


RESISTOR KITS

Resistor Types Contained in Kits:

Series	Type Description	Watts	Tolerance	Body	Lead Length	Lead Diameter	Kits Used In
CFN	Flame Proof Carbon Film	1/2W	+/- 5%	Normal(*)	25 +/	0.5 +/-	4
MF	Precision Metal Film	1/2W	+/- 1%	Normal(*)	25 +/	0.5 +/-	5,6
CF	Carbon Film	1W	+/- 5%	Normal(*)	25 +/	0.6 +/-	9A,9B
RSN	Flame Proof Metal Oxide	1W	+/- 5%	Normal(*)	25 +/	0.6 +/-	7,8A,8B
CFN	Flame Proof Carbon Film	1W	+/- 5%	Normal(*)	25 +/	0.6 +/-	7,8A,8B
RSN	Flame Proof Metal Oxide	2W	+/- 5%	Normal(*)	27 +/	0.65 +/	11,11B,12A,12B
CFN	Flame Proof Carbon Film	2W	+/- 5%	Normal(*)	27 +/	0.65 +/	11,11B,12A,12B
SQP	Wire-Wound (cement)	5W	+/- 5%	Standard	18	0.7 +/-	13
RS+SQP	Metal Oxide Film (cement)	5W	+/- 5%	Standard	18	0.7 +/-	13
SQP	Wire-Wound (cement)	10W	+/- 5%	Standard	20	0.75 +/	14
RS+SQP	Metal Oxide Film (cement)	10W	+/- 5%	Standard	20	0.75 +/	14

Lead sizes in mm.

(*) All resistors in these kits are the higher voltage "Normal Size" type. Major resistor manufacturers make resistors in both Small size and Normal size. The larger bodied Normal size can handle higher voltages (appropriate for circuits that have higher voltage requirements such as tube based electronics). Normal size can replace Small size but not vice versa.

Resistor Kits Available

Kit # 4: **750 Flame Proof Carbon Film 1/2 Watt Resistors**

(25 each of the 30 most often needed sizes)

(each ohm size in it's own poly bag)

The 30 Sizes in this Kit (ohms):

100, 150, 220, 270, 330, 470, 680, 1.0K, 1.5K, 2.2K, 2.7K, 3.3K, 4.7K, 6.8K, 10K, 15K
22K, 27K, 33K, 47K, 68K, 100K, 150K, 220K, 270K, 330K,470K, 680K, 1.0M, 2.2M (akaDK1)

Kit # 5: **610 1% Precision Metal Film 1/2W Resistors**

(10 each of 61 popular sizes - 10 ohm thru 1 Meg ohm)

(packaged 3 sizes per poly bag)

The 61 Sizes in this Kit (ohms):

10, 12, 15, 18, 22, 27, 33, 39, 47, 56, 68, 82, 100, 120, 150, 180, 220, 270, 330, 390,
470, 560, 680, 820, 1.0K, 1.2K, 1.5K, 1.8K, 2.2K, 2.7K, 3.3K, 3.9K, 4.7K, 5.6K, 6.8K,
8.2K, 10K, 12K, 15K, 18K, 22K, 27K, 33K, 39K, 47K, 56K, 68K, 82K, 100K, 120K
150K, 180K, 220K, 270K, 330K, 390K, 470K, 560K, 680K, 820K, 1.0M (akaDK2)

Kit # 6: **600 1% Precision Metal Film 1/2W Resistors**

(20 each of the 30 most often needed "post WWII" sizes
(each ohm size in it's own poly bag)

The 30 Sizes in this Kit (ohms):

100, 150, 220, 270, 330, 470, 680, 1.0K, 1.5K, 2.2K, 2.7K, 3.3K, 4.7K, 6.8K, 8.2K, 10K,
15K, 22K, 27K, 33K, 47K, 68K, 100K, 150K, 220K, 270K, 330K,470K, 680K, 1.0M (akaDK3)

Kit #9A: **625 Carbon Film 1 Watt Resistors**

(25 each of the 25 most often needed "Pre WWII" sizes)
(each ohm size in it's own poly bag)

The 25 Sizes in this Kit (ohms):

100, 150, 200, 250, 500, 1.0K, 1.5K, 2.0K, 2.5K, 5.0K, 10K, 15K, 20K,
25K, 30K, 40K, 50K, 75K, 100K, 150K, 200K, 250K, 500K, 1.0M, 2.0M (akaDK4)

Kit #9B: **600 Carbon Film 1 Watt Resistors**

(20 each of the 30 most often needed "Post WWII" sizes)
(each ohm size in it's own poly bag)

The 30 Sizes in this Kit (ohms):

100, 150, 220, 270, 330, 470, 680, 1.0K, 1.5K, 2.2K, 2.7K, 3.3K, 4.7K, 6.8K, 10K, 15K
22K, 27K, 33K, 47K, 68K, 100K, 150K, 220K, 270K, 330K, 470K, 680K, 1.0M, 2.2M (akaDK5)

Kit # 7: **595 Flame Proof Metal Oxide/CFN 1 Watt Resistors**

(7 each of all 85 sizes - 1 ohm thru 20 Meg ohm)
(packaged 6 sizes per poly bag)

The 85 Sizes in this Kit (ohms):

1, 1.5, 2.2, 3.3, 4.7, 6.8, 10, 15, 22, 33, 47, 75, 100, 120, 150, 180, 200, 220,
250, 270, 330, 390, 470, 500, 560, 680, 750, 820, 1.0K, 1.2K, 1.5K, 1.8K, 2.0K,
2.2K, 2.5K, 2.7K, 3.3K, 3.9K, 4.7K, 5.0K, 5.6K, 6.8K, 8.2K, 10K, 12K, 15K, 18K, 20K, 22K
25K, 27K, 30K, 33K, 40K, 47K, 50K, 56K, 68K, 75K, 82K, 100K, 120K, 150K, 180K, 200K
220K, 250K, 270K, 330K, 390K, 470K, 500K, 680K, 820K, 1.0M, 1.5M, 2.0M, 2.2M, 2.4M,
3.3M, 4.7M, 5.1M, 6.8M, 10M, 20M (680K and over are CFN) (akaDK6)

Kit #8A: **600 Flame Proof Metal Oxide/CFN 1 Watt Resistors**

(20 each of the 30 most often needed "Post WWII" sizes)
(each ohm size in it's own poly bag)

The 30 Sizes in this Kit (ohms):

