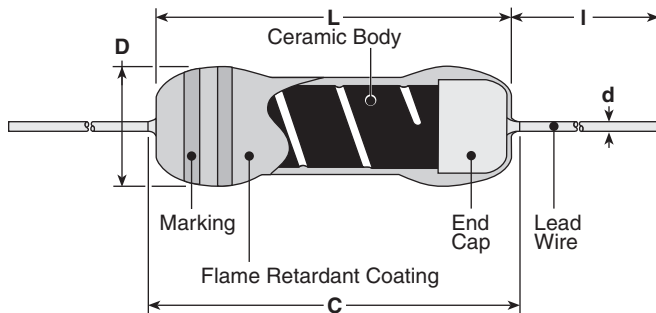


features

- Small size power type resistor
- Coated with UL94V0 equivalent flameproof material
- Suitable for automatic machine insertion
- Marking: Pink body color with color-coded bands or alpha-numeric black marking
- Products with lead-free terminations meet EU RoHS and China RoHS requirements
- Surface mount style “N” forming is suitable for automatic mounting

dimensions and construction



| Type | Dimensions inches (mm) | | | | |
|-------------------|-------------------------|----------------|------------------------|---------------|--------------------------|
| | L | C (max.) | D | d (nom.) | I* |
| MOS1/2 MOSX1/2 | .244±.02 (6.2±0.5) | .280 (7.1) | .098±.02 (2.5±0.5) | .024 (0.6) | .945 Min. (24.0 Min.) |
| MOS1 MOSX1 | .354±.039 (9.0±1.0) | .437 (11.1) | .118±.02 (3.0±0.5) | .031 (0.8) | |
| MOS2 MOSX2 | .472±.039 (12.0±1.0) | .591 (15.0) | .157±.02 (4.0±0.5) | | |
| MOS3 MOSX3 | .610±.039 (15.5±1.0) | .709 (18.0) | .236±.039 (6.0±1.0) | | 1.18±.118 (30.0±3.0) |
| MOS5 MOSX5 | .965±.039 (24.5±1.0) | 1.10 (28.0) | .354±.039 (9.0±1.0) | | 1.50±.118 (38.0±3.0) |

* Lead length changes depending on taping and forming type.

ordering information

| New Part # | MOS | 1/2 | C | T52 | A | 103 | J |
|------------|-------------|---|---------------------------------|---|--|--|---|
| Type | MOS MOSX | Power Rating 1/2: 0.5W 1: 1W 2: 2W 3: 3W 5: 5W | Termination Material C: SnCu | Taping and Forming Axial: T26, T52, T521, T631 Stand-off Axial: L52, L521, L631 Radial: VTP, VTE, GT, GT4, VTF L, U, M, N Forming | Packaging A: Ammo R: Reel TEB, TEG: Plastic embossed (N forming) | Nominal Resistance ±2%, ±5%: 2 significant figures + 1 multiplier “R” indicates decimal on value <10Ω ±1%: 3 significant figures + 1 multiplier “R” indicates decimal on value <100Ω | Tolerance F: ±1% G: ±2% J: ±5% |

