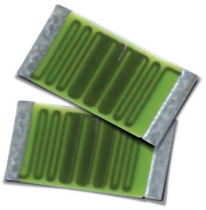
MCH SERIES

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 design rules 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**
- **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 Ratings	TCR (±ppm/°C)	Tolerance 0.10%	0.25%	0.50%	1%	2%	5%	10%	20%
0402 40mW 150V	50				10K-100M	10K-100M	10K-100M	10K-100M	10K-100M
	100				10K-500M	10K-500M	10K-500M	10K-500M	10K-500M
	200				10K-500M	10K-**1G**	-1G	10K-**1G**	-1G
0603 60mW 400V	50			10K-10M	10K-100M	10K-500M	10K-500M	10K-500M	10K-500M
	100			10K-10M	10K-500M	10K-**1G**	-1G	10K-**1G**	-1G
	200			10K-10M	10K-500M	10K-**1G**	-1G	10K-10G	10K-50G
0805 200mW 600V	50			10K-10M	10K-500M	10K-500M	10K-500M	10K-500M	10K-500M
	100			10K-10M	10K-1G	10K-**1G**	-1G	10K-**1G**	-1G
	200			10K-10M	10K-1G	10K-**1G**	-10G	10K-10G	10K-50G
1206 330mW 1500V	25	1M-10M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M
	50	100K-10M	100K-100M	100K-500M	100K-500M	100K-500M	100K-500M	100K-500M	100K-500M
	100	100K-10M	100K-100M	10K-500M	10K-1G	10K-**1G**	-1G	10K-**1G**	-1G
	200	100K-10M	100K-100M	10K-500M	10K-1G	10K-10G	10K-10G	10K-10G	10K-50G
2010 1W 2000V	25	1M-10M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M
	50	100K-10M	100K-100M	100K-500M	100K-500M	100K-500M	100K-500M	100K-500M	100K-500M
	100	100K-10M	100K-100M	10K-500M	10K-1G	10K-**1G**	-1G	10K-**1G**	-1G
	200	100K-10M	100K-100M	10K-500M	10K-1G	10K-10G	10K-10G	10K-10G	10K-50G
2512 2W 3000V	25	1M-100M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M
	50	100K-100M	100K-500M	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G
	100	100K-100M	100K-500M	10K-**1G**	-10G	10K-10G	10K-10G	100K-10G	100K-10G
	200	100K-100M	100K-500M	10K-**1G**	-10G	10K-10G	10K-10G	100K-50G	100K-50G
3512 2W 3500V	25	1M-100M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M
	50	100K-100M	100K-500M	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G
	100	100K-100M	100K-500M	10K-**1G**	-10G	10K-10G	10K-10G	100K-10G	100K-10G
	200	100K-100M	100K-500M	10K-**1G**	-10G	10K-10G	10K-10G	100K-50G	100K-50G
4020 2W 4000V	25	1M-100M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M
	50	100K-100M	100K-500M	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G
	100	100K-100M	100K-500M	10K-**1G**	-10G	10K-10G	10K-10G	100K-10G	100K-10G
	200	100K-100M	100K-500M	10K-**1G**	-10G	10K-10G	10K-10G	100K-50G	100K-50G
5020 2W 5000V	25	1M-100M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M
	50	100K-100M	100K-500M	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G
	100	100K-100M	100K-500M	10K-**1G**	-10G	10K-10G	10K-10G	100K-10G	100K-10G
	200	100K-100M	100K-500M	10K-**1G**	-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.
For custom sizes and configurations, consult ohmcraftsales@exxelia.com.

How to Order

MCH + [ ] + [ ] + [ ] + [ ] + [ ] + [ ]

Type

Military Grade High Voltage Chips

Case Size

See dimension table.

Custom case sizes are available. Please consult factory.

TCR

E ±25ppm/°C

H ±50ppm/°C

K ±100ppm/°C

L ±200ppm/°C

Value

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.

Tolerance

B ±0.1%

C ±0.25%

D ±0.5%

F ±1.0%

G ±2.0%

J ±5.0%

K ±10%

L ±20%

Termina. on

T Solderable wraparound ma. e 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

G Wire bondable gold, Au,

Packaging options: Bulk, Tape & Reel or Flat Pack

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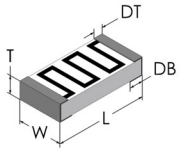
Chip Dimensions

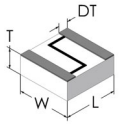
Wrap-around

B and T Terminations



Bondable

G, Z, and S Terminations



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

Other available case sizes: 0403, 0502, 0504, 1004, 1005, 1210, 1505, 2208, 2510, and custom. Please contact ohmcraftsales@exxelia.com.

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

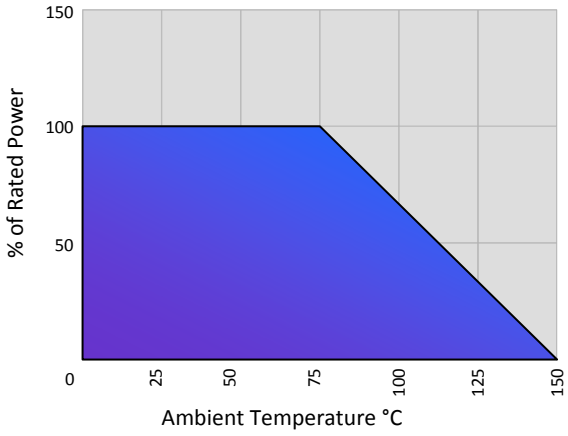
Material Construction

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.

Power Derating Curve



Custom Configurations Available Upon Request

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