ROYALOHM

C O N F I D E N T I A L D O C U M E N T

SPECIFICATION FOR APPROVAL

TRELIK

Description: Thick Film Chip Resistor Array (Terminal Lead Free)

Royalohm Part no.:

4D03WGJxxxxT5E (RMC 1/16W (4D03) +/-5% T/R-5,000)

Approved by

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

Royal Electronic Factory (Thailand) Co., Ltd.
20/1-2 Moo 2 Klong-Na, Muang
Chachoengsao 24000, Thailand
Tel: +66-38-822404-8
Fax: +66 38-981190 / 823765
E-mail Address: Export sales: Export@royalohm.com
Local sales: Local@royalohm.com
http://www.royalohm.com

Approved	Checked	Prepared
Mr. Jack Lin	Mr. S. Polthanasan	Ms.P. Supatta

Issue Date: 2015/01/12

CHANGE NOTIFICATION HISTORY			
Version	**Date of Version**	**History**	**Remark**
1	2015/01/12	Resistance Range: 10Ω ~ 1MΩ	

Customer : TRELIK	**Part No.: 4D03WGJxxxxT5E**

1. Scope:

This specification for approval relates to Thick Film Chip Resistor Array (Terminal Lead Free) manufactured by ROYALOHM 's specifications.

2. Type designation:

The type designation shall be in the following form:

	Type	Power Rating	Resistance tolerance	Nominal Resistance
Ex.	RMC 4D03	0.0625W (1/16W)	J	4.7KΩ

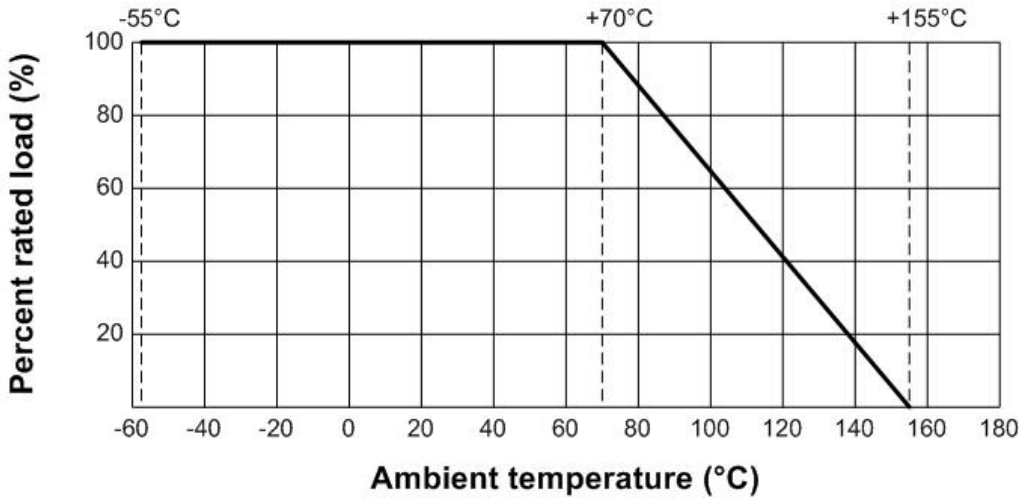
3. Ratings:

Type	RMC 4D03 (8Pin4R)
Power Rating	0.0625W at 70℃
Max. Working Voltage	50 V
Max. Overload Voltage	100 V
Dielectric Withstanding Voltage	300 V
Temperature Range	-55℃～ +155℃
Ambient Temperature	70 ℃
Resistance Range	10Ω ~ 1MΩ

3.1 Power rating:

Resistors shall have a power rating based on continuous load operation at an ambient temperature of 70 ℃ . For temperature in excess of 70 ℃ , The load shall be derate as shown in figure 1.

