

600 WATT TVS COMPONENT



APPLICATIONS

- Power Supply
- AC/DC Applications
- Telecom

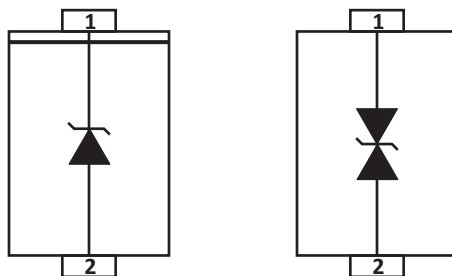
FEATURES

- UL File Recognition #E208219
- Compatible with IEC 61000-4-2 (ESD): Level 4 - Air 15kV, Contact 8kV
- Compatible with IEC 61000-4-4 (EFT): 40A, 5/50ns
- Compatible with IEC 61000-4-5 (Surge): 8/20 μ s Waveform
- Glass Passivated Chip
- 600 Watts Peak Pulse Power per Line (tp = 10/1000 μ s)
- Low Leakage Current
- Bidirectional and Unidirectional Configurations
- Excellent Clamping Capability
- Very Fast Response Time
- Available in Multiple Voltages
- RoHS Compliant
- REACH Compliant

MECHANICAL CHARACTERISTICS

- Molded JEDEC DO-214AA Package
- Approximate Weight: 0.103 grams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature:
Pure-Tin - Sn, 100: 260-270°C
- 12mm Tape and Reel Per EIA Standard 481
- Terminal: Solderable per MIL-STD-750, Method 2026
- Flammability Rating UL 94V-0

PIN CONFIGURATIONS



TYPICAL DEVICE CHARACTERISTICS

MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

| PARAMETER | SYMBOL | VALUE | UNITS |
|---|-----------|------------|-------|
| Operating Temperature | T_J | -55 to 150 | °C |
| Storage Temperature | T_{STG} | -55 to 150 | °C |
| Peak Pulse Power (tp =10/1000µs) - See Figure 1 and Note 1 | P_{PP} | 600 | Watts |
| Power Dissipation on Infinite Heatsink at $T_L = 75^\circ\text{C}$ | P_D | 5.0 | Watts |
| Peak Forward Surge Current, 8.3ms single half sinewave - Unidirectional Only (Note 2) | I_{FSM} | 100 | Amps |
| Maximum Instantaneous Forward Voltage at 50A - Unidirectional Only (Note 3) | V_F | 3.5/5.0 | V |

NOTE

1. Non-repetitive current pulse per Figure 2 and derated above $T_A = 25^\circ\text{C}$ per Figure 3.
2. Measured on 8.3ms single half sinewave or equivalent square wave, duty cycle = 4 pulses per minute maximum.
3. $V_F < 3.5\text{V}$.

