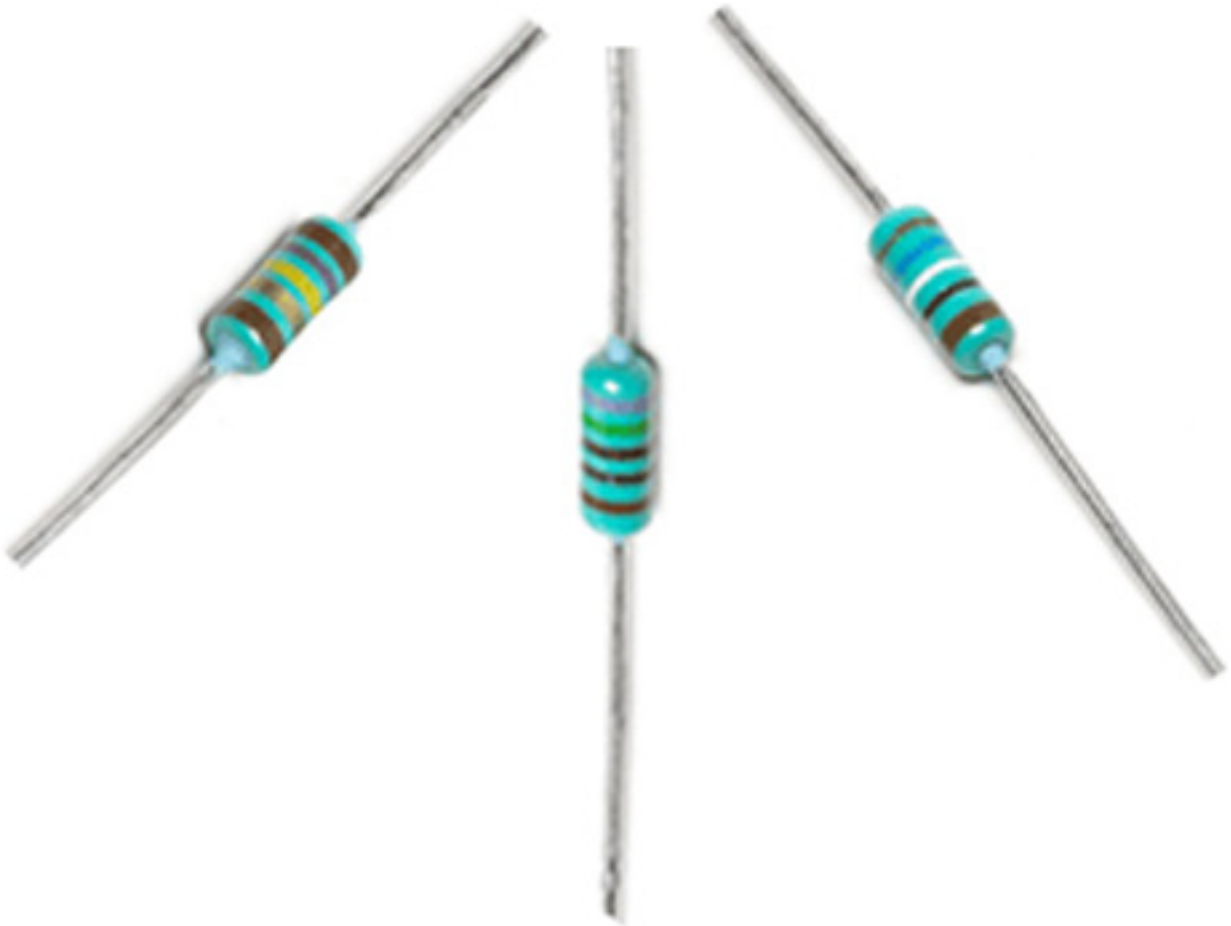
RESISTORS



COSONIC COMPONENTS PVT LTD

CARBON FILM FIXED RESISTOR

PART NUMBER DESCRIPTION (for order booking)

CR25	S	PS	4K7	J	TR
Material Type & Wattage	**SIZE**	**Lead Style**	**Resistance Value**	**Res. Tol.**	**Package**

(**1) Material Type & Wattage:** Carbon Film Fixed Resistors

CR12 (1/8W)	CR25 (1/4W)	CR50 (1/2W)	CR100 (1W)
CR16 (1/6W)	CR25S (1/4W)	CR50S (1/2W)	CR200 (2W)

(2) Lead Style: PS, Horizontal Type
PF, Vertical Type
PM, Cut and Formed for PCB Mounting

(3) Resistance Value: in Ohm (Ω)

Ohm	0.47	1	4.7	10	100	1000	4700	10000	1000000
Code No.	R47	1	4R7	10	100	1K	4K7	10K	1M

(4) Resistance Tolerance: G=± 2%, J=± 5%

(5) Package: It is omitted when the resistors are in bulk package.
TR: Tape/Reel, **TB:** Tape/Box

SPECIFICATIONS:

TYPE	POWER RATING AT 70℃	MAX. WORKING VOLTAGE	MAX OVERLOAD VOLTAGE	OPERATING TEMP. RANGE	RESISTANCE RANGE	
					G (± 2%)	J (± 5%)
CR12	1/8W (0.125W)	150V	300V	-55℃~+155℃	10Ω~470KΩ	1Ω~10MΩ
CR16	1/6W (0.16W)					
CR25S	1/4W (0.25W)	200V	400V		10Ω~1MΩ	1Ω~10MΩ
CR25	1/4W (0.25W)	250V	500V			
CR50S	1/2W (0.5W)	300V	600V		10Ω~1MΩ	1Ω~10MΩ
CR50	1/2W (0.5W)	350V	700V		10Ω~1MΩ	1Ω~10MΩ
CR100	1W	500V	1000V		10Ω~1MΩ	1Ω~10MΩ
CR200	2W	500V	1000V		10Ω~1MΩ	1Ω~10MΩ

SERIES FOR STANDARD VALUES:

E-24: 10 11 12 13 15 16 18 20 24 27 30 33 36 39 43 47 51 56 62 68 75 82 91

ZERO OHM RESISTOR:

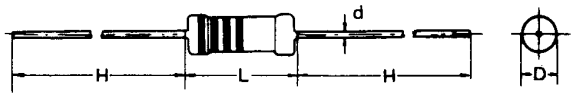
TYPE	RESISTANCE	OPERATING TEMP. RANGE	MAX AMPERAGE	RATING AMBIENT TEMP.	COLOR CODE MAKRING
CR16	**Less than 0.02Ω**	**-55℃~+155℃**	**1.5A**	**70℃**	**by one Black band**
CR25			**2.5A**		

CARBON FILM FIXED RESISTOR

TYPES (LEAD STYLE) AND DIMENSIONS

(unit: mm)

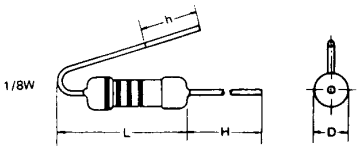
1. PS STYLE



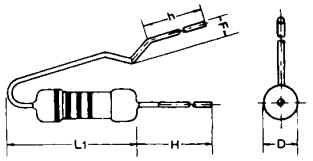
TYPE	L	D	H	d
CR12, CR16, CR25S	3.3± 0.4	1.8± 0.3	28± 2.0	0.5± 0.05
CR25, CR50S	6.5± 0.5	2.3± 0.3	28± 2.0	0.6± 0.05
CR50	9.0± 0.5	3.2± 0.5	26± 2.0	0.6± 0.05
CR100	11.5± 1.0	4.5± 0.5	35± 2.0	0.8± 0.05
CR200	15.5± 1.0	5.5± 0.5	32± 2.0	0.8± 0.05

2. PF STYLE

For types:
CR12, 16, 25S

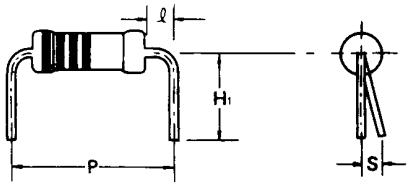


For types:
CR25, 50S, 50



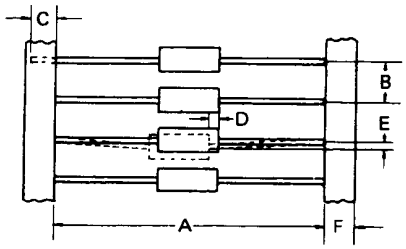
TYPE	L1	H	h	F
CR12, CR16, CR25S	4.5± 0.5	28± 2.0	22± 1.0	—
CR25, CR50S	9.5± 1.0	28± 2.0	16± 2.0	1.8± 0.5
CR50	12.5± 1.0	28± 2.0	12± 2.0	1.8± 0.5

3. PM STYLE



TYPE	P	H1	I	S
CR12, CR16, CR25S	5.0± 0.5	6± 1.0	0.5± 0.3	Max. 1.7
CR25, CR50S	10.0± 0.5	6± 1.0	2.5± 0.5	Max. 1.7
	12.5± 0.5			
CR50	12.5± 1.0	7± 1.0	2.5± 0.5	Max. 2.0
	17.5± 1.0		2.5± 0.5	

TAPING DIMENSIONS

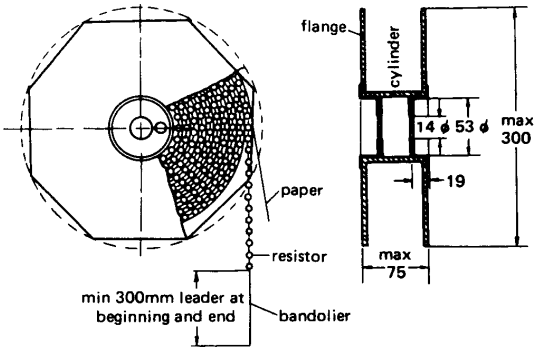


TAPING SPACING	RESISTOR SPACE	LEAD IN TAPE	COMPONENT ALIGNMENT		TAPE WIDTH
A *	B	C	D	E	F
52± 1.0	5± 0.5	3 min.	0.8 MAX	1.2 MAX	6± 1.0

* A=26 also available for Pana-sert

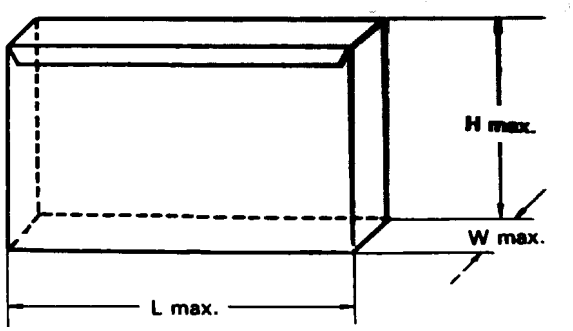
TAPE/REEL, TAPE/BOX PACKAGING AND DIMENSIONS

REEL PACKAGING:



