



昆貿電子股份有限公司

QUEEN MAO ELECTRONIC Co., LTD.

Thick Film Chip Resistor Networks Specifications (RCN Series)

Approved by:

Frank Kao

File Number:	QM-R-005E	Quality Control Stamp
Version:	V4.01	
Pages:	10	
Effective Date:	Jan. 01, 2004	
Written by:	Paul Chang	
Edited by:	Frank Kao	

N O T E	
------------------	--

1. Scope

This specification specifies all criteria of chip Network and jumper resistors manufactured by Queen Mao Electronic Co., Ltd.

2. Part Number

The part number is identified by series name, tolerance reel diameter and resistance value for customer to receive right products on each ordering.

Example

<u>CN43</u>	<u>J</u>	<u>7</u>	<u>68K</u>
Series	Resistance	Reel	Resistance
Name	Tolerance	Diameter	Value
(1)	(2)	(3)	(4)

(1) Series Name

CN 43 = 4 R in 0603
CN 42 = 4 R in 0402

(2) Resistance Tolerance

J = $\pm 5\%$

(3) Reel Diameter

7 = 7 inch
A = 10 inch
D = 13 inch

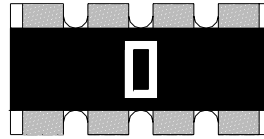
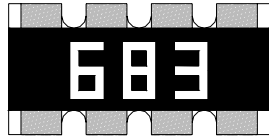
(4) Resistance Value

Chip Network nominal value denoted by 3 digits only.

$\pm 5\%$: according to IEC E-24 Series.

(EX.) 0R0 = 0Ω 0R47 = 0.47Ω 1K3 = 1.3K
1M5 = 1.5M

3. Chip Network Marking Explanation



CN 43
 $\pm 5\%$

Jumper

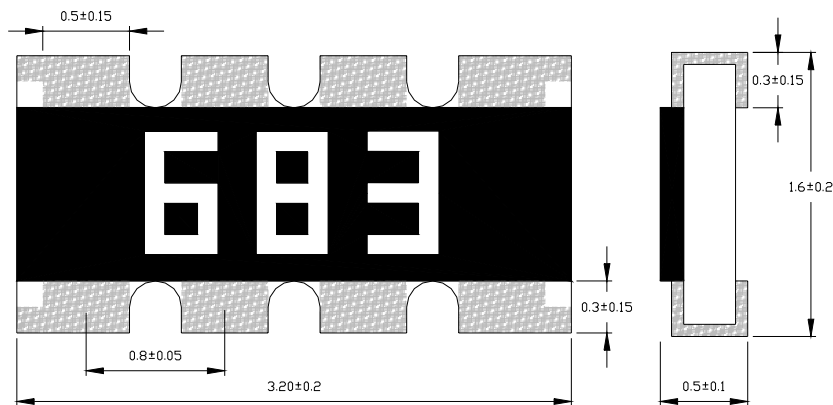
Value : 68K

(1)

(2)

- (1) **5%** : 3 digit, first two digits are significant figures; third digit is number of zeros.
Letter "**R**" is decimal point.
- (2) **Letter "0"** for chip network jumper.

4. Chip Network Dimension & Construction.



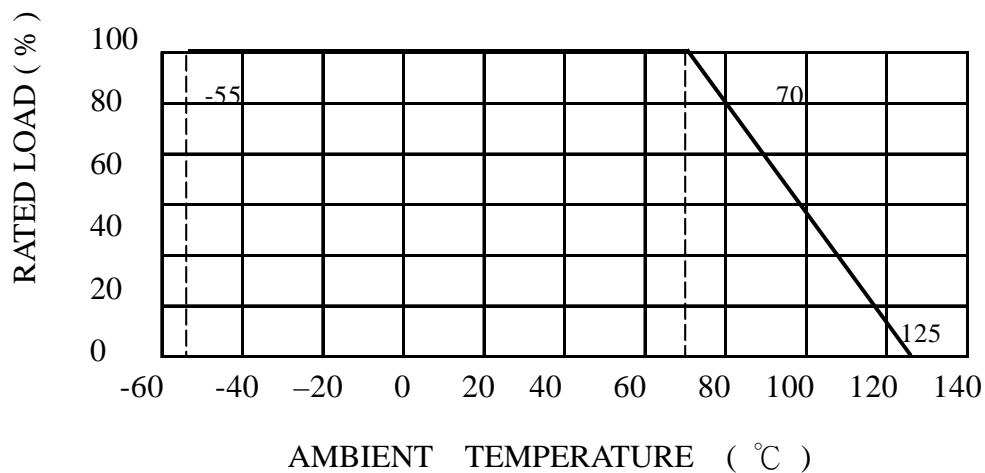
5. Chip Network Characteristics

Table 2

Type	CR 43
*Power rating	1/16 W
Max. working voltage	50V
Max. overload voltage	100V
Dielectric withstand voltage	100V
Operating temp. range	-55°C ~ +125°C
Resistance range ± 5% (E-24)	10Ω~1MΩ
Temperature coefficient of Resistance (ppm / °C)	± 200 ppm
Jumper	< 50 mΩ
Rated current	1A
Max. overload current	2A

*Power rating

For resistors operated in ambient over 70°C, loading power ratio will derated in accordance with following curve.



