Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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Panasonic

2018

CATALOG

Fixed Resistors

2018.3 | industrial.panasonic.com/

Panasonic

Fixed Resistors CONTENTS

All products in this catalog comply with the RoHS Directive.

The RoHS Directive is “the Directive (2011/65/EU) on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment “ and its revisions.

⚠Safety Precautions (Common precautions for Fixed Resistors)

- When using our products, no matter what sort of equipment they might be used for, be sure to make a written agreement on the specifications with us in advance. The design and specifications in this catalog are subject to change without prior notice.
- Do not use the products beyond the specifications described in this catalog.
- This catalog explains the quality and performance of the products as individual components. Before use, check and evaluate their operations when installed in your products.
- Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other significant damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, and disaster/crime prevention equipment.

✻ Systems equipped with a protection circuit and a protection device
✻ Systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault

(1) Precautions for use

- These products are designed and manufactured for general and standard use in general electronic equipment (e.g. AV equipment, home electric appliances, office equipment, information and communication equipment)
- These products are not intended for use in the following special conditions. Before using the products, carefully check the effects on their quality and performance, and determine whether or not they can be used.
  1. In liquid, such as water, oil, chemicals, or organic solvent
  2. In direct sunlight, outdoors, or in dust
  3. In salty air or air with a high concentration of corrosive gas, such as Cl_2, H_2S, NH_3, SO_2, or NO_2
  4. Electric Static Discharge (ESD) Environment
     These components are sensitive to static electricity and can be damaged under static shock (ESD).
     Please take measures to avoid any of these environments.
     Smaller components are more sensitive to ESD environment.
  5. Electromagnetic Environment
     Avoid any environment where strong electromagnetic waves exist.
  6. In an environment where these products cause dew condensation
  7. Sealing or coating of these products or a printed circuit board on which these products are mounted, with resin or other materials
- These products generate Joule heat when energized. Carefully position these products so that their heat will not affect the other components.
- Carefully position these products so that their temperatures will not exceed the category temperature range due to the effects of neighboring heat-generating components. Do not mount or place heat-generating components or inflammables, such as vinyl-coated wires, near these products.
- Note that non-cleaning solder, halogen-based highly active flux, or water-soluble flux may deteriorate the performance or reliability of the products.
- Carefully select a flux cleaning agent for use after soldering. An unsuitable agent may deteriorate the performance or reliability. In particular, when using water or a water-soluble cleaning agent, be careful not to leave water residues. Otherwise, the insulation performance may be deteriorated.

(2) Precautions for storage

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 5 °C to 35 °C and a relative humidity of 45 % to 85 %.

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

<Package markings>
Package markings include the product number, quantity, and country of origin.
In principle, the country of origin should be indicated in English.

Thick Film Chip Resistors

Type: **ERJ XG, 1G, 2G, 3G, 6G, 8G, 14, 12, 12Z, 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
- Reference Standards
  IEC 60115-8, JIS C 5201-8, EIAJ RC-2134B
- AEC-Q200 qualified (Exemption ERJXG)
- RoHS compliant

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

Please see Data Files

Explanation of Part Numbers

- ERJXGN, 1GN, 2GE, 3GE, 6GE, 8GE, 14, 12, 12Z, 1T Type, ±5 %

1	2	3	4	5	6	7	8	9	10	11	12
E	R	J	3	G	E	Y	J	1	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
2GE	0402	0.1 W
3GE	0603	0.1 W
6GE	0805	0.125 W
8GE	1206	0.25 W
14	1210	0.5 W
12	1812	0.75 W
12Z	2010	0.75 W
1T	2512	1 W

Marking

Code	Marking
Y	Value Marking on black side
*Nil	No marking

Resistance Tolerance

Code	Tolerance
J	±5 %
0	Jumper

Resistance Value

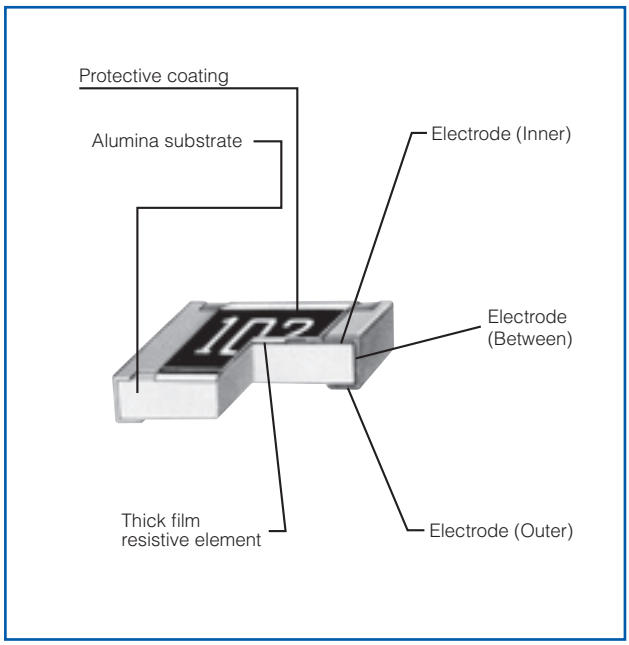
The first two digits are significant figures of resistance and the third one denotes number of zeros following.
Decimal Point is expressed by R as 4.7 = 4R7.
Jumper is expressed by R00.