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

| PART NUMBER (Notes 1-3) | DEVICE MARKING | | REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS | BREAKDOWN VOLTAGE $V_{(BR)} @ I_T$ VOLTS | | TEST CURRENT @ I_T mA | MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ I_P V_C VOLTS | MAXIMUM REVERSE SURGE CURRENT @ I_{PP} AMPS | MAXIMUM REVERSE LEAKAGE CURRENT @ V_{RWM} I_R µA |
|----------------------------|----------------|----|---|--|-------|-----------------------------------|---|---|---|
| | UNI | BI | | MIN | MAX | | | | |
| SMBJ5.0 | KD | AD | 5.0 | 6.40 | 7.30 | 10 | 9.6 | 62.5 | 800 |
| SMBJ5.0A | KE | AE | 5.0 | 6.40 | 7.00 | 10 | 9.2 | 65.2 | 800 |
| SMBJ6.0 | KF | AF | 6.0 | 6.67 | 8.15 | 10 | 11.4 | 52.6 | 800 |
| SMBJ6.0A | KG | AG | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 58.3 | 800 |
| SMBJ6.5 | KH | AH | 6.5 | 7.22 | 8.82 | 10 | 12.3 | 48.8 | 500 |
| SMBJ6.5A | KK | AK | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 53.6 | 500 |
| SMBJ7.0 | KL | AL | 7.0 | 7.78 | 9.51 | 10 | 13.3 | 45.1 | 200 |
| SMBJ7.0A | KM | AM | 7.0 | 7.78 | 8.60 | 10 | 12.0 | 50.0 | 200 |
| SMBJ7.5 | KN | AN | 7.5 | 8.33 | 10.20 | 1 | 14.3 | 42.0 | 100 |
| SMBJ7.5A | KP | AP | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 46.5 | 100 |
| SMBJ8.0 | KQ | AQ | 8.0 | 8.89 | 10.90 | 1 | 15.0 | 40.0 | 50 |
| SMBJ8.0A | KR | AR | 8.0 | 8.89 | 9.83 | 1 | 13.6 | 44.1 | 50 |
| SMBJ8.5 | KS | AS | 8.5 | 9.44 | 11.50 | 1 | 15.9 | 37.7 | 10 |
| SMBJ8.5A | KT | AT | 8.5 | 9.44 | 10.40 | 1 | 14.4 | 41.7 | 10 |
| SMBJ9.0 | KU | AU | 9.0 | 10.00 | 12.20 | 1 | 16.9 | 35.5 | 5 |
| SMBJ9.0A | KV | AV | 9.0 | 10.00 | 11.10 | 1 | 15.4 | 39.0 | 5 |
| SMBJ10 | KW | AW | 10.0 | 11.10 | 13.60 | 1 | 18.8 | 31.9 | 5 |
| SMBJ10A | KX | AX | 10.0 | 11.10 | 12.30 | 1 | 17.0 | 35.3 | 5 |
| SMBJ11 | KY | AY | 11.0 | 12.20 | 14.90 | 1 | 20.1 | 30.0 | 1 |
| SMBJ11A | KZ | AZ | 11.0 | 12.20 | 13.50 | 1 | 18.2 | 33.0 | 1 |
| SMBJ12 | LD | BD | 12.0 | 13.30 | 16.30 | 1 | 22.0 | 27.2 | 1 |
| SMBJ12A | LE | BE | 12.0 | 13.30 | 14.70 | 1 | 19.9 | 30.2 | 1 |

