

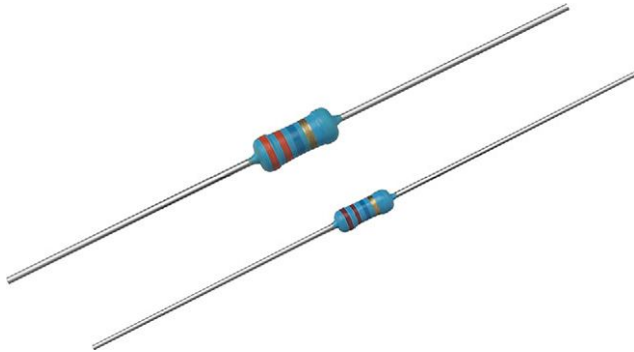


**THE DATASHEET OF
HVR2500002203FR500**





High Ohmic (up to 10 MΩ) / High Voltage (up to 3.5 kV) Metal Film Leaded Resistors



FEATURES

- Technology: metal film
- High pulse loading (up to 10 kV) capability
- Small size (0207 / 0411)
- Compatible with lead (Pb)-free and lead containing soldering processes
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- Power supplies
- Electronic ballast
- White goods
- Television

LINKS TO ADDITIONAL RESOURCES



A homogenous film of metal alloy is deposited on a high grade ceramic body. After a helical groove has been cut in the resistive layer, tinned electrolytic copper wires are welded to the end-caps. The resistors are coated with a blue, non-flammable lacquer, which provides electrical, mechanical, and climatic protection.

TECHNICAL SPECIFICATIONS					
DESCRIPTION	HVR25		HVR37		
Resistance range	100 kΩ to 10 MΩ		100 kΩ to 10 MΩ		
Resistance tolerance	± 5 %	± 1 %	± 5 %	± 1 %	
E-series	E24 series	E24/E96 series	E24 series	E24/E96 series	
Temperature coefficient	± 200 ppm/K				
Climatic category (LCT/UCT/days)	55/155/56				
Rated dissipation, P_{70}	0.25 W		0.5 W		
Maximum permissible voltage U_{max} .	DC	1600 V	3500 V		
	RMS	1150 V	2500 V		
Basic specification	IEC 60115-1				
Stability after:	Load (1000 h, P_{70})	± 5 % R	± 1.5 % R	± 5 % R	± 1.5 % R
	Long term damp heat test (56 days)	± 5 % R	± 1.5 % R	± 5 % R	± 1.5 % R
	Soldering (10 s, 260 °C)	± 1 % R	± 1 % R	± 1 % R	± 1 % R



PART NUMBER AND PRODUCT DESCRIPTION (1)						
Part Number: HVR250001503JA100						
H	V	R	2	5	0	0
0	0	0	0	1	5	0
3	J	A	1	0	0	
MODEL / SIZE	VARIANT	TCR/MATERIAL	VALUE	TOLERANCE	PACKAGING (2)	SPECIAL
HVR2500 HVR3700	0 = neutral	0 = standard	3 digit value 1 digit multiplier MULTIPLIER 3 = *10 ³ 4 = *10 ⁴ 5 = *10 ⁵	F = ± 1 % J = ± 5 %	A1 A5 R5 N4	Up to 2 digits 00 = standard
Product Description: HVR25 5 % A1 150K						
HVR25	5 %	A1	150K			
Model	TOLERANCE	PACKAGING (2)	RESISTANCE VALUE			
HVR25 HVR37	± 1 % ± 5 %	A1 A5 R5 N4	150K = 150 kΩ 4M64 = 4.64 MΩ			

Notes

- (1) The PART NUMBER is shown to facilitate the introduction of the unified part numbering system
- (2) Please refer to table PACKAGING, see next page