100, 150, 220, 270, 330, 470, 680, 1.0K, 1.5K, 2.2K, 2.7K, 3.3K, 4.7K, 6.8K, 10K,
15K, 22K, 27K, 33K, 47K, 68K, 100K, 150K, 220K, 270K, 330K, 470K, 680K, 1.0M,
2.2M (680K and over are CFN) (akaDK7)

Kit #8B: **625 Flame Proof Metal Oxide/CFN 1 Watt Resistors**

(25 each of the 25 most often needed "Pre WWII" sizes)
(each ohm size in it's own poly bag)

The 25 Sizes in this Kit (ohms):

100, 150, 200, 250, 500, 1.0K, 1.5K, 2.0K, 2.5K, 5.0K, 10K, 15K, 20K, 25K, 30K,
40K, 50K, 75K, 100K, 150K, 200K, 250K, 500K, 1.0M, 2.0M (1M and 2M are CFN) (akaDK8)

Kit #11: **400 Flame Proof Metal Oxide/CFN 2 Watt Resistors**

(5 each of 80 "Post WWII" sizes - 1 ohm thru 10M ohm)

(packaged 6 sizes per poly bag)

The 80 Sizes in this Kit (ohms):

1, 1.2, 1.5, 1.8, 2.2, 2.7, 3.3, 3.9, 4.7, 5.6, 6.8, 8.2, 10, 12, 15, 18, 22, 27, 33, ,39, 47, 56,
68, 82, 100, 120, 150, 180, 220, 270, 330, 390, 470, 560, 680, 820, 1.0K, 1.2K, 1.5K,
1.8K, 2.2K, 2.7K, 3.3K, 3.9K, 4.7K, 5.6K, 6.8K, 8.2K, 10K, 12K, 15K, 18K, 22K
27K, 33K, 39K, 47K, 56K, 68K, 82K, 100K, 120K, 150K, 180K, 220K, 270K, 330K,
390K, 470K, 560K, 680K, 820K, 1.0M, 1.5M, 2.2M, 3.3M, 4.7M, 6.8M,
8.2M, 10M (330K and over are CFN) (akaDK9)

Kit #11B: **490 Flame Proof Metal Oxide/CFN 2 Watt Resistors**

(5 each of 98 "Pre & Post WWII" sizes - 1 ohm thru 10M ohm)

(packaged 6 sizes per poly bag)

The 98 Sizes in this Kit (ohms):

1, 1.2, 1.5, 1.8, 2.2, 2.7, 3.3, 3.9, 4.7, 5.6, 6.8, 8.2, 10, 12, 15, 18, 22, 27, 33, ,39, 47, 56, 68,
82, 100, 120, 150, 180, 200, 220, 250, 270, 330, 390, 400, 470, 500, 560, 680, 820, 1.0K,
1.2K, 1.5K, 1.8K, 2.0K, 2.2K, 2.5K, 2.7K, 3.0K, 3.3K, 3.9K, 4.0K, 4.7K, 5.0K, 5.6K, 6.8K, 8.2K, 10K, 12K, 15K, 18K, 20K,
22K, 25K, 27K, 30K, 33K, 39K, 40K, 47K, 50K, 56K, 68K, 82K, 100K, 120K, 150K, 180K, 200K, 220K, 250K, 270K, 330K,
390K, 470K, 500K,560K, 680K, 820K, 1.0M, 2.0M 1.5M, 2.2M, 3.3M, 4.7M, 6.8M,
8.2M, 10M (330K and over are CFN) (akaDK10)

Kit #12A: **405 Flame Proof Metal Oxide/CFN 2 Watt Resistors**

(15 each of the 27 most often needed "Post WWII" sizes)

(each ohm size in it's own poly bag)

The 27 Sizes in this Kit (ohms):

100, 150, 220, 330, 470, 680, 1.0K, 1.5K, 2.2K, 3.3K, 4.7K, 6.8K, 10K, 15K, 22K, 33K, 47K, 68K
100K, 150K, 220K, 330K, 470K, 680K, 1.0M, 1.5M, 2.2M (330K and over are CFN) (akaDK11)

Kit #12B: **405 Flame Proof Metal Oxide/CFN 2 Watt Resistors**

(15 each of the 27 most often needed "Pre WWII" sizes)

(each ohm size in it's own poly bag)

The 27 Sizes in this Kit (ohms):

100, 150, 200, 250, 400, 500, 1.0K, 1.5K, 2.0K, 2.5K, 3.0K, 5.0K, 10K, 15K, 20K, 25K, 30K, 40K
50K, 75K, 100K, 150K, 200K, 250K, 500K, 1.0M, 2.0M (500K, 1M and 2M are CFN) (akaDK12)

Kit # 13: **120 5 Watt Power Resistors (Cement Type)**

(3 each of 40 sizes 5 ohm thru 25K ohm)

(packaged 6 sizes per poly bag)

The 40 Sizes in this Kit (ohms):

5, 7.5, 10, 15, 20, 25, 35, 40, 50, 75, 100, 120, 150, 200, 250, 300, 350, 400, 470, 500,
680, 750, 820, 1.0K, 1.25K, 1.5K, 2.0K, 2.5K, 3.0K, 3.5K, 4.0K, 4.7K, 5.0K, 6.8K, 7.5K,
8.2K, 10K, 15K, 10K, 25K

Note: 5 ohm thru 150 ohm are wire-wound. 200 ohm thru 25K ohm are Metal Oxide. (akaDK13)

Kit # 14: **96 10 Watt Power Resistors (Cement Type)**
(2 each of 48 sizes 0.5 ohm thru 50K ohm)
(packaged 6 sizes per poly bag)

The 48 Sizes in this Kit (ohms):

0.5, 1, 2, 3, 4, 5, 6.8, 7.5, 8.2, 10, 15, 25, 30, 47, 50, 68, 82, 100, 120, 150, 200, 250, 300, 350, 400, 500, 680, 750, 820, 1.0K, 1.2K, 1.5K, 2.0K, 2.5K, 2.7K, 3.9K, 4.8K, 4.7K, 5.0K, 7.5K, 10K, 20K, 25K, 30K, 35K, 40K, 45K, 50K

Note: 0.5 ohm thru 400 ohm are wire-wound. 500 ohm thru 50K ohm are Metal Oxide. (akaDK14)

About Thunder Components Ltd.

Thunder has been a professional resistor manufacturer for over 50 years having been established in 1971. Thunder specializes in the manufacturer of a wide range of leaded resistors, including special/customized resistors. In 1998 Thunder commenced chip resistor production. In addition to normal thick film and thin film resistors, Thunder focuses on innovating special specific resistors with ultra-low resistance values, high resistance values and super precision resistors.Current and past customers include Vishay, Sharp, Panasonic, RCD, Vitrohm and more (see bottom of data sheet).

