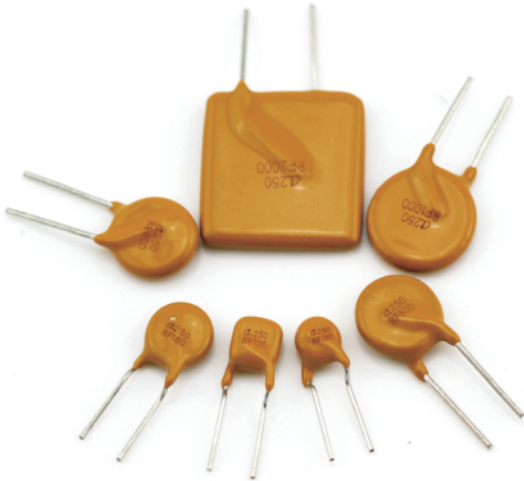


为您的产品保驾护航

PRODUCT DATASHEET

PTC Devices

## A250 Series PTC Devices




### Description

The JDTFUSE A250 Series is designed to protect against short duration high voltage fault currents (power cross or power induction surge) typically found in telecom applications (250Vrms). The series can be used to help telecom networking equipment meet the protection requirements specified in ITU K.20 and K.21.

### Features



- Low resistance
- Solid state
- Radial lead products
- Fast time-to-trip
- Binned and sorted narrow resistance ranges available
- RoHS compliant, Lead-Free and Halogen-Free\*

### Agency Approvals

| Agency  | File Number |
|---|-------------|
|  | E472196     |

### Applications

- Customer Premises Equipment (CPE)
- Central Office (CO)/telecom centers
- LAN/WAN equipment
- Access equipment

| Regulation  | Standard   |
|---|------------|
|  | 2002/95/EC |
|  | EN14582    |

**Performance Specification**

| Model     | I <sub>hold</sub><br>@25°C<br>(A) | I <sub>trip</sub><br>@25°C<br>(A) | V <sub>max</sub><br>V <sub>int</sub> / V <sub>op</sub><br>(V) | I <sub>max</sub><br>(A) | P <sub>d</sub><br>Typ.<br>(W) | Maximum<br>Time To Trip |               | Resistance                |                          |
|-----------|-----------------------------------|-----------------------------------|---|-------------------------|-------------------------------|-------------------------|---------------|---------------------------|--------------------------|
|           |                                   |                                   |   |                         |                               | Current<br>(A)          | Time<br>(Sec) | R <sub>i min</sub><br>(Ω) | R <sub>1max</sub><br>(Ω) |
| A250-030  | 0.03                              | 0.08                              | 250/60  | 3.0                     | 1.00                          | 0.15                    | 10.0          | 40.0                      | 153.0                    |
| A250-040  | 0.04                              | 0.12                              | 250/60  | 3.0                     | 1.00                          | 0.20                    | 10.0          | 33.0                      | 110.5                    |
| A250-050  | 0.05                              | 0.12                              | 250/60  | 3.0                     | 1.00                          | 0.25                    | 10.0          | 24.0                      | 102.0                    |
| A250-060  | 0.06                              | 0.12                              | 250/60  | 3.0                     | 1.00                          | 0.30                    | 10.0          | 22.0                      | 54.40                    |
| A250-080  | 0.08                              | 0.16                              | 250/60  | 3.0                     | 1.00                          | 0.40                    | 10.0          | 14.0                      | 37.40                    |
| A250-090  | 0.09                              | 0.18                              | 250/60  | 3.0                     | 1.00                          | 0.45                    | 10.0          | 10.0                      | 34.00                    |
| A250-110  | 0.11                              | 0.22                              | 250/60  | 3.0                     | 1.00                          | 0.55                    | 15.0          | 7.00                      | 18.70                    |
| A250-120  | 0.12                              | 0.24                              | 250/60  | 3.0                     | 1.00                          | 0.60                    | 15.0          | 8.00                      | 20.40                    |
| A250-145  | 0.145                             | 0.29                              | 250/60  | 3.0                     | 1.00                          | 0.725                   | 15.0          | 3.50                      | 11.05                    |
| A250-180  | 0.18                              | 0.50                              | 250/60  | 3.0                     | 1.50                          | 0.90                    | 15.0          | 0.80                      | 5.10                     |
| A250-200  | 0.20                              | 0.40                              | 250/60  | 3.0                     | 1.50                          | 1.00                    | 15.0          | 1.50                      | 5.44                     |
| A250-300  | 0.30                              | 0.60                              | 250/60  | 3.0                     | 1.50                          | 1.50                    | 15.0          | 0.90                      | 2.38                     |
| A250-350  | 0.35                              | 0.70                              | 250/60  | 3.0                     | 1.50                          | 1.75                    | 10.0          | 0.80                      | 2.55                     |
| A250-400  | 0.40                              | 0.80                              | 250/60  | 3.0                     | 2.50                          | 2.00                    | 10.0          | 0.75                      | 1.87                     |
| A250-500  | 0.50                              | 1.00                              | 250/60  | 5.0                     | 3.00                          | 2.50                    | 15.0          | 0.50                      | 1.36                     |
| A250-600  | 0.60                              | 1.20                              | 250/60  | 5.0                     | 3.00                          | 3.00                    | 10.0          | 0.50                      | 1.275                    |
| A250-800  | 0.80                              | 1.60                              | 250/60  | 5.0                     | 3.50                          | 4.00                    | 10.0          | 0.45                      | 1.05                     |
| A250-1000 | 1.00                              | 2.00                              | 250/60  | 5.0                     | 4.00                          | 5.00                    | 10.0          | 0.28                      | 0.765                    |
| A250-1200 | 1.20                              | 2.40                              | 250/60  | 10.0                    | 4.20                          | 6.00                    | 15.0          | 0.17                      | 0.420                    |
| A250-1400 | 1.40                              | 2.80                              | 250/60  | 10.0                    | 4.50                          | 7.00                    | 20.0          | 0.18                      | 0.375                    |
| A250-2000 | 2.00                              | 4.00                              | 250/60  | 10.0                    | 5.00                          | 10.0                    | 25.0          | 0.12                      | 0.285                    |

