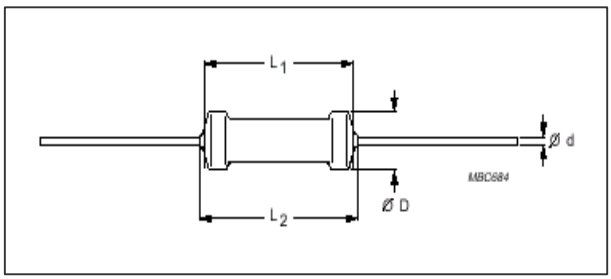
High voltage surge resistors SR25/37/37L/52

FEATURES

- Excellent anti-surge characteristics
- stable characteristics to moisture resistance even in high resistance range.



APPLICATIONS

- CRT-RGB witch is used TV, Monitor
- Devices which need protection surge voltage between power preliminary and secondary.

TYPE	Dimensions (mm)			
	D ±0.8	L 1 ±0.8	L 2 Max.	d (±0.05)
SR25	2.7	6.5	7.5	0.6
SR37	3.7	9.0	12	0.7
SR37L	3.7	11	13	0.7
SR52	6.0	16.5	18.5	0.8

DESCRIPTION

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

QUICK REFERENCE DATA

DESCRIPTION	VALUE			
	SR25	SR37	SR37L	SR52
resistance range	47 kΩ to 33 MΩ	47 kΩ to 500 MΩ		
resistance tolerance	±10%,±5%, ±2%, ±1% (E12, E24, E48 series)			
temperature coefficient	± 350 ppm / ℃			
rated dissipation at T_{amb} = 70 ℃	0.25 W	0.5 W	1 Ws	1W
max. working voltage	1600 V	3600 V	7000 V	10000 V
max. overload voltage	1600 V	3600 V	7000 V	10000 V
basic specifications	IEC 60 115-1B			
safety requirements 1) 125V : 480 kΩ ~ 12 MΩ 2) 250V : 960 kΩ ~ 12 MΩ	-	C-UL ; 1676 VDE: 0860	-	-
climatic category (IEC60)	55 / 155 / 56			
stability, $\Delta R/R_{max}$ after load : 1000 hours	± 1.5% +0.1 Ω			
soldering heat	± 0.5% +0.05 Ω			

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ORDERING INFORMATION

Ordering code indicating resistor types and packing

Table 1

Type	Bandolier width	Packing	Quantity	Resistance range	Tol. ± %	Ordering code
SR25 (0.25W)	52mm	ammo	5000	51 kΩ to 33 MΩ	1 2 5	PPSR 241 3xxxx PPSR 241 63xxx PPSR 241 53xxx

*** PPSR 241 45xxx : yellow color is used to code resistance tolerance ± 5%**

Table 2

Type	Bandolier width	Packing	Quantity	Resistance range	Tol. ± %	Ordering code
SR37 (0.5W)	52mm	ammo	1000	47 kΩ to 500 MΩ	1 2 5 10	PPSR 242 4xxxx PPSR 242 39xxx PPSR 242 13xxx PPSR 242 63xxx

*** PPSR 242 55xxx : yellow color is used to code resistance tolerance ± 5%**

Table 3

Type	Bandolier width	Packing	Quantity	Resistance range	Tol. ± %	Ordering code
SR37L (1Ws)	64mm	ammo	1500	47 kΩ to 500 MΩ	1 2 5 10	PPSR 244 4xxxx PPSR 244 35xxx PPSR 244 36xxx PPSR 244 37xxx
	52mm	ammo	1000	47 kΩ to 500 MΩ	5	PPSR 244 53xxx

Table 4

Type	Bandolier width	Packing	Quantity	Resistance range	Tol. ± %	Ordering code
SR52 (1W)	64mm	ammo	500	47 kΩ to 500 MΩ	1 2 5 10	PPSR 250 5xxxx PPSR 250 15xxx PPSR 250 23xxx PPSR 250 12xxx

Table 5. Last digit of 12NC

Resistance decade	Last digit
10 to 97.6 kΩ	3
100 to 976 kΩ	4
1 to 9.76 MΩ	5
10 to 97.6 MΩ	6
100 to 976 MΩ	7

Ordering Example

The ordering code of a SR37- 0.5W resistor, value 8.2 MΩ ±5%, taped on a bandolier of 1000 units in ammopack is: PPSR 242 13825.

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Limiting values

Table 6

TYPE	LIMITING VOLTAGE(1) (V)	LIMITING POWER (W)
SR25	1600	0.25
SR37	3600	0.5
SR37L	7000	1 (small)
SR52	10000	1

Note

1. the maximum voltage that may be continuously applied to the resistor element, see "IEC publication 60 115-1"

The maximum permissible hot – spot temperature is 155 ℃.