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

reduced size metal oxide power type leaded resistor

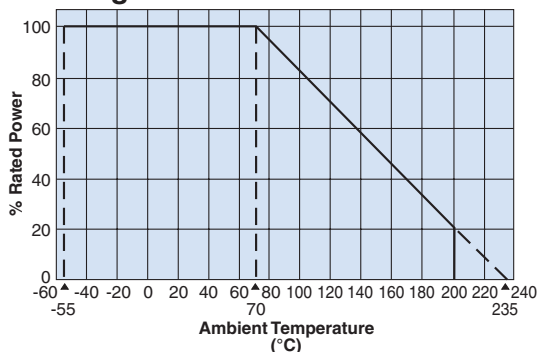
applications and ratings

| Part Designation | Power Rating @ 70°C | Minimum Dielectric Withstanding Voltage | T.C.R. (ppm/°C) Max. | Resistance Range | | | Absolute Maximum Working Voltage | Absolute Maximum Overload Voltage | Operating Temperature Range |
|------------------|---------------------|---|----------------------|--------------------|--------------|--------------|----------------------------------|-----------------------------------|-----------------------------|
| | | | | E-24, E-96* (F±1%) | E-24* (G±2%) | E-24 (J±5%) | | | |
| MOS1/2 | 0.5W | 400V | ±300 | 10Ω - 47kΩ | 10Ω - 47kΩ | 10Ω - 47kΩ | 300V | 600V | -55°C to +200°C |
| MOS1 | 1.0W | 500V | | 10Ω - 68kΩ | 10Ω - 68kΩ | 10Ω - 100kΩ | 350V | | |
| MOS2 | 2.0W | | | 10Ω - 100kΩ | 10Ω - 100kΩ | | | 500V | |
| MOS3 | 3.0W | 700V | | — | 10Ω - 100kΩ | E = √(P x R) | E x 2.5 | | |
| MOS5 | 5.0W | 800V | | — | — | | | 0.1Ω - 9.1Ω | |
| MOSX1/2 | 0.5W | 400V | | 0.1Ω - 9.1Ω | 0.1Ω - 9.1Ω | 0.1Ω - 9.1Ω | E x 2.5 | | |
| MOSX1 | 1.0W | 500V | | 0.1Ω - 9.1Ω | 0.1Ω - 9.1Ω | | | — | |
| MOSX2 | 2.0W | | | 700V | — | — | | | |
| MOSX3 | 3.0W | 700V | | — | — | — | — | | |
| MOSX5 | 5.0W | 800V | | — | — | — | — | | |

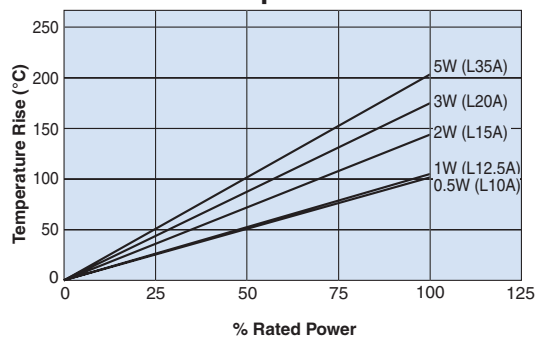
* Please consult when there is a demand of the resistance besides the 1% and 2% range.

environmental applications

Derating Curve



Surface Temperature Rise



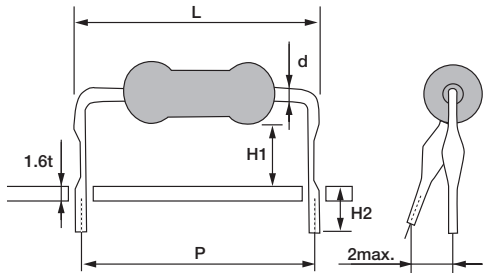
For resistors operated at an ambient temperature of 70°C or above, a power rating shall be derated in accordance with the above derating curve.

Performance Characteristics

| Parameter | Requirement | Δ R ±(% + 0.05Ω) | Test Method |
|-----------------------------|---|------------------|---|
| | Limit | Typical | |
| Resistance | Within specified tolerance | — | Measuring points are at 10mm ±1mm from the end cap. |
| T.C.R. | Within specified T.C.R. | — | +25°C/+125°C |
| Overload (Short time) | ±(2% + 0.1Ω) | ±1% | Rated voltage x 2.5 for 5 seconds |
| 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), +155°C (30 minutes), 5 cycles |
| Moisture Resistance | ±(5%+0.1Ω) | ±2.5% | 40°C ± 2°C, 90 - 95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle |
| Endurance at 70°C | ±(5%+0.1Ω) | ±2.5% | 70°C ± 2°C, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle |
| Resistance to Solvent | No abnormality in appearance. Marking shall be easily legible | — | Ultrasonic washing with isopropyl alcohol for 2 minutes. Power: 0.3W/cm ³ , 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 |