I<sub>hold</sub> = Hold Current. Maximum current device will not trip in 23°C still air.

I<sub>trip</sub> = Trip Current. Minimum current at which the device will always trip in 23°C still air.

V<sub>max</sub> = Maximum operating voltage device can withstand without damage at rated current (I<sub>max</sub>).

V<sub>int</sub> = Maximum impulse voltage.

V<sub>op</sub> = Maximum operating voltage.

I<sub>max</sub> = Maximum fault current device can withstand without damage at rated voltage (V<sub>max</sub>).

P<sub>d</sub> = Power dissipation when device is in the tripped state in 23°C still air environment at rated voltage.

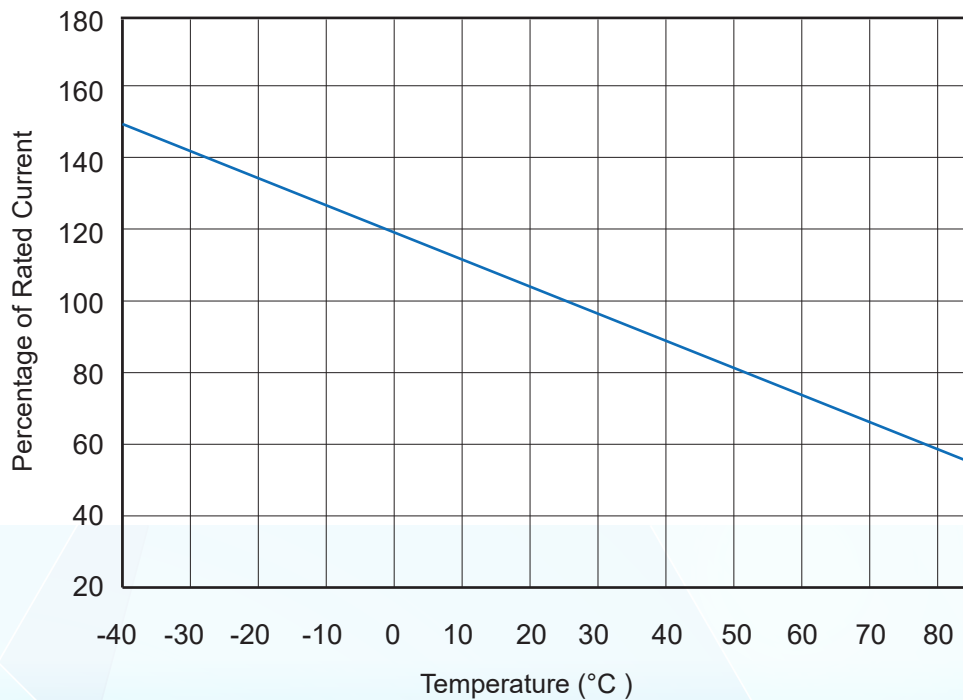
R<sub>i min</sub> = Minimum device resistance prior to tripping at 23°C.