Packaging Methods

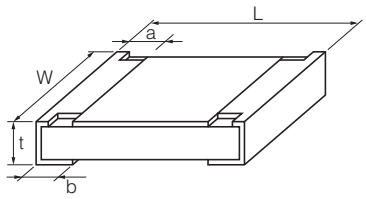
Code	Packaging	Part No.
Y	Pressed Carrier Taping W8P2, 20,000 pcs.	ERJXGN
U	Embossed Carrier Taping W4P1, 40,000 pcs.	
C	Pressed Carrier Taping 2 mm pitch, 15,000 pcs.	ERJ1GN
X	Punched Carrier Taping 2 mm pitch, 10,000 pcs.	ERJ2GE
Y	Punched Carrier Taping 2 mm pitch, 20,000 pcs.	
V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ3GE ERJ6GE ERJ8GE
U	Embossed Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ14 ERJ12 ERJ12Z
	Embossed Carrier Taping 4 mm pitch, 4,000 pcs.	ERJ1T

✻ When omitted, the rest of the P/N factors shall be moved up respectively.
(Only XGN, 1GN, 2GE type)

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	$0.60^{\pm0.03}$	$0.30^{\pm0.03}$	$0.10^{\pm0.05}$	$0.15^{\pm0.05}$	$0.23^{\pm0.03}$	0.15
ERJ2G	$1.00^{\pm0.05}$	$0.50^{\pm0.05}$	$0.20^{\pm0.10}$	$0.25^{\pm0.05}$	$0.35^{\pm0.05}$	0.8
ERJ3G	$1.60^{\pm0.15}$	$0.80^{\pm0.15}_{\pm0.05}$	$0.30^{\pm0.20}$	$0.30^{\pm0.15}$	$0.45^{\pm0.10}$	2
ERJ6G	$2.00^{\pm0.20}$	$1.25^{\pm0.10}$	$0.40^{\pm0.20}$	$0.40^{\pm0.20}$	$0.60^{\pm0.10}$	4
ERJ8G	$3.20^{\pm0.05}_{-0.20}$	$1.60^{\pm0.05}_{-0.15}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	10
ERJ14	$3.20^{\pm0.20}$	$2.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	16
ERJ12	$4.50^{\pm0.20}$	$3.20^{\pm0.20}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	27
ERJ12Z	$5.00^{\pm0.20}$	$2.50^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.10}$	27
ERJ1T	$6.40^{\pm0.20}$	$3.20^{\pm0.20}$	$0.65^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.10}$	45

Ratings

[For Resistor]

Part No. (inch size)	Power Rating (3) at 70 °C (W)	Limiting Element Voltage (1) (V)	Maximum Overload Voltage (2) (V)	Resistance Tolerance (%)	Resistance Range (Ω)	T.C.R. ($\times10^{-6}$/°C)	Category Temperature Range (°C)	AEC-Q200 Grade
ERJXG (01005)	0.031	15	30	±5	4.7 to 1M (E24)	<10 Ω : −100 to +600 10 Ω to 100 Ω : ±300 100 Ω< : ±200	−55 to +125	–
ERJ1G (0201)	0.05	25	50	±5	1 to 10M (E24)	<10 Ω: −100 to +600 10 Ω to 1M Ω: ±200 1M Ω<: −400 to +150	−55 to +125	Grade 1
ERJ2G (0402)	0.1	50	100	±5	1 to 10M (E24)		−55 to +155	Grade 0
ERJ3G (0603)	0.1	75	150	±5	1 to 10M (E24)		−55 to +155	Grade 0
ERJ6G (0805)	0.125	150	200	±5	1 to 10M (E24)		−55 to +155	Grade 0
ERJ8G (1206)	0.25	200	400	±5	1 to 10M (E24)		−55 to +155	Grade 0
ERJ14 (1210)	0.5	200	400	±5	1 to 10M (E24)		−55 to +155	Grade 0
ERJ12 (1812)	0.75	200	500	±5	1 to 10M (E24)		−55 to +155	Grade 0
ERJ12Z (2010)	0.75	200	500	±5	1 to 10M (E24)		−55 to +155	Grade 0
ERJ1T (2512)	1	200	500	±5	1 to 1M (E24)		−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) Use it on the condition that the case temperature is below the upper category temperature.

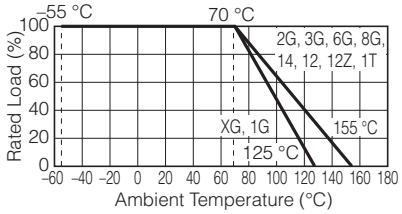
[For Jumper]

Part No. (inch size)	Rated Current (A)	Maximum Overload Current (1) (A)
ERJXG (01005)	0.5	1
ERJ1G (0201)		
ERJ2G (0402)	1	2
ERJ3G (0603)		
ERJ6G (0805)	2	4
ERJ8G (1206)		
ERJ14 (1210)		
ERJ12 (1812)		
ERJ12Z (2010)		
ERJ1T (2512)		

(1) Overload test current

Power Derating Curve

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



Perfomance

Test Item	Performance Requirements		Test Conditions
	Resistor type	Jumper type	
Resistance	Within Specified Tolerance	50m Ω or less	20 °C
T. C. R.	Within Specified T. C. R.	50m Ω or less	+25 °C/+155 °C (ERJXG, ERJ1G : +25 °C/+125 °C)
Overload	±2%	50m Ω or less	Rated Voltage × 2.5, 5 s Jumper type : Max. Overload Current, 5 s
Resistance to Soldering Heat	±1%	50m Ω or less	270 °C, 10 s
Rapid Change of Temperature	±1%	50m Ω or less	–55 °C (30min.) / +155 °C (ERJXG, ERJ1G : +125 °C) (30min.), 100 cycles
High Temperature Exposure	±1%	50m Ω or less	+155 °C (ERJXG, ERJ1G : +125 °C) , 1000 h
Damp Heat, Steady State	±1%	50m Ω or less	60 °C, 90% to 95 %RH, 1000 h
Load Life in Humidity	±3%	50m Ω or less	60 °C, 90% to 95 %RH, Rated Voltage (Jumper type: Rated Current), 1.5 h ON/0.5 h OFF cycle, 1000 h
Endurance at 70 °C	±3%	50m Ω or less	70 °C, Rated Voltage(Jumper type: Rated Current), 1.5 h ON/0.5 h OFF cycle, 1000 h

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

● 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

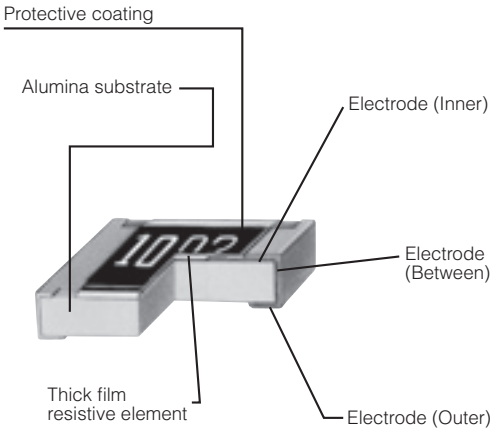
Code	Tolerance
F	±1 %

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

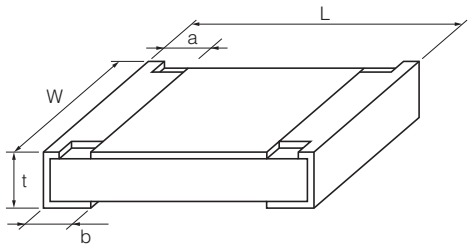
Packaging Methods

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. ($\times 10^{-6}$/°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