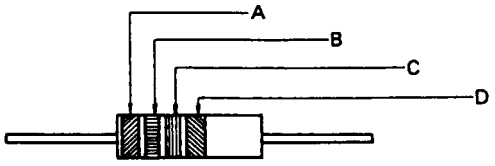
TYPE	QTY'S/REEL
CR12, CR16, CR25, CR25S, CR50S	5,000
CR50	2,500
CR100	2,000
CR200	1,000

AMMUNITION (BOX) PACKAGING



TYPE	L	W	H	QTY'S/BOX
CR12, CR16, CR25, CR25S, CR50S	265	80	110	5,000
CR50	265	80	55	1,000
CR100	265	100	110	1,000
CR200	265	100	110	1,000

COLOR CODE



Color Code	A 1st band Resistance In Ohms	B 2nd band Resistance In Ohms	C Multiple Of Resistance	D Tolerance
Black	0	0	10	—
Brown	1	1	10	± 1%
Red	2	2		± 2%
Orange	3	3		
Yellow	4	4		—
Green	5	5		—
Blue	6	6		—
Violet	7	7		—
Gray	8	8		—
White	9	9		—
Gold	—	—		± 5%
Silver	—	—		± 10%

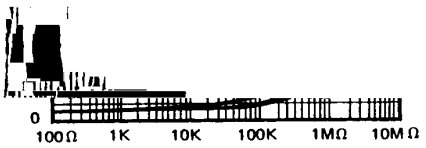
CARBON FILM FIXED RESISTOR

ELECTRICAL PERFORMANCE

TEST ITEM	TEST CONDITIONS	MAX. RESISTANCE CHANGES	TEST METHOD	
			JIS C5205	MIL-STD-202
Dielectric Withstanding Voltage	No evidence of flashover or breakdown		5.7	METHOD 301
Short Time Overload	2.5 times of rated voltage for 5 sec.	± 1%	5.5	—
Temperature Cycling	-30℃ ~ +85℃ 5 cycles	± 0.5%	7.10	METHOD 107
Resistance to Soldering Heat	350℃±10℃, 3±0.5 sec.	± 0.5%	7.10	METHOD 210
Resistance to solvents	Permanent marking no physical or electrical damage or deterioration		—	METHOD 215
Load Life	70℃ on-off cycle 1,000 hours	± 3%	7.10	METHOD 108
Moisture Resistance	40℃ 95% RH on-off cycle 1,000 hours	± 5%	7.9	METHOD 106

Requirments	PERFORMANCE					TEST METHOD	
						JIS C5202	MIL-STD-202
Temperature Coefficient (ppm/℃)	T.C.R. / TYPE	± 350	-150 -600	-150 -1000	-150 -1,300	5.2	METHOD 304
	0.125W	Under 1KΩ	1.1KΩ-47KΩ	51KΩ-510KΩ	560KΩ-1MΩ		
	0.25W	Under 10KΩ	1.1KΩ-150KΩ	160KΩ-2.2MΩ	2.4MΩ-5.1MΩ		
	0.5W & over	Under 22KΩ	24KΩ-470KΩ	510KΩ-2.2MΩ	2.4MΩ-10MΩ		
Noise (μv/v)	NOISE / TYPE	0.1	0.3	0.6	1.0	5.9-11	METHOD 308
	0.125W & 0.16W	—	Under 10KΩ	11KΩ-100KΩ	Over 110KΩ		
	0.25W & over	Under 100KΩ	110K-510KΩ	560KΩ-2.2MΩ	Over 2.4MΩ		

PERFORMACE CHARACTERISTICS:



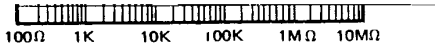


Fig. 5 Load life 70°C 1,000hrs

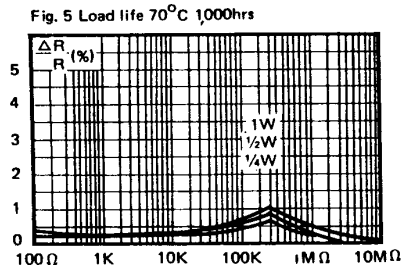
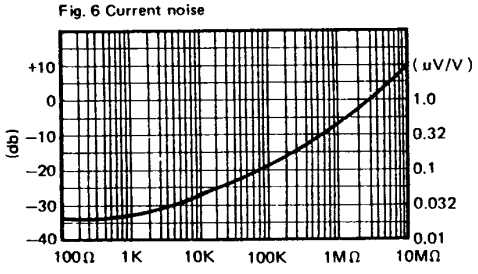


Fig. 6 Current noise



PRECISION METAL FILM RESISTOR

PART NUMBER DESCRIPTION (for order booking)

MR25	PS	100K	F	100	TR
Type & Wattage	Lead Style	Res. Value	Res. Tol.	TC	Package

(1) Type & Wattage: Metal film Resistors
MR12 (1/8W) MR25 (1/4W) MR50 (1/2W) MR100 (1/W) MR200 (2W)

(2) Lead Style: PS - Horizontal Type

(3) Resistance Value: in Ohm (Ω)

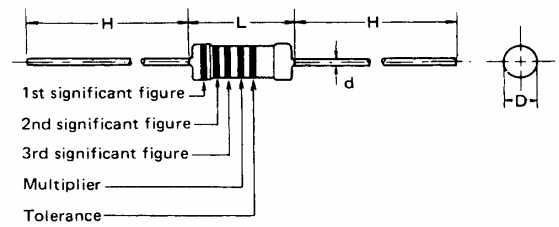
Ohm	0.475	1	4.75	10	100	1000	4750	10000	1000000
Code No.	R475	1	4R75	10	100	1K	4K75	10K	1M

(4) Resistance Tolerance: A=±0.05% B=±0.1% C=±0.25% D=±0.5% F=±1%

(5) Temperature Coefficient: 15 – 15PPM
25 – 25PPM
50 – 50PPM
100 – 100PPM

(6) Package: It is omitted when the resistors are in bulk package.
TR: Tape/Reel, **TB:** Tape/Box

DIMENSIONS: (Unit:mm)



TYPE SIZE	L	D	H	d
MR-12 (1/8W)	3.3± 0.4	1.8±0.3	28±2.0	0.50±0.05
MR-25 (1/4W)	6.3±0.5	2.3±0.3	28±2.0	0.60±0.05
MR-50 (1/2W)	9.0±0.5	3.2±0.5	26±2.0	0.60±0.05
MR-100 (1W)	11.5±1.0	4.5±0.5	35±2.0	0.80±0.05
MR-200 (2W)	15.5±1.0	5.0±0.5	32±2.0	0.80±0.05

COLOR CODE

Color	1st Digit	2nd Digit	3rd Digit	Multi-Plier	Tol.
Black	0	0	0	10	—
Brown	1	1	1	10-2	±1%
Red	2	2	2	10^2	±2%
Orange	3	3	3	10^3	—
Yellow	4	4	4	10^4	—
Green	5	5	5	10^5	±0.5%
Blue	6	6	6	10^6	±0.25%
Violet	7	7	7	10^7	±0.1%
Gray	8	8	8	10^8	—
White	9	9	9	10^9	—
Gold	—	—	—	10^ -1	±5%
Silver	—	—	—	10^ -2	—

STANDARD RESISTANCE VALUE (E-96 Series)

10.0	12.1	14.7	17.8	21.5	26.1	31.6	38.3	46.4	56.2	68.1	82.5
10.2	12.4	15.0	18.2	22.1	26.7	32.4	39.2	47.5	57.6	69.8	84.5
10.5	12.7	15.4	18.7	22.6	27.4	33.2	40.2	48.7	59.0	71.5	86.6
10.7	13.0	15.8	19.1	23.2	28.0	34.0	41.2	49.9	60.4	73.2	88.7
11.0	13.3	16.2	19.6	23.7	28.7	34.8	42.2	51.1	61.9	75.0	90.9
11.3	13.7	16.5	20.0	24.3	29.4	35.7	43.2	52.3	63.4	76.8	93.1
11.5	14.0	16.9	20.5	24.9	30.1	36.5	44.2	53.6	64.9	78.7	95.3
11.8	14.3	17.4	21.0	25.5	30.9	37.4	45.3	54.9	66.5	80.6	97.6

PRECISION METAL FILM RESISTOR

SPECIFICATIONS:

TYPE	POWER RATING		MAX. WORKING VOLTAGE	MAX OVERLOAD VOLTAGE	RESISTANCE TOLERANCE	TEMP. COEFFICIENT	EQUIVALENT TYPE NO. (MIL-R-0509F)
	AT 70℃	AT 125℃					
MR12	0.125W (1/8W)	0.06W	200V	400V	±0.05%	±15PPM/℃	RN50
MR25	0.25W (1/4W)	0.12W	250V	500V	±0.1%	±25PPM/℃	RN55
MR50	0.5W (1/2W)	0.25W	350V	700V	±0.25%	±50PPM/℃	RN60
MR100	1W	0.5W	500V	1000V	±0.5%	±100PPM/℃	RN65
MR200	2W	0.75W	500V	1000V	±1%		RN70

STANDARD RESISTANCE VALUE RANGE

(E-48 AND E-96 SERIES)

TYPE	TEMPERATURE COEFFICIENT	RESISTANCE TOLERANCE	
		±0.25%, ±0.5%, ±1%	±0.05%, ±0.1%
MR12 MR25 MR50 MR100 MR200	±15PPM ±25PPM ±50PPM ±100PPM	10Ω-1MΩ	100Ω-100KΩ

* Resistance values beyond the standard values of 10 ~1M ohm are available for special order only.