TYPICAL DEVICE CHARACTERISTICS

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

| PART NUMBER (Notes 1-3) | DEVICE MARKING | | REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS | BREAKDOWN VOLTAGE $V_{(BR)} @ I_T$ VOLTS | | TEST CURRENT @ I_T mA | MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ I_p V_c VOLTS | MAXIMUM REVERSE SURGE CURRENT @ I_{PP} AMPS | MAXIMUM REVERSE LEAKAGE CURRENT @ V_{RWM} I_R μA |
|----------------------------|----------------|----|---|--|-------|-----------------------------------|--|---|--|
| | UNI | BI | | MIN | MAX | | | | |
| | SMBJ13 | LF | BF | 13.0 | 14.40 | 17.60 | 1 | 23.8 | 25.2 |
| SMBJ13A | LG | BG | 13.0 | 14.40 | 15.90 | 1 | 21.5 | 27.9 | 1 |
| SMBJ14 | LH | BH | 14.0 | 15.60 | 19.10 | 1 | 25.8 | 23.3 | 1 |
| SMBJ14A | LK | BK | 14.0 | 15.60 | 17.20 | 1 | 23.2 | 25.9 | 1 |
| SMBJ15 | LL | BL | 15.0 | 16.70 | 20.40 | 1 | 26.9 | 22.3 | 1 |
| SMBJ15A | LM | BM | 15.0 | 16.70 | 18.50 | 1 | 24.4 | 24.6 | 1 |
| SMBJ16 | LN | BN | 16.0 | 17.80 | 21.80 | 1 | 28.8 | 20.8 | 1 |
| SMBJ16A | LP | BP | 16.0 | 17.80 | 19.70 | 1 | 26.0 | 23.1 | 1 |
| SMBJ17 | LQ | BQ | 17.0 | 18.90 | 23.10 | 1 | 30.5 | 19.7 | 1 |
| SMBJ17A | LR | BR | 17.0 | 18.90 | 20.90 | 1 | 27.6 | 21.7 | 1 |
| SMBJ18 | LS | BS | 18.0 | 20.00 | 24.40 | 1 | 32.2 | 18.6 | 1 |
| SMBJ18A | LT | BT | 18.0 | 20.00 | 22.10 | 1 | 29.2 | 20.6 | 1 |
| SMBJ19 | LA | BA | 19.0 | 21.13 | 25.76 | 1 | 34.0 | 17.6 | 1 |
| SMBJ19A | LB | BB | 19.0 | 21.10 | 23.30 | 1 | 30.8 | 19.5 | 1 |
| SMBJ20 | LU | BU | 20.0 | 22.20 | 27.10 | 1 | 35.8 | 16.8 | 1 |
| SMBJ20A | LV | BV | 20.0 | 22.20 | 24.50 | 1 | 32.4 | 18.5 | 1 |
| SMBJ22 | LW | BW | 22.0 | 24.40 | 29.80 | 1 | 39.4 | 15.2 | 1 |
| SMBJ22A | LX | BX | 22.0 | 24.40 | 26.90 | 1 | 35.5 | 16.9 | 1 |
| SMBJ24 | LY | BY | 24.0 | 26.70 | 32.60 | 1 | 43.0 | 14.0 | 1 |
| SMBJ24A | LZ | BZ | 24.0 | 26.70 | 29.50 | 1 | 38.9 | 15.4 | 1 |
| SMBJ26 | MD | CD | 26.0 | 28.90 | 35.30 | 1 | 46.6 | 12.9 | 1 |
| SMBJ26A | ME | CE | 26.0 | 28.90 | 31.90 | 1 | 42.1 | 14.3 | 1 |
| SMBJ28 | MF | CF | 28.0 | 31.10 | 38.00 | 1 | 50.0 | 12.0 | 1 |
| SMBJ28A | MG | CG | 28.0 | 31.10 | 34.40 | 1 | 45.4 | 13.2 | 1 |
| SMBJ30 | MH | CH | 30.0 | 33.30 | 40.70 | 1 | 53.5 | 11.2 | 1 |
| SMBJ30A | MK | CK | 30.0 | 33.30 | 36.80 | 1 | 48.4 | 12.4 | 1 |
| SMBJ33 | ML | CL | 33.0 | 36.70 | 44.90 | 1 | 59.0 | 10.2 | 1 |
| SMBJ33A | MM | CM | 33.0 | 36.70 | 40.60 | 1 | 53.3 | 11.3 | 1 |
| SMBJ36 | MN | CN | 36.0 | 40.00 | 48.90 | 1 | 64.3 | 9.3 | 1 |
| SMBJ36A | MP | CP | 36.0 | 40.00 | 44.20 | 1 | 58.17 | 10.3 | 1 |
| SMBJ40 | MQ | CQ | 40.0 | 44.40 | 54.30 | 1 | 71.4 | 8.4 | 1 |
| SMBJ40A | MR | CR | 40.0 | 44.40 | 49.10 | 1 | 64.5 | 9.3 | 1 |
| SMBJ43 | MS | CS | 43.0 | 47.80 | 58.40 | 1 | 76.7 | 7.8 | 1 |
| SMBJ43A | MT | CT | 43.0 | 47.80 | 52.80 | 1 | 69.4 | 8.7 | 1 |

