

ROYALOHM

SPECIFICATION FOR APPROVAL

TRELIK COMERCIAL IMPORTADORA LTD.

Description : Carbon Film Fixed Resistors

Royalohm Part no.: CFR0W6JxxxxA50 (CR 1/6W +/-5% PT-52mm.)

Approved by

Parts corresponding to RoHS Compliant: 2005-Apr.-1

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Approved	Checked	Prepared
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Issued Date: 2008/06/13

1. Scope:

This specification for approval relates to Carbon Film Fixed Resistors manufactured by ROYALOHM 's specifications.

2. Type designation:

The type designation shall be in the following form :

(Ex.)	CR	1/6W	J	300Ω
	Type	Power Rating	Resistance Tolerance	Nominal Resistance

3. Ratings:

Ratings shall be shown in the table 1.

Table 1

Type	CR
Rated Power at 70	0.16W at 70
Max. Working Voltage	200 V
Max. Overload Voltage	400 V
Dielectric Withstanding Voltage	400 V
Rated Ambient Temp.	70 □
Operating Temp.Range.	-55□ --- +155□
Resistance Tolerance	± 5 %
Resistance Range	1Ω----10MΩ

3.1 Power rating:

Resistors shall have a power rating based on continuous full load operation at an ambient temperature of 70 □. For temperature in excess of 70 □ , the load shall be derated as shown in the figure 1.

3.2 Voltage rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating , as determined from the following formula :

$$RCWV = \sqrt{P \times R}$$

Were : RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

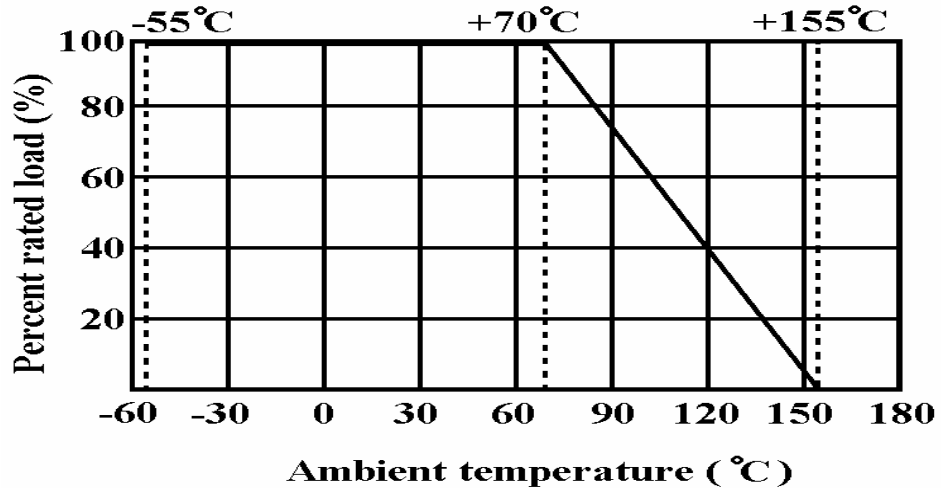
P = Power Rating (watt)

R = Nominal Resistance (ohm)

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In no case shall the rated DC or RMS AC continuous working voltage be greater than the applicable maximum value.

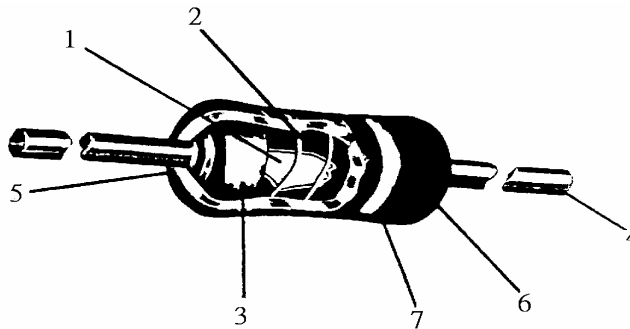
Figure 1.



3.3 Nominal resistance :

Effective figures of nominal resistance shall be in accordance with E-24 series, and resistance tolerance shall be shown by table 1.

