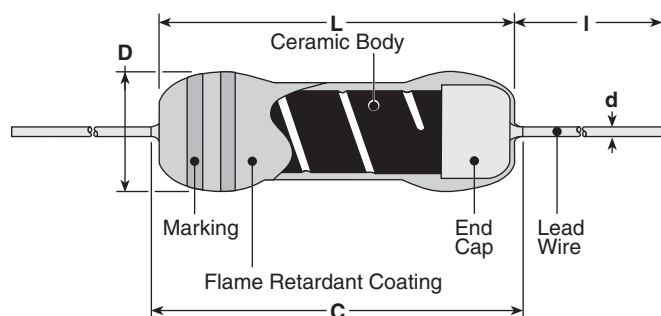


### features

- Fixed metal film resistor available (specify "SPRX")
- Flameproof silicone coating equivalent to (UL94V0)
- High reliability performance
- Suitable for automatic machine insertion
- Marking: Light green body color
  - Color-coded bands on 1/2W - 1W
  - Alpha-numeric black marking on 2W - 5W
- Products with lead-free terminations meet EU RoHS and China RoHS requirements

### dimensions and construction



| Type              | Dimensions inches (mm)  |                |                        |                |                          |
|-------------------|-------------------------|----------------|------------------------|----------------|--------------------------|
|                   | L                       | C (max.)       | D                      | d nominal      | I                        |
| SPR1/4<br>SPRX1/4 | .13±.012<br>(3.3±0.3)   | .138<br>(3.5)  | .067±.012<br>(1.7±0.3) | .018<br>(0.45) | .787 Min.<br>(20.0 Min.) |
| SPR1/2<br>SPRX1/2 | .244±.02<br>(6.2±0.5)   | .280<br>(7.1)  | .098±.02<br>(2.5±0.5)  | .024<br>(0.6)  |                          |
| SPR1<br>SPRX1     | .354±.039<br>(9.0±1.0)  | .437<br>(11.1) | .138±.02<br>(3.5±0.5)  | .031<br>(0.8)  | .945 Min.<br>(24.0 Min.) |
| SPR2<br>SPRX2     | .472±.039<br>(12.0±1.0) | .591<br>(15.0) | .165±.031<br>(4.2±0.8) |                |                          |
| SPR3<br>SPRX3     | .610±.039<br>(15.5±1.0) | .709<br>(18.0) | .236±.039<br>(6.0±1.0) |                | 1.18±.118<br>(30.0±3.0)  |
| SPR5<br>SPRX5     | .965±.039<br>(24.5±1.0) | 1.10<br>(28.0) | .354±.039<br>(9.0±1.0) |                | 1.50±.118<br>(38.0±3.0)  |

### ordering information

| New Part # | SPR         | 1/2                                                                         | C                               | T52                                                                                                                                  | R                               | 103                                                                                                                                                                                                 | J                                       |
|------------|-------------|-----------------------------------------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Type       | SPR<br>SPRX | Power Rating<br>1/4: 0.25W<br>1/2: 0.5W<br>1: 1W<br>2: 2W<br>3: 3W<br>5: 5W | Termination Material<br>C: SnCu | Taping and Forming<br>Axial: T26, T52, T521, T631<br>Stand-off Axial: L52, L521, L631<br>Radial: VT, VTP, VTE, GT<br>L, U, M Forming | Packaging<br>A: Ammo<br>R: Reel | Nominal Resistance<br>±2%, ±5%:<br>2 significant figures + 1 multiplier<br>"R" indicates decimal on value <10Ω<br>±1%: 3 significant figures + 1 multiplier<br>"R" indicates decimal on value <100Ω | Tolerance<br>F: ±1%<br>G: ±2%<br>J: ±5% |

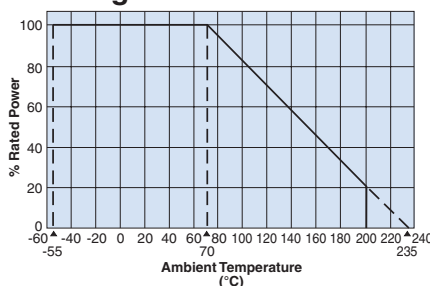
For further information on packaging, please refer to Appendix C.