TYPICAL DEVICE CHARACTERISTICS

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

| PART NUMBER (Notes 1-3) | DEVICE MARKING | | REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS | BREAKDOWN VOLTAGE $V_{(BR)} @ I_T$ VOLTS | | TEST CURRENT @ I_T mA | MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ I_P V_C VOLTS | MAXIMUM REVERSE SURGE CURRENT @ I_{PP} AMPS | MAXIMUM REVERSE LEAKAGE CURRENT @ V_{RWM} I_R μA |
|----------------------------|----------------|----|---|--|--------|-----------------------------------|---|---|--|
| | UNI | BI | | MIN | MAX | | | | |
| | SMBJ45 | MU | CU | 45.0 | 50.0 | 61.10 | 1 | 80.3 | 7.5 |
| SMBJ45A | MV | CV | 45.0 | 50.0 | 55.30 | 1 | 72.7 | 8.3 | 1 |
| SMBJ48 | MW | CW | 48.0 | 53.30 | 65.10 | 1 | 85.5 | 7.0 | 1 |
| SMBJ48A | MX | CX | 48.0 | 53.30 | 58.90 | 1 | 77.4 | 7.8 | 1 |
| SMBJ51 | MY | CY | 51.0 | 56.70 | 69.30 | 1 | 91.1 | 6.6 | 1 |
| SMBJ51A | MZ | CZ | 51.0 | 56.70 | 62.70 | 1 | 82.4 | 7.3 | 1 |
| SMBJ54 | ND | DD | 54.0 | 60.00 | 73.30 | 1 | 96.3 | 6.2 | 1 |
| SMBJ54A | NE | DE | 54.0 | 60.00 | 66.30 | 1 | 87.1 | 6.9 | 1 |
| SMBJ58 | NF | DF | 58.0 | 64.40 | 78.70 | 1 | 103.0 | 5.8 | 1 |
| SMBJ58A | NG | DG | 58.0 | 64.40 | 71.20 | 1 | 93.6 | 6.4 | 1 |
| SMBJ60 | NH | DH | 60.0 | 66.70 | 81.50 | 1 | 107.0 | 5.6 | 1 |
| SMBJ60A | NK | DK | 60.0 | 66.70 | 73.70 | 1 | 96.8 | 6.2 | 1 |
| SMBJ64 | NL | DL | 64.0 | 71.10 | 86.90 | 1 | 114.0 | 5.3 | 1 |
| SMBJ64A | NM | DM | 64.0 | 71.10 | 78.60 | 1 | 103.0 | 5.8 | 1 |
| SMBJ70 | NN | DN | 70.0 | 77.80 | 95.10 | 1 | 125.0 | 4.8 | 1 |
| SMBJ70A | NP | DP | 70.0 | 77.80 | 86.00 | 1 | 113.0 | 5.3 | 1 |
| SMBJ75 | NQ | DQ | 75.0 | 83.30 | 102.00 | 1 | 134.0 | 4.5 | 1 |
| SMBJ75A | NR | DR | 75.0 | 83.30 | 92.10 | 1 | 121.0 | 5.0 | 1 |
| SMBJ78 | NS | DS | 78.0 | 86.70 | 106.00 | 1 | 139.0 | 4.3 | 1 |
| SMBJ78A | NT | DT | 78.0 | 86.70 | 95.80 | 1 | 126.0 | 4.8 | 1 |
| SMBJ80 | NA | DA | 80.0 | 88.96 | 108.80 | 1 | 143.2 | 4.2 | 1 |
| SMBJ80A | NB | DB | 80.0 | 88.80 | 97.60 | 1 | 129.6 | 4.6 | 1 |
| SMBJ85 | NU | DU | 85.0 | 94.40 | 115.00 | 1 | 151.0 | 4.0 | 1 |
| SMBJ85A | NV | DV | 85.0 | 94.40 | 104.00 | 1 | 137.0 | 4.4 | 1 |
| SMBJ90 | NW | DW | 90.0 | 100.00 | 122.00 | 1 | 160.0 | 3.8 | 1 |
| SMBJ90A | NX | DX | 90.0 | 100.00 | 111.00 | 1 | 146.0 | 4.1 | 1 |
| SMBJ100 | NY | DY | 100.0 | 111.00 | 136.00 | 1 | 179.0 | 3.4 | 1 |
| SMBJ100A | NZ | DZ | 100.0 | 111.00 | 123.00 | 1 | 162.0 | 3.7 | 1 |
| SMBJ110 | PD | ED | 110.0 | 122.00 | 149.00 | 1 | 196.0 | 3.1 | 1 |
| SMBJ110A | PE | EE | 110.0 | 122.00 | 135.00 | 1 | 177.0 | 3.4 | 1 |
| SMBJ120 | PF | EF | 120.0 | 133.00 | 163.00 | 1 | 214.0 | 2.8 | 1 |
| SMBJ120A | PG | EG | 120.0 | 133.00 | 147.00 | 1 | 193.0 | 3.1 | 1 |
| SMBJ130 | PH | EH | 130.0 | 144.00 | 176.00 | 1 | 231.0 | 2.6 | 1 |
| SMBJ130A | PK | EK | 130.0 | 144.00 | 159.00 | 1 | 209.0 | 2.9 | 1 |