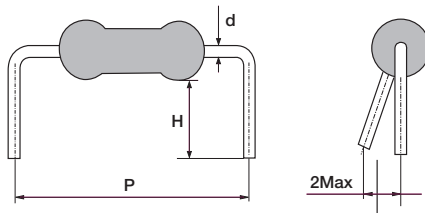
secondary processed products

L Forming



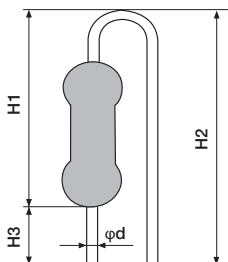
| Type | Dimensions millimeters | | | | L max. | Substrate Hole Dia. |
|----------|------------------------|----------|-----|----------|--------|---------------------|
| | P | H1 | H2 | d (Nom.) | | |
| 1/2CL10A | 10.0±1.0 | 5.3±1.0 | 4.0 | 0.6 | 17.5 | ø0.8 |
| 1CL12.5A | 12.5±1.0 | 7.0±1.0 | | 0.8 | | |
| 1CL15A | 15.0±1.0 | 6.5±1.0 | | | | |
| 2CL15A | | 7.0±1.0 | | | | |
| 2CL15F | 4.5±1.0 | | | | | |
| 2CL20A | 20.0±1.0 | 9.0±1.0 | | | | |
| 2CL20D | | 4.8±1.0 | | | | |
| 3CL20A | | 8.0±1.0 | | | | |
| 3CL20C | | 10.0±1.0 | | | | |
| 3CL20T | 4.0±1.0 | | | | | |
| 3CL25A | 25.0±1.0 | 7.0±1.0 | 0.8 | ø1.0 | | |
| 3CL30A | 30.0±1.0 | 7.0±1.0 | | | | |
| 5CL30A | | 8.5±1.0 | | | | |
| 5CL35A | 35.0±1.0 | 5.5±1.0 | | | | |

M Forming



| Type | Dimensions millimeters | | | Substrate Hole Dia. |
|----------|------------------------|----------|----------|---------------------|
| | P | H | d (Nom.) | |
| 1/2CM10C | 10.0±1.0 | 3.5±1.0 | 0.6 | ø0.8 |
| 1/2CM10F | 10.0±1.0 | 5.0±1.0 | 0.6 | |
| 1CM12.5C | 12.5±1.0 | 3.5±1.0 | 0.8 | ø1.0 |
| 1CM12.5D | 12.5±1.0 | 4.0±1.0 | 0.8 | |
| 1CM15F | 15.0±1.0 | 5.0±1.0 | 0.8 | |
| 1CM15J | 15.0±1.0 | 6.3±1.0 | 0.8 | |
| 1CM15S | 15.0±1.0 | 11.0±1.0 | 0.8 | |
| 2CM15C | 15.0±1.0 | 3.5±1.0 | 0.8 | |
| 2CM15E | 15.0±1.0 | 4.5±1.0 | 0.8 | |
| 2CM16D | 16.0±1.0 | 4.0±1.0 | 0.8 | |
| 2CM20D | 20.0±1.0 | 4.0±1.0 | 0.8 | |
| 2CM20U | 20.0±1.0 | 13.5±1.0 | 0.8 | |
| 3CM20E | 20.0±1.0 | 4.6±1.0 | 0.8 | |
| 3CM26E | 26.0±1.0 | 4.7±1.0 | 0.8 | |
| 5CM30U | 30.0±1.0 | 13.0±1.0 | 0.8 | |

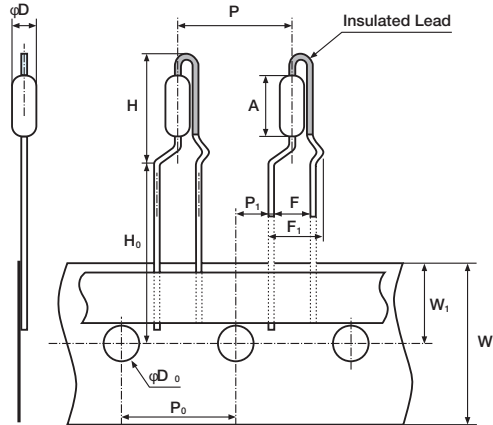
UCL Forming



| Type | Dimensions millimeters | | | | Insertion Pitch | Substrate Hole Dia. |
|-------|------------------------|----------|---------|----------|-----------------|---------------------|
| | H1 | H2 | H3 | d (Nom.) | | |
| 1CUCL | 13.0±1.0 | 16.0±1.0 | 3.5±1.0 | 0.8 | 5.0 | ø1.0 |
| 2CUCL | 14.5±1.0 | 17.5±1.0 | 3.5±1.0 | | | |
| 3CUCL | 18.0±1.0 | 22.0±1.0 | 4.0±1.0 | | | |