PRECISION METAL FILM RESISTOR

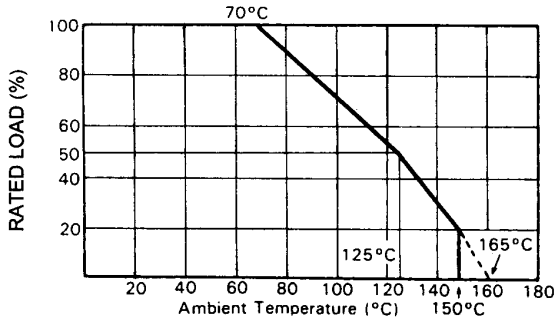
PERFORMANCE CHARACTERISTICS:

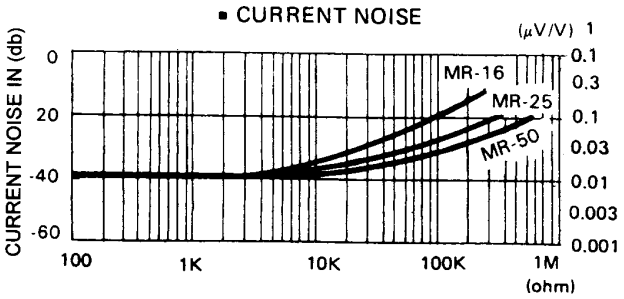
TYPE		MR-12	MR-25	MR-50	MR-100	MR-200
Power Rating – at 70℃ at 125℃		0.125W 0.062W	0.25W 0.125W	0.50W 0.25W	1W 0.5W	2W 0.75W
Max. Rated Continuous Working Voltage		200V	250V	350V	500V	500V
Max. Ambient Temperature		150℃	150℃	150℃	150℃	150℃
Dielectric Withstanding Voltage (Max. overload Voltage V block 1 min.)	ΔR*	0.50%	0.10%	0.25%	0.25%	0.25%
Insulation Resistance – Dry (DC 500V V block 1min.) Wet		10,000MΩ 100MΩ	10,000MΩ 100MΩ	10,000MΩ 100MΩ	10,000MΩ 100MΩ	10,000MΩ 100MΩ
Temperature Cycling (-30℃~+85℃ 5 cycles)	ΔR*	0.20%	0.20%	0.20%	0.20%	0.20%
Short-time Overload (2.5 times of rated voltage 5 sec.)	ΔR*	0.25%	0.25%	0.25%	0.25%	0.25%
Moisture Resistance (10 cycles per MIL-STD-202 method 106)	ΔR*	0.50%	0.50%	0.50%	0.50%	0.50%
Load Life – 1,000 hrs (70℃ on-off cycles) 10,000 hrs	ΔR* ΔR*	1.0% 4.0%	1.0% 4.0%	1.0% 4.0%	1.0% 4.0%	1.0% 4.0%
Terminal Strength (Pull & twist)	ΔR*	0.20%	0.10%	0.10%	0.10%	0.10%
Resistance to Soldering Heat (350℃ 3 sec.)	ΔR*	0.5%	0.25%	0.25%	0.25%	0.25%
Shock, Medium Impact	ΔR*	0.25%	0.25%	0.25%	0.25%	0.25%
Vibration, High Frequency (MIL-STD-202 method 204)	ΔR*	0.25%	0.25%	0.25%	0.25%	0.25%
Low Temperature Operation	ΔR*	0.25%	0.15%	0.15%	0.15%	0.15%
High Temperature Operation	ΔR*	1.0%	1.0%	1.0%	1.0%	1.0%
Solderability (MIL-STD-202 method 208) (% AREA)	%	95%	95%	95%	95%	95%
Shelf Life per year	ΔR*	0.20%	0.10%	0.10%	0.10%	0.10%

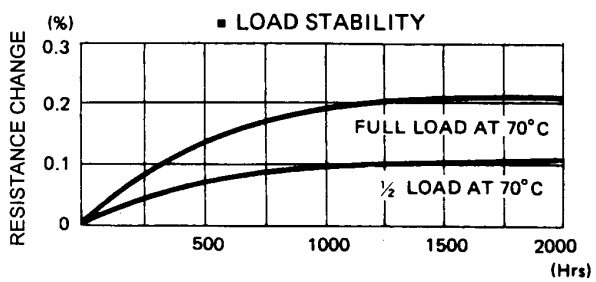
* Maximum percent change in resistance +0.05Ω

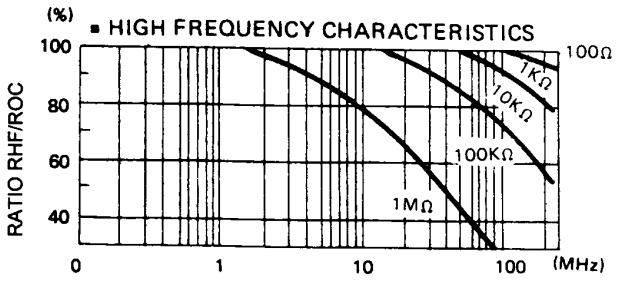
POWER DERATING CURVE

For resistors operated in ambient temperatures above 70℃, power rating must be derated in accordance with the curve below.









FLAME PROOF TYPE

PART NUMBER DESCRIPTION (for order booking)

FMR25	PS	100K	F	50	TB
Type & Wattage	Lead Style	Res. Value	Res. Tol.	TC	Package

(1) Type & Wattage: Flame Proof Metal film Resistors

FMR25 (1/4W) FMR50 (1/2W)

(2) Lead Style: PS - Horizontal Type

(3) Resistance Value: in Ohm (Ω)

Ohm	0.475	1	4.75	10	100	1000	4750	10000	1000000
Code No.	R475	1	4R75	10	100	1K	4K75	10K	1M

(4) Resistance Tolerance: B=± 0.1% C=± 0.25% D=± 0.5% F=± 1%

(5) Temperature Coefficient: 15 – 15PPM
25 – 25PPM
50 – 50PPM
100 – 100PPM

(6) Package: It is omitted when the resistors are in bulk package.

TR: Tape/Reel, **TB:** Tape/Box

SPECIFICATIONS:

TYPE	POWER RATING		MAX. WORKING VOLTAGE		MAX OVERLOAD VOLTAGE	
	70℃	125℃	70℃	125℃	70℃	120℃
FMR25	0.25W	0.1W	250V	200V	500V	400V
FMR50	0.5W	0.125W	350V	250V	700V	500V

CHARATERISTICS

REQIUREMENT: Non-combustibility. Flame resistance, does not burn continuously for more than 5 seconds. Not fume under the overload of less than 5 times of rated power. The volume of fumes emitted under the overload of more than 5 times of rated power is less than that of stilled fumes emitted by one cigarette. During the test, the height of fumes is not over 3mm and the burning does not continue for more than 3 seconds.

TEST METHOD: MIL-STD-202 Method 111
JIS C 525 7.12
EIA-RC 2658 5.1

PRECISION METAL FILM RESISTOR

SUPER MINIATURE TYPE

PART NUMBER DESCRIPTION (for order booking)

MRS50	PS	100K	F	100	TR
Type & Wattage	**Lead Style**	**Res. Value**	**Res. Tol.**	**TC**	**Package**

(1) Type & Wattage: Metal film Resistors, super miniature
MRS40 (0.4W) MRS50 (0.5W) MRS60 (0.6W) MRS100 (1W) MRS180 (1.8W)
MRS300 (3W)

(2) Lead Style: PS - Horizontal Type

(3) Resistance Value: in Ohm (Ω)

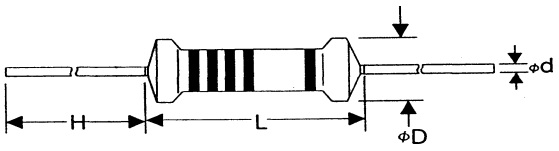
Ohm	0.475	1	4.75	10	100	1000	4750	10000	1000000
Code No.	R475	1	4R75	10	100	1K	4K75	10K	1M

(4) Resistance Tolerance: F=± 1% G=± 2% J=± 5%

(5) Temperature Coefficient: 50 – 50PPM
100 – 100PPM

(6) Package: It is omitted when the resistors are in bulk package.
TR: Tape/Reel, **TB:** Tape/Box

DIMENSIONS:



(Unit:mm)

Type	Power Rating	Res. Range	L	D	H	d
MRS-40	**0.4W**	10Ω～1MΩ	3.3± 0.5	1.8± 0.3	28± 2.0	0.50± 0.05
MRS-50	**0.5W**	10Ω～1MΩ	6.3± 0.5	2.3± 0.3	28± 2.0	0.60± 0.05
MRS-60	**0.6W**	10Ω～1MΩ	6.3± 0.5	2.3± 0.3	28± 2.0	0.60± 0.05
MRS-100	**1W**	10Ω～1MΩ	6.3± 0.5	2.3± 0.3	28± 2.0	0.60± 0.05
MRS-180	**1.8W**	10Ω～1MΩ	9.0± 0.5	3.2± 0.5	26± 2.0	0.60± 0.05
MRS-300	**3W**	10Ω～1MΩ	15.5± 1.0	5.0± 0.5	32± 2.0	0.80± 0.05

SUPER MINIATURE TYPE

SPECIFICATIONS:

ELECTRICAL CHARACTERISTICS:

TYPE	MRS-40	MRS-50	MRS-60	MRS-100	MRS-180	MRS-300
Power Rating 70℃	0.4W	0.5W	0.6W	1W	1.8W	3W
Operating Temperature Range	-55℃~ +155℃					
Max. Working Voltage	250V	200V	250V	250V	350V	500V
Max. Overload Voltage	500V	400V	500V	500V	700V	1000V
Dielectric WithstandingVoltage (AC)	500V	300V	500V	500V	700V	1000V
Max. Intermittence Overload Voltage	300V	250V	300V	300V	500V	1000V
Resistance Value Range	10Ω~ 1MΩ					
Resistance Tolerance	±1%, ±5%					
Temperature Coefficient	±50ppm, ±100ppm					

* Resistance values beyond the standard range are available for special order only.

PERFROMANCE CHARACTERISTICS:

TEST ITEM	TEST METHOD	MAX. RES. CHANGE
Short Time Overload	2.5 times RCWV* for 5 seconds (JIS-C-5202 5.2)	±(0.25%+0.05Ω)
Dielectric Withstanding Voltage	in V-Block for 60 seconds (JIS-C-5202 5.7)	--
Temperature Coefficient	－55℃～＋155℃ (JIS-C-5202 5.7)	--
Insulation Resistance	in V-Block (JIS-C-5202 5.6)	≧1000 MΩ
Solderability	235℃ for 5±0.5 seconds (JIS-C-5202 6.5)	95% min. coverage
Resistance to Solvent	Trichroethance for 1min. with ultrasonic (JIS-C-5202 6.9)	No deterioration
Terminal Strength	Direct load for 10 sec. in the direction of the terminal leads	≧2.5Kg/24.5N
Pulse Overload	4 times RCWV* 10000 cycles(1 sec. on, 25 sec. off) (JIS-C-5202 5.8)	±(0.5%+0.05Ω)
Load Life in Humidity	40±2℃, 90~95% RH at rated voltage for 1000 hrs (JIS-C-5202 7.9)	±(0.5%+0.05Ω)
Load Life	70℃ at RCWV* for 1000hrs(1.5hrs.on,0.5hrs.off) (JIS-C-5202 7.10)	±(0.5%+0.05Ω)
Temperature Cycling	65℃~150℃ for 5 cycles (JIS-C-5202 7.4)	±(0.25%+0.05Ω)
Soldering Heat	350±10℃ for 3±0.5 seconds (JIS-C-5202 6.4)	±(0.25%+0.05Ω)

*Rated continuous Working Voltage (RCWV) = $\sqrt{\text{power rating} \times \text{resistance value}}$