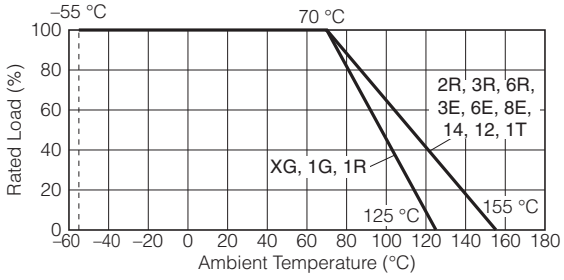
<±1 %>

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. ($\times 10^{-6}$/°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

Metal Film (Thin Film) Chip Resistors, High Reliability Type

Type: ERA 1A, 2A, 3A, 6A, 8A

Features

- High reliability ····· Stable at high temperature and humidity (85 °C 85 %RH rated load, Category temperature range : –55 °C to +155 °C)
- High accuracy ····· Small resistance tolerance and Temperature Coefficient of Resistance
- High performance ····· Low current noise, excellent linearity
- Reference Standard ····· IEC 60115-8, JIS C 5201-8, EIAJ RC-2133B
- AEC-Q200 qualified
- RoHS compliant

■ **As for Packaging Methods, Land Pattern, Soldering Conditions and Safety Precautions,** Please see Data Files

Explanation of Part Numbers

- E24 Series

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

Product Code

Metal Film Chip Resistors

Size, Power Rating

Code	Inch	Power Rating
1A	0201	0.05 W
2A	0402	0.063 W
3A	0603	0.1 W
6A	0805	0.125 W
8A	1206	0.25 W

Temperature Coefficient

Code	T.C.R.
R	±10×10^{-6}/°C
P	±15×10^{-6}/°C
E	±25×10^{-6}/°C
H	±50×10^{-6}/°C
K	±100×10^{-6}/°C

Resistance Tolerance

Code	Tolerance
W	±0.05 %
B	±0.1 %
C	±0.25 %
D	±0.5 %

Packaging Methods

Code	Packaging	Part No.
C	Pressed Carrier Taping 2 mm pitch, 15000 pcs.	ERA1A
X	Punched Carrier Taping 2 mm pitch, 10000 pcs.	ERA2A
V	Punched CarrierTaping 4 mm pitch, 5000 pcs.	ERA3A ERA6A ERA8A

Resistance Value

Consist of three figures for E24 series resistance value. The first two digits are significant figures of resistance and the third one denotes number of zeros following.
(example) 102 : 1k Ω

- E96 Series and other Resistance values

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

Product Code

Metal Film Chip Resistors

Size, Power Rating

Code	Inch	Power Rating
1A	0201	0.05 W
2A	0402	0.063 W
3A	0603	0.1 W
6A	0805	0.125 W
8A	1206	0.25 W

Temperature Coefficient

Code	T.C.R.
R	±10×10^{-6}/°C
P	±15×10^{-6}/°C
E	±25×10^{-6}/°C
H	±50×10^{-6}/°C
K	±100×10^{-6}/°C

Resistance Tolerance

Code	Tolerance
W	±0.05 %
B	±0.1 %
C	±0.25 %
D	±0.5 %

Packaging Methods

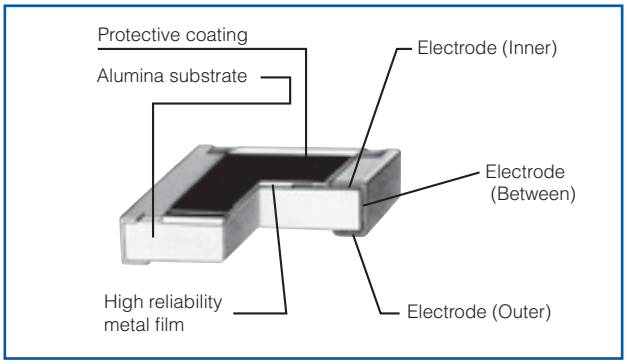
Code	Packaging	Part No.
C	Pressed Carrier Taping 2 mm pitch, 15000 pcs.	ERA1A
X	Punched Carrier Taping 2 mm pitch, 10000 pcs.	ERA2A
V	Punched CarrierTaping 4 mm pitch, 5000 pcs.	ERA3A ERA6A ERA8A

Resistance Value

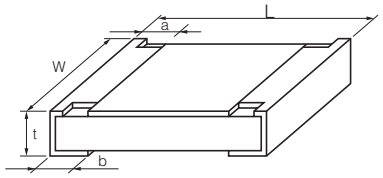
Consist of four figures for E96 series resistance value. The first three digits are significant figures of resistance and the fourth one denotes number of zeros following.
(example) 1051 : 1.05k Ω

note : Duplicated resistance values as E24 series part numbers shall follow E24 part numbers.
(apply three digit resistance value)

Construction



Dimensions in mm (not to scale)



Part No. (inch size)	Dimensions (mm) L	W	a	b	t	Mass (Weight) [g/1000pcs.]
ERA1A (0201)	$0.60^{\pm0.03}$	$0.30^{\pm0.03}$	$0.15^{\pm0.05}$	$0.15^{\pm0.05}$	$0.23^{\pm0.03}$	0.14
ERA2A (0402)	$1.00^{\pm0.10}$	$0.50^{+0.10}_{-0.05}$	$0.15^{\pm0.10}$	$0.25^{\pm0.10}$	$0.35^{\pm0.05}$	0.6
ERA3A (0603)	$1.60^{\pm0.20}$	$0.80^{\pm0.20}$	$0.30^{\pm0.20}$	$0.30^{\pm0.20}$	$0.45^{\pm0.10}$	2
ERA6A (0805)	$2.00^{\pm0.20}$	$1.25^{\pm0.10}$	$0.40^{\pm0.25}$	$0.40^{\pm0.25}$	$0.50^{\pm0.10}$	4
ERA8A (1206)	$3.20^{\pm0.20}$	$1.60^{+0.05}_{-0.15}$	$0.50^{\pm0.25}$	$0.50^{\pm0.25}$	$0.60^{\pm0.10}$	8