6. Characteristics Performance and test method.

The following test method based on MIL-STD 202F / MIL-R-55342E or JIS-C-5202 most specimens shall be mounted on test board, unless otherwise specified herein.

6-1 Electrical Performance

Item	Test Method	Specifications ±5%	Jumper																
DC Resistance	DC resistance was measured as following specified voltage	DC resistance value within specified tolerance	< 50mΩ																
	<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Resistance (Ω)</th> <th style="text-align: center;">Test Voltage (V)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">R < 10</td> <td style="text-align: center;">0.1</td> </tr> <tr> <td style="text-align: center;">10 ≤ R < 100</td> <td style="text-align: center;">0.3</td> </tr> <tr> <td style="text-align: center;">100 ≤ R < 1K</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">1K ≤ R < 10K</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">10K ≤ R < 100K</td> <td style="text-align: center;">10</td> </tr> <tr> <td style="text-align: center;">100K ≤ R < 1M</td> <td style="text-align: center;">30</td> </tr> <tr> <td style="text-align: center;">1M ≤ R</td> <td style="text-align: center;">50</td> </tr> </tbody> </table>	Resistance (Ω)	Test Voltage (V)	R < 10	0.1	10 ≤ R < 100	0.3	100 ≤ R < 1K	1	1K ≤ R < 10K	3	10K ≤ R < 100K	10	100K ≤ R < 1M	30	1M ≤ R	50		
Resistance (Ω)	Test Voltage (V)																		
R < 10	0.1																		
10 ≤ R < 100	0.3																		
100 ≤ R < 1K	1																		
1K ≤ R < 10K	3																		
10K ≤ R < 100K	10																		
100K ≤ R < 1M	30																		
1M ≤ R	50																		
Temperature Coefficient of Resistance (T.C.R.)	Measured resistance at +25°C or specified room temperature as R1, then measure -55°C or +125°C respectively as R2. Determine the temperature coefficient of resistance from the following formula. $\text{T.C.R.} = \frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM/°C)}$ t ₁ = +25°C or specified room temperature t ₂ = -55°C or +125°C test temperature R ₁ = resistance at reference temperature (Ω) R ₂ = resistance at test temperature (Ω)	±200ppm	—																
Short Time Overload	Apply 2.5 times of rated voltage but not exceeding the maximum overload voltage for 5 seconds.	& No visible damage	< 50mΩ																

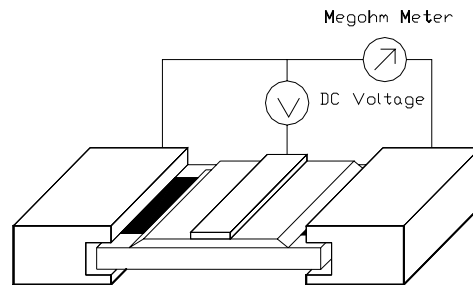
Have the specimen stabilized at room temperature for 30 minutes minimum.

Measure the resistance to Determine $\Delta R/R(\%)$.

Jumper shall be applied max overload current per table2

Insulation Resistance	Place the specimen in the jig and apply a rated continues overload voltage (100V) for one minute as. (Fig1.) shows.Then measure the insulation resistance.	$\geq 10^4 M\Omega$
------------------------------	--	---------------------

(Fig.1)



Dielectric Resistance	Place the specimen in the jig as (Fig.1) show and apply a continuous AC voltage till breakdown happened.	Breakdown Voltage > Max. Overload Voltage.
------------------------------	--	--

Intermittent Overload	The specimen shall be subjected to 10000±200 cycles of an AC voltage of 4 time the rated voltage between tests applied for 1 sec with pauses of 25 sec. And the specimen shall be kept at standard atmospheric conditions without electrical load for 30 min after which the resistance shall be measured. However the applied voltage shall not exceed the maximum intermittent overload voltage. (Jumper with Max. Overload current.)	$\pm(5\%+0.1\Omega)$ < 50m Ω
------------------------------	---	-------------------------------------