SUPER MINIATURE TYPE

FIG.1 DERATING CURVE

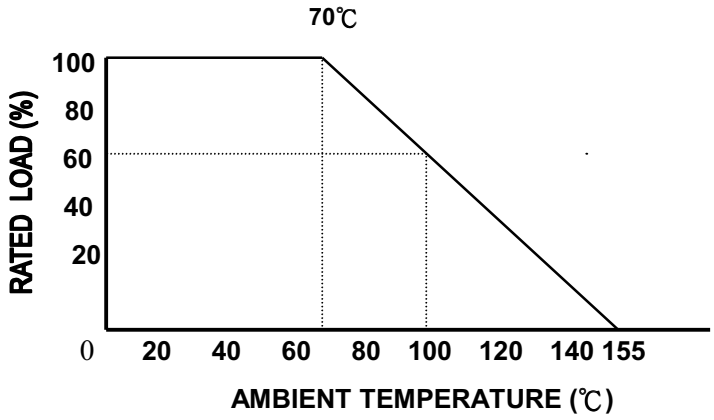
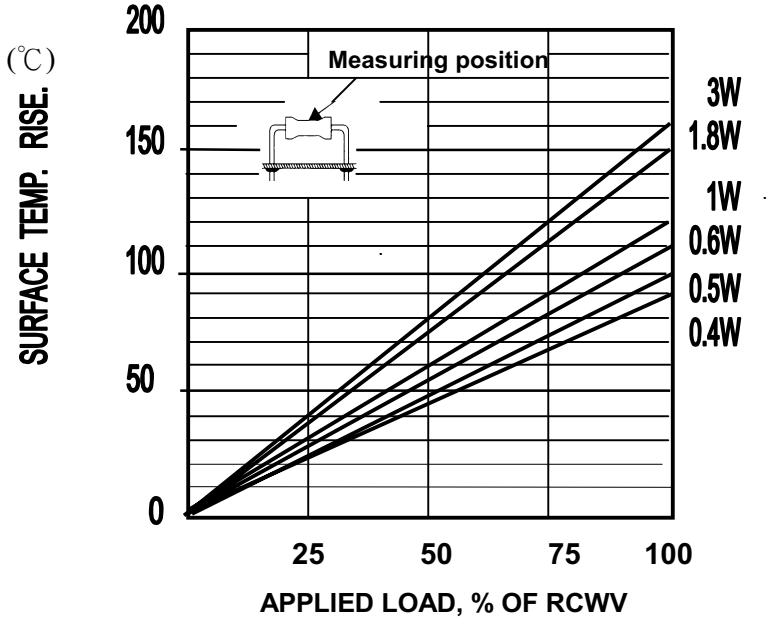


FIG.2 HOT-SPOT TEMPERATURE



FUSIBLE METAL FILM RESISTOR

FUSIBLE FLAME-PROOF TYPE

PART NUMBER DESCRIPTION (for order booking)

FR25	PS	100K	J	TR
Type & Wattage	**Lead Style**	**Res. Value**	**Res. Tol.**	**Package**

(1) Type & Wattage: Fusible Metal Film Resistors
FR25 (0.25W) FR50 (0.5W) FR100 (1W) FR200 (2W) FR300 (3W)
Miniature Type - FRS300 (3W)

(2) Lead Style: PS - Horizontal Type

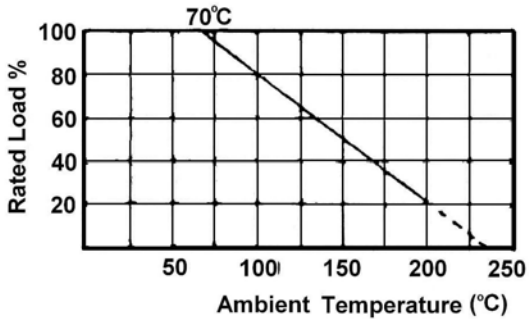
(3) Resistance Value: in Ohm (Ω)

Ohm	0.475	1	4.75	10	100	1000	4750	10000	1000000
Code No.	R475	1	4R75	10	100	1K	4K75	10K	1M

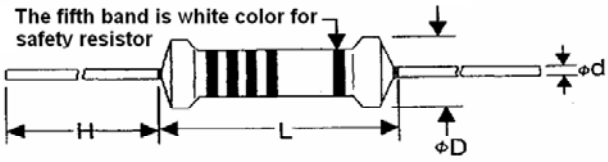
(4) Resistance Tolerance: G=±2% J=±5%

(5) Package: It is omitted when the resistors are in bulk package.
TR: Tape/Reel, **TB:** Tape/Box

POWER DERATING CURVE



DIMENSIONS: (Unit: mm)



Type	Power Rating	Max. Working Voltage	Max. Overload voltage	Resistance Range		L	D	H	d (±0.05)
				G: ±2%	J: ±5%				
FR-25	**1/4W**	250	300	4.7Ω～1KΩ	2.2Ω～1KΩ	6.0±0.2	2.3±0.3	28±2.0	0.50
FR-50	**1/2W**	250	400	4.7Ω～1KΩ	2.2Ω～1KΩ	9.0±0.5	3.2±0.3	26±2.0	0.60
FR-100	**1W**	300	500	4.7Ω～1KΩ	0.27Ω～1KΩ	11.0±0.5	4.5±0.5	35±2.0	0.80
FR-200	**2W**	350	500	4.7Ω～1KΩ	0.33Ω～1KΩ	15.0±0.5	5.0±0.5	32±2.0	0.80
FRS-300	**3W**	500	500	4.7Ω～1KΩ	0.33Ω～1KΩ	15.0±0.5	5.0±0.5	32±2.0	0.80
FR-300	**3W**	500	500	4.7Ω～1KΩ	0.33Ω～1KΩ	17.0±0.5	6.0±0.5	32±2.0	0.80

FUSIBLE METAL FILM RESISTOR

Performance Characteristics

Item	Res. Variation	Characteristics
Temperature Coefficient (±100PPM Type)		350Ω Max
Insulation Resistance		10,000 MΩ min.
Load Life: 1,000 hrs (70℃ on-off cycles)	ΔR	±5% + 0.05Ω max.
Temperature Cycling (-30℃~+85℃ 5 cycles)	ΔR	±1% + 0.05Ω max.
Short-time Overload (2.5 times of rated voltage 5 sec.)	ΔR	±2% + 0.05Ω max.
Moisture Resistance (10 cycles per MIL-STD-202 method 106)	ΔR	±5% + 0.05Ω max.
Resistance to Soldering Heat (350℃ 3 sec.)	ΔR	±1% + 0.05Ω max.
Shock and Vibration	ΔR	±1% + 0.05Ω max.

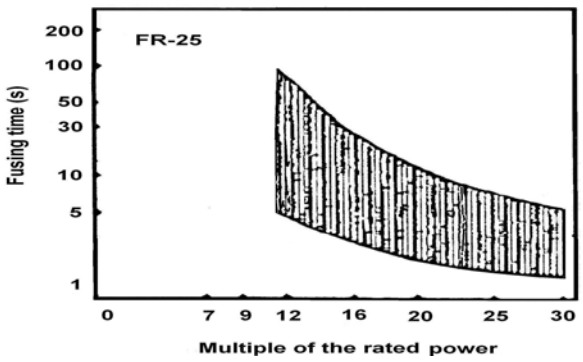
Power vs. Fusing Time

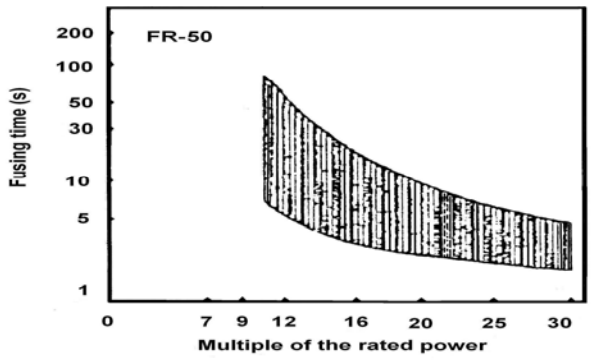
Wattage	Fusing Time Max.
16 times of the rated power	1 minute
20 times of the rated power	40 seconds
24 times of the rated power	30 seconds
28 times of the rated power	20 seconds
32 times of the rated power	15 seconds

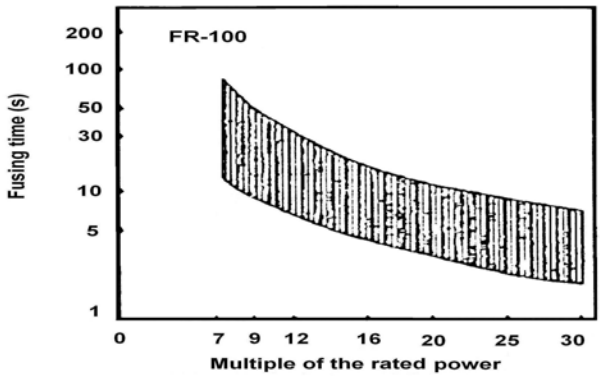
Note: 1. The variable resistance after applied voltage in excess 100 times will be open.

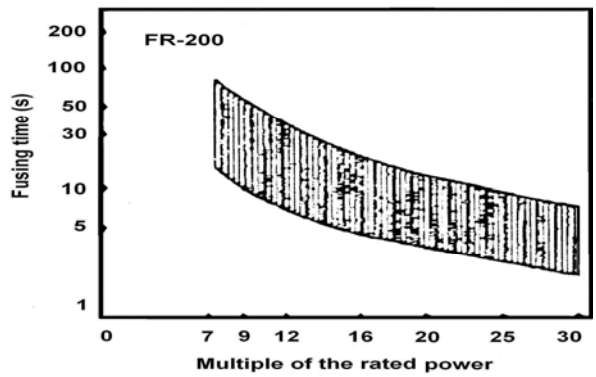
2. Operating Temperature range is -30℃~155℃.

FUSING CHARACTERISTICS





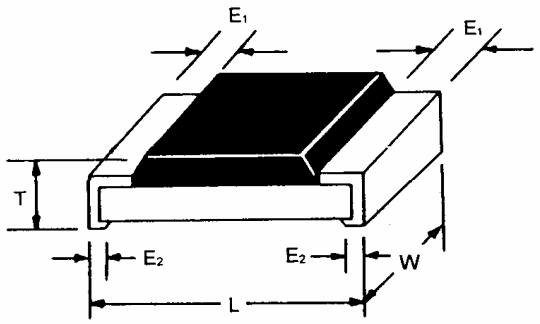


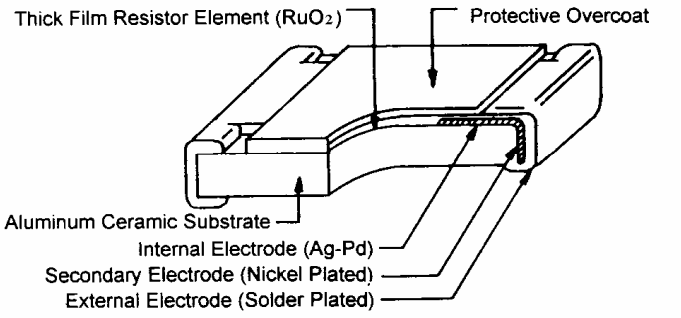


THICK FILM CHIP RESISTOR

FEATURES:

1. Subminiature
2. High stability and reliability
3. Suitable for both reflow and flow soldering
4. Easy to match with surface mounting machines and reduce assembly cost





DIMENSIONS:

(unit: mm)

