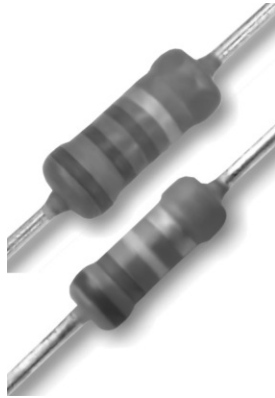


High Ohmic (up to 10 MΩ), High Voltage (up to 3.5 kV) Metal Film Leaded Resistors



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.

FEATURES

- Metal film technology
- High pulse loading (up to 10 kV) capability
- Small size (0207/0411)
- Compatible with lead (Pb)-free and lead containing soldering processes
- Lead (Pb)-free and RoHS compliant



RoHS
COMPLIANT

APPLICATIONS

- Power supplies
- Electronic ballast
- White goods
- Television

TECHNICAL SPECIFICATIONS				
DESCRIPTION	HVR25		HVR37	
Resistance Range	100 kΩ to 10 MΩ	100 kΩ to 10 MΩ	100 kΩ to 10 MΩ	100 kΩ to 10 MΩ
Resistance Tolerance	± 5 % E24 series	± 1 % E24/E96 series	± 5 % E24 series	± 1 % 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:				
DC	1600 V		3500 V	
RMS	1150 V		2500 V	
Basic Specification	IEC 60115-1			
Maximum Resistance Change at P_{70} for Resistance Range, ΔR max., after:				
Load (1000 h)	± (5 % R + 0.1 Ω)	± (1.5 % R + 0.1 Ω)	± (5 % R + 0.1 Ω)	± (1.5 % R + 0.1 Ω)
Climatic Tests	± (1.5 % R + 0.1 Ω)	± (1.5 % R + 0.1 Ω)	± (1.5 % R + 0.1 Ω)	± (1.5 % R + 0.1 Ω)
Resistance to Soldering Heat	± (1 % R + 0.1 Ω)	± (1 % R + 0.1 Ω)	± (1 % R + 0.1 Ω)	± (1 % R + 0.1 Ω)



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			ORDERING CODE 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...

PART NUMBER AND PRODUCT DESCRIPTION (1)

PART NUMBER: HVR2500001503JA100

H	V	R	2	5	0	0	0	0	1	5	0	3	J	A	1	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

MODEL/SIZE HVR2500 HVR3700	SPECIAL CHARACTER 0 = Neutral	TCR/MATERIAL 0 = Standard	VALUE 3 digit value 1 digit multiplier MULTIPLIER 3 = *10 ³ 4 = *10 ⁴ 5 = *10 ⁵	TOLERANCE F = ± 1 % J = ± 5 %	PACKAGING (2) A1 A5 R5 N4	SPECIAL 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

HVR25, HVR37

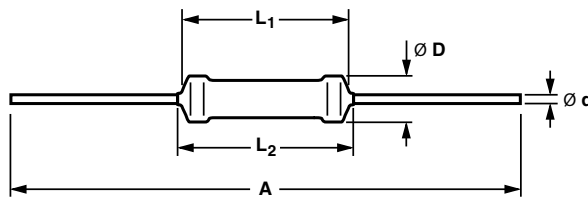


Vishay BCcomponents

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

PACKAGING				
MODEL	REEL		BOX	
	PIECES	CODE	PIECES	CODE
HVR25	5000	R5	1000	A1
			4000	N4
			5000	A5
HVR37	5000	R5	1000	A1

DIMENSIONS

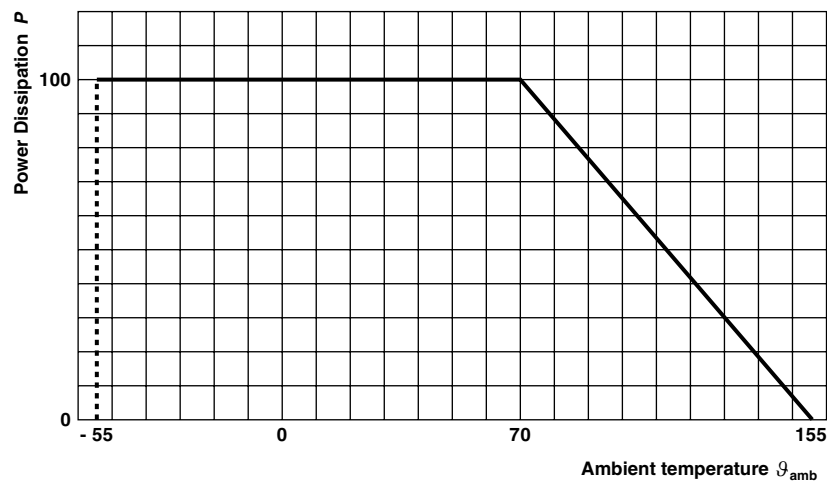


DIMENSIONS - resistor types, mass and relevant physical dimensions						
TYPE	L ₁ max. (mm)	L ₂ max. (mm)	D _{max.} (mm)	Ø d (mm)	A (mm)	MASS (g)/ 100 pieces
HVR25	6.5	7.5	2.5	0.58 ± 0.05	52.5 ± 1.5	22
HVR37	10	12	4	0.78 ± 0.05	52.5 ± 1.5	50