DERATING

The power that the resistor can dissipate depends on the operating temperature : Fig. 1

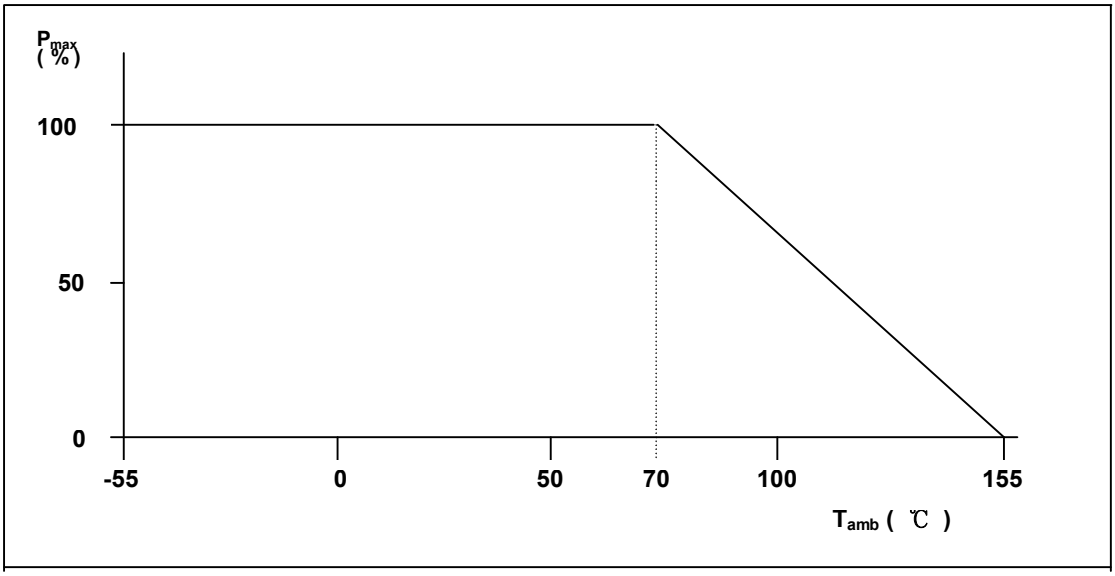

Fig. 1 Maximum dissipation (P_{max}) in percentage of rated power as a function of the ambient Temperature (T_{amb})

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Surge resistance characteristics

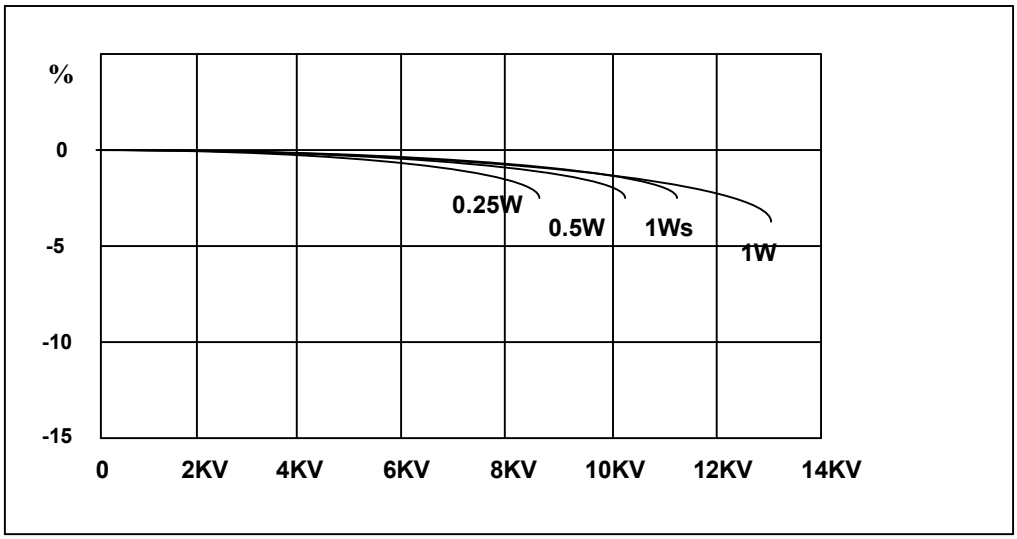

Fig. 2 Maximum allowed peak surge voltage in accordance with "IEC 60065 chapter 14.1" 10 discharges form a 10nF capacitor charged to V_{max} ; 12 discharges / minute