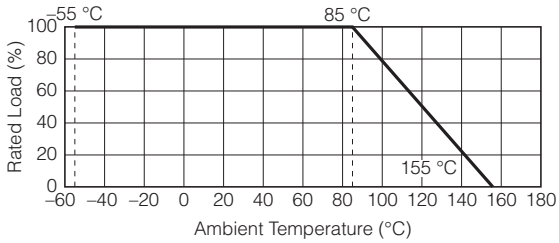
Ratings

Part No. (inch size)	Power Rating at 85 °C (W)	Limiting Element Voltage[1] (V)	Maximum Overload Voltage[2] (V)	Part No. (detail)	Resistance Tolerance (%)	T.C.R. ($\times10^{-6}$/°C)	Resistance Range[3][4] (Ω)	Category Temperature Range (°C)
ERA1A (0201)	0.05	25	50	ERA1AEB	±0.1	±25	100 to 10k (E24, E96)	–55 to +155
				ERA1AEC	±0.25			
				ERA1ARC	±0.25	±10	100 to 10k (E24, E96)	
				ERA1ARB	±0.1			
				ERA1ARW	±0.05		1k to 10k (E24, E96)	
ERA2A (0402)	0.063	50	100	ERA2AKD	±0.5	±100	10 to 46.4 (E24, E96)	
				ERA2AED	±0.5	±25	47 to 100k (E24, E96)	
				ERA2AEC	±0.25			
				ERA2AEB	±0.1			
				ERA2APC	±0.25	±15	200 to 47k (E24, E96)	
				ERA2APB	±0.1			
				ERA2ARC	±0.25	±10	200 to 47k (E24, E96)	
				ERA2ARB	±0.1			
ERA3A (0603)	0.1	75	150	ERA3AHD	±0.5	±50	10 to 46.4 (E24, E96)	
				ERA3AED	±0.5	±25	47 to 330k (E24, E96)	
				ERA3AEC	±0.25			
				ERA3AEB	±0.1			
				ERA3APC	±0.25	±15	470 to 100k (E24, E96)	
				ERA3APB	±0.1			
				ERA3ARC	±0.25	±10	1k to 100k (E24, E96)	
				ERA3ARB	±0.1			
				ERA3ARW	±0.05			
ERA6A (0805)	0.125	100	200	ERA6AHD	±0.5	±50	10 to 46.4 (E24, E96)	
				ERA6AED	±0.5	±25	47 to 1M (E24, E96)	
				ERA6AEC	±0.25			
				ERA6AEB	±0.1			
				ERA6APC	±0.25	±15	470 to 100k (E24, E96)	
				ERA6APB	±0.1			
				ERA6ARC	±0.25	±10	1k to 100k (E24, E96)	
				ERA6ARB	±0.1			
				ERA6ARW	±0.05			
ERA8A (1206)	0.25	150	300	ERA8AHD	±0.5	±50	10 to 46.4 (E24, E96)	
				ERA8AED	±0.5	±25	47 to 1M (E24, E96)	
				ERA8AEC	±0.25			
				ERA8AEB	±0.1			
				ERA8APC	±0.25	±15	470 to 100k (E24, E96)	
				ERA8APB	±0.1			
				ERA8ARC	±0.25	±10	1k to 100k (E24, E96)	
				ERA8ARB	±0.1			
				ERA8ARW	±0.05			

(1) Rated Continuous Working Voltage (RCWV) shall be determined from RCWV=$\sqrt{\text{Rated Power} \times \text{Resistance Values}}$, or Limiting Element Voltage listed above, whichever less.
(2) Overload (Short-time Overload) Test Voltage (SOTV) shall be determined from SOTV=2.5 × RCWV or max. Overload Voltage listed above whichever less.
(3) E192 series resistance values are also available. Please contact us for details.
(4) Duplicated resistance values between E96, E192 and E24 series shall follow E24 Part Numbers. (apply three digit resistance value)

Power Derating Curve

For resistors operated in ambient temperatures above 85 °C, power rating shall be derated in accordance with the figure on the right.



Thick Film Chip Resistors / Low Resistance Type

Type: **ERJ 2LW, 3LW, 6LW**
2BW, 3BW, 6BW,
8BW, 6CW, 8CW
ERJ 2B, 3B, 6D, 6B, 8B,
14B, 3R, 6R, 8R, 14R,
12R, 12Z, 1TR
ERJ L03, L06, L08, L14,
L12, L1D, L1W

Features

- Current Sensing resistor
- Small size and lightweight
- Realize both low-resistance & High-precision by original thick film resistive element & special electrode structure
- Suitable for both reflow and flow soldering
- Realize High-power by double-sided resistive elements structure that aimed to suppress temperature rising : ERJ2LW, 3LW, 6LW, 2BW, 3BW, 6BW, 8BW, 6CW, 8CW
- Low TCR : ±75×10^{-6}/°C (ERJ6CW, 8CW)
- Low Resistance Value : Thick film resistors available from 5m Ω (ERJ3LW, 6LW)
- Reference Standards : IEC 60115-8, JIS C 5201-8, JEITA RC-2144
- AEC-Q200 qualified
- RoHS compliant

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

Please see Data Files

Explanation of Part Numbers

- ERJ2LW, 3LW, 6LW, 2BW, 3BW, 6BW, 8BW, 6CW, 8CW
  <High power (double-sided resistive elements structure) type>

