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SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

SMBJXXX(C)A

Product specification

Description

Transient voltage suppression diodes, also known as TVS diodes, are protective electronic parts that protect electrical equipment from voltage spikes introduced by wires.

Applications

- computer system
- domestic appliance
- video input


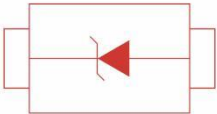


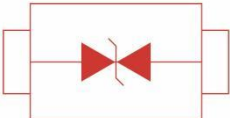

Features

- For surface mounted applications
- Excellent clamping capability
- 400 W peak pulse power capability with a 10/1000 μ s Waveform.
- V_{RWM} 3.3-440V
- Low profile package and low inductance
- Typical IR less than 1 μ A above 10 V
- Fast response time: typically less than 1.0ps from 0V to V_{BRmin} .

Mechanical Characteristics

- Package: SMA/DO-214AC
- Case Material:Molded Plastic. UL Flammability Classification Rating 94V-0 .RoHS compliant
- Moisture Sensitivity: Meet MSL 1
- Terminal: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
Weight: 0.07g(approximate)

Reference News

| PACKAGE OUTLINE | PIN CONFIGURATION | Marking Information |
|---|---|--|
|  |  |  |
| Unipolar | | |
|  |  |  |
| Bipolar | | |

Electrical Characteristics (T=25°C)

