

## ➤ Features

- Size 0.12\*0.10 inch /3.2\*2.5 mm
- RoHS compliant, lead-free and halogen-free
- Fast response to fault current
- Low resistance
- Low profile
- Compatible with high temperature solders

## ➤ Applications

- Computer, Mobile phones, Multimedia
- Automotive, Industrial controls, Telephony and broadband
- Game machines, Portable electronics, Battery

## ➤ Electrical Characteristics (25°C)

| Part Number        | $I_{hold}$ | $I_{trip}$ | $V_{max}$          | $I_{max}$ | $P_{d\ typ}$ | Time to trip |       | $R_{min}$ | $R_{1max}$ |
|--------------------|------------|------------|--------------------|-----------|--------------|--------------|-------|-----------|------------|
|                    | (A)        | (A)        | (V <sub>dc</sub> ) | (A)       | (W)          | (A)          | (Sec) | (Ω)       | (Ω)        |
| BSMD1210-005-30V   | 0.05       | 0.15       | 30                 | 40        | 0.6          | 0.25         | 1.50  | 2.800     | 50.00      |
| BSMD1210-005-60V   | 0.05       | 0.15       | 60                 | 40        | 0.6          | 0.25         | 1.50  | 2.800     | 50.00      |
| BSMD1210-010-30V   | 0.10       | 0.34       | 30                 | 40        | 0.6          | 0.50         | 0.60  | 0.800     | 15.00      |
| BSMD1210-010-60V   | 0.10       | 0.34       | 60                 | 40        | 0.6          | 0.50         | 0.60  | 0.800     | 15.00      |
| BSMD1210-020-30V   | 0.20       | 0.40       | 30                 | 40        | 0.6          | 8.00         | 0.02  | 0.400     | 5.000      |
| BSMD1210-020-60V   | 0.20       | 0.40       | 60                 | 40        | 0.6          | 8.00         | 0.02  | 0.400     | 5.000      |
| BSMD1210-035-6V    | 0.35       | 0.70       | 6                  | 100       | 0.6          | 8.00         | 0.20  | 0.200     | 1.300      |
| BSMD1210-035-16V   | 0.35       | 0.70       | 16                 | 100       | 0.6          | 8.00         | 0.20  | 0.200     | 1.300      |
| BSMD1210-050-13.2V | 0.50       | 1.00       | 13.2               | 100       | 0.6          | 8.00         | 0.10  | 0.180     | 0.900      |
| BSMD1210-050-24V   | 0.50       | 1.00       | 24                 | 100       | 0.6          | 8.00         | 0.10  | 0.180     | 0.900      |
| BSMD1210-075-6V    | 0.75       | 1.50       | 6                  | 100       | 0.6          | 8.00         | 0.10  | 0.070     | 0.400      |
| BSMD1210-075-16V   | 0.75       | 1.50       | 16                 | 100       | 0.6          | 8.00         | 0.10  | 0.070     | 0.400      |
| BSMD1210-110-6V    | 1.10       | 2.20       | 6                  | 100       | 0.6          | 8.00         | 0.30  | 0.050     | 0.230      |
| BSMD1210-110-12V   | 1.10       | 2.20       | 12                 | 100       | 0.6          | 8.00         | 0.30  | 0.050     | 0.230      |
| BSMD1210-150-6V    | 1.50       | 3.00       | 6                  | 100       | 0.8          | 8.00         | 0.50  | 0.030     | 0.110      |
| BSMD1210-150-12V   | 1.50       | 3.00       | 12                 | 100       | 0.8          | 8.00         | 0.50  | 0.030     | 0.110      |
| BSMD1210-175-6V    | 1.75       | 3.50       | 6                  | 100       | 0.8          | 8.00         | 0.60  | 0.020     | 0.080      |
| BSMD1210-200-6V    | 2.00       | 4.00       | 6                  | 100       | 0.8          | 8.00         | 1.00  | 0.015     | 0.070      |

$I_{hold}$  = Hold current: maximum current device will pass without tripping in 25°C still air.