TYPICAL DEVICE CHARACTERISTICS

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

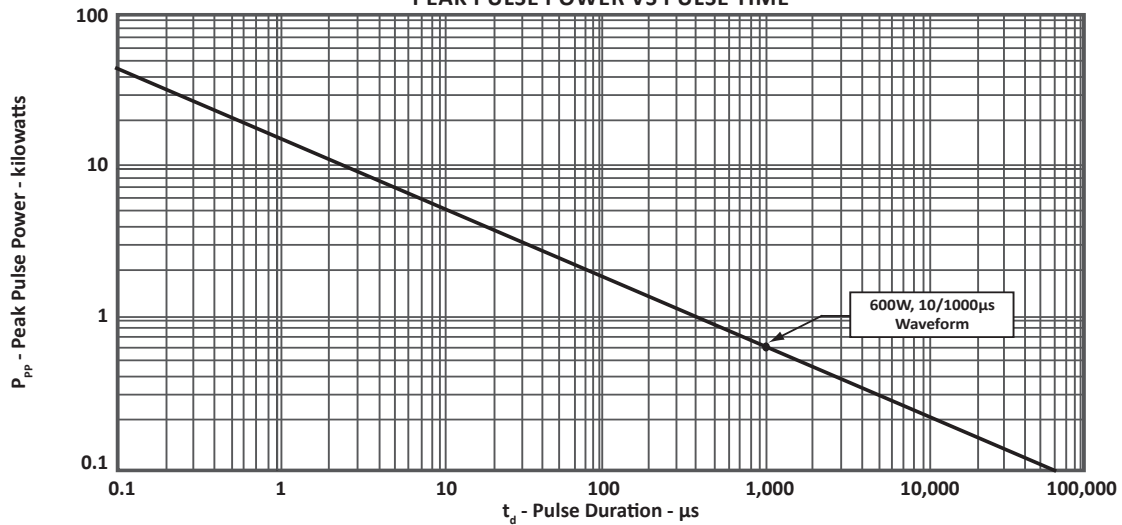
| PART NUMBER (Notes 1-3) | DEVICE MARKING | | REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS | BREAKDOWN VOLTAGE $V_{(BR)} @ I_T$ VOLTS | | TEST CURRENT @ I_T mA | MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ I_P V_C VOLTS | MAXIMUM REVERSE SURGE CURRENT @ I_{PP} AMPS | MAXIMUM REVERSE LEAKAGE CURRENT @ V_{RWM} I_R μA |
|----------------------------|----------------|----|---|--|--------|-----------------------------------|---|---|--|
| | UNI | BI | | MIN | MAX | | | | |
| | SMBJ140 | PA | EA | 140.0 | 155.68 | 190.40 | 1 | 250.6 | 2.4 |
| SMBJ140A | PB | EB | 140.0 | 155.00 | 171.00 | 1 | 226.8 | 2.7 | 1 |
| SMBJ150 | PL | EL | 150.0 | 167.00 | 204.00 | 1 | 268.0 | 2.2 | 1 |
| SMBJ150A | PM | EM | 150.0 | 167.00 | 185.00 | 1 | 243.0 | 2.5 | 1 |
| SMBJ160 | PN | EN | 160.0 | 178.00 | 218.00 | 1 | 287.0 | 2.1 | 1 |
| SMBJ160A | PP | EP | 160.0 | 178.00 | 197.00 | 1 | 259.0 | 2.3 | 1 |
| SMBJ170 | PQ | EQ | 170.0 | 189.00 | 231.00 | 1 | 304.0 | 2.0 | 1 |
| SMBJ170A | PR | ER | 170.0 | 189.00 | 209.00 | 1 | 275.0 | 2.2 | 1 |
| SMBJ180 | PS | ES | 180.0 | 200.16 | 244.80 | 1 | 322.2 | 1.9 | 1 |
| SMBJ180A | PT | ET | 180.0 | 200.00 | 220.00 | 1 | 291.6 | 2.1 | 1 |
| SMBJ190 | PU | EU | 190.0 | 211.28 | 258.40 | 1 | 340.1 | 1.8 | 1 |
| SMBJ190A | PV | EV | 190.0 | 211.00 | 232.00 | 1 | 307.8 | 2.0 | 1 |
| SMBJ200A | PW | EW | 200.0 | 224.00 | 247.00 | 1 | 324.0 | 1.9 | 1 |
| SMBJ220A | PX | EX | 220.0 | 246.00 | 272.00 | 1 | 356.0 | 1.7 | 1 |
| SMBJ250A | PZ | EZ | 250.0 | 279.00 | 309.00 | 1 | 405.0 | 1.5 | 1 |
| SMBJ300A | QE | FE | 300.0 | 335.00 | 371.00 | 1 | 486.0 | 1.2 | 1 |
| SMBJ350A | QG | FG | 350.0 | 391.00 | 432.00 | 1 | 567.0 | 1.1 | 1 |
| SMBJ400A | QK | FK | 400.0 | 447.00 | 494.00 | 1 | 648.0 | 0.9 | 1 |
| SMBJ440A | QM | FM | 440.0 | 492.00 | 543.00 | 1 | 713.0 | 0.8 | 1 |

