

PolySwitch Surface-mount

Resettable Devices

More than ten years ago, Raychem Circuit Protection introduced the SMD product family, and polymeric PTC devices quickly became the computer industry standard for keyboard, mouse, and disk drive protection. In 1995, Raychem Circuit Protection advanced the technology, reducing the size and cost of surface-mount resettable devices with the introduction of its miniSMD product series. The recent additions to the surface-mount family include the nanoSMD series, which reduces the size to a 3216mm (1206mils) foot print, one-third the size of the popular miniSMD series.



4

Benefits:

- Smaller size saves board space and cost
- Many product choices give engineers more design flexibility
- Compatible with high-volume electronics assembly
- Assists in meeting regulatory requirements
- Higher voltage ratings allow use in new applications

Features:

- Broadest range of resettable devices available in the industry
- Current ratings from 0.05 to 3A
- Voltage ratings from 6V computer and electronic applications to 60V (600V Telecom)
- Agency recognition: UL, CSA, TÜV
- Small footprint
- Fast time-to-trip
- Low resistance

Applications:

- Computer motherboards
- Modems
- USB hub, ports and peripherals
- IEEE1394 ports
- Digital cameras
- Disk drives
- CD-ROMs
- Game machines
- Battery packs
- Phones
- Fax machines
- Analog and digital line cards
- Printers
- PDAs
- Chargers

Products in this section are grouped by:

Product Dimensions, Product Series, Hold Current

Step 1. Determine the circuit's operating parameters.

Fill in the following information about the circuit:

Maximum ambient operating temperature _____

Normal operating current _____

Maximum operating voltage
(i.e. miniSMDC014 is $60V_{DC}$ max.) _____

Maximum interrupt current _____

Step 2. Select the PolySwitch device that will accommodate the circuit's maximum ambient temperature and normal operating current.

Look across the top of Table S2 to find the temperature that most closely matches the circuit's maximum operating temperature. Look down that column to find the value equal to or greater than the circuit's normal operating current. Now look to the far left of that row to find the part number for the PolySwitch surface-mount device that will best accommodate the circuit. Devices in this section are grouped by device dimensions, so your operating-current requirement may be found in more than one grouping.

The thermal derating curves located in Figure S1 are the normalized representations of the data in Table S2.

Step 3. Compare the selected device's maximum electrical ratings with the circuit's maximum operating voltage and interrupt current.

Look down the first column of Table S3 to find the part number you selected in Step 2. Look to the right in that row to find the device's maximum operating voltage (V_{MAX}) and maximum interrupt current (I_{MAX}). Ensure that V_{MAX} and I_{MAX} are greater than or equal to the circuit's maximum operating voltage and maximum interrupt current.

Step 4. Determine time-to-trip.

Time-to-trip is the amount of time it takes for a device to switch to a high-resistance state once a fault current has been applied across the device. Identifying the PolySwitch device's time-to-trip is important in order to provide the desired protection capabilities. If the device you choose trips too fast, undesired or nuisance tripping will occur. If the device trips too slowly, the components being protected may be damaged before the device switches to a high-resistance state.

Figures S11-S19 show the typical time-to-trip at 20°C for each of the PolySwitch devices.

If the PolySwitch device's time-to-trip is too fast or too slow for the circuit, go back to Step 2 and choose an alternate device.

Step 5. Verify ambient operating conditions.

Ensure that your application's minimum and maximum ambient temperatures are within the operating temperature of -40°C to 85°C (-40°C to 125°C for SMDH160).

Step 6. Verify the PolySwitch device dimensions.

Using dimensions in Table S4, compare the dimensions of the PolySwitch device you selected with the application's space considerations.

Protection Application Selection Table for Surface-mount Devices

The table below lists Polyswitch devices typically used in these applications.

Specifications for the suggested device part numbers can be found in this section.

Once a part has been selected, the user should evaluate and test each product for the intended application.

| Protection Application | Additional Comments | Overcurrent Overvoltage | PolySwitch Resettable Devices—Key Selection Criteria | | |
|-----------------------------|----------------------|-------------------------|--|---------------------------------|--|
| | | | Small Size | Low Resistance | Fast Time-to-trip (Temperature Protection) |
| AC adapter input power | use w/ Zener & triac | | SMD250 | SMD250 | SMD200 |
| Battery pack protection | | | nanoSMDC150 | miniSMDC260 | miniSMDE190 |
| Charger protection | | | nanoSMDM050 | miniSMDM110/16 | nanoSMDM075 |
| CPU/IC protection | | | nanoSMDM100 | nanoSMDC150 | nanoSMDM075 |
| Data acquisition/sensor | | | microSMD005 | — | microSMD005 |
| DC input/output power | ≤6V | | nanoSMDM075 | nanoSMDC150 | nanoSMDM050 |
| | ≤12V | | miniSMDC075 | miniSMDM110/16 | miniSMDC075 |
| DDC | | | nanoSMDM075 | nanoSMDM100 | nanoSMDM050 |
| Device Bay system | DB12, DB20 | | miniSMDC200 | miniSMDC260 | miniSMDC200 |
| | DB32 | | miniSMDC260 | SMD300 | miniSMDM200 |
| Ethernet/Lan | | | nanoSMDM050 | miniSMDM110/16 | nanoSMDM075 |
| Fan | | | microSMD035 | microSMD050 | microSMD035 |
| IEEE 802.3af | VOIP | | SMD050-2018 | SMD050-2018 | SMD050-2018 |
| IEEE-1394 | power provider | | SMD100/33 | SMD185 | SMD100/33 |
| | alt. power provider | | SMD185 | SMD185 | SMD150/33 |
| | self-powered | | SMD185 | SMD185 | SMD150/33 |
| LCD inverter | | | nanoSMDM050 | miniSMDM110/16 | nanoSMDM075 |
| LCD screen power | | | nanoSMDM050 | nanoSMDM050 | microSMD035 |
| LNB (Low Noise Block) | | | SMD075 | SMD075 | SMD050 |
| Motor | ≤6V | | nanoSMDM100 | nanoSMDC150 | microSMDM075 |
| | ≤13.2V | | miniSMDC075 | miniSMDM110/16 | miniSMDC075 |
| PS/2 mouse/keyboard | | | nanoSMDM075 | nanoSMDM100 | nanoSMDM050 |
| Signal - data communication | ≤6V | | nanoSMDM075 | nanoSMDM075 | nanoSMDM075 |
| | ≤13.2V | | miniSMDC050 | miniSMDM075 | miniSMDC020 |
| | ≤30V | | SMD030-2018 | SMD075 | SMD050 |
| SCSI | | | nanoSMDM100 | nanoSMDC150 | nanoSMDM075 |
| Smart card reader | | | microSMD010 | microSMD035 | microSMD005 |
| Telecom - modem | UL1950 | OC OV | TS600-170 TVB270SA or SC* | TS250-130 TVB270SA or SC* | TS600-170 TVB270SA or SC* |
| | ITU-T K.21 | OC OV | TS250, TSV250 TVB270SA* | TS250, TSV250-130 TVB270SA* | TS250-130-RB TVB270SA* |
| | Digital line | OC OV | miniSMDC014 TVB270SC* | miniSMDC014 TVB270SC* | miniSMDC014 TVB270SC* |
| Telecom - PBX | UL1950 | OC OV | TS600-170 TVB270SA or SC* | TS600-200-RA TVB270SA or SC* | TS600-170 TVB270SA or SC* |
| | ITU-T K.21 | OC OV | TS250, TSV250 TVB270SA* | TS250-130 TVB270SA* | TS250-130-RB TVB270SA* |
| | Subscriber | OC | miniSMDC014 | miniSMDC014 | miniSMDC014 |
| Telecom - line card | Telcordia | OC | TS600-200-RA-B-0.5 | TS600-200-RA-B-0.5 | TS600-200-RA-B-0.5 |
| | GR-1089 | OV | TVB270SC* | TVB270SC* | TVB270SC* |
| | ITU-T K.20 | OC OV | TS250, TSV250 TVB270SA* | TS250-130-RA TVB270SA* | TS250 TVB270SA* |
| Intrabuilding protection | Telcordia GR1089 | | TSL250-080 | SMD030-2018 | TSL250-080 |
| Temperature sensor | CPU | | nanoSMDM050 | nanoSMDM075 | nanoSMDM050 |
| USB | Individual Port | | nanoSMDM075 | nanoSMDM100 | nanoSMDM050 |
| | 2 port ganged | | nanoSMDC150 | miniSMDC150 | miniSMDC125 |
| | 3 port ganged | | miniSMDC200 | miniSMDM200 | miniSMDM200 |

*Refer to the SiBar thyristor product section for more information.

This list is not exhaustive. Raychem Circuit Protection welcomes our customers' input for additional application ideas for Polyswitch Resettable devices.

Table S1. Product Series: Size, Current Rating, Voltage Rating/Typical Resistance for Surface-mount Devices

| | nanoSMDC nanoSMDM | microSMD | miniSMDC miniSMDM | midSMD | SMD | SMD2 | miniSMDE | TS250 TSL250 TSV250 | TS600 |
|------------------|-------------------------|----------------------------|--|--------------------------|--|--|---------------------------|---------------------------|-----------|
| Size mm (mils) | 3216 (1206) | 3225 (1210) | 4532 (1812) | 5050 (2018) | 7555 (2920) | 8763 (3425) | 11550 (4420) | * | * |
| Hold Current (A) | — | — | — | — | — | — | — | — | — |
| 0.05 | — | 30V _{DC} /25Ω | — | — | — | — | — | — | — |
| 0.08 | — | — | — | — | — | — | — | 80V/12.5Ω | — |
| 0.100 | 30V _{DC} /12Ω | — | — | — | — | — | — | — | — |
| 0.125 | 30V _{DC} /— | — | — | — | — | — | — | — | — |
| 0.13 | — | — | — | — | — | — | — | 60V/6.0-8.0Ω | — |
| 0.14 | — | — | 60V _{DC} /4.0Ω | — | — | — | — | — | — |
| 0.160 | 30V _{DC} /— | — | — | — | — | — | — | — | — |
| 0.17 | — | — | — | — | — | — | — | — | 60V/11.0Ω |
| 0.18 | — | — | — | — | — | — | — | — | — |
| 0.20 | 24V _{DC} /— | — | 30V _{DC} /1.4Ω | — | — | — | — | — | 60V/8.5Ω |
| 0.30 | — | — | — | 60V _{DC} /1.4Ω | 60V _{DC} /3.0Ω | — | — | — | — |
| 0.35 | — | 6V _{DC} /0.81Ω | — | — | — | — | — | — | — |
| 0.50 | 6V _{DC} /0.40Ω | 13.2V _{DC} /0.55Ω | 24V _{DC} /0.60Ω | 57V _{DC} /0.5Ω | 60V _{DC} /0.87Ω | — | — | — | — |
| 0.75 | 6V _{DC} /0.20Ω | 6V _{DC} /0.29Ω | 13.2V _{DC} /0.23Ω 24V _{DC} /0.20Ω | — | 30V _{DC} /0.67Ω | — | — | — | — |
| 1.00 | 6V _{DC} /0.15Ω | — | — | 15V _{DC} /0.25Ω | 30V _{DC} /0.30Ω 33V _{DC} /0.27Ω | — | — | — | — |
| 1.10 | 6V _{DC} /— | 6V _{DC} /0.14Ω | 6V _{DC} /0.12Ω 8V _{DC} /0.14Ω 16V _{DC} /0.12Ω | — | — | — | — | — | — |
| 1.25 | — | — | 6V _{DC} /0.09Ω | — | 15V _{DC} /0.16Ω | — | — | — | — |
| 1.50 | 6V _{DC} /0.08Ω | 6V _{DC} /0.07Ω | 6V _{DC} /0.07Ω | 15V _{DC} /0.13Ω | — | 15V _{DC} /0.16Ω 33V _{DC} /0.15Ω | — | — | — |
| 1.60 | — | — | 8V _{DC} /0.066Ω | — | — | 16V _{DC} /0.10Ω | — | — | — |
| 1.85 | — | — | — | — | — | 33V _{DC} /0.12Ω | — | — | — |
| 1.90 | — | — | — | — | — | — | 16V _{DC} /0.065Ω | — | — |
| 2.00 | — | — | 6V _{DC} /0.050Ω 8V _{DC} /0.040Ω | 6V _{DC} /0.07Ω | — | 15V _{DC} /0.09Ω | — | — | — |
| 2.50 | — | — | — | — | — | 15V _{DC} /0.06Ω | — | — | — |
| 2.60 | — | — | 6V _{DC} /0.035Ω 6V _{DC} /0.030Ω | — | 6V _{DC} /0.05Ω | — | — | — | — |
| 3.00 | — | — | — | — | 6V _{DC} /0.033Ω | — | — | — | — |

*Refer to Telecommunications and Networking section for dimensions; voltage for these parts is RMS max.

Table S2-A. Thermal Derating for Surface-mount Devices [Hold Current (A) at Ambient Temperature (°C)]

| Part Number | Maximum Ambient Temperature | | | | | | | | | | | |
|---|-----------------------------|-------|------|------|-------|------|------|------|------|------|------|-------|
| | -40°C | -20°C | 0°C | 20°C | 25°C | 40°C | 50°C | 60°C | 70°C | 80°C | 85°C | 125°C |
| nanoSMDC Series Size 3216 mm/1206 mils | | | | | | | | | | | | |
| nanoSMDC150 | 2.20 | 1.99 | 1.77 | 1.55 | 1.50 | 1.34 | 1.23 | 1.10 | 1.01 | 0.90 | 0.84 | — |
| Lead-free devices are listed in Table S2-B | | | | | | | | | | | | |
| nanoSMDM Series Size 3216 mm/1206 mils | | | | | | | | | | | | |
| nanoSMDM012† | 0.19 | 0.17 | 0.15 | 0.13 | 0.125 | 0.11 | 0.10 | 0.09 | 0.08 | 0.07 | 0.07 | — |
| nanoSMDM016† | 0.24 | 0.22 | 0.19 | 0.17 | 0.16 | 0.14 | 0.13 | 0.10 | 0.09 | 0.09 | 0.08 | — |
| nanoSMDM050† | 0.76 | 0.68 | 0.59 | 0.52 | 0.50 | 0.44 | 0.40 | 0.35 | 0.32 | 0.28 | 0.26 | — |
| nanoSMDM075† | 1.11 | 1.00 | 0.85 | 0.78 | 0.75 | 0.67 | 0.61 | 0.52 | 0.50 | 0.44 | 0.42 | — |
| nanoSMDM100† | 1.49 | 1.34 | 1.15 | 1.04 | 1.00 | 0.89 | 0.81 | 0.70 | 0.66 | 0.58 | 0.55 | — |
| Lead-free devices are listed in Table S2-B | | | | | | | | | | | | |
| microSMD Series Size 3225 mm/1210 mils | | | | | | | | | | | | |
| microSMD005 | 0.08 | 0.07 | 0.06 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.02 | 0.02 | — |
| microSMD010 | 0.15 | 0.13 | 0.12 | 0.10 | 0.10 | 0.09 | 0.08 | 0.07 | 0.06 | 0.05 | 0.05 | — |
| microSMD035 | 0.51 | 0.46 | 0.40 | 0.35 | 0.34 | 0.30 | 0.27 | 0.24 | 0.22 | 0.19 | 0.18 | — |
| microSMD050 | 0.76 | 0.66 | 0.58 | 0.50 | 0.48 | 0.42 | 0.38 | 0.35 | 0.29 | 0.25 | 0.23 | — |
| microSMD075 | 1.10 | 0.97 | 0.86 | 0.75 | 0.72 | 0.64 | 0.58 | 0.55 | 0.47 | 0.42 | 0.39 | — |
| microSMD110 | 1.60 | 1.42 | 1.26 | 1.10 | 1.06 | 0.94 | 0.86 | 0.80 | 0.70 | 0.62 | 0.58 | — |
| microSMD150 | 2.30 | 2.02 | 1.76 | 1.50 | 1.43 | 1.24 | 1.11 | 1.00 | 0.85 | 0.72 | 0.65 | — |
| Lead-free devices are listed in Table S2-B | | | | | | | | | | | | |
| miniSMDC Series Size 4532 mm/1812 mils | | | | | | | | | | | | |
| miniSMDC014 | 0.23 | 0.20 | 0.17 | 0.14 | 0.13 | 0.11 | 0.10 | 0.09 | 0.07 | 0.06 | 0.05 | — |
| miniSMDC020 | 0.30 | 0.27 | 0.23 | 0.20 | 0.19 | 0.17 | 0.15 | 0.13 | 0.12 | 0.10 | 0.09 | — |
| miniSMDC050 | 0.59 | 0.57 | 0.55 | 0.50 | 0.48 | 0.45 | 0.43 | 0.35 | 0.30 | 0.25 | 0.23 | — |
| miniSMDC075 | 1.10 | 0.99 | 0.87 | 0.75 | 0.72 | 0.63 | 0.57 | 0.49 | 0.45 | 0.39 | 0.35 | — |
| miniSMDC110 | 1.60 | 1.45 | 1.28 | 1.10 | 1.07 | 0.92 | 0.83 | 0.71 | 0.66 | 0.57 | 0.52 | — |
| miniSMDC125 | 2.00 | 1.69 | 1.47 | 1.25 | 1.17 | 1.03 | 0.92 | 0.90 | 0.69 | 0.58 | 0.53 | — |
| miniSMDC150 | 2.30 | 2.05 | 1.77 | 1.50 | 1.44 | 1.23 | 1.09 | 0.95 | 0.82 | 0.68 | 0.61 | — |
| miniSMDC200 | 2.60 | 2.44 | 2.22 | 2.00 | 1.96 | 1.78 | 1.67 | 1.50 | 1.45 | 1.34 | 1.29 | — |
| miniSMDC260 | 3.40 | 3.16 | 2.88 | 2.60 | 2.54 | 2.32 | 2.18 | 2.00 | 1.90 | 1.76 | 1.69 | — |
| Lead-free devices are listed in Table S2-B | | | | | | | | | | | | |
| miniSMDM Series Size 4532 mm/1812 mils | | | | | | | | | | | | |
| miniSMDM075† | 1.11 | 1.00 | 0.81 | 0.78 | 0.75 | 0.67 | 0.61 | 0.49 | 0.47 | 0.45 | 0.42 | — |
| miniSMDM075/24† | 1.11 | 1.00 | 0.85 | 0.78 | 0.75 | 0.67 | 0.61 | 0.52 | 0.50 | 0.44 | 0.42 | — |
| miniSMDM110† | 1.58 | 1.43 | 1.20 | 1.14 | 1.10 | 0.98 | 0.92 | 0.77 | 0.73 | 0.70 | 0.66 | — |
| miniSMDM110/16† | 1.61 | 1.46 | 1.25 | 1.14 | 1.10 | 0.98 | 0.90 | 0.78 | 0.74 | 0.66 | 0.62 | — |
| miniSMDM150/24† | 2.11 | 1.92 | 1.70 | 1.50 | 1.45 | 1.29 | 1.18 | 1.00 | 0.97 | 0.87 | 0.81 | — |
| miniSMDM160† | 2.32 | 2.10 | 1.80 | 1.66 | 1.60 | 1.43 | 1.32 | 1.14 | 1.10 | 0.99 | 0.93 | — |
| miniSMDM200† | 2.88 | 2.61 | 2.25 | 2.07 | 2.00 | 1.80 | 1.66 | 1.45 | 1.39 | 1.26 | 1.19 | — |
| miniSMDM260† | 3.70 | 3.36 | 2.90 | 2.68 | 2.60 | 2.35 | 2.18 | 1.90 | 1.84 | 1.67 | 1.59 | — |
| Lead-free devices are listed in Table S2-B | | | | | | | | | | | | |
| miniSMDE Series Size 11550 mm/4420 mils | | | | | | | | | | | | |
| miniSMDE190 | 3.16 | 2.74 | 2.20 | 1.90 | 1.74 | 1.48 | 1.27 | 1.10 | 0.80 | 0.50 | 0.35 | — |
| Lead-free devices are listed in Table S2-B | | | | | | | | | | | | |

