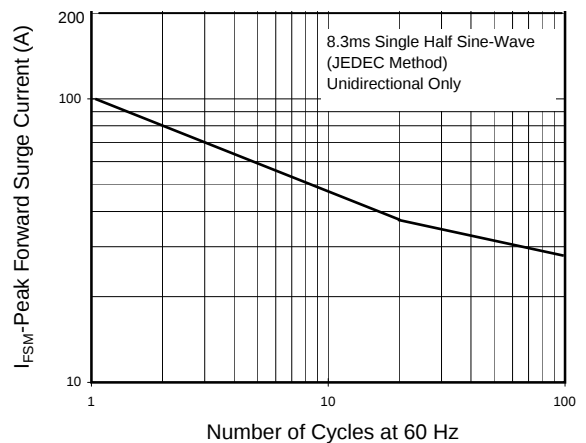
**Fig.4 - Typical Junction**



**Fig. 5 - Typ. Transient Thermal Impedance**



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



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## 600 Watt Surface Mount TVS

| UNI-POLAR | BI-POLAR  | DEVICE MARKING CODE |    | REVERSE STANDOFF VOLTAGE<br>V <sub>RWM</sub> (V) | BREAKDOWN VOLTAGE<br>V <sub>BR</sub> (V)<br>MIN. @ I <sub>T</sub> | BREAKDOWN VOLTAGE<br>V <sub>BR</sub> (V)<br>MAX. @ I <sub>T</sub> | TEST CURRENT<br>(I <sub>T</sub> )<br>mA | MAXIMUM CLAMPING VOLTAGE<br>@I <sub>PP</sub> V <sub>C</sub> (V) | PEAK PULSE CURRENT<br>I <sub>PP</sub> (A) | REVERSE LEAKAGE<br>@ V <sub>RWM</sub><br>I <sub>R</sub> (μA) |
|-----------|-----------|---------------------|----|--------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------|-----------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------|
|           |           | UNI                 | BI |                                                  |                                                                   |                                                                   |                                         |                                                                 |                                           |                                                              |
| SMBJ5.0A  | SMBJ5.0CA | KE                  | AE | 5.00                                             | 6.40                                                              | 7.00                                                              | 10                                      | 9.2                                                             | 65.3                                      | 800                                                          |
| SMBJ6.0A  | SMBJ6.0CA | KG                  | AG | 6.00                                             | 6.67                                                              | 7.37                                                              | 10                                      | 10.3                                                            | 58.3                                      | 800                                                          |
| SMBJ6.5A  | SMBJ6.5CA | KK                  | AK | 6.50                                             | 7.22                                                              | 7.98                                                              | 10                                      | 11.2                                                            | 53.6                                      | 500                                                          |
| SMBJ7.0A  | SMBJ7.0CA | KM                  | AM | 7.00                                             | 7.78                                                              | 8.60                                                              | 10                                      | 12.0                                                            | 50.0                                      | 200                                                          |
| SMBJ7.5A  | SMBJ7.5CA | KP                  | AP | 7.50                                             | 8.33                                                              | 9.21                                                              | 1                                       | 12.9                                                            | 46.6                                      | 100                                                          |
| SMBJ8.0A  | SMBJ8.0CA | KR                  | AR | 8.00                                             | 8.89                                                              | 9.83                                                              | 1                                       | 13.6                                                            | 44.2                                      | 50                                                           |
| SMBJ8.5A  | SMBJ8.5CA | KT                  | AT | 8.50                                             | 9.44                                                              | 10.40                                                             | 1                                       | 14.4                                                            | 41.7                                      | 20                                                           |
| SMBJ9.0A  | SMBJ9.0CA | KV                  | AV | 9.00                                             | 10.00                                                             | 11.10                                                             | 1                                       | 15.4                                                            | 39.0                                      | 10                                                           |
| SMBJ10A   | SMBJ10CA  | KX                  | AX | 10.00                                            | 11.10                                                             | 12.30                                                             | 1                                       | 17.0                                                            | 35.3                                      | 5                                                            |
| SMBJ11A   | SMBJ11CA  | KZ                  | AZ | 11.00                                            | 12.20                                                             | 13.50                                                             | 1                                       | 18.2                                                            | 33.0                                      | 5                                                            |
| SMBJ12A   | SMBJ12CA  | LE                  | BE | 12.00                                            | 13.30                                                             | 14.70                                                             | 1                                       | 19.9                                                            | 30.2                                      | 5                                                            |
| SMBJ13A   | SMBJ13CA  | LG                  | BG | 13.00                                            | 14.40                                                             | 15.90                                                             | 1                                       | 21.5                                                            | 28.0                                      | 5                                                            |
| SMBJ14A   | SMBJ14CA  | LK                  | BK | 14.00                                            | 15.60                                                             | 17.20                                                             | 1                                       | 23.2                                                            | 25.9                                      | 5                                                            |
| SMBJ15A   | SMBJ15CA  | LM                  | BM | 15.00                                            | 16.70                                                             | 18.50                                                             | 1                                       | 24.4                                                            | 24.6                                      | 5                                                            |
| SMBJ16A   | SMBJ16CA  | LP                  | BP | 16.00                                            | 17.80                                                             | 19.70                                                             | 1                                       | 26.0                                                            | 23.1                                      | 5                                                            |
| SMBJ17A   | SMBJ17CA  | LR                  | BR | 17.00                                            | 18.90                                                             | 20.90                                                             | 1                                       | 27.6                                                            | 21.8                                      | 5                                                            |
