Specifications

Products Name	Low Resistance Chip Resistor
Product Series	FLRH9045FCR***F
Classification	Generic Specification

YOKOHAMA
ELECTRONIC DEVICES
Y. E. D

FLRH9045 Low Resistance Chip Resistor Specification

1. Scope
   This specification applies to FLRH9045 Series Low Resistance Chip Resistor for use in electric equipment.

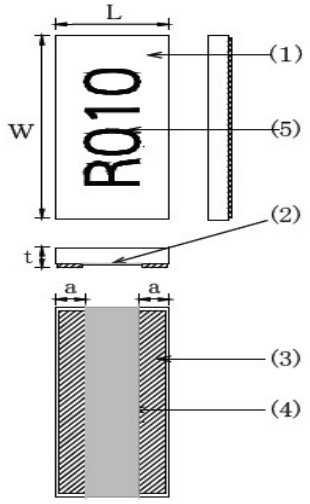
2. Part number

FLR	**H9045**	**F**	**C**	**R*****	**F**
(1)	(2)	(3)	(4)	(5)	(6)

(1)	Product series	Foil Low Resistance
(2)	Size	Long-side electrode 9.0*4.5mm size
(3)	Side-face electrode type	Face-down type
(4)	Characteristic type	High operating temperature type
(5)	Nominal resistance	(example) 10mΩ → R010
(6)	Resistance tolerance	F (±1.0%) G(±2.0%) J(±5.0%)

3. Structure
   The ceramic substrate is adhered to the metal foil (Ni-Cu) resistive element; terminals are formed on top of the foil.

4. Dimensions



No.	Components	Material / Process
(1)	Substrate	Alumina 96%
(2)	Resistor	Ni-Cu alloy
(3)	Terminals	Plated Sn+Ni (on Cu)
(4)	Protection coat	Epoxy resin (Green)
(5)	Marking	Epoxy resin (Black)

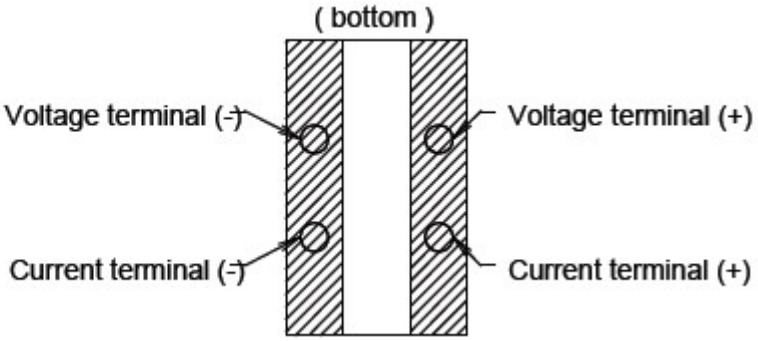
Symbol	Dimensions (mm)	
L	4.50±0.20	
W	9.00±0.20	
a	2mΩ～: 0.70±0.20	1mΩ : 1.60±0.20
t	0.50±0.20	

5. Marking
   Resistance value code is marked on the top surface.
   Example) 10mΩ -> R010
   20mΩ -> R020

6. Schematic diagram, Measurement point

Schematic diagram

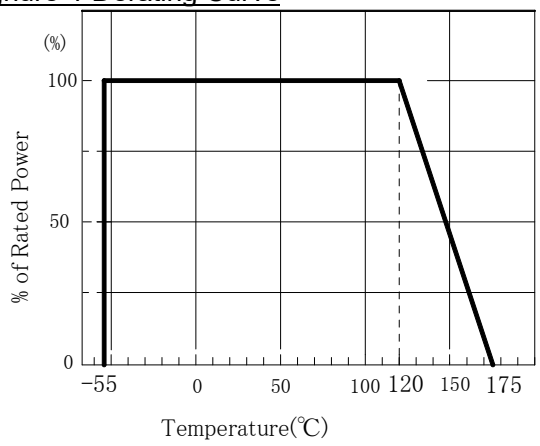
Measurement point



7. Specification

Parameter	Specification	
Resistance Value	1m to 500mΩ (for standard resistances)	
Resistance Tolerance	F (±1.0%) for 2mΩ~	
Temperature Coefficient of Resistance	±50ppm/℃ for 2mΩ~	
Rated Load	5.0W	Refer to Derating curve, Figure-1
Operating Temperature Range	-55~+175℃	
Rated ambient temperature	+120℃	
Rated Voltage	√(Power×Resistance) (V)	
Maximum Over Current	when ≦10mΩ : which smaller between √(440W÷resistance) & 180A 10msec on, 60sec off in maximum of 10 times with recommended footprint set forth hereunder.	
	When >10mΩ & <100mΩ : which smaller between √(300W÷resistance) & 100A 10msec on, 60sec off in maximum of 10 times with recommended footprint set forth hereunder.	