$I_{trip}$  = Trip current: minimum current at which the device will trip in 25°C still air.

$V_{max}$  = Maximum voltage device can withstand without damage at rated current ( $I_{max}$ ).

$I_{max}$  = Maximum fault current device can withstand without damage at rated voltage ( $V_{max}$ ).

$P_{d\ typ.}$  = Typical power dissipated from device when in the tripped state at 25°C still air.

$R_{min}$  = Minimum resistance of device in initial (un-soldered) state.

$R_{1max}$  = Maximum resistance of device at 25°C measured one hour after tripping or reflow soldering of 260°C for 20 sec.

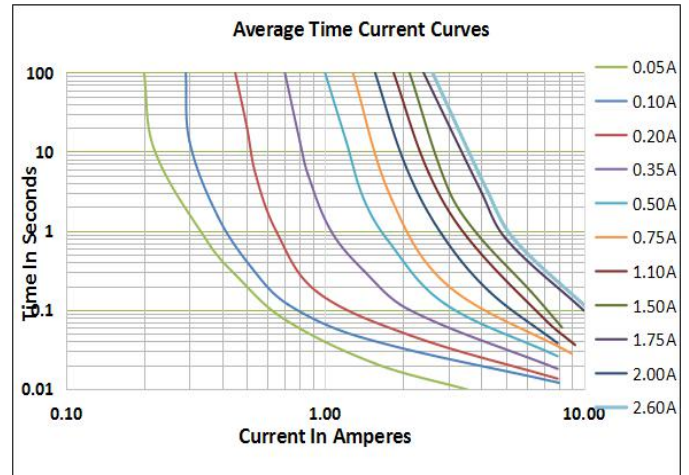
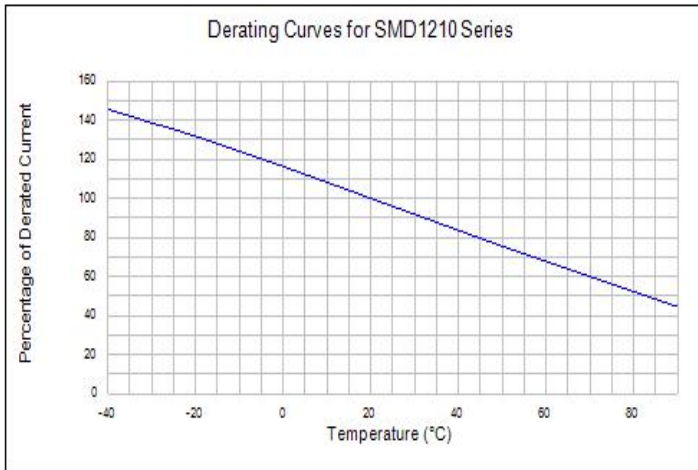
**Caution:** Operation beyond the specified ratings may result in damage and possible arcing and flame.

## ➤ WARNING

- Users shall independently assess the suitability of these devices for each of their applications.
- Operation of these devices beyond the stated maximum ratings could result in damage to the devices and lead to electrical arcing and/or fire.
- These devices are intended to protect against the effects of temporary over-current or over-temperature conditions and are not intended to perform as protective devices where such conditions are expected to be repetitive or prolonged in duration.
- Exposure to silicon-based oils, solvents, electrolytes, acids, and similar materials can adversely affect the prolonged of these PPTC devices.
- These devices undergo thermal expansion under fault conditions, and thus shall be provided with adequate space and be protected against mechanical stresses.
- Circuits with inductance may generate a voltage ( $L di/dt$ ) above the rated voltage of the PPTC device.

