

Thick Film Chip Resistors / Low Resistance Type

ERJ R, B : 0603, 0805, 1206, 1210, 1812, 2512

ERJ L : 0603, 0805, 1206, 1210, 1812, 2512

Type: ERJ 3R, 3B, 6R, 6B, 8R, 8B

14R, 14B, 12R, 1TR

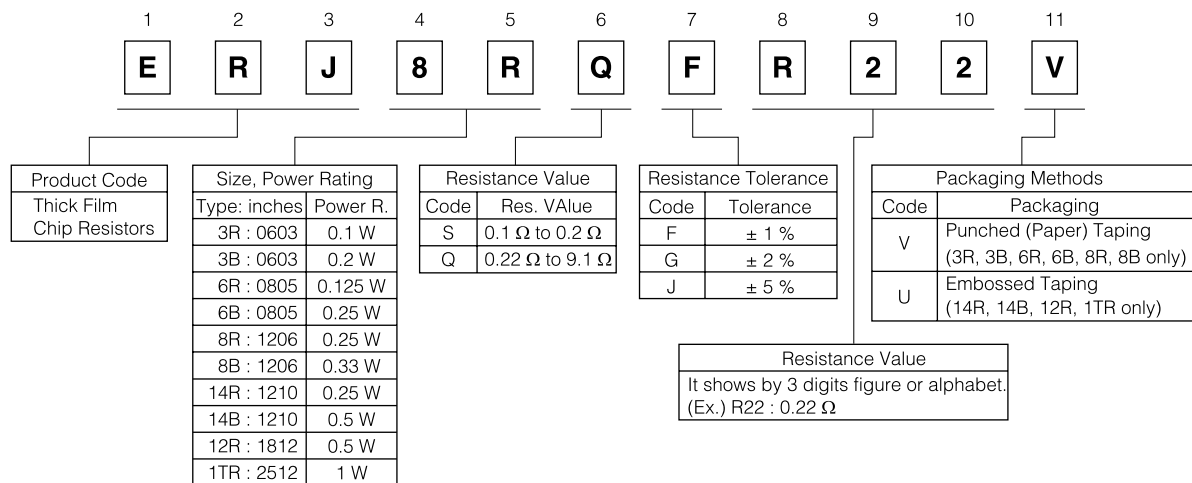
ERJ L03, L06, L08, L14, L12, L1W



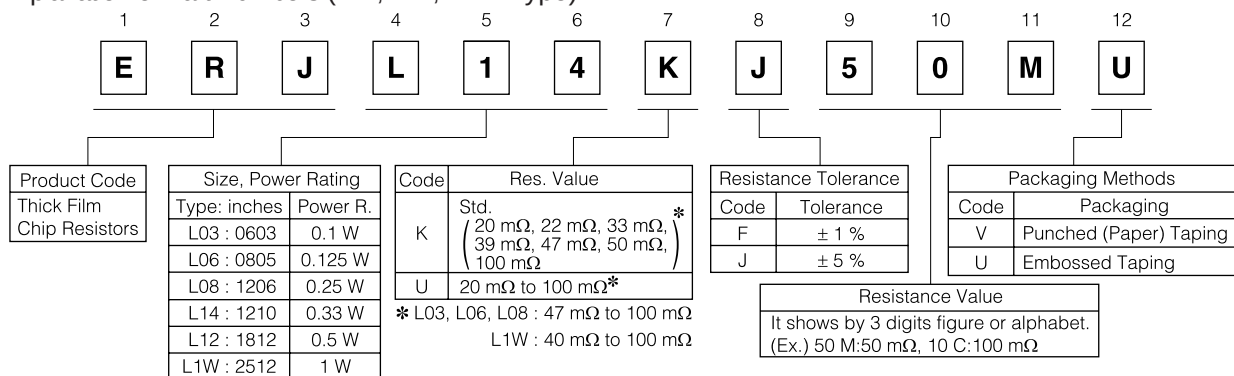
■ Features

- Small size and lightweight
For PCB size reduction and lightweight products
- High reliability
Metal glaze thick film resistive element and three layers of electrodes result in high reliability
- Solderability
Suitable for both reflow soldering and flow soldering
- Low Resistance Value
3R, 3B, 6R, 6B, 8R, 8B, 14R, 14B, 12R, 1TR Type : 0.1 Ω to 9.1 Ω
L03, L06, L08 Type : 47 m Ω to 100 m Ω
L14, L12 Type : 20 m Ω to 100 m Ω
L1W Type : 40 m Ω to 100 m Ω
- Reference Standards
IEC 60115-8, JIS C 5201-8