**Table S2-A. Thermal Derating for Surface-mount Devices [Hold Current (A) at Ambient Temperature (°C)]
continued**

| Part Number | Maximum Ambient Temperature | | | | | | | | | | | |
|--|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | -40°C | -20°C | 0°C | 20°C | 25°C | 40°C | 50°C | 60°C | 70°C | 80°C | 85°C | 125°C |
| midSMD Size 5050 mm/2018 mils | | | | | | | | | | | | |
| SMD030-2018 | 0.48 | 0.42 | 0.35 | 0.30 | 0.28 | 0.24 | 0.21 | 0.17 | 0.15 | 0.12 | 0.10 | — |
| SMD050-2018 | 0.86 | 0.77 | 0.70 | 0.55 | 0.53 | 0.48 | 0.43 | 0.38 | 0.36 | 0.29 | 0.26 | — |
| SMD100-2018 | 1.59 | 1.43 | 1.20 | 1.10 | 1.03 | 0.94 | 0.85 | 0.72 | 0.69 | 0.61 | 0.57 | — |
| SMD150-2018 | 2.21 | 1.97 | 1.70 | 1.50 | 1.43 | 1.26 | 1.15 | 1.00 | 0.91 | 0.79 | 0.73 | — |
| SMD200-2018 | 2.81 | 2.54 | 2.27 | 2.00 | 1.93 | 1.73 | 1.59 | 1.46 | 1.32 | 1.19 | 1.12 | — |
| Lead-free devices are listed in Table S2-B | | | | | | | | | | | | |
| SMD Size 7555 mm/2920 mils | | | | | | | | | | | | |
| SMD030 | 0.44 | 0.39 | 0.32 | 0.30 | 0.28 | 0.26 | 0.23 | 0.19 | 0.18 | 0.17 | 0.15 | — |
| SMD050 | 0.73 | 0.65 | 0.55 | 0.50 | 0.47 | 0.43 | 0.39 | 0.33 | 0.31 | 0.28 | 0.26 | — |
| SMD075 | 1.11 | 0.99 | 0.84 | 0.75 | 0.71 | 0.63 | 0.57 | 0.49 | 0.45 | 0.39 | 0.36 | — |
| SMD100 | 1.59 | 1.43 | 1.20 | 1.10 | 1.03 | 0.94 | 0.85 | 0.72 | 0.69 | 0.61 | 0.57 | — |
| SMD100/33 | 1.48 | 1.35 | 1.20 | 1.10 | 1.06 | 0.98 | 0.91 | 0.83 | 0.79 | 0.73 | 0.69 | — |
| SMD125 | 1.89 | 1.68 | 1.50 | 1.25 | 1.21 | 1.04 | 0.93 | 0.85 | 0.71 | 0.61 | 0.55 | — |
| SMD260 | 3.82 | 3.41 | 2.90 | 2.60 | 2.45 | 2.19 | 1.99 | 1.70 | 1.58 | 1.38 | 1.28 | — |
| SMD260-RB | 3.82 | 3.41 | 2.90 | 2.60 | 2.45 | 2.19 | 1.99 | 1.70 | 1.58 | 1.38 | 1.28 | — |
| SMD300 | 4.13 | 3.75 | 3.30 | 3.00 | 2.87 | 2.62 | 2.43 | 2.25 | 2.00 | 1.87 | 1.78 | — |
| Lead-free devices are listed in Table S2-B | | | | | | | | | | | | |
| SMD2 Size 8763 mm/3425 mils | | | | | | | | | | | | |
| SMD150 | 2.30 | 2.04 | 1.80 | 1.50 | 1.45 | 1.23 | 1.10 | 0.99 | 0.83 | 0.70 | 0.63 | — |
| SMD150/33 | 2.30 | 2.04 | 1.80 | 1.50 | 1.45 | 1.23 | 1.10 | 0.99 | 0.83 | 0.70 | 0.63 | — |
| SMDH160 | 2.15 | 1.96 | 1.78 | 1.60 | 1.55 | 1.42 | 1.33 | 1.24 | 1.15 | 1.05 | 1.01 | 0.64 |
| SMD185 | 2.54 | 2.29 | 2.20 | 1.85 | 1.80 | 1.55 | 1.43 | 1.31 | 1.19 | 1.06 | 1.00 | — |
| SMD200 | 3.01 | 2.67 | 2.30 | 2.00 | 1.90 | 1.66 | 1.50 | 1.30 | 1.16 | 0.99 | 0.91 | — |
| SMD250 | 3.72 | 3.31 | 2.80 | 2.50 | 2.35 | 2.09 | 1.89 | 1.60 | 1.48 | 1.28 | 1.18 | — |
| Lead-free devices are listed in Table S2-B | | | | | | | | | | | | |
| Telecom Surface-mount | | | | | | | | | | | | |
| TSL250-080 | 0.124 | 0.110 | 0.095 | 0.080 | 0.077 | 0.066 | 0.059 | 0.051 | 0.044 | 0.037 | 0.033 | — |
| TS250-130 | 0.208 | 0.182 | 0.156 | 0.130 | 0.124 | 0.104 | 0.091 | 0.078 | 0.065 | 0.052 | 0.045 | — |
| TSV250-130 | 0.208 | 0.182 | 0.156 | 0.130 | 0.124 | 0.104 | 0.091 | 0.078 | 0.065 | 0.052 | 0.045 | — |
| TS600-170 | 0.264 | 0.230 | 0.200 | 0.170 | 0.163 | 0.140 | 0.125 | 0.109 | 0.094 | 0.077 | 0.070 | — |
| TS600-200-RA | 0.310 | 0.275 | 0.238 | 0.200 | 0.193 | 0.165 | 0.147 | 0.128 | 0.110 | 0.091 | 0.083 | — |
| TSM600-250 | 0.400 | 0.350 | 0.300 | 0.250 | 0.241 | 0.198 | 0.170 | 0.141 | 0.117 | 0.097 | 0.083 | — |

**Table S2-B. Thermal Derating for Lead-free Surface-mount Devices
[Hold Current (A) at Ambient Temperature (°C)]**

| Part Number | Maximum Ambient Temperature | | | | | | | | | | | |
|--|-----------------------------|-------|------|------|------|------|------|------|------|------|------|-------|
| | -40°C | -20°C | 0°C | 20°C | 25°C | 40°C | 50°C | 60°C | 70°C | 80°C | 85°C | 125°C |
| Lead-free nanoSMDC Series Size 3216 mm/1206 mils | | | | | | | | | | | | |
| nanoSMDC020F | 0.34 | 0.30 | 0.26 | 0.22 | 0.20 | 0.17 | 0.15 | 0.13 | 0.11 | 0.09 | 0.08 | — |
| nanoSMDC035F | 0.58 | 0.51 | 0.44 | 0.38 | 0.35 | 0.31 | 0.28 | 0.24 | 0.21 | 0.18 | 0.16 | — |
| nanoSMDC050F/13.2 | 0.78 | 0.69 | 0.61 | 0.52 | 0.50 | 0.44 | 0.39 | 0.35 | 0.30 | 0.25 | 0.24 | — |
| nanoSMDC075F | 1.15 | 1.04 | 0.92 | 0.78 | 0.75 | 0.69 | 0.63 | 0.58 | 0.51 | 0.46 | 0.43 | — |

Table S2-B. Thermal Derating for Lead-free Surface-mount Devices [Hold Current (A) at Ambient Temperature (°C)]
continued

| Part Number | Maximum Ambient Temperature | | | | | | | | | | | |
|--|-----------------------------|-------|------|------|-------|------|------|------|------|------|------|-------|
| | -40°C | -20°C | 0°C | 20°C | 25°C | 40°C | 50°C | 60°C | 70°C | 80°C | 85°C | 125°C |
| nanoSMDC110F | 1.64 | 1.46 | 1.30 | 1.10 | 1.06 | 0.92 | 0.83 | 0.80 | 0.65 | 0.56 | 0.52 | — |
| nanoSMDC150F | 2.20 | 1.99 | 1.77 | 1.55 | 1.50 | 1.34 | 1.23 | 1.10 | 1.01 | 0.90 | 0.84 | — |
| Lead-free nanoSMDM Series Size 3216 mm/1206 mils | | | | | | | | | | | | |
| nanoSMDM012F | 0.19 | 0.17 | 0.15 | 0.13 | 0.125 | 0.11 | 0.10 | 0.09 | 0.08 | 0.07 | 0.07 | — |
| nanoSMDM020F | 0.30 | 0.27 | 0.24 | 0.21 | 0.20 | 0.18 | 0.16 | 0.14 | 0.12 | 0.11 | 0.10 | — |
| nanoSMDM050F | 0.76 | 0.68 | 0.59 | 0.52 | 0.50 | 0.44 | 0.40 | 0.35 | 0.32 | 0.28 | 0.26 | — |
| nanoSMDM050F/13.2 | 0.76 | 0.68 | 0.59 | 0.52 | 0.50 | 0.44 | 0.40 | 0.35 | 0.32 | 0.28 | 0.26 | — |
| nanoSMDM075F | 1.11 | 1.00 | 0.85 | 0.78 | 0.75 | 0.67 | 0.61 | 0.52 | 0.50 | 0.44 | 0.42 | — |
| nanoSMDM100F | 1.49 | 1.34 | 1.15 | 1.04 | 1.00 | 0.89 | 0.81 | 0.70 | 0.66 | 0.58 | 0.55 | — |
| Lead-free microSMD Series Size 3225 mm/1210 mils | | | | | | | | | | | | |
| microSMD005F | 0.08 | 0.07 | 0.06 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.02 | 0.02 | — |
| microSMD010F | 0.15 | 0.13 | 0.12 | 0.10 | 0.10 | 0.09 | 0.08 | 0.07 | 0.06 | 0.05 | 0.05 | — |
| microSMD035F | 0.51 | 0.46 | 0.40 | 0.35 | 0.34 | 0.30 | 0.27 | 0.24 | 0.22 | 0.19 | 0.18 | — |
| microSMD050F | 0.76 | 0.66 | 0.58 | 0.50 | 0.48 | 0.42 | 0.38 | 0.35 | 0.29 | 0.25 | 0.23 | — |
| microSMD075F | 1.10 | 0.97 | 0.86 | 0.75 | 0.72 | 0.64 | 0.58 | 0.55 | 0.47 | 0.42 | 0.39 | — |
| microSMD110F | 1.60 | 1.42 | 1.26 | 1.11 | 1.06 | 0.94 | 0.86 | 0.80 | 0.70 | 0.62 | 0.58 | — |
| microSMD150F | 2.30 | 2.02 | 1.76 | 1.50 | 1.43 | 1.24 | 1.11 | 1.00 | 0.85 | 0.72 | 0.65 | — |
| Lead-free miniSMDC Series Size 4532 mm/1812 mils | | | | | | | | | | | | |
| miniSMDC014F | 0.23 | 0.20 | 0.17 | 0.14 | 0.13 | 0.11 | 0.10 | 0.09 | 0.07 | 0.06 | 0.05 | — |
| miniSMDC020F | 0.30 | 0.27 | 0.23 | 0.20 | 0.19 | 0.17 | 0.15 | 0.13 | 0.12 | 0.10 | 0.09 | — |
| miniSMDC050F | 0.59 | 0.57 | 0.55 | 0.50 | 0.48 | 0.45 | 0.43 | 0.35 | 0.30 | 0.25 | 0.23 | — |
| miniSMDC075F | 1.10 | 0.99 | 0.87 | 0.75 | 0.72 | 0.63 | 0.57 | 0.49 | 0.45 | 0.39 | 0.35 | — |
| miniSMDC110F | 1.60 | 1.45 | 1.28 | 1.10 | 1.07 | 0.92 | 0.83 | 0.71 | 0.66 | 0.57 | 0.52 | — |
| miniSMDC110F/16 | 1.68 | 1.49 | 1.30 | 1.10 | 1.05 | 0.92 | 0.83 | 0.75 | 0.64 | 0.55 | 0.50 | — |
| miniSMDC125F | 2.00 | 1.69 | 1.47 | 1.25 | 1.17 | 1.03 | 0.92 | 0.90 | 0.69 | 0.58 | 0.53 | — |
| miniSMDC125F/16 | 2.00 | 1.69 | 1.47 | 1.25 | 1.17 | 1.03 | 0.92 | 0.90 | 0.69 | 0.58 | 0.53 | — |
| miniSMDC150F | 2.30 | 2.05 | 1.77 | 1.50 | 1.44 | 1.23 | 1.09 | 0.95 | 0.82 | 0.68 | 0.61 | — |
| miniSMDC160F | 2.50 | 2.19 | 1.89 | 1.60 | 1.53 | 1.31 | 1.16 | 1.10 | 0.95 | 0.79 | 0.71 | — |
| miniSMDC200F | 2.60 | 2.44 | 2.22 | 2.00 | 1.96 | 1.78 | 1.67 | 1.50 | 1.45 | 1.34 | 1.29 | — |
| miniSMDC260F | 3.40 | 3.16 | 2.90 | 2.60 | 2.54 | 2.32 | 2.18 | 2.00 | 1.90 | 1.76 | 1.69 | — |
| miniSMDC260F/12 | 3.40 | 3.16 | 3.00 | 2.60 | 2.54 | 2.32 | 2.18 | 2.00 | 1.90 | 1.76 | 1.69 | — |
| Lead-free miniSMDM Series Size 4532 mm/1812 mils | | | | | | | | | | | | |
| miniSMDM075F/24 | 1.11 | 1.00 | 0.85 | 0.78 | 0.75 | 0.67 | 0.61 | 0.52 | 0.50 | 0.44 | 0.42 | — |
| miniSMDM110F | 1.58 | 1.43 | 1.20 | 1.14 | 1.10 | 0.98 | 0.92 | 0.77 | 0.73 | 0.70 | 0.66 | — |
| miniSMDM110F/16 | 1.61 | 1.46 | 1.25 | 1.14 | 1.10 | 0.98 | 0.90 | 0.78 | 0.74 | 0.66 | 0.62 | — |
| miniSMDM200F | 2.88 | 2.61 | 2.25 | 2.07 | 2.00 | 1.80 | 1.66 | 1.45 | 1.39 | 1.26 | 1.19 | — |
| miniSMDM260F | 3.70 | 3.36 | 2.90 | 2.68 | 2.60 | 2.35 | 2.18 | 1.90 | 1.84 | 1.67 | 1.59 | — |
| Lead-free SMD Series Size 5050 mm/2018 mils | | | | | | | | | | | | |
| SMD030F-2018 | 0.18 | 0.42 | 0.35 | 0.30 | 0.28 | 0.24 | 0.21 | 0.17 | 0.15 | 0.12 | 0.10 | — |
| SMD100F-2018 | 1.59 | 1.43 | 1.20 | 1.10 | 1.03 | 0.94 | 0.85 | 0.72 | 0.69 | 0.61 | 0.57 | — |
| SMD150F-2018 | 2.21 | 1.97 | 1.70 | 1.50 | 1.43 | 1.26 | 1.15 | 1.00 | 0.91 | 0.79 | 0.73 | — |
| SMD200F-2018 | 2.81 | 2.54 | 2.27 | 2.00 | 1.93 | 1.73 | 1.59 | 1.46 | 1.32 | 1.19 | 1.12 | — |

Table S2-B. Thermal Derating for Lead-free Surface-mount Devices [Hold Current (A) at Ambient Temperature (°C)]
continued