NOTE

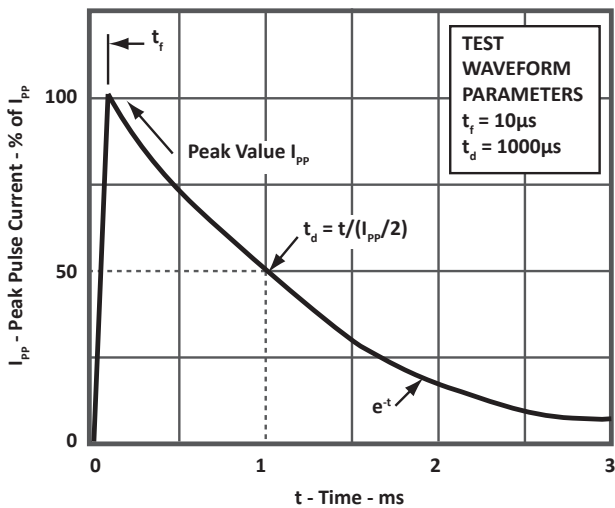
1. Suffix 'A' denotes 5% tolerance, without 'A' denotes 10% tolerance.
2. Add suffix 'C' or 'CA' after part number to specify a bidirectional device.
3. For bidirectional devices having a V_{RWM} of 10 Volts and under, the I_R limit is double.

TYPICAL DEVICE CHARACTERISTICS

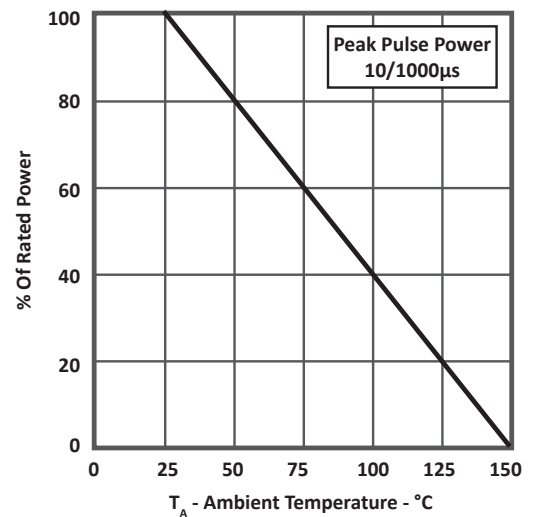
**FIGURE 1
PEAK PULSE POWER VS PULSE TIME**