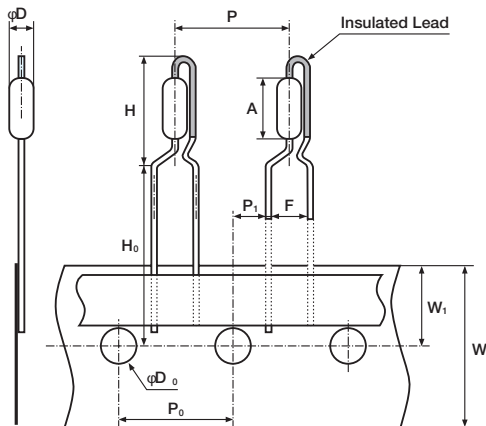
secondary processed products (continued)

VTF Radial Taping

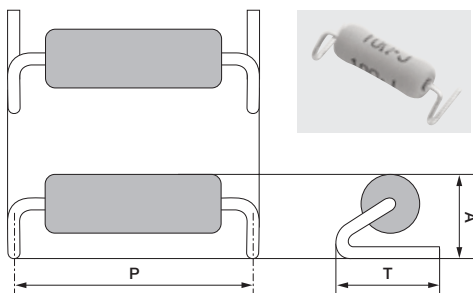


| Type | 1/2C | 1C | 2C | 2C |
|---------------------|-------------|-------------|-------------|-------------|
| | VTP | VTP | VTP | VTF |
| A | 6.2±0.5 | 9.0±1.0 | 12.0±1.0 | 12.0±1.0 |
| øD | 2.5±0.5 | 3.0±0.5 | 4.0±0.5 | 4.0±0.5 |
| d (Nom.) | 0.6 | 0.6 | 0.65 | 0.8 |
| F | 5.0±0.5 | 5.0±0.5 | 5.0±0.5 | 5.0±0.5 |
| F1 | — | — | — | 7.3 max. |
| H | 13 max. | 16 max. | 22.5 max. | 22.5 max. |
| H0 | 16.0+1.0/-0 | 16.0+1.0/-0 | 16.0+1.0/-0 | 16.0+1.0/-0 |
| P | 12.7±1.0 | 12.7±1.0 | 12.7±1.0 | 12.7±1.0 |
| P0 | 12.7±0.3 | 12.7±0.3 | 12.7±0.3 | 12.7±0.3 |
| P1 | 3.85±0.7 | 3.85±0.7 | 3.85±0.7 | 3.85±0.7 |
| W | 18.0±0.5 | 18.0±0.5 | 18.0±0.5 | 18.0±0.5 |
| W1 | 9.0±0.5 | 9.0±0.5 | 9.0±0.5 | 9.0±0.5 |
| øD0 | 4.0±0.2 | 4.0±0.2 | 4.0±0.2 | 4.0±0.2 |
| Substrate Hole Dia. | ø0.8 | ø0.8 | ø0.8 | ø1.0 |

VTP Radial Taping

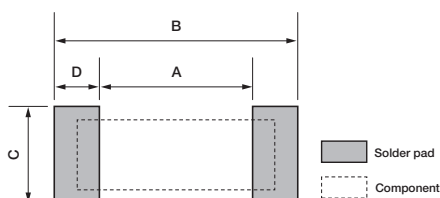


N Forming



| Type | 1C | 2C | 3C |
|----------|----------|--------|---------|
| | N14.5TEB | N17TEB | N20TEG |
| P±1 | 14.5 | 17.0 | 20.0 |
| T±0.5 | 5.0 | 6.0 | 7.5±1.0 |
| A±0.5 | 4.8 | 5.8 | 6.5 |
| d (Nom.) | 0.8 | 0.8 | 0.8 |

UCL Forming



| Type | 1C | 2C | 3C |
|------|----------|--------|--------|
| | N14.5TEB | N17TEB | N20TEG |
| A | 12.5 | 14.6 | 17.6 |
| B | 16.5 | 19.4 | 22.4 |
| C | 7.0 | 8.0 | 9.5 |
| D | 2.0 | 2.4 | 2.4 |