Fighure-1 Derating Curve



8. Reliability testing

Test Item	Test Conditions		Specification
Short Time Over Load	Voltage of 1.5 times the rated voltage shall be applied for 5S.		±(1.0%+0.0005Ω)
Load life	Rated voltage for 90 min followed by a pause of 30 min at a temperature of 70±3℃. Cycles shall be repeated for 1000h.		±(2.0%+0.0005Ω)
Moisture Load life	Rated voltage for 90 min followed by a pause of 30 min at a temperature of 60±2℃ with relative humidity of 90%. Cycles shall be repeated for 1000h.		±(2.0%+0.0005Ω)
Temperature Cycle	[-55℃ 30 min -> R.T. 3 min -> +155℃ 30 min -> R.T. 3 min]	100 continuous cycles	±(1.0%+0.0005Ω)
		1000 continuous cycle	±(2.0% +0.0005Ω)
Soldering Hearting	260±5℃ solder, 10±1sec dip		±(1.0%+0.0005Ω)
Substrate Bending	Test board length: 90mm Bend depth: 2mm Test board: Glass-Epoxy t=1.6mm		±(1.0%+0.0005Ω)
Solderability	245±5℃ solder, 3+1/-0 sec dip.		A new solder shall cover minimum of 90%

9. Packaging

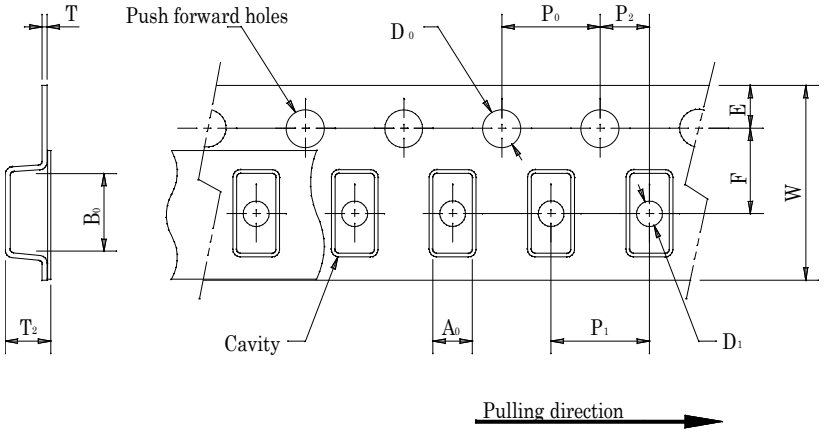
Packing quantity: 5,000 pieces/reel.

Tape diagram/dimension	Figure-2
Peeling strength of seal tape	Figure-3
Reel form·Labeling position	Figure-4
Taping direction	Figure-5

Marking The following items shall be printed on the reel label. (Figure-6)

- Part number
- Quantity for each reel
- Manufacturing month code
- Manufacturer
- Inspection number (Lot number)
- The country of origin
- Lead free designation by double broken line

Figure-2 Tape diagram/dimension: Material: Plastic



Symbol	Dimensions (mm)
A0	4.85±0.10
B0	9.35±0.10
W	16.00±0.30
F	7.50±0.10
E	1.75±0.10
P0	4.00±0.10
P1	8.00±0.10
P2	2.00±0.10
D0	1.50±0.10
D1	1.50±0.10
T	0.30±0.05
T2	1.20±0.15

