

## Surge Metal Film Leaded Resistor



A multi layer metal film 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 light blue non-flammable lacquer, which provides electrical, mechanical, and climatic protection.

The encapsulation is resistant to all cleaning solvents in accordance with IEC 60068-2-45.

### FEATURES

- Metal film technology
- High pulse load (up to 10 kV) capability
- Replacement for carbon-composition resistors
- Compatible with lead (Pb)-free and lead containing soldering processes
- Compliant to RoHS directive 2002/95/EC



### APPLICATIONS

- Automotive
- Telecommunication
- Industrial
- Medical equipment

### TECHNICAL SPECIFICATIONS

DESCRIPTION	SR37
Resistance Range	220 $\Omega$ to 10 k $\Omega$
Resistance Tolerance	$\pm 10\%$ , $\pm 20\%$ , E12 series
Temperature Coefficient	$\pm 250$ ppm/K
Climatic Category (LCT/UCT/Days)	55/155/56
Rated Dissipation, $P_{70}$	0.5 W
Rated Voltage, $U_{max}$ .	$\sqrt{P_n \times R}$
Voltage Proof on Insulation	700 V
Basic Specification	IEC 60115-1
Stability After:	
Load (1000 h, $P_{70}$ )	$\pm (3\% R + 0.1 \Omega)$
Long Term Damp Heat Test (56 Days)	$\pm (3\% R + 0.1 \Omega)$
Soldering (10 s, 260 °C)	$\pm (1\% R + 0.1 \Omega)$
High Voltage Pulse Test for R-Value $\leq 4.7$ k $\Omega$ , 10 kV; 1 nF; 50 x 12/Min	$\pm 20\%$

**PART NUMBER AND PRODUCT DESCRIPTION (1)**

PART NUMBER: SR03700001501KR500

S	R	0	3	7	0	0	0	0	1	5	0	1	K	R	5	0	0
MODEL/SIZE		VARIANT		TCR/MATERIAL		VALUE		TOLERANCE		PACKAGING (2)		SPECIAL					
SR03700		0 = Neutral		0 = Standard		3 digit value 1 digit multiplier MULTIPLIER 3 = $\times 10^3$ 4 = $\times 10^4$ 5 = $\times 10^5$		K = $\pm 10\%$ M = $\pm 20\%$		A1 R5		Up to 2 digits 00 = Standard					
PRODUCT DESCRIPTION: SR037 10 % R5 1K5																	
SR037		10 %		R5		1K5		RESISTANCE VALUE									
MODEL		TOLERANCE		PACKAGING (2)		A1		R5									
SR03700		$\pm 10\%$				$\pm 20\%$						1K5 = 1.5 k $\Omega$					

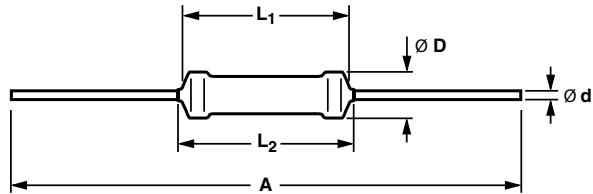
**Notes:**

(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	REEL		BOX	
	PIECES	CODE	PIECES	CODE
SR37	5000	R5	1000	A1

