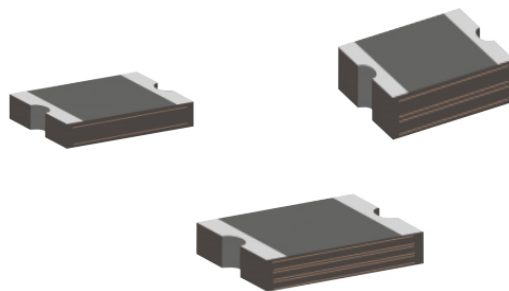


### Description

The 1210 series provides miniature surface mount over-current protection with holding current from 0.05A to 2.60A. This series is suitable for wide range of applications in modern electronics where space is limited



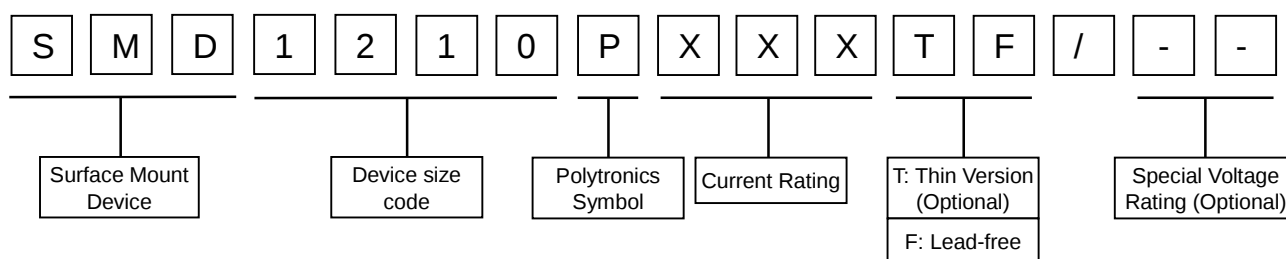
### Features

- I I(hold): 0.05~2.60A
- I Very high voltage surge capabilities
- I Available in lead-free version
- I Fast response to fault current
- I RoHS compliant, Lead- Free and Halogen-Free
- I Low resistance
- I Compact design saves board space
- I Compatible with high temperature solders

### Applications

- I USB peripherals
- I Disk drives
- I CD-ROMs
- I General electronics
- I Disk drives
- I Set-top-box and HDMI
- I Mobile Internet Device (MID)
- I PDAs / digital cameras
- I Game console port protection
- I Plug and play protection for motherboards and peripherals
- I Mobile phones - battery and port protection

### Part Number Code



### Environmental Specifications

| Test            | Test Conditions                     | Accept/Reject Criteria        |
|-----------------|-------------------------------------|-------------------------------|
| Resistance      | In still air @ 25°C                 | $R_{min} \leq R \leq R_{max}$ |
| Time to Trip    | Specified current, $V_{max}$ , 25°C | $T \leq$ maximum Time to Trip |
| Hold Current    | 30min, at $I_H$                     | No trip                       |
| Trip Cycle Life | $V_{max}$ , $I_{max}$ , 100cycles   | No arcing or burning          |
| Trip Endurance  | $V_{max}$ , 1 hours                 | No arcing or burning          |

## Physical Characteristics and Environmental Specifications

|                              |                                                                  |                                |
|------------------------------|------------------------------------------------------------------|--------------------------------|
| Terminal materials :         | Tin-Plated Nickle-copper                                         |                                |
| Soldering zone               | Meets EIA specification RS 186-9E and ANSI/J-STD-002 Category 3. |                                |
| Environmental Specifications |                                                                  |                                |
| Test                         | Conditions                                                       | Resistance Change              |
| Passive aging                | 85°C ,1000hours                                                  | ±10%                           |
| Humidity aging               | 85°C/85%RH.1000 hours                                            | ±5%                            |
| Thermal shock                | MIL-STD-202,Method 107G<br>+85°C/-40°C ,20times                  | -30% typical resistance change |
| Solvent Resistance           | MIL-STD-202,Method 215                                           | no change                      |
| Vibration                    | ML-STD-883C,Test Condition A                                     | No change                      |

