

DESCRIPTION

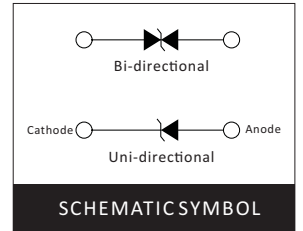
The SMB15J series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

FEATURES

- > Low profile package
- > Ideal for automated placement
- > Available in uni-directional and Bi-directional
- > 1500 Watt peak pulse power capability with a 10/1000 μ s waveform
- > For surface mounted applications to optimize board space
- > Excellent clamping capability
- > Very fast response time
- > Low incremental surge resistance

APPLICATIONS

TVS devices are ideal for the protection of I/O Interfaces, VCC bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.



MAXIMUM RATINGS @ 25°C UNLESS OTHERWISE SPECIFIED

| PARAMETER | SYMBOL | VALUE | UNIT |
|--------------------------------------------------------------------------------|--------------------|---------|-------|
| Peak pulse power dissipation at 10/1000 μ s waveform (Note1, Note2, Fig.2) | PPPM | 1500 | Watts |
| Steady state power dissipation at T _A =50°C (Fig.6) | P _{M(AV)} | 6.5 | Watts |
| Peak forward surge current, 8.3ms single half sine-wave(Note3) | I _{FSM} | 120 | A |
| Operating junction Temperatur Range | T _J | -55~125 | °C |
| Storage Temperature Range | T _{STG} | -55~150 | °C |
| Typical thermal resistance junction to ambient | R _{θJA} | 90 | °C/W |

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above T_A=25°C per Fig.4.
2. Mounted on 8.0mm×8.0mm copper pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C UNLESS OTHERWISE SPECIFIED

| PART NUMBER | | DEVICE MARKING CODE | | REVERSE STAND-OFF VOLTAGE | BREAKDOWN VOLTAGE @IT | TEST CURRENT | MAXIMUM CLAMPING VOLTAGE @I _{PP} | PEAK PULSE CURRENT | REVERSE LEAKAGE @V _{RWM} |
|----------------|---------------|---------------------|-----|---------------------------|-----------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
| Unidirectional | Bidirectional | UNI | BI | V _{RWM} (V) | V _{BR} (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (μ A) |
| SMB15J11A | SMB15J11CA | GDZ | BDZ | 11.0 | 12.20~13.50 | 10 | 18.2 | 82.4 | 800 |
| SMB15J12A | SMB15J12CA | GEE | BEE | 12.0 | 13.30~14.70 | 10 | 19.9 | 75.4 | 800 |
| SMB15J13A | SMB15J13CA | GEG | BEG | 13.0 | 14.40~15.90 | 10 | 21.5 | 69.8 | 500 |
| SMB15J14A | SMB15J14CA | GEK | BEK | 14.0 | 15.60~17.20 | 10 | 23.2 | 64.7 | 200 |
| SMB15J15A | SMB15J15CA | GEM | BEM | 15.0 | 16.70~18.50 | 1 | 24.4 | 61.5 | 100 |
| SMB15J16A | SMB15J16CA | GEP | BEP | 16.0 | 17.80~19.70 | 1 | 26.0 | 57.7 | 50 |
| SMB15J17A | SMB15J17CA | GER | BER | 17.0 | 18.90~20.90 | 1 | 27.6 | 54.3 | 20 |
| SMB15J18A | SMB15J18CA | GET | BET | 18.0 | 20.00~22.10 | 1 | 29.2 | 51.4 | 10 |
| SMB15J20A | SMB15J20CA | GEV | BEV | 20.0 | 22.20~24.50 | 1 | 32.4 | 46.3 | 5 |