➤ Thermal Derating Curve

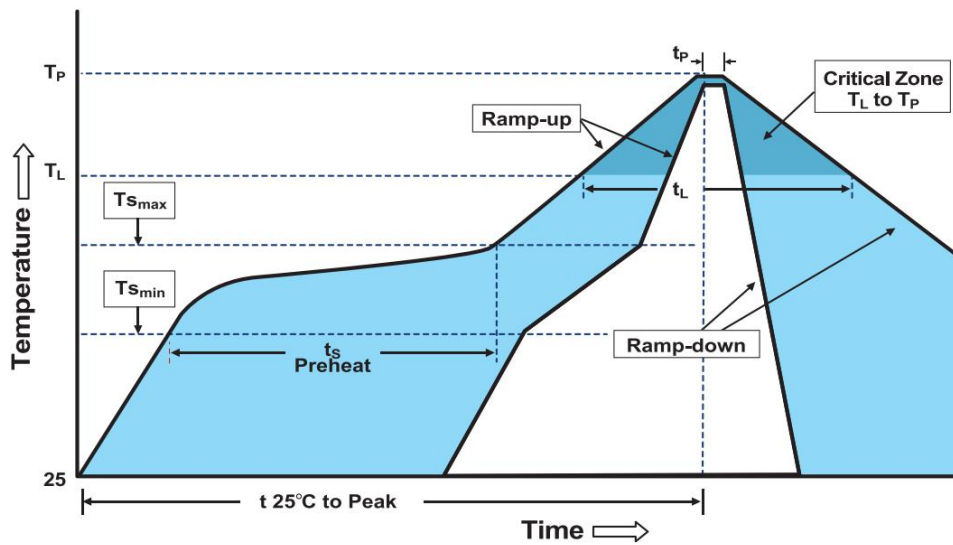
➤ Typical Time-to-Trip At 25°C



➤ Thermal Derating Chart

| Part Number  | Ambient operating temperature hold current( $I_{hold}$ ) |       |      |      |      |      |      |      |      |
|--------------|--|-------|------|------|------|------|------|------|------|
|              | -40°C  | -20°C | 0°C  | 25°C | 40°C | 50°C | 60°C | 70°C | 85°C |
| BSMD1210-005 | 0.08   | 0.07  | 0.06 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.02 |
| BSMD1210-010 | 0.16   | 0.14  | 0.12 | 0.10 | 0.08 | 0.07 | 0.06 | 0.05 | 0.03 |
| BSMD1210-020 | 0.29   | 0.26  | 0.22 | 0.20 | 0.16 | 0.14 | 0.13 | 0.11 | 0.08 |
| BSMD1210-035 | 0.47   | 0.45  | 0.40 | 0.35 | 0.33 | 0.28 | 0.24 | 0.21 | 0.18 |
| BSMD1210-050 | 0.76   | 0.67  | 0.58 | 0.50 | 0.43 | 0.40 | 0.36 | 0.32 | 0.28 |
| BSMD1210-075 | 1.00   | 0.97  | 0.86 | 0.75 | 0.64 | 0.59 | 0.54 | 0.48 | 0.40 |
| BSMD1210-110 | 1.69   | 1.48  | 1.29 | 1.10 | 0.88 | 0.76 | 0.65 | 0.57 | 0.43 |
| BSMD1210-150 | 2.13   | 1.92  | 1.71 | 1.50 | 1.26 | 1.14 | 1.01 | 0.89 | 0.71 |
| BSMD1210-175 | 2.54   | 2.30  | 2.02 | 1.75 | 1.47 | 1.33 | 1.18 | 1.05 | 0.86 |
| BSMD1210-200 | 2.90   | 2.63  | 2.31 | 2.00 | 1.68 | 1.52 | 1.35 | 1.20 | 0.98 |

➤ Soldering Parameters



| Profile Feature                                | Pb-Free Assembly     |
|--|----------------------|
| Average Ramp-Up Rate( $T_{s_{max}}$ to $T_p$ ) | 3°C/second max       |
| <b>Preheat</b>                                 |                      |
| -Temperature Min( $T_{s_{min}}$ )              | 150°C                |
| -Temperature Max( $T_{s_{max}}$ )              | 200°C                |
| -Time( $T_{s_{min}}$ to $T_{s_{max}}$ )        | 60~180 seconds       |
| <b>Time maintained above:</b>                  |                      |
| -Temperature( $T_L$ )                          | 217°C                |
| -Time( $t_L$ )                                 | 60~150 seconds       |
| <b>Peak Temperature(<math>T_p</math>)</b>      | 260°C                |
| <b>Ramp-Down Rate</b>                          | 6°C/second max       |
| <b>Time 25°C to Peak Temperature</b>           | 8 minutes max        |
| <b>Storage Condition</b>                       | 0°C ~30°C, 30%-60%RH |

- Recommended reflow methods: IR, vapor phase oven, hot air oven, N<sub>2</sub> environment for lead-free.
- Recommended maximum paste thickness is 0.25mm.
- Devices can be cleaned using standard industry methods and solvents.