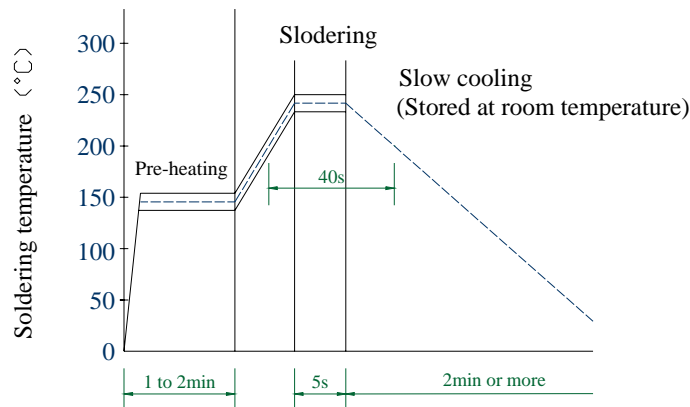
6-2 Mechanical Performance

Solderability	Immerse the specimen into R type flux	> 95% coverage
----------------------	---------------------------------------	----------------

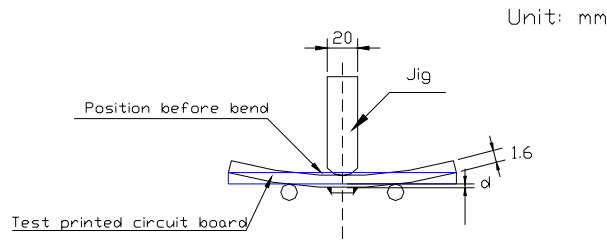
for 1-2 sec. And then into the solder pot at $230\pm 5^{\circ}\text{C}$ for 5 sec.

Resistance to Soldering Heat	(A) Immerse the specimen in the solder pot at $260\pm 5^{\circ}\text{C}$ for 10 ± 1 seconds.	$\pm(1.0\%+0.1\Omega)$
	Have the specimen stabilized at room temperature for 30 minutes minimum. Then measure the resistivity.	$< 50\text{m}\Omega$
	(B) The specimen shall be passed through the reflow furnace with the condition in the following profile (Fig.2) for 3 times. Then specimen shall be stored at a standard atmospheric conditions for 24hrs and measurement its resistivity. The specimen was mount on QA test PC board (1.6mm) print with 1.5mm of solder paste. (Fig.2)	

Temperature profile of reflow soldering



Resistance to Solvent	Immerse the specimen into a breaker with Isopropyl Alcohol, ultrasonic rinsing for 5 minute.	No mechanical damage & marking must be legible.
Bending Strength	Mount the specimen on a test board as shown in the (fig.3). Slowly apply the force till the board is bent to 2 mm for 5 ± 1 sec, measured the $\Delta R/R(\%)$ at this position. (Fig.3)	$\pm(1.0+0.1\Omega)$ & No visible damage. $< 50\text{m}\Omega$

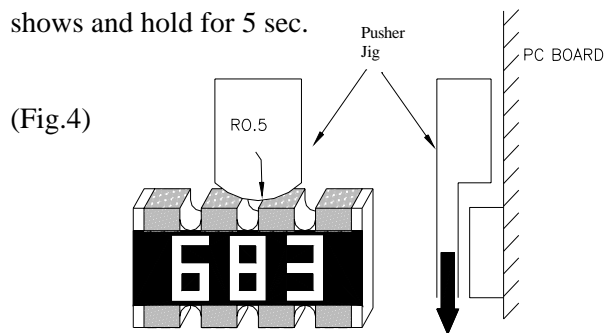


Adhesion

Apply 2 kgf of vertical pressure to the edge of specimen as illustrated (Fig.4) shows and hold for 5 sec.

$\pm(1\%+0.1\Omega)$

$< 50m\Omega$



6-3 Environmental Performance

Thermal Shock

Keep the specimen in the fluid bath for $-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$, 2 minutes and $+125 \pm 2^{\circ}\text{C}$, 2 minutes as one cycle. After 5 cycle, the specimen shall be stabilized at room temp. for 1 hour minimum , then measure the resistance to determine $\Delta R/R(\%)$.

$\pm(1.0\%+0.1\Omega)$

$< 50m\Omega$

Low Temperature Operation

Place the specimen in a test chamber maintained at $-65^{+0}_{-5}^{\circ}\text{C}$. After one hour stabilization at this temperature, full rated working voltage shall be applied 45^{+5}_{-0} minutes. Leave 15^{+5}_{-0} minutes after remove the voltage, then specimen be removed out of the chamber and stabilized at room temperature for 24hr. Measure the resistance to determine $\Delta R/R(\%)$.