Figure 1

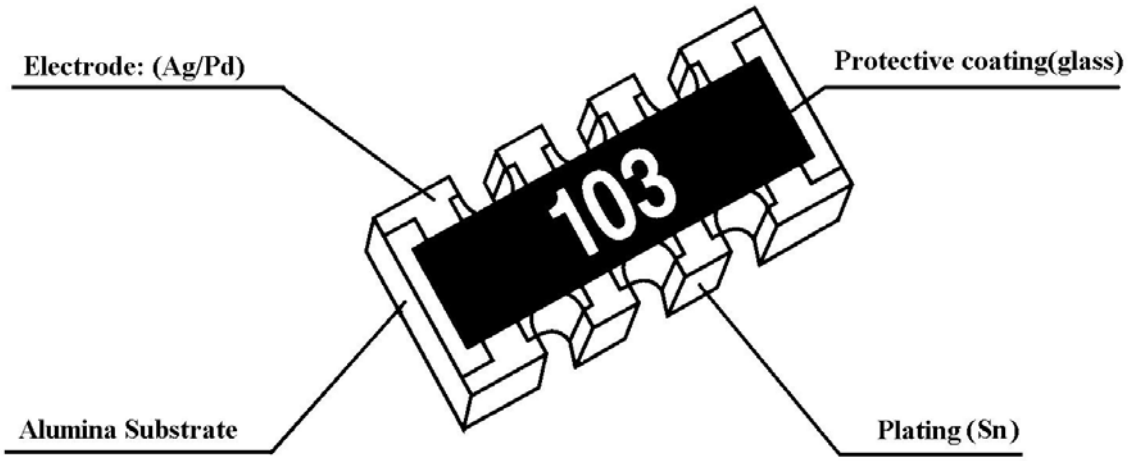


3.2 Nominal Resistance

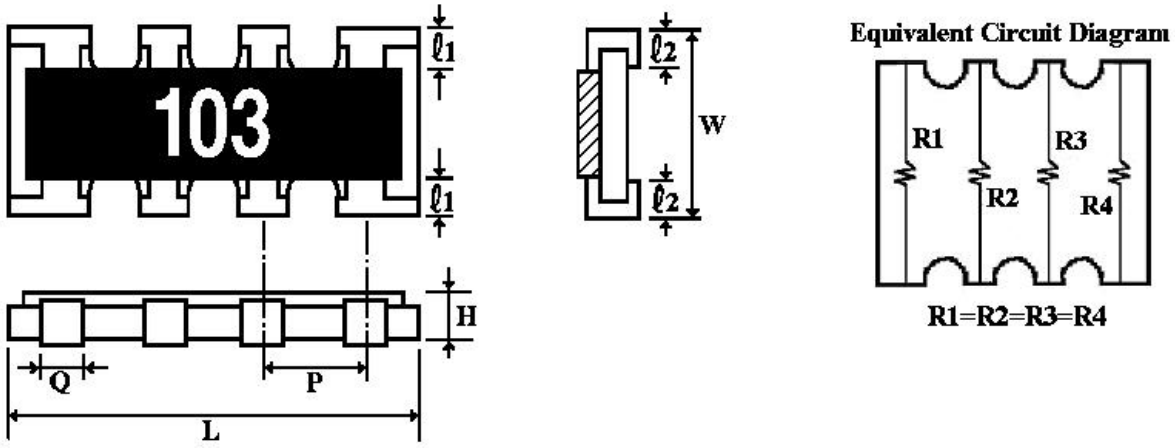
Effective figures of nominal resistance shall be in accordance with E-24 and E-96 series E-96 series for 1 % and E-24 series for 2 % and 5 %

Thick Film Chip Resistor Array (Terminal Lead Free)

4. Construction :



5. Power rating and dimensions



Dimension :

Type	Dimension (mm)						
	L ± 0.20	W ± 0.20	H ± 0.10	ℓ1 ± 0.15	ℓ2 ± 0.15	P ± 0.10	Q ± 0.15
RMC 4D03	3.20	1.60	0.50	0.30	0.30	0.8	0.50

Power Rating :

Type	Power Rating at 70 ℃	Tolerance %	Resistance Range	Standard Resistance values
RMC 4D03	0.0625 W (1/16W)	± 5	10Ω ~ 1MΩ	E-24

Thick Film Chip Resistor Array (Terminal Lead Free)

6. Marking :

6.1 Resistors

A. Marking for E-24 series in 4D03 size : 3 Digits

*The first 2 digits are singnificant figures of resistance and the 3rd digit denoted number of zeros.

Ex. | | 103 | | 10KΩ

*For ohmic values below 10 Ω, letter"R" is for decimal point.

Ex. | | R68 | | 0.68Ω

6.2 Labels

Label shall be marked with the following item :

A. Nominal Resistance and Resistance Tolerance

B. Power Rating and Size

C. Quantity

D. Part No.

E. P.O.No.

F. Lot No.

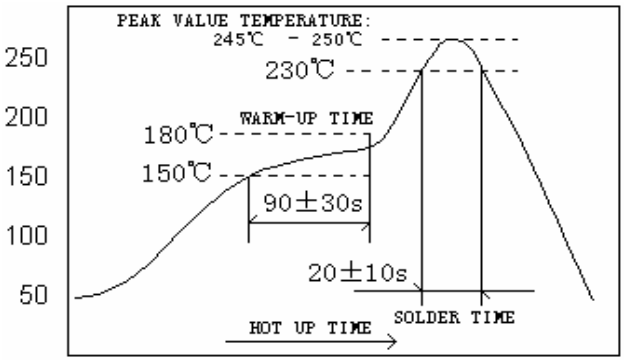
Ex.