| Part Number | | Marking | | V _R | I _R @V _R | V _{BR} @I _T | | I _T | V _C @I _{PP} | I _{PP} ^① |
|-------------|-----------|----------|-----------|----------------|--------------------------------|---------------------------------|--------|----------------|---------------------------------|------------------------------|
| Uni-Polar | Bi-Polar | Uni | Bi | V | μA | min(V) | max(V) | mA | max(V) | A |
| SMBJ3.3A | / | SMBJ3.3A | / | 3.3 | 600 | 5.2 | 6 | 10 | 8.0 | 75.00 |
| SMBJ5.0A | SMBJ5.0CA | SMBJ5.0A | SMBJ5.0CA | 5.0 | 800 | 6.40 | 7.00 | 10 | 9.2 | 65.22 |
| SMBJ6.0A | SMBJ6.0CA | SMBJ6.0A | SMBJ6.0CA | 6.0 | 800 | 6.67 | 7.37 | 10 | 10.3 | 58.26 |
| SMBJ6.5A | SMBJ6.5CA | SMBJ6.5A | SMBJ6.5CA | 6.5 | 500 | 7.22 | 7.98 | 10 | 11.2 | 53.58 |
| SMBJ7.0A | SMBJ7.0CA | SMBJ7.0A | SMBJ7.0CA | 7.0 | 200 | 7.78 | 8.60 | 10 | 12.0 | 50.00 |
| SMBJ7.5A | SMBJ7.5CA | SMBJ7.5A | SMBJ7.5CA | 7.5 | 100 | 8.33 | 9.21 | 1 | 12.9 | 46.52 |
| SMBJ8.0A | SMBJ8.0CA | SMBJ8.0A | SMBJ8.0CA | 8.0 | 50 | 8.89 | 9.83 | 1 | 13.6 | 44.12 |
| SMBJ8.5A | SMBJ8.5CA | SMBJ8.5A | SMBJ8.5CA | 8.5 | 20 | 9.44 | 10.40 | 1 | 14.4 | 41.67 |
| SMBJ9.0A | SMBJ9.0CA | SMBJ9.0A | SMBJ9.0CA | 9.0 | 10 | 10.00 | 11.10 | 1 | 15.4 | 38.97 |
| SMBJ10A | SMBJ10CA | SMBJ10A | SMBJ10CA | 10.0 | 5 | 11.10 | 12.30 | 1 | 17.0 | 35.30 |
| SMBJ11A | SMBJ11CA | SMBJ11A | SMBJ11CA | 11.0 | 1 | 12.20 | 13.50 | 1 | 18.2 | 32.97 |
| SMBJ12A | SMBJ12CA | SMBJ12A | SMBJ12CA | 12.0 | 1 | 13.30 | 14.70 | 1 | 19.9 | 30.16 |
| SMBJ13A | SMBJ13CA | SMBJ13A | SMBJ13CA | 13.0 | 1 | 14.40 | 15.90 | 1 | 21.5 | 27.91 |
| SMBJ14A | SMBJ14CA | SMBJ14A | SMBJ14CA | 14.0 | 1 | 15.60 | 17.20 | 1 | 23.2 | 25.87 |
| SMBJ15A | SMBJ15CA | SMBJ15A | SMBJ15CA | 15.0 | 1 | 16.70 | 18.50 | 1 | 24.4 | 24.60 |
| SMBJ16A | SMBJ16CA | SMBJ16A | SMBJ16CA | 16.0 | 1 | 17.80 | 19.70 | 1 | 26.0 | 23.08 |
| SMBJ17A | SMBJ17CA | SMBJ17A | SMBJ17CA | 17.0 | 1 | 18.90 | 20.90 | 1 | 27.6 | 21.74 |
| SMBJ18A | SMBJ18CA | SMBJ18A | SMBJ18CA | 18.0 | 1 | 20.00 | 22.10 | 1 | 29.2 | 20.55 |
| SMBJ20A | SMBJ20CA | SMBJ20A | SMBJ20CA | 20.0 | 1 | 22.20 | 24.50 | 1 | 32.4 | 18.52 |
| SMBJ22A | SMBJ22CA | SMBJ22A | SMBJ22CA | 22.0 | 1 | 24.40 | 26.90 | 1 | 35.5 | 16.91 |
| SMBJ24A | SMBJ24CA | SMBJ24A | SMBJ24CA | 24.0 | 1 | 26.70 | 29.50 | 1 | 38.9 | 15.43 |
| SMBJ26A | SMBJ26CA | SMBJ26A | SMBJ26CA | 26.0 | 1 | 28.90 | 31.90 | 1 | 42.1 | 14.26 |
| SMBJ28A | SMBJ28CA | SMBJ28A | SMBJ28CA | 28.0 | 1 | 31.10 | 34.40 | 1 | 45.4 | 13.22 |
| SMBJ30A | SMBJ30CA | SMBJ30A | SMBJ30CA | 30.0 | 1 | 33.30 | 36.80 | 1 | 48.4 | 12.40 |
| SMBJ33A | SMBJ33CA | SMBJ33A | SMBJ33CA | 33.0 | 1 | 36.70 | 40.60 | 1 | 53.3 | 11.26 |
| SMBJ36A | SMBJ36CA | SMBJ36A | SMBJ36CA | 36.0 | 1 | 40.00 | 44.20 | 1 | 58.1 | 10.33 |
| SMBJ40A | SMBJ40CA | SMBJ40A | SMBJ40CA | 40.0 | 1 | 44.40 | 49.10 | 1 | 64.5 | 9.31 |
| SMBJ43A | SMBJ43CA | SMBJ43A | SMBJ43CA | 43.0 | 1 | 47.80 | 52.80 | 1 | 69.4 | 8.65 |
| SMBJ45A | SMBJ45CA | SMBJ45A | SMBJ45CA | 45.0 | 1 | 50.00 | 55.30 | 1 | 72.7 | 8.26 |
| SMBJ48A | SMBJ48CA | SMBJ48A | SMBJ48CA | 48.0 | 1 | 53.30 | 58.90 | 1 | 77.4 | 7.76 |
| SMBJ51A | SMBJ51CA | SMBJ51A | SMBJ51CA | 51.0 | 1 | 56.70 | 62.70 | 1 | 82.4 | 7.29 |
| SMBJ54A | SMBJ54CA | SMBJ54A | SMBJ54CA | 54.0 | 1 | 60.00 | 66.30 | 1 | 87.1 | 6.89 |
| SMBJ58A | SMBJ58CA | SMBJ58A | SMBJ58CA | 58.0 | 1 | 64.40 | 71.20 | 1 | 93.6 | 6.42 |
| SMBJ60A | SMBJ60CA | SMBJ60A | SMBJ60CA | 60.0 | 1 | 66.70 | 73.70 | 1 | 96.8 | 6.20 |
| SMBJ64A | SMBJ64CA | SMBJ64A | SMBJ64CA | 64.0 | 1 | 71.10 | 78.60 | 1 | 103.0 | 5.83 |