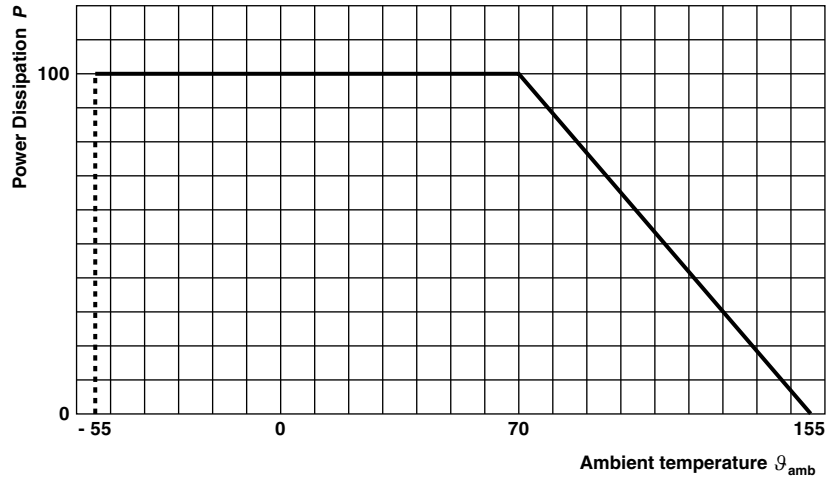
PACKAGING					
MODEL	TAPING	AMMO PACK		REEL	
		PIECES	CODE	PIECES	CODE
HVR25	Axial, 52 mm	5000	A5	5000	R5
		1000	A1		
	Radial	4000	N4		
HVR37	Axial, 52 mm	1000	A1	5000	R5

MARKING

The nominal resistance and tolerance are marked on the resistor using four or five colored bands in accordance with IEC 60062, marking codes for resistors and capacitors. Standard values of nominal resistance are taken from the E24 and E24 / E96 series for resistors with a tolerance of ± 5 % or ± 1 % respectively. The values of the E24 / E96 series are in accordance with IEC 60063. Yellow and grey are used instead of gold and silver because metal particles in the lacquer could affect high voltage properties.



FUNCTIONAL PERFORMANCE



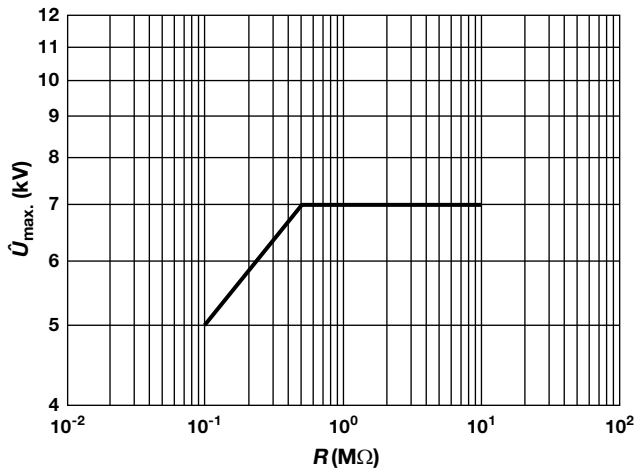
Derating - Standard Operation

Maximum dissipation ($P_{max.}$) in percentage of rated power as a function of ambient temperature (T_{amb})

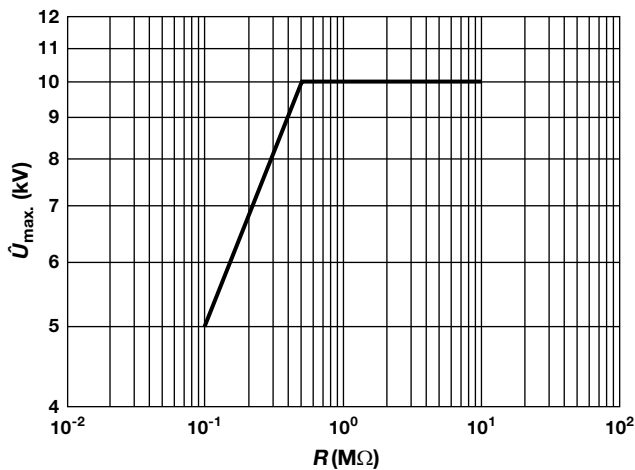
PULSE LOADING CAPABILITY

Note

- Maximum allowed peak pulse voltage in accordance with IEC 60065, 14.1.a; 50 discharges from a 1 nF capacitor charged to $U_{max.}$; 12 discharges/min



HVR25
 $\Delta R = \pm 4.0 \% R$



HVR37
For 5 % tolerance $\Delta R = \pm 4.0 \% R$
For 1 % tolerance $\Delta R = \pm 2.0 \% R$