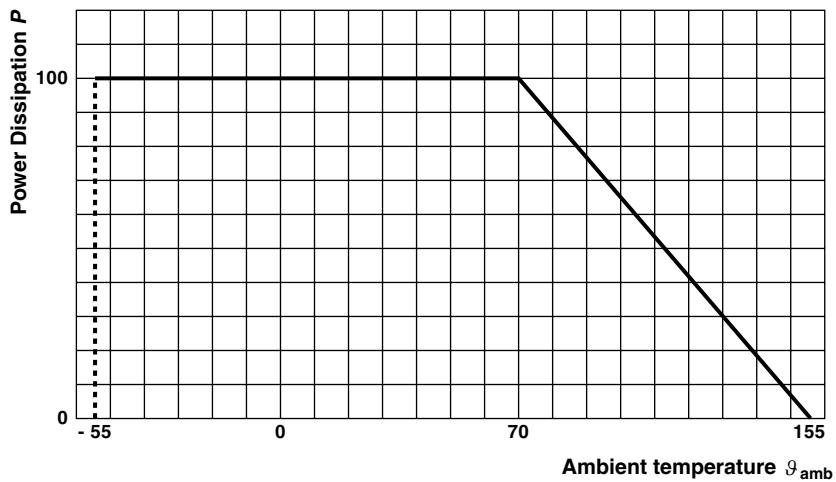
**DIMENSIONS**

**DIMENSIONS - Resistor types, mass and relevant physical dimensions**

TYPE	L <sub>1</sub> max. (mm)	L <sub>2</sub> max. (mm)	D <sub>max.</sub> (mm)	$\varnothing$ d (mm)	A (mm)	MASS (g)/ 100 pieces
SR37	9.0	11.0	4.0	$0.80 \pm 0.03$	$52.5 \pm 1.5$	50.5

**MARKING**

The nominal resistance and tolerance are marked on the resistor using three colored bands for  $\pm 20\%$  tolerance and four bands for  $\pm 10\%$  tolerance in accordance with IEC 60062, marking codes for resistors and capacitors. Standard values of nominal resistance are taken from the E12 series for resistors with a tolerance of  $\pm 10\%$  or  $\pm 20\%$ . The values of the E12 series are in accordance with IEC 60063.

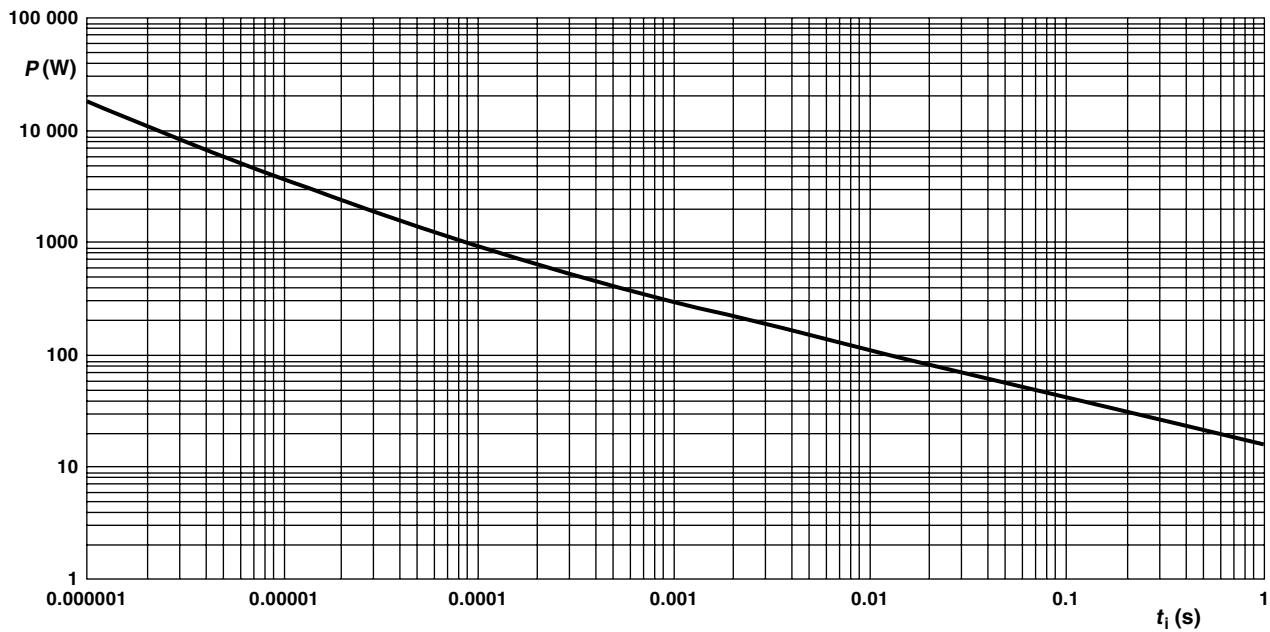
## FUNCTIONAL PERFORMANCE



### Derating - Standard Operation

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

## PULSE LOADING CAPABILITY



Pulse on a regular basis; maximum permissible peak pulse power ( $P_{\text{max.}}$ ) as a function of pulse duration ( $t_i$ ) for single pulse condition

## TESTS AND REQUIREMENTS

Essentially all tests are carried out in accordance with IEC 60115-1, category 55/155/56 (rated temperature range - 55 to + 155 °C; damp heat, steady state, 56 days). The tests are carried out in accordance with IEC 60068-2-xx.