4. Construction :



No.	Name	Material
1	Basic Body	Rod Type Ceramics
2	Resistance Film	Carbon Film
3	End Cap	Steel (Tin plated iron surface)
4	Lead Wire	Annealed copper wire coated with tin
5	Joint	By welding
6	Coating	Insulated epoxy resin (Color : Beige)
7	Color Code	Epoxy Resin

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5. Characteristics :

Characteristics	Limits	Test Methods (JIS C 5201-1)										
DC. Resistance	Must be within the specified tolerance.	5.1 The limit of error of measuring apparatus shall not exceed allowable range or 5% of resistance tolerance										
Temperature coefficient	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Resis.Range</th> <th style="text-align: center;">T.C.R. (PPM/)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">□ 10 Ω</td> <td style="text-align: center;">0 □ ±350</td> </tr> <tr> <td style="text-align: center;">11Ω □ 99K</td> <td style="text-align: center;">0 □ -450</td> </tr> <tr> <td style="text-align: center;">100K □ 1M</td> <td style="text-align: center;">0 □ -700</td> </tr> <tr> <td style="text-align: center;">1.1M □ 10M</td> <td style="text-align: center;">0 □ -1500</td> </tr> </tbody> </table>	Resis.Range	T.C.R. (PPM/)	□ 10 Ω	0 □ ±350	11Ω □ 99K	0 □ -450	100K □ 1M	0 □ -700	1.1M □ 10M	0 □ -1500	5.2 Natural resistance change per temp. degree centigrade. $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \quad (\text{PPM}/\square)$ R1: Resistance value at room temperature (t ₁) R2: Resistance value at room temp.plus 100□ (t ₂)
Resis.Range	T.C.R. (PPM/)											
□ 10 Ω	0 □ ±350											
11Ω □ 99K	0 □ -450											
100K □ 1M	0 □ -700											
1.1M □ 10M	0 □ -1500											
Short time overload	Resistance change rate is ± (1 % + 0.05Ω) Max. with no evidence of mechanical damage	5.5 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds.										
Insulation Resistance	Insulation resistance is 10,000 MΩ Min	5.6 Resistors shall be clamped in the trough of a 90° metallic V-block and shall be tested at DC potential respectively specified in the above list for 60 +10/ -0 seconds.										
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down.	5.7 Resistors shall be clamped in the trough of a 90° metallic V-block and shall be tested at AC potential respectively specified in the table 1. for 60 + 10/-0 seconds.										
Terminal strength	No evidence of mechanical damage.	6.1 Direct load : Resistance to a 2.5 kgs direct load for 10 secs. in the direction of the longitudinal axis of the terminal leads. Twist test : Terminal leads shall be bent through 90 ° at a point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations.										

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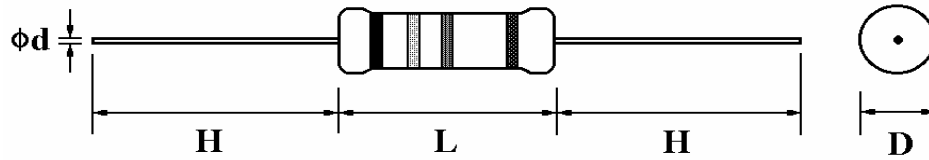
Characteristics	Limits	Test Methods (JIS C 5201-1)															
Resistance to soldering heat	Resistance change rate is $\pm (1\% + 0.05\Omega)$ Max. with no evidence of mechanical damage.	6.4 Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in $350 \square \pm 10 \square$ solder for 3 ± 0.5 seconds															
Solderability	95 % coverage Min.	6.5 The area covered with a new , smooth clean , shiny and continuous surface free from concentrated pinholes. Test temp. of solder : $245 \square \pm 3 \square$ Dwell time in solder : 2 ~ 3 seconds															
Temperature cycling	Resistance change rate is $\pm (1\% + 0.05\Omega)$ Max. with no evidence of mechanical damage.	7.4 Resistance change after continuous 5 cycles for duty shown below: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 10%;">Step</th> <th style="width: 50%;">Temperature</th> <th style="width: 40%;">Time</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">$-55 \square \pm 3 \square$</td> <td style="text-align: center;">30 mins</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Room temp.</td> <td style="text-align: center;">10 \square 15 mins</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">$+155 \square \pm 2 \square$</td> <td style="text-align: center;">30 mins</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Room temp.</td> <td style="text-align: center;">10 \square 15 mins</td> </tr> </tbody> </table>	Step	Temperature	Time	1	$-55 \square \pm 3 \square$	30 mins	2	Room temp.	10 \square 15 mins	3	$+155 \square \pm 2 \square$	30 mins	4	Room temp.	10 \square 15 mins
Step	Temperature	Time															
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Load life in humidity	<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th colspan="2" style="text-align: center;">Resistance value</th> <th style="text-align: center;">\square R/R</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Normal</td> <td style="text-align: center;">\square 100KΩ</td> <td style="text-align: center;">$\pm 3 \%$</td> </tr> <tr> <td style="text-align: center;">Type</td> <td style="text-align: center;">\square 100KΩ</td> <td style="text-align: center;">$\pm 5 \%$</td> </tr> </tbody> </table>	Resistance value		\square R/R	Normal	\square 100K Ω	$\pm 3 \%$	Type	\square 100K Ω	$\pm 5 \%$	7.9 Resistance change after 1,000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") in a humidity test chamber controlled at $40 \square \pm 2 \square$ and 90 to 95 % relative humidity						
Resistance value		\square R/R															
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Resistance value		\square R/R															
Normal	\square 56K Ω	$\pm 2 \%$															
Type	\square 56K Ω	$\pm 3 \%$															