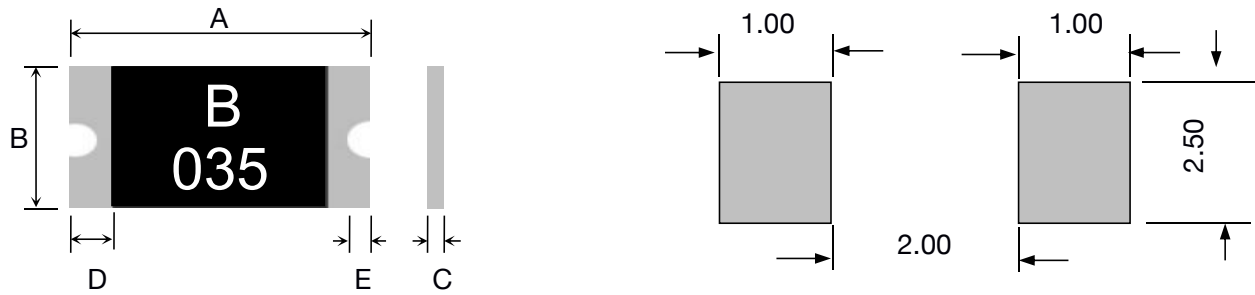
**Note 1: All temperature refer to topside of the package, measured on the package body surface.**

**Note 2: If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.**

➤ Environmental Specifications

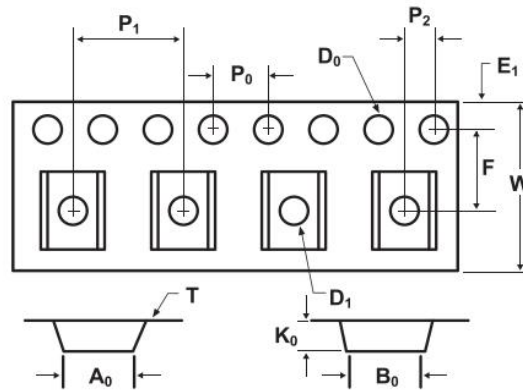
| Test  | Conditions                  | Resistance change |
|---|-----------------------------|-------------------|
| Passive aging   | +85°C, 1000 hrs.            | ±5% typical       |
| Humidity aging  | +85°C, 85% R.H. , 168 hours | ±5% typical       |
| Thermal shock   | +85°C to -40°C, 20 times    | ±33% typical      |
| Resistance to solvent   | MIL-STD-202,Method 215      | No change         |
| Vibration   | MIL-STD-202,Method 201      | No change         |
| <b>Ambient operating conditions : - 40 °C to +85 °C</b>                         |                             |                   |
| <b>Maximum surface temperature of the device in the tripped state is 125 °C</b> |                             |                   |

➤ Physical Dimensions & Recommended Pad Layout (mm)



