

# PTSA1210

## Automotive SMD PTC fuses



### Product features

- AEC-Q200 qualified
- Positive temperature coefficient (PTC)
- Surface mount resettable fuse
- Compact 1210 (3225 metric) footprint
- Low resistance
- Fast time-to-trip
- Current rating 0.50 A
- Voltage rating 13.2 V

### Applications

- Infotainment
- In-vehicle navigation
- Telematics
- Car lighting
- Power window and seat control
- Instrument clusters
- PCB trace protection

### Environmental compliance



### Part number system/ordering:

#### **PTSA121013V050**

- PT= PTC resettable fuse
- S= Surface mount
- A= Automotive
- 1210= Dimension code
- 13V= Maximum voltage
- 050= Ihold current rating (050= 0.50 A)

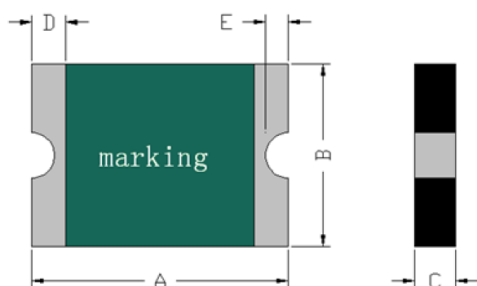
## Product specifications

|                | V <sub>max</sub> <sup>1</sup> | I <sub>max</sub> <sup>2</sup> | I <sub>hold</sub> <sup>3</sup> | I <sub>trip</sub> <sup>4</sup> | P <sub>d</sub> <sup>5</sup> | Time-to-trip (maximum) |           | Resistance <sup>6</sup>               |                                         |              |
|----------------|-------------------------------|-------------------------------|--------------------------------|--------------------------------|-----------------------------|------------------------|-----------|---------------------------------------|-----------------------------------------|--------------|
| Part number    | (V <sub>dc</sub> )            | (A)                           | (A)                            | (A)                            | typical (W)                 | (A)                    | (seconds) | Initial (R <sub>i</sub> ) minimum (Ω) | Post trip (R <sub>p</sub> ) maximum (Ω) | Part marking |
| PTSA121013V050 | 13.2                          | 40                            | 0.50                           | 1.00                           | 0.8                         | 8.0                    | 0.10      | 0.15                                  | 1.00                                    | W4           |

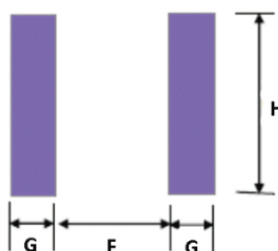
1. V<sub>max</sub>: Maximum continuous voltage the device can withstand without damage at rated current
2. I<sub>max</sub>: Maximum fault current the device can withstand without damage at rated voltage
3. I<sub>hold</sub>: Maximum current the device will pass without interruption at +23 °C still air
4. I<sub>trip</sub>: Minimum current that will transition the device from low resistance to high resistance at +23 °C still air
5. P<sub>d</sub>: Power dissipated from the device when in tripped state at +23 °C still air

6. R<sub>i</sub>: Minimum resistance of the device at +23 °C  
R<sub>p</sub>: Maximum resistance of the device one hour after tripping at +23 °C

## Dimensions—mm



## Recommended pad layout



| Part number    | A typ | A max | B typ | B max | C typ | C max | D min | E min | F   | G   | H   |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-----|-----|
| PTSA121013V050 | 3.25  | 3.43  | 2.50  | 2.80  | 0.60  | 0.85  | 0.25  | 0.10  | 2.0 | 1.0 | 2.5 |

## Thermal derating chart - I<sub>hold</sub> (A)

| Part number    | Maximum ambient temperature (°C) |      |      |      |      |      |      |      |      |
|----------------|----------------------------------|------|------|------|------|------|------|------|------|
|                | -40                              | -20  | 0    | 25   | 40   | 50   | 60   | 70   | 85   |
| PTSA121013V050 | 0.76                             | 0.65 | 0.57 | 0.50 | 0.44 | 0.39 | 0.35 | 0.29 | 0.24 |