Test method under standard atmospheric conditions according to IEC 60068-1, 5.3. In the Test Procedures and Requirements table the tests and requirements are listed with reference to the relevant clauses of IEC 60115-1 and IEC 60068-2-xx test methods. A short description of the test procedure is also given. In some instances deviations from IEC applications were necessary for our specified method.

<b>PERFORMANCE</b>				
<b>IEC 60115-1 CLAUSE</b>	<b>IEC 60068-2-xx TEST METHOD</b>	<b>TEST</b>	<b>PROCEDURE</b>	<b>REQUIREMENTS PERMISSIBLE CHANGE (<math>\Delta R</math>) SR37</b>
4.8	-	Temperature coefficient	Between - 55 °C and + 155 °C	± 250 ppm/K
4.25.1	-	Endurance at 70 °C	1000 h; loaded with $P_{70}$ or $U_{max.}$ ; 1.5 h ON; 0.5 h OFF	± (3 % $R$ + 0.1 $\Omega$ )
4.24	78 (Cab)	Damp heat, steady state	56 days; 40 °C; 90 % to 95 % RH loaded with 0.01 $P_{70}$	± (3 % $R$ + 0.1 $\Omega$ )
4.23 4.23.2 4.23.3 4.23.4 4.23.6	2 (Ba) 30 (Db) 1 (Aa) 30 (Db)	Climatic sequence Dry heat Damp heat (accelerated) Cold Damp heat, (accelerated) remaining cycles	155 °C; 16 h dry heat 24 h; 25 °C to 55 °C; 90 % to 100 % RH 1 <sup>st</sup> cycle - 55 °C; 2 h 5 days; 25 °C to 55 °C 90 % to 100 % RH	± (3 % $R$ + 0.1 $\Omega$ )
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 ± (1 % $R$ + 0.1 $\Omega$ )
4.26	-	Active flammability "Cheese-cloth test"	Steps of: 5/10/16/25/40 x $P_{70}$ duration 5 min	No flaming of gauze cylinder
-	-	Passive flammability "Needle-flame test"	Application of test flame for 20 s	No ignition of product no ignition of under-layer burning time less than 30 s
-	-	High voltage pulse test	For R-value ≤ 4.7 k $\Omega$ , 10 kV; 1 nF; 50 x 12/min (in accordance with IEC 60065 14.1.a)	± 20 % $R$
4.16 4.16.2 4.16.3 4.16.4	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 % $R$ + 0.1 $\Omega$ )
4.22	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 % $R$ + 0.1 $\Omega$ )
4.17	20 (Ta)	Solderability (after ageing)	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
4.18	20 (Tb)	Resistance to soldering heat	Thermal shock: 10 s; 260 °C; 3 mm from body	± (1 % $R$ + 0.1 $\Omega$ )
4.29	45 (XA)	Component solvent resistance	Isopropyl alcohol or H <sub>2</sub> O followed by brushing	No visible damage
4.6.1.1	-	Insulation resistance	$U = 500$ V <sub>DC</sub> during 1 min, V-block method	$R_{ins}$ min. 10 <sup>4</sup> M $\Omega$
4.7	-	Voltage proof on insulation	$U_{RMS} = 700$ V during 1 min, V-block method	No flashover or breakdown

## 12NC INFORMATION FOR HISTORICAL CODING REFERENCE ONLY

- The resistors have a 12 digit ordering code starting with 2306
- The next 5 digits indicate the resistor type and packaging. The last 3 digits indicate resistance value in which:
  - The first 2 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	LAST DIGIT
220 $\Omega$ to 910 $\Omega$	1
1 k $\Omega$ to 9.1 k $\Omega$	2
10 k $\Omega$	3

### 12NC Example

SR37, 1.5 k $\Omega$ ,  $\pm$  10 %, reel 5000 pieces is **2306 245 33152**

12NC - Resistor type and packaging				
DESCRIPTION			2306 ... .....	
TYPE	TAPE WIDTH	TOLERANCE	BANDOLIER IN AMMOPACK	BANDOLIER ON REEL
SR37	52.5	$\pm$ 10 %	245 31....	245 33....
		$\pm$ 20 %	245 11...	245 23...

## Disclaimer

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

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