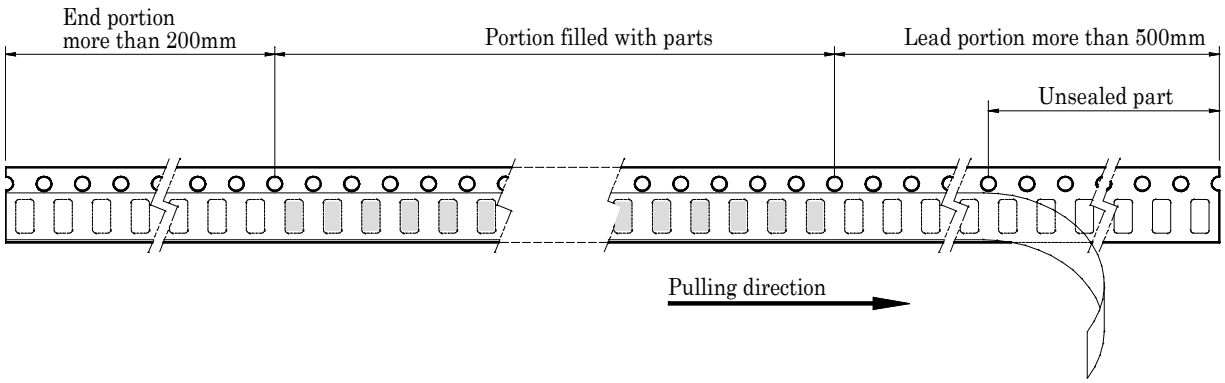


Figure-3 Peeling strength of seal tape:

F = peeling strength: 0.1~0.7N (10~71gf)

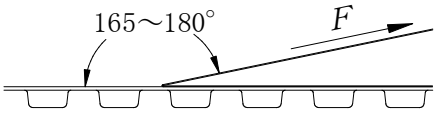
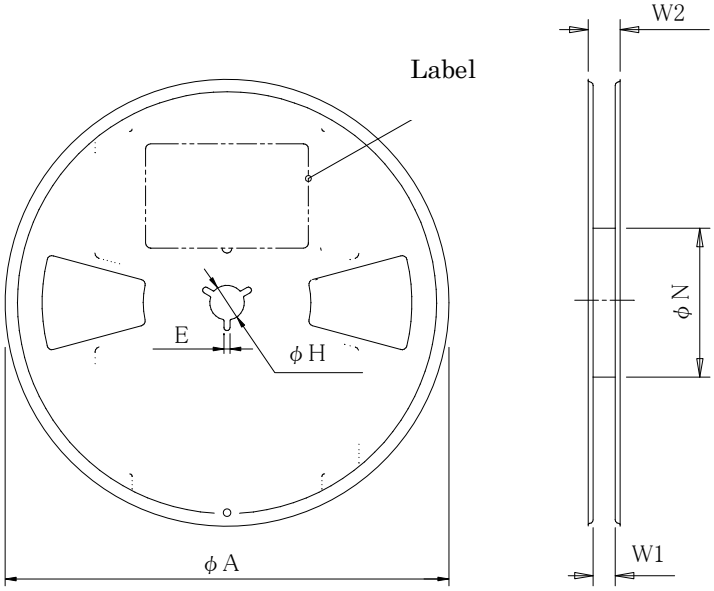


Figure-4 Reel form・Labeling position:



Symbol	Dimensions (mm)	
Pieces	5,000/reel	1,000pcs/reel
φA	330±2.0	180+0.0/-3.0
φH	13.0±0.2	13.0±0.2
E	2.0±0.5	2.0±0.5
φN	80±1.0	60±1.0/-0.0
W1	17.4±1.0	17.0±0.3
W2	21.4±1.0	19.4±1.0

Material: Plastic

Figure-5 Taping direction:

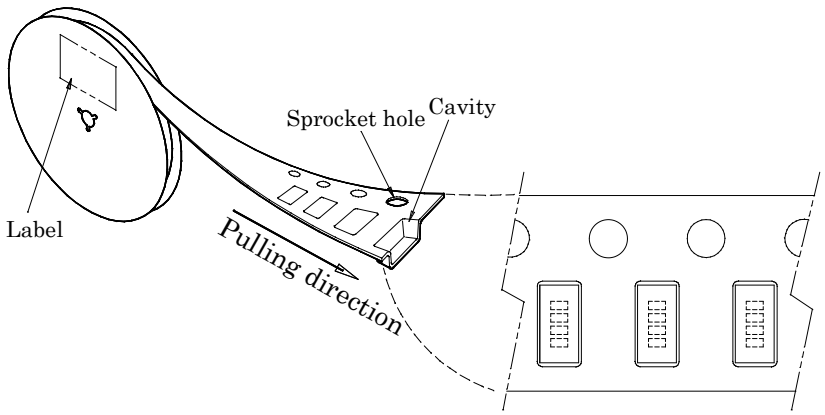


Figure-6 Label contents:

FLRH9045FCR010F

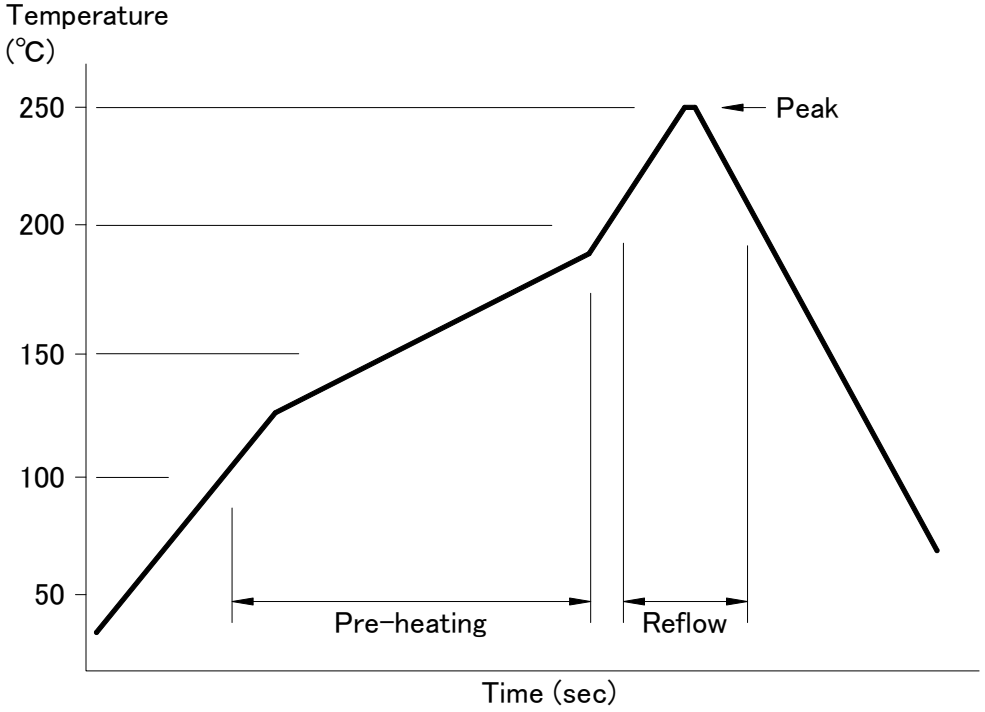
Q.T.Y 1,000 [PCS]
INSPECTED u
Y.E.D CO.,LTD.
80801123
MADE IN JAPAN
==========

Part number
Quantity for each reel
Manufacturing month code
Manufacturer
Inspection number (Lot number)
The country of origin
Lead free designation by double broken line

10. Recommended implementation temperature profile

10.1 Reflow temperature profile

Twice reflows are allowed by the following temperature profile



Surface temperature of resistance and time

Pre-heating	130~180℃	60~90sec
Reflow	220℃ Max	30~90sec
Peak	240~260℃	10sec Max

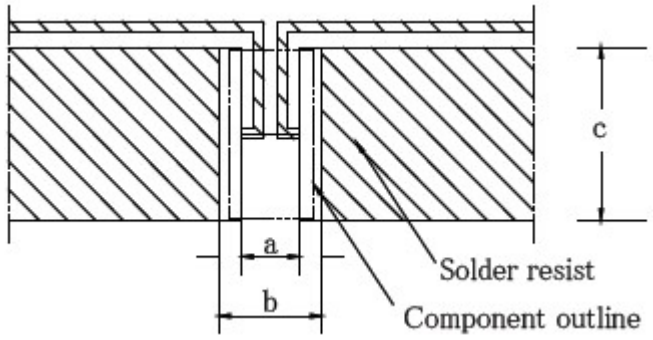
10.2 Flow temperature profile

Less than 260℃ 10sec Max

10.3 Hand solder attachment conditions

Work in 3 seconds or less is [temperature of 350℃] possible.
When soldering with a soldering iron, heating is performed on a land and the point does not hit the main part of a product. Please carry out.

11. Recommended land pattern (for current sensing)
Board materials: Glass epoxy (FR-4) t=0.6mm
Thickness of copper foil: 100 um
Note: The terminal temperature should not exceed 120℃ at the rated power.



Symbol	Dimensions (mm)	
a	2mΩ~:3.10	1mΩ:1.30
b	5.10	
c	9.20	

12. Country of origin and Location
Country of origin : Japan
Location : Shin-Yokohama, Kouhoku-ku, Yokohama-city, 222-0033 Japan

13. Storage note
(1) To maintain good solderability, Store the components in the temperature and humidity controlled room.
Temperature: 5~35℃ Humidity: 45~85% RH
(2) Store the components at the place avoiding moisture, dust and corrosive harmful gas (hydrogen chloride, sulfurous acid gas and hydrogen sulfide) that may cause the decrease in solderability.
(3) Store the components at the place avoiding direct sunlight.