ROYALOHM CHIP RESISTOR			
RESISTANCE:	4.7K	Ω	± 5 %
WATTAGE:	1/16W		SIZE: 4D03
QUANTITY:	5,000	PCS	Pb-Free
PART NO.:			
P.O.NO.:			
LOT NO. :	6050008	4D03WGJ0472T5E	

Remark : Label is 4K7, value is 4.7KΩ, marking is 472

Thick Film Chip Resistor Array (Lead Free)

7. Performance specification :

Characteristics	Limits	Test Methods (JIS C 5201-1)
Insulation resistance	1,000 MΩ or more	4.6 Apply 500V DC between protective coating and termination for 1 min, then measure
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	4.7 Apply 500V AC between protective coating and termination for 1 minute
Temperature coefficient	± 200 PPM/℃	4.8 Natural resistance change per temp. degree centigrade. $\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6$ (PPM/℃) R_1: Resistance value at room temperature (t1) R_2: Resistance value at room temp. plus 100 ℃ (t2)
Short time overload	Resistance change rate is ± (2.0% + 0.1Ω) Max.	4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds
Solderability	95 % coverage Min.	Wave Solder: Test temperature of solder: 245°C ±3°C dipping time in solder : 2-3 seconds.
	Go up tin rate bigger than half of end pole.	Refolw: 
Soldering Heat	Resistance change rate is: ±(1%+0.05Ω) Max.	4.18 Dip the resistor into a solder bath having a temperature of 260°C±3°C and hold it for 10±1 seconds.

Thick Film Chip Resistor Array (Lead Free)

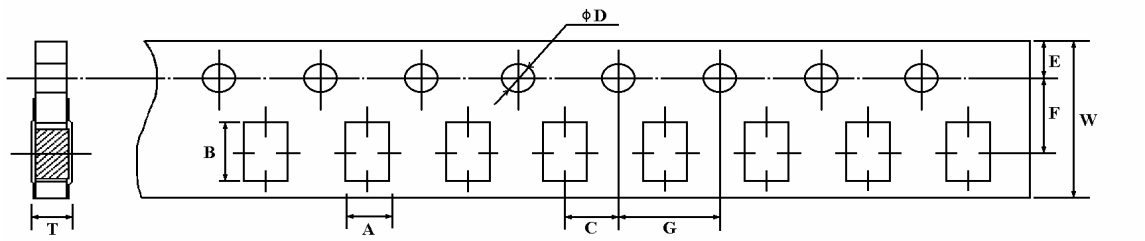
7. Performance specification :

<table>
<tr><th>Characteristics</th><th>Limits</th><th>Test Methods
(JIS C 5201-1)</th></tr>
<tr><td rowspan="2">Temperature cycling</td><td rowspan="2">Resistance change rate is
± (1.0% + 0.05Ω) Max.</td><td>4.19 Resistance change after continuous
5 cycles for duty cycle specified below :
<table>
<tr><th>Step</th><th>Temperature</th><th>Time</th></tr>
<tr><td>1</td><td>-55℃ ± 3℃</td><td>30 mins</td></tr>
<tr><td>2</td><td>Room temp.</td><td>10～15 mins</td></tr>
<tr><td>3</td><td>+155℃ ± 2℃</td><td>30 mins</td></tr>
<tr><td>4</td><td>Room temp.</td><td>10～15 mins</td></tr>
</table></td></tr>
<tr><td></td></tr>
<tr><td>Load life in humidity</td><td>Resistance change rate is
± (3.0% + 0.1Ω) Max.</td><td>7.9 Resistance change after 1,000 hours
(1.5 hours "on", 0.5 hour "off") at RCWV
in a humidity chamber controlled at
40℃ ± 2℃ and 90 to 95 % relative humidity</td></tr>
<tr><td>Load Life</td><td>Resistance change rate is
± (3.0% + 0.1Ω) Max.</td><td>4.25.1 Permanent resistance change after 1,000 hours
operating at RCWV, with duty cycle of
(1.5 hours"on", 0.5 hour"off") at 70℃ ± 2℃ ambient</td></tr>
<tr><td>Terminal bending</td><td>Resistance change rate is
± (1.0% + 0.05Ω) Max.</td><td>4.33 Twist of Test Board :
Y/X = 3/90 mm for 60 seconds</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Thick Film Chip Resistor Array (Terminal Lead Free)