ELECTRICAL CHARACTERISTICS PER LINE@ 25°C UNLESS OTHERWISE SPECIFIED

| PART NUMBER | | DEVICE MARKING CODE | | REVERSE STAND-OFF VOLTAGE | BREAKDOWN VOLTAGE @IT | TEST CURRENT | MAXIMUM CLAMPING VOLTAGE @I _{PP} | PEAK PULSE CURRENT | REVERSE LEAKAGE @V _{RWM} |
|----------------|---------------|---------------------|-----|---------------------------|-----------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
| Unidirectional | Bidirectional | UNI | BI | V _{RWM} (V) | V _{BR} (V) | I _T (mA) | V _C (V) | I _{PP} (A) | I _R (uA) |
| SMB15J22A | SMB15J22CA | GEX | BEX | 22.0 | 24.40~26.90 | 1 | 35.5 | 42.3 | 1 |
| SMB15J24A | SMB15J24CA | GEZ | BEZ | 24.0 | 26.70~29.50 | 1 | 38.9 | 38.6 | 1 |
| SMB15J26A | SMB15J26CA | GFE | BFE | 26.0 | 28.90~31.90 | 1 | 42.1 | 35.6 | 1 |
| SMB15J28A | SMB15J28CA | GFG | BFG | 28.0 | 31.10~34.40 | 1 | 45.4 | 33 | 1 |
| SMB15J30A | SMB15J30CA | GFK | BFK | 30.0 | 33.30~36.80 | 1 | 48.4 | 31 | 1 |
| SMB15J33A | SMB15J33CA | GFM | BFM | 33.0 | 36.70~40.60 | 1 | 53.3 | 28.1 | 1 |
| SMB15J36A | SMB15J36CA | GFP | BFP | 36.0 | 40.00~44.20 | 1 | 58.1 | 25.8 | 1 |
| SMB15J40A | SMB15J40CA | GFR | BFR | 40.0 | 44.40~49.10 | 1 | 64.5 | 23.3 | 1 |
| SMB15J43A | SMB15J43CA | GFT | BFT | 43.0 | 47.80~52.80 | 1 | 69.4 | 21.6 | 1 |
| SMB15J45A | SMB15J45CA | GFV | BFV | 45.0 | 50.00~55.30 | 1 | 72.7 | 20.6 | 1 |
| SMB15J48A | SMB15J48CA | GFX | BFX | 48.0 | 53.30~58.90 | 1 | 77.4 | 19.4 | 1 |
| SMB15J51A | SMB15J51CA | GFZ | BFZ | 51.0 | 56.70~62.70 | 1 | 82.4 | 18.2 | 1 |
| SMB15J54A | SMB15J54CA | GGE | BGE | 54.0 | 60.00~66.30 | 1 | 87.1 | 17.2 | 1 |
| SMB15J58A | SMB15J58CA | GGG | BGG | 58.0 | 64.40~71.20 | 1 | 93.6 | 16 | 1 |
| SMB15J60A | SMB15J60CA | GGK | BGK | 60.0 | 66.70~73.70 | 1 | 96.8 | 15.5 | 1 |
| SMB15J64A | SMB15J64CA | GGM | BGM | 64.0 | 71.10~78.60 | 1 | 103.0 | 14.6 | 1 |
| SMB15J70A | SMB15J70CA | GGP | BGP | 70.0 | 77.80~86.00 | 1 | 113.0 | 13.3 | 1 |
| SMB15J75A | SMB15J75CA | GGR | BGR | 75.0 | 83.30~92.10 | 1 | 121.0 | 12.4 | 1 |
| SMB15J78A | SMB15J78CA | GGT | BGT | 78.0 | 86.70~95.80 | 1 | 126.0 | 11.9 | 1 |
| SMB15J85A | SMB15J85CA | GGV | BGV | 85.0 | 94.40~104.00 | 1 | 137.0 | 10.9 | 1 |
| SMB15J90A | SMB15J90CA | GGX | BGX | 90.0 | 100.00~111.00 | 1 | 146.0 | 10.3 | 1 |
| SMB15J100A | SMB15J100CA | GGZ | BGZ | 100.0 | 111.00~123.00 | 1 | 162.0 | 9.3 | 1 |
| SMB15J110A | SMB15J110CA | GHE | BHE | 110.0 | 122.00~135.00 | 1 | 177.0 | 8.5 | 1 |
| SMB15J120A | SMB15J120CA | GHG | BHG | 120.0 | 133.00~147.00 | 1 | 193.0 | 7.8 | 1 |
| SMB15J130A | SMB15J130CA | GHK | BHK | 130.0 | 144.00~159.00 | 1 | 209.0 | 7.2 | 1 |
| SMB15J150A | SMB15J150CA | GHM | BHM | 150.0 | 167.00~185.00 | 1 | 243.0 | 6.2 | 1 |
| SMB15J160A | SMB15J160CA | GHP | BHP | 160.0 | 178.00~197.00 | 1 | 259.0 | 5.8 | 1 |
| SMB15J170A | SMB15J170CA | GHR | BHR | 170.0 | 189.00~209.00 | 1 | 275.0 | 5.5 | 1 |