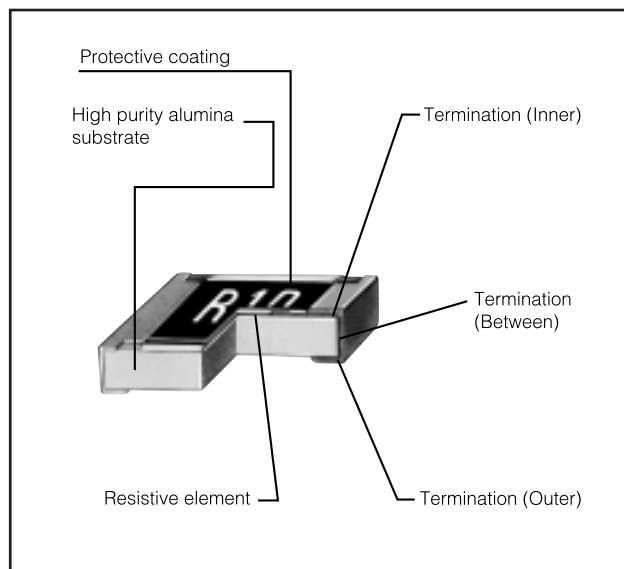
■ Explanation of Part Numbers (3R, 3B, 6R, 6B, 8R, 8B, 14R, 14B, 12R, 1TR Type)



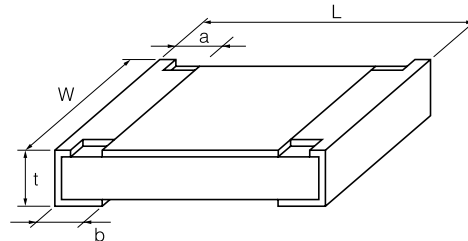
■ Explanation of Part Numbers (L14, L12, L1W Type)



Construction



Dimensions in mm (not to scale)



Type (inches)	Dimensions (mm)					Weight (1000 pcs.)
	L	W	a	b	t	
ERJ3R ERJ3B (0603)	1.60 $\pm$ 0.15	0.80 $\pm$ 0.15	0.30 $\pm$ 0.20	0.30 $\pm$ 0.15	0.45 $\pm$ 0.10	2 g
NEW ERJL03						
ERJ6R ERJ6B (0805)	2.00 $\pm$ 0.20	1.25 $\pm$ 0.10	0.40 $\pm$ 0.20	0.40 $\pm$ 0.20	0.60 $\pm$ 0.10	4 g
NEW ERJL06						
ERJ8R ERJ8B (1206)	3.20 $\pm$ 0.05 -0.20	1.60 $\pm$ 0.05 -0.15	0.50 $\pm$ 0.20	0.50 $\pm$ 0.20	0.60 $\pm$ 0.10	10 g
NEW ERJL08						
ERJ14R ERJ14B (1210)	3.20 $\pm$ 0.20	2.50 $\pm$ 0.20	0.50 $\pm$ 0.20	0.50 $\pm$ 0.20	0.60 $\pm$ 0.10	16 g
ERJL14						
ERJ12R ERJL12 (1812)	4.50 $\pm$ 0.20	3.20 $\pm$ 0.20	0.50 $\pm$ 0.20	0.50 $\pm$ 0.20	0.60 $\pm$ 0.10	27 g
ERJ1TR ERJL1W (2512)	6.40 $\pm$ 0.20	3.20 $\pm$ 0.20	0.65 $\pm$ 0.20	0.60 $\pm$ 0.20	0.60 $\pm$ 0.10	45 g
	6.40 $\pm$ 0.20	3.20 $\pm$ 0.20	0.65 $\pm$ 0.20	1.30 $\pm$ 0.20	1.10 $\pm$ 0.10	79 g

