

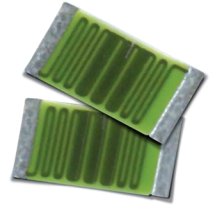
MCH SERIES

Military Grade High Voltage Chip Resistors

Advantages

Our patented Micropen® precision printing technology provides ultra precision, thick-film high voltage, military grade, surface mount resistors. Our military SMT chips have extended TCR temperature range and are stringently inspected. Ohmcraft's Micropenned serpentine patterned resistors produce superior electrical characteristics:

- Voltage Ratings to 5,000 Volts
- Resistance Values to 50 Gigohms
- Extended TCR Range
- Ultra High Stability
- Very Low Noise
- Tolerances to 0.1%
- TCR to 25 ppm/°C
- VCR to 1 ppm/V
- Custom Configurations



Electrical Specifications

| Case Size | TCR (±ppm/°C) | Tolerance | | | | | | | |
|--------------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | 0.10% | 0.25% | 0.50% | 1% | 2% | 5% | 10% | 20% |
| 0402 | 50 | | | | 10K-100M | 10K-100M | 10K-100M | 10K-100M | 10K-100M |
| 40mW | 100 | | | | 10K-500M | 10K-500M | 10K-500M | 10K-500M | 10K-500M |
| 150V | 200 | | | | 10K-500M | 10K-1G | 10K-1G | 10K-1G | 10K-1G |
| 0603 | 50 | | | 10K-10M | 10K-100M | 10K-500M | 10K-500M | 10K-500M | 10K-500M |
| 60mW | 100 | | | 10K-10M | 10K-500M | 10K-1G | 10K-1G | 10K-1G | 10K-1G |
| 400V | 200 | | | 10K-10M | 10K-500M | 10K-1G | 10K-1G | 10K-10G | 10K-50G |
| 0805 | 50 | | | 10K-10M | 10K-500M | 10K-500M | 10K-500M | 10K-500M | 10K-500M |
| 200mW | 100 | | | 10K-10M | 10K-1G | 10K-1G | 10K-1G | 10K-1G | 10K-1G |
| 600V | 200 | | | 10K-10M | 10K-1G | 10K-1G | 10K-10G | 10K-10G | 10K-50G |
| 1206 | 25 | 1M-10M | 1M-100M | 1M-100M | 1M-100M | 1M-100M | 1M-100M | 1M-100M | 1M-100M |
| 330mW | 50 | 100K-10M | 100K-100M | 100K-500M | 100K-500M | 100K-500M | 100K-500M | 100K-500M | 100K-500M |
| 1500V | 100 | 10K-10M | 10K-100M | 10K-500M | 10K-1G | 10K-1G | 10K-1G | 10K-1G | 10K-1G |
| | 200 | 10K-10M | 10K-100M | 10K-500M | 10K-1G | 10K-10G | 10K-10G | 10K-10G | 10K-50G |
| 2010 | 25 | 1M-10M | 1M-100M | 1M-100M | 1M-100M | 1M-100M | 1M-100M | 1M-100M | 1M-100M |
| 1W | 50 | 100K-10M | 100K-100M | 100K-500M | 100K-500M | 100K-500M | 100K-500M | 100K-500M | 100K-500M |
| 2000V | 100 | 10K-10M | 10K-100M | 10K-500M | 10K-1G | 10K-1G | 10K-1G | 10K-1G | 10K-1G |
| | 200 | 10K-10M | 10K-100M | 10K-500M | 10K-1G | 10K-10G | 10K-10G | 10K-10G | 10K-50G |
| 2512 | 25 | 1M-100M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M |
| 2W | 50 | 100K-100M | 100K-500M | 100K-1G | 100K-1G | 100K-1G | 100K-1G | 100K-1G | 100K-1G |
| 3000V | 100 | 10K-100M | 10K-500M | 10K-1G | 10K-10G | 10K-10G | 10K-10G | 100K-10G | 100K-10G |
| | 200 | 10K-100M | 10K-500M | 10K-1G | 10K-10G | 10K-10G | 10K-10G | 100K-50G | 100K-50G |
| 3512 | 25 | 1M-100M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M |
| 2W | 50 | 100K-100M | 100K-500M | 100K-1G | 100K-1G | 100K-1G | 100K-1G | 100K-1G | 100K-1G |
| 3500V | 100 | 10K-100M | 10K-500M | 10K-1G | 10K-10G | 10K-10G | 10K-10G | 100K-10G | 100K-10G |
| | 200 | 10K-100M | 10K-500M | 10K-1G | 10K-10G | 10K-10G | 10K-10G | 100K-50G | 100K-50G |
| 4020 | 25 | 1M-100M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M |
| 2W | 50 | 100K-100M | 100K-500M | 100K-1G | 100K-1G | 100K-1G | 100K-1G | 100K-1G | 100K-1G |
| 4000V | 100 | 10K-100M | 10K-500M | 10K-1G | 10K-10G | 10K-10G | 10K-10G | 100K-10G | 100K-10G |
| | 200 | 10K-100M | 10K-500M | 10K-1G | 10K-10G | 10K-10G | 10K-10G | 100K-50G | 100K-50G |
| 5020 | 25 | 1M-100M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M | 1M-500M |
| 2W | 50 | 100K-100M | 100K-500M | 100K-1G | 100K-1G | 100K-1G | 100K-1G | 100K-1G | 100K-1G |
| 5000V | 100 | 10K-100M | 10K-500M | 10K-1G | 10K-10G | 10K-10G | 10K-10G | 100K-10G | 100K-10G |
| | 200 | 10K-100M | 10K-500M | 10K-1G | 10K-10G | 10K-10G | 10K-10G | 100K-50G | 100K-50G |