1	2	3	4	5	6	7	8	9	10	11	12
E	R	J	2	B	W	G	R	0	4	7	X

Product Code
Thick Film Chip Resistors

Code	Inch	Power Rating	Resistance Value
2LW	0402	0.2 W	10m Ω
3LW	0603	0.25 W	5m Ω,10m Ω
6LW	0805	0.5 W	5, 6, 7, 8, 9m Ω
2BW	0402	0.25 W	47m Ω to 100m Ω
3BW	0603	0.33 W	20m Ω to 100m Ω
6BW	0805	0.5 W	10m Ω to 100m Ω
8BW	1206	1 W	10m Ω to 100m Ω
6CW	0805	0.5 W	10m Ω to 30m Ω
8CW	1206	1 W	10m Ω to 50m Ω

Resistance Tolerance	
Code	Tolerance
D	± 0.5 %*
F	± 1 %
G	± 2 %
J	± 5 %

* Please refer to the rating table for the resistance tolerance

Resistance Value
Shown by 4 digits or letters. (Ex.) R047 : 0.047 Ω=47m Ω

Packaging Methods		
Code	Packaging	Part No.
X	Pressed Carrier Taping 2 mm pitch, 10,000 pcs.	ERJ2LW ERJ2BW
V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ3LW ERJ6LW ERJ3BW ERJ6BW ERJ8BW ERJ6CW ERJ8CW

● ERJ2BS/2BQ, 3BS/3BQ, 6BS/6BQ, 8BS/8BQ, 14BS/14BQ, 6D, 3R, 6R, 8R, 14R, 12R, 12Z, 1TR
<High power type/Standard type>

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

Product Code

Thick Film Chip Resistors

Size, Power Rating

Type	Inch	Power R.
2B	0402	0.166 W
3B	0603	0.25 W
3R	0603	0.1 W
6D	0805	0.5 W
6B	0805	0.33 W
6R	0805	0.125 W
8B	1206	0.5 W
8R	1206	0.25 W
14B	1210	0.5 W
14R	1210	0.25 W
12R	1812	0.5 W
12Z	2010	0.5 W
1TR	2512	1 W

Resistance Value

Code	Res. Value
S	0.1 Ω to 0.2 Ω
Q	0.22 Ω to 9.1 Ω*

* 2B : 0.22 Ω to 1.0 Ω

Resistance Tolerance

Code	Tolerance
D	± 0.5 %*
F	± 1 %
G	± 2 %
J	± 5 %

* Please refer to the rating table for the resistance tolerance

Resistance Value

Shown by 3 digits or letters.
Only when it is D (E24,E96) or F (E96), shown by 4 digits or letters.
(Ex.) R22 : 0.22 Ω
R102 : 0.102 Ω

Packaging Methods

Code	Packaging	Part No.
X	Punched Carrier Taping 2 mm pitch, 10,000 pcs.	ERJ2B
V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ3B/3R ERJ6D/6B/6R ERJ8B/8R
U	Embossed Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ14B/14R ERJ12R ERJ12Z
	Embossed Carrier Taping 4 mm pitch, 4,000 pcs.	ERJ1TR

● ERJL03, L06, L08, L14, L12, L1D, L1W <Low TCR type>

1	2	3	4	5	6	7	8	9	10	11	12
E	R	J	L	1	4	K	J	5	0	M	U

Product Code

Thick Film Chip Resistors

Size, Power Rating

Type	Inch	Power R.
L03	0603	0.2 W
L06	0805	0.25 W
L08	1206	0.33 W
L14	1210	0.33 W
L12	1812	0.5 W
L1D	2010	0.5 W
L1W	2512	1 W

Code / Res. Value

Code	Res. Value
K	Std. 20m Ω, 22m Ω, 33m Ω, 39m Ω, 47m Ω, 50m Ω, 100m Ω *
U	20m Ω to 100m Ω*

* L03, L06, L08 : 47m Ω to 100m Ω
L1D, L1W : 40m Ω to 100m Ω

Resistance Tolerance

Code	Tolerance
F	± 1 %
J	± 5 %

Resistance Value

Shown by 3 digits or letters.
(Ex.) 50M:50m Ω, 10 C:100m Ω

Packaging Methods

Code	Packaging	Part No.
V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJL03 ERJL06 ERJL08
U	Embossed Carrier Taping 4 mm pitch, 5,000 pcs.	ERJL14 ERJL12 ERJL1D
	Embossed Carrier Taping 4 mm pitch, 3,000 pcs.	ERJL1W

Ratings

<High power (double-sided resistive elements structure) type>

Part No. (inch size)	Power Rating (2) at 70 °C (W)	Resistance Tolerance (%)	Resistance (1) Range (Ω)	T.C.R. (×10^{-6}/°C)	Category Temperature Range (°C)	AEC-Q200 Grade
ERJ2LW (0402)	0.2	±1, ±2, ±5	10m	0 to 500	–55 to +125	Grade 1
ERJ3LW (0603)	0.25	±1, ±2, ±5	5m	0 to 700	–55 to +125	Grade 1
			10m	0 to 300	–55 to +125	
ERJ6LW (0805)	0.5	±1, ±2, ±5	5, 6, 7, 8, 9m	0 to 300	–55 to +125	Grade 1
ERJ2BW (0402)	0.25	±1, ±2, ±5	47m to 100m (E24)	±300	–55 to +155	Grade 0
ERJ3BW (0603)	0.33	±1, ±2, ±5	20m to 100m (E24)	20m Ω ≤ R < 39m Ω : ±250 39m Ω ≤ R ≤ 100m Ω : ±150	–55 to +155	Grade 0
ERJ6BW (0805)	0.5	±1, ±2, ±5	10m to 100m (E24)	10m Ω ≤ R < 15m Ω : ±300 15m Ω ≤ R ≤ 100m Ω : ±200	–55 to +155	Grade 0
ERJ8BW (1206)	1	±1, ±2, ±5	10m to 100m (E24)	10m Ω ≤ R < 20m Ω : ±200 20m Ω ≤ R < 47m Ω : ±150 47m Ω ≤ R ≤ 100m Ω : ±100	–55 to +155	Grade 0
ERJ6CW (0805)	0.5	±0.5, ±1, ±2, ±5	10m to 30m (E24)	±75	–55 to +125	Grade 1
ERJ8CW (1206)	1	±1, ±2, ±5	10m to 50m (E24)	±75	–55 to +125	Grade 1

(1) Please contact us when resistors of irregular series are needed.
(2) Use it on the condition that the case temperature is below the upper category temperature.
· Rated Continuous Working Voltage (RCWV) shall be determined from RCWV = $\sqrt{\text{Power Rating} \times \text{Resistance Values}}$.
· Overload Test Voltage (OTV) shall be determined from OTV = Specified Magnification (refer to performance) × RCWV.

