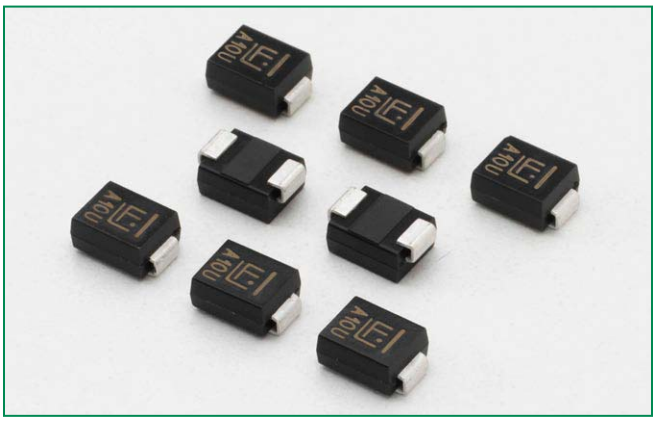
# RoHS 1KSMB Series



## Agency Approvals

| AGENCY | AGENCY FILE NUMBER |
|---|---|
| ® | E128662 |

## Maximum Ratings and Thermal Characteristics ($T_A$=25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Peak Pulse Power Dissipation at $T_A$=25°C by 10x1000µs waveform (Fig.1)(Note 1), (Note 2) | $P_{PPM}$ | 1000 | W |
| Power Dissipation on infinite heat sink at $T_A$=50°C | $P_{M(AV)}$ | 5.0 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3) | $I_{FSM}$ | 100 | A |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional only (Note 4) | $V_F$ | 3.5V/5.0 | V |
| Operating Junction and Storage Temperature Range | $T_J$, $T_{STG}$ | -65 to 150 | °C |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 20 | °C/W |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 100 | °C/W |

**Notes:**

1. Non-repetitive current pulse , per Fig. 3 and derated above $T_A$ = 25°C per Fig. 2.
2. Mounted on copper pad area of 0.2x0.2" (5.0 x 5.0mm) to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.
4. $V_F$<3.5V for $V_{BR} \leq$ 50V and $V_F$<5.0V for $V_{BR} \geq$ 51V.

## Description

The 1KSMB series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

## Features

- RoHS compliant
- For surface mounted applications to optimize board space
- Low profile package
- Built-in strain relief
- Typical maximum temperature coefficient $\Delta V_{BR}$ = 0.1% × $V_{BR}$@25°C
- Glass passivated chip junction
- 1000W peak pulse power capability at 10×1000µs waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ps from 0V to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical $I_R$ less than 1µA above 12V
- High Temperature soldering guaranteed: 260°C/40 seconds at terminals
- Plastic package has Underwriters Laboratory Flammability 94V-O
- Matte Tin Lead–free Plated
- Available in breakdown Voltage from 6.8V to 160V specially designed for automotive applications
- Offers High-Surge rating in compact package: bridges the gap between 600W and 1.5KW

## Applications

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


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## Electrical Characteristics