The continuous maximum applied voltage cannot exceed the maximum power rating and is ohmic value dependent.

Standard case sizes: 0402, 0403, 0502, 0504, 0603, 0805, 1004, 1005, 1206, 1210, 1505, 2010, 2208, 2510, 2512, 3512, 4020, 5020.

Military case sizes: RM0402, RM0603, RM0705, RM1206, RM2010, RM2512.

For custom sizes and configurations, contact us.

How to Order

| MCH | + | | + | | + | | + | | + | |
|-----------------------------------|---|--|---|--|---|--|---|---|---|---|
| Type | | Case Size | | TCR | | Value | | Tolerance | | Termination |
| Military Grade High Voltage Chips | | See dimension table. Custom case sizes are available. Please consult factory. | | E ±25ppm/°C H ±50ppm/°C K ±100ppm/°C L ±200ppm/°C | | Resistance value expressed as a four digit number, where the first three numbers are the significant value, and the fourth number is the number of zeroes. | | B ±0.1% C ±0.25% D ±0.5% F ±1.0% G ±2.0% J ±5.0% K ±10% L ±20% | | T Solderable wraparound matte tin Sn99.9 on Ni barrier, RoHS B Solderable wraparound Sn63Pb37 solder over Ni barrier Z Solderable single surface matte tin Sn99.9 on Ni barrier, flip-chip, RoHS S Solderable single surface Sn63Pb37, flip-chip U Epoxy bondable gold wraparound over Ni |

Packaging options: Bulk, Tape & Reel or Flat Pack

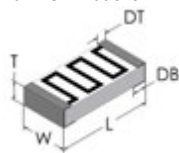
Military Grade High Voltage Chip Resistors