Professional Resistor Manufacturer

Thunder specializes in producing a wide range of lead resistors: carbon film resistors, metal film resistors, metal oxide film resistors, fusible metal film resistors, wirewound resistors (non-inductive), thick film resistor networks (SIP), as well as many other special products.

THUNDER

CARBON FILM RESISTORS
Tinned Copper Wire

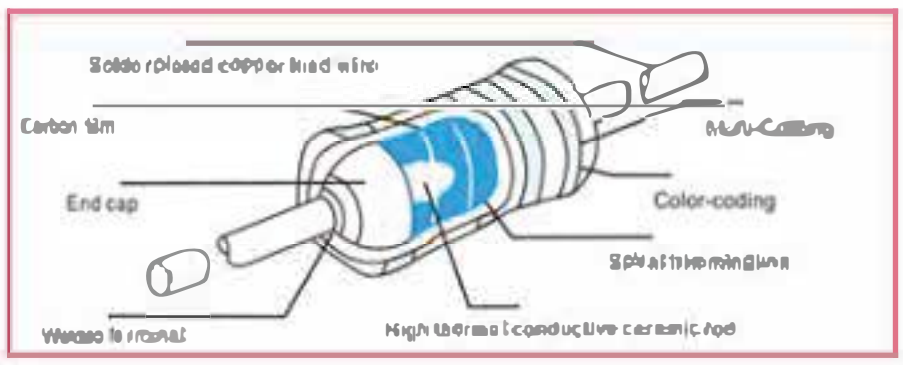
CF/CFN

INTRODUCTION

(CFN is flame proof version of CF)

CF: Carbon film resistor, is with the features of high reliability, stability, and lower price, and applied for various electronic equipments.

CONSTRUCTION



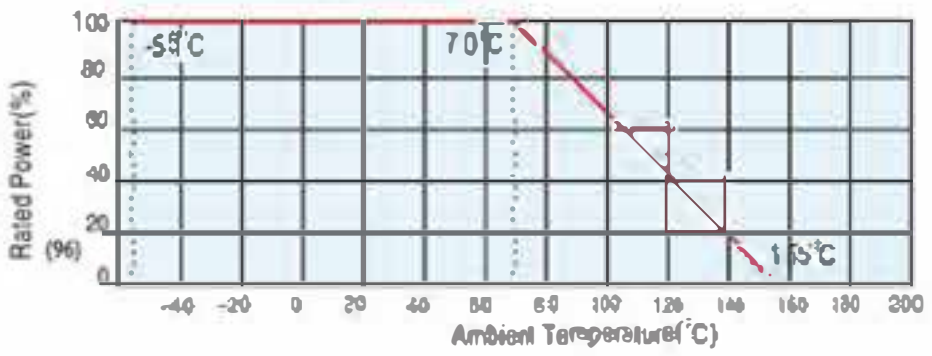
FEATURES

- High reliability
- High stability
- Lower price

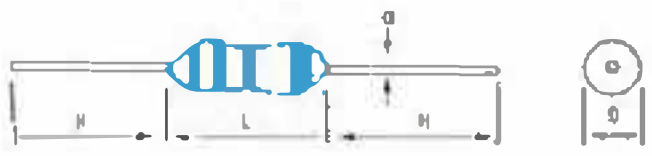
CHARACTERISTICS

Test Items	Specified Value
Short time overload	±(1%+0.05Ω)
Dielectric withstanding voltage	No evidence of damage
Insulation resistance	Over 10 MΩ
Terminal strength	No evidence of damage
Moisture load life	R < 100KΩ ±3% R ≥ 100K Ω ±5%
Load life at 70°C	R < 100KΩ ±(2%+0.05Ω) R ≥ 100 KΩ ±3%
Temperature cycling	±(1%+0.05Ω)
Resistance to soldering heat	±(0.5%+0.05Ω)
Solderability	Over 95%
Resistance to solvent	No evidence of damage

DERATING CURVE



STYLE



Temp. coefficient of resistance

TCR / Type	±450PPM/°C	-700PPM/°C	-1000PPM/°C	-1300PPM/°C
1/8W, 1/4WS	< 47KΩ	51K ~ 100KΩ	110K ~ 330KΩ	> 360KΩ
Over 1/4W,1/2WS	< 100KΩ	110K ~ 1MΩ	1.1M ~ 22MΩ	> 2.4MΩ

DIMENSIONS

	TYPE	Dimensions (mm) L	D	d	H	Power Rating	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Resistance Range
Normal size	CF 1/8W	3.5±0.2	1.8±0.2	0.40±0.02	25±3	0.16W	150V	300V	300V	1Ω~10M
	CF 1/4W	6.5±0.5	2.3±0.3	0.40±0.02	25±3	0.25W	250V	500V	500V	0.1Ω~10M
	CF 1/2W	9.0±1.0	3.2±0.5	0.50±0.02	25±3	0.5W	350V	700V	500V	0.1Ω~10M
	CF 1W	12.0±1.0	4.5±0.5	0.65±0.02	25±3	1W	500V	1000V	1000V	0.1Ω~10M
	CF 2W	15.5±1.0	5.0±1.0	0.72±0.02	23±3	2W	500V	1000V	1000V	0.1Ω~10M
	CF 3W	17.5±1.0	6.0±1.0	0.72±0.02	27±3	3W	600V	1100V	1000V	0.1Ω~10M
	CF 5W	24.5±1.0	8.5±1.0	0.75±0.02	27±3	5W	700V	1200V	1000V	0.1Ω~10M
Small size	CF 1/4WS	3.5±0.2	1.8±0.2	0.40±0.02	25±3	0.25W	200V	400V	400V	0.1Ω~10M
	CF 1/2WS	6.5±0.5	2.3±0.3	0.40±0.02	25±3	0.5W	300V	600V	500V	0.1Ω~10M
	CF 1WS	9.0±1.0	3.2±0.5	0.50±0.02	25±3	1W	400V	800V	700V	0.1Ω~10M
	CF 2WS	12.0±1.0	4.5±0.5	0.65±0.02	25±3	2W	500V	1000V	1000V	0.1Ω~10M
	CF 3WS	15.5±1.0	5.0±0.5	0.75±0.02	23±3	3W	500V	1000V	1000V	0.1Ω~10M
	CF 5WS	17.0±1.0	6.0±1.0	0.72±0.02	27±3	5W	700V	1100V	1100V	0.1Ω~10M

NOTE: Specification can be constructed on request. Tinned Copper Leads. Dimensions subject to change without notice