Ratings

<High power type>

Part No. (inch size)	Power Rating (2) at 70 °C (W)	Resistance (3) Tolerance (%)	Resistance (1) Range (Ω)	T.C.R. (×10⁻⁶/°C)	Category Temperature Range (°C)	AEC-Q200 Grade
ERJ2BS (0402)	0.166	±1, ±2, ±5	0.10 to 0.20 (E24)	±300	–55 to +155	Grade 0
ERJ2BQ (0402)			0.22 to 1.0 (E24)	±250		
ERJ3BS (0603)	0.25	±1, ±2, ±5	0.10 to 0.20 (E24)	±300	–55 to +155	Grade 0
ERJ3BQ (0603)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±200		
ERJ6DS (0805)	0.5	±0.5, ±1, ±2, ±5	0.10 to 0.20 (E24, E96)	±150	–55 to +155	Grade 0
ERJ6DQ (0805)			0.22 to 9.1 (E24, E96)	±100		
ERJ6BS (0805)	0.33	±1, ±2, ±5	0.10 to 0.20 (E24)	±250	–55 to +155	Grade 0
ERJ6BQ (0805)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±200		
ERJ8BS (1206)	0.5	±1, ±2, ±5	0.10 to 0.20 (E24)	±250	–55 to +155	Grade 0
ERJ8BQ (1206)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±200		
ERJ14BS (1210)	0.5	±1, ±2, ±5	0.10 to 0.20 (E24)	±200	–55 to +155	Grade 0
ERJ14BQ (1210)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±100		

(1) Please contact us when resistors of irregular series are needed.
(2) Use it on the condition that the case temperature is below the upper category temperature.
(3) E96 series also have ±0.5 %, ±1 % line-up.
· Rated Continuous Working Voltage (RCWV) shall be determined from RCWV = $\sqrt{\text{Power Rating} \times \text{Resistance Values}}$.
· Overload Test Voltage (OTV) shall be determined from OTV = Specified Magnification (refer to performance) × RCWV.

<Standard type>

Part No. (inch size)	Power Rating (2) at 70 °C (W)	Resistance Tolerance (%)	Resistance (1) Range (Ω)	T.C.R. (×10⁻⁶/°C)	Category Temperature Range (°C)	AEC-Q200 Grade
ERJ3RS (0603)	0.1	±1, ±2, ±5	0.10 to 0.20 (E24)	±300	–55 to +155	Grade 0
ERJ3RQ (0603)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±200		
ERJ6RS (0805)	0.125	±1, ±2, ±5	0.10 to 0.20 (E24)	±250	–55 to +155	Grade 0
ERJ6RQ (0805)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±200		
ERJ8RS (1206)	0.25	±1, ±2, ±5	0.10 to 0.20 (E24)	±250	–55 to +155	Grade 0
ERJ8RQ (1206)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±200		
ERJ14RS (1210)	0.25	±1, ±2, ±5	0.10 to 0.20 (E24)	±200	–55 to +155	Grade 0
ERJ14RQ (1210)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±100		
ERJ12RS (1812)	0.5	±1, ±2, ±5	0.10 to 0.20 (E24)	±200	–55 to +155	Grade 0
ERJ12RQ (1812)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±100		
ERJ12ZS (2010)	0.5	±1, ±2, ±5	0.10 to 0.20 (E24)	±200	–55 to +155	Grade 0
ERJ12ZQ (2010)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±100		
ERJ1TRS (2512)	1	±1, ±2, ±5	0.10 to 0.20 (E24)	±200	–55 to +155	Grade 0
ERJ1TRQ (2512)			0.22 to 0.91 (E24)			
			1.0 to 9.1 (E24)	±100		

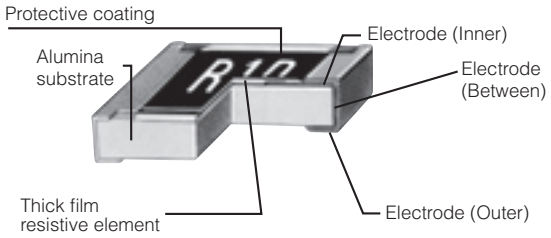
(1) Please contact us when resistors of irregular series are needed.
(2) Use it on the condition that the case temperature is below the upper category temperature.
· Rated Continuous Working Voltage (RCWV) shall be determined from RCWV = $\sqrt{\text{Power Rating} \times \text{Resistance Values}}$.
· Overload Test Voltage (OTV) shall be determined from OTV = Specified Magnification (refer to performance) × RCWV.

<Low TCR type>

Part No. (inch size)	Power Rating (2) at 70 °C (W)	Resistance Tolerance (%)	Resistance (1) Range (Ω)	T.C.R. (×10⁻⁶/°C)	Category Temperature Range (°C)	AEC-Q200 Grade
ERJL03 (0603)	0.2	±1, ±5	47m to 100m	±200	–55 to +125	Grade 1
ERJL06 (0805)	0.25	±1, ±5	47m to 100m	±100	–55 to +125	Grade 1
ERJL08 (1206)	0.33	±1, ±5	47m to 100m	±100	–55 to +125	Grade 1
ERJL14 (1210)	0.33	±1, ±5	20m to 100m		–55 to +125	Grade 1
ERJL12 (1812)	0.5	±1, ±5	20m to 100m	R < 47m Ω : ±300	–55 to +125	Grade 1
ERJL1D (2010)	0.5	±1, ±5	40m to 100m	R ≥ 47m Ω : ±100	–55 to +125	Grade 1
ERJL1W (2512)	1	±1, ±5	40m to 100m		–55 to +125	Grade 1

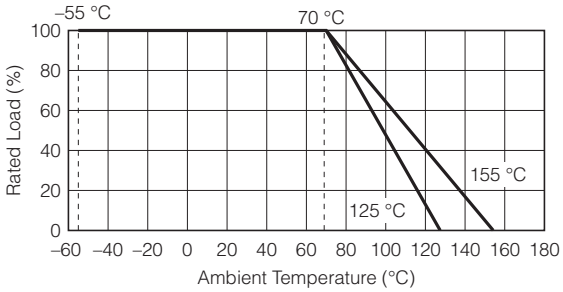
(1) Standard R.V. : 20m Ω, 22m Ω, 33m Ω, 39m Ω, 47m Ω, 50m Ω, 100m Ω, Custom R.V. : Each 1m Ω within upper range.
(2) Use it on the condition that the case temperature is below the upper category temperature.
· Rated Continuous Working Voltage (RCWV) shall be determined from RCWV = $\sqrt{\text{Power Rating} \times \text{Resistance Values}}$.
· Overload Test Voltage (OTV) shall be determined from OTV = Specified Magnification (refer to performance) × RCWV.