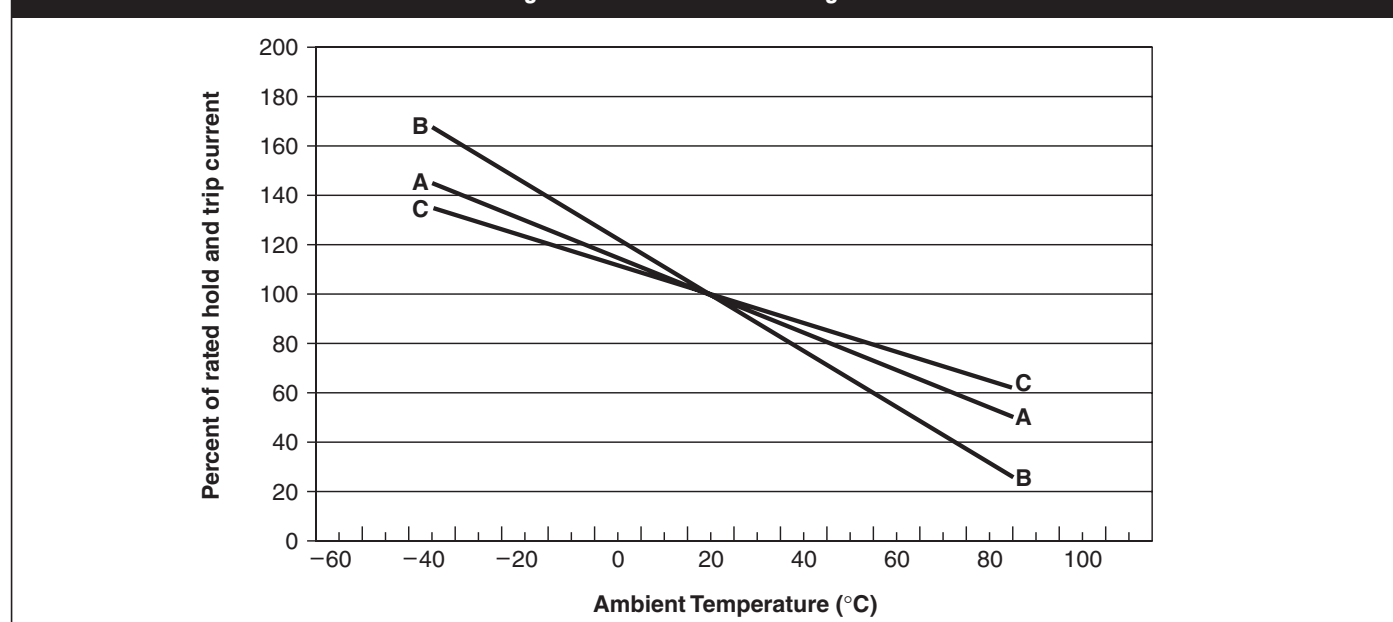
| Part Number | Maximum Ambient Temperature | | | | | | | | | | | |
|---|-----------------------------|-------|------|------|------|------|------|------|------|------|------|-------|
| | -40°C | -20°C | 0°C | 20°C | 25°C | 40°C | 50°C | 60°C | 70°C | 80°C | 85°C | 125°C |
| Lead-free SMD Series Size 5050 mm/2018 mils | | | | | | | | | | | | |
| SMD030F-2018 | 0.48 | 0.42 | 0.35 | 0.30 | 0.28 | 0.24 | 0.21 | 0.17 | 0.15 | 0.12 | 0.10 | — |
| SMD050F-2018 | 0.86 | 0.77 | 0.70 | 0.55 | 0.53 | 0.48 | 0.43 | 0.38 | 0.36 | 0.29 | 0.26 | — |
| SMD100F-2018 | 1.59 | 1.43 | 1.20 | 1.10 | 1.03 | 0.94 | 0.85 | 0.72 | 0.69 | 0.61 | 0.57 | — |
| SMD150F-2018 | 2.21 | 1.97 | 1.70 | 1.50 | 1.43 | 1.26 | 1.15 | 1.00 | 0.91 | 0.79 | 0.73 | — |
| SMD200F-2018 | 2.81 | 2.54 | 2.27 | 2.00 | 1.93 | 1.73 | 1.59 | 1.46 | 1.32 | 1.19 | 1.12 | — |
| Lead-free SMD Series Size 7555 mm/2920 mils | | | | | | | | | | | | |
| SMD030F | 0.44 | 0.39 | 0.32 | 0.30 | 0.28 | 0.26 | 0.23 | 0.19 | 0.18 | 0.17 | 0.15 | — |
| SMD050F | 0.73 | 0.65 | 0.55 | 0.50 | 0.47 | 0.43 | 0.39 | 0.33 | 0.31 | 0.28 | 0.26 | — |
| SMD075F | 1.11 | 0.99 | 0.84 | 0.75 | 0.71 | 0.63 | 0.57 | 0.49 | 0.45 | 0.39 | 0.36 | — |
| SMD075F/60 | 1.11 | 0.99 | 0.84 | 0.75 | 0.71 | 0.63 | 0.57 | 0.49 | 0.45 | 0.39 | 0.36 | — |
| SMD100F | 1.59 | 1.43 | 1.20 | 1.10 | 1.03 | 0.94 | 0.85 | 0.72 | 0.69 | 0.61 | 0.57 | — |
| SMD100F/33 | 1.48 | 1.35 | 1.20 | 1.10 | 1.06 | 0.98 | 0.91 | 0.83 | 0.79 | 0.73 | 0.69 | — |
| SMD125F | 1.89 | 1.68 | 1.50 | 1.25 | 1.21 | 1.04 | 0.93 | 0.85 | 0.71 | 0.61 | 0.55 | — |
| SMD260F | 3.82 | 3.41 | 2.90 | 2.60 | 2.45 | 2.19 | 1.99 | 1.70 | 1.58 | 1.38 | 1.28 | — |
| SMD300F | 4.13 | 3.75 | 3.30 | 3.00 | 2.87 | 2.62 | 2.43 | 2.25 | 2.00 | 1.87 | 1.78 | — |
| Lead-free SMD2 Series Size 8763 mm/3425 mils | | | | | | | | | | | | |
| SMD150F | 2.30 | 2.04 | 1.80 | 1.50 | 1.45 | 1.23 | 1.10 | 0.99 | 0.83 | 0.70 | 0.63 | — |
| SMD150F/33 | 2.30 | 2.04 | 1.80 | 1.50 | 1.45 | 1.23 | 1.10 | 0.99 | 0.83 | 0.70 | 0.63 | — |
| SMD185F | 2.54 | 2.29 | 2.20 | 1.85 | 1.80 | 1.55 | 1.43 | 1.31 | 1.19 | 1.06 | 1.00 | — |
| SMD200F | 3.01 | 2.67 | 2.30 | 2.00 | 1.90 | 1.66 | 1.50 | 1.30 | 1.16 | 0.99 | 0.91 | — |
| SMD250F | 3.72 | 3.31 | 2.80 | 2.50 | 2.35 | 2.09 | 1.89 | 1.60 | 1.48 | 1.28 | 1.18 | — |

Thermal Derating Curves for Surface-mount Devices*

A = nanoSMD/microSMD/miniSMD & SMD

B = miniSMDE190

C = SMDH160

Figure S1. Thermal Derating Curve

*Refer to Telecom and Networking section for thermal derating of Telecom parts.

Table S3-A. Electrical Characteristics for Surface-mount Devices at 20°C

| Part Number | I _H (A) | I _T (A) | V _{MAX} (V _{DC}) | I _{MAX} (A) | P _{D TYP} (W) | Max. Time-to-Trip | | R _{MIN} Ω | R _{TYP} Ω | R _{1 MAX} Ω | Figure for Dimensions |
|--|-----------------------|-----------------------|--|-------------------------|---------------------------|-------------------|------|-----------------------|-----------------------|-------------------------|--------------------------|
| | | | | | | (A) | (s) | | | | |
| nanoSMDC Series | | | | | | | | | | | |
| Size 3216 mm / 1206 mils | | | | | | | | | | | |
| nanoSMDC150† | 1.50 | 3.00 | 6 | 40 | 0.6 | 8.0 | 0.30 | 0.04 | 0.080 | 0.110 | S3 |
| Lead-free devices are listed in Table S3-B | | | | | | | | | | | |
| nanoSMDM Series | | | | | | | | | | | |
| Size 3216 mm / 1206 mils | | | | | | | | | | | |
| nanoSMDM012† | 0.125 | 0.29 | 30 | 10 | 0.4 | 1.0 | 0.20 | 1.50 | 4.5 | 6.000 | S2 |
| nanoSMDM016† | 0.16 | 0.37 | 30 | 10 | 0.4 | 1.0 | 0.30 | 1.20 | 3.5 | 4.500 | S2 |
| nanoSMDM050† | 0.50 | 1.00 | 6 | 40 | 0.4 | 8.0 | 0.10 | 0.15 | 0.400 | 0.700 | S2 |
| nanoSMDM075† | 0.75 | 1.50 | 6 | 40 | 0.4 | 8.0 | 0.20 | 0.10 | 0.200 | 0.290 | S2 |
| nanoSMDM100† | 1.00 | 1.80 | 6 | 40 | 0.4 | 8.0 | 0.30 | 0.06 | 0.150 | 0.210 | S2 |
| Lead-free devices are listed in Table S3-B | | | | | | | | | | | |
| microSMD Series | | | | | | | | | | | |
| Size 3225 mm / 1210 mils | | | | | | | | | | | |
| microSMD005 | 0.05 | 0.15 | 30 | 10 | 0.6 | 0.25 | 1.5 | 3.60 | 25.00 | 50.000 | S4 |
| microSMD010 | 0.10 | 0.25 | 30 | 10 | 0.6 | 0.5 | 1.0 | 2.10 | 9.00 | 15.000 | S3 |
| microSMD035 | 0.35 | 0.75 | 6 | 40 | 0.6 | 8.0 | 0.2 | 0.32 | 0.81 | 1.300 | S3 |
| microSMD050 | 0.50 | 1.00 | 13.2 | 40 | 0.6 | 5.0 | 0.1 | 0.25 | 0.55 | 0.900 | S3 |
| microSMD075 | 0.75 | 1.50 | 6 | 40 | 0.6 | 8.0 | 0.1 | 0.11 | 0.29 | 0.400 | S3 |
| microSMD110 | 1.10 | 2.20 | 6 | 40 | 0.6 | 5.0 | 1.0 | 0.07 | 0.14 | 0.210 | S3 |
| microSMD150 | 1.50 | 3.00 | 6 | 40 | 0.6 | 5.0 | 5.0 | 0.04 | 0.07 | 0.110 | S3 |
| Lead-free devices are listed in Table S3-B | | | | | | | | | | | |
| miniSMDC Series | | | | | | | | | | | |
| Size 4532 mm / 1812 mils | | | | | | | | | | | |
| miniSMDC014 | 0.14 | 0.34 | 60 | 10 | 0.6 | 1.5 | 0.15 | 1.500 | 4.000 | 6.000 | S3 |
| miniSMDC020 | 0.20 | 0.40 | 30 | 10 | 0.6 | 8.0 | 0.02 | 0.600 | 2.900 | 3.300 | S3 |
| miniSMDC050 | 0.50 | 1.00 | 24 | 40 | 0.6 | 8.0 | 0.15 | 0.150 | 0.600 | 1.000 | S3 |
| miniSMDC075 | 0.75 | 1.50 | 13.2 | 40 | 0.6 | 8.0 | 0.20 | 0.110 | 0.260 | 0.450 | S3 |
| miniSMDC110 | 1.10 | 2.20 | 8 | 40 | 0.6 | 8.0 | 0.30 | 0.040 | 0.120 | 0.210 | S3 |
| miniSMDC125 | 1.25 | 2.50 | 6 | 40 | 0.6 | 8.0 | 0.40 | 0.050 | 0.090 | 0.140 | S3 |
| miniSMDC150 | 1.50 | 3.00 | 6 | 40 | 0.6 | 8.0 | 0.50 | 0.040 | 0.070 | 0.110 | S3 |
| miniSMDC200 | 2.00 | 4.00 | 6 | 40 | 0.6 | 8.0 | 5.00 | 0.020 | 0.050 | 0.070 | S3 |
| miniSMDC260 | 2.60 | 5.00 | 6 | 40 | 0.6 | 8.0 | 7.00 | 0.015 | 0.035 | 0.047 | S3 |
| Lead-free devices are listed in Table S3-B | | | | | | | | | | | |
| miniSMDM Series | | | | | | | | | | | |
| Size 4532 mm / 1812 mils | | | | | | | | | | | |
| miniSMDM075† | 0.75 | 1.50 | 13.2 | 40 | 0.5 | 8.0 | 0.20 | 0.100 | 0.230 | 0.290 | S2 |
| miniSMDM075/24† | 0.75 | 1.50 | 24 | 40 | 0.6 | 8.0 | 0.30 | 0.090 | 0.200 | 0.290 | S5 |
| miniSMDM110† | 1.10 | 2.00 | 8 | 40 | 0.5 | 8.0 | 0.30 | 0.060 | 0.140 | 0.180 | S2 |
| miniSMDM110/16† | 1.10 | 1.95 | 16 | 40 | 0.6 | 8.0 | 0.50 | 0.060 | 0.120 | 0.180 | S5 |
| miniSMDM150/24 | 1.50 | 3.00 | 24 | 20 | 0.6 | 8.0 | 1.50 | 0.040 | — | 0.120 | S5 |
| miniSMDM160† | 1.60 | 2.80 | 8 | 40 | 0.6 | 8.0 | 2.00 | 0.033 | 0.066 | 0.099 | S5 |
| miniSMDM200† | 2.00 | 3.50 | 8 | 40 | 0.6 | 8.0 | 3.00 | 0.020 | 0.040 | 0.060 | S5 |
| miniSMDM260† | 2.60 | 4.55 | 6 | 40 | 0.6 | 8.0 | 6.00 | 0.010 | 0.030 | 0.043 | S5 |
| Lead-free devices are listed in Table S3-B | | | | | | | | | | | |
| miniSMDE Series | | | | | | | | | | | |
| Size 11550 mm / 4420 mils | | | | | | | | | | | |
| miniSMDE190 | 1.90 | 3.80 | 16 | 100 | 1.4 | 10 | 2.0 | 0.024 | 0.065 | 0.08 | S3 |
| Lead-free devices are listed in Table S3-B | | | | | | | | | | | |

†Electrical characteristics determined at 25°C.

Table S3-A. Electrical Characteristics for Surface-mount Devices at 20°C *continued*

| Part Number | I_H (A) | I_T (A) | V_{MAX} (V_{DC}) | I_{MAX} (A) | $P_{D TYP}$ (W) | Max. Time-to-Trip | | R_{MIN} Ω | R_{TYP} Ω | $R_{I MAX}$ Ω | Figure for Dimensions |
|---|--------------|--------------|---------------------------|------------------|--------------------|-------------------|-----|-----------------------|-----------------------|-------------------------|--------------------------|
| | | | | | | (A) | (s) | | | | |
| midSMD Size 5050 mm/2018 mils | | | | | | | | | | | |
| SMD030-2018 | 0.30 | 0.80 | 60 | 20 | 0.7 | 1.5 | 1.5 | 0.500 | 1.40 | 2.300 | S6 |
| SMD050-2018 | 0.55 | 1.20 | 57 | 10 | 1.0 | 2.5 | 5.0 | 0.200 | — | 1.000 | S6 |
| SMD100-2018 | 1.10 | 2.20 | 15 | 40 | 1.2 | 8.0 | 0.5 | 0.100 | 0.25 | 0.400 | S6 |
| SMD150-2018 | 1.50 | 3.00 | 15 | 40 | 1.4 | 8.0 | 1.0 | 0.070 | 0.13 | 0.180 | S6 |
| SMD200-2018 | 2.00 | 4.20 | 6 | 40 | 1.4 | 8.0 | 3.0 | 0.048 | 0.07 | 0.100 | S6 |

SMD
Size 7555 mm/2920 mils

| | | | | | | | | | | | |
|-----------|------|------|----|----|-----|-----|------|-------|-------|-------|----|
| SMD030 | 0.30 | 0.60 | 60 | 10 | 1.5 | 1.5 | 3.0 | 1.200 | 3.00 | 4.800 | S7 |
| SMD050 | 0.50 | 1.00 | 60 | 10 | 1.5 | 2.5 | 4.0 | 0.350 | 0.87 | 1.400 | S7 |
| SMD075 | 0.75 | 1.50 | 30 | 40 | 1.5 | 8.0 | 0.3 | 0.350 | 0.67 | 1.000 | S7 |
| SMD100 | 1.10 | 2.20 | 30 | 40 | 1.5 | 8.0 | 0.5 | 0.120 | 0.30 | 0.480 | S7 |
| SMD100/33 | 1.10 | 2.20 | 33 | 40 | 1.5 | 8.0 | 0.5 | 0.120 | 0.27 | 0.410 | S7 |
| SMD125 | 1.25 | 2.50 | 15 | 40 | 1.5 | 8.0 | 2.0 | 0.070 | 0.16 | 0.250 | S7 |
| SMD260 | 2.60 | 5.20 | 6 | 40 | 1.5 | 8.0 | 20.0 | 0.025 | 0.05 | 0.075 | S7 |
| SMD260-RB | 2.60 | 5.00 | 6 | 40 | 1.5 | 5.0 | 60.0 | 0.030 | 0.055 | 0.075 | S7 |
| SMD300 | 3.00 | 6.00 | 6 | 40 | 1.3 | 8.0 | 35.0 | 0.015 | 0.033 | 0.048 | S7 |