HOW TO ORDER

CF — Type

1/4W — Power Rating

Normal Size	Small Size
1/8W	1/4WS
1/4W	1/2WS
1/2W	1WS
1W	2WS
2W	3WS
3W	5WS
5W	

T52 — Form/ Packaging

B	Bulk (Straight)
M	Bulk, M-Form series (Horizontal Forming)
U	Bulk, U-Form series (Vertical Forming)
Txx	Boxed (26,52,63,73,83mm width taping)

J — Resistance Tolerance

J	±5%
K	±10%
G	±2%

10K — Nominal Resistance

3-Digit E-24, 12 Series

e.g. 0R12 = 0.12Ω
1R20 = 1.2Ω
1K2 = 1.2KΩ
12K = 12KΩ
12M = 12MΩ

DIP Resistors

THUNDER®

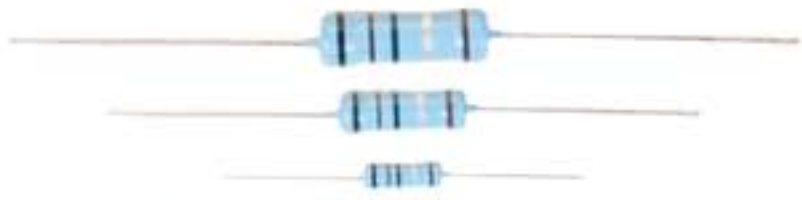
PRECISION METAL FILM RESISTORS MF

INTRODUCTION

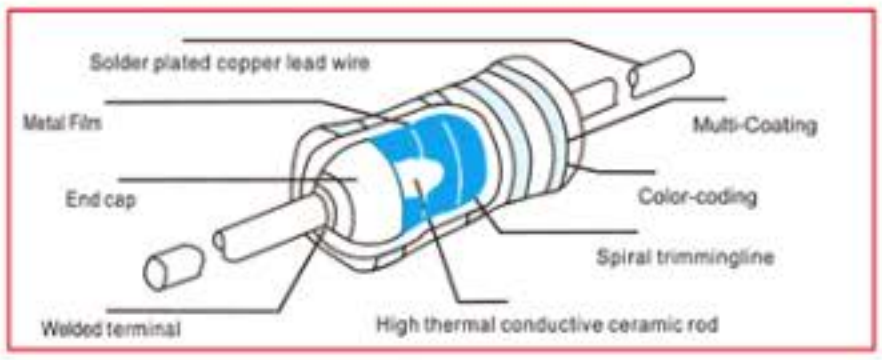
MF, Metal film resistor,is a precise and functional resistor.it is suitable for applications on precise electronic circuits.

FEATURES

- High stability
- Low noise.Low temp.coefficient
- Precision characteris tics



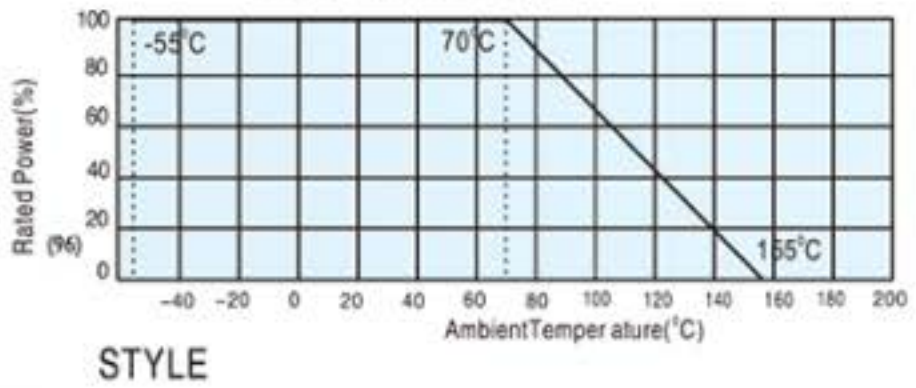
CONSTRUCTION



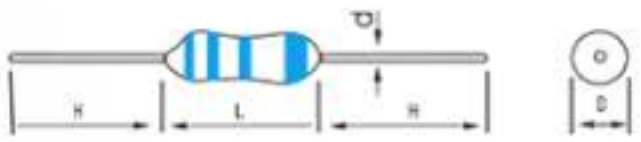
CHARACTERISTICS

Test Items	Specified Value
Temp.coefficient of resistance	±50, ±100PPM/°C
Short time overload	±(0.5%+0.05Ω)
Dielectric withstanding voltage	No evidence of damage
Insulation resistance	Over 10⁴MΩ
Terminal strength	No evidence of damage
Moisture load life	±(1.5%+0.05Ω)
Load life at 70°C	±(2%+0.05Ω)
Temperature cycling	±(1%+0.05Ω)
Resistance to soldering heat	±(0.5%+0.05Ω)
Resistance to soldering heat	Over 95%
Resistance to solvent	No evidence of damage

DERATING CURVE



STYLE



DIMENSIONS

TYPE		Dimensions (mm) L	D	d	H	Power Rating	Max Working Voltage	Max Overload Voltage	Dielectric Withstanding Voltage	Resistance Range
Normal size	MF1/6W	3.5±0.2	1.8±0.2	0.40±0.02	25±3	0.16W	200V	400V	300V	0.1Ω~22M
	MF1/4W	6.5±0.5	2.3±0.3	0.43±0.02	25±3	0.25W	250V	500V	500V	0.1Ω~22M
	MF1/2W	9.0±1.0	3.2±0.5	0.50±0.02	25±3	0.5W	350V	700V	500V	0.1Ω~22M
	MF1W	12.0±1.0	4.5±0.5	0.65±0.02	25±3	1W	400V	800V	500V	0.1Ω~22M
	MF2W	15.5±1.0	5.0±1.0	0.72±0.02	23±3	2W	500V	1000V	500V	0.1Ω~22M
	MF3W	17.5±1.0	6.0±1.0	0.72±0.02	27±3	3W	750V	1200V	600V	0.1Ω~22M
	MF5W	24.5±1.0	8.5±1.0	0.75±0.02	27±3	5W	900V	1400V	750V	0.1Ω~22M
Small size	MF1/4WS	3.5±0.2	1.8±0.2	0.40±0.02	25±3	0.25W	200V	400V	300V	0.1Ω~22M
	MF1/2WS	6.5±0.5	2.3±0.3	0.43±0.02	25±3	0.5W	250V	500V	500V	0.1Ω~22M
	MF1WS	9.0±1.0	3.2±0.5	0.50±0.02	25±3	1W	350V	700V	500V	0.1Ω~22M
	MF2WS	12.0±1.0	4.5±0.5	0.65±0.02	25±3	2W	400V	800V	700V	0.1Ω~22M
	MF3WS	15.5±1.0	5.0±1.0	0.72±0.02	23±3	3W	500V	1000V	700V	0.1Ω~22M
	MF5WS	17.0±1.0	6.0±1.0	0.72±0.02	27±3	5W	750V	1200V	700V	0.1Ω~22M
Super Mini-Size	MF1/2W(SS)	3.5±0.2	1.8±0.2	0.40±0.02	25±3	0.5W	250V	500V	500V	0.1Ω~1M
	MF1W(SS)	6.5±0.5	2.3±0.32	0.43±0.02	25±3	1W	350V	700V	500V	0.1Ω~1M
	MF2W(SS)	9.0±1.0	3.2±0.5	0.50±0.02	25±3	2W	400V	800V	500V	0.1Ω~1M
	MF3W(SS)	12.0±1.0	4.5±0.5	0.65±0.02	25±3	3W	500V	1000V	500V	0.1Ω~1M
	MF5W(SS)	15.5±1.0	5.0±1.0	0.72±0.02	27±3	5W	750V	1200V	600V	0.1Ω~1M
	MF0.6W	6.5±0.5	2.3±0.3	0.43±0.02	25±3	0.6W	250V	500V	500V	0.1Ω~22M