8. Packing specification :

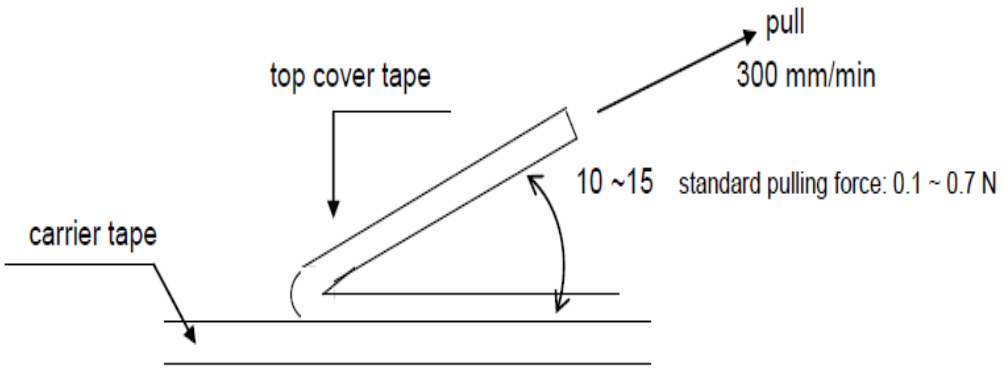
* Taping Dimension (mm)



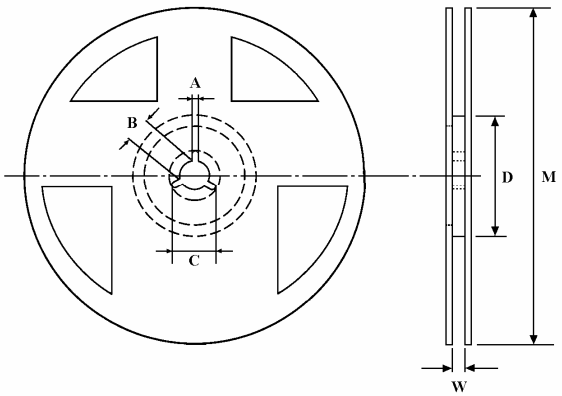
Type	A ± 0.2	B ± 0.2	C ± 0.05	ϕD +0.1 - 0	E ± 0.1	F ± 0.05	G ± 0.1	W ± 0.2	T ± 0.1	T ± 0.1
RMC 4D03	2.0	3.6	2.0	1.5	1.75	3.5	4.0	8.0	0.83	1.0

* Peeling Strength of Top Cover Tape

Test Condition: 0.1 to 0.7 N at a peel-off speed of 300 mm / min.



* Reel Dimension (mm)



Type	Quantity Per Reel	A ± 0.5	B ± 0.5	C ± 0.5	D ± 1	M ± 2	W ± 1
RMC 4D03	5,000 pcs.	2	13	21	60	178	10

Remark : ϕM 10,000pcs. / Reel = 255 ± 2mm

20,000pcs. / Reel = 330 ± 2mm

Part Number System

Explanation of Part Number System

(Thick Film Chip Resistor Array (Terminal Lead Free))

1	2	3	4	5	6	7	8	9	10	11	12	13	14
4	D	0	3	W	G	J	0	4	7	2	T	5	E

Product Type:
Fill-in these 4 digits with the Chip resistor types as follows:
- 2D02
- 4D02
- 4D03
- 10P8
- 16P8

Wattage:
Fill-in these 2 digits with the codes as follows:

Normal size:
- WG = 1/16W

Special:
- WH = 1/32W

Tolerance:
- F ~ ± 1%
- G ~ ± 2%
- J ~ ± 5%

Resistance Value:

1. 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;

2. E-96 series: the 1st to 3rd digits are for the significant figures of the resistance and the 4th digit indicate the number of zeros following.

Decimal point is expressed :
"J"~ 0.1,**"K"**~0.01,**"L"**~0.001
Ex: 2Ω26 ~226K, 226Ω ~2260

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
- G = 25,000pcs
- H = 50,000pcs

Packing Type:
- T = T/R Packing
- B = Bulk in Poly-bag
- C = Bulk in cassette

Special Feature:
- 0 = NIL
- E = Lead Free

Sample : RMC 1/16W (4D03) +/- 5% 4.7KΩ T/R-5,000 → 4D03WGJ0472T5E

Thick Film Chip Resistor Array (Terminal Lead Free)

Environment Related Substance

This product complies to EU RoHS directive, EU PAHs directive, EU PFOS directive and Halogen free.

Ozone layer depleting substances.

Ozone depleting substances are not used in our manufacturing process of this product.
This product is not manufactured using Chloro fluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), Hydrobromofluorocarbons (HBFCs) or other ozone depleting substances in any phase of the manufacturing process.

Storage Condition

The performance of these products, including the solderability, is guaranteed for a year from the date of arrival at your company, provided that they remain packed as they were when delivered and stored at a temperature of 25°C ± 5°C and a relative humidity of 60%RH ± 10%RH

Even within the above guarantee periods, do not store these products in the following conditions. Otherwise, their electrical performance and/or solderability may be deteriorated, and the packaging materials (e.g. taping materials) may be deformed or deteriorated, resulting in mounting failures.

1. In salty air or in air with a high concentration of corrosive gas, such as Cl_2, H_2S, NH_3, SO_2, or NO_2
2. In direct sunlight