## Electrical Characteristic

| Part Number      | $V_{Max}$ | $I_{Max}$ | $I_{Hold}$ | $I_{Trip}$ | $P_D$       | Maximum Time-to-trip |               | Resistance       |                   |
|------------------|-----------|-----------|------------|------------|-------------|----------------------|---------------|------------------|-------------------|
|                  | (Vdc)     | (A)       | (A)        | (A)        | Max.<br>(W) | Current<br>(A)       | Time<br>(Sec) | $R_{Min}$<br>(Ω) | $R1_{Max}$<br>(Ω) |
| SMD1210P005TF    | 60        | 100       | 0.05       | 0.15       | 0.6         | 0.25                 | 1.50          | 2.8              | 50                |
| SMD1210P010TF    | 30        | 100       | 0.10       | 0.30       | 0.6         | 0.50                 | 0.60          | 0.8              | 15                |
| SMD1210P020TF    | 30        | 100       | 0.20       | 0.40       | 0.6         | 8.0                  | 0.02          | 0.40             | 5                 |
| SMD1210P035TF/30 | 30        | 100       | 0.35       | 0.75       | 0.6         | 8.0                  | 0.20          | 0.20             | 1.3               |
| SMD1210P035TF    | 16        | 100       | 0.35       | 0.75       | 0.6         | 8.0                  | 0.20          | 0.20             | 1.3               |
| SMD1210P050TF    | 16        | 100       | 0.50       | 1.00       | 0.6         | 8.0                  | 0.10          | 0.18             | 0.9               |
| SMD1210P075TF    | 6         | 100       | 0.75       | 1.50       | 0.6         | 8.0                  | 0.10          | 0.07             | 0.4               |
| SMD1210P075TF/24 | 24        | 100       | 0.75       | 1.50       | 0.6         | 8.0                  | 0.10          | 0.07             | 0.45              |
| SMD1210P110TF    | 6         | 100       | 1.10       | 2.20       | 0.6         | 8.0                  | 0.30          | 0.05             | 0.21              |
| SMD1210P110TF/12 | 12        | 100       | 1.10       | 2.20       | 0.8         | 8.0                  | 0.30          | 0.05             | 0.25              |
| SMD1210P110TF/16 | 16        | 100       | 1.10       | 2.20       | 0.8         | 8.0                  | 0.30          | 0.05             | 0.25              |
| SMD1210P150TF    | 6         | 100       | 1.50       | 3.00       | 0.8         | 8.0                  | 0.50          | 0.03             | 0.11              |
| SMD1210P175TF    | 6         | 100       | 1.75       | 3.50       | 0.8         | 8.0                  | 0.60          | 0.02             | 0.08              |
| SMD1210P200TF    | 6         | 100       | 2.00       | 4.00       | 0.8         | 8.0                  | 1.00          | 0.015            | 0.07              |

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

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

$I_{hold}$  = Hold Current. Maximum current device will not trip in 25°C still air.

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

$P_d$  = Power dissipation when device is in the tripped state in 25°C still air environment at rated voltage.

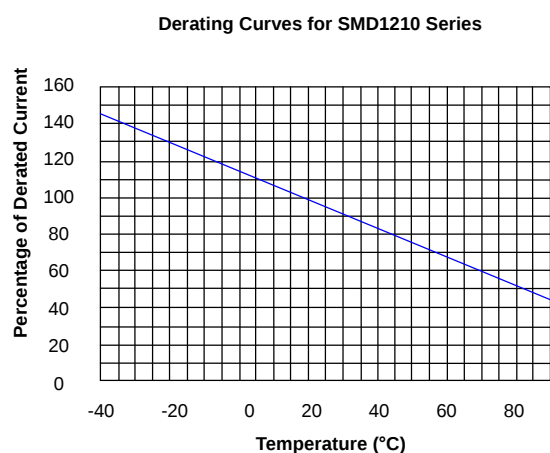
$R_{i min/max}$  = Minimum/Maximum device resistance prior to tripping at 25°C.

$R1_{max}$  = Maximum device resistance is measured one hour post reflow.