TYPE	L	W	T	E1	E2
PR0402	1.00±0.10	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
PR0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
PR0805	2.00±.010	1.25±0.10	0.50±0.10	0.40±0.20	0.40±0.20
PR1206	3.20±0.10	1.60±0.15	0.55±0.10	0.50±0.25	0.50±0.25
PR2512	6.35±0.10	3.20±0.15	0.55±0.10	0.60±0.25	0.50±0.20

PART NUMBER DESCRIPTION (for order booking)

PR1206	**1/4W**	**1K**	**F**	**TR**
Type Size	**Rated Power**	**Resistance Value**	**Resistance Tolerance**	**Package**
PR0402	**1/16W**	**R47 – 0.47Ω**	**F= ±1%**	**TR – Tape and Reel**
PR0603	**1/10W**	**4R7 – 4.7Ω**	**J= ±5%**	
PR0805	**1/8W**	**100 – 100Ω**		
PR1206	**1/4W**	**1K – 1KΩ**		
PR2512	**1W**	**1M – 1MΩ**		

SPECIFICATIONS:

TYPE	POWER RATING AT 70℃	MAX. WORKING VOLTAGE	MAX OVERLOAD VOLTAGE	OPERATING TEMP. RANGE	RESISTANCE RANGE	
					Tol.: F (±1%) (E-96 series)	Tol.: J (±5%) (E-24 series)
PR0402	1/16W	25V	50V	- 55℃~+125℃	100Ω~100KΩ ±100ppm/℃	10Ω~3.3MΩ ±200ppm/℃
PR0603	1/10W	50V	100V	- 55℃~+125℃	10Ω~1MΩ ±50ppm/℃	1Ω~10MΩ ±100ppm/℃
PR0805	1/8W	150V	300V	- 55℃~+125℃	10Ω~1MΩ ±50ppm/℃	1Ω~10MΩ ±100ppm/℃
PR1206	1/4W	200V	400V	- 55℃~+125℃	10Ω~1MΩ ±50ppm/℃	1Ω~10MΩ ±100ppm/℃
PR2512	1W	200V	400V	- 55℃~+125℃	10Ω~1MΩ ±50ppm/℃	1Ω~10MΩ ±100ppm/℃

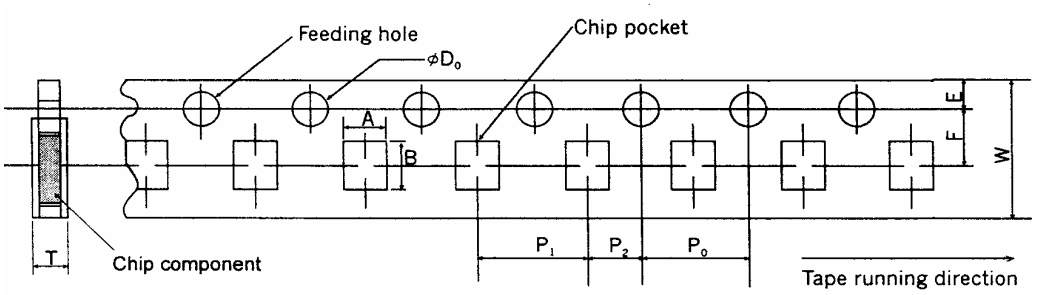
Standard Resistance Values: E-24 & E-96 Series, Zero ohm resistor (<50mΩ)

THICK FILM CHIP RESISTOR

PERFORMANCE CHARACTERISTICS

TEST ITEM	MAX RESISTANCE CHANGES	TEST CONDITIONS
Temperature coefficient (ppm/℃)	R<10Ω -100~+600PPM 10Ω≦R≦1MΩ ±250PPM 1MΩ<R -300~+100PPM	Measuring temperature +20/-55/+20/+120℃
Short time overload	±(1%+0.05Ω) Max.	Rated voltagex2.5 times for 5 seconds
Insulation resistance	10,000MΩ Min.	DC500V, V block, 1 min.
Terminal strength pull	±(1%+0.05Ω) Max. No mechanical damage	Pulling test: 500g load for 10 seconds
Board bending	±(1%+0.05Ω) Max. No mechanical damage	Bending test: 5/90mm bent for 10 seconds
Temperature cycling	±(1%+0.05Ω) Max. No mechanical damage	-55℃ (30 min) to + 125℃ (30min) 5 cycles
Load life in moisture	±(3%+0.1Ω) Max. No mechanical damage	At 40℃, 90~95% RH, rated voltage with the cycle of 1.5hrs on and 0.5hrs off 1000hrs
Load life	±(3%+0.1Ω) Max. No mechanical damage	At 70℃ rated voltage with the cycle of 1.5hrs on and 0.5hrs off 1000hrs
Resistance to soldering heat	±(1%+0.05Ω) Max. No mechanical damage	260℃ for 10 seconds
Dry heat	±(3%+0.1Ω) Max. No mechanical damage	125℃ for 1000hrs
Solderability	New solder shall cover at least 95%	230℃ for 3 seconds flux applied
Dielectric withstanding voltage	No insulation breakdown	500V, 1min
Vibration	±(1%+0.05Ω) Max.	10~55Hz. 3 directions, each 2hrs.

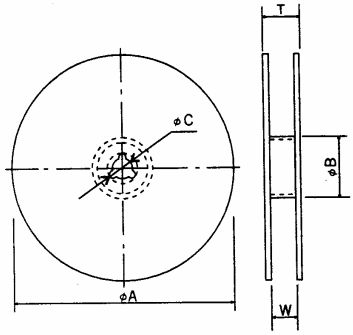
TAPING DIMENSIONS (unit: mm)



Model	A±0.1	B±0.1	W±0.2	E±0.1	F±0.05	P0±0.1	P1±0.05	P2±0.05	D0+0.1-0	T±0.1
PR0402	0.65	1.15	8.0	1.75	3.5	4.0	2.0	2.0	1.5	0.53
PR0603	1.10	1.9	8.0	1.75	3.5	4.0	4.0	2.0	1.5	0.60
PR0805	1.65	2.4	8.0	1.75	3.5	4.0	4.0	2.0	1.5	0.75
PR1206	1.90	3.5	8.0	1.75	3.5	4.0	4.0	2.0	1.5	0.75

REEL DIMENSIONS (unit: mm)

Model	A +0-3	B+1 -0	C±0.2	W±0.3	T±1
PR0402/0603/0805/1206	180	60	13.0	9.0	11.4



Standard packing: 5,000pcs per Reel

THICK FILM CHIP NETWORK RESISTOR
(PROTROUDE ELECTRODE)

PART NUMBER DESCRIPTION (for order booking)

CW06	04B	J	22K
Type & Wattage	Circuit	Res. Tol.	Resistance

(1) Type & Wattage: CW06 - Chip Network Resistors, 1/16W

(2) Circuit: 04-08= 04-08 joints
A-Z= A-Z circuits type

(3) Resistance Tolerance: J=±5%

(4) Resistance Value: in Ohm (Ω)

Ohm	0.47	1	4.7	10	100	1000	4700	10000	1000000
Code No.	R47	1	4R7	10	100	1K	4K7	10K	1M

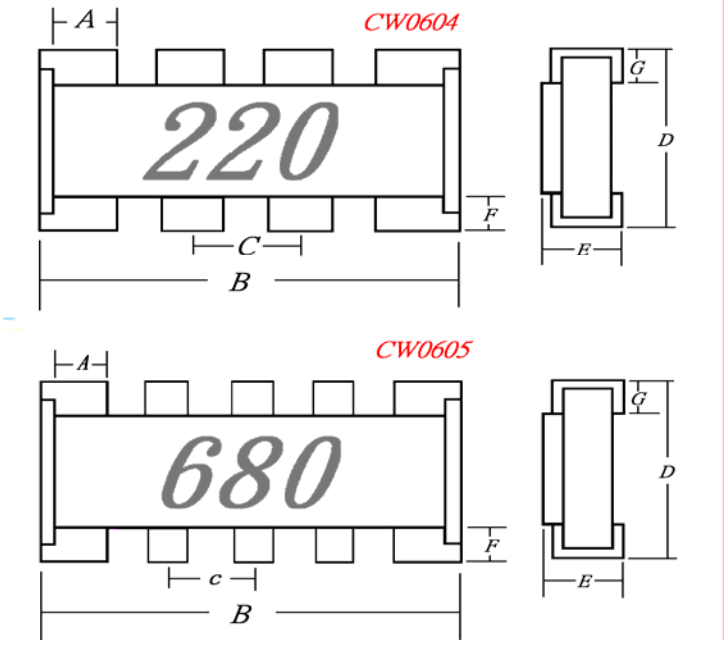
APPEARANCE DIMENSION

UNIT: MM

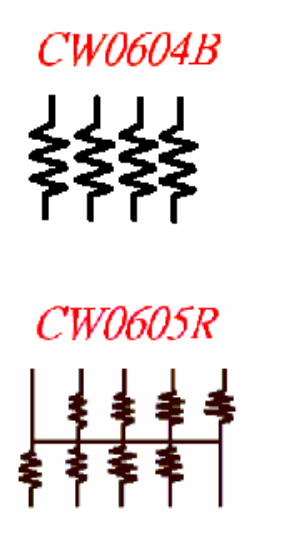
STYLE	CIRCUIT	A	B	C	D	E	F	G
CW06	04B	0.5±0.1	3.2±0.2	0.8±0.05	1.6±0.2	0.5±0.1	0.3±0.1	0.3 MAX
CW06	05R	0.3±0.05	3.2±0.2	0.64±0.05	1.6±0.2	0.5±0.1	0.3±0.1	0.3 MAX

OUTSIDE COATING

BODY: BLACK, CONDUCTIVITY: SILVER



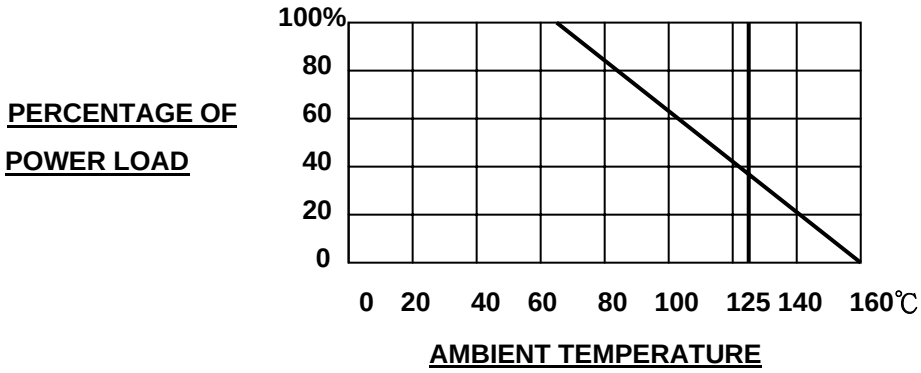
CIRCUIT



THICK FILM CHIP NETWORK RESISTOR
(PROTROUDE ELECTRODE)

SPECIFICATIONS

The rated power means the allowed continuous and maximum power and voltage under the ambient temperature of 70℃.