Ratings

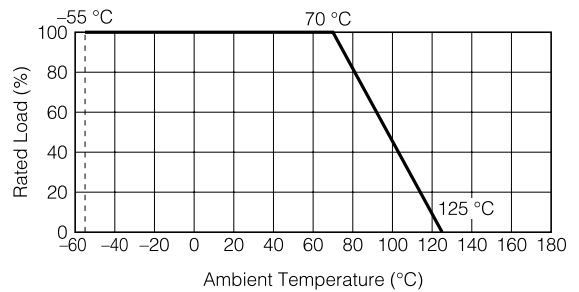
Type (inches)	Power Rating at 70 °C ⁽¹⁾ (W)	Resistance Tolerance (%)	Resistance Range(Ω)		T.C.R. ×10 ⁻⁶ /°C (ppm/°C)	Standard Resistance Values	
			min.	max.			
ERJ3R (0603)	0.1	±5	S	0.1	0.1 Ω to 0.91 Ω :±300 1 Ω to 9.1 Ω :±200	E24	
ERJ3B (0603)		±1, ±2, ±5	Q	0.22		9.1	E24
ERJ6R (0805)	0.125	±5	S	0.1	0.1 Ω to 0.91 Ω :±250 1 Ω to 9.1 Ω :±200	E24	
ERJ6B (0805)		±1, ±2, ±5	Q	0.22		9.1	E24
ERJ8R (1206)	0.25	±5	S	0.1	0.1 Ω to 0.91 Ω :±250 1 Ω to 9.1 Ω :±200	E24	
ERJ8B (1206)		±1, ±2, ±5	Q	0.22		9.1	E24
ERJ14R (1210)	0.33	±5	S	0.1	0.1 Ω to 0.91 Ω :±200 1 Ω to 9.1 Ω :±100	E24	
ERJ14B (1210)		±1, ±2, ±5	Q	0.22		9.1	E24
ERJ12R (1812)	0.5	±1, ±2, ±5	S	0.1	0.1 Ω to 0.91 Ω :±200 1 Ω to 9.1 Ω :±100	E24	
ERJ1TR (2512)		±1, ±2, ±5	Q	0.22		9.1	E24
ERJL03 (0603)	0.1 (0.2)*	±5	47 m		100 m	±200	47 mΩ, 50 mΩ, 100 mΩ
ERJL06 (0805)	0.125 (0.25)*	±5	47 m		100 m		
ERJL08 (1206)	0.25 (0.33)*	±5	47 m		100 m		
ERJL14 (1210)	0.33	±1, ±5	20 m		100 m	20 mΩ to 46 mΩ :±300 47 mΩ to 100 mΩ :±100	20 mΩ, 22 mΩ, 33 mΩ, 39 mΩ, 47 mΩ, 50 mΩ, 100 mΩ
ERJL12 (1812)	0.5	±1, ±5	20 m		100 m		
ERJL1W (2512)	1	±1, ±5	40 m		100 m		

(1) Rated Continuous Working Voltage (RCWV) shall be determined from $RCWV = \sqrt{\text{Power Rating} \times \text{Resistance Values}}$

* Please ask us when resistors guaranteed high power are needed.

Power Derating Curve

For resistors operated in ambient temperatures above 70 °C, power rating shall be derated in accordance with the right figure.