Electrical Characteristics (T=25°C)

| Part Number | | Marking | | V _R | I _R @V _R | V _{BR} @I _T | | I _T | V _C @I _{PP} | I _{PP} ^① |
|-------------|------------|----------|------------|----------------|--------------------------------|---------------------------------|--------|----------------|---------------------------------|------------------------------|
| Uni-Polar | Bi-Polar | Uni | Bi | V | μA | min(V) | max(V) | mA | max(V) | A |
| SMBJ70A | SMBJ70 CA | SMBJ70A | SMBJ70 CA | 70.0 | 1 | 77.80 | 86.00 | 1 | 113.0 | 5.31 |
| SMBJ75A | SMBJ75 CA | SMBJ75A | SMBJ75 CA | 75.0 | 1 | 83.30 | 92.10 | 1 | 121.0 | 4.96 |
| SMBJ78A | SMBJ78 CA | SMBJ78A | SMBJ78 CA | 78.0 | 1 | 86.70 | 95.80 | 1 | 126.0 | 4.77 |
| SMBJ85A | SMBJ85 CA | SMBJ85A | SMBJ85 CA | 85.0 | 1 | 94.40 | 104.0 | 1 | 137.0 | 4.38 |
| SMBJ90A | SMBJ90 CA | SMBJ90A | SMBJ90 CA | 90.0 | 1 | 100.0 | 111.0 | 1 | 146.0 | 4.11 |
| SMBJ100A | SMBJ100 CA | SMBJ100A | SMBJ100 CA | 100.0 | 1 | 111.0 | 123.0 | 1 | 162.0 | 3.71 |
| SMBJ110A | SMBJ110 CA | SMBJ110A | SMBJ110 CA | 110.0 | 1 | 122.0 | 135.0 | 1 | 177.0 | 3.39 |
| SMBJ120A | SMBJ120 CA | SMBJ120A | SMBJ120 CA | 120.0 | 1 | 133.0 | 147.0 | 1 | 193.0 | 3.11 |
| SMBJ130A | SMBJ130 CA | SMBJ130A | SMBJ130 CA | 130.0 | 1 | 144.0 | 159.0 | 1 | 209.0 | 2.88 |
| SMBJ150A | SMBJ150 CA | SMBJ150A | SMBJ150 CA | 150.0 | 1 | 167.0 | 185.0 | 1 | 243.0 | 2.47 |
| SMBJ160A | SMBJ160 CA | SMBJ160A | SMBJ160 CA | 160.0 | 1 | 178.0 | 197.0 | 1 | 259.0 | 2.32 |
| SMBJ170A | SMBJ170 CA | SMBJ170A | SMBJ170 CA | 170.0 | 1 | 189.0 | 209.0 | 1 | 275.0 | 2.19 |
| SMBJ180A | SMBJ180 CA | SMBJ180A | SMBJ180 CA | 180.0 | 1 | 201.0 | 222.0 | 1 | 292.0 | 2.06 |
| SMBJ190A | SMBJ190 CA | SMBJ190A | SMBJ190 CA | 190.0 | 1 | 209.0 | 233.0 | 1 | 308.0 | 1.96 |
| SMBJ200A | SMBJ200 CA | SMBJ200A | SMBJ200 CA | 200.0 | 1 | 224.0 | 247.0 | 1 | 324.0 | 1.86 |
| SMBJ210A | SMBJ210 CA | SMBJ210A | SMBJ210 CA | 210.0 | 1 | 237.0 | 263.0 | 1 | 340.0 | 1.79 |
| SMBJ220A | SMBJ220 CA | SMBJ220A | SMBJ220 CA | 220.0 | 1 | 246.0 | 272.0 | 1 | 356.0 | 1.69 |
| SMBJ250A | SMBJ250 CA | SMBJ250A | SMBJ250 CA | 250.0 | 1 | 279.0 | 309.0 | 1 | 405.0 | 1.49 |
| SMBJ300A | SMBJ300 CA | SMBJ300A | SMBJ300 CA | 300.0 | 1 | 335.0 | 371.0 | 1 | 486.0 | 1.24 |
| SMBJ350A | SMBJ350 CA | SMBJ350A | SMBJ350 CA | 350.0 | 1 | 391.0 | 432.0 | 1 | 567.0 | 1.06 |
| SMBJ400A | SMBJ400 CA | SMBJ400A | SMBJ400 CA | 400.0 | 1 | 447.0 | 494.0 | 1 | 648.0 | 0.93 |
| SMBJ440A | SMBJ440 CA | SMBJ440A | SMBJ440 CA | 440.0 | 1 | 492.0 | 543.0 | 1 | 713.0 | 0.85 |

Notes:

① Surge waveform: 10/1000μs

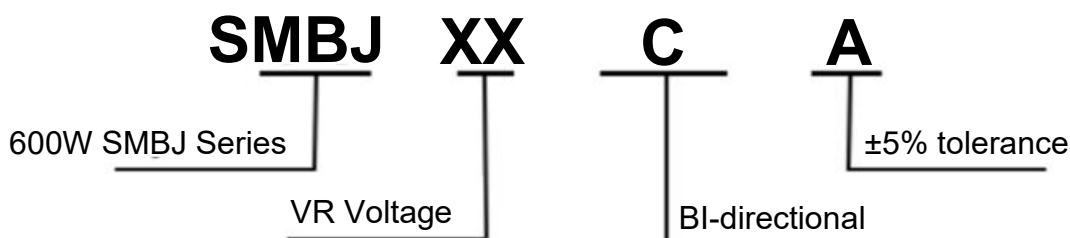
V_R : Stand-off Voltage -- Maximum voltage that can be applied

V_{BR}: Breakdown Voltage

V_C: Clamping Voltage -- Peak voltage measured across the suppressor at a specified I_{pp}

I_R: Reverse Leakage Current

Part number code

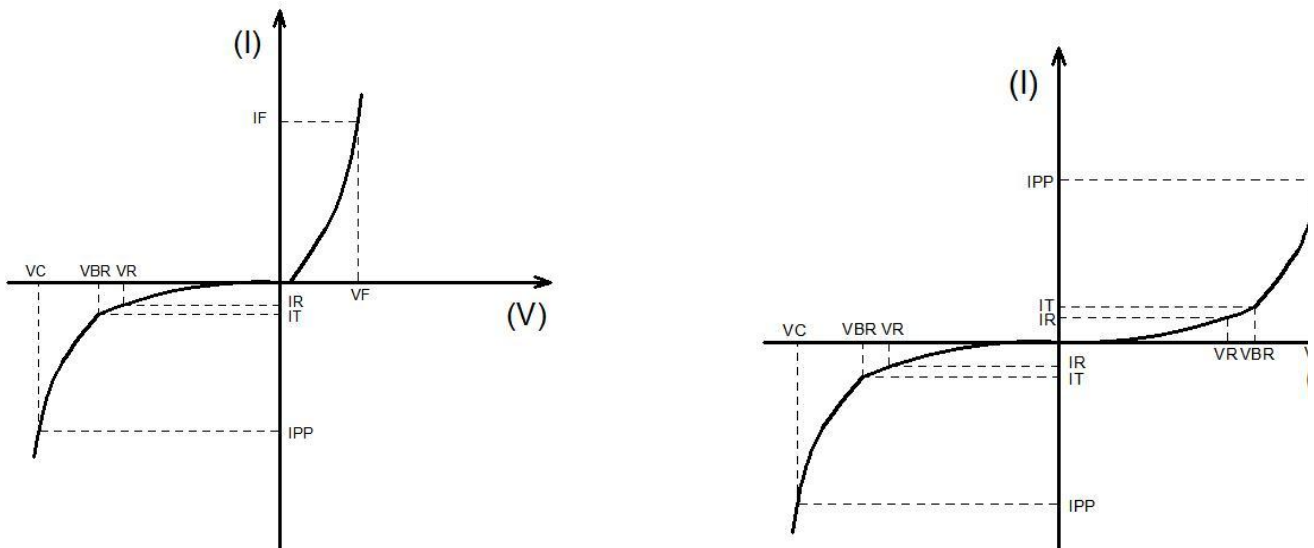


Absolute Maximum Ratings(T=25°C, RH=45%-75%, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|--------------------|-------------|------|
| Peak pulse power dissipation on 10/1000µs waveform | P _{PP} | 600 | W |
| Steady state power dissipation at T _L =75°C | P _{M(AV)} | 5.0 | W |
| Operating junction temperature range | T _j | -55 to +125 | °C |
| Storage temperature range | T _{stg} | -55 to +150 | °C |

Ratings And V-I Characteristics Curves (T=25°C, unless otherwise noted)

FIG1: V-I cure characteristics



| Symbol | Parameter |
|-----------------|--|
| I _F | Mean Forward Current |
| V _F | Maximum Forward Voltage @I _F |
| V _R | Peak Reverse Working Voltage |
| I _R | Reverse Leakage Current @ V _R |
| V _{BR} | Breakdown Voltage @ I _T |
| I _T | Test Current |
| I _{PP} | Maximum Reverse Peak Pulse Current |
| V _C | Clamping Voltage @ I _{PP} |