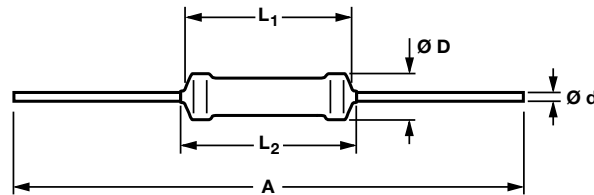


TESTS AND REQUIREMENTS

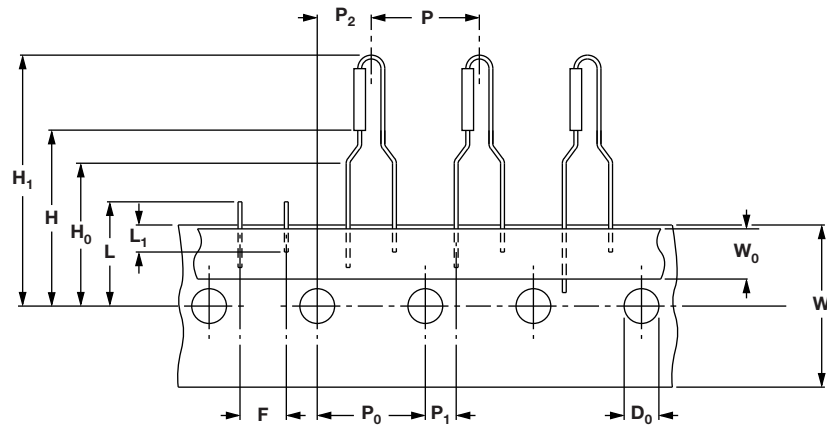
Essentially all tests are carried out in accordance with IEC 60115-1, category 55 / 155 / 56 (rated temperature range -55 °C to +155 °C; damp heat, long term, 56 days) and along the lines of IEC 60068-2-xx test method. The tests are carried out under standard atmospheric conditions according to IEC 60068-1, 4.3 unless otherwise specified. In some instances deviations from IEC recommendations were necessary for our method of specifying.

PERFORMANCE					
IEC 60115-1 CLAUSE	IEC 60068-2-xx TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (δR)	
				HVR25	HVR37
6.2	-	Temperature coefficient	Between -55 °C and +155 °C	± 200 ppm/K	
7.1	-	Endurance at 70 °C	1000 h; loaded with P_{70} or U_{max} ; 1.5 h on; 0.5 h off for 5 % tolerance for 1 % tolerance	± 5 % R ± 1.5 % R	
10.4	78 (Cab)	Damp heat, steady state	56 days; 40 °C; 90 % to 95 % RH loaded with 0.01 P_{70} for 5 % tolerance for 1 % tolerance	± 5 % R ± 1.5 % R	
10.3 10.3.4.2 10.3.4.3 10.3.4.4 10.3.4.6	2 (Bb) 30 (Db) 1 (Ab) 30 (Db)	Climatic sequence Dry heat Damp heat, cyclic Cold Damp heat, (accelerated) remaining cycles	16 h, 155 °C 24 h; 25 °C to 55 °C 90 % to 100 % RH; 1 cycle 2 h, -55 °C 5 days; 25 °C to 55 °C 90 to 100 % RH	± 1.5 % R	
10.1	14 (Na)	Rapid change of temperature	30 min at LCT; 30 min at UCT; LCT = -55 °C; UCT = 155 °C; 5 cycles	No visual damage ± 1 % R	
8.1	-	Short time overload	Room temperature; dissipation 6.25 x P_{70} (voltage not more than 2 x limiting voltage, 10 000 V_{max}); 10 cycles 5 s on and 45 s off for 5 % tolerance for 1 % tolerance	± 2 % R ± 1 % R	
6.6	-	Noise	IEC 60195	Max. 5 $\mu V/V$	Max. 2.5 $\mu V/V$
9.5 9.5.4.2 9.5.4.3 9.5.4.4	21 (Ua1) 21 (Ub) 21 (Uc)	Robustness of terminations: Tensile all samples Bending half number of samples Torsion other half of samples	Load 10 N; 10 s Load 5 N; 4 x 90° 3 x 360° in opposite direction	No damage ± 1 % R	
9.11	6 (Fc)	Vibration	Frequency 10 Hz to 500 Hz; displacement 1.5 mm or acceleration 10 g; 3 directions; total 6 h (3 x 2 h)	± 1.0 % R	