## applications and ratings

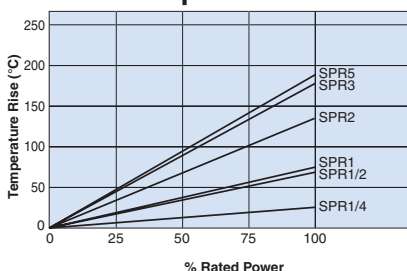
| Part Designation | Power Rating @ 70°C | Minimum Dielectric Withstanding Voltage | T.C.R. (ppm/°C) ±350 | T.C.R. (ppm/°C) +350 to -600 | Resistance Range E-24 (F±1%, G±2%) | Resistance Range E-24 (J±5%) | Absolute Maximum Working Voltage | Absolute Maximum Overload Voltage | Operating Temperature Range |
|------------------|---------------------|-----------------------------------------|----------------------|------------------------------|------------------------------------|------------------------------|----------------------------------|-----------------------------------|-----------------------------|
| SPR1/4           | 0.25W               | 300V                                    | 2.2Ω - 10KΩ          | —                            | —                                  | 2.2Ω - 10KΩ                  | 250V                             | 500V                              | -55°C to +200°C             |
| SPR1/2           | 0.5W                | 500V                                    | 2.2Ω - 91KΩ          | ≥100KΩ                       | 10Ω - 100KΩ                        | 2.2Ω - 240KΩ                 | 400V                             | 800V                              |                             |
| SPR1             | 1W                  |                                         |                      |                              |                                    | 2.2Ω - 330KΩ                 | 500V                             | 1000V                             |                             |
| SPR2             | 2W                  | 2.2Ω - 510KΩ                            |                      |                              |                                    |                              |                                  |                                   |                             |
| SPR3             | 3W                  | 2.2Ω - 750KΩ                            |                      |                              |                                    |                              |                                  |                                   |                             |
| SPR5             | 5W                  | 800V                                    | 2.2Ω - 220KΩ         | ≥240KΩ                       |                                    | 2.2Ω - 1.0MΩ                 | 600V                             | 1200V                             |                             |
| SPRX1/4          | 0.25W               | 300V                                    | 0.1Ω - 2.0Ω          | —                            | —                                  | 0.1Ω - 2.0Ω                  | E = √P x R                       | E x 2.5                           |                             |
| SPRX1/2          | 0.5W                | 500V                                    |                      |                              |                                    |                              |                                  |                                   |                             |
| SPRX1            | 1W                  |                                         |                      |                              |                                    |                              |                                  |                                   |                             |
| SPRX2            | 2W                  | 700V                                    |                      |                              |                                    |                              |                                  |                                   |                             |
| SPRX3            | 3W                  |                                         |                      |                              |                                    |                              |                                  |                                   |                             |
| SPRX5            | 5W                  |                                         |                      |                              |                                    |                              |                                  |                                   |                             |

## environmental applications

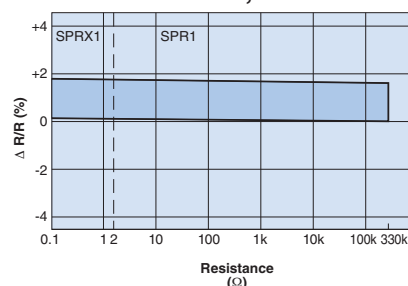
### Derating Curve



### Surface Temperature Rise



### Load Life @ 70°C, 1000 Hr



## Performance Characteristics

| Parameter                   | Requirement Limit                                             | Δ R ±(% + 0.05Ω)<br>Typical | Test Method                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------|---------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resistance                  | Within specified tolerance                                    | —                           | Measuring points are at 10mm ±1mm from the end cap.                                                                                                                                                                                                                                                                                                                                     |
| T.C.R.                      | Within specified T.C.R.                                       | —                           | Room temperature +100°C                                                                                                                                                                                                                                                                                                                                                                 |
| Overload (Short time)       | ±(1%+0.1Ω)                                                    | ±0.5%                       | Rated voltage x 2.5 or max. overload voltage for 5 seconds, whichever is lower                                                                                                                                                                                                                                                                                                          |
| Resistance to Solder Heat   | ±1%                                                           | ±0.5%                       | 260°C ±5°C, 10 seconds ± 1 second                                                                                                                                                                                                                                                                                                                                                       |
| Terminal Strength           | No lead-coming off and loose terminals                        | —                           | Twist 360°C, 5 times                                                                                                                                                                                                                                                                                                                                                                    |
| Rapid Change of Temperature | ±1%                                                           | ±0.5%                       | -55°C (30 minutes), +125°C (30 minutes), 5 cycles                                                                                                                                                                                                                                                                                                                                       |
| Moisture Resistance         | ±(3%+0.1Ω):1/4W-2W<br>±(5%+0.1Ω):3W,5W                        | 1.5: 1/4W-2W<br>2.5: 3W, 5W | 40°C ± 2°C, 90 - 95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle                                                                                                                                                                                                                                                                                                                        |
| Endurance at 70°C           | ±(3%+0.1Ω):1/4W-2W<br>±(5%+0.1Ω):3W,5W                        | 1.5: 1/4W-2W<br>2.5: 3W, 5W | 70°C ± 2°C, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle                                                                                                                                                                                                                                                                                                                                     |
| High Temperature Exposure   | ±(2% +0.1Ω)                                                   | ±1%                         | -125°C, 100 hours                                                                                                                                                                                                                                                                                                                                                                       |
| Resistance to Solvent       | No abnormality in appearance. Marking shall be easily legible | —                           | Ultrasonic washing with isopropyl alcohol for 2 minutes. Power: 0.3W/cm³, f: 28kHz, Temp: 35°C ±5°C                                                                                                                                                                                                                                                                                     |
| Flame Retardant             | No evidence of flaming or self-flaming                        | —                           | Flame test: the test flame shall be applied and removed for each 15 seconds respectively to repeat the cycle 5 times. Overload flame retardant: power (AC) corresponding to 2, 4, 8, 16 and 32 times the power rating shall be applied for each 1 minute until disconnection occurs. However the applied voltage shall not exceed the value of 4 times of the maximum operating voltage |

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

12/29/08