### General specifications

Operating temperature: -40 °C to +85 °C (with derating)

Storage temperature: -10 °C to +40 °C

Storage relative humidity: ≤70%

Storage condition: Keep away from corrosive atmosphere and sunlight

Passive aging: IEC60738-1, +60 °C, 1000 hours, ≤ 20%  
IEC60738-1, +85 °C, 1000 hours, ≤ 20%

Humidity aging: +85 °C, 85% RH, 100 hours, ≤ 20%

Thermal shock: IEC60738-1, +85 °C/ -40 °C, 20 cycles, ≤ 50%

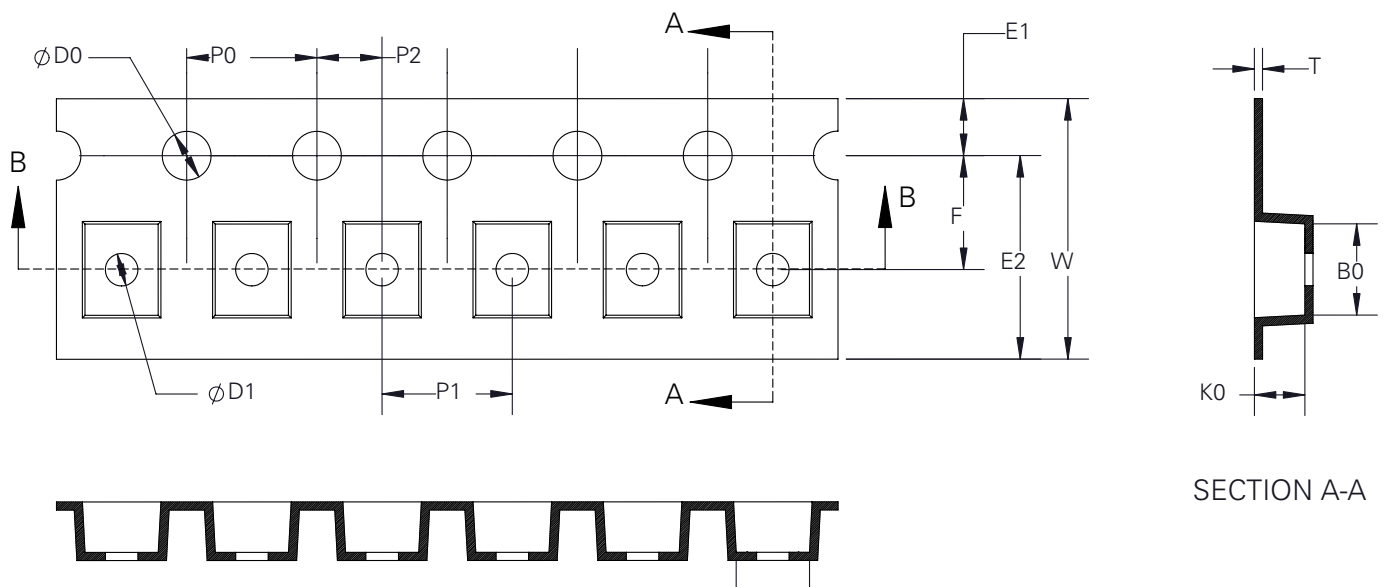
Trip cycle life: UL1434, Vmax, Imax, 100 cycles, no arcing or burning