Lead-free devices are listed in Table S3-B

SMD2
Size 8763 mm/3425 mils

| | | | | | | | | | | | |
|-----------|------|------|----|----|-----|-----|------|-------|------|-------|----|
| SMD150 | 1.50 | 3.00 | 15 | 40 | 1.7 | 8.0 | 5.0 | 0.060 | 0.16 | 0.250 | S7 |
| SMD150/33 | 1.50 | 3.00 | 33 | 40 | 1.7 | 8.0 | 5.0 | 0.080 | 0.15 | 0.230 | S7 |
| SMDH160 | 1.60 | 3.20 | 16 | 70 | 2.1 | 8.0 | 15.0 | 0.050 | 0.10 | 0.150 | S7 |
| SMD185 | 1.80 | 3.60 | 33 | 40 | 1.2 | 8.0 | 5.0 | 0.065 | 0.12 | 0.165 | S7 |
| SMD200 | 2.00 | 4.00 | 15 | 40 | 1.7 | 8.0 | 12.0 | 0.050 | 0.09 | 0.125 | S7 |
| SMD250 | 2.50 | 5.00 | 15 | 40 | 1.7 | 8.0 | 25.0 | 0.035 | 0.06 | 0.085 | S7 |

Lead-free devices are listed in Table S3-B

| Part Number | I_H (A) | I_T (A) | V_{MAX} (V_{RMS}) | I_{MAX} (A) | $P_{D TYP}$ (W) | Max. Time-to-Trip | | R_{MIN} Ω | R_{TYP} Ω | $R_{I MAX}$ Ω | Figure for Dimensions |
|------------------------------|--------------|--------------|----------------------------|------------------|--------------------|-------------------|------|-----------------------|-----------------------|-------------------------|--------------------------|
| | | | | | | (A) | (s) | | | | |
| Telecom Surface-mount | | | | | | | | | | | |
| TSL250-080 | 0.080 | 0.16 | 250 | 3.0 | 1.2 | 1.0 | 0.8 | 5.0 | 11.0 | 20.0 | S7 |
| TS250-130 | 0.130 | 0.26 | 250 | 3.0 | 1.1 | 1.0 | 0.9 | 6.5 | 12.0 | 20.0 | S8 |
| | — | — | 650 | 1.1 | — | — | — | — | — | — | — |
| TSV250-130 | 0.130 | 0.26 | 250 | 3.0 | 1.5 | 1.0 | 2.0 | 4.0 | 7.0 | 12.0 | S10 |
| TS600-170 | 0.170 | 0.40 | 600 | 3.0 | 2.5 | 1.0 | 10.0 | 4.0 | 9.0 | 18.0 | S9 |
| TS600-200-RA | 0.200 | 0.40 | 600 | 3.0 | 2.5 | 1.0 | 12.0 | 4.0 | 7.5 | 13.5 | S9 |
| TSM600-250 | 0.250 | 0.86 | 600 | 3.0 | 2.0 | 3.0 | 8.0 | 1.0 | 3.5 | 7.0 | — |

Table S3-B. Electrical Characteristics for Lead-free Surface-mount Devices at 20°C

| Part Number | I _H (A) | I _T (A) | V _{MAX} (V _{DC}) | I _{MAX} (A) | P _{D TYP} (W) | Max. Time-to-Trip | | R _{MIN} Ω | R _{TYP} Ω | R _{I MAX} Ω | Figure for Dimensions |
|--|-----------------------|-----------------------|--|-------------------------|---------------------------|-------------------|------|-----------------------|-----------------------|-------------------------|--------------------------|
| | | | | | | (A) | (s) | | | | |
| Lead-free nanoSMDC Series Size 3216 mm/1206 mils | | | | | | | | | | | |
| nanoSMDC020F† | 0.20 | 0.42 | 24 | 100 | 0.6 | 8.0 | 0.10 | 0.65 | — | 2.600 | S3 |
| nanoSMDC035F† | 0.35 | 0.75 | 16 | 20 | 0.6 | 3.5 | 0.10 | 0.45 | — | 1.400 | S3 |
| nanoSMDC050F/13.2† | 0.50 | 1.10 | 13.2 | 40 | 0.6 | 8.0 | 0.10 | 0.20 | — | 0.800 | S3 |
| nanoSMDC075F† | 0.75 | 1.50 | 6 | 40 | 0.6 | 8.0 | 0.10 | 0.12 | — | 0.400 | S3 |
| nanoSMDC110F | 1.10 | 2.20 | 6 | 40 | 0.6 | 8.0 | 0.10 | 0.07 | — | 0.200 | S3 |
| nanoSMDC150F† | 1.50 | 3.00 | 6 | 40 | 0.6 | 8.0 | 0.30 | 0.04 | 0.080 | 0.110 | S3 |
| Lead-free nanoSMDM Series Size 3216 mm/1206 mils | | | | | | | | | | | |
| nanoSMDM012F† | 0.125 | 0.29 | 30 | 10 | 0.4 | 1.0 | 0.20 | 1.50 | 4.5 | 6.000 | S2 |
| nanoSMDM020F† | 0.20 | 0.46 | 24 | 10 | 0.4 | 1.0 | 0.60 | 0.65 | — | 2.600 | S2 |
| nanoSMDM050F† | 0.50 | 1.00 | 6 | 40 | 0.4 | 8.0 | 0.10 | 0.15 | 0.400 | 0.700 | S2 |
| nanoSMDM050F/13.2† | 0.50 | 1.00 | 13.2 | 40 | 0.4 | 8.0 | 0.10 | 0.15 | 0.400 | 0.700 | S2 |
| nanoSMDM075F† | 0.75 | 1.50 | 6 | 40 | 0.4 | 8.0 | 0.20 | 0.10 | 0.200 | 0.290 | S2 |
| nanoSMDM100F† | 1.00 | 1.80 | 6 | 40 | 0.4 | 8.0 | 0.30 | 0.06 | 0.150 | 0.210 | S2 |
| Lead-free microSMD Series Size 3225 mm/1210 mils | | | | | | | | | | | |
| microSMD005F | 0.05 | 0.15 | 30 | 10 | 0.6 | 0.25 | 1.5 | 3.60 | 25.00 | 50.000 | S4 |
| microSMD010F | 0.10 | 0.25 | 30 | 10 | 0.6 | 0.5 | 1.0 | 2.10 | 9.00 | 15.000 | S3 |
| microSMD035F | 0.35 | 0.75 | 6 | 40 | 0.6 | 8.0 | 0.2 | 0.33 | 0.81 | 1.300 | S3 |
| microSMD050F | 0.50 | 1.00 | 13.2 | 40 | 0.6 | 5.0 | 0.1 | 0.25 | 0.55 | 0.900 | S3 |
| microSMD075F | 0.75 | 1.50 | 6 | 40 | 0.6 | 8.0 | 0.1 | 0.11 | 0.29 | 0.400 | S3 |
| microSMD110F | 1.10 | 2.20 | 6 | 40 | 0.6 | 5.0 | 1.0 | 0.07 | 0.14 | 0.210 | S3 |
| microSMD150F | 1.50 | 3.00 | 6 | 40 | 0.6 | 5.0 | 5.0 | 0.04 | 0.07 | 0.110 | S3 |
| Lead-free miniSMDC Series Size 4532 mm/1812 mils | | | | | | | | | | | |
| miniSMDC014F | 0.14 | 0.34 | 60 | 10 | 0.6 | 1.5 | 0.15 | 1.500 | 4.000 | 6.000 | S3 |
| miniSMDC020F | 0.20 | 0.40 | 30 | 10 | 0.6 | 8.0 | 0.02 | 0.600 | 2.900 | 3.300 | S3 |
| miniSMDC050F | 0.50 | 1.00 | 24 | 100 | 0.6 | 8.0 | 0.15 | 0.150 | 0.600 | 1.000 | S3 |
| miniSMDC075F | 0.75 | 1.50 | 13.2 | 100 | 0.6 | 8.0 | 0.20 | 0.110 | 0.260 | 0.450 | S3 |
| miniSMDC110F | 1.10 | 2.20 | 8 | 100 | 0.6 | 8.0 | 0.30 | 0.040 | 0.120 | 0.210 | S3 |
| miniSMDC110F/16 | 1.10 | 2.20 | 16 | 100 | 0.3 | 8.0 | 0.30 | 0.060 | — | 0.180 | S3 |
| miniSMDC125F | 1.25 | 2.50 | 6 | 100 | 0.6 | 8.0 | 0.40 | 0.050 | 0.090 | 0.140 | S3 |
| miniSMDC125F/16 | 1.25 | 2.50 | 16 | 100 | 0.6 | 8.0 | 0.40 | 0.050 | 0.090 | 0.140 | S3 |
| miniSMDC150F | 1.50 | 3.00 | 6 | 100 | 0.6 | 8.0 | 0.50 | 0.040 | 0.070 | 0.110 | S3 |
| miniSMDC160F | 1.60 | 3.20 | 6 | 100 | 0.6 | 8.0 | 1.00 | 0.030 | 0.078 | 0.100 | S3 |
| miniSMDC200F | 2.00 | 4.00 | 6 | 100 | 0.6 | 8.0 | 5.00 | 0.020 | 0.050 | 0.070 | S3 |
| miniSMDC260F | 2.60 | 5.00 | 6 | 100 | 0.6 | 8.0 | 7.00 | 0.015 | 0.035 | 0.047 | S3 |
| miniSMDC260F/12 | 2.60 | 5.00 | 12 | 100 | 0.6 | 8.0 | 5.00 | 0.015 | 0.035 | 0.047 | S3 |
| Lead-free miniSMDM Series Size 4532 mm/1812 mils | | | | | | | | | | | |
| miniSMDM075F/24† | 0.75 | 1.50 | 24 | 40 | 0.6 | 8.0 | 0.30 | 0.090 | 0.200 | 0.290 | S5 |
| miniSMDM110F† | 1.10 | 2.00 | 8 | 40 | 0.5 | 8.0 | 0.30 | 0.060 | 0.140 | 0.180 | S2 |
| miniSMDM110F/16† | 1.10 | 1.95 | 16 | 40 | 0.6 | 8.0 | 0.50 | 0.060 | 0.120 | 0.180 | S2 |
| miniSMDM200F† | 2.00 | 3.50 | 8 | 40 | 0.6 | 8.0 | 3.00 | 0.020 | 0.040 | 0.060 | S5 |
| miniSMDM260F† | 2.60 | 4.55 | 6 | 40 | 0.6 | 8.0 | 6.00 | 0.010 | 0.030 | 0.043 | S5 |
| Lead-free midSMD Series Size 5050 mm/2018 mils | | | | | | | | | | | |
| SMD030F-2018 | 0.30 | 0.80 | 60 | 20 | 0.9 | 1.5 | 1.50 | 0.500 | 1.400 | 2.300 | S6 |
| SMD100F-2018 | 1.10 | 2.20 | 15 | 40 | 1.2 | 8.0 | 0.50 | 0.100 | 0.250 | 0.400 | S6 |

†Electrical characteristics determined at 25°C.

Table S3-B. Electrical Characteristics for Lead-free Surface-mount Devices at 20°C *continued*

| Part Number | I _H (A) | I _T (A) | V _{MAX} (V _{DC}) | I _{MAX} (A) | P _{D TYP} (W) | Max. Time-to-Trip | | R _{MIN} Ω | R _{TYP} Ω | R _{I MAX} Ω | Figure for Dimensions |
|--|-----------------------|-----------------------|--|-------------------------|---------------------------|-------------------|------|-----------------------|-----------------------|-------------------------|--------------------------|
| | | | | | | (A) | (s) | | | | |
| SMD150F-2018 | 1.50 | 3.00 | 15 | 40 | 1.4 | 8.0 | 1.00 | 0.070 | 0.130 | 0.180 | S6 |
| SMD200F-2018 | 2.00 | 4.20 | 6 | 40 | 1.4 | 8.0 | 3.00 | 0.048 | 0.700 | 0.100 | S6 |
| Lead-free SMD Series Size 7555 mm/2920 mils | | | | | | | | | | | |
| SMD030F | 0.30 | 0.60 | 60 | 10 | 1.5 | 1.5 | 3.0 | 1.200 | 3.00 | 4.800 | S7 |
| SMD050F | 0.50 | 1.00 | 60 | 10 | 1.5 | 2.5 | 4.0 | 0.350 | 0.87 | 1.400 | S7 |
| SMD075F | 0.75 | 1.50 | 30 | 40 | 1.5 | 8.0 | 0.3 | 0.350 | 0.67 | 1.000 | S7 |
| SMD075F/60 | 0.75 | 1.50 | 60 | 10 | 1.5 | 8.0 | 0.3 | 0.350 | 0.67 | 1.000 | S7 |
| SMD100F | 1.10 | 2.20 | 30 | 40 | 1.5 | 8.0 | 0.5 | 0.120 | 0.30 | 0.480 | S7 |
| SMD100F/33 | 1.10 | 2.20 | 33 | 40 | 1.5 | 8.0 | 0.5 | 0.120 | 0.27 | 0.410 | S7 |
| SMD125F | 1.25 | 2.50 | 15 | 40 | 1.5 | 8.0 | 2.0 | 0.070 | 0.16 | 0.250 | S7 |
| SMD260F | 2.60 | 5.20 | 6 | 40 | 1.5 | 8.0 | 20.0 | 0.025 | 0.05 | 0.075 | S7 |
| SMD300F | 3.00 | 5.00 | 6 | 40 | 1.3 | 8.0 | 35.0 | 0.015 | 0.033 | 0.048 | S7 |
| Lead-free SMD2 Devices Size 8763 mm/3425 mils | | | | | | | | | | | |
| SMD150F | 1.50 | 3.00 | 15 | 40 | 1.7 | 8.0 | 5.0 | 0.060 | 0.16 | 0.250 | S7 |
| SMD150F/33 | 1.50 | 3.00 | 33 | 40 | 1.7 | 8.0 | 5.0 | 0.080 | 0.15 | 0.230 | S7 |
| SMD185F | 1.80 | 3.60 | 33 | 40 | 1.2 | 8.0 | 5.0 | 0.065 | 0.12 | 0.165 | S7 |
| SMD200F | 2.00 | 4.00 | 15 | 40 | 1.7 | 8.0 | 12.0 | 0.050 | 0.09 | 0.125 | S7 |
| SMD250F | 2.50 | 5.00 | 15 | 40 | 1.7 | 8.0 | 25.0 | 0.035 | 0.06 | 0.085 | S7 |

Figures S2–S10. Physical Description for Dimensions for Surface-mount Devices

Figure S2

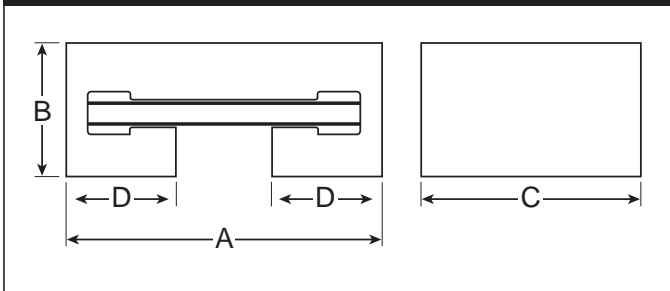


Figure S3

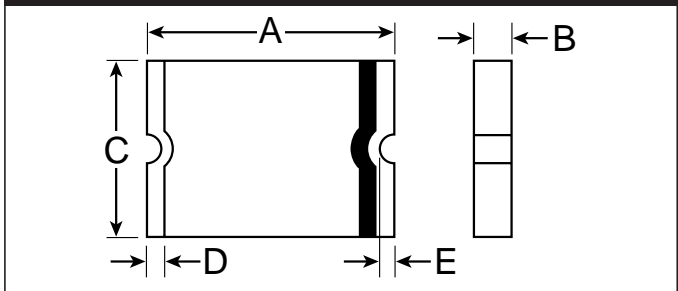


Figure S4

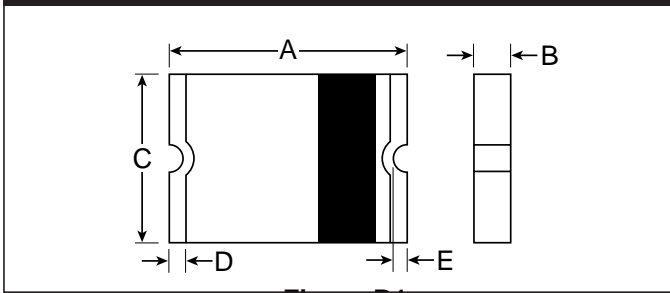


Figure S5

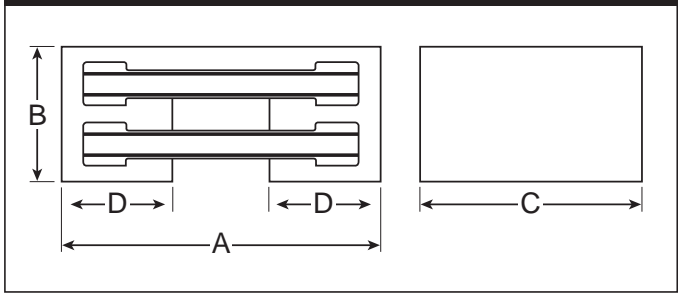


Figure S6

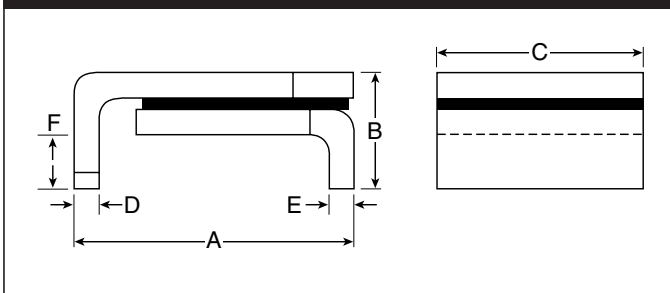


Figure S7

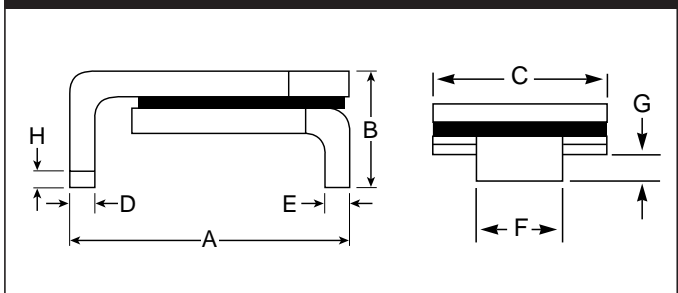


Figure S8

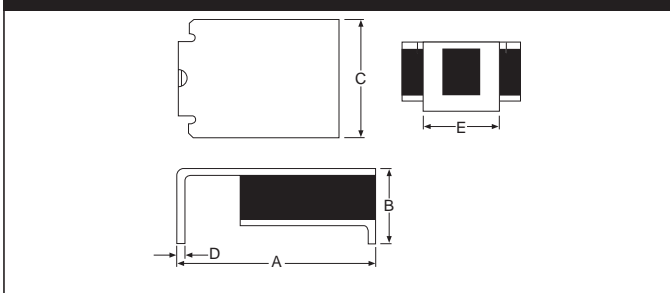


Figure S9

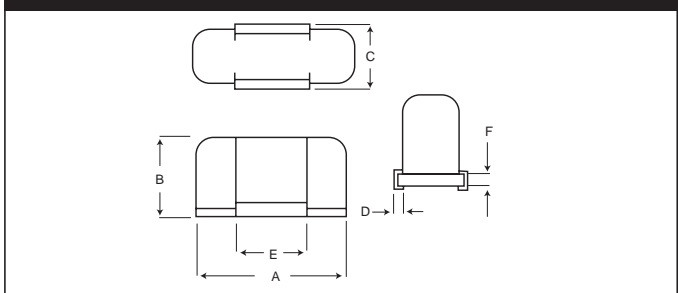
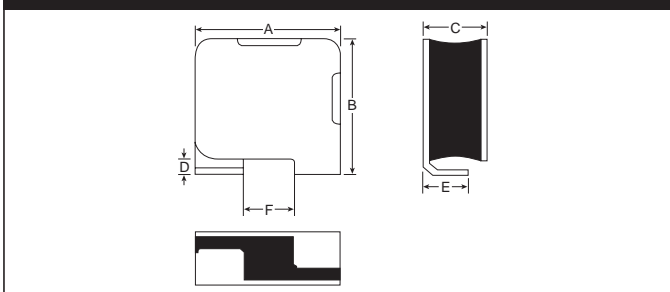