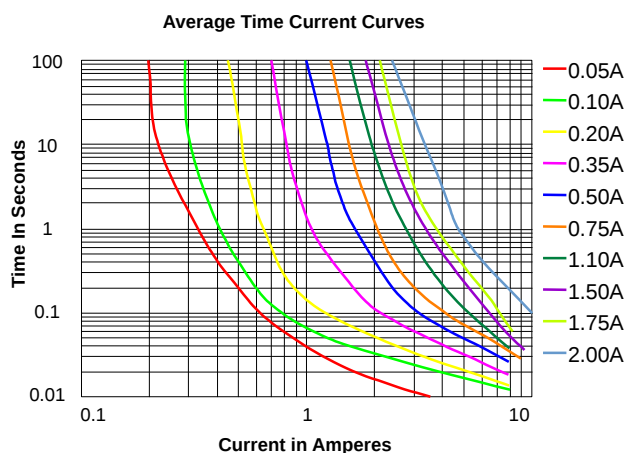
## Thermal Derating Chart-I<sub>H</sub> ( A )

| Part Number      | Maximum ambient operating temperatures ( °C ) |      |      |      |      |      |      |      |      |
|------------------|-----------------------------------------------|------|------|------|------|------|------|------|------|
|                  | -40                                           | -20  | 0    | 25   | 40   | 50   | 60   | 70   | 85   |
| SMD1210P005TF    | 0.08                                          | 0.07 | 0.06 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.02 |
| SMD1210P010TF    | 0.16                                          | 0.14 | 0.12 | 0.10 | 0.08 | 0.07 | 0.06 | 0.05 | 0.05 |
| SMD1210P020TF    | 0.29                                          | 0.26 | 0.22 | 0.20 | 0.16 | 0.14 | 0.13 | 0.11 | 0.08 |
| SMD1210P035TF    | 0.47                                          | 0.45 | 0.40 | 0.35 | 0.33 | 0.28 | 0.24 | 0.21 | 0.18 |
| SMD1210P035TF/30 | 0.47                                          | 0.45 | 0.40 | 0.35 | 0.33 | 0.28 | 0.24 | 0.21 | 0.18 |
| SMD1210P050TF    | 0.76                                          | 0.67 | 0.58 | 0.50 | 0.43 | 0.40 | 0.36 | 0.32 | 0.28 |
| SMD1210P075TF    | 1.00                                          | 0.97 | 0.86 | 0.75 | 0.64 | 0.59 | 0.54 | 0.48 | 0.40 |
| SMD1210P075TF/24 | 1.00                                          | 0.97 | 0.86 | 0.75 | 0.64 | 0.59 | 0.54 | 0.48 | 0.40 |
| SMD1210P110TF    | 1.60                                          | 1.42 | 1.26 | 1.10 | 0.94 | 0.86 | 0.80 | 0.70 | 0.58 |
| SMD1210P110TF/12 | 1.60                                          | 1.42 | 1.26 | 1.10 | 0.94 | 0.86 | 0.80 | 0.70 | 0.58 |
| SMD1210P110TF/16 | 1.60                                          | 1.42 | 1.26 | 1.10 | 0.94 | 0.86 | 0.80 | 0.70 | 0.58 |
| SMD1210P150TF    | 2.30                                          | 2.02 | 1.76 | 1.50 | 1.24 | 1.11 | 1.00 | 0.85 | 0.65 |
| SMD1210P175TF    | 2.45                                          | 2.22 | 2.01 | 1.75 | 1.45 | 1.26 | 1.10 | 0.98 | 0.80 |
| SMD1210P200TF    | 2.60                                          | 2.44 | 2.35 | 2.00 | 1.78 | 1.67 | 1.50 | 1.45 | 1.10 |