RATINGS AND CHARACTERISTIC CURVES (T_A=25°C unless otherwise noted)

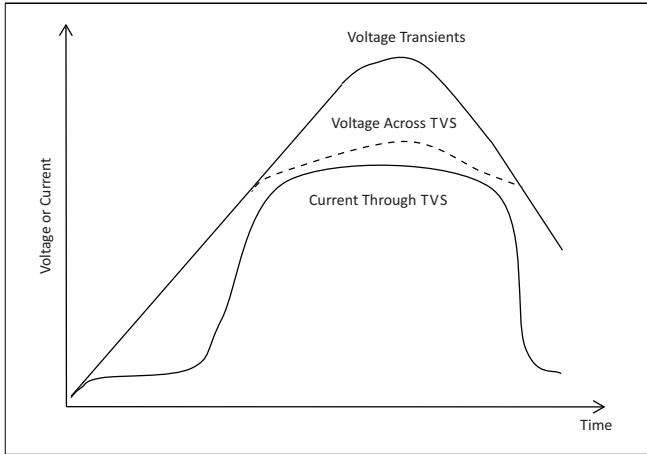


Figure 1 - TVS Transients Clamping Waveform

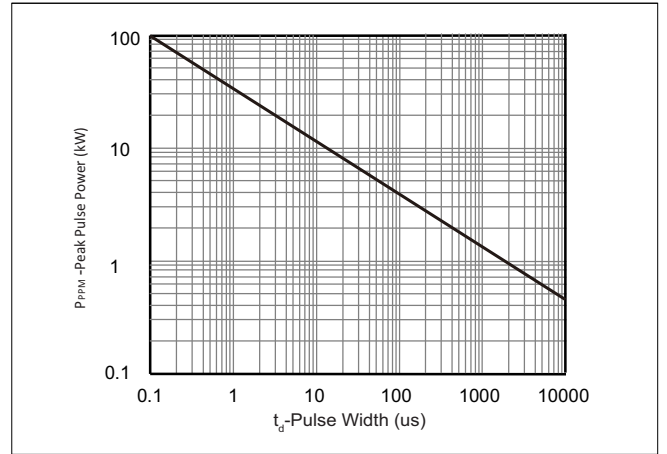


Figure 2 - Peak Pulse Power Rating Curve

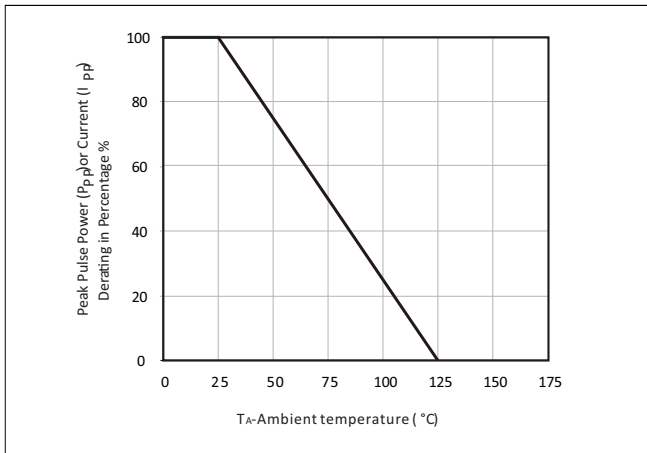


