

# SMD Precision Current Sense Resistor

## Type S Series

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Tyco introduces a range of surface mount power resistors to meet today's circuit design needs. One design concept allows an engineer to choose from three styles (Lo Ohm, Power, or Ultra Precision) while staying within the new standard circuit board land pattern guidelines now accepted by the wirewound resistor industry. Each size offers low profile case design with flexible tinned copper terminations for reliable solder joints. All styles utilise a fully welded construction technique, unlike other designs that rely solely on tinned termination connections. These features allow the S Series to withstand the higher temperatures associated with reflow, vapour phase, or infrared (IR) manufacturing processes without degradation.

### Key Features

- Low Profile Design
- Available on Tape (3 Reel Sizes)
- Very Wide Value Range
- Ideal for Current Sensing
- Up to 3.0 Watts Power
- High TCR Versions (to 6000ppm)
- Stable to 5ppm/°C

### Characteristics - Electrical

|                              | "SL" Lo Ohm                                    | "SP" Power      | "SU" Precision  |
|------------------------------|--|-----------------|-----------------|
| Values S1/2:                 | R01 - R05                                      | R06 - 1K4       | ----            |
| Values S1:                   | R005 - R075                                    | R10 - 5K0       | 1R0 - 300K      |
| Values S2:                   | R005 - R099                                    | R10 - 10K       | 1R0 - 1 Meg     |
| Values S3:                   | R005 - R099                                    | R10 - 45K       | 1R0 - 2 Meg     |
| Grid:                        | E24  | E96             | E192            |
| Resistance Tolerances:       | 1%, 3%, 5%.                                    | 0.1% to 5%.     | 0.005% to 1%.   |
| Power Rating @ 25°C S1/2:    | 0.5 Watt                                       | 0.75 Watts      | ----            |
| Power Rating @ 25°C S1:      | 1 Watt   | 1.5 Watt        | 0.125 Watts     |
| Power Rating @ 25°C S2:      | 2 Watts  | 2.5 Watts       | 0.250 Watts     |
| Power Rating @ 25°C S3:      | 3 Watts  | 3.5 Watts       | 0.500 Watts     |
| Derating:                    | See Curve Below                                | See Curve Below | See Curve Below |
| Max. Operating Voltage S1/2: | $\sqrt{\text{Power} \times \text{Resistance}}$ | 33 Volts        | ----            |
| Max Operating Voltage S1:    | $\sqrt{\text{Power} \times \text{Resistance}}$ | 58 Volts        | 100 Volts       |
| Max Operating Voltage S2:    | $\sqrt{\text{Power} \times \text{Resistance}}$ | 127 Volts       | 300 Volts       |
| Max Operating Voltage S3:    | $\sqrt{\text{Power} \times \text{Resistance}}$ | 212 Volts       | 400 Volts       |
| Inductance:                  | < 7 NanoHenries                                | ----            | ----            |

### Characteristics - Electrical

|                       |  | Typical $\Delta R$ |
|-----------------------|--|--------------------|
| Solder Immersion:     | 260°C for 10 seconds.                                  | 0.1%               |
| Load Life:            | 2000 hours at rated power at 25°C.                     | 0.2%               |
| Moisture Resistance:  | 240 hours with humidity ranging from 80% RH to 98% RH. | 0.1%               |
| Thermal Shock:        | -55°C for 15 minutes no load.                          | 0.1%               |
| Dielectric Withstand: | 1000 Volts.  |                    |
| Short Term Overload:  | 5 times rated power for 5 seconds                      | 0.1%               |
| Solderability:        | 95% coverage within 1/16" of contact point.            | ----               |
| Flammability:         | UL94V Rating.  | ----               |

### Temperature Coefficient of Resistance

| Range         | (L) Low Ohm | (P) Power | (U) Precision |
|---------------|-------------|-----------|---------------|
| R005 - R20    | <100 PPM    |           |               |
| R10 - R99     |             | ±90ppm    |               |
| 1R0 - 10R     |             | ±50ppm    | ±25ppm        |
| 11R - 100R    |             | ±30ppm    | ±10ppm        |
| 102R and over |             | ±20ppm    | ±10ppm        |

### Power Derating



Note: U Style derates to 145°C. All others derate to 275°C

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### Dimensions



| Size  | Length (L) | Width (W) | Height (H) | Stand Off (S) | Pad Width (PW) | Pad Length (PL) |
|-------|------------|-----------|------------|---------------|----------------|-----------------|
| S 1/2 | 5.46       | 3.18      | 2.54       | n/a           | 1.27           | 1.02            |
| S1    | 6.48       | 3.81      | 2.84       | 0.50          | 1.27           | 1.25            |
| S2    | 12.14      | 5.84      | 5.33       | 0.50          | 2.54           | 2.54            |
| S3    | 15.24      | 7.00      | 6.48       | 0.50          | 2.29           | 1.27            |

### Land Pattern



| Type  | H     | J     | X    | Y    |
|-------|-------|-------|------|------|
| S 1/2 | 1.91  | 4.45  | 1.78 | 2.54 |
| S1    | 3.43  | 5.97  | 2.03 | 2.54 |
| S2    | 6.98  | 10.54 | 3.05 | 3.56 |
| S3    | 10.42 | 14.78 | 2.80 | 3.56 |

### Cleaning Conditions

After soldering use cleaning solvents such as chlorosen, dyefreon, suitable aqueous or semi aqueous cleaner.

### Storage

To prevent damage to the electrode, be sure to observe the following cautions for storage.

- Store in 40°C maximum ambient temperature, and 70% maximum R.H.
- For maximum possible shelf life do not disturb polythene sleeve until you are ready to use.
- Store where there are no harmful gases containing sulphur or chlorine.

### How to Order

| S                 | L   | 1  | 1R0   | J  | T  |
|-------------------|---|--|---|--|--|
| Common Part       | Resistor Type                               | Case Size  | Resistance Value  | Absolute Tol. at +25°C   | Pack Style                                     |
| S - Standard Part | L - Low Ohmic<br>P - Power<br>U - Precision | 1/2 - 5.5 x 3.2<br>1 - 6.5 x 3.8<br>2 - 12.1 x 5.9<br>3 - 15.3 x 7.0 | 0.1 Ohm (100 milli ohms) R10<br>1 Ohm (1000 milli ohms) 1R0<br>1K Ohm (1000 Ohms) 1K0 | K ±10%<br>J ±5%<br>E ±3%<br>F ±1%<br>D ±0.5%<br>C ±0.25%<br>B ±0.1%<br>A ±0.05%<br>Q ±0.02%<br>T ±0.01%<br>Z ±0.005% | L - Loose Piece<br>T - 7" Reel<br>R - 13" Reel |

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