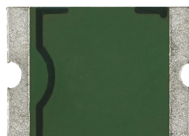


# PTSA1812

## Automotive SMD PTC fuses



### Product features

- AEC-Q200 qualified
- Positive temperature coefficient (PTC)
- Surface mount resettable fuse
- Compact 1812 (4532 metric) footprint
- Low resistance
- Fast time-to-trip
- Current rating from 0.10 A to 2.60 A
- Voltage rating from 16 V to 60 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:

#### PTSA181260V010

- PT= PTC resettable fuse
- S= Surface mount
- A= Automotive
- 1812= Dimension code
- 60V= Maximum voltage
- 010= Ihold current rating (010= 0.10 A)

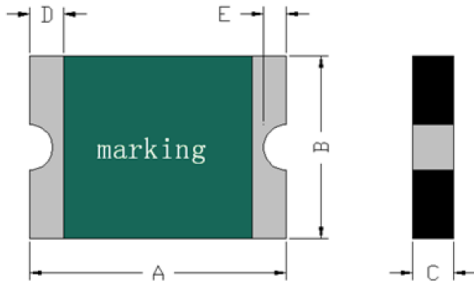
## Product specifications

|                | 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 |
| PTSA181260V010 | 60                            | 10                            | 0.10                           | 0.3                            | 1.0                         | 1.5                    | 0.15      | 0.70                                  | 15.0                                    | W010         |
| PTSA181260V014 | 60                            | 10                            | 0.14                           | 0.34                           | 1.0                         | 1.5                    | 0.30      | 0.65                                  | 6.00                                    | W014         |
| PTSA181230V020 | 30                            | 10                            | 0.20                           | 0.4                            | 1.0                         | 6.0                    | 0.02      | 0.60                                  | 5.00                                    | W020         |
| PTSA181230V030 | 30                            | 40                            | 0.30                           | 0.6                            | 1.0                         | 8.0                    | 0.15      | 0.20                                  | 1.75                                    | W030         |
| PTSA181224V050 | 24                            | 50                            | 0.50                           | 1.0                            | 1.0                         | 8.0                    | 0.15      | 0.10                                  | 1.00                                    | W050         |
| PTSA181233V075 | 33                            | 100                           | 0.75                           | 1.5                            | 1.0                         | 8.0                    | 0.30      | 0.07                                  | 0.48                                    | W075         |
| PTSA181224V110 | 24                            | 40                            | 1.10                           | 2.2                            | 1.0                         | 8.0                    | 0.30      | 0.04                                  | 0.26                                    | W110         |
| PTSA181216V150 | 16                            | 40                            | 1.50                           | 3.0                            | 1.0                         | 8.0                    | 0.50      | 0.03                                  | 0.12                                    | W150         |
| PTSA181224V150 | 24                            | 40                            | 1.50                           | 3.0                            | 1.0                         | 8.0                    | 1.50      | 0.03                                  | 0.12                                    | W150         |
| PTSA181216V200 | 16                            | 40                            | 2.00                           | 4.0                            | 1.0                         | 8.0                    | 5.00      | 0.02                                  | 0.085                                   | W200         |
| PTSA181216V260 | 16                            | 40                            | 2.60                           | 5.2                            | 1.0                         | 8.0                    | 5.00      | 0.015                                 | 0.07                                    | W260         |