R<sub>1max</sub> = Maximum device resistance is measured one hour post reflow.

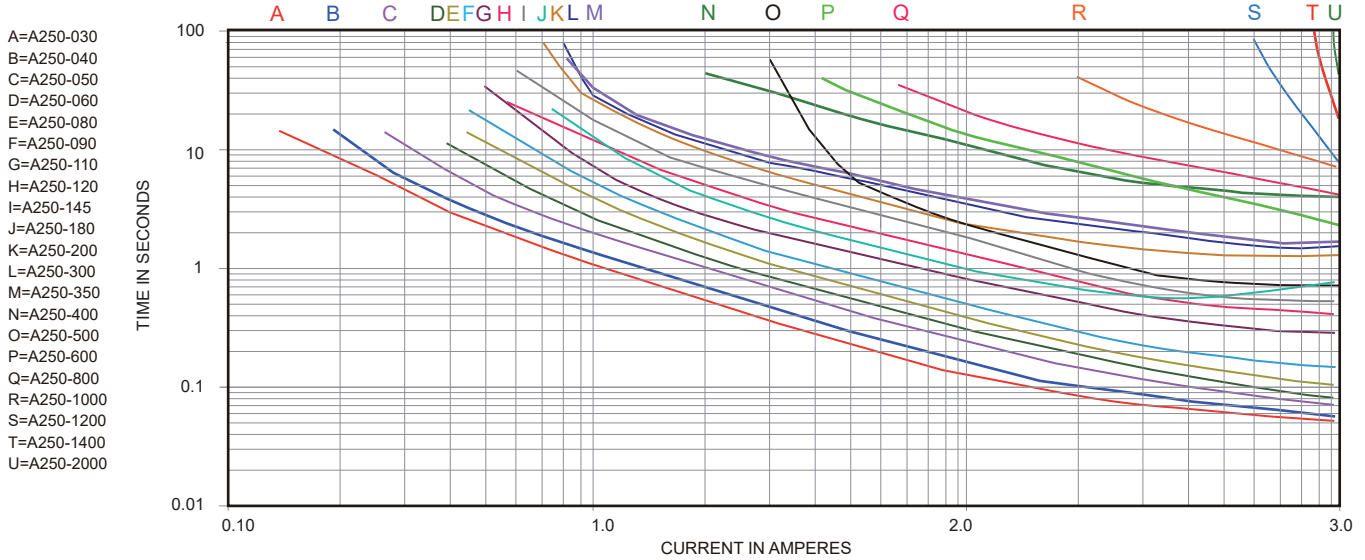
CAUTION : Operation beyond the specified ratings may result in damage and possible arcing and flame.