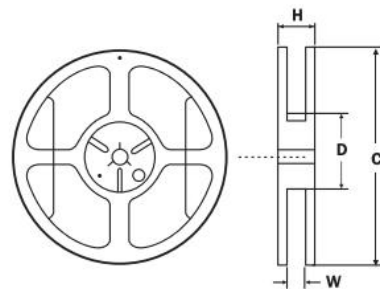
| Part Number        | Marking | Quantity | A    |      | B    |      | C    |      | D    | E    |
|--------------------|---------|----------|------|------|------|------|------|------|------|------|
|                    |         |          | Min  | Max  | Min  | Max  | Min  | Max  | Min  | Min  |
| BSMD1210-005-30V   | B005    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.60 | 1.20 | 0.30 | 0.10 |
| BSMD1210-005-60V   | B005    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.60 | 1.20 | 0.30 | 0.10 |
| BSMD1210-010-30V   | B010    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.60 | 1.20 | 0.30 | 0.10 |
| BSMD1210-010-60V   | B010    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.60 | 1.20 | 0.30 | 0.10 |
| BSMD1210-020-30V   | B020    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.10 | 0.30 | 0.10 |
| BSMD1210-020-60V   | B020    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.10 | 0.30 | 0.10 |
| BSMD1210-035-6V    | B035    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.10 | 0.30 | 0.10 |
| BSMD1210-035-16V   | B035    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.10 | 0.30 | 0.10 |
| BSMD1210-050-13.2V | B050    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.10 | 0.30 | 0.10 |
| BSMD1210-050-24V   | B050    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.10 | 0.30 | 0.10 |
| BSMD1210-075-6V    | B075    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.10 | 0.30 | 0.10 |
| BSMD1210-075-16V   | B075    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.10 | 0.30 | 0.10 |
| BSMD1210-110-6V    | B110    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.10 | 0.30 | 0.10 |
| BSMD1210-110-12V   | B110    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.10 | 0.30 | 0.10 |
| BSMD1210-150-6V    | B150    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.20 | 0.30 | 0.10 |
| BSMD1210-150-12V   | B150    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.50 | 1.20 | 0.30 | 0.10 |
| BSMD1210-175-6V    | B175    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.80 | 1.40 | 0.30 | 0.10 |
| BSMD1210-200-6V    | B200    | 4000     | 3.00 | 3.50 | 2.35 | 2.80 | 0.80 | 1.40 | 0.30 | 0.10 |

➤ Tape And Reel Specifications (mm)



| Governing Specifications | BSMD1210-005-30V~<br>BSMD1210-035-16V | BSMD1210-050-13.2V~<br>BSMD1210-175-6V | BSMD1210-200-6V~<br>BSMD1210-260-6V |
|--------------------------|---------------------------------------|--|-------------------------------------|
| W                        | 8.0 ± 0.3                             | 8.0 ± 0.3                              | 8.0 ± 0.3                           |
| F                        | 3.5 ± 0.05                            | 3.5 ± 0.05                             | 3.5 ± 0.05                          |
| E1                       | 1.75 ± 0.1                            | 1.75 ± 0.1                             | 1.75 ± 0.1                          |
| D0                       | 1.55 ± 0.05                           | 1.55 ± 0.05                            | 1.55 ± 0.05                         |
| D1                       | 1.0 ± 0.1                             | 1.0 ± 0.1                              | 1.0 ± 0.1                           |
| P0                       | 4.0 ± 0.1                             | 4.0 ± 0.1                              | 4.0 ± 0.1                           |
| P1                       | 4.0 ± 0.1                             | 4.0 ± 0.1                              | 4.0 ± 0.1                           |
| P2                       | 2.0 ± 0.05                            | 2.0 ± 0.05                             | 2.0 ± 0.05                          |
| A0                       | 2.9 ± 0.1                             | 2.9 ± 0.1                              | 2.9 ± 0.1                           |
| B0                       | 3.65 ± 0.1                            | 3.65 ± 0.1                             | 3.65 ± 0.1                          |
| T                        | 0.2 ± 0.1                             | 0.2 ± 0.1                              | 0.2 ± 0.1                           |
| K0                       | 0.74 ± 0.1                            | 1.04 ± 0.1                             | 1.35 ± 0.1                          |
| Leader <sub>min</sub>    | 390                                   | 390                                    | 390                                 |
| Trailer <sub>min</sub>   | 160                                   | 160                                    | 160                                 |

| Reel Dimensions |             |
|-----------------|-------------|
| C               | φ178 ± 1.0  |
| D               | φ60.2 ± 0.5 |
| H               | 11.0 ± 0.5  |
| W               | 9.0 ± 1.5   |



➤ Contact information

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