Figure 3 - Pulse Derating Curve

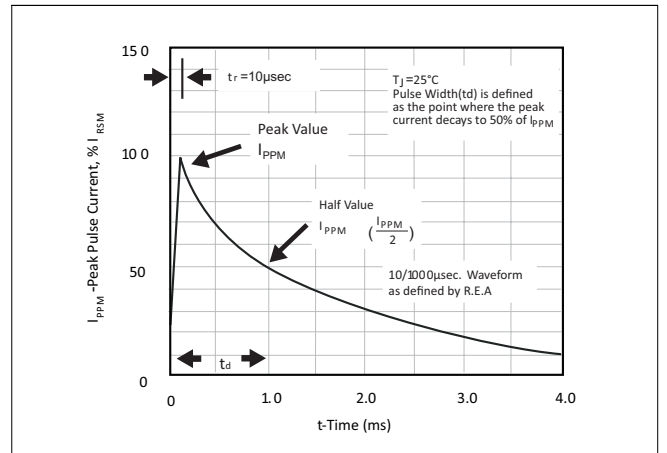


Figure 4 - Pulse Waveform

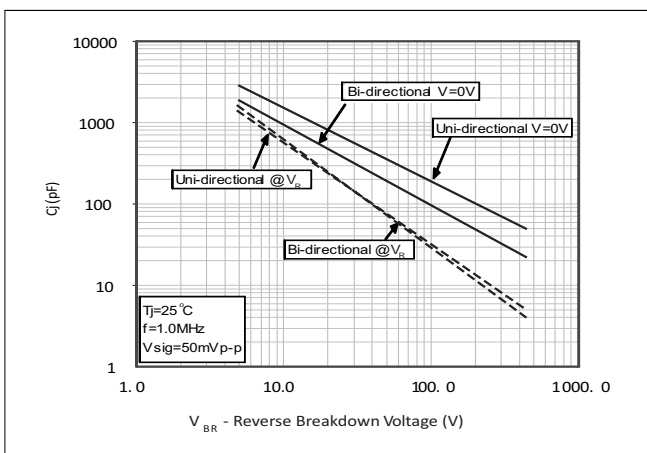


Figure 5 - Typical Junction Capacitance

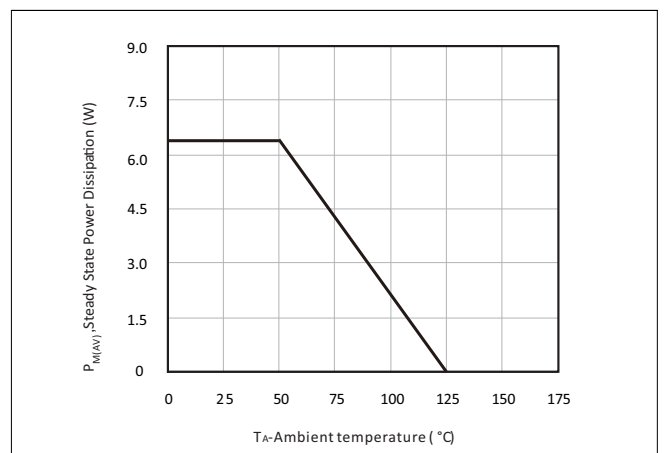
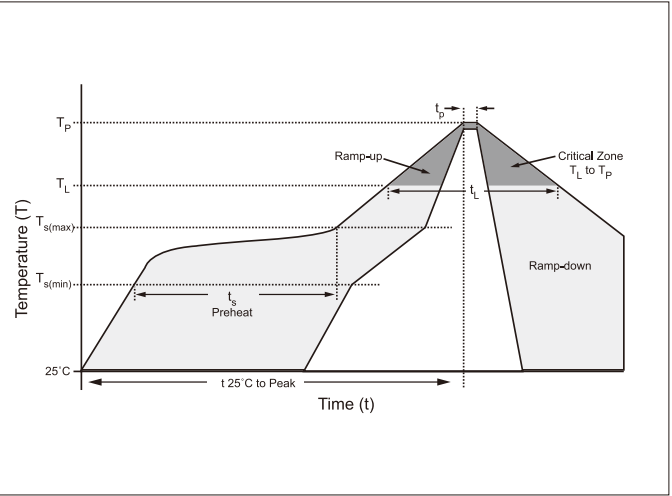