PERFORMANCE					
IEC 60115-1 CLAUSE	IEC 60068-2-xx TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (δR)	
				HVR25	HVR37
11.1	20 (Ta)	Solderability (after aging)	2 s; 235 °C: Solder bath method; SnPb40 3 s; 245 °C: Solder bath method; SnAg3Cu0.5	Good tinning ($\geq 95\%$ covered); no visible damage	
11.2	20 (Tb)	Resistance to soldering heat	Thermal shock: 10 s; 260 °C; 3 mm from body	$\pm 1\% R$	
11.3.2.3	45 (XA)	Component solvent resistance	Isopropyl alcohol	No visible damage	
12.1	-	Insulation resistance	$U = 500 V_{DC}$ during 1 min, V-block method	R_{ins} min. 104 M Ω	
12.2	-	Voltage proof on insulation	$U_{RMS} = 700 V$ during 1 min, V-block method	No flashover or breakdown	

DIMENSIONS


DIMENSIONS - Resistor types, mass and relevant physical dimensions						
TYPE	L_1 max. (mm)	L_2 max. (mm)	$D_{max.}$ (mm)	$\varnothing d$ (mm)	A (mm)	MASS (mg)
HVR25	6.5	7.5	2.5	0.58 ± 0.05	$52.5 + 2 / - 1$	220
HVR37	10	12	4	0.70 ± 0.03	$52.5 + 2 / - 1$	500

PRODUCTS WITH RADIAL LEADS (HVR25)


DIMENSIONS - Radial taping				
SYMBOL	PARAMETER	VALUE	TOLERANCE	UNIT
P	Pitch of components	12.7	± 1.0	mm
P_0	Feed-hole pitch	12.7	± 0.2	mm
P_1	Feed-hole centre to lead at topside at the tape	3.85	± 0.5	mm
P_2	Feed-hole center to body center	6.35	± 1.0	mm
F	Lead-to-lead distance	4.8	+0.7 / -0	mm
W	Tape width	18.0	± 0.5	mm
W_0	Minimum hold down tape width	5.5	-	mm
H_1	Component height	29	Max.	mm
H_0	Lead wire clinch height	16.5	0.5	mm
H	Height of component from tape center	19.5	± 1	mm
D_0	Feed-hole diameter	4.0	± 0.2	mm
L	Maximum length of snapped lead	11.0	-	mm
L_1	Minimum lead wire (tape portion) shortest lead	2.5	-	mm

Note

- Please refer document number 28721 "Packaging" for more detail



12NC INFORMATION FOR HISTORICAL CODING REFERENCE ONLY

- The resistors have a 12 digit ordering code starting with 2306
- The next 4 or 5 digits indicate the resistor type and packaging
- For 5 % tolerance the last 3 digits indicate the resistance value:
 - The first 2 digits indicate the resistance value
 - The last digit indicates the resistance decade in accordance with table
- For 1 % tolerance the last 4 digits indicate the resistance value:
 - The first 3 digits indicate the resistance value
 - The last digit indicates the resistance decade in accordance with table

Last Digit of 12NC Indicating Resistance Decade

RESISTANCE DECADE (5 %)	RESISTANCE DECADE (1 %)	LAST DIGIT
100 kΩ to 910 kΩ	100 kΩ to 976 kΩ	4
1 MΩ to 9.1 MΩ	1 MΩ to 9.76 MΩ	5
= 10 MΩ	= 10 MΩ	6

12NC Example

HVR25, 150 kΩ, ± 5 %, ammpack 1000 pieces is **2306 241 13154**

12NC - resistor type and packaging						
DESCRIPTION			2306			
			BANDOLIER IN AMMOPACK			BANDOLIER ON REEL
TYPE	TAPE WIDTH	TOLERANCE	RADIAL TAPED	1000 UNITS	5000 UNITS	5000 UNITS
			4000 UNITS			
HVR25	52.5	± 5 %	241 36...	241 13...	241 53...	241 23...
		± 1 %	241 0....	241 8....	241 7....	241 6....
HVR37	52.5	± 5 %	-	242 13...	-	242 23...
		± 1 %	-	242 8....	-	242 6....



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