NOTE:Specification can be constructed on request. Tinned Copper Leads. Dimensions subject to change without notice.

PRECISION METAL FILM RESISTORS **MF**

TOL：±0.02%、±0.05%、±0.1%、±0.25%、±0.5%、±1%、±5%

TC：±5PPM、±10MMM、±15PPM、±25PPM、±50PPM

TYPE		MF1/8	MF1/4	MF 1/2	MF1W	MF2W		
MIL-R-10509F		RN50	RN55	RN60	RN65071	RN70	MIL-R-10509F	
DIN-44061		0204	0207	0411	0617	0719	DIN-44061	
POWER	70°C	0.125	0.250	0.500	0.75	1.00	70°C	(W)
RATING	100°C	0.067	0.110	0.173	0.350	0.610	100°C	
(W)	125°C	0.050	0.100	0.125	0.250	0.500	1250C	
MAX.WORKING VOLTAGE(V)		200	250	300	350	400		(V)

STANDARD RESISTANCE RANGE (Ω)

TYPE		MF1/8	MF1/4	MF1/2	MF1W	MF2W	
P(±0.02%)	from		5	5	10	10	(±0.02%)-P
	to		1M21	1M21	2M	2M	
W(±0.05%)	from	100	5	5	10	10	(±0.05%)-W
	to	100k	1M21	1M5	2M	2M	
B(±0.1%)	from	10	1	1	1	1	(±0.10%)-B
	to	500k	1M5	2M5	5M	10M	
C(±0.25%)	from	10	1	1	1	1	(±0.25%)-C
	to	600k	2M5	5M	10M	10M	
D(±0.50%)	from	10	1	1	1	1	(±0.50%)-D
	to	800k	5M	10M	10M	10M	
F(±1.00%)	from	10	1	1	1	1	(±1.00%)-F
	to	1M	10M	10M	10M	10M	
C7(±5ppm/°C)	from	10	10	10	10	10	(±5ppm/°C)-C7
	to	1M	1M	1M	1M	1M	
C6(±10ppm/°C)	from	100	10	10	10	10	(±10ppm/°C)-C6
	to	100k	1M5	1M5	1M5	1M5	
C5(±15ppm/°C)	from	100	5	5	5	5	(±15ppm/°C)-C5
	to	200k	1M5	1M5	1M5	1M5	
C3(±25ppm/°C)	from	10	5	5	5	5	(±25ppm/°C)-C3
	to	600k	2M5	2M5	2M5	2M5	
C2(±50ppm/°C)	from	10	5	5	5	5	(±50ppm/°C)-C2
	to	1M	10M	10M	10M	10M	

HOW TO ORDER

MF — Type

1/4W — Power Rating

Normal Size	Small Size
1/6W	1/4WS
1/4W	1/2WS
1/2W	1WS
1W	2WS
2W	3WS

T52 — Form/ Packaging

B	Bulk (Straight)
M	Bulk. M-Form series (Horizontal Forming)
U	Buld,U-Form series(Vertical Forming)
Txx	Boxed (26.52.63.73.83mm width taping)

J — Resistance Tolerance

J	±5%
F	±1%
D	±0.5%
C	±0.25%
B	±0.1%
W	±0.05%
P	±0.02%

C2 — TCR (ppm/°C)

C7	±5
C6	±10
C5	±15
C3	±25
C2	±50
C1	±100

10K — Nominal Resistance

3-Digit:E-24, 12 Series

e.g. OR12 = 0.12Ω
120R = 120Ω
1K2 = 1.2KΩ
12K = 12KΩ
12M = 12MΩ

THUNDER

METAL OXIDE FILM RESISTORS

RSN

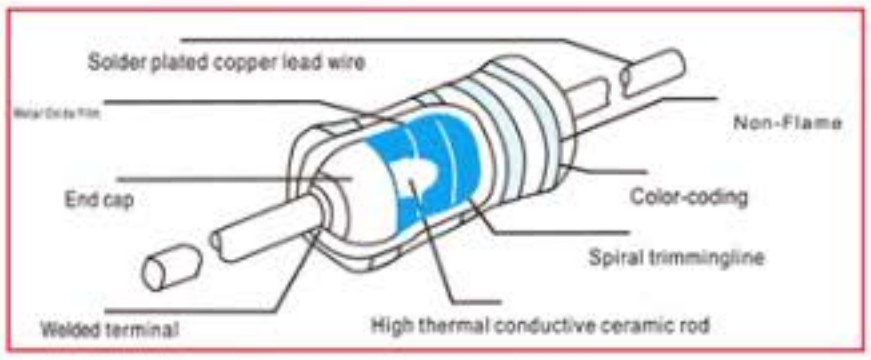
INTRODUCTION

RSN Metal oxide film resistor,is with high reliability,high stability,and flameproof.It is applied to higherpower circuits of electronic devices.

