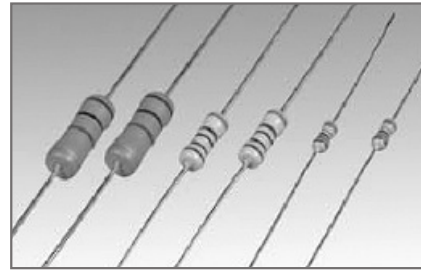


## High Ohmic Value Thick Film Resistors

These are thick film, low cost, axial lead, color coded resistors which exhibit a high overload rating. Complete environmental protection is ensured with an epoxy coating.



### GENERAL SPECIFICATIONS

Model	Power Rating[W]	Max. Working Voltage[V]	Max. Overload Voltage[V]	Resistance Range[Ω]	
				C(±0.25%), F(±1%), G(±2%)	K(±10%), J(±5%)
HOR 14	0.25	500	700	100k - 100M	101M - 1G
HOR 12	0.5	700	1000	100k - 100M	101M - 1G
HOR 10	1	1000	1500	100k - 100M	101M - 1G
HOR 20	2	1200	1500	100k - 100M	101M - 1G

### CHARACTERISTICS

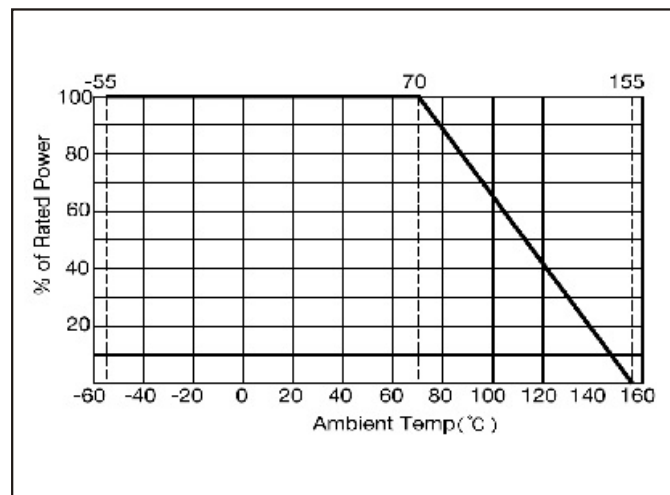
Values in [ ] mean change in Ω after test

Temperature Range	-55°C - 155°C	
Insulation Resistance	[10,000 MΩ minimum]	DC 100V, 1minute
Dielectric Withstanding Voltage	[No evidence of damage]	maximum working voltage / minute
Temp. Coefficient	[±100 - 200 ppm/°C]	
Short Time Overload	[±1%]	Use smallest valve: 2.5 x Rated Voltage or Max, Overload voltage for 5 sec.
Moisture Resistance	[±5%]	40°C ±2°C, 90%-95%RH 1000. 1.5h on, 0.5h off cycle
Thermal Shock	[±1%]	-55°C(30minute.) 155°C(30minute), 5 cycles
Resistance to Soldering Heat	[±1%]	260°C ±5°C, 10sec. ±1sec. or 350°C ±10°C, 3.5sec. ±0.5sec.
Load Life	[±5%]	70°C ±2°C 1000hours. 1.5hours on, 0.5hours off cycle

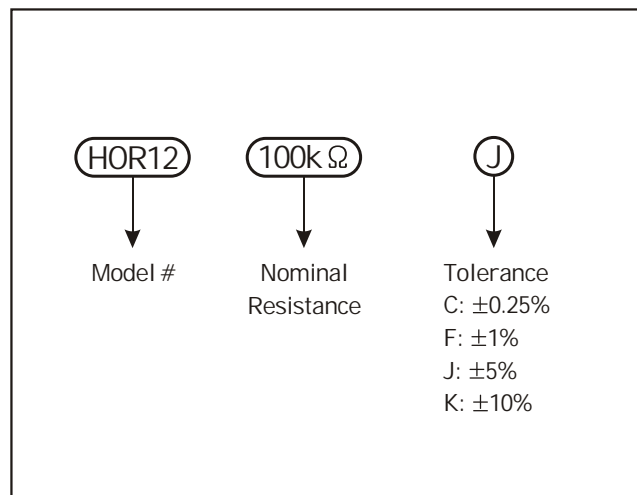
### DIMENSIONS (mm)