**FIGURE 2
PULSE WAVEFORM**



**FIGURE 3
POWER DERATING CURVE**



TYPICAL DEVICE CHARACTERISTICS

FIGURE 4
TYPICAL JUNCTION CAPACITANCE

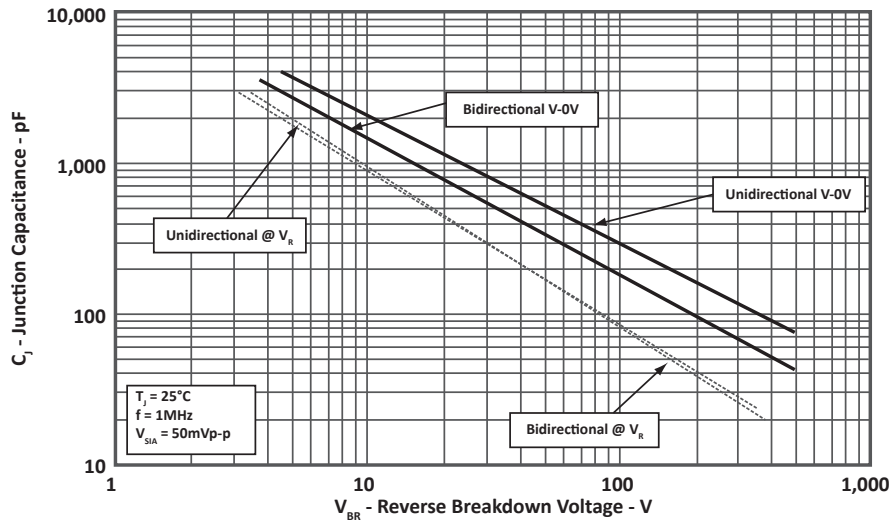


FIGURE 5
MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

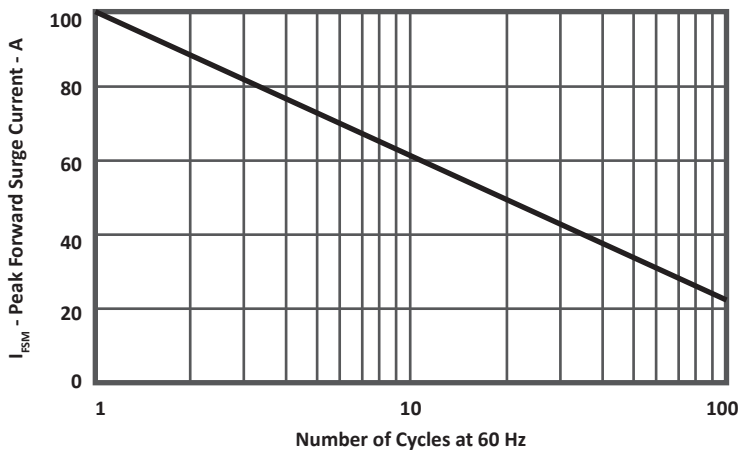
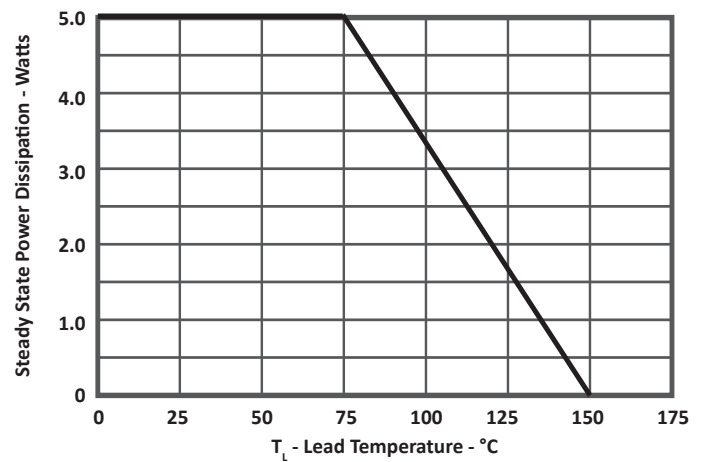


FIGURE 6
STEADY STATE POWER DERATING CURVE



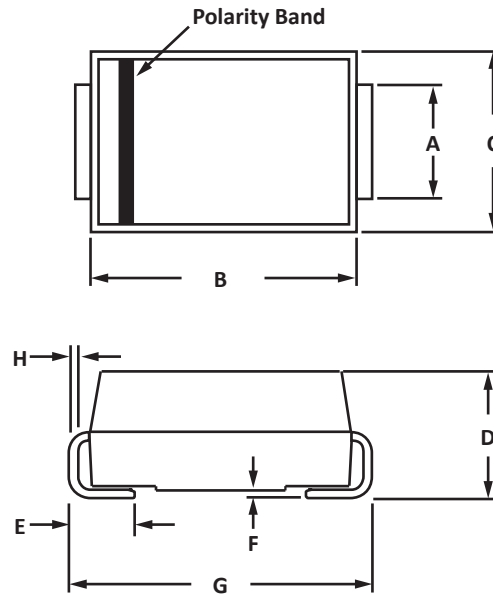
DO-214AA PACKAGE INFORMATION

OUTLINE 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 | 2.13 | 2.44 | 0.084 | 0.096 |
| E | 0.75 | 1.52 | 0.030 | 0.060 |
| F | 0.02 | 0.20 | 0.001 | 0.008 |
| G | 5.10 | 5.50 | 0.201 | 0.216 |
| H | 0.15 | 0.30 | 0.006 | 0.012 |