Application information

SR25 - 0.25W

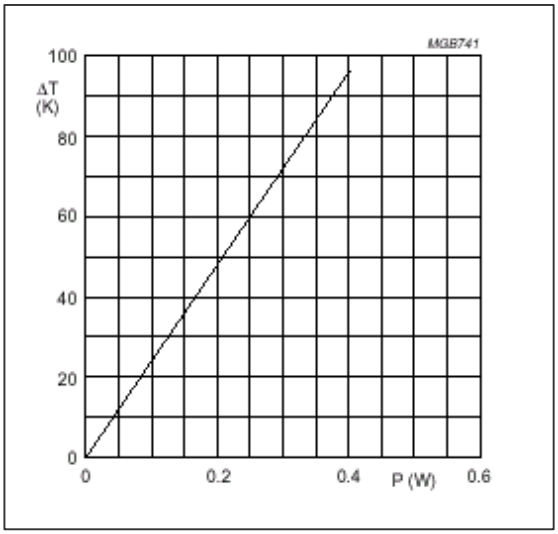

Fig. 3 Hot – spot temperature rise (Δ T) as a function of dissipated power

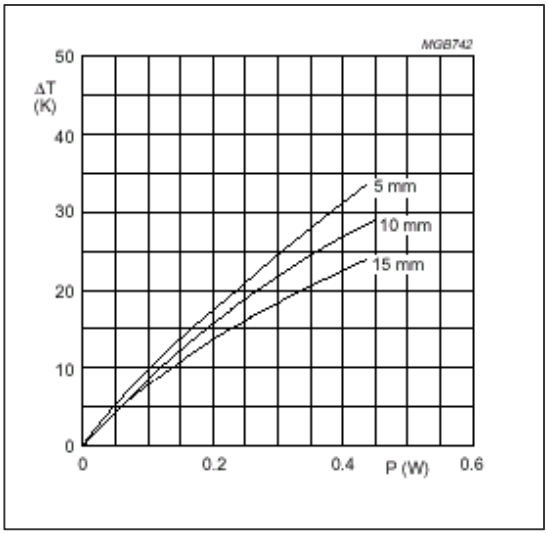

Fig.4 Temperature rise (Δ T) at the lead end of the lead (soldering point) as a f function of dissipated Power at various lead lengths after mounting

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SR37 – 0.5W

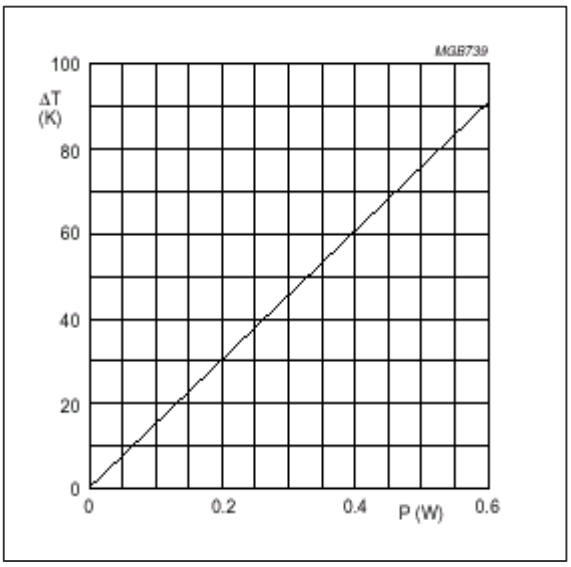

Fig. 5 Hot – spot temperature rise (Δ T) as a function of dissipated power

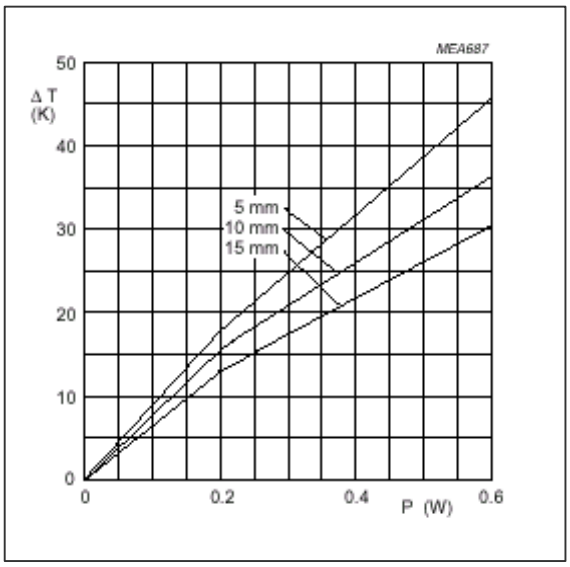

Fig.6 Temperature rise (Δ T) at the lead end of the lead soldering point as a function of dissipated power at various lead lengths after mounting