| Part Number (Uni) | Part Number (Bi) | Marking | | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$ | | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_C$ @ $I_{pp}$ (V) | Maximum Peak Pulse Current $I_{pp}$ (A) | Maximum Reverse Leakage $I_R$ @ $V_R$ (µA) | Agency Approval |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNI | BI | | MIN | MAX | | | | | |
| 1KSMB6.8A | 1KSMB6.8CA | A10A | N10A | 5.80 | 6.45 | 7.14 | 10 | 10.5 | 95.2 | 900 | x |
| 1KSMB7.5A | 1KSMB7.5CA | A10B | N10B | 6.40 | 7.13 | 7.88 | 10 | 11.3 | 88.5 | 400 | x |
| 1KSMB8.2A | 1KSMB8.2CA | A10C | N10C | 7.02 | 7.79 | 8.61 | 10 | 12.1 | 82.6 | 180 | x |
| 1KSMB9.1A | 1KSMB9.1CA | A10D | N10D | 7.78 | 8.65 | 9.55 | 1 | 13.4 | 74.6 | 45 | x |
| 1KSMB10A | 1KSMB10CA | A10E | N10E | 8.55 | 9.50 | 10.50 | 1 | 14.5 | 69.0 | 8 | x |
| 1KSMB11A | 1KSMB11CA | A10F | N10F | 9.40 | 10.50 | 11.60 | 1 | 15.6 | 64.1 | 4 | x |
| 1KSMB12A | 1KSMB12CA | A10G | N10G | 10.20 | 11.40 | 12.60 | 1 | 16.7 | 59.9 | 1 | x |
| 1KSMB13A | 1KSMB13CA | A10H | N10H | 11.10 | 12.40 | 13.70 | 1 | 18.2 | 54.9 | 1 | x |
| 1KSMB15A | 1KSMB15CA | A10I | N10I | 12.80 | 14.30 | 15.80 | 1 | 21.2 | 47.2 | 1 | x |
| 1KSMB16A | 1KSMB16CA | A10J | N10J | 13.60 | 15.20 | 16.80 | 1 | 22.5 | 44.4 | 1 | x |
| 1KSMB18A | 1KSMB18CA | A10K | N10K | 15.30 | 17.10 | 18.90 | 1 | 25.5 | 39.2 | 1 | x |
| 1KSMB20A | 1KSMB20CA | A10L | N10L | 17.10 | 19.00 | 21.00 | 1 | 27.7 | 36.1 | 1 | x |
| 1KSMB22A | 1KSMB22CA | A10M | N10M | 18.80 | 20.90 | 23.10 | 1 | 30.6 | 32.7 | 1 | x |
| 1KSMB24A | 1KSMB24CA | A10N | N10N | 20.50 | 22.80 | 25.20 | 1 | 33.2 | 30.1 | 1 | x |
| 1KSMB27A | 1KSMB27CA | A10O | N10O | 23.10 | 25.70 | 28.40 | 1 | 37.5 | 26.7 | 1 | x |
| 1KSMB30A | 1KSMB30CA | A10P | N10P | 25.60 | 28.50 | 31.50 | 1 | 41.4 | 24.2 | 1 | x |
| 1KSMB33A | 1KSMB33CA | A10Q | N10Q | 28.20 | 31.40 | 34.70 | 1 | 45.7 | 21.9 | 1 | x |
| 1KSMB36A | 1KSMB36CA | A10R | N10R | 30.80 | 34.20 | 37.80 | 1 | 49.9 | 20.0 | 1 | x |
| 1KSMB39A | 1KSMB39CA | A10S | N10S | 33.30 | 37.10 | 41.00 | 1 | 53.9 | 18.6 | 1 | x |
| 1KSMB43A | 1KSMB43CA | A10T | N10T | 36.80 | 40.90 | 45.20 | 1 | 59.3 | 16.9 | 1 | x |
| 1KSMB47A | 1KSMB47CA | A10U | N10U | 40.20 | 44.70 | 49.40 | 1 | 64.8 | 15.4 | 1 | x |
| 1KSMB51A | 1KSMB51CA | A10V | N10V | 43.60 | 48.50 | 53.60 | 1 | 70.1 | 14.3 | 1 | x |
| 1KSMB56A | 1KSMB56CA | A10W | N10W | 47.80 | 53.20 | 58.80 | 1 | 77.0 | 13.0 | 1 | x |
| 1KSMB62A | 1KSMB62CA | A10X | N10X | 53.00 | 58.90 | 65.10 | 1 | 85.0 | 11.8 | 1 | x |
| 1KSMB68A | 1KSMB68CA | A10Y | N10Y | 58.10 | 64.60 | 71.40 | 1 | 92.0 | 10.9 | 1 | x |
| 1KSMB75A | 1KSMB75CA | A10Z | N10Z | 64.10 | 71.30 | 78.80 | 1 | 103.0 | 9.7 | 1 | x |
| 1KSMB82A | 1KSMB82CA | B10A | O10A | 70.10 | 77.90 | 86.10 | 1 | 113.0 | 8.8 | 1 | x |
| 1KSMB91A | 1KSMB91CA | B10B | O10B | 77.80 | 86.50 | 95.50 | 1 | 125.0 | 8.0 | 1 | x |
| 1KSMB100A | 1KSMB100CA | B10C | O10C | 85.50 | 95.00 | 105.00 | 1 | 137.0 | 7.3 | 1 | x |
| 1KSMB110A | 1KSMB110CA | B10D | O10D | 94.00 | 105.00 | 116.00 | 1 | 152.0 | 6.6 | 1 | |
| 1KSMB120A | 1KSMB120CA | B10E | O10E | 102.00 | 114.00 | 126.00 | 1 | 165.0 | 6.1 | 1 | |
| 1KSMB130A | 1KSMB130CA | B10F | O10F | 111.00 | 124.00 | 137.00 | 1 | 179.0 | 5.6 | 1 | |
| 1KSMB150A | 1KSMB150CA | B10G | O10G | 128.00 | 143.00 | 158.00 | 1 | 207.0 | 4.8 | 1 | |
| 1KSMB160A | 1KSMB160CA | B10H | O10H | 136.00 | 152.00 | 168.00 | 1 | 219.0 | 4.6 | 1 | |

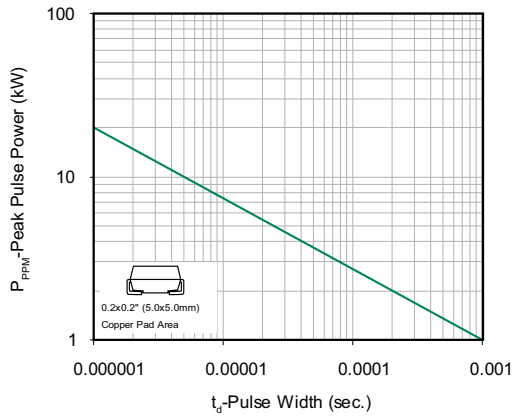
For bidirectional type having $V_R$ of 10 volts and less, the $I_R$ limit is double.