**Environmental Specifications**

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

**Thermal Derating Curve**


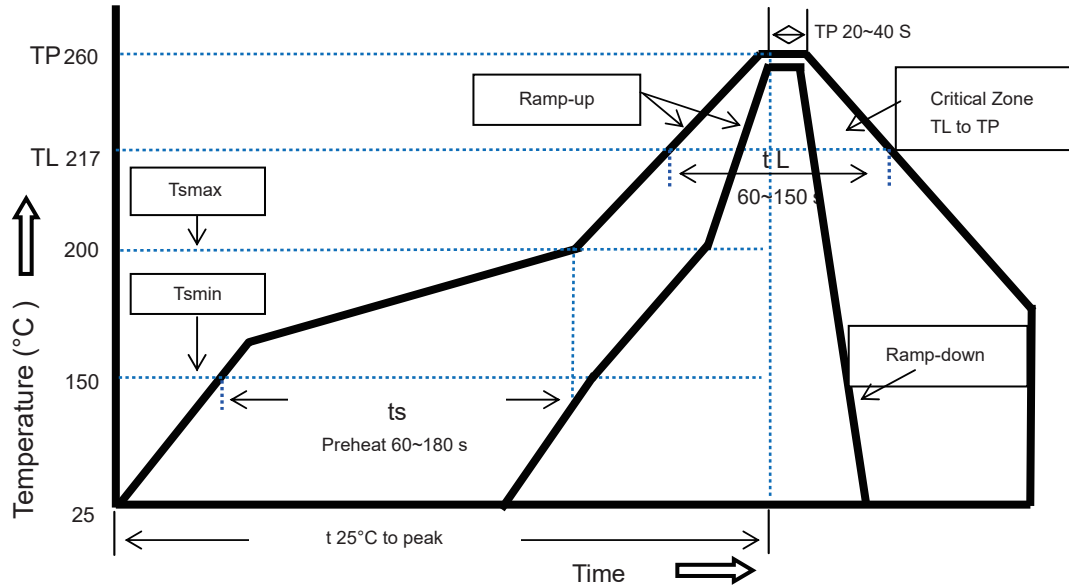
## Average Time-Current Curve



## I<sub>hold</sub> Versus Temperature

| Model     | Maximum ambient operating temperature (T <sub>mao</sub> ) vs. hold current (I <sub>hold</sub> ) |        |       |       |       |       |       |       |       |       |
|-----------|---|--------|-------|-------|-------|-------|-------|-------|-------|-------|
|           | - 40°C  | - 20°C | 0°C   | 23°C  | 30°C  | 40°C  | 50°C  | 60°C  | 70°C  | 85°C  |
| A250-030  | 0.047   | 0.041  | 0.036 | 0.030 | 0.028 | 0.025 | 0.022 | 0.019 | 0.016 | 0.012 |
| A250-040  | 0.063   | 0.055  | 0.048 | 0.040 | 0.037 | 0.033 | 0.029 | 0.026 | 0.022 | 0.016 |
| A250-050  | 0.079   | 0.069  | 0.060 | 0.050 | 0.046 | 0.042 | 0.037 | 0.032 | 0.027 | 0.020 |
| A250-060  | 0.095   | 0.083  | 0.071 | 0.060 | 0.055 | 0.050 | 0.044 | 0.038 | 0.032 | 0.024 |
| A250-080  | 0.126   | 0.110  | 0.095 | 0.080 | 0.074 | 0.066 | 0.058 | 0.051 | 0.043 | 0.032 |
| A250-090  | 0.142   | 0.124  | 0.107 | 0.090 | 0.083 | 0.075 | 0.066 | 0.058 | 0.049 | 0.036 |
| A250-110  | 0.174   | 0.152  | 0.131 | 0.110 | 0.101 | 0.091 | 0.080 | 0.070 | 0.059 | 0.044 |
| A250-120  | 0.190   | 0.166  | 0.143 | 0.120 | 0.110 | 0.100 | 0.088 | 0.077 | 0.065 | 0.048 |
| A250-145  | 0.229   | 0.200  | 0.173 | 0.145 | 0.133 | 0.120 | 0.106 | 0.093 | 0.078 | 0.058 |
| A250-180  | 0.284   | 0.248  | 0.214 | 0.180 | 0.166 | 0.149 | 0.131 | 0.115 | 0.097 | 0.072 |
| A250-200  | 0.316   | 0.276  | 0.238 | 0.200 | 0.184 | 0.166 | 0.146 | 0.128 | 0.108 | 0.080 |
| A250-300  | 0.474   | 0.414  | 0.357 | 0.300 | 0.276 | 0.249 | 0.219 | 0.192 | 0.162 | 0.120 |
| A250-350  | 0.553   | 0.483  | 0.417 | 0.350 | 0.322 | 0.291 | 0.256 | 0.224 | 0.189 | 0.140 |
| A250-400  | 0.632   | 0.552  | 0.476 | 0.400 | 0.368 | 0.332 | 0.292 | 0.256 | 0.216 | 0.160 |
| A250-500  | 0.790   | 0.690  | 0.595 | 0.500 | 0.460 | 0.415 | 0.365 | 0.320 | 0.270 | 0.200 |
| A250-600  | 0.948   | 0.828  | 0.714 | 0.600 | 0.552 | 0.498 | 0.438 | 0.384 | 0.324 | 0.240 |
| A250-800  | 1.264   | 1.104  | 0.952 | 0.800 | 0.736 | 0.664 | 0.584 | 0.512 | 0.432 | 0.320 |
| A250-1000 | 1.580   | 1.380  | 1.190 | 1.000 | 0.920 | 0.830 | 0.730 | 0.640 | 0.540 | 0.400 |
| A250-1200 | 1.896   | 1.656  | 1.428 | 1.200 | 1.104 | 0.996 | 0.876 | 0.768 | 0.648 | 0.480 |
| A250-1400 | 2.212   | 1.932  | 1.666 | 1.400 | 1.288 | 1.162 | 1.022 | 0.896 | 0.756 | 0.560 |
| A250-2000 | 3.160   | 2.760  | 2.380 | 2.000 | 1.840 | 1.660 | 1.460 | 1.280 | 1.080 | 0.800 |