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6. Dimension :

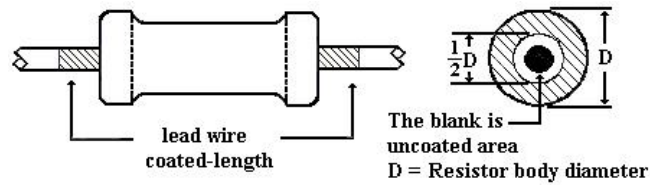
Unit: mm



Type	Power Rating	D (Max.)	L (Max.)	d ± 0.05	H ± 3
CR	1/6W	1.85 mm	3.5 mm	0.45 mm	28 mm

Painting method:

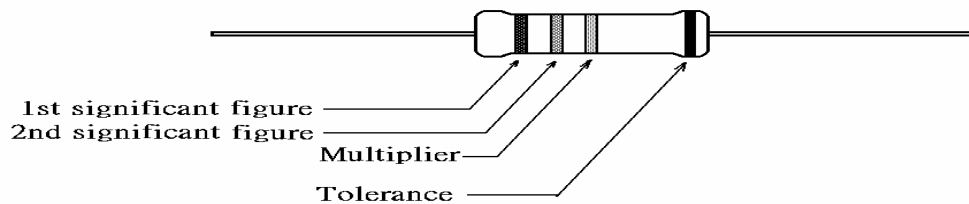
Welding point, terminal and lead wire, is permissible to be exposed without the outer coated cover.
The extent should be within 1/2 of the arc angle.



7. Marking :

7.1 Resistor :

Resistors shall be marked with color coding
colors shall be in accordance with JIS C 0802



7.2 Label :

Label shall be marked with following items:

- (1) Type and style
- (2) Nominal resistance
- (3) Resistance tolerance
- (4) Quantity
- (5) Lot number
- (6) PPM

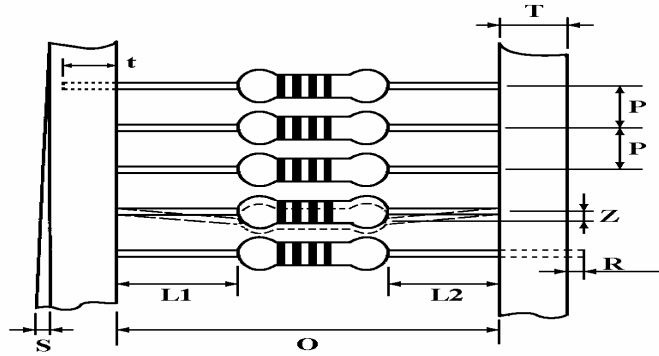
Example :

Carbon Film Fixed Resistors			
Watt :	1/6W	Val :	300E
Q'TY :	5,000	Tol :	5%
Lot :	813478	PPM :	
	ROYALOHM		Pb Free

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8. Packing specification :

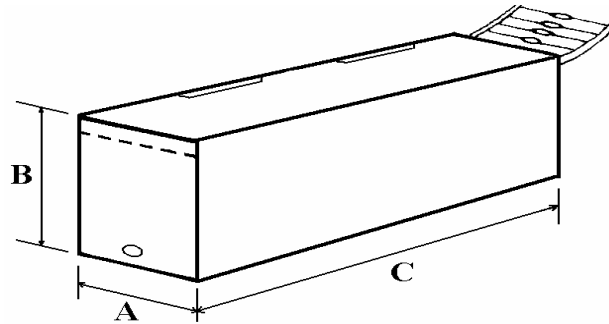
8.1 Taping dimension :



Dimensions (mm)

Type	Style	O	P	L1-L2	T	Z	R	t	S
CR-16	PT-52	52±1	5±0.3	1 Max.	6±1	1 Max.	0	4 ±1	0.5 Max.