Typical Characteristics

FIG2: Pulse Derating Curve

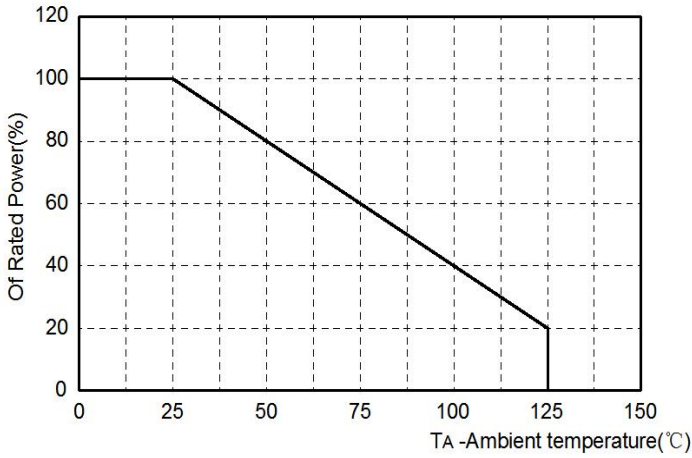


FIG3: Pulse Waveform

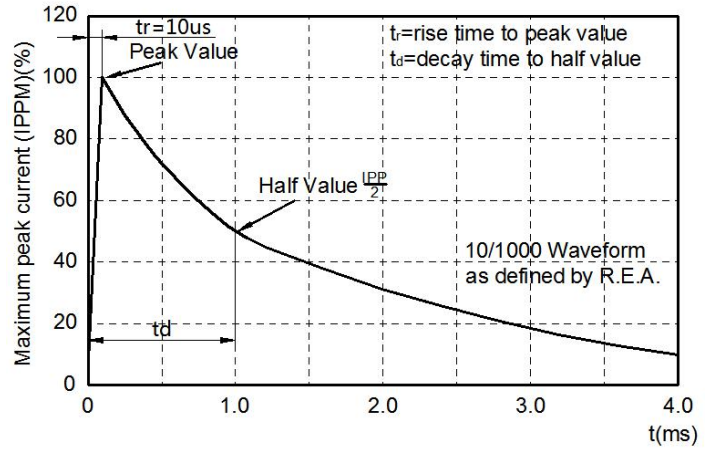


FIG4: Peak Pulse Power Rating Curve

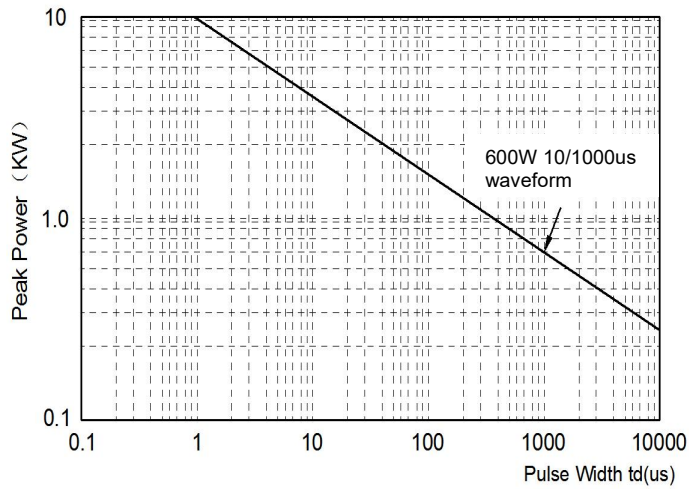
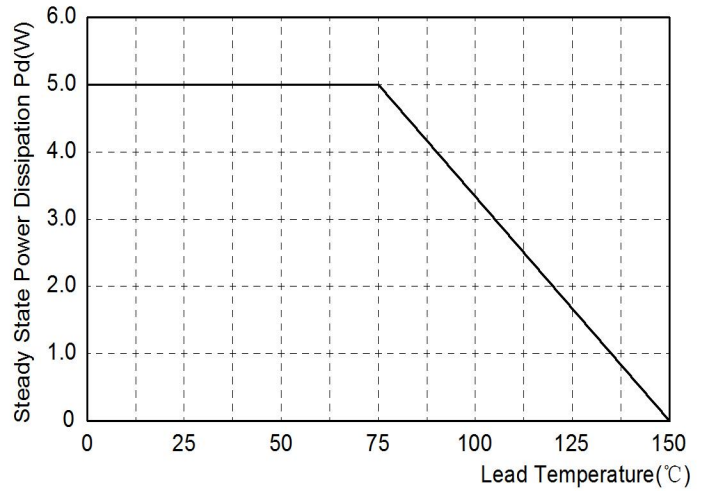
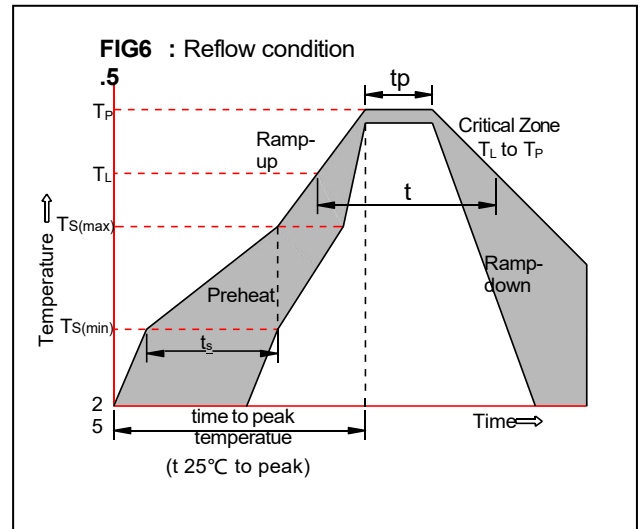


