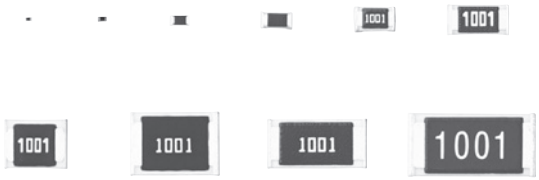
Precision Thick Film Chip Resistors

Type: **ERJ XG, 1G**
ERJ 1R, 2R, 3R, 6R
ERJ 3E, 6E, 8E, 14, 12, 1T



Features

- Small size and lightweight
- High reliability
  Metal glaze thick film resistive element and three layers of electrodes
- Compatible with placement machines
  Taping packaging available
- Suitable for both reflow and flow soldering
- Low Resistance Tolerance
  ERJXG, 1G, 2R, 3E, 6E, 8E, 14, 12, 1T Type : ±1 %
  ERJ1R, 2R, 3R, 6R Type : ±0.5 %
- Reference Standards
  IEC 60115-8, JIS C 5201-8, EIAJ RC-2134B
- AEC-Q200 qualified (Exemption ERJXG, ERJ1R)
- RoHS compliant

■ As for Packaging Methods, Land Pattern, Soldering Conditions and Safety Precautions,

Please see Data Files

Explanation of Part Numbers

- ERJ1R, 2R, 3R, 6R Type, ±0.5 %

1	2	3	4	5	6	7	8	9	10	11	12
E	R	J	3	R	B	D	1	0	0	2	V

Product Code
Thick Film Chip Resistors

Size, Power Rating		
Code	Inch	Power R.
1R	0201	0.05 W
2R	0402	0.063 W
3R	0603	0.1 W
6R	0805	0.1 W

T.C.R. Marking	
Code	T.C.R.
H	±50×10^{-6}/°C (1R, 2R)
B	±50×10^{-6}/°C (3R, 6R)
K	±100×10^{-6}/°C (2R)
E	±100×10^{-6}/°C (3R, 6R)

Resistance Tolerance	
Code	Tolerance
D	±0.5 %

Packaging Methods		
Code	Packaging	Part No.
C	Pressed Carrier Taping 2 mm pitch, 15,000 pcs.	ERJ1R
X	Punched Carrier Taping 2 mm pitch, 10,000 pcs.	ERJ2R
V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ3R ERJ6R

Resistance Value
The first three digits are significant figures of resistance and the last one denotes number of zeros following. Example: 1002 →10k Ω

Precision Thick Film Chip Resistors

● ERJXGN, 1GN, 2RC, 2RK, 3EK, 6EN, 8EN, 14N, 12N, 12S, 1TN Type, ±1%

1	2	3	4	5	6	7	8	9	10	11	12
E	R	J	8	E	N	F	1	0	0	2	V

Product Code
Thick Film Chip Resistors

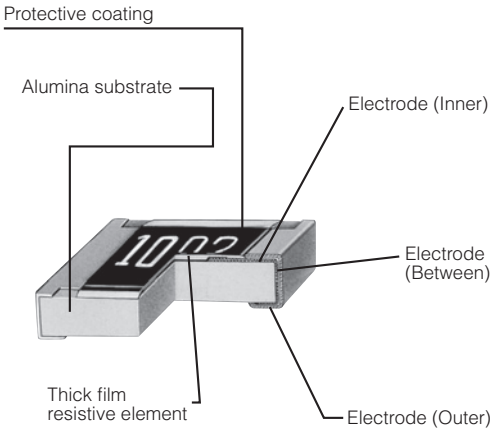
Size, Power Rating		
Code	Inch	Power R.
XGN	01005	0.031 W
1GN	0201	0.05 W
2RC	0402	0.1 W
2RK	0402	0.1 W
3EK	0603	0.1 W
6EN	0805	0.125 W
8EN	1206	0.25 W
14N	1210	0.5 W
12N	1812	0.75 W
12S	2010	0.75 W
1TN	2512	1 W

Resistance Tolerance	
Code	Tolerance
F	±1 %

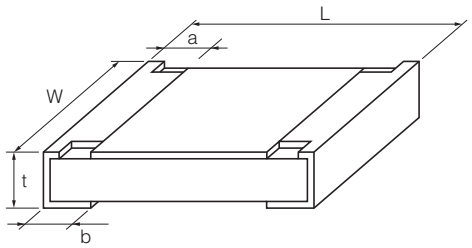
Resistance Value
The first three digits are significant figures of resistance and the last one denotes number of zeros following. Decimal point is expressed by "R". Example : 1002 → 10k Ω