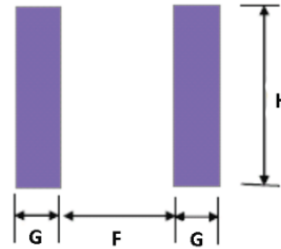
1. V<sub>max</sub>: Maximum continuous voltage the device can withstand without damage at rated current
2. I<sub>max</sub>: Maximum fault current the device can withstand without damage at rated voltage
3. I<sub>hold</sub>: Maximum current the device will pass without interruption at +23 °C still air
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   |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-----|
| PTSA181260V010 | 4.50  | 4.73  | 3.20  | 3.41  | 0.79  | 1.0   | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |
| PTSA181260V014 | 4.50  | 4.73  | 3.20  | 3.41  | 0.79  | 1.0   | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |
| PTSA181230V020 | 4.50  | 4.73  | 3.20  | 3.41  | 0.79  | 1.0   | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |
| PTSA181230V030 | 4.50  | 4.73  | 3.20  | 3.41  | 0.79  | 1.0   | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |
| PTSA181224V050 | 4.50  | 4.73  | 3.20  | 3.41  | 0.75  | 1.05  | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |
| PTSA181233V075 | 4.53  | 4.73  | 3.20  | 3.41  | 1.15  | 1.3   | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |
| PTSA181224V110 | 4.50  | 4.73  | 3.20  | 3.41  | 0.79  | 1.3   | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |
| PTSA181216V150 | 4.53  | 4.73  | 3.20  | 3.41  | 1.20  | 1.7   | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |
| PTSA181224V150 | 4.53  | 4.73  | 3.20  | 3.41  | 1.20  | 1.7   | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |
| PTSA181216V200 | 4.53  | 4.73  | 3.20  | 3.41  | 1.20  | 2.0   | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |
| PTSA181216V260 | 4.53  | 4.83  | 3.20  | 3.41  | 1.20  | 2.0   | 0.3   | 0.2   | 3.10 | 1.68 | 3.2 |

### Thermal derating chart - Ihold (A)

| Part number    | Maximum ambient temperature (°C) |      |      |      |       |      |      |      |      |
|----------------|----------------------------------|------|------|------|-------|------|------|------|------|
|                | -40                              | -20  | 0    | 25   | 40    | 50   | 60   | 70   | 85   |
| PTSA181260V010 | 0.18                             | 0.16 | 0.14 | 0.10 | 0.08  | 0.07 | 0.06 | 0.05 | 0.04 |
| PTSA181260V014 | 0.23                             | 0.20 | 0.18 | 0.14 | 0.12  | 0.11 | 0.09 | 0.07 | 0.05 |
| PTSA181230V020 | 0.33                             | 0.29 | 0.26 | 0.20 | 0.175 | 0.16 | 0.15 | 0.13 | 0.09 |
| PTSA181230V030 | 0.49                             | 0.44 | 0.39 | 0.30 | 0.27  | 0.24 | 0.22 | 0.18 | 0.14 |
| PTSA181224V050 | 0.78                             | 0.69 | 0.59 | 0.50 | 0.45  | 0.41 | 0.37 | 0.33 | 0.23 |
| PTSA181233V075 | 1.12                             | 1.02 | 0.89 | 0.75 | 0.66  | 0.58 | 0.53 | 0.47 | 0.39 |
| PTSA181224V110 | 1.65                             | 1.49 | 1.29 | 1.10 | 0.95  | 0.85 | 0.79 | 0.66 | 0.53 |
| PTSA181216V150 | 2.28                             | 2.05 | 1.85 | 1.50 | 1.26  | 1.14 | 1.05 | 0.92 | 0.73 |
| PTSA181224V150 | 2.28                             | 2.05 | 1.85 | 1.50 | 1.26  | 1.14 | 1.05 | 0.92 | 0.73 |
| PTSA181216V200 | 2.90                             | 2.61 | 2.40 | 2.00 | 1.70  | 1.51 | 1.41 | 1.21 | 0.95 |
| PTSA181216V260 | 3.80                             | 3.51 | 3.12 | 2.60 | 2.28  | 2.10 | 1.85 | 1.61 | 1.29 |