PERFORMANCE CHARATERISTICS

RATED POWER

TYPE	POWER RATING AT 70℃	MAX WORKING VOLTAGE	MAX OVERLOAD VOLTAGE	OPERATING TEMP. RANGE	RESISTANCE RANGE
CW0604	0.0625W	50V	100V	-55℃~ +125℃	1Ω~10MΩ
CW0605	0.0625W	25V	50V	-55℃~ +125℃	33Ω~100KΩ

(TABLE 1)

RATED VOLTAGE

Rated voltage means the equivalent of rated power to the DC or AC (commercial effective cycles) voltage. The result can be obtained from the rated resistance exceeds the figure in table 2. The maximum working voltage will apply.

E=$\sqrt{PxR}$ where E: Rated Voltage (V), P: Power Rating (W), R: Resistance (Ohm)

ITEM	CHARACTERISTICS	MIL SPEC.
Operating Temp. Range	-55℃ - 125 ℃	---------
Temp. Coefficient	10Ω- 1 MΩ ±200 ppm/℃	STD-202F.304
Short Time Overload	±2% +0.05Ω	2.5 times of the rated voltage R-55342D.4.7.6
Resistance To Soldering Heat	±1% +0.05Ω	260℃ 10 sec. R-55342D.4.7.7
Moisture Resistance	±2% +0.05Ω	40±2℃ 90% RH STD-202F.106
Load Life	±2% +0.1Ω	70±2℃, 500±4 hours STD-202F.108A
Resistance To Solvent	No physical or electrical damage or deterioration on permanent marking	STD-202E.215
Pulse	±2% +0.05Ω	4 x rated volt, on-off 10,000 cycles R55342D.4.7.6
Solderability	Solder to cover over 95% ±1%+0.05Ω	230℃, 5 seconds STD-202F.208
High Temperature Exposure	±2% +0.1Ω	125℃±5℃ 100 hours R-55342D.4.7.6

(TABLE 2)

STANDARD TESTING CONDITION

The standard testing conditions are at temperature +25℃, relative humidity 65% under unquestionable circumstance. Test may be conducted of 5℃ to 35℃ with relative humidity of 45% to 85% in testing and affixing ohm values. It may also be conducted under constant temperature and humidity. But the result of ohm value will require adjustment.

1. ADJUSTMENT OF OHM VALUES

In principle, the standard testing conditions used for testing decide the ohm values. But the constant temperature and humidity used before and after the test which result the ohm values in decision will require the adjustment within the tolerances referring to table 3.

RESISTANCE	100Ω under	100KΩ-255KΩ	255KΩ-1MΩ	1MΩ-5.11MΩ	5.11MΩ over
Adjust rate % per 1℃	－0.02	－0.035	－0.04	－0.05	－0.06

(TABLE 3)

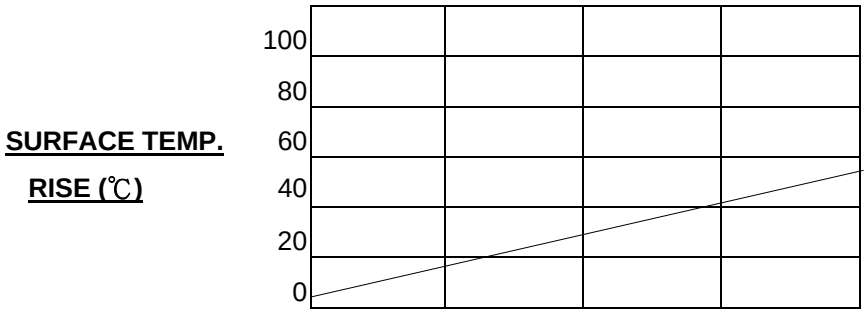
2. TEMPERATURE COEFFICIENT TEST

The resistors are put into the testing chamber at 50℃ ~ 55℃ for 30 to 40 minutes then measure the resistance. However, the temperature coefficient can be calculated by the following equation and its value should be within the range of table 3.

$$\text{RESISTOR TEMPERATURE COEFFICIENT} = \frac{R - R_0}{R} \times \frac{1}{T - T_0} \times 10^6$$

where R= Resistance Value Under The Testing Temperature.
R_0= Resistance Value At Room Temperature.
T= The Testing Temperature.

SURFACE TEMPERTURE RISE



1/16W

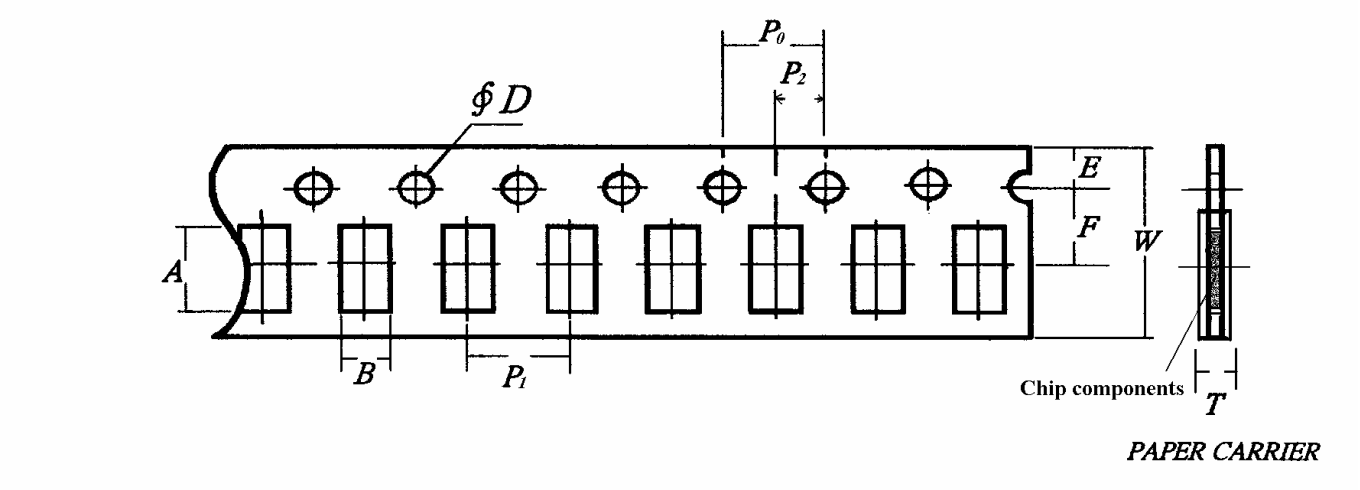
PERCENT RATED LOAD (W)

THICK FILM CHIP NETWORK RESISTOR
(PROTROUDE ELECTRODE)

TAPING DIMENSIONS

Unit: mm

STYLE	ELEMENT NUMBER	TAPING STYLE	A	B	W	E	F	P_0	P_1	P_2	ϕ D	T
CW06	04B	PAPER	1.9	1.1	8.0	1.75	3.5	4.0	4.0	2.0	1.5	0.6
CW06	05R	CARRIER	±0.1	±0.1	±0.2	±0.1	±0.05	±0.1	±0.1	±0.05	+0.1-0	±0.1

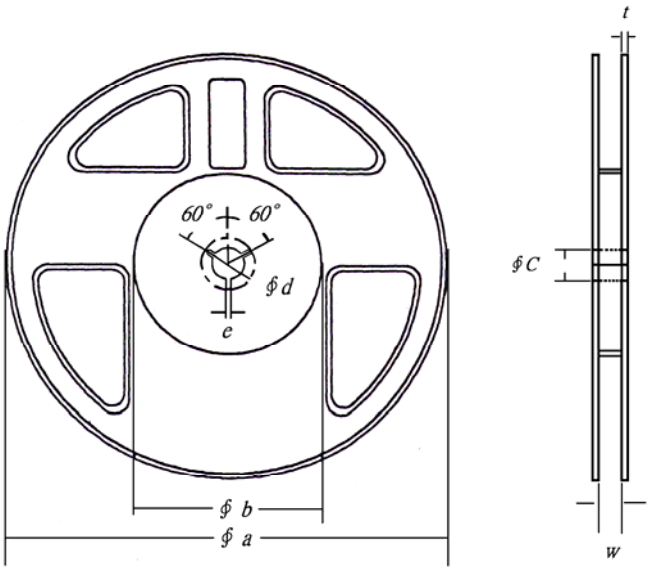


PAPER CARRIER

REEL DIMENSIONS

Unit: mm

STYLE	ϕ a	ϕ b	w	t	ϕ c	ϕ d	e
CW0604/ 0605	178±0.1	60±0.1	10±0.2	1.0±0.2	13.5±0.5	27±0.5	2.0±0.5



METAL OXIDE FILM RESISTOR, NON-FLAME

PART NUMBER DESCRIPTION (for order booking)

MOR100	PS	100K	J	TB
Type & Wattage	Lead Style	Res. Value	Res. Tol.	Package

(1) Type & Wattage: Metal Oxide Resistors, MOR25 (1/4W)
MOR50, MORS50 (1/2W) MOR100, MORS100 (1W)
MOR200, MORS200 (2W) MOR300, MORS300 (3W)
MOR500, MORS500 (5W) MORS700 (7W)

(2) Lead Style: PS, Horizontal Type

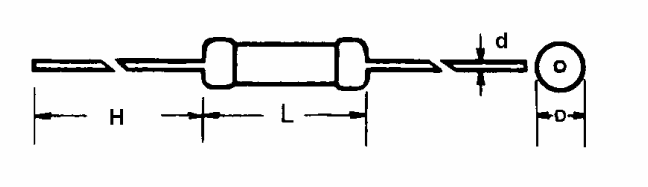
(3) Resistance Value: in Ohm (Ω)

Ohm	0.47	1	4.7	10	100	1000	4700	10000	1000000
Code No.	R47	1	4R7	10	100	1K	4K7	10K	1M

(4) Resistance Tolerance: J=±5%

(5) PACKAGE: TAPE/BOX

DIMENSION & RESISTANCE RANGE:



（Unit: mm）

TYPE		SIZE				Power rating (W)		Resistance Range(E-24)
Normal	Small	L	D	H	d			
MOR25	MORS50	6.3+-0.5	2.3+-0.3	28+-2	0.6+-0.05	1/4W	1/2W	1-1M ohm
MOR50	MORS100	9.5+-0.5	3.2+-0.3	26+-2	0.6+-0.05	1/2W	1W	1-1M ohm
MOR100	MORS200	11.5+-1.0	4.5+-0.5	35+-2	0.8+-0.05	1W	2W	1-1M ohm
MOR200	MORS300	15.5+-1.0	5.0+-0.5	33+-2	0.8+-0.05	2W	3W	1-1M ohm
MOR300	MORS500	17.5+-1.0	6.5+-1.0	32+-2	0.8+-0.05	3W	5W	1-1M ohm
MOR500	MORS700	24.5+-1.0	8.5+-1.0	38+-2	0.8+-0.05	5W	7W	1-1M ohm

PERFORMANCE CHARACTERISTICS:

TEST ITEM	TEST CONDITIONS	MAX. RES. CHANGE
Temperature Coefficient	-55℃~+155℃	±300PPM/℃
Short Time Overload	2.5 times of rated voltage for 5 sec.	±(1%+0.05Ω)
Resistance to Soldering Heat	350+-10℃ 3+-0.5 sec.	±(1%+0.05Ω)
Temperature Cycling	-65℃~ +150℃, 5 cycles	±(1%+0.05Ω)
Load Life	70℃ (1.5hrs.on,0.5hrs.office)	±(5%+0.05Ω)
Moisture-proof Load Life	40+-2℃ 90-95% RH on-off cycle 1,000 hours	±(5%+0.05Ω)
Incombustibility	6 times of rated wattage for 5 min.	Not flamed

WIRE WOUND RESISTOR, NON-FLAME

PART NUMBER DESCRIPTION (for order booking)

WWR100	**PS**	**100K**	**J**
Type & Wattage	**Lead Style**	**Res. Value**	**Res. Tol.**

(**1) Type & Wattage:** WWR100 – Wire Wound Resistors, 1W
WWR200 (2W)
WWR300 (3W)

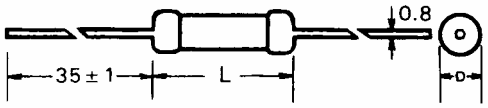
(2) Lead Style: PS, Horizontal Type

(3) Resistance Value: in Ohm (Ω)

Ohm	0.47	1	4.7	10	100	1000	4700	10000	1000000
Code No.	R47	1	4R7	10	100	1K	4K7	10K	1M

(4) Resistance Tolerance: J=±5%

DIMENSION & RESISTANCE RANGE:



TYPE	L±1.0	D±0.5	RESISTANCE RANGE RES. TOL.: J (±5%)
WWR100 (1W)	11.0	4.5	0.1Ω~50Ω
WWR200 (2W)	15.0	5.0	0.1Ω~100Ω
WWR300 (3W)	17.0	6.0	0.1Ω~100Ω

PERFORMANCE CHARACTERISTICS:

TEST ITEM	TEST CONDITIONS	MAX. RES. CHANGE
Temperature Coefficient	-30℃~+155℃	±300PPM/℃
Short Time Overload	5 times of rated voltage for 5 sec.	±2%
Voltage Withstanding	500V AC 1 Min.	No change
Insulation Resistance	500V megger.	500MΩ
Temperature Cycle	-30℃~ +85℃, 5 cycles	±1%
Load Life	70℃ on-off cycle 1,000 hours	±5%
Moisture-proof Load Life	40℃ 95% RH on-off cycle 1,000 hours	±3%
Incombustibility	6 times of rated wattage for 5 min.	Not flamed

WIRE WOUND RESISTOR, CEMENT ENCASED

PART NUMBER DESCRIPTION (for order booking)

WCR200	S	QP	470	J
Type & Wattage	**SIZE**	**Lead Style**	**Res. Value**	**Res. Tol.**

(1) Type & Wattage:

WCR200 (2W)	WCR500 (5W)	WCR700 (7W)	WCR10W (10W)	WCR15W (15W)	WCR20W (20W)	WCR25W (25W)
WCR300 (3W)	WCR500S (5W)	WCR700S (7W)	WCR10WS (10W)	WCR15WS (15W)	WCR20WS (20W)	WCR25WS (25W)
WCR300S (3W)	WCR500A (5W)					WCR25WA (25W)

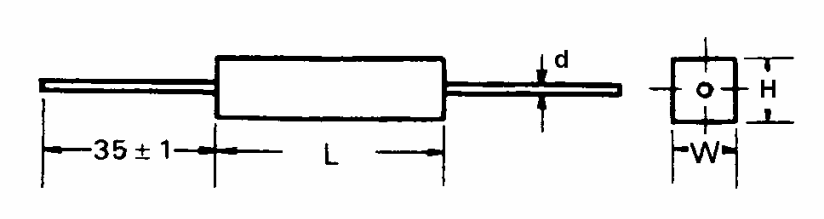
(2) Case Style: QP – Horizontal Square Type

(3) Resistance Value: in Ohm (Ω)

Ohm	0.47	1	4.7	10	100	1000	4700	10000	1000000
Code No.	R47	1	4R7	10	100	1K	4K7	10K	1M

(4) Resistance Tolerance: J=±5%

DIMENSION & RESISTANCE RANGE:



TYPE	WATT	DIMENSIONS				RESISTANCE RANGE * RES. TOL.: J (±5%)
		L	W	H	d±0.05	
WCR200	**2W**	18.0±1.0	6.5±1.0	6.5±1.0	0.8	0.1Ω~100KΩ
WCR300	**3W**	22.0±1.5	8.0±1.0	8.0±1.0	0.8	0.1Ω~100KΩ
WCR300S	**3W**	20.0±1.5	6.5±1.0	6.5±1.0	0.8	0.1Ω~100KΩ
WCR500	**5W**	22.0±1.5	9.5±1.0	9.0±1.0	0.8	0.1Ω~100KΩ
WCR500S	**5W**	22.0±1.5	8.0±1.0	8.0±1.0	0.8	0.1Ω~100KΩ
WCR500A	**5W**	25.0±1.5	6.5±1.0	6.5±1.0	0.8	0.1Ω~100KΩ
WCR700	**7W**	35.0±1.5	9.5±1.0	9.0±1.0	0.8	0.5Ω~10KΩ
WCR700S	**7W**	25.0±1.5	6.5±1.0	6.5±1.0	0.8	0.1Ω~100KΩ
WCR10W	**10W**	48.0±1.5	9.5±1.0	9.0±1.0	0.8	1Ω~10KΩ
WCR10WS	**10W**	35.0±1.5	9.5±1.0	9.0±1.0	0.8	0.5Ω~10KΩ
WCR15W	**15W**	48.0±1.5	12.5±1.0	12.5±1.5	0.8	1Ω~10KΩ
WCR15WS	**15W**	48.0±1.5	9.5±1.0	9.0±1.0	0.8	1Ω~10KΩ
WCR20W	**20W**	60.0±1.5	14.0±1.5	14.0±1.5	0.8	1Ω~10KΩ
WCR20WS	**20W**	48.0±1.5	12.5±1.5	12.5±1.5	0.8	1Ω~10KΩ
WCR25W	**25W**	60.0±1.5	14.0±1.5	14.0±1.5	0.8	1Ω~10KΩ
WCR25WS	**25W**	60.0±1.5	12.5±1.5	12.5±1.5	0.8	1Ω~10KΩ

*** Remarks: 1. Resistance values beyond the above listed standard value are available for special order only.**

2. Resistance values for Non-Inductive type are up to 50Ω only.

WIRE WOUND RESISTOR, CEMENT ENCASED

ELECTRICAL CHARACTERISTICS

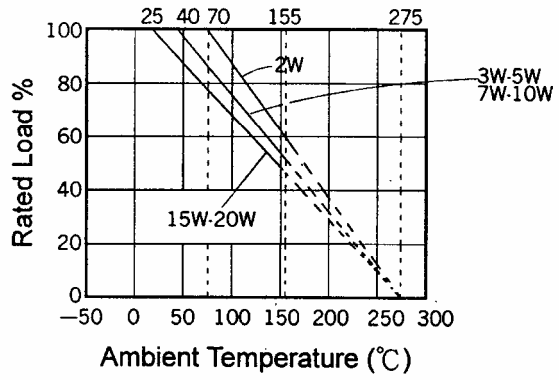
TYPE	WCR200	WCR300	WCR500	WCR700	WCR10W	WCR10W
	WCR300S	WCR500S	WCR700S	WCR10WS	WCR15WS	WCR15WS
Operating Temperature Range	-55℃ ~ +155℃					
Max. Working Voltage	250V	350V	350V	500V	500V	500V
Max. Overload Voltage	500V	700V	700V	1000V	1000V	1000V
Dielectric Withstanding Voltage (AC)	500V	700V	700V	1000V	1000V	1000V
Temperature Coefficient	±300ppm/℃					

PERFORMANCE CHARACTERISTICS:

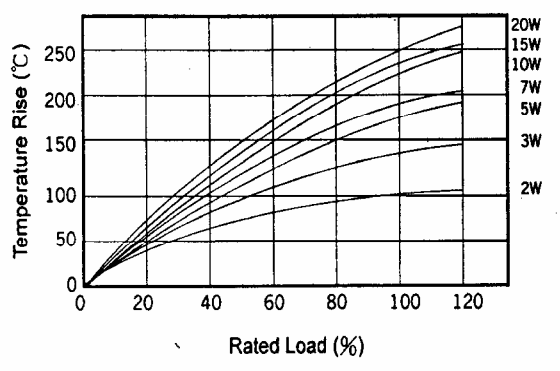
TEST ITEM	TEST CONDITIONS	MAX. RES. CHANGE
Short Time Overload	2.5 times RCWV* for 5 seconds (JIS-C-5202 5.5)	±(2%+0.05Ω)
Dielectric Withstanding Voltage	in V-Block for 60 seconds (JIS-C-5202 5.7)	--
Temperature Coefficient	－55℃～ ＋155℃ (JIS-C-5202 5.2)	Max. 300PPM/℃
Insulation Resistance	in V-Block (JIS-C-5202 5.6)	≧1000 MΩ
Solderability	235℃ for 5±0.5 seconds (JIS-C-5202 6.5)	95% min. coverage
Resistance to Solvent	Trichroethance for 1min. (JIS-C-5202 6.9)	no deterioration
Terminal Strength	Direct load for 10 sec. in the direction of the terminal leads	≧2.5KG/24.5N
Pulse Overload	4 times RCWV 10,000 cycles (1 sec. on, 25 sec. off) (JIS-C-5202 5.8)	±(2%+0.05Ω)
Moisture-proof Load Life	40±2℃,90~95% RH at RCWV for 1000 hrs (1.5 hrs. on, 0.5 hrs. off) (JIS-C-5202 7.9)	±(5%+0.05Ω)
Load Life	70℃ at RCWV for 1000 hrs. (1.5 hrs. on, 0.5 hrs. off) (JIS-C-5202 7.10)	±(5%+0.05Ω)
Soldering Heat	350±10℃ for 3±0.5 sec. (JIS-C-5202 6.4)	±(1%+0.05Ω)

*** Rated continuous Working Voltage (RCWV) = power rating × resistance value**

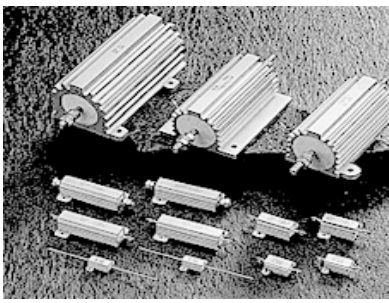
DERATING CURVE



TEMPERAUTRE RISE



WIREWOUND RESISTOR, ALUMINUM ENCASED



PART NUMBER DESCRIPTION (for order booking)

WAR50 **470** **J**

Type & Wattage **Res. Value** **Res. Tol.**

(1) Type & Wattage:

Inductive Type

WAR5 (5W)	WAR10 (10W)	WAR25 (25W)	WAR50 (50W)	WAR100 (100W)	WAR250 (250W)

Non-inductive Type

WARN5 (5W)	WARN10 (10W)	WARN25 (25W)	WARN50 (50W)	WARN100(100W)	WARN250(250W)

(2) Resistance Value: in Ohm (Ω)

Ohm	0.47	1	4.7	10	100	1000	4700	10000	1000000
Code No.	R47	1	4R7	10	100	1K	4K7	10K	1M

(3) Resistance Tolerance: D=±0.5% F=±1% G=±2% H=±3% J=±5% K=±10%

FEATURE:

- High power rating, small size and ultra precision.
- Standard winding & non-inductive winding types.
- High stability, strong construction.