## Soldering Parameters



| Profile Feature                         | Pb-Free Assembly |
|---|------------------|
| Average Ramp-Up Rate<br>(Ts max to T p) | 3°C/second max.  |
| Preheat                                 |                  |
| -Temperature Min(Ts min)                | 150°C            |
| -Temperature Max(Ts max)                | 200°C            |
| -Time(Ts min to Ts max)                 | 60~180 seconds   |
| Time maintained above:                  |                  |
| -Temperature(TL)                        | 217°C            |
| -Time(tL)                               | 60~150 seconds   |
| Peak Temperature(Tp)                    | 260°C            |
| Ramp-Down Rate                          | 6°C/second max.  |
| Time 25°C to Peak Temperature           | 8 minutes max    |
| Storage Condition                       | 0°C~35°C, ≤70%RH |

Recommended reflow methods: IR, vapor phase oven, hot air oven, N2 environment for lead-free  
 Recommended maximum paste thickness is 0.25mm

Devices can be cleaned using standard industry methods and solvents.

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

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



## Physical Dimensions(mm.)

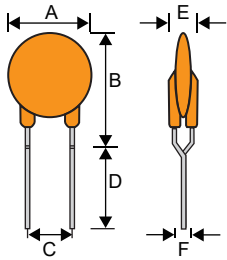


FIG 1

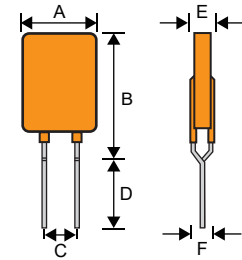


FIG 2

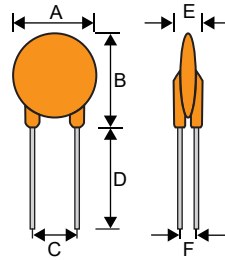


FIG 3

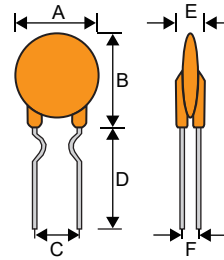


FIG 4

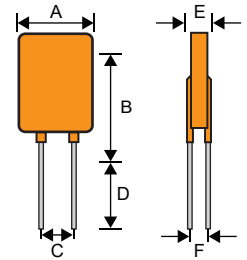


FIG 5

| Model     | A Max. | B Max. | C Typ.   | D Min. | E Max. | F Typ. | Lead $\phi$ | FIG |
|-----------|--------|--------|----------|--------|--------|--------|-------------|-----|
| A250-030  | 7.00   | 12.80  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 1   |
| A250-040  | 7.00   | 12.80  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 1   |
| A250-050  | 7.00   | 12.80  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 1   |
| A250-060  | 7.00   | 12.80  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 1   |
| A250-080  | 7.00   | 12.80  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 1   |
| A250-090  | 7.00   | 12.80  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 1   |
| A250-110  | 7.00   | 13.50  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 2   |
| A250-120  | 7.00   | 13.50  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 2   |
| A250-145  | 7.00   | 13.50  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 2   |
| A250-180  | 9.00   | 15.50  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 1   |
| A250-200  | 9.00   | 15.50  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 1   |
| A250-300  | 9.00   | 15.50  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 1   |
| A250-350  | 9.50   | 15.50  | 5.1±0.5  | 7.6    | 4.40   | /      | 0.6         | 1   |
| A250-400  | 10.00  | 16.40  | 5.1±0.5  | 7.6    | 4.40   | 2.20   | 0.6         | 4   |
