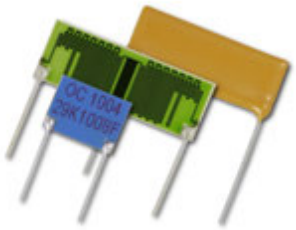
HVR SERIES

High Voltage Leaded Resistors

Advantages

Our patented Micropen® precision printing technology provides superior precision, thick-film resistors.



- **Voltage Ratings to 40,000 Volts**
- **Resistance Values to 4 TΩ**
- **Ultra High Stability**
- **Very Low Noise**
- **Tolerances to 0.1%**
- **TCR to 25 ppm/°C**
- **VCR to 0.05 ppm/V**
- **Custom Configurations**

Electrical Specifications

Case Size Ratings	TCR (±ppm/°C)	Tolerance 0.10%	0.25%	0.50%	1%	2%	5%	10%	20%
39 500mW 2kV	25	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M
	50	100K-100M	100K-100M	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G
	100	100K-100M	100K-100M	100K-10G	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G
	200	100K-100M	100K-100M	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G	100K-50G
	>200	100K-100M	100K-100M	100K-10G	100K-50G	100K-50G	100K-50G	100K-100G	100K-1T
29 500mW 4kV	25	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M	1M-100M
	50	100K-100M	100K-100M	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G	100K-1G
	100	100K-100M	100K-100M	100K-10G	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G
	200	100K-100M	100K-100M	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G	100K-50G
	>200	100K-100M	100K-100M	100K-10G	100K-50G	100K-50G	100K-50G	100K-100G	100K-1T
21 1W 10kV	25	1M-100M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M
	50	100K-100M	100K-500M	100K-10G	100K-10G	100K-10G	100K-10G	100K-10G	100K-10G
	100	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G	100K-50G
	200	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G	100K-50G
	>200	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-100G	100K-1T	100K-1T
42 2W 20kV	25	1M-100M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M
	50	100K-100M	100K-500M	100K-10G	100K-10G	100K-10G	100K-10G	100K-10G	100K-10G
	100	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G	100K-50G
	200	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G	100K-50G
	>200	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-100G	100K-1T	100K-1T
43 3W 30kV	25	1M-100M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M
	50	100K-100M	100K-500M	100K-10G	100K-10G	100K-10G	100K-10G	100K-10G	100K-10G
	100	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G	100K-50G
	200	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G	100K-50G
	>200	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-100G	100K-1T	100K-1T
56 6W 40kV	25	1M-100M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M	1M-500M
	50	100K-100M	100K-500M	100K-10G	100K-10G	100K-10G	100K-10G	100K-10G	100K-10G
	100	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G	100K-50G
	200	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-50G	100K-50G	100K-50G
	>200	100K-100M	100K-500M	100K-10G	100K-50G	100K-50G	100K-100G	100K-1T	100K-1T

The continuous maximum applied voltage cannot exceed the maximum power rating and is ohmic value dependent.
Value range is case size dependent.
For custom sizes and configurations, contact us.

How to Order

HVR + [ ] + [ ] + [ ] + [ ] + [ ] + [ ]

Type

Leaded High Voltage Resistor

Lead Style

T Spade Terminal, 100% Tin RoHS

S Spade Terminal, Sn60Pb40 solder

W Wire, 22AWG 100% Tin RoHS

B Wire, 22AWG Sn60Pb40 solder

Case Size

39
29
21
42
43
56

TCR Rating

E ±25ppm/°C

H ±50ppm/°C

K ±100ppm/°C

L ±200ppm/°C

M >±200ppm/°C

Total R 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 zeros.

Tolerance

B ±0.1%
C ±0.25%
D ±0.5%
F ±1.0%
G ±2.0%
J ±5.0%
K ±10%
L ±20%

Coating

2 Bare

3 Powder Coating

4 Single Surface Epoxy

High Voltage Leaded Resistors

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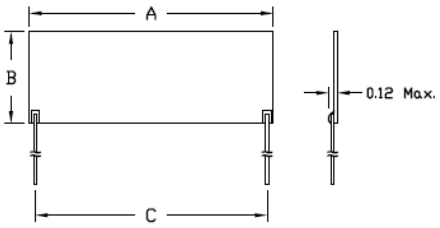
Resistor Dimensions



Wire Leads: 22AWG (0.025"), 1.3" typical length.

Spade Leads: 0.01" thick, 0.02" wide, 0.325" mini-

Case Size	A (Length)	B (Height)	C (Lead Spacing)	Units
39	0.3 +0.08/-0.03 7.62 +2.03/-0.76	0.4 ±0.03 10.16 ±0.76	0.2 5.08	inches mm
29	0.5 +0.08/-0.03 12.7 +2.03/-0.76	0.375 ±0.03 9.53 ±0.76	0.4 10.16	inches mm
21	1.0 +0.08/-0.03 25.4 +2.03/-0.76	0.375 ±0.03 9.53 ±0.76	0.9 22.86	inches mm
42	2.0 +0.08/-0.03 50.8 +2.03/-0.76	0.5 ±0.03 12.7 ±0.76	1.9 48.26	inches mm
43	3.0 +0.08/-0.03 76.2 +2.03/-0.76	0.5 ±0.03 12.7 ±0.76	2.9 73.66	inches mm
56	4.0 +0.08/-0.03 101.6 +2.03/-0.76	0.75 ±0.03 19.05 ±0.76	3.9 99.06	inches mm

For custom case sizes, contact us.