Packaging Methods		
Code	Packaging	Part No.
Y	Pressed Carrier Taping W8P2, 20,000 pcs.	ERJXGN
U	Embossed Carrier Taping W4P1, 40,000 pcs.	
C	Pressed Carrier Taping 2 mm pitch, 15,000 pcs.	ERJ1GN
X	Punched Carrier Taping 2 mm pitch, 10,000 pcs.	ERJ2RC ERJ2RK
V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ3EK ERJ6EN ERJ8EN
U	Embossed Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ14N ERJ12N ERJ12S
	Embossed Carrier Taping 4 mm pitch, 4,000 pcs.	ERJ1TN

Construction



Dimensions in mm (not to scale)



Part No.	Dimensions (mm)					Mass (Weight) [g/1000 pcs.]
	L	W	a	b	t	
ERJXG	$0.40^{\pm0.02}$	$0.20^{\pm0.02}$	$0.10^{\pm0.03}$	$0.10^{\pm0.03}$	$0.13^{\pm0.02}$	0.04
ERJ1G, 1R	$0.60^{\pm0.03}$	$0.30^{\pm0.03}$	$0.10^{\pm0.05}$	$0.15^{\pm0.05}$	$0.23^{\pm0.03}$	0.15
ERJ2R□	$1.00^{\pm0.05}$	$0.50^{\pm0.05}$	$0.20^{\pm0.10}$	$0.25^{\pm0.05}$	$0.35^{\pm0.05}$	0.8
ERJ3R□ ERJ3EK	$1.60^{\pm0.15}$	$0.80^{+0.15}_{-0.05}$	$0.30^{\pm0.20}$	$0.30^{\pm0.15}$	$0.45^{\pm0.10}$	2
ERJ6R□ ERJ6EN	$2.00^{\pm0.20}$	$1.25^{\pm0.10}$	$0.40^{\pm0.20}$	$0.40^{\pm0.20}$	$0.60^{\pm0.10}$	4
ERJ8EN	$3.20^{+0.05}_{-0.20}$	$1.60^{+0.05}_{-0.15}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	10
ERJ14N	$3.20^{\pm0.20}$	$2.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	16
ERJ12N	$4.50^{\pm0.20}$	$3.20^{\pm0.20}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	27
ERJ12S	$5.00^{\pm0.20}$	$2.50^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.10}$	27
ERJ1TN	$6.40^{\pm0.20}$	$3.20^{\pm0.20}$	$0.65^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.10}$	45

Ratings

<±0.5 %>

Part No. (inch size)	Power Rating at 70 °C (4) (W)	Limiting Element Voltage (1) (V)	Maximum Overload Voltage (2) (V)	Resistance Tolerance (%)	Resistance Range (Ω)	T.C.R. (×10⁻⁶/°C)	Category Temperature Range (°C)	AEC-Q200 Grade
ERJ1RH (0201)	0.05	15	30	±0.5	1k to 1M (E24, E96)	±50	–55 to +125	–
ERJ2RH (0402)	0.063	50	100	±0.5	100 to 100k (E24, E96)	±50	–55 to +155	Grade 0
ERJ2RK (0402)	0.063	50	100	±0.5	10 to 97.6 102k to 1M (E24, E96)	±100	–55 to +155	Grade 0
ERJ3RB (0603)	0.1	50	100	±0.5	100 to 100k (E24, E96)	±50	–55 to +155	Grade 0
ERJ3RE (0603)	0.1	50	100	±0.5	10 to 97.6 102k to 1M (E24, E96)	±100	–55 to +155	Grade 0
ERJ6RB (0805)	0.1	150	200	±0.5	100 to 100k (E24, E96)	±50	–55 to +155	Grade 0
ERJ6RE (0805)	0.1	150	200	±0.5	10 to 97.6 102k to 1M (E24, E96)	±100	–55 to +155	Grade 0