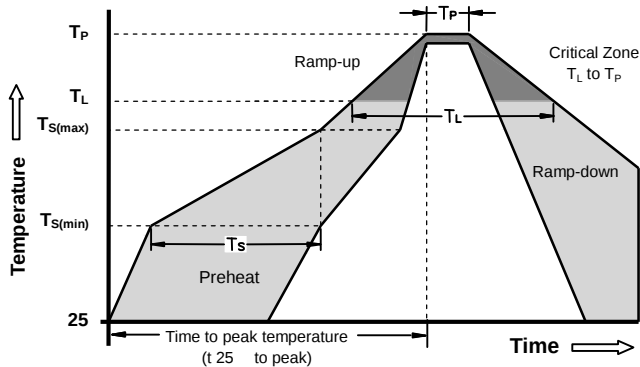
## Thermal Derating Curve



## Average Time-Current Curve

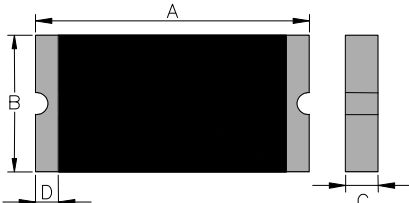
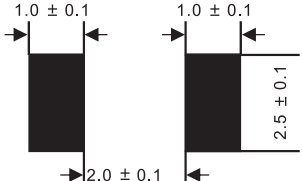


## Soldering Parameters



| Reflow Condition                                     |                                   | Pb - Free assembly |
|------------------------------------------------------|-----------------------------------|--------------------|
| Pre Heat                                             | -Temperature Min ( $T_{s(min)}$ ) | 150°C              |
|                                                      | -Temperature Max ( $T_{s(max)}$ ) | 200°C              |
|                                                      | - Time (min to max) ( $t_s$ )     | 60 -180 Seconds    |
| Average ramp up rate ( Liquids Temp $T_L$ ) to peak  |                                   | 3°C/second max     |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                 |                                   | 3°C/second max     |
| Reflow                                               | - Temperature ( $T_L$ ) (Liquids) | 217°C              |
|                                                      | - Time (min to max) ( $t_s$ )     | 60 -150 Seconds    |
| Peak Temperature ( $T_P$ )                           |                                   | 260 +0/-5°C        |
| Time within 5°C of actual peak Temperature ( $t_p$ ) |                                   | 20 - 40 Seconds    |
| Ramp-down Rate                                       |                                   | 6°C/second max     |
| Time 25°C to peak Temperature ( $T_P$ )              |                                   | 8 minutes Max      |
| Do not exceed                                        |                                   | 260°C              |

## Recommended pad layout (mm)

| Lead style code                                                                     | Recommended Pad Layout (mm.)                                                         |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |

## Product Dimensions

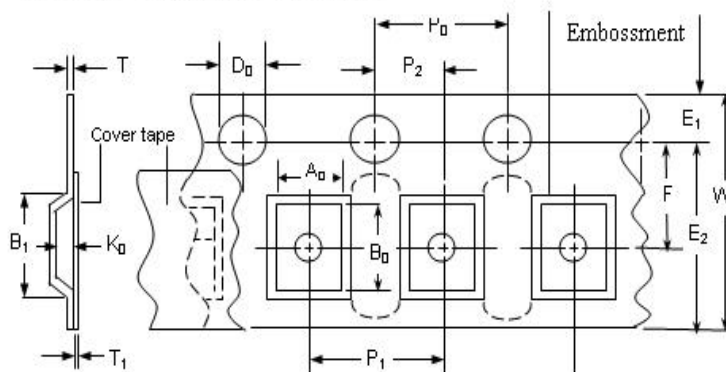
Unit : mm

| Part Number      | Marking | A    |      | B    |      | C    |      | D    | E    |
|------------------|---------|------|------|------|------|------|------|------|------|
|                  |         | Max  | Min  | Max  | Min  | Max  | Min  | Min  | Min  |
| SMD1210P005TF    | JN      | 3.00 | 3.43 | 2.35 | 2.80 | 0.60 | 1.25 | 0.15 | 0.10 |
| SMD1210P010TF    | JN      | 3.00 | 3.43 | 2.35 | 2.80 | 0.60 | 1.25 | 0.15 | 0.10 |
| SMD1210P020TF    | JF      | 3.00 | 3.43 | 2.35 | 2.80 | 0.50 | 1.00 | 0.15 | 0.10 |
| SMD1210P035TF    | JB      | 3.00 | 3.43 | 2.35 | 2.80 | 0.35 | 0.90 | 0.15 | 0.10 |
| SMD1210P035TF/30 | JB      | 3.00 | 3.43 | 2.35 | 2.80 | 0.35 | 1.00 | 0.15 | 0.10 |
| SMD1210P050TF    | JG      | 3.00 | 3.43 | 2.35 | 2.80 | 0.35 | 0.90 | 0.15 | 0.10 |
| SMD1210P075TF    | JA      | 3.00 | 3.43 | 2.35 | 2.80 | 0.35 | 0.85 | 0.15 | 0.10 |
| SMD1210P075TF/24 | JA      | 3.00 | 3.43 | 2.35 | 2.80 | 0.50 | 1.10 | 0.15 | 0.10 |
| SMD1210P110TF    | JK      | 3.00 | 3.43 | 2.35 | 2.80 | 0.40 | 1.00 | 0.15 | 0.10 |
| SMD1210P110TF/12 | JK      | 3.00 | 3.43 | 2.35 | 2.80 | 0.50 | 1.10 | 0.15 | 0.10 |
| SMD1210P110TF/16 | JK      | 3.00 | 3.43 | 2.35 | 2.80 | 0.50 | 1.10 | 0.15 | 0.10 |
| SMD1210P150TF    | JK      | 3.00 | 3.43 | 2.35 | 2.80 | 0.60 | 1.40 | 0.15 | 0.10 |
| SMD1210P175TF    | JK      | 3.00 | 3.43 | 2.35 | 2.80 | 0.60 | 1.40 | 0.15 | 0.10 |
| SMD1210P200TF    | JK      | 3.00 | 3.43 | 2.35 | 2.80 | 0.60 | 1.50 | 0.15 | 0.10 |

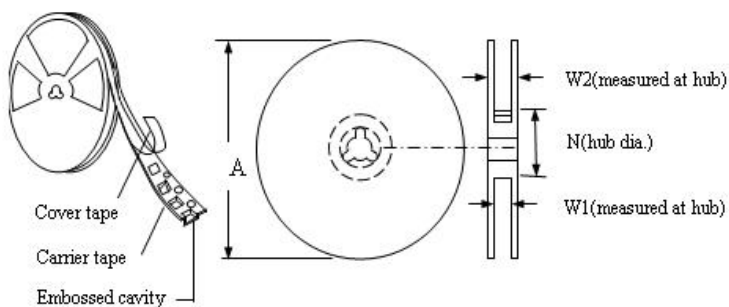
## Taping and Reel Specifications

| Covering Specifications<br>EIA 481-1(Unit:mm) |              |
|-----------------------------------------------|--------------|
| W                                             | 8.0± 0.3     |
| P <sub>0</sub>                                | 4.0 ± 0.10   |
| P <sub>1</sub>                                | 4.0 ± 0.10   |
| P <sub>2</sub>                                | 2.0 ± 0.05   |
| A <sub>0</sub>                                | 2.87± 0.10   |
| B <sub>0</sub>                                | 3.56± 0.10   |
| D <sub>0</sub>                                | 1.55 ± 0.05  |
| F                                             | 3.5 0± 0.05  |
| E <sub>1</sub>                                | 1.75 ± 0.10  |
| T                                             | 0.25 ± 0.10  |
| Leader min.                                   | 390          |
| Trailer min.                                  | 160          |
| Reel Dimensions                               |              |
| A                                             | 178±1.0      |
| N                                             | 59±1         |
| W <sub>1</sub>                                | 8.5+1.0/-0.2 |
| W <sub>2</sub>                                | 12.0±1       |

EIA Tape Component Dimintions



EIA Reel Dimintions



## Packaging Quantity

| Quantity    |               | 3000          | 4000             |
|-------------|---------------|---------------|------------------|
| Part Number | SMD1210P175TF | SMD1210P200TF | SMD1210P005TF    |
|             |               |               | SMD1210P010TF    |
|             |               |               | SMD1210P020TF    |
|             |               |               | SMD1210P035TF/30 |
|             |               |               | SMD1210P035TF    |
|             |               |               | SMD1210P050TF    |
|             |               |               | SMD1210P075TF    |
|             |               |               | SMD1210P075TF/24 |
|             |               |               | SMD1210P110TF    |
|             |               |               | SMD1210P110TF/12 |
|             |               |               | SMD1210P110TF/16 |
|             |               |               | SMD1210P150TF    |