FEATURES

- High wattage
- High stability,High reliability
- Flame proof paintinge

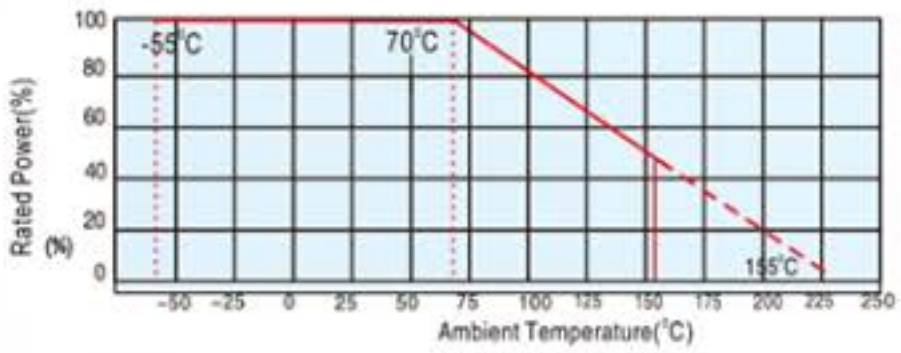
CONSTRUCTION



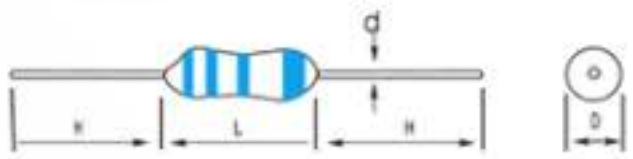
CHARACTERISTICS

Test Items	Specified Value
Temp.coefficient of resistance	±350PPM/°C
Short time overload	RSN：±(1%+0.05Ω) RSS：±(2%+0.1Ω)
Dielectric withstanding voltage	No evidence of damage
Insulation resistance	> 10^4MΩ
Terminal strength	No evidence of damage
Moisture load life	±(5%+0.05Ω)
Load life at 700C	±(5%+0.05Ω)
Temperature cycling	±(1%+0.05Ω)
Solderability	> 95%
Solderability	No evidence of damage
Flame proof	No evidence of flame

DERATING CURVE



STYLE



DIMENSIONS

TYPE		Dimensions (mm) L	D	d	H	Power Rating	Max Working Voltage	Max Overload Voltage	Dielectric Withstanding Voltage	Resistance Range
Normal size	RSN1/4W	6.5±0.5	2.3±0.3	0.43±0.02	25±3	0.25W	200V	300V	250V	0.1Ω~600KΩ
	RSN1/2W	9.0±1.0	3.2±0.5	0.50±0.02	25±3	0.5W	250V	400V	350V	0.1Ω~600KΩ
	RSN1W	12.0±1.0	4.5±0.5	0.65±0.02	25±3	1W	350V	600V	500V	0.1Ω~600KΩ
	RSN2W	15.5±1.0	5.0±1.0	0.72±0.02	23±3	2W	350V	600V	500V	0.1Ω~600KΩ
	RSN3W	17.5±1.0	6.0±1.0	0.72±0.02	27±3	3W	450V	700V	600V	0.1Ω~600KΩ
	RSN5W	24.5±1.0	8.5±1.0	0.75±0.02	27±3	5W	750V	1000V	750V	0.1Ω~600KΩ
	RSN7W	41.0±1.0	8.5±1.0	0.8±0.02	38±3	7W	750V	1000V	750V	10Ω~200KΩ
Small size	RSN1/2WS	6.5±0.5	2.3±0.3	0.43±0.02	25±3	0.5W	250V	400V	350V	0.1Ω~600KΩ
	RSN1WS	9.0±1.0	3.2±0.3	0.50±0.02	25±3	1W	300V	500V	400V	0.1Ω~600KΩ
	RSN2WS	12.0±1.0	4.5±0.5	0.65±0.02	25±3	2W	350V	600V	500V	0.1Ω~600KΩ
	RSN3WS	15.5±1.0	5.0±1.0	0.72±0.02	23±3	3W	350V	600V	500V	0.1Ω~600KΩ
	RSN5WS	17.0±1.0	6.0±1.0	0.72±0.02	27±3	5W	500V	800V	700V	0.1Ω~600KΩ
	RSN7WS	24.5±1.0	8.5±1.0	0.75±0.02	27±3	7W	750V	1000V	750V	0.1Ω~600KΩ
	RSN10WS	53.0±1.0	8.5±1.0	0.8±0.02	38±3	10W	800V	150VV	1200V	10Ω~200KΩ

NOTE:Specification can be constructed on request.

Tinned Copper Leads.

Dimensions subject to change without notice.

HOW TO ORDER

RSN — Type: Normal Size: RSN

1/4W — Power Rating

Normal Size	Small Size
1/4W	1/2WS
1/2W	1WS
1W	2WS
2W	3WS
3W	5WS
5W	7WS
7W	10WS

T52 — Form/ Packaging

B	Bulk (Straight)
M	Bulk. M-Form series (Horizontal Forming)
U	Buld,U-Form series(Vertical Forming)
Txx	Boxed (26.52.63.73.83mm width taping)

J — Resistance Tolerance

F	±1%
G	±2%
J	±5%
K	±10%

10K — Nominal Resistance

3-Digit:E-24, 12 Series

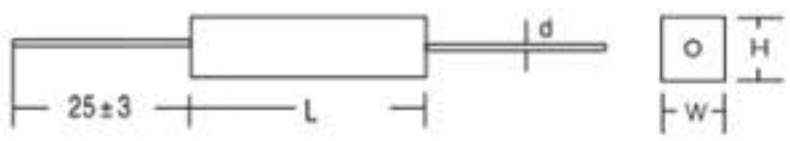
e.g. 0R12 = 0.12Ω
120R = 120Ω
1K2 = 1.2KΩ
12K = 12KΩ
12M = 12MΩ

FIXED WIRE WOUND RESISTORS(CEMENT TYPE) SQ

FEATURE:

1. Materials used are all non-inflummable. So that even if overcurrent flows, no self-ignition occuts. thus giving high safety.
2. Hermetically sealed.Sealed in a highly insulated box type casedwith special cement.
3. Highly heat resistant and moisture resistant.High mechanical strength.
4. Can be mounted with high degree of safety.High heat radiation effect.Box type closely bonded to the chassis.Most suitable for printed wiring.
5. Use TH-SQZ TH-SQH type according to the condition of the place where it is mounted and the way it is mounted.
6. Can be used as complying with safety standards,such as UL Standard.Electric Apparatuis Control Law,etc..
7. We can offering: Toler ance ±1%、±5%、±10%