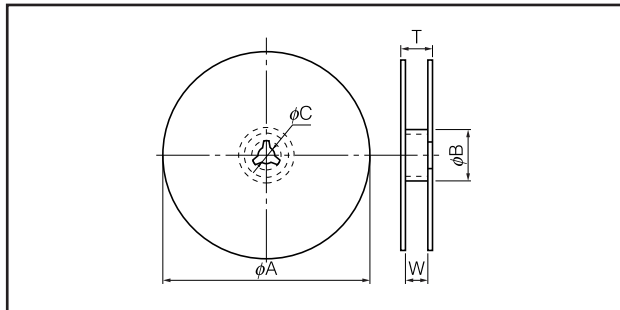


■ Packaging Methods

● Standard Quantity

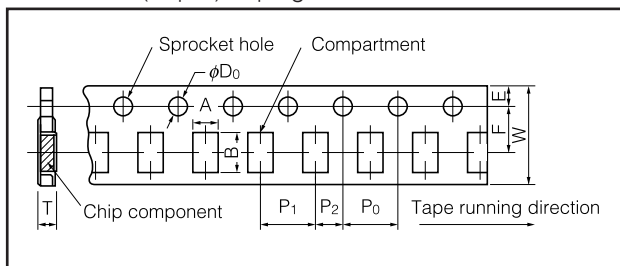
Type (inches)	Thickness (mm)	Punched (Paper) Taping (4 mm pitch)	Embossed Taping (4 mm pitch)
ERJ3R, 3B, L03 (0603)	0.45	5000 pcs./reel	
ERJ6R, 6B, L06 (0805)	0.6	5000 pcs./reel	
ERJ8R, 8B, L08 (1206)	0.6	5000 pcs./reel	
ERJ14R, 14B, L14 (1210)	0.6		5000 pcs./reel
ERJ12R, L12 (1812)	0.6		5000 pcs./reel
ERJ1TR (2512)	0.6		4000 pcs./reel
ERJL1W (2512)	1.1		3000 pcs./reel

● Taping Reel



Dimensions (mm)	Type	φA	φB	φC	W	T
	3R,3B,L03,6R,6B, L06,8R,8B,L08, 14R,14B,L14	180.0 ⁰ _{-3.0}	60 min.	13.0 ^{±1.0}	9.0 ^{±1.0}	11.4 ^{±2.0}
	12R,1TR,L12,L1W				13.0 ^{±1.0}	15.4 ^{±2.0}

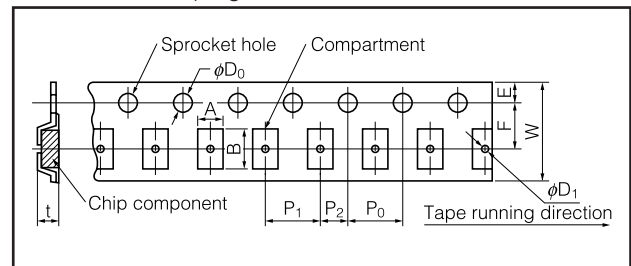
● Punched (Paper) Taping



Dimensions (mm)	Type	A	B	W	F	E
	3R,3B,L03	1.05 ^{±0.10}	1.85 ^{±0.10}	8.00 ^{±0.20}	3.50 ^{±0.05}	1.75 ^{±0.10}
	6R,6B,L06	1.60 ^{±0.15}	2.40 ^{±0.20}			
	8R,8B,L08	1.90 ^{±0.15}	3.50 ^{±0.20}			

Dimensions (mm)	Type	P1	P2	P0	φD0	T
	3R,3B,L03	4.00 ^{±0.10}	2.00 ^{±0.05}	4.00 ^{±0.10}	1.50 ^{±0.10} ₀	0.70 ^{±0.05}
	6R,6B,L06					0.84 ^{±0.05}
	8R,8B,L08					

● Embossed Taping



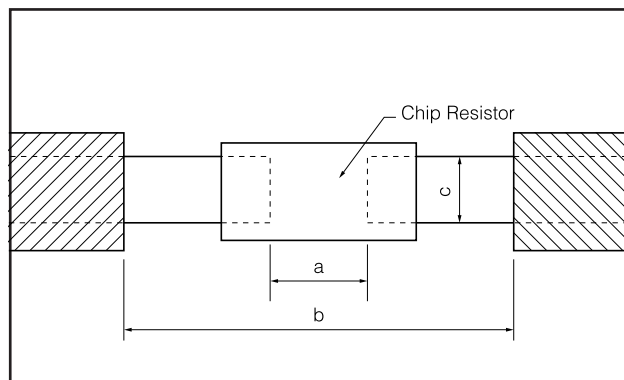
Dimensions (mm)	Type	A	B	W	F	E	P ₁
	14R,14B,L14	2.80 $\pm$ 0.20	3.50 $\pm$ 0.20	8.00 $\pm$ 0.30	3.50 $\pm$ 0.05	1.75 $\pm$ 0.10	4.00 $\pm$ 0.10
	12R,L12	3.50 $\pm$ 0.20	4.80 $\pm$ 0.20	12.00 $\pm$ 0.30	5.50 $\pm$ 0.05		
	1TR	3.60 $\pm$ 0.20	6.90 $\pm$ 0.20				
	L1W						

Dimensions (mm)	Type	P ₂	P ₀	ϕD ₀	t	ϕD ₁
	14R,14B,L14	2.00±0.05	4.00±0.10	1.50 ^{+0.10} ₀	1.00±0.10	1 min.
	12R,L12				1.5 min.	
	1TR					
	L1W					

Design, Specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use. Whenever a doubt about safety arises from this product, please inform us immediately for technical consultation without fail.