| SMBJ18A   | SMBJ18CA  | LT                  | BT | 18.00                                            | 20.00                                                             | 22.10                                                             | 1                                       | 29.2                                                            | 20.6                                      | 5                                                            |
| SMBJ20A   | SMBJ20CA  | LV                  | BV | 20.00                                            | 22.20                                                             | 24.50                                                             | 1                                       | 32.4                                                            | 18.6                                      | 5                                                            |
| SMBJ22A   | SMBJ22CA  | LX                  | BX | 22.00                                            | 24.40                                                             | 26.90                                                             | 1                                       | 35.5                                                            | 16.9                                      | 5                                                            |
| SMBJ24A   | SMBJ24CA  | LZ                  | BZ | 24.00                                            | 26.70                                                             | 29.50                                                             | 1                                       | 38.9                                                            | 15.5                                      | 5                                                            |
| SMBJ26A   | SMBJ26CA  | ME                  | CE | 26.00                                            | 28.90                                                             | 31.90                                                             | 1                                       | 42.1                                                            | 14.3                                      | 5                                                            |
| SMBJ28A   | SMBJ28CA  | MG                  | CG | 28.00                                            | 31.10                                                             | 34.40                                                             | 1                                       | 45.4                                                            | 13.3                                      | 5                                                            |
| SMBJ30A   | SMBJ30CA  | MK                  | CK | 30.00                                            | 33.30                                                             | 36.80                                                             | 1                                       | 48.4                                                            | 12.4                                      | 5                                                            |
| SMBJ33A   | SMBJ33CA  | MM                  | CM | 33.00                                            | 36.70                                                             | 40.60                                                             | 1                                       | 53.3                                                            | 11.3                                      | 5                                                            |
| SMBJ36A   | SMBJ36CA  | MP                  | CP | 36.00                                            | 40.00                                                             | 44.20                                                             | 1                                       | 58.1                                                            | 10.4                                      | 5                                                            |
| SMBJ40A   | SMBJ40CA  | MR                  | CR | 40.00                                            | 44.40                                                             | 49.10                                                             | 1                                       | 64.5                                                            | 9.3                                       | 5                                                            |
| SMBJ43A   | SMBJ43CA  | MT                  | CT | 43.00                                            | 47.80                                                             | 52.80                                                             | 1                                       | 69.4                                                            | 8.7                                       | 5                                                            |
| SMBJ45A   | SMBJ45CA  | MV                  | CV | 45.00                                            | 50.00                                                             | 55.30                                                             | 1                                       | 72.7                                                            | 8.3                                       | 5                                                            |
| SMBJ48A   | SMBJ48CA  | MX                  | CX | 48.00                                            | 53.30                                                             | 58.90                                                             | 1                                       | 77.4                                                            | 7.8                                       | 5                                                            |
| SMBJ51A   | SMBJ51CA  | MZ                  | CZ | 51.00                                            | 56.70                                                             | 62.70                                                             | 1                                       | 82.4                                                            | 7.3                                       | 5                                                            |
| SMBJ54A   | SMBJ54CA  | NE                  | DE | 54.00                                            | 60.00                                                             | 66.30                                                             | 1                                       | 87.1                                                            | 6.9                                       | 5                                                            |
| SMBJ58A   | SMBJ58CA  | NG                  | DG | 58.00                                            | 64.40                                                             | 71.20                                                             | 1                                       | 93.6                                                            | 6.5                                       | 5                                                            |
| SMBJ60A   | SMBJ60CA  | NK                  | DK | 60.00                                            | 66.70                                                             | 73.70                                                             | 1                                       | 96.8                                                            | 6.2                                       | 5                                                            |
| SMBJ64A   | SMBJ64CA  | NM                  | DM | 64.00                                            | 71.10                                                             | 78.60                                                             | 1                                       | 103.0                                                           | 5.9                                       | 5                                                            |
| SMBJ70A   | SMBJ70CA  | NP                  | DP | 70.00                                            | 77.80                                                             | 86.00                                                             | 1                                       | 113.0                                                           | 5.3                                       | 5                                                            |