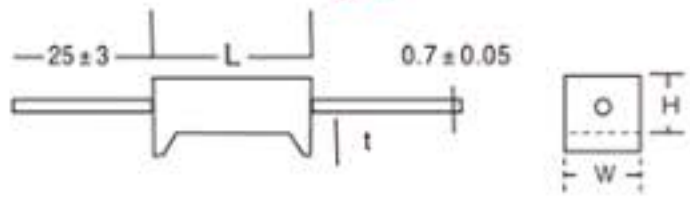
SQP



Tpye	Dimension (mm)				Resistance Range (Ω)		Max Working
SQP	W±1	H±1	L±1.5	d±0.05	SQP	RS+SQP	Voltage
2W	7	7	18	0.65	0.1~82		15V
3W	8	8	22	0.70	0.1~180	181~33K	350V
5W	10	9	22	0.70	0.1~180	181~50K	350V
7W	10	9	35	0.70	0.1~430	431~50K	350V
10W	10	9	48	0.70	0.1~470	471~100K	750V
15W	12.5	11.5	48	0.70	0.5~600	601~150K	1000V
20W.25W	14	12.5	60	0.70	0.5~1K	1.1K~150K	1000V
30W	19	19	75	0.70	0.5~1K		1000V
40W	19	19	90	0.70	0.5~1K		1000V
50W	19	19	90	0.70	0.5~1K		1000V

Notes: 1. Max Overload Voltage is 2 times of Max Working Voltage.
2. Too low or too high ohmic value can be supplied only case by case.
3. Resistance Value under 0.5Ω the tolerance shall be ±10%.
4. Max Working Vlotage is fit for all SQ type.

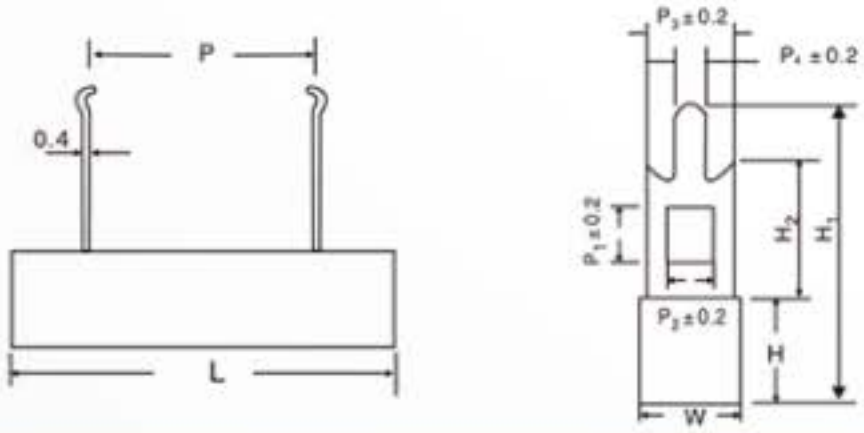
SQT



Type	Dimension (mm)				Resistance
SQT	W±1	H±1	L±1.5	t±0.5	Range (Ω)
5W	10	9	22	1.5	0.1~50K
7W	10	9	35	3.0	0.1~50K
10W	10	9	48	3.0	0.1~50K
20W.25W	17	14	59	3.5	0.1~50K

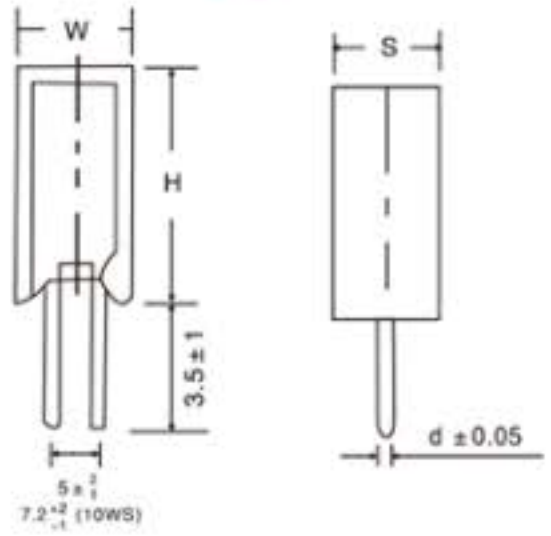
Note:Wirewound (SQT)& Metal Oxide Film(RS + SQT) resistance-range detail same as SQP type.

SQZ



Type	Dimension(mm)										Resistance Range(Ω)	
SQZ	L±1.5	W±1	H±1	P±1.5	P1	P2	P3	P4	H1±1	H2±1	SQZ	RS+SQZ
5W	28(25)	10	10	15(9.5)	4.2	2	7	1.5	25	10.5	0.1-130	131-50K
7W	36	10	10	20	4.2	2	7	1.5	25	10.5	0.1-430	431-50K
10W	48	10	10	32	4.2	2	7	1.5	25	10.5	0.2-430	471-50K
15W	48	12.5	12	32	4.2	2	7	1.5	26	10.5	1-30	601-150K
20-20W	60	15	15	42	7	4	10	3	36	15	1-1K	1.1K-150K
30-40W	75	19	19	57	7	4	10	3	36	15	1-1K	
50W	90	19	19	67	7	4	10	3	60	30	1-1K	

SQM



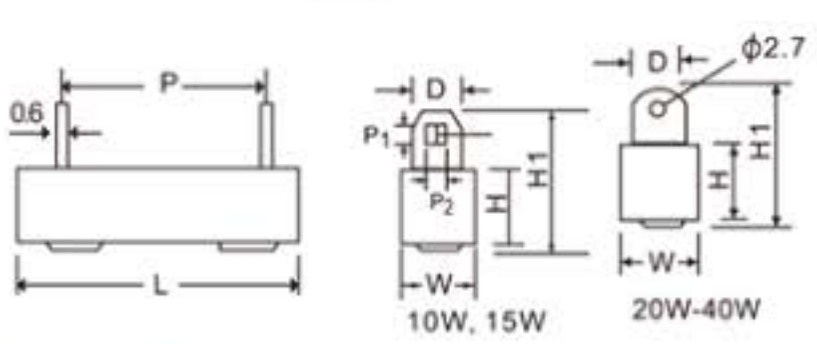
Type	Dimension(mm)				Resistance Range(Ω)	
SQM	H±1.5	W±1	S±1	d±0.05	SQM	RS+SQM
2W	20	11	7	0.70	0.1~82	83~10K
3W	25	12	8	0.70	0.1~180	181~50K
5W	25	13	9	0.70	0.1~180	181~50K
7W	39	13	9	0.70	0.1~430	431~50K
10W	51	13	9	0.70	0.1~470	471~75K
10WS	35	16	12	0.70	0.1~360	361~100K

Dimensions subject to change without notice.