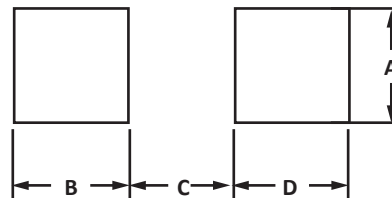
NOTES

1. Dimensions are exclusive of mold flash and metal burrs.

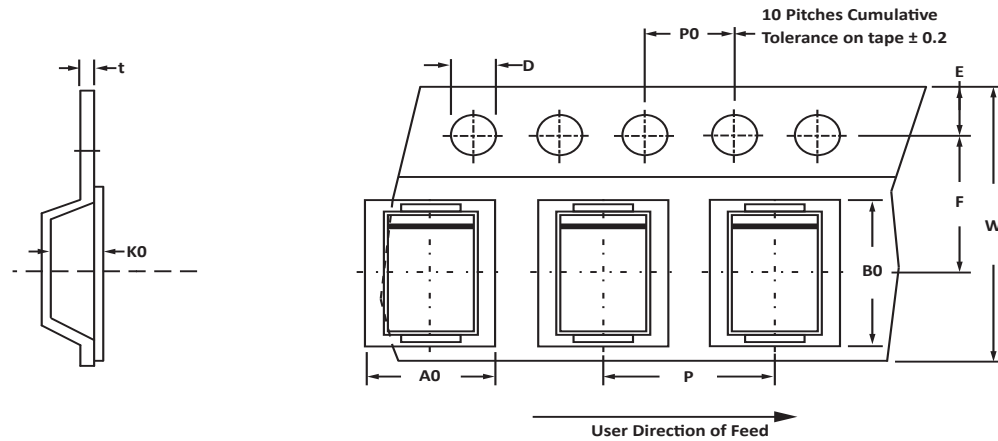


PAD LAYOUT DIMENSIONS

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|--------|------|
| | MIN | MAX | MIN | MAX |
| A | 2.03 | - | 0.080 | - |
| B | 1.91 | - | 0.075 | - |
| C | - | 2.54 | - | 1.00 |
| D | 1.91 | - | 0.075 | - |



TAPE AND REEL



SPECIFICATIONS

| REEL DIA. | TAPE WIDTH | A0 | B0 | K0 | D | E | F | W | P0 | P | tmax |
|-------------|------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|-------------|-------------|------|
| 330mm (13") | 12mm | 3.67 ± 0.10 | 5.69 ± 0.10 | 2.67 ± 0.10 | 1.55 ± 0.10 | 1.75 ± 0.10 | 5.5 ± 0.05 | 12.00 ± 0.30 | 4.00 ± 0.10 | 8.00 ± 0.10 | 0.4 |

NOTES

- Dimensions are in millimeters.
- Surface mount product is taped and reeled in accordance with EIA-481.
- Suffix - T13 = 13" Reel - 3,000 pieces per 12mm tape.
- Marking on Part - marking code (see page 2), date code, logo and cathode defined by polarity band.

ORDERING INFORMATION

| BASE PART NUMBER (xx = Voltage) | LEADFREE SUFFIX | TAPE SUFFIX | QTY/REEL | REEL SIZE | TUBE QTY |
|------------------------------------|-----------------|-------------|----------|-----------|----------|
| SMBJxx | N/A | -T13 | 3,000 | 13" | N/A |
| SMBJxxA | N/A | -T13 | 3,000 | 13" | N/A |
| SMBJxxC | N/A | -T13 | 3,000 | 13" | N/A |
| SMBJxxCA | N/A | -T13 | 3,000 | 13" | N/A |

This device is only available in a Lead-Free configuration.

COMPANY INFORMATION

COMPANY PROFILE

In business more than 20 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection and overcurrent protection components. These include transient voltage suppressor array (TVS arrays) avalanche breakdown diode, steering diode TVS array and electronics SMD chip fuses. These components deliver circuit protection in electronic systems from numerous overvoltage and overcurrent events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices also offers high performance interface and linear products. They include analog switches; multiplexers; LED drivers; LED wafer die for ESD protection; audio control ICs; RF and related high frequency products.

CONTACT US

Corporate Headquarters

2929 South Fair Lane
Tempe, Arizona 85282
USA

By Telephone

General: 602-431-8101
Sales: & Marketing: 602-414-5109
Customer Service: 602-414-5114
Product Technical Support: 602-414-5107

By Fax

General: 602-431-2288

By E-mail:

Asia Sales: asiasales@protekdevices.com
Europe Sales: europesales@protekdevices.com
U.S. Sales: ussales@protekdevices.com
Distributor Sales: distysales@protekdevices.com
Customer Service: service@protekdevices.com
Technical Support: support@protekdevices.com

ProTek Devices (Asia Pacific) Pte. Ltd.

8 Ubi Road 2, #06-19
Zervex
Singapore - 408538
Tel: +65-67488312
Fax: +65-67488313

Web

www.protekdevices.com

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