Construction

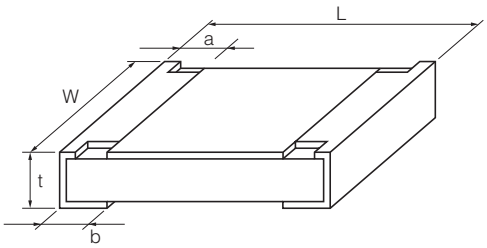


Power Derating Curve

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



Dimensions in mm (not to scale)



Part No.	Dimensions (mm) L	W	a	b	t	Mass(Weight) [g/1000 pcs.]
ERJ2LW	$1.00^{\pm0.10}$	$0.50^{+0.10}_{-0.05}$	$0.25^{\pm0.10}$	$0.25^{\pm0.10}$	$0.40^{\pm0.05}$	0.8
ERJ2BW	$1.00^{\pm0.10}$	$0.50^{+0.10}_{-0.05}$	$0.24^{\pm0.10}$	$0.24^{\pm0.10}$	$0.35^{\pm0.05}$	0.8
ERJ2BS ERJ2BQ	$1.00^{\pm0.10}$	$0.50^{+0.10}_{-0.05}$	$0.20^{\pm0.10}$	$0.27^{\pm0.10}$	$0.35^{\pm0.05}$	0.8
ERJ3LW (5m Ω)	$1.60^{\pm0.15}$	$0.80^{\pm0.15}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.55^{\pm0.10}$	3
ERJ3LW (10m Ω) ERJ3BW	$1.60^{\pm0.15}$	$0.80^{\pm0.15}$	$0.40^{\pm0.20}$	$0.40^{\pm0.20}$	$0.55^{\pm0.10}$	3
ERJ3R ERJ3B ERJL03	$1.60^{\pm0.15}$	$0.80^{+0.15}_{-0.05}$	$0.30^{\pm0.20}$	$0.30^{\pm0.15}$	$0.45^{\pm0.10}$	2
ERJ6LW	$2.00^{\pm0.20}$	$1.25^{\pm0.20}$	$0.63^{\pm0.20}$	$0.63^{\pm0.20}$	$0.70^{\pm0.10}$	6
ERJ6BW	$2.00^{\pm0.20}$	$1.25^{\pm0.20}$	$0.55^{\pm0.20}$	$0.55^{\pm0.20}$	$0.65^{\pm0.10}$	6
ERJ6CW (10 to 13m Ω)	$2.05^{\pm0.20}$	$1.30^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.20}$	$0.65^{\pm0.10}$	6
ERJ6CW (15 to 30m Ω)			$0.45^{\pm0.20}$	$0.45^{\pm0.20}$		
ERJ6D	$2.00^{\pm0.20}$	$1.25^{\pm0.10}$	$0.40^{\pm0.20}$	$0.55^{\pm0.25}$	$0.60^{\pm0.10}$	5
ERJ6R ERJ6B ERJL06	$2.00^{\pm0.20}$	$1.25^{\pm0.10}$	$0.40^{\pm0.20}$	$0.40^{\pm0.20}$	$0.60^{\pm0.10}$	5

Part No.	Dimensions (mm) L	W	a	b	t	Mass(Weight) [g/1000 pcs.]
ERJ8BW	$3.20^{\pm0.20}$	$1.60^{\pm0.20}$	$1.00^{\pm0.20}$	$1.00^{\pm0.20}$	$0.65^{\pm0.10}$	13
ERJ8CW (10 to 16m Ω)	$3.20^{\pm0.20}$	$1.60^{\pm0.20}$	$1.10^{\pm0.20}$	$1.10^{\pm0.20}$	$0.65^{\pm0.10}$	13
ERJ8CW (18 to 50m Ω)	$3.20^{\pm0.20}$	$1.60^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.20}$	$0.65^{\pm0.10}$	13
ERJ8R ERJ8B ERJL08	$3.20^{+0.05}_{-0.20}$	$1.60^{+0.05}_{-0.15}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	10
ERJ14R ERJ14B ERJL14	$3.20^{\pm0.20}$	$2.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	16
ERJ12R ERJL12	$4.50^{\pm0.20}$	$3.20^{\pm0.20}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	27
ERJ12Z ERJL1D	$5.00^{\pm0.20}$	$2.50^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.10}$	27
ERJ1TR	$6.40^{\pm0.20}$	$3.20^{\pm0.20}$	$0.65^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.10}$	45
ERJL1W	$6.40^{\pm0.20}$	$3.20^{\pm0.20}$	$0.65^{\pm0.20}$	$1.30^{\pm0.20}$	$1.10^{\pm0.10}$	79

Performance

● ERJ2LW, 3LW, 6LW, 2BW, 3BW, 6BW, 8BW, 6CW, 8CW
<High power (double-sided resistive elements structure) type>

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 × 2.0, 5 s ERJ6LW : × 1.77, 5 s ERJ8BW (R > 0.05 Ω) : × 1.77, 5 s
Resistance to Soldering Heat	±1%	270 °C, 10 s
Rapid Change of Temperature	±1% ERJ2LW : ±2%	–55 °C (30 min.) / +155 °C (ERJ✻LW, ERJ✻CW : +125 °C) (30 min.), 100 cycles
High Temperature Exposure	±1%	+155 °C (ERJ✻LW, ERJ✻CW : +125 °C), 1000 h
Damp Heat, Steady State	±1%	60 °C, 90% to 95%RH, 1000 h
Load Life in Humidity	±3%	60 °C, 90% to 95%RH, Rated Voltage, 1.5 h ON/0.5 h OFF cycle, 1000 h
Endurance at 70 °C	±3%	70 °C, Rated Voltage, 1.5 h ON/0.5 h OFF cycle, 1000 h