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

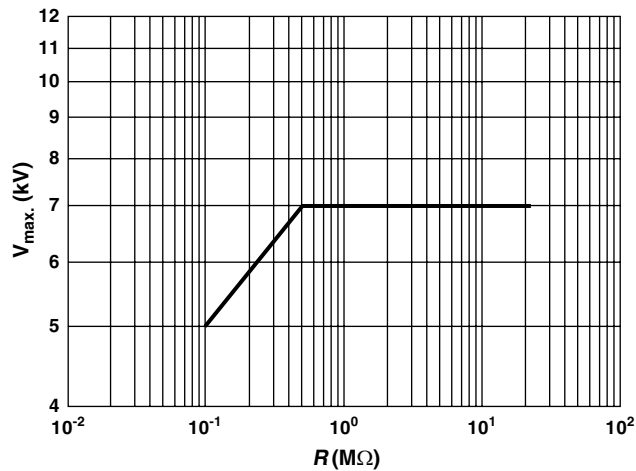
Maximum dissipation ($P_{max.}$) in percentage of rated power as a function of ambient temperature (T_{amb})



PULSE LOADING CAPABILITY

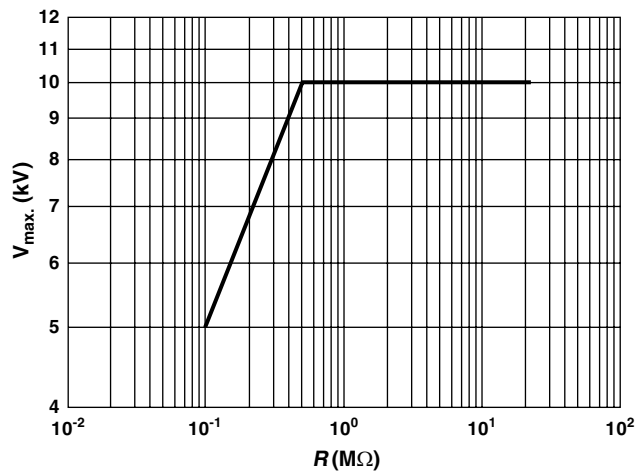
Note

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



HVR25

$\Delta R \pm (4.0 \% R + 0.1 \Omega)$



HVR37

For 5 % tolerance $\Delta R \pm (4.0 \% R + 0.1 \Omega)$

For 1 % tolerance $\Delta R \pm (2.0 \% R + 0.1 \Omega)$

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 test method. The tests are carried out under standard atmospheric conditions according to IEC 60068-1, 5.3 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 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)	
				HVR25	HVR37
4.8	-	Temperature coefficient	Between - 55 °C and + 155 °C	± 200 ppm/K	
4.25.1	-	Endurance at 70 °C	1000 h; loaded with Pn or V _{max} ; 1.5 h ON; 0.5 h OFF for 5 % tolerance for 1 % tolerance	$\pm (5 \% R + 0.1 \Omega)$ $\pm (1.5 \% R + 0.1 \Omega)$	
4.24	3 (Ca)	Damp heat, steady state	56 days; 40 °C; 90 % to 95 % RH loaded with 0.01 Pn for 5 % tolerance for 1 % tolerance	$\pm (5 \% R + 0.1 \Omega)$ $\pm (1.5 \% R + 0.1 \Omega)$	
4.23	2 (Ba) 30 (Db) 1 (Aa) 30 (Db)	Climatic sequence	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	$\pm (1.5 \% R + 0.1 \Omega)$	
4.23.2		Dry heat			
4.23.3		Damp heat, cyclic			
4.23.4		Cold			
4.23.6	30 (Db)	Damp heat, (accelerated) remaining cycles			
4.19	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 $\pm (1 \% R + 0.1 \Omega)$	
4.13	-	Short time overload	Room temperature; dissipation 6.25 x Pn (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	$\pm (2 \% R + 0.1 \Omega)$ $\pm (1 \% R + 0.1 \Omega)$	
4.12	-	Noise	IEC 60195	Max. 5 μ V/V	Max. 2.5 μ V/V
4.16	21 (U)	Robustness of terminations:	Load 10 N; 10 s Load 5 N; 4 x 90° 3 x 360° in opposite direction	No damage $\pm (1 \% R + 0.1 \Omega)$	
4.16.2	21 (Ua1)	Tensile all samples			
4.16.3	21 (Ub)	Bending half number of samples			
4.16.4	21 (Uc)	Torsion other half of samples			



PERFORMANCE					
IEC 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)	
				HVR25	HVR37
4.22	6 (Fc)	Vibration	Endurance by sweeping; 10 Hz to 500 Hz; displacement 1.5 mm or acceleration 10 g; 6 h (3 x 2 h)	$\pm (1.0 \% R + 0.1 \Omega)$	
4.17	20 (Ta)	Solderability (after ageing)	16 h at 155 °C; immersed in flux 600, leads immersed 2 mm in solder bath at (235 ± 5) °C for (2 ± 0.5) s	Good tinning (≥ 95 % covered); no visible damage	
4.18	20 (Tb)	Resistance to soldering heat	Solder bath method; (350 ± 10) °C; 6 mm from body 3 s	$\pm (1 \% R + 0.1 \Omega)$	
4.29	45 (XA)	Component solvent resistance	Isopropyl alcohol	No visible damage	
4.6.11	-	Insulation resistance	500 V _{DC} during 1 min, V-block method	R_{ins} min. 10 ⁴ MΩ	
4.7	-	Voltage proof on insulation	700 V _{RMS} during 1 min, V-block method	No flashover or breakdown	



Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.