FIG5: Steady State Power Dissipation

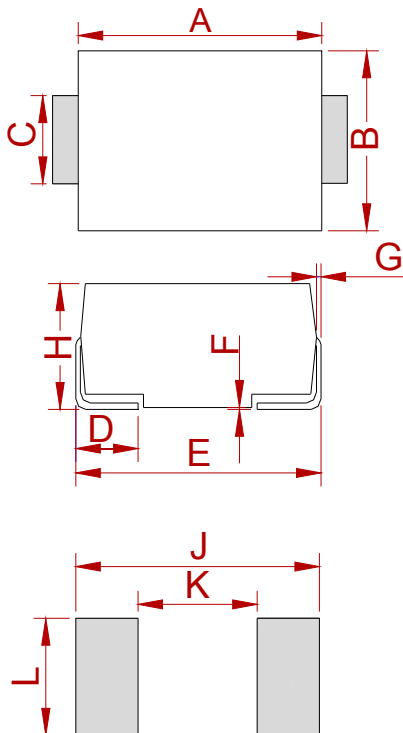


Soldering parameters

| ReflowCondition | | Pb-Free assembly (see as below) |
|---|-----------------------------------|------------------------------------|
| Pre Heat | -Temperature Min ($T_{s(min)}$) | +150°C |
| | -Temperature Max($T_{s(max)}$) | +200°C |
| | -Time (Min to Max) (t_s) | 60-180 secs. |
| Average ramp up rate (Liquid us Temp (T_L) to peak) | | 3°C/sec. Max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/sec. Max |
| Reflow | -Temperature(T_L)(Liquid us) | +217°C |
| | -Temperature(t_L) | 60-150 secs. |
| Peak Temp (T_P) | | +260(+0/-5)°C |
| Time within 5°C of actual Peak Temp (t_p) | | 30 secs. Max |
| Ramp-down Rate | | 6°C/sec. Max |
| Time 25°C to Peak Temp (T_P) | | 8 min. Max |
| Do not exceed | | +260°C |



PACKAGE ECHANICAL DATA



| Ref. | Dimensions | | | |
|------|-------------|-------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.25 | 4.75 | 0.167 | 0.187 |
| B | 3.30 | 3.94 | 0.130 | 0.155 |
| C | 1.85 | 2.21 | 0.073 | 0.087 |
| D | 0.76 | 1.52 | 0.030 | 0.060 |
| E | 5.08 | 5.59 | 0.200 | 0.220 |
| F | 0.051 | 0.203 | 0.002 | 0.008 |
| G | 0.15 | 0.31 | 0.006 | 0.012 |
| H | 2.11 | 2.44 | 0.083 | 0.096 |
| J | 6.80 | | 0.270 | |
| K | | 2.60 | | 0.100 |
| L | 2.40 | | 0.090 | |

REEL SPECIFICATION

| P/N | PKG | QTY |
|--------------|-----|------|
| SMBJXXXA(CA) | SMB | 3000 |

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