The avaliable parts are "A" type only, the parts without A ($V_{BR}$ is ± 10%) is not avaliable.

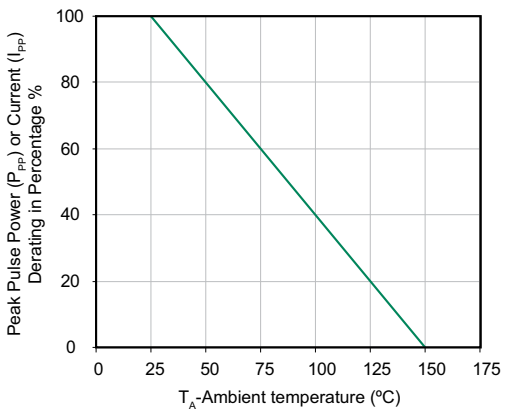

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## Ratings and Characteristic Curves ($T_A$=25°C unless otherwise noted)

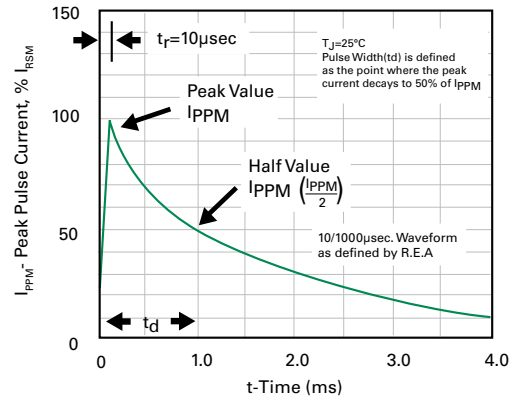
### Figure 1 - Peak Pulse Power Rating Curve