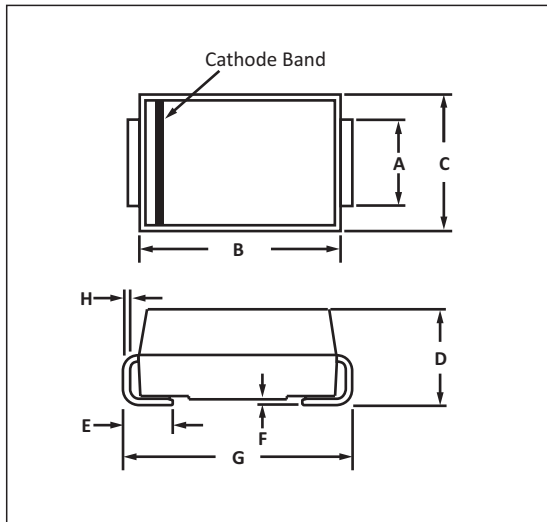
Figure 6 - Steady State Power Dissipation Derating Curve

REFLOW PROFILE

| Reflow Condition | | Lead-free assembly |
|---------------------------------------------------|-----------------------------|--------------------|
| Pre Heat | Temperature Min (Ts(min)) | 150°C |
| | Temperature Max (Ts(max)) | 200°C |
| | Time (min to max) (ts) | 60 – 180 secs |
| Average ramp up rate (Liquidus Temp (TL) to peak) | | 3°C/second max |
| Ts(max) to TL - Ramp-up Rate | | 3°C/second max |
| Reflow | Temperature (TL) (Liquidus) | 217°C |
| | Time (min to max) (tl) | 60 – 150 seconds |
| Peak Temperature (TP) | | 260°C |
| Time within 5°C of actual peak Temperature (tp) | | 20 – 40 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (TP) | | 8 minutes Max. |
| Do not exceed | | 260°C |



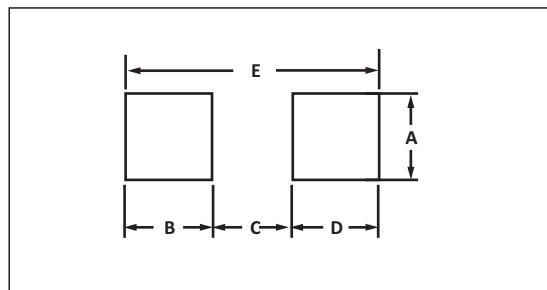
DO-214AA(SMB) PACKAGE DIMENSIONS



| SMB PACKAGE DIMENSIONS | | | | |
|------------------------|-------------|------|--------|-------|
| DIM | MILLIMETERS | | INCHES | |
| | MIN | MAX | MIN | MAX |
| A | 1.96 | 2.20 | 0.077 | 0.087 |
| B | 4.35 | 4.85 | 0.171 | 0.191 |
| C | 3.30 | 3.94 | 0.130 | 0.155 |
| D | 2.20 | 2.50 | 0.087 | 0.098 |
| E | 0.76 | 1.52 | 0.030 | 0.060 |
| F | 0.02 | 0.20 | 0.001 | 0.008 |
| G | 5.08 | 5.59 | 0.200 | 0.220 |
| H | 0.15 | 0.30 | 0.006 | 0.012 |