MCH SERIES

Chip Dimensions

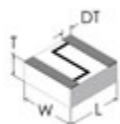
Wrap-around

B and T Terminations



Bondable

G, Z, and S Terminations



| Case Size | Length | Width | Thickness (Max.) | DT | DB | Units |
|-----------|--------------------|--------------|------------------|--------------|---------------------|--------|
| 0402 | 0.040 ±0.005 | 0.020 ±0.003 | 0.020 | 0.008 ±0.004 | 0.010 +0.002/-0.004 | inches |
| | 1.02 ±0.13 | 0.51 ±0.08 | 0.51 | 0.20 ±0.10 | 0.25 +0.05/-0.10 | mm |
| 0603 | 0.063 +0.01/-0.005 | 0.031 ±0.005 | 0.020 | 0.010 ±0.005 | 0.012 ±0.008 | inches |
| | 1.60 +0.25/-0.13 | 0.79 ±0.13 | 0.51 | 0.25 ±0.13 | 0.30 ±0.20 | mm |
| 0805 | 0.079 +0.01/-0.005 | 0.050 ±0.005 | 0.025 | 0.010 ±0.005 | 0.013 ±0.008 | inches |
| | 2.01 +0.25/-0.13 | 1.27 ±0.13 | 0.64 | 0.25 ±0.13 | 0.33 ±0.20 | mm |
| 1206 | 0.126 +0.01/-0.005 | 0.063 ±0.005 | 0.030 | 0.010 ±0.005 | 0.020 ±0.010 | inches |
| | 3.20 +0.25/-0.13 | 1.60 ±0.13 | 0.76 | 0.25 ±0.13 | 0.51 ±0.25 | mm |
| 2010 | 0.200 +0.01/-0.005 | 0.100 ±0.005 | 0.030 | 0.018 ±0.010 | 0.020 ±0.010 | inches |
| | 5.08 +0.25/-0.13 | 2.54 ±0.13 | 0.76 | 0.46 ±0.25 | 0.51 ±0.25 | mm |
| 2512 | 0.250 +0.01/-0.005 | 0.125 ±0.005 | 0.030 | 0.020 ±0.010 | 0.024 ±0.010 | inches |
| | 6.35 +0.25/-0.13 | 3.18 ±0.13 | 0.76 | 0.51 ±0.25 | 0.61 ±0.25 | mm |
| 3512 | 0.350 +0.01/-0.005 | 0.125 ±0.005 | 0.030 | 0.020 ±0.010 | 0.024 ±0.010 | inches |
| | 8.89 +0.25/-0.13 | 3.18 ±0.13 | 0.76 | 0.51 ±0.25 | 0.61 ±0.25 | mm |
| 4020 | 0.400 +0.01/-0.005 | 0.200 ±0.005 | 0.030 | 0.025 ±0.010 | 0.030 ±0.010 | inches |
| | 10.16 +0.25/-0.13 | 5.08 ±0.13 | 0.76 | 0.64 ±0.25 | 0.76 ±0.25 | mm |
| 5020 | 0.500 +0.01/-0.005 | 0.200 ±0.005 | 0.030 | 0.025 ±0.010 | 0.030 ±0.010 | inches |
| | 12.70 +0.25/-0.13 | 5.08 ±0.13 | 0.76 | 0.76 ±0.25 | 0.76 ±0.25 | mm |

Other available case sizes: 0403, 0502, 0504, 1004, 1005, 1210, 1505, 2208, 2510, and custom.
For custom sizes and configurations, contact us.

Typical Performance Characteristics

| Test | Maximum ΔR |
|------------------------------|------------|
| Short Time Overload | 0.1% |
| Load Life | 0.1% |
| Thermal Shock | 0.1% |
| Resistance to Soldering Heat | 0.05% |

| Parameter | Typical |
|-----------------------|--|
| Operating Temperature | -55°C to 150°C |
| TCR | Measured from 25°C to 75°C |
| Pulse Capability | 10X rated wattage for custom pulse applications consult factory |
| Resistance Value | Values > 10M are measured at 100 VDC for custom test voltages consult factory |

Material Construction

| | |
|-------------------|---|
| Resistive Element | Thick Film |
| Substrate | 96% Alumina |
| Encapsulation | Epoxy |
| Termination | Tin over nickel barrier, lead solder over nickel barrier, or gold |

Tape and Reel Specifications

Parts are packaged in accordance with EIA-481 tape and reel specifications.

Custom Configurations Available Upon Request

Please consult us with our knowledgeable sales staff for help specifying custom parts to meet your needs.

Power Derating Curve