8.2 Tape in box packing :



Bandoliers may also be contained in a cardboard box ("Ammopack")

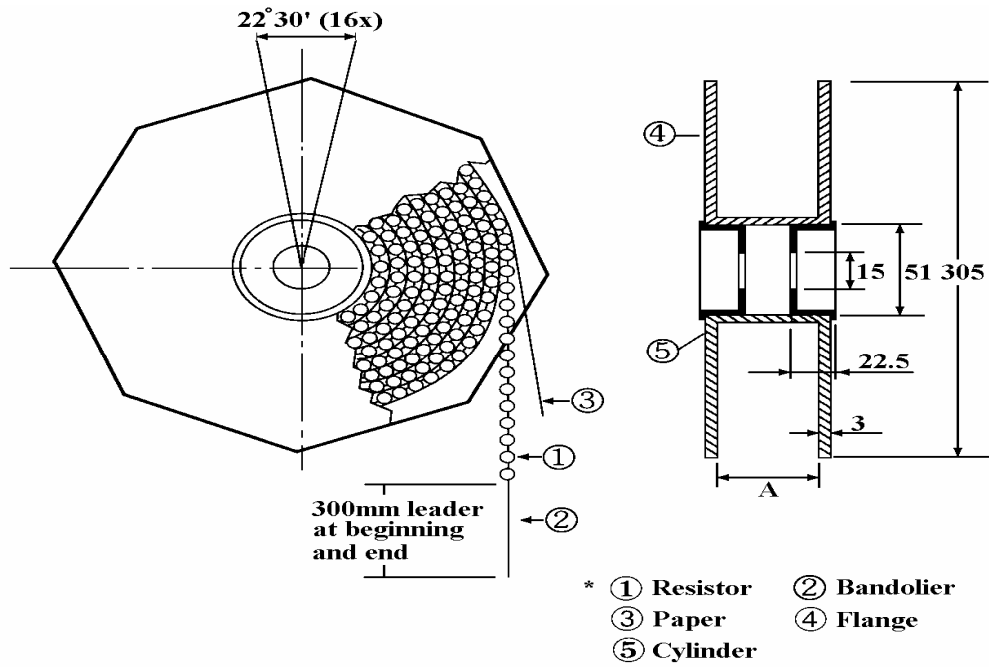
Dimension (mm)

Type	Style	L (C)	W (A)	H (B)	Quantity Per Box (pcs.)
CR-16	PT-52	±5	±5	±5	5,000

"Ammopack" is an abbreviation of "ammunition pack"

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8.3 Tape on reel packing :



Dimension (mm) :

Type	Style	Across Flange (A)	Quantity Per Reel
CR-16	PT-52	73 ± 2	5,000 pcs.

Part Number System

Explanation of Part Number System (Carbon Film Fixed Resistors)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
C	F	R	0	W	6	J	0	3	0	1	A	5	0

Product Type:
CFR = Carbon Film Fixed Resistor

Special Feature:
0 = Standard Product
F = Non-Flame Product
I = Non-Inductive Product

Tolerance:
F ~ ± 1%
G ~ ± 2%
J ~ ± 5%
K ~ ± 10%

Resistance Value:
E-24 series: the 1st digit is "0", the 2nd & 3rd digits are for the significant figures of the resistance and the 4th indicate the number of zeros following:
"J" ~ 0.1, "K" ~ 0.01
Ex.: 4.7Ω ~ 47J, 4.7KΩ ~ 472
E--96 Series: the 1st to 3rd digits are significant figures of resistance and the fourth one denotes number of zeros following:
Ex.: 1.33KΩ = 1331

Packing Quantity:
1 = 1,000pcs
2 = 2,000pcs
3 = 3,000pcs
4 = 4,000pcs
5 = 5,000pcs
A = 500pcs
B = 2,500pcs
C = 10,000pcs
D = 20,000pcs
0 = for Bulk/Box packing

Packing Type:
A = Tape/Box
T = Tape/Reel
B = Bulk/Box

Wattage:

Normal size:	Small size:
W8 = 1/8W	S4 = 1/4W-S
W6 = 1/6W	S2 = 1/2W-S
W4 = 1/4W	1S = 1W-S
W2 = 1/2W	2S = 2W-S
1W = 1W	3S = 3W-S
2W = 2W	S3 = 1/3W-S
3W = 3W	

Extra Small size:
U2 = 1/2W-SS
1U = 1W-SS

Addition Information:
0 = PT-52mm, NIL for PT-26mm
8 = PT-58mm
9 = PT-64mm
P = Panasert type
1 = Avisert type 1
2 = Avisert type 2
3 = Avisert type 3
A = Cutting type CO 1/4W-A type
B = Cutting type CO 1/4W-B type
7 = Lead wire(H) 38mm

Sample: CR 1/6W +/- 5% 300Ω T/B 5,000 PT-52mm. → CFR0W6J0301A50