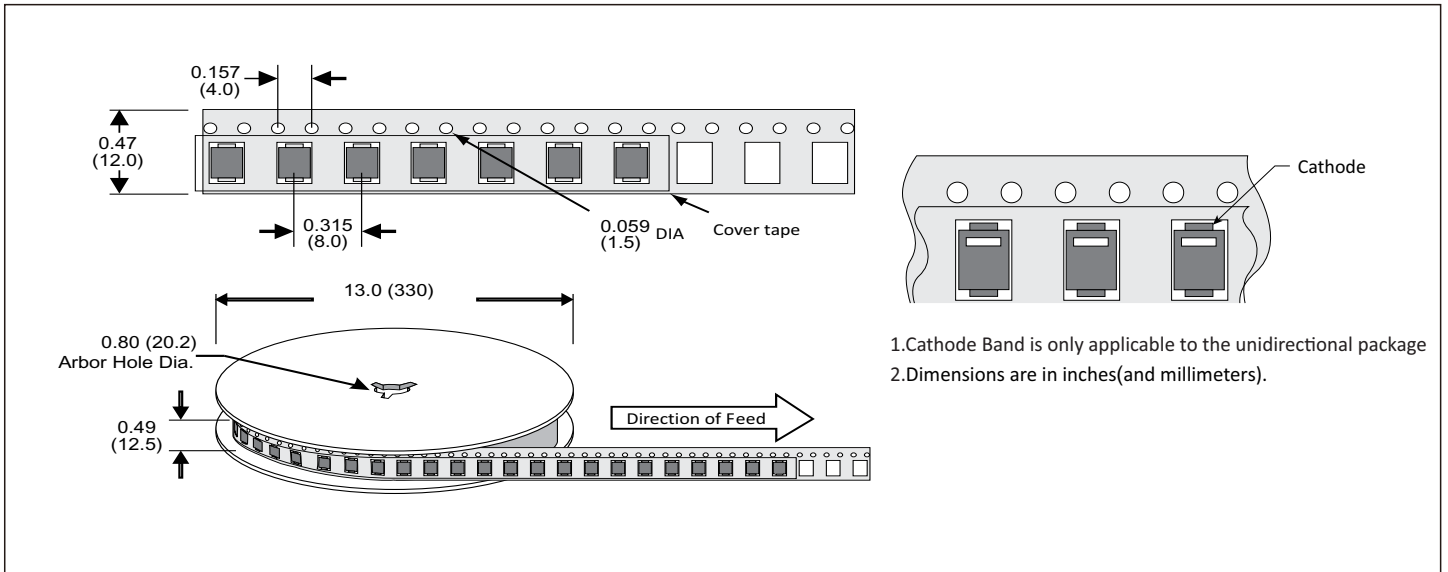
NOTES:
 1. Dimensions are exclusive of mold flash and metal burrs
 2. Cathode Band is only applicable to the unidirectional package

RECOMMENDED PAD LAYOUT DIMENSIONS



| RECOMMENDED PAD LAYOUT DIMENSIONS | | | | |
|-----------------------------------|-------------|------|-----------|-------|
| DIM | MILLIMETERS | | INCHES | |
| | MIN | MAX | MIN | MAX |
| A | 2.20 | - | 0.087 | - |
| B | 1.45 | - | 0.057 | - |
| C | - | 2.55 | - | 0.100 |
| D | 1.45 | - | 0.057 | - |
| E | 5.60 REF | | 0.220 REF | |

TAPE AND REEL SPECIFICATION



ORDERING INFORMATION

| Part Number | Component Package | QTY/Reel | Reel Size |
|--------------|-------------------|----------|-----------|
| SMB15Jxx(C)A | DO-214AA(SMB) | 3000PCS | 13" |