### 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

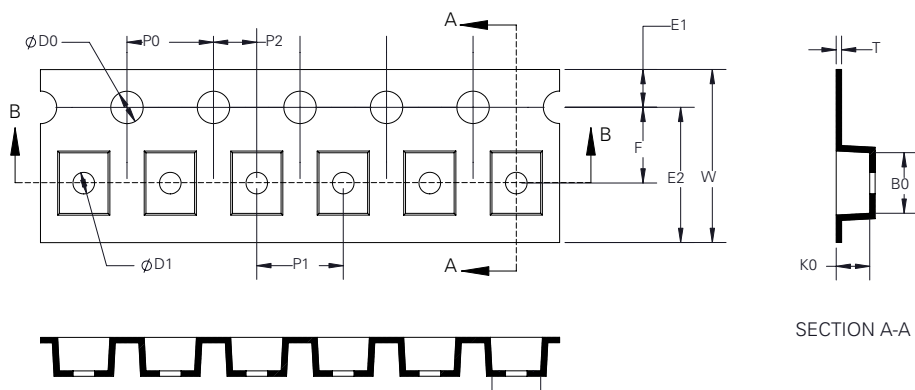
Trip endurance: UL1434, Vmax, Itrip ≤ I, 2 hours, no arcing or burning

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

### Packaging information

PTSA181260V010, PTSA181260V014, PTSA181230V020, PTSA181230V030, PTSA181224V050, PTSA181224V110  
Supplied in tape and reel packaging, 2000 parts per 7.0" (178 mm) diameter reel (EIA-481 compliant)

PTSA181233V075, PTSA181224V150, PTSA181216V150, PTSA181216V200, PTSA181216V260  
Supplied in tape and reel packaging, 1000 parts per 7.0" (178 mm) diameter reel (EIA-481 compliant)



PTSA181260V010, PTSA181260V014, PTSA181230V020, PTSA181230V030, PTSA181224V050

| W            | F           | E1          | E2 | P0          | P1          | P2          | D0             | D1 | A0          | B0          | K0          | T           |
|--------------|-------------|-------------|----|-------------|-------------|-------------|----------------|----|-------------|-------------|-------------|-------------|
| 12.00 ± 0.30 | 5.50 ± 0.10 | 1.75 ± 0.10 | -  | 4.00 ± 0.10 | 8.00 ± 0.10 | 1.75 ± 0.10 | 1.50 ± 0.10/-0 | -  | 3.55 ± 0.10 | 4.90 ± 0.10 | 0.80 ± 0.10 | 0.25 ± 0.05 |

PTSA181233V075, PTSA181224V150, PTSA181224V110, PTSA181216V150, PTSA181216V200, PTSA181216V260

| W            | F           | E1          | E2 | P0          | P1          | P2          | D0             | D1 | A0          | B0          | K0          | T           |
|--------------|-------------|-------------|----|-------------|-------------|-------------|----------------|----|-------------|-------------|-------------|-------------|
| 12.00 ± 0.30 | 5.50 ± 0.10 | 1.75 ± 0.10 | -  | 4.00 ± 0.10 | 8.00 ± 0.10 | 1.75 ± 0.10 | 1.50 ± 0.10/-0 | -  | 3.66 ± 0.10 | 4.95 ± 0.10 | 1.85 ± 0.10 | 0.24 ± 0.05 |

## Solder reflow profile

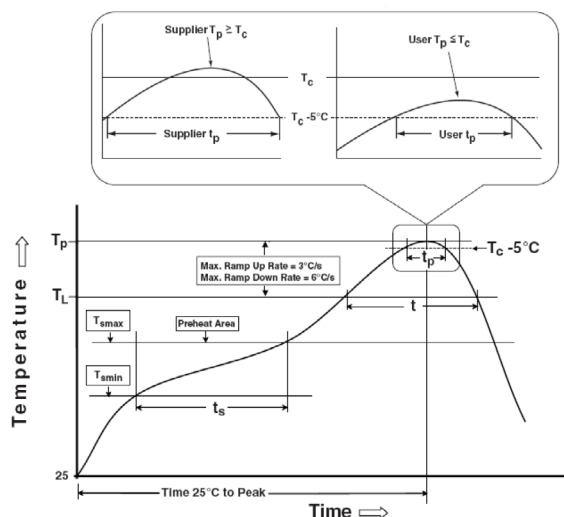


Table 1 - Standard SnPb solder ( $T_c$ )

| Package thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5 mm)          | 235 °C                      | 220 °C                      |
| ≥2.5 mm           | 220 °C                      | 220 °C                      |

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

| Package thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> 350 - 2000 | Volume mm <sup>3</sup> >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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