MATERIALS:

- Encapsulant: Silicone
- End caps: Stainless steel
- Core: Ceramic steatite or aluminum
- Standard Terminals: 5~50W Tinned terminals; 100~250W Threaded terminals
- Housing: Aluminum with hard anodic coating
- Element: Copper-nickel alloy, nickel-chrome alloy or manganese copper

GENERAL SPECIFICATIONS:

Wattage Range:	5 to 250 watts.
Resistance Tolerance:	0.5%, 1%, 2%, 3%, 5%, 10%
Operating Temperature Range:	-55℃ to +275℃
Dielectric Strength:	1000V for WAR5, WAR10, WAR25, WAR50 2500V for WAR100, WAR250
Temperature Coefficient of Resistance **Standard T.C.:**	±30PPM/°C =10Ω and up, ±50PPM/°C =1 to 9.99Ω ±90PPM/°C =below 1Ω

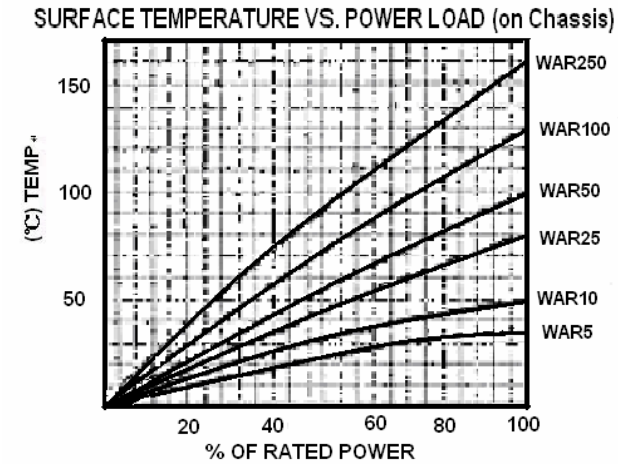
WIREWOUND RESISTOR, ALUMINUM ENCASED

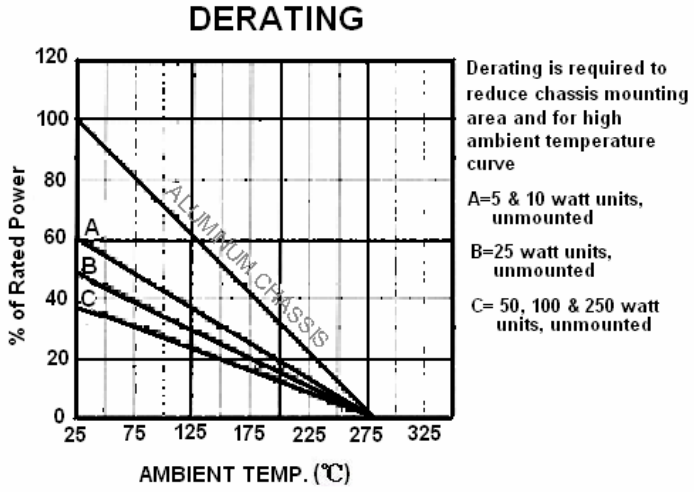
ELECTRICAL CHARACTERISTICS

Type	MIL Style	Wattage Rating	Resistance Range (Ω)		MAX Working (V)		(g) MAX Weight	proper heat sink (aluminum chassis)
			WAR	WARN	WAR	WARN		
WAR- 5	RE60	5W	0.05 ~ 3k	0.1~1k	120	70	3	152X102X51X1t
WAR- 10	RE65	10W	0.02 ~ 6k	0.03~2.3k	245	180	7	152X102X51X1t
WAR- 25	RE70	25W	0.012~15k	0.02~5.5k	500	300	15	178X127X51X1t
WAR- 50	RE75	50W	0.01 ~40k	0.02~12k	1300	600	33	305X305X1.5t
WAR-100	RE77	100W	0.4 ~50k	0.12~25k	1900	1340	450	305X305X3t
WAR-250	RE80	250W	0.6 ~80k	0.15~40k	2500	1750	800	305X305X3t

PERFORMANCE CHARACTERISTICS

Parameters	Test Conditions	Specifications
Short Time Overload	5x wattage rating-5sec.	ΔR± (0.5%+0.05Ω) MAX
Moisture Resistance	Temp. 40°C moisture 95% DC 100V 500Hr	ΔR± (0.5%+0.05Ω) MAX
Moisture Load Life	Temp. 40°C moisture 95% 1/10 x wattage rating (1.5Hr ON - 0.5Hr OFF) - Repeat 1000Hr	ΔR± (0.5%+0.05Ω) MAX
Load Life	Load Rating (chassis is mounted) (1.5Hr ON-0.5Hr OFF) Repeat 1000Hr	ΔR± (1.5%+0.05Ω) MAX
Vibration	10c/s~50c/s~10c/s (1min) 2Hr each of paralleled and right angle	ΔR± (0.2%+0.05Ω) MAX
Heat Resistance	275°C 2Hr	ΔR± (0.5%+0.05Ω) MAX
Dielectric Strength	1000V for WAR-5, WAR-10, WAR-25 1500V for WAR-50 2500V for WAR-100, WAR-250	ΔR± (0.2%+0.05Ω) MAX
Insulation Resistance	Under the same test condition of Dielectric Strength, Load DC 500V and measure the Insulation R.	1000MΩ min
Terminal Strength	1. Pull Test (30 sec Min): 1kg for WAR-5, 2.3kg for WAR-10, 4.5kg for WAR-25, WAR-50 2. Torque Test (5~15sec): 27kg-cm for WAR-100, 36kg-cm for WAR-250	ΔR± (0.2%+0.05Ω) MAX

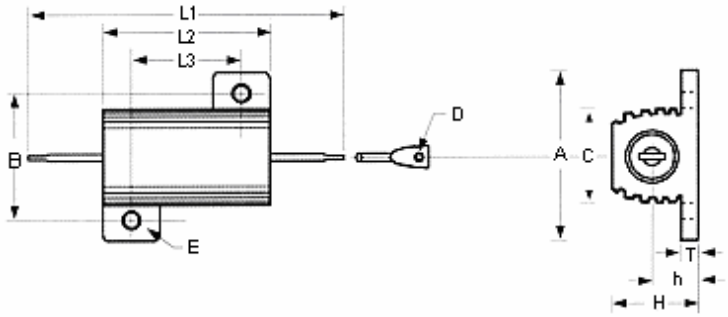




WIREWOUND RESISTOR, ALUMINUM ENCASED

DIMENSION OF PRECISION POWER RESISTORS (unit: mm)

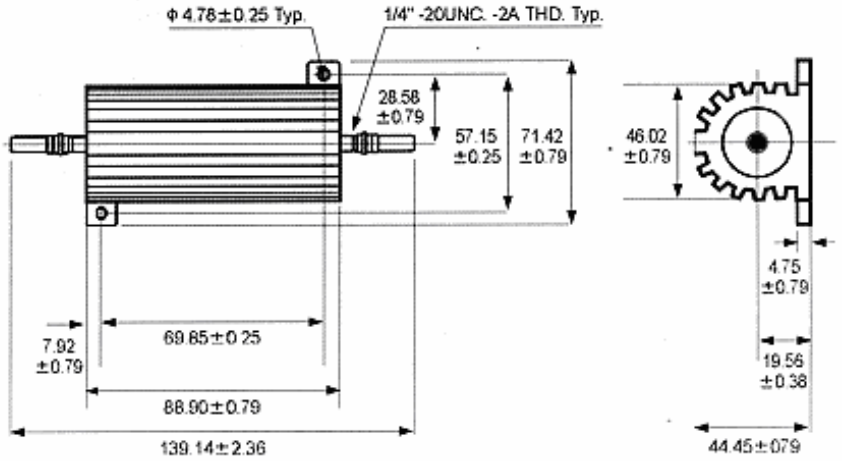
WAR-5 WARN-5
WAR-10 WARN-10
WAR-25 WARN-25
WAR-50 WARN-50



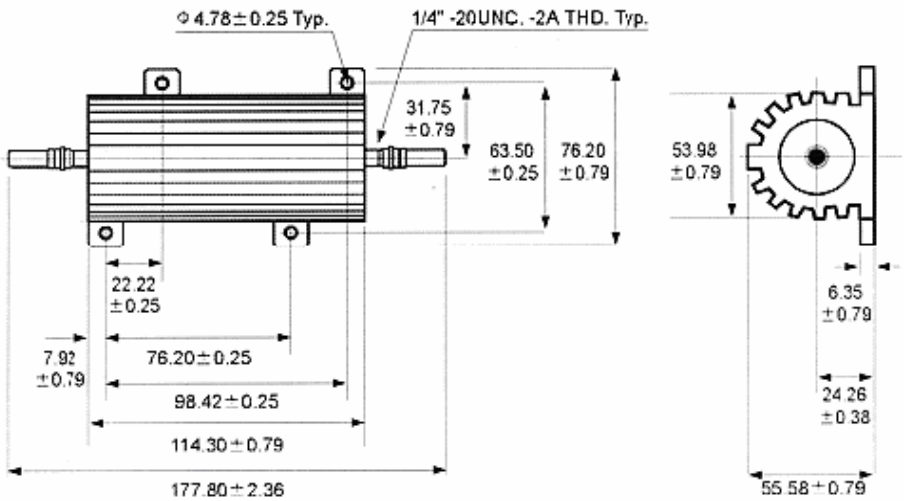
Dimensions:

TYPE	L 1	L 2 ± 1	L 3 ± 0.8	A ± 1	B ± 0.8	C ± 1	D ± 0.1	E ± 0.3	H ± 1	h ± 1	T ± 0.2
WAR- 5 WARN-5	28.6	15.3	11.3	16.5	12.4	8.5	1.3	2.4	8.2	4	1.6
WAR-10 WARN-10	35	19	14.3	20.4	15.9	11	2.2	2.4	10	5	2
WAR-25 WARN-25	49	27	18.3	27.2	19.8	14	2.2	3.2	14.	6.5	2
WAR-50 WARN-50	70	50	39.7	29.2	21.5	16	2.2	3.2	16.7	7	2

WAR-100
WARN-100



WAR-250
WARN-250



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