Figure S10



4

Table S4-A. Dimensions for Surface-mount Devices in Millimeters (Inches)

| Part Number | Dimension | | | | | | | | | | | | | | Figure | |
|--|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------|------|------|------|------|--------|------|
| | A | | B | | C | | D | | E | | F | | G | | | H |
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | | Min. |
| nanoSMDC Series Size 3216 mm/1206 mils | | | | | | | | | | | | | | | | |
| nanoSMDC150 | 3.0 (0.118) | 3.4 (0.134) | 0.85 (0.033) | 1.4 (0.055) | 1.37 (0.054) | 1.8 (0.071) | 0.25 (0.010) | — | 0.076 (0.003) | — | — | — | — | — | — | S3 |
| Lead-free devices are listed in Table S4-B | | | | | | | | | | | | | | | | |
| nanoSMDM Series Size 3216 mm/1206 mils | | | | | | | | | | | | | | | | |
| nanoSMDM012 | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| nanoSMDM016 | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| nanoSMDM050 | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| nanoSMDM075 | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| nanoSMDM100 | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| Lead-free devices are listed in Table S4-B | | | | | | | | | | | | | | | | |
| microSMD Series Size 3225 mm/1210 mils | | | | | | | | | | | | | | | | |
| microSMD005 | 3.00 (0.118) | 3.43 (0.135) | 0.50 (0.019) | 0.85 (0.034) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S4 |
| microSMD010 | 3.00 (0.118) | 3.43 (0.135) | 0.50 (0.019) | 0.85 (0.034) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| microSMD035 | 3.00 (0.118) | 3.43 (0.135) | 0.38 (0.015) | 0.62 (0.025) | 2.35 (0.092) | 2.80 (0.110) | 0.30 (0.012) | — | 0.25 (0.010) | — | — | — | — | — | — | S3 |
| microSMD050 | 3.00 (0.118) | 3.43 (0.135) | 0.38 (0.015) | 0.62 (0.025) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| microSMD075 | 3.00 (0.118) | 3.43 (0.135) | 0.38 (0.015) | 0.62 (0.025) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| microSMD110 | 3.00 (0.118) | 3.43 (0.135) | 0.28 (0.011) | 0.48 (0.019) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| microSMD150 | 3.00 (0.118) | 3.43 (0.135) | 0.51 (0.020) | 1.22 (0.048) | 2.35 (0.092) | 2.80 (0.110) | 0.30 (0.012) | — | 0.25 (0.010) | — | — | — | — | — | — | S3 |
| Lead-free devices are listed in Table S4-B | | | | | | | | | | | | | | | | |
| miniSMDC Series Size 4532 mm/1812 mils | | | | | | | | | | | | | | | | |
| miniSMDC014 | 4.37 (0.172) | 4.73 (0.186) | 0.635 (0.025) | 0.89 (0.035) | 3.07 (0.121) | 3.41 (0.134) | 0.30 (0.012) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC020 | 4.37 (0.172) | 4.73 (0.186) | 0.635 (0.025) | 0.89 (0.035) | 3.07 (0.121) | 3.41 (0.134) | 0.30 (0.012) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC050 | 4.37 (0.172) | 4.73 (0.186) | 0.38 (0.015) | 0.62 (0.025) | 3.07 (0.121) | 3.41 (0.134) | 0.30 (0.012) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC075 | 4.37 (0.172) | 4.73 (0.186) | 0.38 (0.015) | 0.62 (0.025) | 3.07 (0.121) | 3.41 (0.134) | 0.30 (0.012) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC110 | 4.37 (0.172) | 4.73 (0.186) | 0.38 (0.015) | 0.62 (0.025) | 3.07 (0.121) | 3.41 (0.134) | 0.30 (0.012) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC125 | 4.37 (0.172) | 4.73 (0.186) | 0.28 (0.011) | 0.48 (0.019) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC150 | 4.37 (0.172) | 4.73 (0.186) | 0.28 (0.011) | 0.48 (0.019) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC200 | 4.37 (0.172) | 4.73 (0.186) | 0.51 (0.020) | 1.22 (0.048) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC260 | 4.37 (0.172) | 4.73 (0.186) | 0.76 (0.030) | 1.25 (0.050) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| Lead-free devices are listed in Table S4-B | | | | | | | | | | | | | | | | |
| miniSMDM Series Size 4532 mm/1812 mils | | | | | | | | | | | | | | | | |
| miniSMDM075 | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S2 |
| miniSMDM075/24 | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S5 |
| Lead-free devices are listed in Table S4-B | | | | | | | | | | | | | | | | |

Table S4. Dimensions for Surface-mount Devices in Millimeters (Inches) *continued*

| Part Number | Dimension | | | | | | | | | | | | | | Figure | |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|------|------|------|------|------|------|--------|------|
| | A | | B | | C | | D | | E | | F | | G | | | H |
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | | Min. |
| miniSMDM Series | | | | | | | | | | | | | | | | |
| Size 4532 mm/1812 mils <i>continued</i> | | | | | | | | | | | | | | | | |
| miniSMDM110 | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S2 |
| miniSMDM110/16 | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S5 |
| miniSMDM150/24 | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S5 |
| miniSMDM160 | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S5 |
| miniSMDM200 | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S5 |
| miniSMDM260 | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S5 |

Lead-free devices are listed in Table S4-B

miniSMDE Series
Size 11550 mm/4420 mils

| | | | | | | | | | | | | | | | | |
|-------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---|---|---|---|---|---|----|
| miniSMDE190 | 11.15 (0.439) | 11.51 (0.453) | 0.33 (0.013) | 0.53 (0.021) | 4.83 (0.190) | 5.33 (0.210) | 0.51 (0.020) | 1.02 (0.040) | 3.81 (0.015) | — | — | — | — | — | — | S3 |
|-------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---|---|---|---|---|---|----|

midSMD
Size 5050 mm/2018 mils

| | | | | | | | | | | | | | | | | |
|-------------|-----------------|-----------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---|---|---|----|
| SMD030-2018 | 4.72 (0.186) | 5.44 (0.214) | — | 1.78 (0.070) | 4.22 (0.166) | 4.93 (0.194) | 0.25 (0.010) | 0.36 (0.014) | 0.25 (0.010) | 0.36 (0.014) | 0.30 (0.012) | 0.46 (0.018) | — | — | — | S6 |
| SMD050-2018 | 4.72 (0.186) | 5.44 (0.214) | — | 1.78 (0.070) | 4.22 (0.166) | 4.93 (0.194) | 0.25 (0.010) | 0.36 (0.014) | 0.25 (0.010) | 0.36 (0.014) | 0.30 (0.012) | 0.46 (0.018) | — | — | — | S6 |
| SMD100-2018 | 4.72 (0.186) | 5.44 (0.214) | — | 1.52 (0.060) | 4.22 (0.166) | 4.93 (0.194) | 0.25 (0.010) | 0.36 (0.014) | 0.25 (0.010) | 0.36 (0.014) | 0.30 (0.012) | 0.46 (0.018) | — | — | — | S6 |
| SMD150-2018 | 4.72 (0.186) | 5.44 (0.214) | — | 1.52 (0.060) | 4.22 (0.166) | 4.93 (0.194) | 0.25 (0.010) | 0.36 (0.014) | 0.25 (0.010) | 0.36 (0.014) | 0.30 (0.012) | 0.46 (0.018) | — | — | — | S6 |
| SMD200-2018 | 4.72 (0.186) | 5.44 (0.214) | — | 1.52 (0.060) | 4.22 (0.166) | 4.93 (0.194) | 0.25 (0.010) | 0.36 (0.014) | 0.25 (0.010) | 0.36 (0.014) | 0.30 (0.012) | 0.46 (0.018) | — | — | — | S6 |

SMD
Size 7555 mm/2920 mils

| | | | | | | | | | | | | | | | | |
|-----------|-----------------|-----------------|---|-----------------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----|
| SMD030 | 6.73 (0.265) | 7.98 (0.314) | — | 3.18 (0.125) | 4.8 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD050 | 6.73 (0.265) | 7.98 (0.314) | — | 3.18 (0.125) | 4.8 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.20 (0.008) | 0.30 (0.012) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD075 | 6.73 (0.265) | 7.98 (0.314) | — | 3.18 (0.125) | 4.8 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD100 | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.8 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD100/33 | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.8 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD125 | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.8 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD260 | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.8 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD260-RB | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.8 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD300 | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.8 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |

Lead-free devices are listed in Table S4-B

SMD2
Size 8763 mm/3425 mils

| | | | | | | | | | | | | | | | | |
|-----------|-----------------|-----------------|---|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----|
| SMD150 | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.0 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD150/33 | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.0 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMDH160 | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.0 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD185 | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.0 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |

Lead-free devices are listed in Table S4-B

Table S4-A. Dimensions for Surface-mount Devices in Millimeters (Inches) *continued*

| Part Number | Dimension | | | | | | | | | | | | | | | Figure |
|--|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------|
| | A | | B | | C | | D | | E | | F | | G | | H | |
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | |
| SMD2 | | | | | | | | | | | | | | | | |
| Size 8763 mm/3425 mils <i>continued</i> | | | | | | | | | | | | | | | | |
| SMD200 | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.0 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| SMD250 | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.0 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | S7 |
| Lead-free devices are listed in Table S4-B | | | | | | | | | | | | | | | | |
| Telecom Surface-mount | | | | | | | | | | | | | | | | |
| TSL250-080 | 6.7 (0.265) | 7.9 (0.310) | 2.7 (0.110) | 3.7 (0.145) | 4.8 (0.190) | 5.3 (0.210) | 0.2 (0.008) | 0.4 (0.015) | 2.5 (0.100) | 3.1 (0.120) | — | — | — | — | — | S7 |
| TS250-130 | 8.5 (0.335) | 9.4 (0.370) | — | 3.4 (0.135) | — | 7.4 (0.290) | 0.3 (0.011) | — | 3.8 (0.150) | — | — | — | — | — | — | S8 |
| TSV250-130 | — | 6.1 (0.240) | — | 6.9 (0.270) | — | 3.2 (0.126) | 0.56 (0.022) | — | — | 1.9 (0.075) | 1.6 (0.065) | 2.31 (0.091) | — | — | — | S10 |
| TS600-170 | 18.2 (0.720) | 19.4 (0.765) | 11.5 (0.455) | 12.3 (0.485) | 7.2 (0.285) | 8.3 (0.325) | 1.6 (0.065) | 2.4 (0.095) | 9.9 (0.390) | 10.4 (0.410) | 1.5 (0.060) | 2.3 (0.090) | — | — | — | S9 |
| TS600-200-RA | 18.2 (0.720) | 19.4 (0.765) | 11.5 (0.455) | 12.3 (0.485) | 7.2 (0.285) | 8.3 (0.325) | 1.6 (0.065) | 2.4 (0.095) | 9.9 (0.390) | 10.4 (0.410) | 1.5 (0.060) | 2.3 (0.090) | — | — | — | S9 |
| TSM600-250 | — | 17.6 (0.69) | — | 11.7 (0.46) | — | 11.2 (0.44) | — | 5.2 (0.20) | — | 2.8 (0.11) | 0.6 (0.02) | — | — | — | — | — |
| TSM600-250-RA | — | 17.6 (0.69) | — | 11.7 (0.46) | — | 11.2 (0.44) | — | 5.2 (0.20) | — | 2.8 (0.11) | 0.6 (0.02) | — | — | — | — | — |

Table S4-B. Dimensions for Lead-free Surface-mount Devices in Millimeters (Inches)

| Part Number | Dimension | | | | | | | | | | | | | | | Figure |
|----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------|------|------|------|------|------|--------|
| | A | | B | | C | | D | | E | | F | | G | | H | |
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | |
| Lead-free nanoSMD Series | | | | | | | | | | | | | | | | |
| Size 3216 mm/1206 mils | | | | | | | | | | | | | | | | |
| nanoSMD020F | 3.0 (0.118) | 3.4 (0.134) | 0.38 (0.015) | 0.64 (0.025) | 1.37 (0.054) | 1.80 (0.071) | 0.15 (0.006) | — | 0.076 (0.003) | — | — | — | — | — | — | S3 |
| nanoSMD035F | 3.0 (0.118) | 3.4 (0.134) | 0.38 (0.015) | 0.64 (0.025) | 1.37 (0.054) | 1.80 (0.071) | 0.15 (0.006) | — | 0.076 (0.003) | — | — | — | — | — | — | S3 |
| nanoSMD050F/13.2 | 3.0 (0.118) | 3.4 (0.134) | 0.38 (0.015) | 0.64 (0.025) | 1.37 (0.054) | 1.80 (0.071) | 0.15 (0.006) | — | 0.076 (0.003) | — | — | — | — | — | — | S3 |
| nanoSMD075F | 3.0 (0.118) | 3.4 (0.134) | 0.25 (0.010) | 0.38 (0.015) | 1.37 (0.054) | 1.80 (0.071) | 0.15 (0.006) | — | 0.076 (0.003) | — | — | — | — | — | — | S3 |
| nanoSMD110F | 3.0 (0.118) | 3.4 (0.134) | 0.67 (0.026) | 1.00 (0.039) | 1.37 (0.054) | 1.80 (0.071) | 0.25 (0.010) | — | 0.076 (0.003) | — | — | — | — | — | — | S3 |
| nanoSMD150F | 3.0 (0.118) | 3.4 (0.134) | 0.85 (0.033) | 1.40 (0.055) | 1.37 (0.054) | 1.80 (0.071) | 0.25 (0.010) | — | 0.076 (0.003) | — | — | — | — | — | — | S3 |
| Lead-free nanoSMDM Series | | | | | | | | | | | | | | | | |
| Size 3216 mm/1206 mils | | | | | | | | | | | | | | | | |
| nanoSMDM012F | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| nanoSMDM020F | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| nanoSMDM050F | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| nanoSMDM050F/13.2 | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| nanoSMDM075F | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| nanoSMDM100F | 3.0 (0.118) | 3.4 (0.134) | 0.8 (0.032) | 1.2 (0.047) | 1.4 (0.055) | 1.8 (0.071) | 0.75 (0.030) | 1.05 (0.041) | — | — | — | — | — | — | — | S2 |
| Lead-free microSMD Series | | | | | | | | | | | | | | | | |
| Size 3225 mm/1210 mils | | | | | | | | | | | | | | | | |
| microSMD005F | 3.00 (0.118) | 3.43 (0.135) | 0.50 (0.019) | 0.85 (0.034) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| microSMD010F | 3.00 (0.118) | 3.43 (0.135) | 0.50 (0.019) | 0.85 (0.034) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |

Table S4-B. Dimensions for Lead-free Surface-mount Devices in Millimeters (Inches) continued

| Part Number | A | | B | | C | | D | | E | | F | | G | | H | Figure |
|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------|-----------------|------|------|------|------|------|------|--------|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | |
| microSMD035F | 3.00 (0.118) | 3.43 (0.135) | 0.38 (0.015) | 0.62 (0.025) | 2.35 (0.092) | 2.80 (0.110) | 0.30 (0.012) | — | 0.25 (0.010) | — | — | — | — | — | — | S3 |
| microSMD050F | 3.00 (0.118) | 3.43 (0.135) | 0.38 (0.015) | 0.62 (0.025) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| microSMD075F | 3.00 (0.118) | 3.43 (0.135) | 0.38 (0.015) | 0.62 (0.025) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| microSMD110F | 3.00 (0.118) | 3.43 (0.135) | 0.28 (0.011) | 0.48 (0.019) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| microSMD150F | 3.00 (0.118) | 3.43 (0.135) | 0.51 (0.020) | 1.22 (0.048) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |

**Lead-free microSMD Series
Size 3225 mm/1210 mils continued**

| | | | | | | | | | | | | | | | | |
|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---|-----------------|---|---|---|---|---|---|----|
| microSMD110F | 3.00 (0.118) | 3.43 (0.135) | 0.28 (0.011) | 0.48 (0.019) | 2.35 (0.092) | 2.80 (0.110) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| microSMD150F | 3.00 (0.118) | 3.43 (0.135) | 0.51 (0.020) | 1.22 (0.048) | 2.35 (0.092) | 2.80 (0.110) | 0.30 (0.012) | — | 0.25 (0.010) | — | — | — | — | — | — | S3 |

**Lead-free miniSMDC Series
Size 4532 mm/1812 mils**

| | | | | | | | | | | | | | | | | |
|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|-----------------|---|-----------------|---|---|---|---|---|---|----|
| miniSMDC014F | 4.37 (0.172) | 4.73 (0.186) | 0.635 (0.025) | 0.89 (0.035) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC020F | 4.37 (0.172) | 4.73 (0.186) | 0.635 (0.025) | 0.89 (0.035) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC050F | 4.37 (0.172) | 4.73 (0.186) | 0.38 (0.015) | 0.62 (0.025) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC075F | 4.37 (0.172) | 4.73 (0.186) | 0.38 (0.015) | 0.62 (0.025) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC110F | 4.37 (0.172) | 4.73 (0.186) | 0.38 (0.015) | 0.62 (0.025) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC110F/16 | 4.37 (0.172) | 4.73 (0.186) | 0.38 (0.015) | 0.62 (0.025) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC125F | 4.37 (0.172) | 4.73 (0.186) | 0.28 (0.011) | 0.48 (0.019) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC125F/16 | 4.37 (0.172) | 4.73 (0.186) | 0.28 (0.011) | 0.48 (0.019) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC150F | 4.37 (0.172) | 4.73 (0.186) | 0.28 (0.011) | 0.48 (0.019) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC160F | 4.37 (0.172) | 4.73 (0.186) | 0.28 (0.011) | 0.48 (0.019) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC200F | 4.37 (0.172) | 4.73 (0.186) | 0.51 (0.020) | 1.22 (0.048) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.010) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC260F | 4.37 (0.172) | 4.73 (0.186) | 0.76 (0.030) | 1.25 (0.050) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.012) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |
| miniSMDC260F/12 | 4.37 (0.172) | 4.73 (0.186) | 0.76 (0.030) | 1.25 (0.050) | 3.07 (0.121) | 3.41 (0.134) | 0.25 (0.012) | — | 0.20 (0.008) | — | — | — | — | — | — | S3 |

**Lead-free miniSMDM Series
Size 4532 mm/1812 mils**

| | | | | | | | | | | | | | | | | |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|---|---|---|---|---|---|---|----|
| miniSMDM075F/24 | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S5 |
| miniSMDM110F | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S2 |
| miniSMDM110F/16 | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S5 |
| miniSMDM200F | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S5 |
| miniSMDM260F | 4.35 (0.172) | 4.75 (0.187) | 1.75 (0.069) | 2.00 (0.079) | 3.05 (0.120) | 3.60 (0.142) | 1.4 (0.055) | 1.7 (0.067) | — | — | — | — | — | — | — | S5 |

Table S4-B. Dimensions for Lead-free Surface-mount Devices in Millimeters (Inches) *continued*

| Part Number | A | | B | | C | | D | | E | | F | | G | | H | | Figure |
|--|-----------------|-----------------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------|--------|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | |
| Lead-free midSMD Series Size 5050 mm/2018 mils | | | | | | | | | | | | | | | | | |
| SMD030F-2018 | 4.72 (0.186) | 5.44 (0.214) | — | 1.78 (0.070) | 4.22 (0.166) | 4.93 (0.194) | 0.25 (0.010) | 0.36 (0.014) | 0.25 (0.010) | 0.36 (0.014) | 0.30 (0.012) | 0.46 (0.018) | — | — | — | — | S6 |
| SMD100F-2018 | 4.72 (0.186) | 5.44 (0.214) | — | 1.52 (0.060) | 4.22 (0.166) | 4.93 (0.194) | 0.25 (0.010) | 0.36 (0.014) | 0.25 (0.010) | 0.36 (0.014) | 0.30 (0.012) | 0.46 (0.018) | — | — | — | — | S6 |
| SMD150F-2018 | 4.72 (0.186) | 5.44 (0.214) | — | 1.52 (0.060) | 4.22 (0.166) | 4.93 (0.194) | 0.25 (0.010) | 0.36 (0.014) | 0.25 (0.010) | 0.36 (0.014) | 0.30 (0.012) | 0.46 (0.018) | — | — | — | — | S6 |
| SMD200F-2018 | 4.72 (0.186) | 5.44 (0.214) | — | 1.52 (0.060) | 4.22 (0.166) | 4.93 (0.194) | 0.25 (0.010) | 0.36 (0.014) | 0.25 (0.010) | 0.36 (0.014) | 0.30 (0.012) | 0.46 (0.018) | — | — | — | — | S6 |
| Lead-free SMD Series Size 7555 mm/2920 mils | | | | | | | | | | | | | | | | | |
| SMD030F | 6.73 (0.265) | 7.98 (0.314) | — | 3.18 (0.125) | 4.80 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD050F | 6.73 (0.265) | 7.98 (0.314) | — | 3.18 (0.125) | 4.80 (0.19) | 5.44 (0.214) | 0.20 (0.008) | 0.30 (0.012) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD075F | 6.73 (0.265) | 7.98 (0.314) | — | 3.18 (0.125) | 4.80 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD075F/60 | 6.73 (0.265) | 7.98 (0.314) | — | 3.18 (0.125) | 4.80 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD100F | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.80 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD100F/33 | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.80 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD125F | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.80 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD260F | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.80 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD300F | 6.73 (0.265) | 7.98 (0.314) | — | 3.00 (0.118) | 4.80 (0.19) | 5.44 (0.214) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 2.16 (0.085) | 2.41 (0.095) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| Lead-free SMD2 Series Size 8763 mm/3425 mils | | | | | | | | | | | | | | | | | |
| SMD150F | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.00 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD150F/33 | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.00 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD185F | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.00 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD200F | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.00 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |
| SMD250F | 8.00 (0.315) | 9.40 (0.370) | — | 3.00 (0.118) | 6.00 (0.236) | 6.71 (0.264) | 0.56 (0.022) | 0.71 (0.028) | 0.56 (0.022) | 0.71 (0.028) | 3.68 (0.145) | 3.94 (0.155) | 0.66 (0.026) | 1.37 (0.054) | 0.43 (0.017) | — | S7 |

Figures S11–S19. Typical Time-to-trip Curves at 20°C for Surface-mount Devices

Telecom and Networking Devices

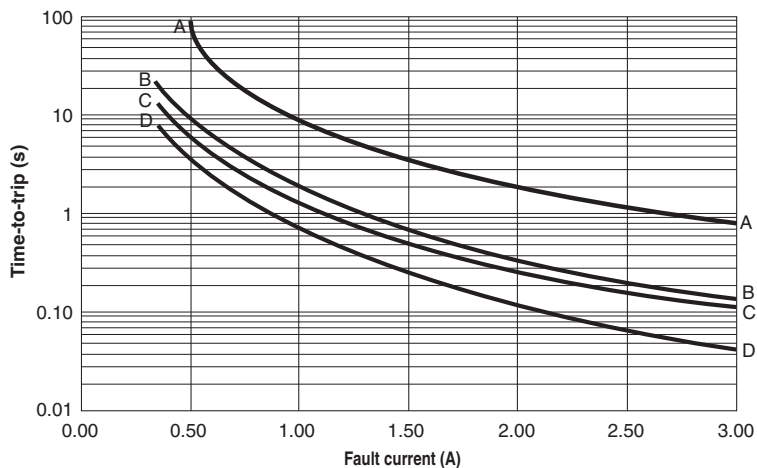
A = TS600-170/TS600-200

B = TS250-130

C = TSV250-130

D = TSL250-080

Figure S11



nanoSMDC and nanoSMDCxxxF

A = nanoSMDC020F

B = nanoSMDC035F

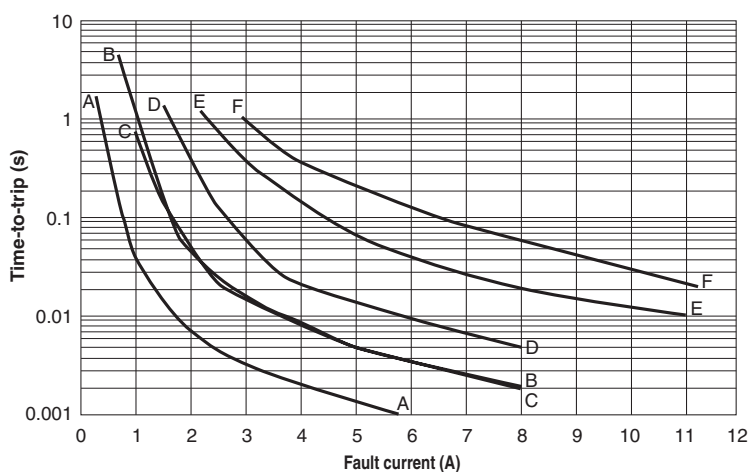
C = nanoSMDC050F/13.2

D = nanoSMDC075F

E = nanoSMDC110F

F = nanoSMDC150,
nanoSMDC150F

Figure S12



nanoSMDM and nanoSMDMxxxF

A = nanoSMDM012,
nanoSMDM012F

B = nanoSMDM016

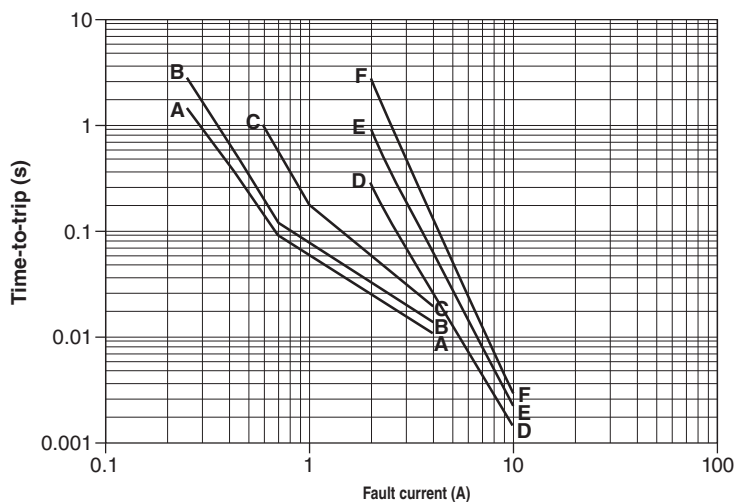
C = nanoSMDM020F

D = nanoSMDM050,
nanoSMDM050F,
nanoSMDM050F/13.2

E = nanoSMDM075,
nanoSMDM075F

F = nanoSMDM100,
nanoSMDM100F

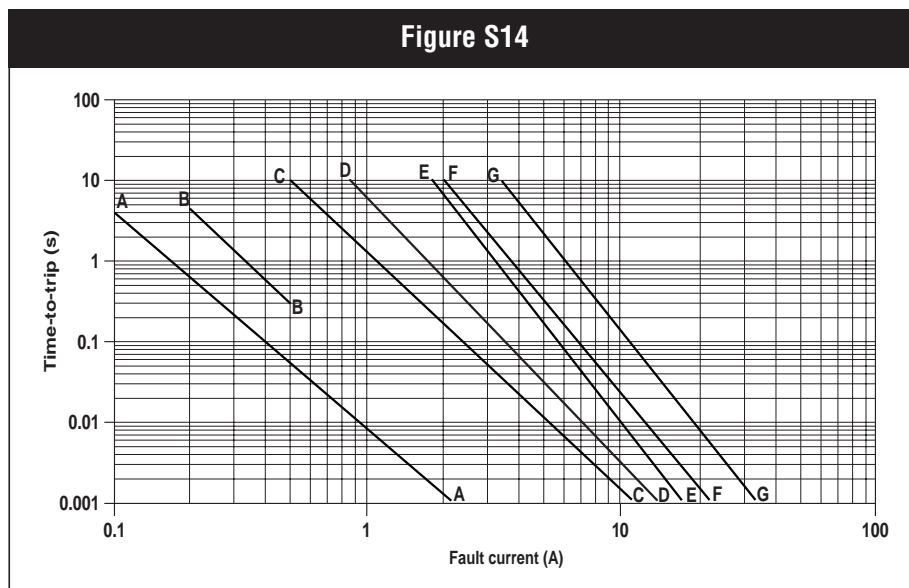
Figure S13



Figures S11–S19. Typical Time-to-trip Curves at 20°C for Surface-mount Devices *continued*

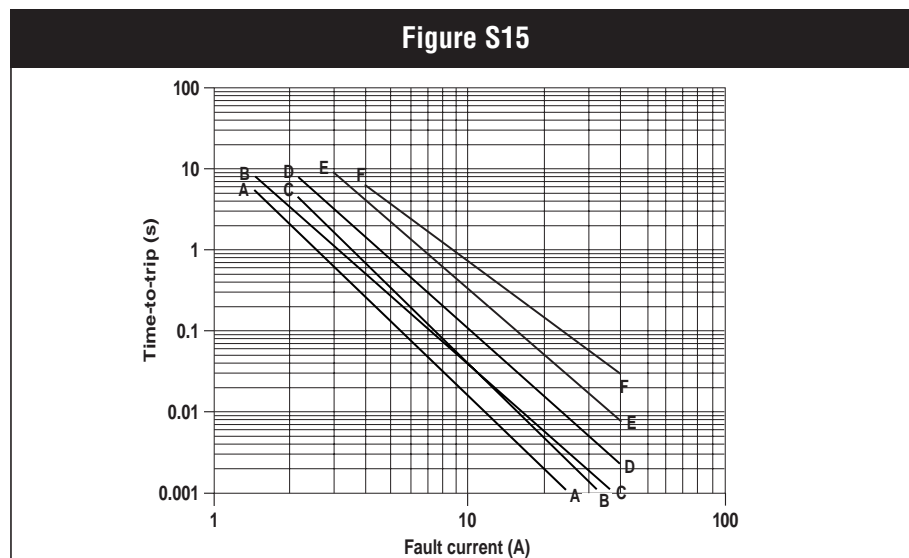
microSMD and microSMDF

- A = microSMD005,
microSMD005F
- B = microSMD010,
microSMD010F
- C = microSMD035,
microSMD035F
- D = microSMD050,
microSMD050F
- E = microSMD075,
microSMD075F
- F = microSMD110,
microSMD110F
- G = microSMD150,
microSMD150F



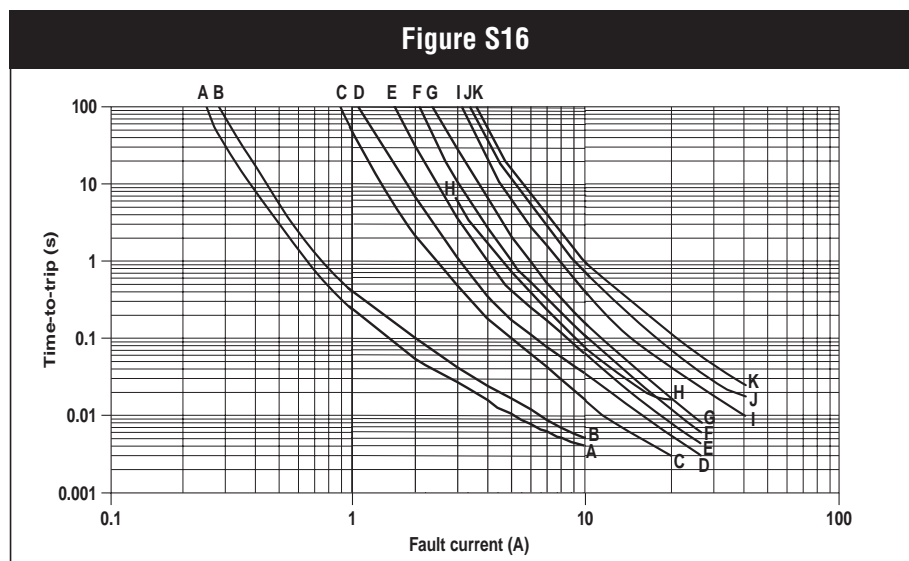
miniSMDM and miniSMDMxxxF (data at 25°C)