$\pm(1.0\%+0.1\Omega)$

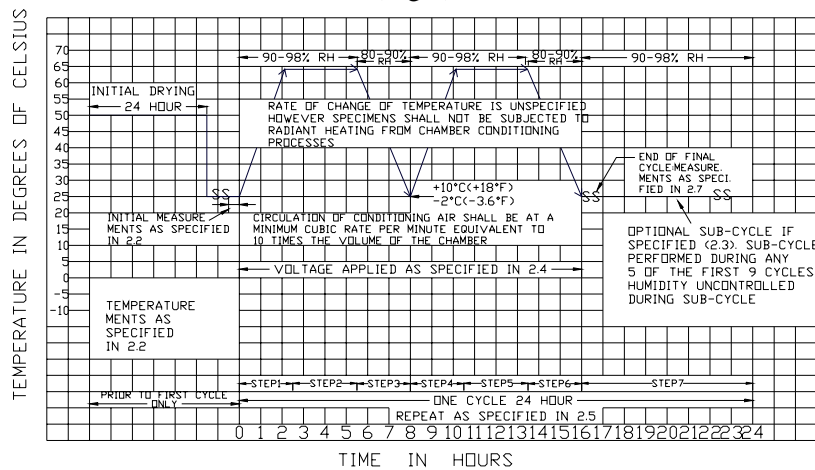
$< 50m\Omega$

Moisture Resistance Place the specimen in the test chamber, and subjected to 42 damp heat cycles. Each one of which consists of the steps 1 to 7 as (Fig.5). The total test time is 1000 hours. After the test, have the specimen stabilized at room temperature for 24 hours and measure the resistance to determine $\Delta R/R(\%)$.

< 100m Ω

$\pm(1.0\%+0.1\Omega)$

(Fig.5)

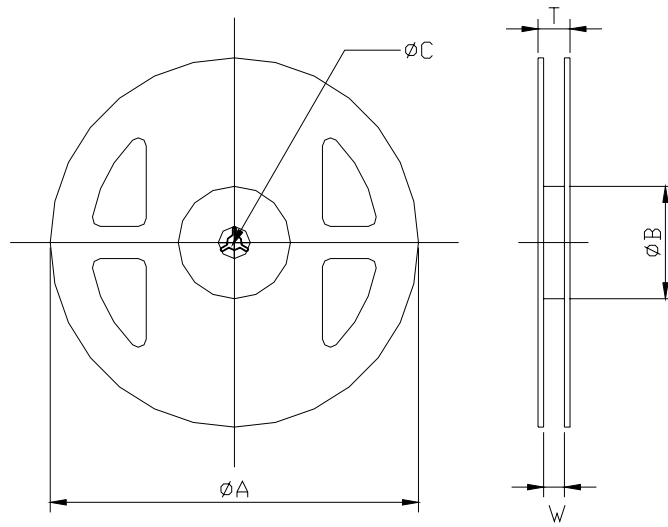


Load Life Place the specimen in the oven at $70\pm 2^{\circ}\text{C}$. Apply the rated voltage to the specimen at the 1.5 hours on and 0.5 hour off cycle. The total length of test is 1000 hours. After the test, have the specimen stabilized at room temperature for one hour minimum and measure the $\Delta R/R(\%)$.

< 100m Ω

$\pm(3.0\%+0.1\Omega)$

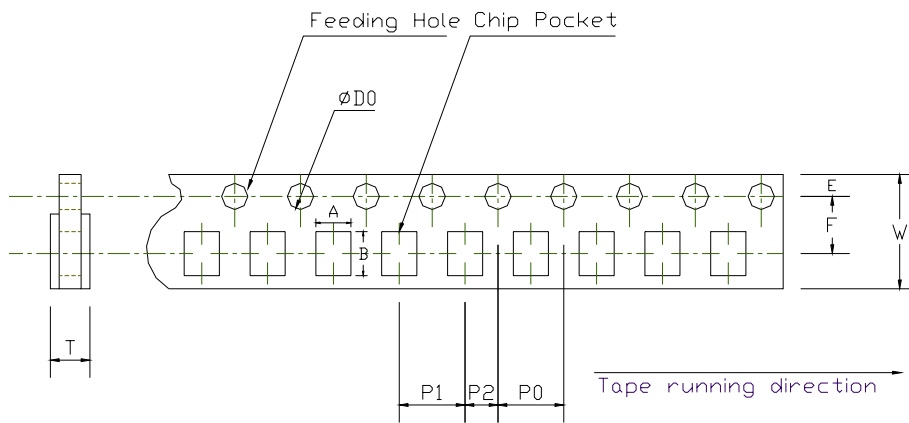
7. TAPING REEL



Unit: mm

Style	Packing	Tape width	Reel Dia.	ϕA	ϕB	ϕC	W	T
CN 43	Paper	8 mm	7"	180^{+0}_{-3}	60^{+1}_{-0}	13.0 ± 0.2	9.0 ± 0.3	11.4 ± 1

8. PAPER TAPING



Unit: mm

Dimension	A	B	W	E	F	P0	P1	P2	$\phi D0$	T
CN 43	2.0 ± 0.1	3.60 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	$1.5^{+0.1}_{-0}$	0.85 ± 0.1