■ Recommended Land Pattern

In the case of flow soldering, the land width must be smaller than the Chip Resistor width to control the solder amount properly. Generally, the land width should be 0.7 to 0.8 times (W) of the width of chip resistor. In the case of reflow soldering, solder amount can be adjusted, therefor the land width should be set to 1.0 to 1.3 times chip resistor width (W).



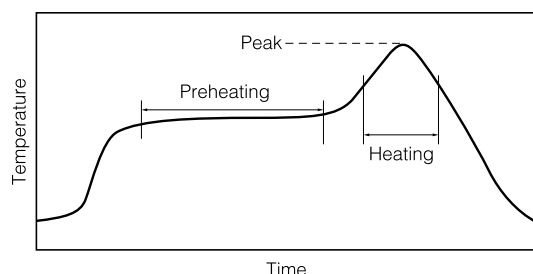
Type (inches)	Dimensions (mm)		
	a	b	c
ERJ3R, 3B, L03 (0603)	0.7 to 0.9	2 to 2.2	0.8 to 1
ERJ6R, 6B, L06 (0805)	1 to 1.4	3.2 to 3.8	0.9 to 1.4
ERJ8R, 8B, L08 (1206)	2 to 2.4	4.4 to 5	1.2 to 1.8
ERJ14R, 14B, L14 (1210)	2 to 2.4	4.4 to 5	1.8 to 2.8
ERJ12R, L12 (1812)	3.3 to 3.7	5.7 to 6.5	2.3 to 3.5
ERJ1TR (2512)	5 to 5.4	7.6 to 8.6	2.3 to 3.5
ERJL1W (2512)	3.6 to 4	7.6 to 8.6	2.3 to 3.5

■ Recommended Soldering Conditions

Recommendations and precautions are described below.

● Recommended soldering conditions for reflow

- Reflow soldering shall be two times maximum.
- Please contact us for additional information when you use in conditions other than those specified.
- Please measure a temperature of terminations and study solderability every kind of solder and board, before actual use.



For solder (Example : Sn/Pb)

	Temperature	Time
Preheating	140 °C to 160 °C	60 s to 120 s
Main heating	Above 200 °C	30 s to 40 s
Peak	235 ± 5 °C	max. 10 s

For lead-free solder (Example : Sn/Ag/Cu)

	Temperature	Time
Preheating	150 °C to 180 °C	60 s to 120 s
Main heating	Above 230 °C	30 s to 40 s
Peak	max. 260 °C	max. 10 s

● Recommended soldering conditions for flow

	For solder		For lead-free solder	
	Temperature	Time	Temperature	Time
Preheating	140 °C to 160 °C	60 s to 120 s	150 °C to 180 °C	60 s to 120 s
Soldering	245±5 °C	20 s to 30 s	max. 260 °C	max. 10 s

⚠ Cautions for Safety

1. If transient load (heavy load in a short time) like pulse is expected to be applied, carry out evaluation and confirmation test with the resistors actually mounted on your own board.
When the load of more than rated power is applied under the load condition at steady state, it may impair performance and/or reliability of resistor.
Never exceed the rated power.
2. Chlorine type or other high-activity flux is not recommended as the residue may affect performance or reliability of resistors.
3. When soldering with soldering iron, never touch the body of the chip resistor with a tip of the soldering iron. When using a soldering iron with a tip at high temperature, solder for a time as short as possible (three seconds or less up to 350 °C).
4. Avoid physical shock to the resistor and nipping of the resistor with hard tool (a pair of pliers or tweezers) as it may damage protective film or the body of resistor and may affect resistor's performance.