

## 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



**RoHS**  
COMPLIANT

### 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	$\pm 20\%$

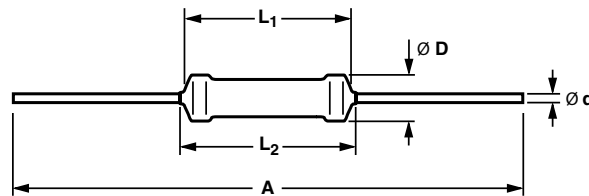
PART NUMBER AND PRODUCT DESCRIPTION (1)						
PART NUMBER: SR0370001501KR500						
S	R	0	3	7	0	0
0	0	0	0	1	5	0
1	K	R	5	0	0	
MODEL/SIZE	VARIANT	TCR/MATERIAL	VALUE	TOLERANCE	PACKAGING (2)	SPECIAL
SR03700	0 = Neutral	0 = Standard	3 digit value 1 digit multiplier MULTIPLIER 3 = *10 <sup>3</sup> 4 = *10 <sup>4</sup> 5 = *10 <sup>5</sup>	K = ± 10 % M = ± 20 %	A1 R5	Up to 2 digits 00 = Standard
PRODUCT DESCRIPTION: SR037 10 % R5 1K5						
SR037	10 %	R5	1K5			
MODEL	TOLERANCE	PACKAGING (2)	RESISTANCE VALUE			
SR03700	± 10 % ± 20 %	A1 R5	1K5 = 1.5 kΩ			

**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)	Ø d (mm)	A (mm)	MASS (g)/ 100 pieces
SR37	9.0	11.0	4.0	0.80 ± 0.03	52.5 ± 1.5	50.5

**MARKING**

The nominal resistance and tolerance are marked on the resistor using three colored bands for ± 20 % tolerance and four bands for ± 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 ± 10 % or ± 20 %. The values of the E12 series are in accordance with IEC 60063.

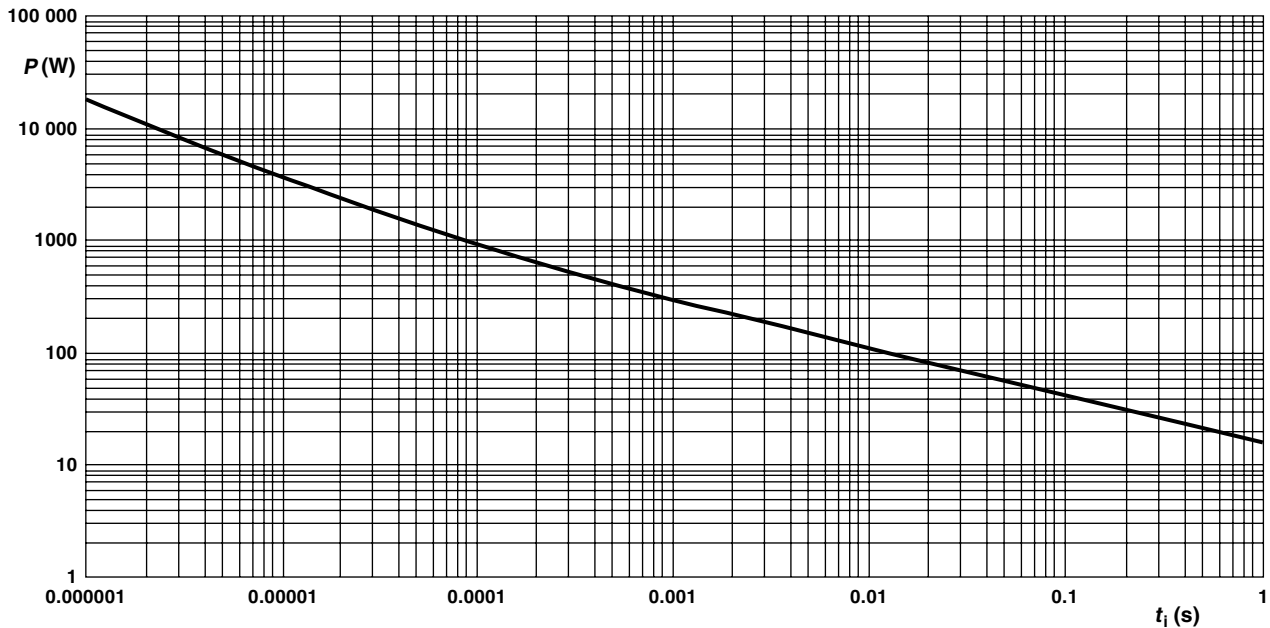
**FUNCTIONAL PERFORMANCE**



**Derating - Standard Operation**

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

**PULSE LOADING CAPABILITY**



Pulse on a regular basis; maximum permissible peak pulse power ( $P_{max}$ ) 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	$\pm 250$ 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	$\pm (3 \% R + 0.1 \Omega)$
4.24	78 (Cab)	Damp heat, steady state	56 days; 40 °C; 90 % to 95 % RH loaded with $0.01 P_{70}$	$\pm (3 \% R + 0.1 \Omega)$
4.23		Climatic sequence		
4.23.2	2 (Ba)	Dry heat	155 °C; 16 h dry heat	
4.23.3	30 (Db)	Damp heat (accelerated)	24 h; 25 °C to 55 °C; 90 % to 100 % RH 1 <sup>st</sup> cycle	$\pm (3 \% R + 0.1 \Omega)$
4.23.4	1 (Aa)	Cold	- 55 °C; 2 h	
4.23.6	30 (Db)	Damp heat, (accelerated) remaining cycles	5 days; 25 °C to 55 °C 90 % to 100 % RH	
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 $\pm (1 \% R + 0.1 \Omega)$
4.26	-	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 $\leq 4.7$ k $\Omega$ , 10 kV; 1 nF; 50 x 12/min (in accordance with IEC 60065 14.1.a)	$\pm 20 \% R$
4.16		Robustness of terminations:		
4.16.2	21 (Ua1)	Tensile all samples	Load 10 N; 10 s	No damage $\pm (1 \% R + 0.1 \Omega)$
4.16.3	21 (Ub)	Bending half number of samples	Load 5 N; 4 x 90°	
4.16.4	21 (Uc)	Torsion other half of samples	3 x 360° in opposite direction	
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)	$\pm (1 \% R + 0.1 \Omega)$
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	$\pm (1 \% R + 0.1 \Omega)$
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	$U = 500 V_{DC}$ during 1 min, V-block method	$R_{ins}$ min. $10^4 M\Omega$
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 Ω to 910 Ω	1
1 kΩ to 9.1 kΩ	2
10 kΩ	3

**12NC Example**

SR37, 1.5 kΩ, ± 10 %, reel 5000 pieces is **2306 245 33152**

12NC - Resistor type and packaging				
DESCRIPTION			2306 ... ..	
			BANDOLIER IN AMMOPACK	BANDOLIER ON REEL
TYPE	TAPE WIDTH	TOLERANCE	1000 UNITS	5000 UNITS
SR37	52.5	± 10 %	245 31....	245 33....
		± 20 %	245 11...	245 23...



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