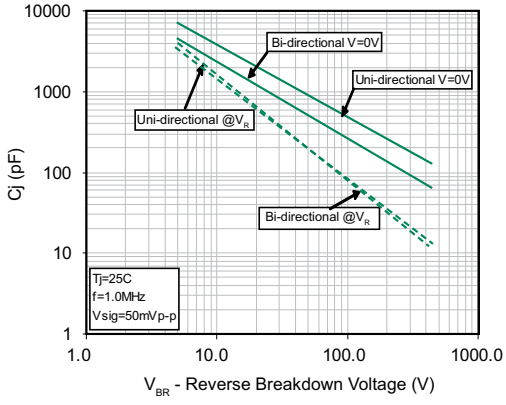

### Figure 2 - Pulse Derating Curve



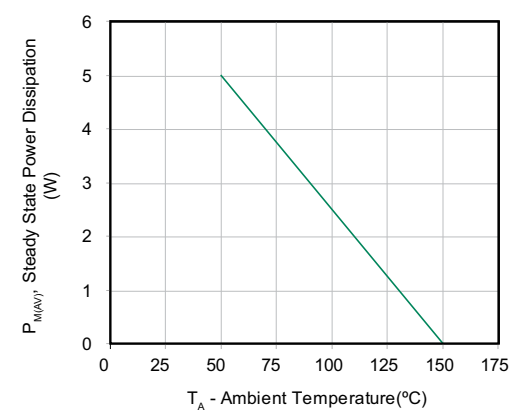

### Figure 3 - Pulse Waveform



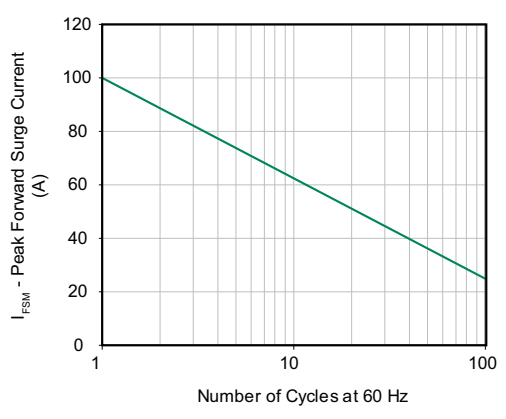

### Figure 4 - Typical Junction Capacitance




### Figure 5 - Steady State Power Dissipation Derating Curve




### Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only

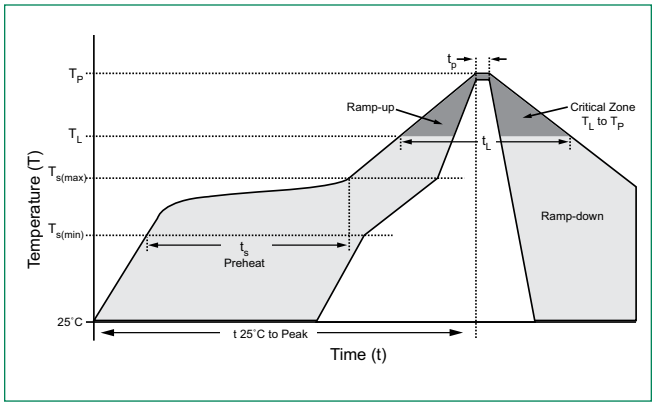




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## Soldering Parameters

| | | |
|---|---|---|
| Reflow Condition | | Lead–free assembly |
| 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 (Liquidus Temp ($T_L$) to peak | | 3°C/second max |
| $T_{S(max)}$ to $T_L$ - Ramp-up Rate | | 3°C/second max |
| Reflow | -Temperature ($T_L$) (Liquidus) | 217°C |
| | -Time (min to max) ($t_s$) | 60 – 150 seconds |
| Peak Temperature ($T_P$) | | $260^{+0/-5}$ °C |
| Time within 5°C of actual peak Temperature ($t_p$) | | 20 – 40 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature ($T_P$) | | 8 minutes Max. |
| Do not exceed | | 280°C |




## Physical Specifications

| | |
|---|---|
| **Weight** | 0.003 ounce, 0.093 grams |
| **Case** | JEDEC DO214AA. Molded plastic body over glass passivated junction |
| **Polarity** | Color band denotes cathode except Bidirectional. |
| **Terminal** | Matte Tin-plated leads, Solderable per JESD22-B102D |

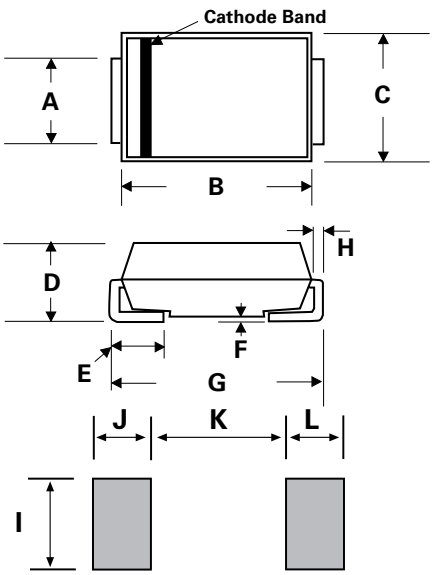
## Environmental Specifications

| | |
|---|---|
| **Temperature Cycle** | JESD22-A104 |
| **Pressure Cooker** | JESD 22-A102 |
| **High Temp. Storage** | JESD22-A103 |
| **HTRB** | JESD22-A108 |
| **Thermal Shock** | JESD22-A106 |


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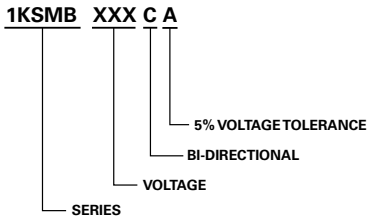
## Dimensions

**DO-214AA (SMB J-Bend)**

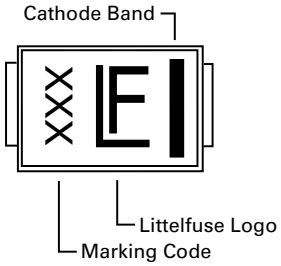



| Dimensions | Inches | | Millimeters | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.077 | 0.086 | 1.950 | 2.200 |
| B | 0.160 | 0.180 | 4.060 | 4.570 |
| C | 0.130 | 0.155 | 3.300 | 3.940 |
| D | 0.084 | 0.096 | 2.130 | 2.440 |
| E | 0.030 | 0.060 | 0.760 | 1.520 |
| F | - | 0.008 | - | 0.203 |
| G | 0.205 | 0.220 | 5.210 | 5.590 |
| H | 0.006 | 0.012 | 0.152 | 0.305 |
| I | 0.089 | - | 2.260 | - |
| J | 0.085 | - | 2.160 | - |
| K | - | 0.107 | - | 2.740 |
| L | 0.085 | - | 2.160 | - |

## Part Numbering System




## Part Marking System




## Packaging

| Part number | Component Package | Quantity | Packaging Option | Packaging Specification |
|---|---|---|---|---|
| 1KSMBxxxXX | DO-214AA | 3000 | Tape & Reel – 12mm/13" tape | EIA STD RS-481 |


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