- A = miniSMDM075,
miniSMDM075/24,
miniSMDM075F/24
- B = miniSMDM110,
miniSMDM110F,
miniSMDM110/16,
miniSMDM110F/116
- C = miniSMDM150/24
- D = miniSMDM160
- E = miniSMDM200,
miniSMDM200F
- F = miniSMDM260,
miniSMDM260F



miniSMDC, miniSMDCxxxF and miniSMDE

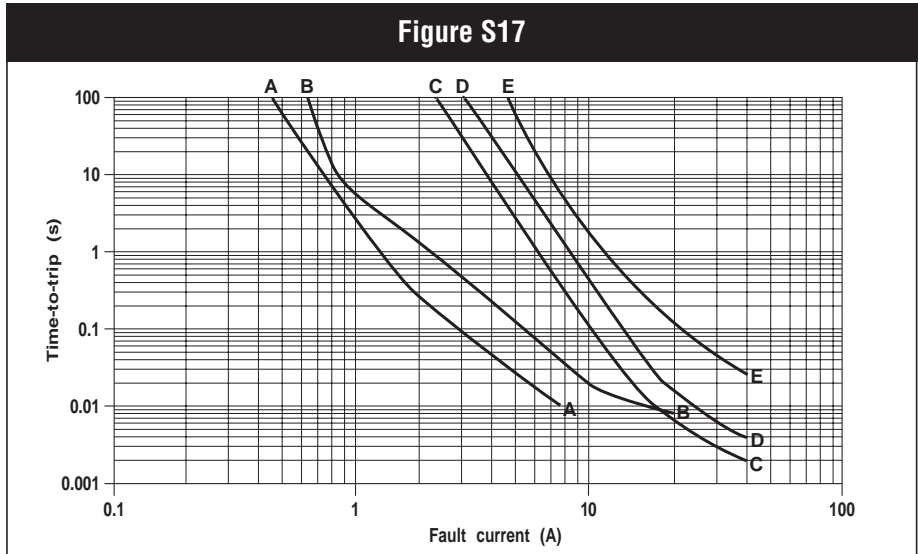
- A = miniSMDC014, miniSMDC014F
- B = miniSMDC020, miniSMDC020F
- C = miniSMDC050, miniSMDC050F
- D = miniSMDC075, miniSMDC075F
- E = miniSMDC110, miniSMDC110F,
miniSMDC110F/16
- F = miniSMDC125, miniSMDC125F,
miniSMDC125F/16
- G = miniSMDC150, miniSMDC150F
- H = miniSMDC160F
- I = miniSMDC200, miniSMDC200F
- J = miniSMDE190
- K = miniSMDC260, miniSMDC260F,
miniSMDC260F/12



Figures S11–S19. Typical Time-to-Trip Curves at 20°C for Surface-mount Devices

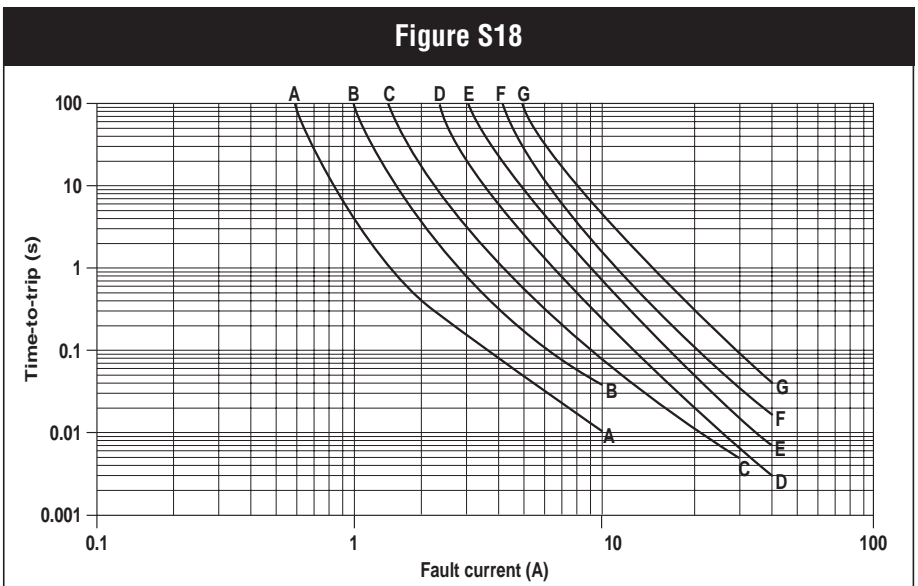
midSMD

- A = SMD030-2018,
SMD030F-2018
- B = SMD050-2018
- C = SMD100-2018,
SMD100F-2018
- D = SMD150-2018,
SMD150F-2018
- E = SMD200-2018,
SMD200F-2018



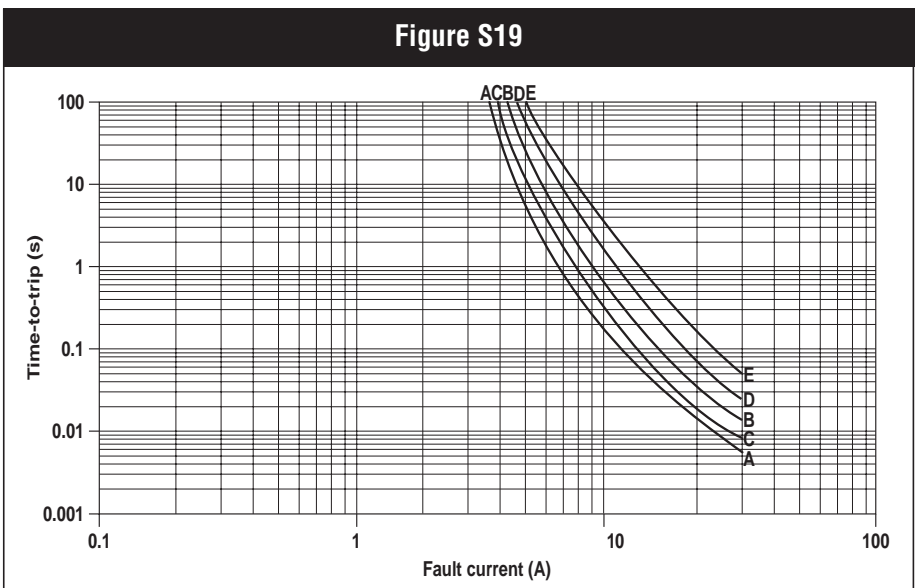
SMD and SMDxxxF

- A = SMD030, SMD030F
- B = SMD050, SMD050F
- C = SMD075, SMD075F,
SMD075F/60
- D = SMD100, SMD100F,
SMD100/33, SMD100F/33
- E = SMD125, SMD125F
- F = SMD260, SMD260RB,
SMD260F
- G = SMD300, SMD300F



SMD2 and SMDxxxF

- A = SMD150, SMD150F,
SMD150/33, SMD150F/33
- B = SMDH160
- C = SMD185, SMD185F
- D = SMD200, SMD200F
- E = SMD250, SMD250F



4

**Table S5. Physical Characteristics and Environmental Specifications for Surface-mount Devices
Operating temperature range -40°C to 85°C, -40°C to 125°C for SMDH160****Physical Characteristics**

| | |
|--------------------------------|---|
| Terminal pad material | Solder-plated copper for nanoSMDC, microSMD, and miniSMDC series Gold plating for nanoSMDM, and miniSMDM series 100% tin for SMD series |
| Soldering characteristics | ANSI/J-STD-002B Category 3 for nanoSMDC, nanoSMDM, microSMD, miniSMDC, and miniSMDM series ANSI/J-STD-002B Category 1 for SMD series |
| Solder heat withstand | per IEC-STD 68-2-20, Test Tb, Section 5, Method 1A |
| Flammability resistance | per IEC 695-2-2 Needle Flame Test for 20 sec. |
| Recommended storage conditions | 40°C max, 70% R.H. max; devices may not meet specified ratings if storage conditions are exceeded. |

Environmental Specifications

| Test | Test Method | Conditions | Resistance Change |
|--------------------|------------------------------|-------------------------|-------------------|
| Passive aging | Raychem PS300, Section 5.3.2 | 60°C, 1000 hours | ±3% typical |
| | | 85°C, 1000 hours | ±5% typical |
| Humidity aging | Raychem PS300, Section 5.3.1 | 85°C, 85% RH, 100 hours | ±1.2% typical |
| Thermal shock | MIL-STD-202, Method 107G | 85°C, -40°C (20 times) | -33% typical |
| | | 125°C, -55°C (10 times) | -33% typical |
| Vibration | MIL-STD-883C | per MIL-STD-883C | No change |
| Solvent resistance | Raychem PS300, Section 5.2.2 | Freon | No change |
| | | Trichloroethane | No change |
| | | Hydrocarbons | No change |

Agency Recognition for Surface-mount Devices*

| | |
|-----|--|
| UL | File # E74889 for all surface-mount devices |
| CSA | File # CA78165 for SMD/miniSMDC/miniSMDM/microSMD/nanoSMDC/nanoSMDM series |
| TÜV | Certificate # R9872048 for microSMD/miniSMDC/miniSMDM series Certificate # R2172061 for nanoSMDM/nanoSMDC series Certificate # R9872049 for SMD series |

*Refer to Telecom and Networking section for agency recognition on Telecom and Networking Surface Mount Devices.

Table S6-A. Packaging and Marking Information for Surface-mount Devices

| Part Number | Tape & Reel Quantity | Standard Package | Part Marking | Recommended Pad Layout Figures [mm (In.)] | | | Agency Recognition |
|--|----------------------|------------------|--------------|---|--------------------|--------------------|--------------------|
| | | | | Dimension A (Nom.) | Dimension B (Nom.) | Dimension C (Nom.) | |
| nanoSMDC Series | | | | | | | |
| Size 3216 mm/1206 mils | | | | | | | |
| nanoSMDC150 | 3,000 | 15,000 | J | 1.60 (0.063) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| Lead-free devices are listed in Table S6-B | | | | | | | |
| nanoSMDM Series | | | | | | | |
| Size 3216 mm/1206 mils | | | | | | | |
| nanoSMDM012 | 3,000 | 15,000 | 012 | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| nanoSMDM016 | 3,000 | 15,000 | 016 | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| nanoSMDM050 | 3,000 | 15,000 | 050 | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| nanoSMDM075 | 3,000 | 15,000 | 075 | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| nanoSMDM100 | 3,000 | 15,000 | 100 | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| Lead-free devices are listed in Table S6-B | | | | | | | |
| microSMD Series | | | | | | | |
| Size 3225 mm/1210 mils | | | | | | | |
| microSMD005 | 4,000 | 20,000 | 05 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD010 | 4,000 | 20,000 | 10 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD035 | 4,000 | 20,000 | 3 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD050 | 4,000 | 20,000 | 50 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD075 | 4,000 | 20,000 | 75 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD110 | 4,000 | 20,000 | 11 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD150 | 4,000 | 20,000 | 15 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| Lead-free devices are listed in Table S6-B | | | | | | | |
| miniSMDC Series | | | | | | | |
| Size 4532 mm/1812 mils | | | | | | | |
| miniSMDC014 | 2,000 | 10,000 | 14 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC020 | 2,000 | 10,000 | 2 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC050 | 2,000 | 10,000 | 5 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC075 | 2,000 | 10,000 | 7 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC110 | 2,000 | 10,000 | 1 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC125 | 2,000 | 10,000 | 12 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC150 | 2,000 | 10,000 | 15 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC200 | 2,000 | 10,000 | 20 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC260 | 1,500 | 7,500 | 26 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| Lead-free devices are listed in Table S6-B | | | | | | | |
| miniSMDM Series | | | | | | | |
| Size 4532 mm/1812 mils | | | | | | | |
| miniSMDM075 | 3,000 | 15,000 | 075 | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM075/24 | 3,000 | 15,000 | 075G | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM110 | 3,000 | 15,000 | 110 | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM110/16 | 3,000 | 15,000 | 110G | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM150/24 | 3,000 | 15,000 | 150 | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM160 | 3,000 | 15,000 | 160 | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM200 | 3,000 | 15,000 | 200 | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM260 | 3,000 | 15,000 | 260 | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| Lead-free devices are listed in Table S6-B | | | | | | | |
| miniSMDE Series | | | | | | | |
| Size 11550 mm/4420 mils | | | | | | | |
| miniSMDE190 | 5,000 | 20,000 | 19 | 4.75 (0.187) | 1.45 (0.057) | 9.57 (0.377) | UL, CSA, TÜV |

Table S6-A. Packaging and Marking Information for Surface-mount Devices *continued*

| Part Number | Tape & Reel Quantity | Standard Package | Part Marking | Recommended Pad Layout Figures [mm (In.)] | | | Agency Recognition |
|--|----------------------|------------------|---------------|---|--------------------|--------------------|--------------------|
| | | | | Dimension A (Nom.) | Dimension B (Nom.) | Dimension C (Nom.) | |
| midSMD | | | | | | | |
| Size 5050 mm/2018 mils | | | | | | | |
| SMD030-2018 | 4,000 | 20,000 | A03 | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD050-2018 | 4,000 | 20,000 | A05 | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA |
| SMD100-2018 | 4,000 | 20,000 | A10 | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD150-2018 | 4,000 | 20,000 | A15 | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD200-2018 | 4,000 | 20,000 | A20 | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD | | | | | | | |
| Size 7555 mm/2920 mils | | | | | | | |
| SMD030 | 2,000 | 10,000 | 030 | 3.1 (0.12) | 2.3 (0.09) | 5.1 (0.201) | UL, CSA, TÜV |
| SMD050 | 2,000 | 10,000 | 050 | 3.1 (0.12) | 2.3 (0.09) | 5.1 (0.201) | UL, CSA, TÜV |
| SMD075 | 2,000 | 10,000 | 075 | 3.1 (0.12) | 2.3 (0.09) | 5.1 (0.201) | UL, CSA, TÜV |
| SMD100 | 2,000 | 10,000 | 100 | 3.1 (0.12) | 2.3 (0.09) | 5.1 (0.201) | UL, CSA, TÜV |
| SMD100/33 | 2,000 | 10,000 | 103 | 3.1 (0.12) | 2.3 (0.09) | 5.1 (0.201) | UL, CSA, TÜV |
| SMD125 | 2,000 | 10,000 | 125 | 3.1 (0.12) | 2.3 (0.09) | 5.1 (0.201) | UL, CSA, TÜV |
| SMD260 | 2,000 | 10,000 | 260 | 3.1 (0.12) | 2.3 (0.09) | 5.1 (0.201) | UL, CSA, TÜV |
| SMD260-RB | 2,000 | 10,000 | 260 | 3.1 (0.12) | 2.3 (0.09) | 5.1 (0.201) | UL, CSA, TÜV |
| SMD300 | 2,000 | 10,000 | 300 | 3.1 (0.12) | 2.3 (0.09) | 5.1 (0.201) | UL, CSA, TÜV |
| Lead-free devices are listed in Table S6-B | | | | | | | |
| SMD2 | | | | | | | |
| Size 8763 mm/3425 mils | | | | | | | |
| SMD150 | 1,500 | 7,500 | 150 | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | UL, CSA, TÜV |
| SMD150/33 | 1,500 | 7,500 | 153 | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | UL, CSA, TÜV |
| SMDH160 | 1,500 | 7,500 | 160 | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | |
| SMD185 | 1,500 | 7,500 | 185 | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | UL, CSA, TÜV |
| SMD200 | 1,500 | 7,500 | 200 | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | UL, CSA, TÜV |
| SMD250 | 1,500 | 7,500 | 250 | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | UL, CSA, TÜV |
| Lead-free devices are listed in Table S6-B | | | | | | | |
| Telecom Surface-mount | | | | | | | |
| TSL250-080 | 1,500 | 7,500 | T08 | 3.6 (0.14) | 1.8 (0.07) | 5.5 (0.22) | UL, CSA, TÜV |
| TS250-130 | 1,500 | 7,500 | T13 | 4.6 (0.18) | 1.8 (0.07) | 6.1 (0.24) | UL, CSA, TÜV |
| TSV250-130 | 1,200 | 6,000 | T13V | * | * | * | UL, CSA, TÜV |
| TS600-170 | 300 | 900 | T20 | 9.91 (0.390) | 3.30 (0.130) | 3.35 (0.132) | UL, CSA |
| TS600-200-RA | 300 | 900 | T20 | 9.91 (0.390) | 3.30 (0.130) | 3.35 (0.132) | UL, CSA |
| TSM600-250 | 200 | 1,000 | TSM600 | * | * | * | UL, CSA |

*For TSV250-130 and BM 600-250 pad layout, see Telecom and Networking Section.