Typical Performance Characteristics

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

Parameter	Typical
Operating Temperature	-55°C to 150°C
TCR	Measured from 25°C to 75°C
Resistance Value	Values > 10M are measured at 100 VDC For custom test voltages consult factory

Material Construction

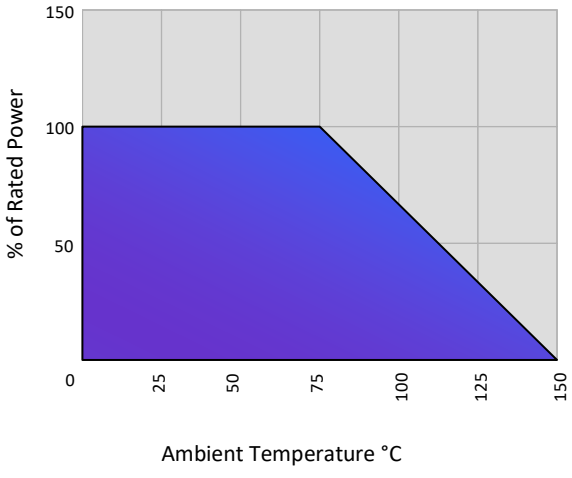
Substrate 96% Alumina

Coatings All resistors are glass encapsulated with optional single side epoxy or powder coating.

Custom Selections Available Upon Request

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

Power Derating Curve



Lot Acceptance Testing (LAT)

Lot Acceptance Testing provides screening and qualification tests to enable the use of Exxelia Ohmcraft's standard parts in flight applications (Aerospace/Space).

Exxelia Ohmcraft can screen and qualify its resistor products to MIL-PRF-55342, MIL-PRF-49462, NASA EEE-INST-002 (Level 1 or Level 2) or a custom test plan. LAT Testing includes but is not limited to:

- Thermal Shock
- Power Conditioning
- High Temperature Exposure
- Solderability
- TCR
- Load Life
- Short Term Overload
- Terminal Strength
- Resistance to Solvents

Electrical Specifications

Value R	R Ω	Resistance Value in kΩs, MΩs, GΩs, or TΩs
Tolerance	± X% at V	Resistance Tolerance measured at specified voltage
TCR	< [Ordering Coder TCR] ppm/ºC (Hot to TmaxºC, Cold to TminºC) < 2*[Ordering Coder TCR] ppm/ºC (Hot to 125ºC, Cold to -55ºC)	TCR referenced to 25ºC
Working Voltage	V	Voltage across the resistor during application operation
Max Voltage Rating	V	Maximum Voltage based on resistance value or case rating
Max Power Rating	W	Maximum Wattage based on resistance value or case rating

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S.A.S. au capital de 12.525.700 €
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APE 2611Z - TVA FR 73 444 344 766
SIRET 444 344 766 00027
www.exxelia.com

Lot Acceptance Testing (LAT)

Conformance Testing

Pre-Cap Visual Inspection

Prior to Conformance Test	13 pcs

Conformance Test – 100% Screening

Visual Inspection • Magnification: 30x to 60x	100%
Mechanical Inspection	3 pcs. (minimum)
DC Resistance • Per MIL-STD-202, Method 303 • Measured at specified test voltage for resistance tolerance	100%
Thermal Shock • Per-MIL-STD-202. Method 107, Test Condition B (modified) • 5 cycles (MIL-PRF-55342), 10 cycles (NASA level 2) or 25 cycles (NASA level 1) • Min. temp -55ºC, Max temp 125ºC	100%
High Temperature Exposure (SMT) • 100 hours at 125ºC	100%
Power Conditioning (Leaded) • 100 hours at Working Voltage at 25ºC	100%
Final DC Resistance	100%

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• Per MIL-STD-202, Method 303 • Measured at specified test voltage for resistance tolerance	

Conformance PDA: 5% (NASA Level 1 or MIL-PRF-55342), 10% (MIL-PRF-49462) or 15% (NASA Level 2)

Qualification Testing

Group	NASA Sample Size (Level 1 / Level 2)
Group 1 • Conformance Testing: Basic Screening	100%

Group 2
• Solderability
  • MIL-STD-202, Method 208
• Resistance to Solvents (Leaded)
  • MIL-STD-202, Method 215
	3 pcs / 3 pcs

Group 3
• Temperature Coefficient (TCR)
  • Per MIL-STD-202, Method 304
  • Reference Temperature: 25ºC
• Low Temperature Storage
  • -65ºC no load dwell for 24±4 hours
  • +25ºC ambient no load dwell for 2-8 hours
• Low Temperature Operation
  • -65ºC no load dwell for 1 hour
  • Working Voltage for 54 minutes
  • +25ºC no load dwell for 24±4 hours
• Short Time Overload
  • 2X Working Voltage for 5 seconds
	10 pcs / 6 pcs

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Lot Acceptance Testing (LAT)

Group 4
• Resistance to soldering heat
  • MIL-STD-202, Method 210, Test Condition B (modified)
  • 260ºC for 20 seconds
• Terminal Strength (Leaded)
• MIL-STD-202, Method 211 Test Condition C
• 16 ounces ± 1 ounce for 10 seconds
	9 pcs / 6 pcs

Group 5
• Shock (Leaded)
  • MIL-STD-202, Method 213B, Test Condition I
• Vibration (Leaded)
  • Per MIL-STD-202, Method 204, Test Condition D
	9 pcs / 6 pcs

Group 6
• Load Life
  • Per MIL-STD-202, Method 108
  • Working Voltage for 1000 or 2000 hours at 25ºC
	12 pcs / 9 pcs

Group 7
• Resistance to Bonding Exposure (SMT)
  • Solder mounted to a ceramic test plate
  • 4-12 hours stabilization at 25ºC
	10 pcs / 5 pcs

Group 8 • No Applicable Tests	

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Group 9 • High Temperature Exposure • 125ºC for 100 hours	5 pcs

Custom Configurations Available Upon Request

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