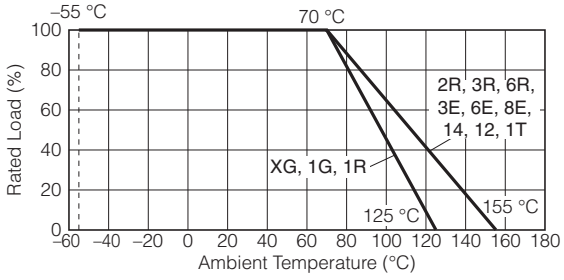
<±1 %>

Part No. (inch size)	Power Rating at 70 °C (4) (W)	Limiting Element Voltage (1) (V)	Maximum Overload Voltage (2) (V)	Resistance Tolerance (%)	Resistance Range (Ω)	T.C.R. (×10⁻⁶/°C)	Category Temperature Range (°C)	AEC-Q200 Grade
ERJXGN (01005)	0.031	15	30	±1	10 to 1 M (E24, E96)	<100 Ω : ±300 100 Ω ≤ : ±200	–55 to +125	–
ERJ1GN (0201)	0.05	25	50	±1	10 to 1 M(3) (E24, E96)	±200	–55 to +125	Grade 1
ERJ2RC (0402)	0.1	50	100	±1	1 to 9.76 (E24, E96)	–100 to +600	–55 to +155	Grade 0
ERJ2RK (0402)	0.1	50	100	±1	10 to 1 M (E24, E96)	±100	–55 to +155	Grade 0
ERJ3EK (0603)	0.1	75	150	±1	10 to 1 M (E24, E96)	±100	–55 to +155	Grade 0
ERJ6EN (0805)	0.125	150	200	±1	10 to 2.2 M (E24, E96)	±100	–55 to +155	Grade 0
ERJ8EN (1206)	0.25	200	400	±1	10 to 2.2 M (E24, E96)	±100	–55 to +155	Grade 0
ERJ14N (1210)	0.5	200	400	±1	10 to 1 M (E24, E96)	±100	–55 to +155	Grade 0
ERJ12N (1812)	0.75	200	500	±1	10 to 1 M (E24, E96)	±100	–55 to +155	Grade 0
ERJ12S (2010)	0.75	200	500	±1	10 to 1 M (E24, E96)	±100	–55 to +155	Grade 0
ERJ1TN (2512)	1	200	500	±1	10 to 1 M (E24, E96)	±100	–55 to +155	Grade 0

(1) Rated Continuous Working Voltage (RCWV) shall be determined from RCWV=$\sqrt{\text{Power Rating} \times \text{Resistance Values}}$, or Limiting Element Voltage listed above, whichever less.
(2) Overload Test Voltage (OTV) shall be determined from OTV=Specified Magnification (refer to performance) × RCWV or Maximum Overload Voltage listed above, whichever less.
(3) Please contact us when you need a type with a resistance of less than 10 Ω.
(4) Use it on the condition that the case temperature is below the upper category temperature.

Power Derating Curve

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



Perfomance

● ERJ1R, 2R, 3R, 6R Type, ±0.5%(D)

Test Item	Performance Requirements	Test Conditions
Resistance	Within Specified Tolerance	20 °C
T. C. R.	Within Specified T. C. R.	+25 °C/+125 °C
Overload	±2%	Rated Voltage × 2.5, 5 s
Resistance to Soldering Heat	±1%	270 °C, 10 s
Rapid Change of Temperature	±1%	–55 °C (30min.) / +155 °C (ERJ1R : +125 °C) (30min.), 100 cycles
High Temperature Exposure	±1%	+155 °C (ERJ1R : +125 °C) , 1000 h
Damp Heat, Steady State	±1%	60 °C, 90% to 95 %RH, 1000 h
Load Life in Humidity	±2% ERJ1R: ±3%	60 °C, 90% to 95 %RH, Rated Voltage, 1.5 h ON/0.5 h OFF cycle, 1000 h
Endurance at 70 °C	±2% ERJ1R: ±3%	70 °C, Rated Voltage, 1.5 h ON/0.5 h OFF cycle, 1000 h

● ERJXGN, 1GN, 2RC, 2RK, 3EK, 6EN, 8EN, 14N, 12N, 12S, 1TN Type, ±1%(F)

Test Item	Performance Requirements	Test Conditions
Resistance	Within Specified Tolerance	20 °C
T. C. R.	Within Specified T. C. R.	+25 °C/+155 °C (ERJXG, ERJ1G : +25 °C/+125 °C)
Overload	±2%	Rated Voltage × 2.5, 5 s
Resistance to Soldering Heat	±1%	270 °C, 10 s
Rapid Change of Temperature	±1%	–55 °C (30min.) / +155 °C (ERJXG, ERJ1G : +125 °C) (30min.), 100 cycles
High Temperature Exposure	±1%	+155 °C (ERJXG, ERJ1G : +125 °C) , 1000 h
Damp Heat, Steady State	±1%	60 °C, 90% to 95 %RH, 1000 h
Load Life in Humidity	±2% ERJXG, ERJ1G: ±3%	60 °C, 90% to 95 %RH, Rated Voltage, 1.5 h ON/0.5 h OFF cycle, 1000 h
Endurance at 70 °C	±2% ERJXG, ERJ1G: ±3%	70 °C, Rated Voltage, 1.5 h ON/0.5 h OFF cycle, 1000 h