Table S6-B. Packaging and Marking Information for Lead-free Surface-mount Devices

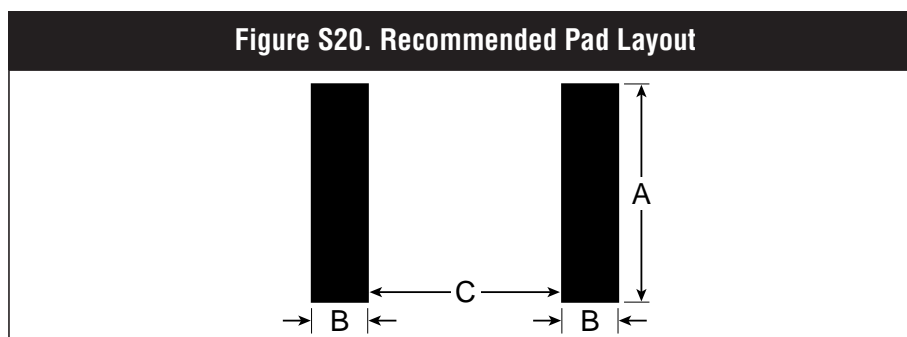
| Part Number | Tape & Reel Quantity | Standard Package | Part Marking | Recommended Pad Layout Figures [mm (In.)] | | | Agency Recognition |
|----------------------------------|----------------------|------------------|---------------------------|---|--------------------|--------------------|--------------------|
| | | | | Dimension A (Nom.) | Dimension B (Nom.) | Dimension C (Nom.) | |
| Lead-free nanoSMDC Series | | | | | | | |
| Size 3216 mm/1206 mils | | | | | | | |
| nanoSMDC020F | 3,000 | 15,000 | 02 | 1.60 (0.063) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| nanoSMDC035F | 3,000 | 15,000 | 03 | 1.60 (0.063) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA |
| nanoSMDC050F/13.2 | 3,000 | 15,000 | M | 1.60 (0.063) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| nanoSMDC075F | 3,000 | 15,000 | L | 1.60 (0.063) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| nanoSMDC110F | 3,000 | 15,000 | K | 1.60 (0.063) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| nanoSMDC150F | 3,000 | 15,000 | J | 1.60 (0.063) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| Lead-free nanoSMDM Series | | | | | | | |
| Size 3216 mm/1206 mils | | | | | | | |
| nanoSMDM012F | 3,000 | 15,000 | 012F | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| nanoSMDM020F | 3,000 | 15,000 | 02F | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| nanoSMDM050F | 3,000 | 15,000 | 05F | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| nanoSMDM050F/13.2 | 3,000 | 15,000 | 5FG | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| nanoSMDM075F | 3,000 | 15,000 | 07F | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| nanoSMDM100F | 3,000 | 15,000 | 10F | 1.80 (0.071) | 1.00 (0.039) | 1.5 (0.059) | UL, CSA, TÜV |
| Lead-free microSMD Series | | | | | | | |
| Size 3225 mm/1210 mils | | | | | | | |
| microSMD005F | 4,000 | 20,000 | 05F | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD010F | 4,000 | 20,000 | 10 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD035F | 4,000 | 20,000 | 3 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD050F | 4,000 | 20,000 | 50 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD075F | 4,000 | 20,000 | 75 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD110F | 4,000 | 20,000 | 11 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| microSMD150F | 4,000 | 20,000 | 15 | 2.50 (0.098) | 1.00 (0.039) | 2.00 (0.079) | UL, CSA, TÜV |
| Lead-free miniSMDC Series | | | | | | | |
| Size 4532 mm/1812 mils | | | | | | | |
| miniSMDC014F | 2,000 | 10,000 | 14 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC020F | 2,000 | 10,000 | 2 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC050F | 2,000 | 10,000 | 5 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC075F | 2,000 | 10,000 | 7 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC110F | 2,000 | 10,000 | 1 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC110F/16 | 2,000 | 10,000 | 110F 16V | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC125F | 2,000 | 10,000 | 12 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC125F/16 | 2,000 | 10,000 | 125F 16V | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC150F | 2,000 | 10,000 | 15 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC160F | 2,000 | 10,000 | 16 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC200F | 2,000 | 10,000 | 20 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC260F | 1,500 | 7,500 | 26 | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |
| miniSMDC260F/12 | 1,500 | 7,500 | 260F 12V | 3.15 (0.124) | 1.78 (0.070) | 3.45 (0.136) | UL, CSA, TÜV |

4

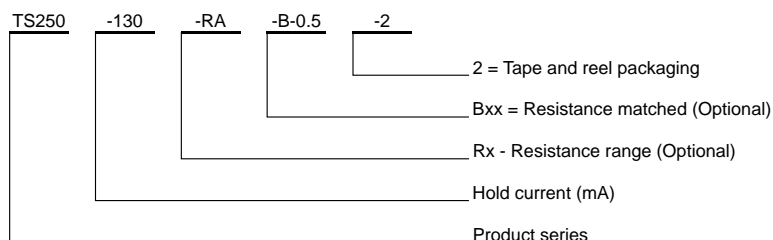
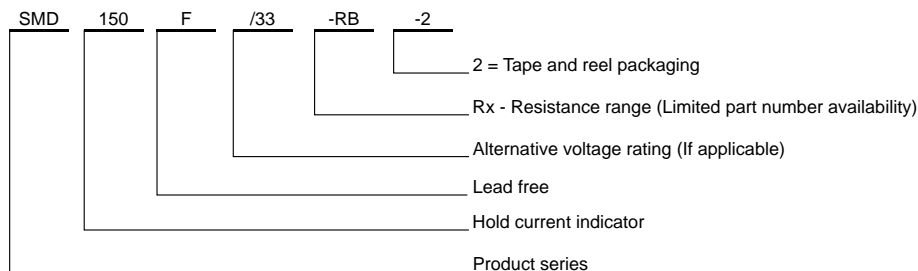
Table S6-B. Packaging and Marking Information for **Lead-free Surface-mount Devices** *continued*

| Part Number | Tape & Reel Quantity | Standard Package | Part Marking | Recommended Pad Layout Figures [mm (In.)] | | | Agency Recognition |
|----------------------------------|----------------------|------------------|--------------|---|--------------------|--------------------|--------------------|
| | | | | Dimension A (Nom.) | Dimension B (Nom.) | Dimension C (Nom.) | |
| Lead-free miniSMDM Series | | | | | | | |
| Size 4532 mm/1812 mils | | | | | | | |
| miniSMDM075F/24 | 3,000 | 15,000 | 07FG | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM110F | 3,000 | 15,000 | 110F | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM110F/16 | 3,000 | 15,000 | 11FG | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM200F | 3,000 | 15,000 | 200F | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| miniSMDM260F | 3,000 | 15,000 | 260F | 3.20 (0.126) | 1.50 (0.059) | 2.50 (0.098) | UL, CSA, TÜV |
| Lead-free midSMD Series | | | | | | | |
| Size 5050 mm/2018 mils | | | | | | | |
| SMD030F-2018 | 4,000 | 20,000 | A03F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD100F-2018 | 4,000 | 20,000 | A10F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD150F-2018 | 4,000 | 20,000 | A15F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD200F-2018 | 4,000 | 20,000 | A20F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| Lead-free SMD Series | | | | | | | |
| Size 7555 mm/2920 mils | | | | | | | |
| SMD030F | 2,000 | 10,000 | 030F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD050F | 2,000 | 10,000 | 050F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD075F | 2,000 | 10,000 | 075F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD075F/60 | 2,000 | 10,000 | 075F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA |
| SMD100F | 2,000 | 10,000 | 100F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD100F/33 | 2,000 | 10,000 | 103F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD125F | 2,000 | 10,000 | 125F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD260F | 2,000 | 10,000 | 260F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| SMD300F | 2,000 | 10,000 | 300F | 4.6 (0.18) | 1.50 (0.059) | 3.4 (0.134) | UL, CSA, TÜV |
| Lead-free SMD2 Devices | | | | | | | |
| Size 8763 mm/3425 mils | | | | | | | |
| SMD150F | 1,500 | 7,500 | 150F | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | UL, CSA, TÜV |
| SMD150F/33 | 1,500 | 7,500 | 153F | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | UL, CSA, TÜV |
| SMD185F | 1,500 | 7,500 | 185F | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | UL, CSA, TÜV |
| SMD200F | 1,500 | 7,500 | 200F | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | UL, CSA, TÜV |
| SMD250F | 1,500 | 7,500 | 250F | 4.6 (0.18) | 2.3 (0.09) | 6.1 (0.240) | UL, CSA, TÜV |

Figure S20. Recommended Pad Layout



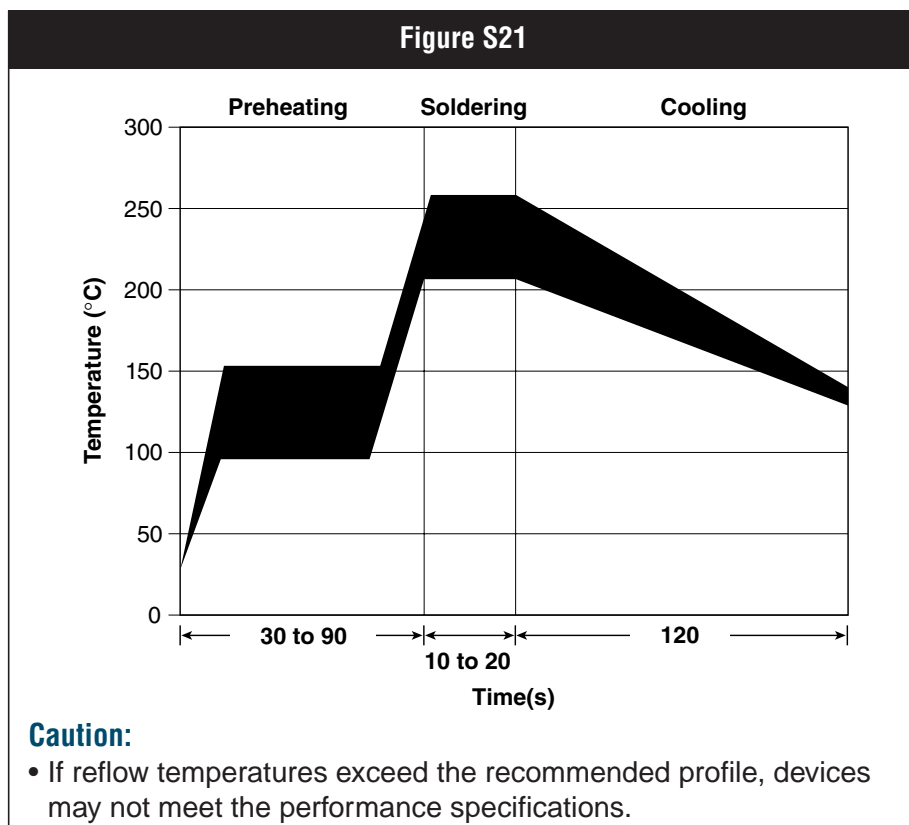
Part Numbering System



Solder Reflow and Rework Recommendations for Surface-mount Devices

Solder Reflow

- Recommended reflow methods: IR, Vapor phase, and hot air oven.
- The following product series are not designed to be wave soldered to circuit boards:
 - nanoSMDM
 - miniSMDM
 - midSMD
 - SMD
 - SMD2
 - TS
- The following product series are designed to be wave soldered to circuit boards:
 - nanoSMDC
 - microSMD
 - miniSMDC, miniSMDE
- Recommended maximum paste thickness for the microSMD, miniSMDC, and miniSMDE devices is 0.25 mm (10mils), 0.13-0.25 mm for miniSMDM and nanoSMDM, and 0.38 mm for SMD.
- Devices can be cleaned using standard methods and solvents.



Rework

- Use standard industry practices for the nanoSMDC, nanoSMDM, microSMD, miniSMDC, miniSMDM, and miniSMDE devices.
- For SMD and midSMD series and all TS devices rework should be confined to removal of the installed product and replacement with a fresh device.

Table S7. Tape and Reel Specifications for Surface-mount Devices (in Millimeters)

| | nanoSMDC nanoSMDM | microSMD | miniSMDC miniSMDM | miniSMDE190 | midSMD | SMD | SMD2 |
|---------------------|----------------------|-------------------|----------------------|-------------------|-------------------|-------------------|-------------------|
| | EIA 481-1 | EIA 481-1 | EIA 481-1 | EIA 481-2 | EIA 481-2 | EIA 481-2 | EIA 481-2 |
| W | 8.0 ± 0.30 | 8.0 ± 0.30 | 12.0 ± 0.30 | 24.0 ± 0.30 | 16.0 ± 0.30 | 16.0 ± 0.30 | 16.0 ± 0.30 |
| P ₀ | 4.0 ± 0.10 | 4.0 ± 0.10 | 4.0 ± 0.10 | 4.0 ± 0.10 | 4.0 ± 0.10 | 4.0 ± 0.10 | 4.0 ± 0.10 |
| P ₁ | 4.0 ± 0.10 | 4.0 ± 0.10 | 8.0 ± 0.10 | 8.0 ± 0.10 | 8.0 ± 0.10 | 8.0 ± 0.10 | 12.0 ± 0.10 |
| P ₂ | 2.0 ± 0.05 | 2.0 ± 0.05 | 2.0 ± 0.05 | 2.0 ± 0.10 | 2.0 ± 0.10 | 2.0 ± 0.10 | 2.0 ± 0.10 |
| A ₀ | Table S7a | 2.9 ± 0.10 | Table S7b | 5.70 ± 0.10 | 5.11 ± 0.15 | 5.6 ± 0.23 | 6.9 ± 0.23 |
| B ₀ | Table S7a | 3.5 ± 0.10 | Table S7b | 11.90 ± 0.10 | 5.6 ± 0.23 | 8.1 ± 0.15 | 9.6 ± 0.15 |
| B ₁ max. | 4.35 | 4.35 | 8.2** | 20.1 | 12.1 | 12.1 | 12.1 |
| D ₀ | 1.5 + 0.10/ -0.00 | 1.5 + 0.10/ -0.00 | 1.5 + 0.10/ -0.00 | 1.5 + 0.10/ -0.00 | 1.5 + 0.10/ -0.00 | 1.5 + 0.10/ -0.00 | 1.5 + 0.10/ -0.00 |
| F | 3.5 ± 0.05 | 3.5 ± 0.05 | 5.5 ± 0.05 | 11.5 ± 0.10 | 7.5 ± 0.10 | 7.5 ± 0.10 | 7.5 ± 0.10 |
| E ₁ | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 | 1.75 ± 0.10 |
| E ₂ min. | 6.25 | 6.25 | 10.25 | 22.25 | 14.25 | 14.25 | 14.25 |
| T max. | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| T ₁ max. | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| K ₀ | Table S7a | 0.90 ± 0.10* | Table S7b | 0.95 ± 0.10 | 1.8 ± 0.15 | 3.2 ± 0.15 | 3.4 ± 0.15 |
| Leader min. | 390*** | 390 | 390*** | 400 | 400 | 400 | 400 |
| Trailer min. | 160*** | 160 | 160*** | 160 | 160 | 160 | 160 |

*1.1±0.05 for microSMD150

**5.9 for miniSMDM

***200 for nanoSMDM, miniSMDM

Table S7a

| | nanoSMDC150 | nanoSMDM |
|----------------|-------------|-------------|
| A ₀ | 2.3 ± 0.10 | 1.88 ± 0.10 |
| B ₀ | 3.5 ± 0.10 | 3.5 ± 0.10 |
| K ₀ | 1.45 ± 0.10 | 1.4 ± 0.10 |

Table S7b

| | miniSMDC | miniSMDC260 | miniSMDM |
|----------------|------------|-------------|------------|
| A ₀ | 3.5 ± 0.23 | 3.7 ± 0.10 | 3.5 ± 0.23 |
| B ₀ | 5.1 ± 0.15 | 4.9 ± 0.10 | 5.1 ± 0.15 |
| K ₀ | 0.9 ± 0.15 | 1.4 ± 0.10 | 2.3 ± 0.15 |

Table S7c. Reel Dimensions for Surface-mount Devices (in millimeters)

| | nanoSMDC nanoSMDM | microSMD | miniSMDC | miniSMDM | miniSMDE190 | midSMD | SMD | SMD2 |
|---------------------|----------------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|
| A max. | 180 | 180 | 180 | 340 | 330 | 330 | 330 | 330 |
| N min. | 50 | 50 | 50 | 50 | 60 | 50 | 50 | 50 |
| W ₁ | 8.5 + 1.5/-0.00 | 8.4 + 1.5/-0.00 | 12.4 + 2.0/-0.00 | 12.4 + 2.0/-0.00 | 24.4 + 2.0/-0.00 | 16.4 + 2.0/-0.00 | 16.4 + 2.0/-0.00 | 16.4 + 2.0/-0.00 |
| W ₂ max. | 14.4 | 14.4 | 18.4 | 18.4 | 30.4 | 22.4 | 22.4 | 22.4 |

Figure S21. EIA Taped Component Dimensions

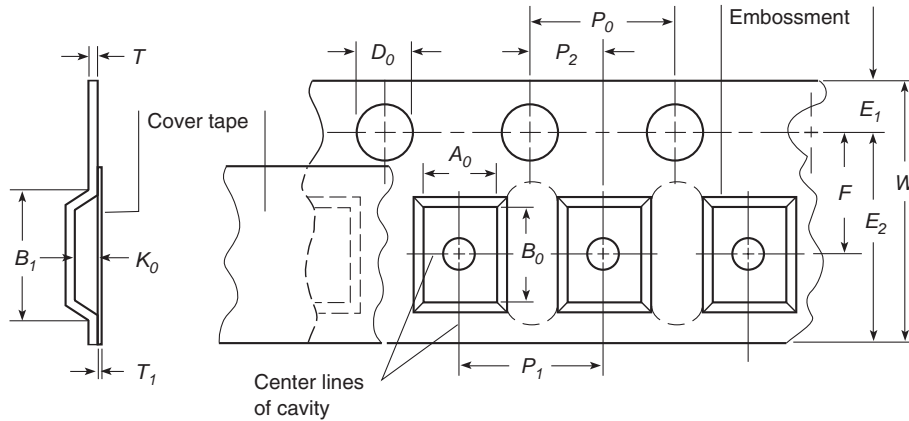
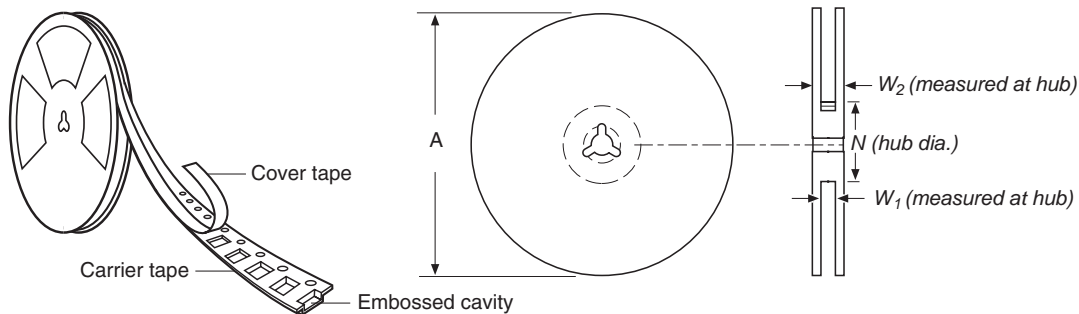


Figure S22. EIA Reel Dimensions



4

Latest Information

- Please visit us at www.circuitprotection.com or contact your local representative for the latest information.
- The information in this data package contains some preliminary information. Raychem Circuit Protection, a division of Tyco Electronics, reserves the right to change any of the specifications without notice. In addition, Tyco Electronics reserves the right to make changes—without notification to Buyer—to materials or processing that do not affect compliance with any applicable specification.

WARNING:

- Operation beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- The devices are intended for protection against occasional overcurrent or overtemperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Contamination of the PPTC material with certain silicon based oils or some aggressive solvents can adversely impact the performance of the devices.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- Operation in circuits with a large inductance can generate a circuit voltage ($L \frac{di}{dt}$) above the rated voltage of the PolySwitch resettable device.