SR37L – 1Ws

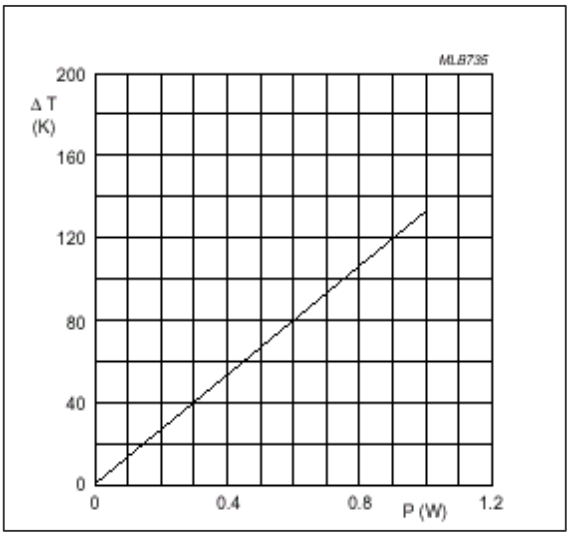

Fig. 7 Hot – spot temperature rise (Δ T) as a function of dissipated power

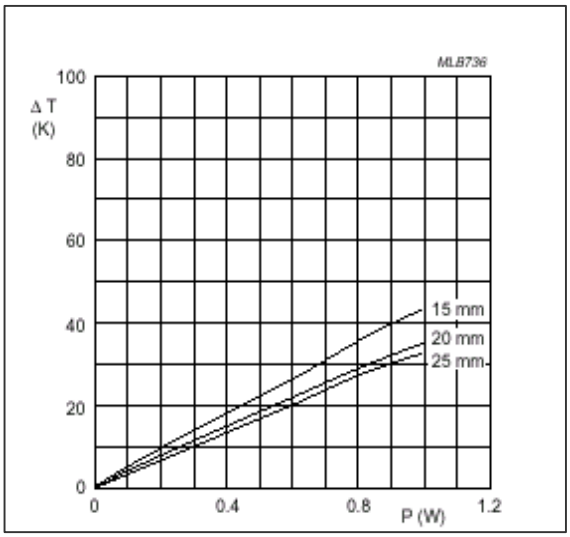

Fig.8 Temperature rise (Δ T) at the lead end of the lead soldering point as a function of dissipated power at various lead lengths after mounting

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SR52 – 1W

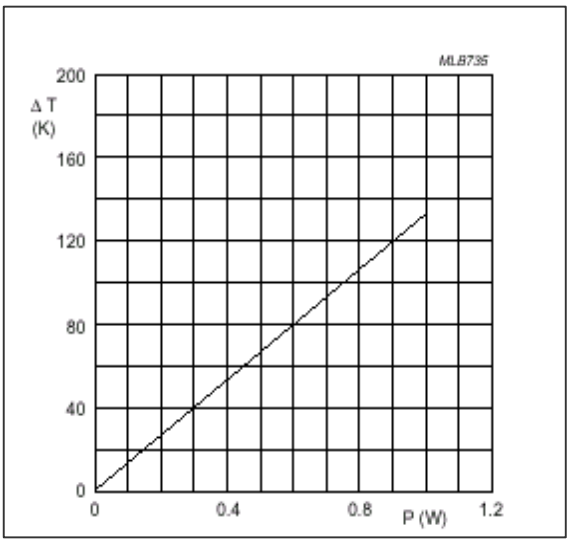

Fig. 9 Hot – spot temperature rise (Δ T) as a function of dissipated power

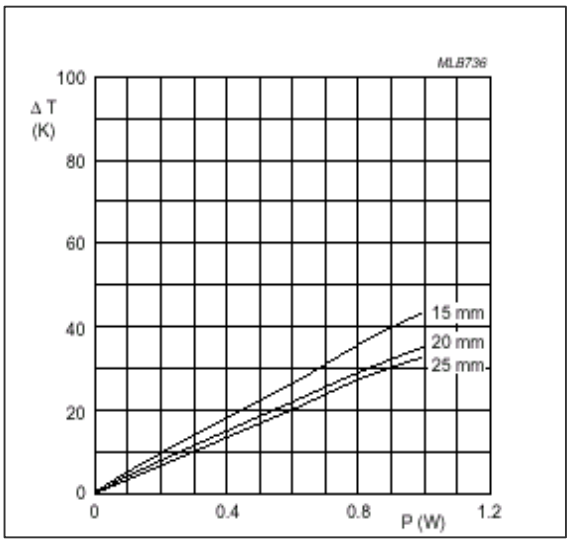

Fig.10 Temperature rise (Δ T) at the lead end of the lead soldering point as a function of dissipated power at various lead lengths after mounting