| A250-500  | 11.00  | 15.80  | 5.1±0.5  | 7.6    | 4.40   | 2.20   | 0.8         | 3   |
| A250-600  | 11.00  | 15.80  | 5.1±0.5  | 7.6    | 4.40   | 2.20   | 0.8         | 3   |
| A250-800  | 11.00  | 15.80  | 5.1±0.5  | 7.6    | 4.40   | 2.20   | 0.8         | 3   |
| A250-1000 | 14.00  | 19.10  | 5.1±0.5  | 7.6    | 4.40   | 2.20   | 0.8         | 3   |
| A250-1200 | 16.00  | 21.00  | 5.1±0.5  | 7.6    | 4.40   | 2.20   | 0.8         | 3   |
| A250-1400 | 17.10  | 21.60  | 5.1±0.5  | 7.6    | 4.40   | 2.20   | 0.8         | 3   |
| A250-2000 | 21.00  | 25.00  | 10.2±0.5 | 7.6    | 4.40   | 2.20   | 0.8         | 5   |

### PHYSICAL SPECIFICATIONS :

Lead Materials : A250-030~A250-1400:Tinned copper clad steel wire (CP wire);  
A250-2000:Tinned copper wire.

Lead Solderability: MIL-STD-202.

Encapsulation: Flame retardant epoxy resin, This meets the requirements of UL-94V-0.

**Packaging Quantity**

| Model  | Reel QTY | Bag QTY |
|--|----------|---------|
| A250 Series                                  | 2000     | 500     |
| Tape & Reel packaging per EIA468-B standard. |          |         |

**Cross Reference**

| Model     | Cross Reference    |                     |                         |
|-----------|--------------------|---------------------|-------------------------|
|           | Tyco / PolySwitch® | Bourns / POLY-FUSE® | Polytronics / EVERFUSE® |
| A250-030  | -                  | -                   | -                       |
| A250-040  | -                  | -                   | -                       |
| A250-050  | -                  | -                   | -                       |
| A250-060  | -                  | -                   | -                       |
| A250-080  | TRF250-080         | -                   | HVR250P080CF            |
| A250-090  | -                  | -                   | -                       |
| A250-110  | TRF250-110         | -                   | -                       |
| A250-120  | TRF250-120         | MF-RX012/250        | HVR250P120CF            |
| A250-145  | TRF250-145         | MF-RX014/250        | HVR250P145CF            |
| A250-180  | TRF250-180         | MF-RX018/250        | HVR250P180CF            |
| A250-200  | -                  | -                   | -                       |
| A250-300  | -                  | -                   | -                       |
| A250-400  | -                  | -                   | -                       |
| A250-500  | -                  | -                   | -                       |
| A250-600  | -                  | -                   | -                       |
| A250-800  | -                  | -                   | -                       |
| A250-1000 | -                  | -                   | -                       |

“PolySwitch” is a registered trademark of Tyco Electronics.

“POLY-FUSE” is a registered trademark of Littelfuse, Inc.

“EVERFUSE” is a registered trademark of Polytronics Technology Corp.