Model	Dimensions[mm]				
	L	C maximum	D	φd (Nominal)	L1±3
HOR 14	6.3±0.5	7.1	2.3±0.3	0.6	30
HOR 12	9.5±1.0	11.1	3.5±0.4	0.7	30
HOR 10	12±1.0	14.0	4.0±0.5	0.8	30
HOR 20	16±1.0	18.0	4.5±0.5	0.8	30

### DERATING CURVE



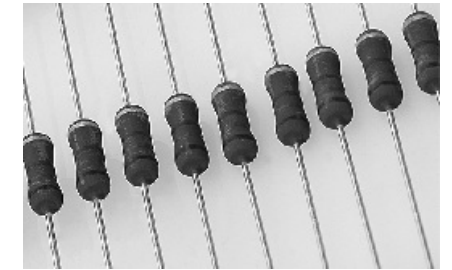
### ORDERING PROCEDURE EXAMPLE



## High Voltage Surge Resistor

Features and Applications

- Provide high stable performance against environmental conditions and over load voltage.
- Wide resistance range.
  - Resistance and tolerance are indicated as four or five color coding to IEC rules of marking code for resistor.
  - Color coding should be satisfied on the standards and good discernment.



### GENERAL SPECIFICATIONS

Model	Rating Power At 70°C	Max. Working Voltage	Resistance Range	Resistance Tolerance(%)	Safety Approvals	Climatic Category (IEC68)
SUR25	0.25W	350V	Non-Inductive 10Ω - 10KΩ / Inductive 10KΩ - 10MΩ	±5, ±10, ±20	UL, S	55/155/56
SUR37	0.5W	700V		±5, ±10, ±15, ±20		
SUR68	1W	1000V				

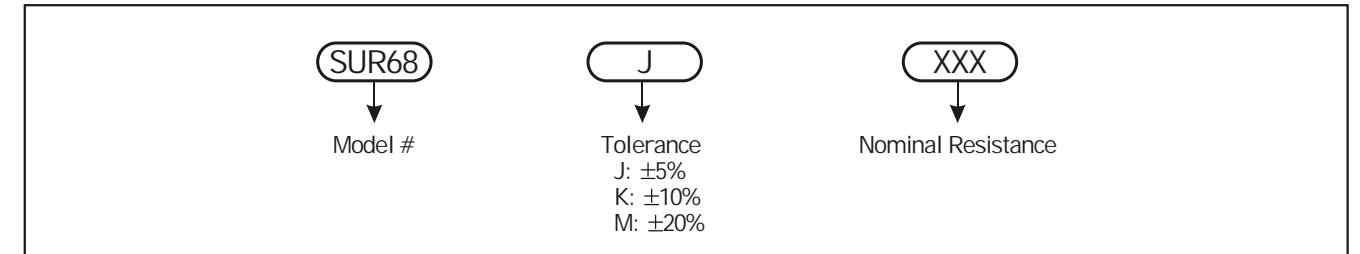
### CHARACTERISTICS

Insulation Resistance	Minimum. More than 10M Ω	SUR25	SUR37	SUR68
		350±50VDC for 1minute	500±50VDC for 1minute	700±50VDC for 1minute
Temperature Coefficient	±1000ppm/°C			
Short Time Overload	2.5 x Rated Power 5sec. on, 45sec. off, 10 cycles.			
Rapid Change of Temperature	30minute -55°C, 30minute +155°C 5 cycles.			
Damp Heat steady state	40 ±2°C, 90-95%, 56days after 30minute. dissipation ≤0.01Pn			
Over Load Test	3.5* rated voltage for 5sec.			
Endurance	70±3°C, 0.5hours on, 0.5hours off 1000 ±12hours, Pn or Vmax			
Vibration	Frequency 10-55Hz Displacement 1.5mm or acceleration 10g Three direction: total 6h(2*3h)			
Solderability	Good tinning No damage 95%		Solderability : 2sec. 235±5°C. Flux 600	
Surge Test	Δ R±10% No damage	8KV/10nF (2.5secs on/off) 10cycle	8KV/10nF (2.5secs on/off) 10cycle	R≤1KΩ: 8KV/10nF R > 1KΩ: 10KV/10nF 10cycle
Torsion	No damage 2.5kgf remains 5-10sec.			