Trip endurance: UL1434, Vmax, Itrip ≤ I, 2 hours, no arcing or burning

MSL test: J-STD-020, MSL=1, pass and no visible damage

### Packaging information

Supplied in tape and reel packaging, 4000 parts per 7.0" (178 mm) diameter reel (EIA-481 compliant)



| W           | F           | E1          | E2 | P0          | P1          | P2          | D0             | D1 | A0          | B0          | K0          | T           |
|-------------|-------------|-------------|----|-------------|-------------|-------------|----------------|----|-------------|-------------|-------------|-------------|
| 8.00 ± 0.30 | 3.50 ± 0.10 | 1.75 ± 0.10 | -  | 4.00 ± 0.10 | 4.00 ± 0.10 | 2.00 ± 0.05 | 1.55 ± 0.10/-0 | -  | 2.82 ± 0.30 | 3.46 ± 0.30 | 1.25 ± 0.10 | 0.22 ± 0.05 |

## Solder reflow profile

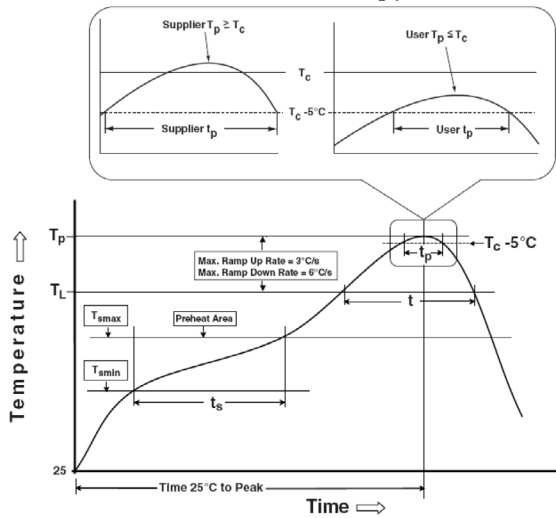


Table 1 - Standard SnPb solder ( $T_c$ )

| Package thickness | Volume $\text{mm}^3$ <350 | Volume $\text{mm}^3$ $\geq 350$ |
|-------------------|---------------------------|---------------------------------|
| <2.5 mm           | 235 °C                    | 220 °C                          |
| $\geq 2.5$ mm     | 220 °C                    | 220 °C                          |

Table 2 - Lead (Pb) Free Solder ( $T_c$ )

| Package thickness | Volume $\text{mm}^3$ <350 | Volume $\text{mm}^3$ 350 - 2000 | Volume $\text{mm}^3$ >2000 |
|-------------------|---------------------------|---------------------------------|----------------------------|
| <1.6 mm           | 260 °C                    | 260 °C                          | 260 °C                     |
| 1.6 – 2.5 mm      | 260 °C                    | 250 °C                          | 245 °C                     |
| >2.5 mm           | 250 °C                    | 245 °C                          | 245 °C                     |

## Reference J-STD-020

| Profile feature                                                                   | Standard SnPb solder | Lead (Pb) free solder |
|-----------------------------------------------------------------------------------|----------------------|-----------------------|
| Preheat and soak                                                                  |                      |                       |
| • Temperature min. ( $T_{smin}$ )                                                 | 100 °C               | 150 °C                |
| • Temperature max. ( $T_{smax}$ )                                                 | 150 °C               | 200 °C                |
| • Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                     | 60-120 seconds       | 60-120 seconds        |
| Ramp up rate $T_L$ to $T_p$                                                       | 3 °C/ second max.    | 3 °C/ second max.     |
| Liquidous temperature ( $T_L$ )                                                   | 183 °C               | 217 °C                |
| Time ( $t_L$ ) maintained above $T_L$                                             | 60-150 seconds       | 60-150 seconds        |
| Peak package body temperature ( $T_p$ )*                                          | Table 1              | Table 2               |
| Time ( $t_p$ )* within 5 °C of the specified classification temperature ( $T_c$ ) | 20 seconds*          | 30 seconds*           |
| Ramp-down rate ( $T_p$ to $T_L$ )                                                 | 6 °C/ second max.    | 6 °C/ second max.     |
| Time 25 °C to peak temperature                                                    | 6 minutes max.       | 8 minutes max.        |

\* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

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