MECHANICAL DATA

Table 7. Mass per 100 units

TYPE	MASS (g)
SR25 - 0.25W	25
SR37 - 0.5W	42
SR37L - 1Ws	67
SR52 - 1W	148

MARKING

The nominal resistance and tolerance are marked on the resistor using four or five colored Bands in accordance with IEC publication 60 062 “color codes for fixed resistors”

Table 8. BODY COLORS

TYPE	COLORS
SR25 – 0.25W	Brown
SR37 – 0.5W	Brown
SR37L – 1Ws	Brown
SR52 – 1W	Blue

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TEST AND REQUIREMENTS

Table 9. Test procedures and requirements

TEST	PROCEDURE	REQUIREMENTS			
		SR25	SR37	SR37L	SR52
robustness of terminations: tensile all samples	ϕ 0.6 / 0.7 / 0.8 mm : load 10N:10s	number of failures < 10^{-6}			
bending half number of samples	ϕ 0.6 / 0.7 / 0.8 mm : load 5N: 4x90°	number of failures < 10^{-6}			
torsion other half number samples	3x360°in opposite directions	no damage ±0.25% + 0.05 Ω			
solderability	2 s ; 235℃ flux 600	good tinning; no damage			
soldering heat	Thermal shock: 3 s; 360℃ 6mm from body	± 0.5% +0.05Ω			
rapid change of temperature	30 minutes at –55℃ and 30 minutes at +155℃;5cycles	± 0.5% +0.05Ω			
vibration	frequency 10 to 500 Hz; displacement 1.5mm or acceleration 10g; 3 directions total 6 hours(3x2 hours)	no damage ± 1% +0.05Ω			
Climatic sequence dry heat damp heat (accelerated) 1st cycle cold low air pressure damp heat (accelerated) remaining cycles	16 hours;155℃ 24hours;55℃; 90 to 100% RH 2 hours; - 55℃ 2 hours;8.5 Kpa; 15 to 35℃ 5 days;55℃;95 to 100% RH	$R_{ins\ min.}$; 1000 MΩ ± 2% + 0.1Ω			
damp heat	56 days; 40 ℃; 90 to 95% RH dissipation 0.01 P_n	± 1.5% + 0.1Ω			
endurance	1000 hours at 70 ℃; P_n or V_{max}	± 1.5% + 0.1Ω			
temperature coefficient	between –55 ℃and +155 ℃	± 350 ppm / ℃			
dielectric withstanding voltage	$500V_{RMS}$ SR25 $700V_{RMS}$ SR37,SR37L and SR52 during 1min. V- block method	no breakdown			
insulation resistance	$500V_{DC}$ during 1 minute ; V – block method	min. : 1000 MΩ			
short time overload	rated voltage x 2.5 5 s on 45 s off ($V \leq V_{max}$) 10 cycles	± 1% + 0.05Ω			

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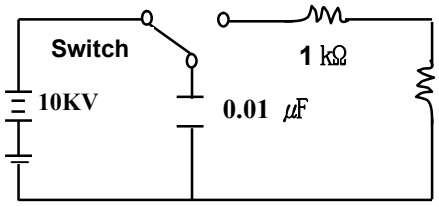
TEST AND REQUIREMENTS

TEST	PROCEDURE	REQUIREMENTS			
		SR25	SR37	SR37L	SR52
overload test	1) 480 kΩ ≤ R <1 MΩ;1500V_{RMS} during 1 sec. 2) R ≥ 1 MΩ; 3600V_{RMS} during 5 sec.	no evidence of flash over, mechanical damage, arcing or, insulation breakdown ± 10% + 0.1Ω			
high voltage surge test	 Circuits				
10 discharges from a 10 nF capacitor charged to V_{max} ;12 discharges / minute					
SR25	SR37	SR37L	SR52		
51 kΩ-91 kΩ : 3 KV	51 kΩ-470 kΩ : 7 KV	51 kΩ-470 kΩ : 7 KV	51 kΩ-1G : 10 KV		
100 kΩ-470 kΩ : 5 KV	480 kΩ-1G : 10KV	480 kΩ- 1 G : 10 KV			
510 kΩ-33 MΩ : 7 KV					

* SR25; 1nF capacitor