### DIMENSIONS (mm)

Model	D max	L max	d+0.02/-0.05	H±3
SUR25	2.5	6.5	0.58	26mm
SUR37	3.5	9.0	0.7	26mm
SUR68	5.5	16	0.8	32mm

### ORDERING PROCEDURE EXAMPLE



### PACKING

Series	Style	Packing	W	H	L	Packing Unit
SUR25	Straight Taping	Inner	78	98	270	5,000
SUR37	Straight Taping	Inner	73	71	260	1,000
SUR68	Straight Taping	Inner	83	71	260	750

## High Voltage Thick Film Planar Resistors

These units are available in two terminal styles. Large ohmic range from 0.5Mohms to 1Gohms. Superior characteristics in pulse voltage and high voltage applications. Excellent general electrical characteristics. These models are also suitable for customer designed specs and high voltage resistive patterns.



### GENERAL SPECIFICATIONS

Model	Resistance Range [Ω]	Resistance Tolerance [%]	Power Rating & Max. Working Voltage																		
			03		04		05		06		07		08		09		11		18		
			W	KV	W	KV	W	KV	W	KV	W	KV	W	KV	W	KV	W	KV	W	KV	
HVP03	0.5MΩ-1GΩ	F.G.J																			
		K.M						0.5	6.7						1.0	9.5					
HVP05		F.G.J																			
		K.M	0.6	3.2	0.7	4.8	0.8	5.5	0.9	6.7	1.0	7.4	1.1	8.6							
HVP06		F.G.J	0.2	2.0	0.3	3.0	0.4	4.0	0.5	5.0	0.6	6.0	0.7	7.0							
		K.M	0.7	3.0	0.8	4.8	0.9	5.5	1.0	6.7	1.1	7.4	1.2	8.6							
HVP07		F.G.J	0.3	2.0	0.4	3.0	0.5	4.0	0.6	5.0	0.7	6.0	0.8	7.0							
		K.M	0.8	3.2	0.9	4.8	1.0	5.5	1.1	6.7	1.2	7.4	1.6	8.6							
HVP10		F.G.J	0.4	2.0	0.5	3.0	0.7	4.0	0.9	5.0	1.1	6.0	1.4	7.0			1.7	10	2.7	15	
		K.M	0.9	3.2	1.1	4.8	1.3	5.5	1.5	6.7	1.7	7.4	1.9	8.6			1.7	10	2.7	15	

### CHARACTERISTICS

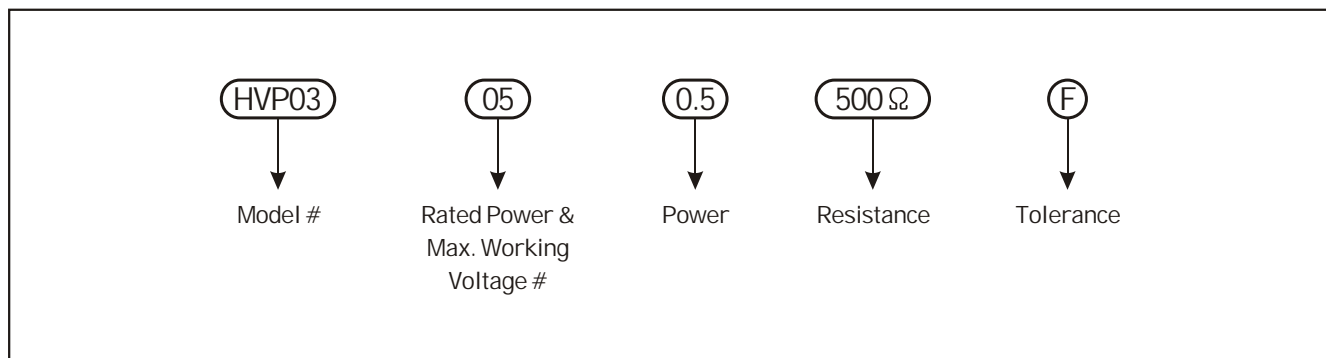
Operating Temperature Range	-25°C~+125°C
Temperature Coefficient	Typical ±250ppm/°C