| SMBJ75A   | SMBJ75CA  | NR                  | DR | 75.00                                            | 83.30                                                             | 92.10                                                             | 1                                       | 121.0                                                           | 5.0                                       | 5                                                            |
| SMBJ78A   | SMBJ78CA  | NT                  | DT | 78.00                                            | 86.70                                                             | 95.80                                                             | 1                                       | 126.0                                                           | 4.8                                       | 5                                                            |
| SMBJ85A   | SMBJ85CA  | NV                  | DV | 85.00                                            | 94.40                                                             | 104.00                                                            | 1                                       | 137.0                                                           | 4.4                                       | 5                                                            |
| SMBJ90A   | SMBJ90CA  | NX                  | DX | 90.00                                            | 100.00                                                            | 111.00                                                            | 1                                       | 146                                                             | 4.1                                       | 5                                                            |
| SMBJ100A  | SMBJ100CA | NZ                  | DZ | 100.00                                           | 111.00                                                            | 123.00                                                            | 1                                       | 162                                                             | 3.7                                       | 5                                                            |
| SMBJ110A  | SMBJ110CA | PE                  | EE | 110.00                                           | 122.00                                                            | 135.00                                                            | 1                                       | 177                                                             | 3.4                                       | 5                                                            |
| SMBJ120A  | SMBJ120CA | PG                  | EG | 120.00                                           | 133.00                                                            | 147.00                                                            | 1                                       | 193                                                             | 3.1                                       | 5                                                            |
| SMBJ130A  | SMBJ130CA | PK                  | EK | 130.00                                           | 144.00                                                            | 159.00                                                            | 1                                       | 209                                                             | 2.9                                       | 5                                                            |
| SMBJ150A  | SMBJ150CA | PM                  | EM | 150.00                                           | 167.00                                                            | 185.00                                                            | 1                                       | 243                                                             | 2.5                                       | 5                                                            |
| SMBJ160A  | SMBJ160CA | PP                  | EP | 160.00                                           | 178.00                                                            | 197.00                                                            | 1                                       | 259                                                             | 2.3                                       | 5                                                            |
| SMBJ170A  | SMBJ170CA | PR                  | ER | 170.00                                           | 189.00                                                            | 209.00                                                            | 1                                       | 275                                                             | 2.2                                       | 5                                                            |
| SMBJ180A  | SMBJ180CA | PT                  | ET | 180.00                                           | 201.00                                                            | 222.00                                                            | 1                                       | 292                                                             | 2.1                                       | 5                                                            |
| SMBJ200A  | SMBJ200CA | PV                  | EV | 200.00                                           | 224.00                                                            | 247.00                                                            | 1                                       | 324                                                             | 1.9                                       | 5                                                            |
| SMBJ220A  | SMBJ220CA | PX                  | EX | 220.00                                           | 246.00                                                            | 272.00                                                            | 1                                       | 356                                                             | 1.7                                       | 5                                                            |
| SMBJ250A  | SMBJ250CA | PZ                  | EZ | 250.00                                           | 279.00                                                            | 309.00                                                            | 1                                       | 405                                                             | 1.5                                       | 5                                                            |
| SMBJ300A  | SMBJ300CA | QE                  | FE | 300.00                                           | 335.00                                                            | 371.00                                                            | 1                                       | 486                                                             | 1.3                                       | 5                                                            |
| SMBJ350A  | SMBJ350CA | QG                  | FG | 350.00                                           | 391.00                                                            | 432.00                                                            | 1                                       | 567                                                             | 1.1                                       | 5                                                            |
| SMBJ400A  | SMBJ400CA | QK                  | FK | 400.00                                           | 447.00                                                            | 494.00                                                            | 1                                       | 648                                                             | 0.9                                       | 5                                                            |
| SMBJ440A  | SMBJ440CA | QM                  | FM | 440.00                                           | 492.00                                                            | 543.00                                                            | 1                                       | 713                                                             | 0.9                                       | 5                                                            |

For bidirectional type having V<sub>RWM</sub> of 10 volts and less, the IR limit is double

For parts without A , the VBR is ± 10%

Certified RoHS Compliant

UL File # E223026