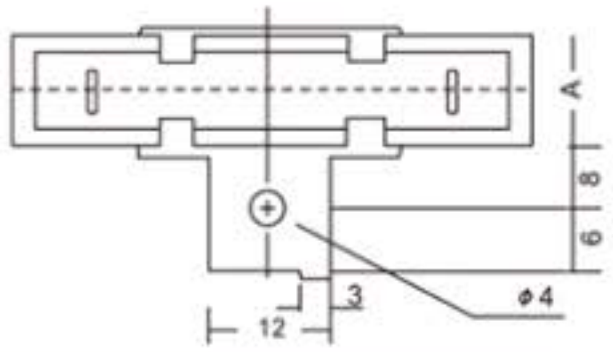
Tinned copper wire leads used for all 5W resistors in kit #13.
In 10 watt kit #14 some resistors have tin plated CP wire leads.

FIXED WIRE WOUND RESISTORS(CEMENT TYPE) SQ

SQH



SQHG

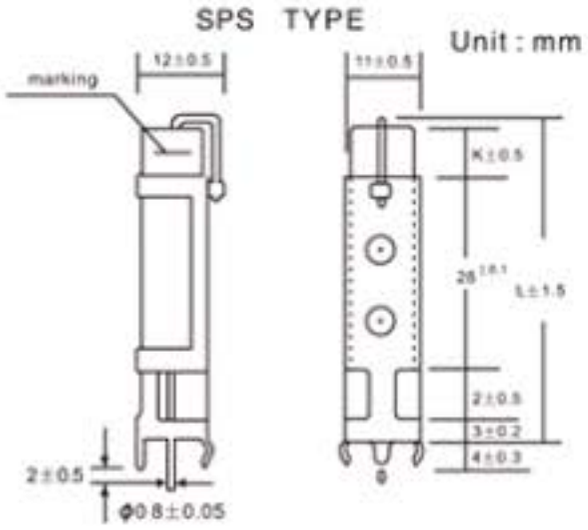


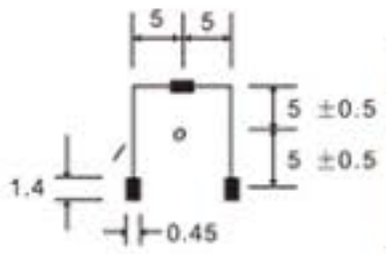
Type	Dimansion (mm)								Resistance Range (Ω)	
SQH	W±1	H±1	L±1.5	P	H1±1	D±0.5	P1±0.2	P2±0.2	SQH (WIREWOUND)	RS + SQH (METAL OXIDE)
10W	10	10	48	32±1	21	5	2.5	1.7	0.1~700	701~100K
15W	12.5	12	48	32±1	21	5	2.5	1.7	0.2~1K	1K1~150K
20W	14.5	13.5	60	42±1	24	6	3.0	2.5	0.2~1K	1K1~150K
30W	19	19	75	55±2	31	7.5			0.2~1K	
40W(50W)	19	19	90	67±2	31	7.5			0.5~1K	

Notes. 1. Max Overload Voltage is 2 times of Max working Voltage.
2. Too low or too high ohmic value can be supplied only case by case.

SPS TYPE

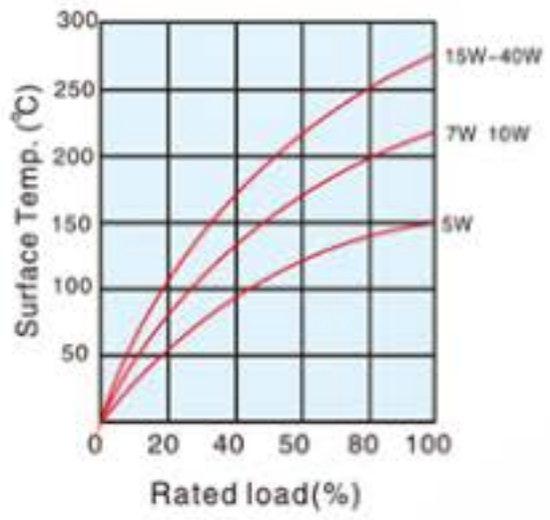
Unit : mm



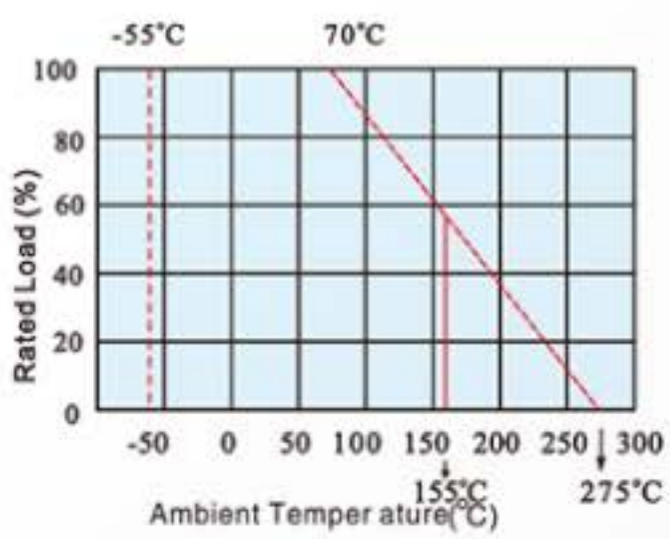


TYPE	Dimansion (mm)		Resistance Range (Ω)	
SPS	L±1.5	k±0.5	SPS	RS.SPS
7W	48	8.5	0.1~430	431~50K
10W	60	20	0.1~470	471~50K

RATED LOAD VS. SURFACE TEMP.



DERATING CURVE



ELECTRICAL PERFORMANCE

Test Ltems	Condition	Spec.
Resistance Temp. Coeff.	-55°C ~ 155°C	±300ppm/ °C
Short Time Over Load	10 times of rated wattage for 5sec.	±2%
Rated Load	Rated wattage for 30 min.	±1%
Voltage Withstanding	1.000V AC 1 min.	no change
Insulation Resistance	500V megger	1000m Ω
Temp. Cvcle	-30°C ~ 85°C for 5 cycles	±1%
Load Life	70°C on-off eycle 1000 hrs.	±5%
Moisture proof Load Life	40°C 95% RH on-off cycie1.000 hrs.	±5%
Incombustibility	16 times of rated wattage for 5 min.	not liamed

Notes: 1. Max Overload Voltage is 2 times of Max Working Voltage
2. Too low or too high ohmic value can be supplied only case by case.
※ 3. "RS +SQ" short time over load is 5 times of rated wattage for 5 sec.

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