Values in [ ] mean change in Ω after test

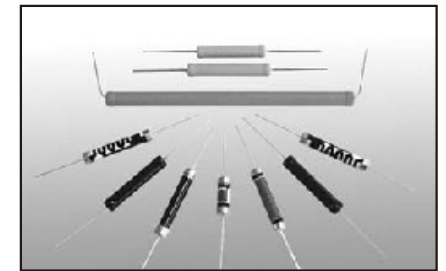
### DIMENSIONS (mm)

Terminal Pitch	H max.					L max	P±0.3
	HVP03	HVP05	HVP06	HVP07	HVP10		
03						10.7	7.62
04						13.2	10.16
05						15.8	12.70
06						18.3	15.24
07	3.5	5.0	6.35	7.5	10	20.9	17.78
08						23.4	20.32
09						27.0	22.86
11						31.0	27.94
18						48.8	45.72

### ORDERING PROCEDURE EXAMPLE



The HVR series of cylindrical resistors are designed to operate at high voltage at an economical price. The HVR resistor is available with silicone[S] coating or epoxy[E] coating. The epoxy coated models have excellent humidity protection. A wide range of tolerances and TCRs are available in both types.



### APPLICATIONS INCLUDE

Automated Test(ATE), Medical(Imaging), Ion Source Chromatography(Gas), Medical(PET, CT), Medical(Radiation therapy) Military, Radar, Lasers, Plasmas, Measurements(High Voltage) Capacitor Charging, Microwave(Klystron), Medical(Blood Analyzers) Corona Generators, Multichannel Analyzers, Ozone Generating Detectors, Nuclear instrumentation, Medical(Gamma Cameras) Electron Beam, Testing, Pulse Generators, Surface Analysis CRT, X-Ray, MRI, Electrophoresis, Image Intensifier Surface Analysis, Piezo. Focusing(poling), High Voltage Dividers Stress Testing, Agricultural Sensors, Ion Beam

### GENERAL SPECIFICATIONS

Model	Wattage [W]	Wattage(1) in molded	Max Voltage [kV]	Resistance Range[Ω]	
				Min.	Max.
HVR15	0.2	N/A	2.0	100K	500M
HVR19	0.3	N/A	2.5	100K	500M
HVR25	0.5	N/A	4.5	100K	500M
HVR24	1.5	N/A	4.0	100K	500M
HVR39	2.5	0.8	10.0	100K	1G
HVR52	3.0	1.0	15.0	100K	1G
HVR76	4.5	1.5	22.5	100K	1G
HVR102	6.0	2.0	32.0	100K	1G
HVR117	7.0	2.3	35.0	100K	1G
HVR127	7.5	2.5	37.0	100K	1G
HVR137	8.0	2.7	40.0	100K	1G
HVR152	9.0	3.0	48.0	100K	1G

(1) in fully epoxy/or silicone rubber molded case condition, precision high voltage dividers required very long life stability in harsh condition

### CHARACTERISTICS

Tolerance	±0.5%, ±1%, ±2%, ±5%, ±10%
Temperature Range	-55°C~+195°C
Temp. Coefficient	Std, 75ppm/°C, Other special TCR on request (20ppm/°C, 35ppm/°C, 50ppm/°C, 60ppm/°C, 85ppm/°C)
Short Time Overload	±[0.5%] 5*Power Rating for 5sec.
Thermal Shock	±[0.25%] Mil-Std-220, Method-107, Cond, C
Load Life	±[0.5%] 1,000 hours at rated power
Moisture Resistance	±[0.4%] Mil-Std-202, Method 106
Insulation Resistance	10,000MΩ Min

### DIMENSIONS (mm)

Model	Dimensions(mm)		
	A	B	C
HVR15	15±1.5	5.0±1.5	0.8
HVR19	19±1.5	5.0±1.5	0.8
HVR25	25.4±1.5	5.0±1.5	0.8
HVR24	24.0±1.5	8.0±1.5	1.0
HVR39	39.0±1.5	8.0±1.5	1.0
HVR52	52.0±1.5	8.0±1.5	1.0
HVR76	76.0±2.0	8.0±1.0	1.0
HVR102	102.0±2.0	9.0±1.0	1.0
HVR117	117.0±2.0	9.0±1.0	1.0
HVR127	127.0±2.0	9.0±1.0	1.0
HVR137	137.0±2.0	9.0±1.0	1.0
HVR152	152.0±2.0	9.0±1.0	1.0

### DERATING CURVE AND ORDERING PROCEDURE EXAMPLE