● ERJ2BS/2BQ, 3BS/3BQ, 6BS/6BQ, 8BS/8BQ, 14BS/14BQ, 6D, 3R, 6R, 8R, 14R, 12R, 12Z, 1TR
<High power type/Standard type>

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 (ERJ6D : × 1.77), 5 s
Resistance to Soldering Heat	±1%	270 °C, 10 s
Rapid Change of Temperature	±1%	–55 °C (30 min.) / +155 °C (30 min.), 100 cycles
High Temperature Exposure	±1%	+155 °C, 1000 h
Damp Heat, Steady State	±1%	60 °C, 90% to 95%RH, 1000 h
Load Life in Humidity	±3%	60 °C, 90% to 95%RH, Rated Voltage, 1.5 h ON/0.5 h OFF cycle, 1000 h
Endurance at 70 °C	±3%	70 °C, Rated Voltage, 1.5 h ON/0.5 h OFF cycle, 1000 h

● ERJL03, L06, L08, L14, L12, L1D, L1W <Low TCR type>

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 (30 min.) / +125 °C (30 min.), 100 cycles
High Temperature Exposure	±1%	+125 °C, 1000 h
Damp Heat, Steady State	±1%	60 °C, 90% to 95%RH, 1000 h
Load Life in Humidity	±3%	60 °C, 90% to 95%RH, Rated Voltage, 1.5 h ON/0.5 h OFF cycle, 1000 h
Endurance at 70 °C	±3%	70 °C, Rated Voltage, 1.5 h ON/0.5 h OFF cycle, 1000 h

Current Sensing Resistors, Metal Plate Type

Type: ERJ MS4, MS6, MB1

Features

- Ideal for current sensing solution
- Small case size with high power
- Metal plate bonding technology. Excellent long term stability
- Outer Resin with high heat dissipation. Wide temperature range (-65 °C to +170 °C)
- AEC-Q200 qualified
- RoHS compliant
- ISO9001, ISO/TS16949 certified

■ **As for Packaging Methods, Soldering Conditions and Safety Precautions,**
Please see Data Files

Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	R	J	M	S	4	S	F	2	M	0	U

Product Code
Metal Plate Chip Resistors

Type Code		
Code	Inch size	Electrode type
S4S	2512	Standard
S4H	2512	Narrow
S6S	2526	Standard
B1S	1020	Standard

Resistance Tolerance	
Code	Tolerance
F	±1 %

Resistance Value
Shown by 3 digits or letters.Decimal point is expressed by M as 2.0m Ω=2M0, 0.5m Ω=M50, 10.0m Ω=10M

Packaging Methods		
Code	Packaging	Part No.
U	Embossed Carrier Taping 4 mm pitch, 2,000 pcs.	ERJMS4
	Embossed Carrier Taping 8 mm pitch, 1,000 pcs.	ERJMS6
	Embossed Carrier Taping 4 mm pitch, 3,000 pcs.	ERJMB1

Ratings

Part No. (inch size)	Power Rating at 70 °C (W)	Resistance Range (mΩ)	Resistance Tolerance (%)	T.C.R. ($\times 10^{-6}$/°C)	Category Temperature Range (°C)	Terminal temp. upper limit (°C)
ERJMS4S (2512)	3	1, 2, 3, 4	F : ±1	±75	–65 to +170	130
ERJMS4H (2512)	3	5, 6	F : ±1	±75	–65 to +170	130
	2	7, 8, 9, 10	F : ±1	±75	–65 to +170	100
ERJMS6S (2526)	5	0.5, 1, 2	F : ±1	±75	–65 to +170	130
ERJMB1S (1020)	2	1, 2, 3, 4, 5	F : ±1	±75	–65 to +170	130

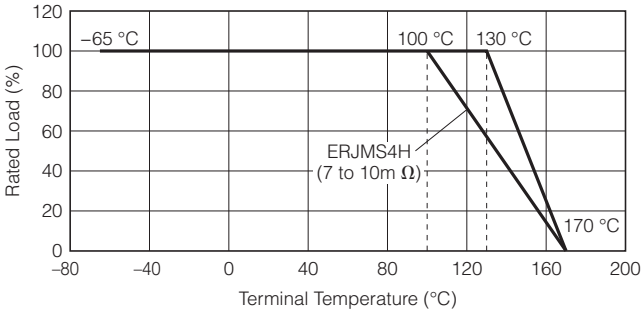
✻ Please contact us when resistors of irregular series are needed.

Power Derating Curve

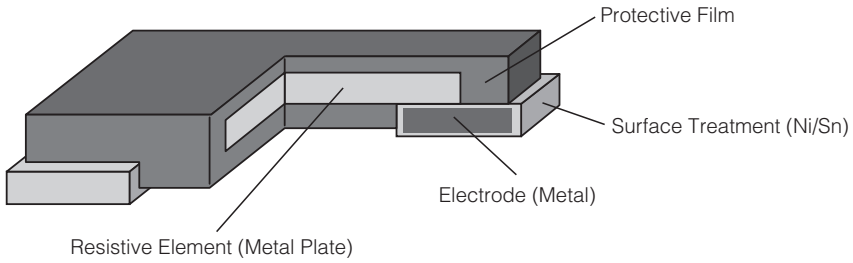
If the terminal temperature of the resistor is more than terminal temperature upper limit value of the rated table, please reduce the rated power according to the Power Derating Curve shown in the figure on the right.

<Supplemented>
In the case of the temperature measurement of the terminal portion of the resistor, Please perform under the following conditions.

1) Tarminal temperature measurement, please apply the temperature of the higher of either the left or right electrode upper surface of the resistor.
2) Please measure the temperature of the resistor in the land pattern printed of circuit board and plan to use by real conditions.

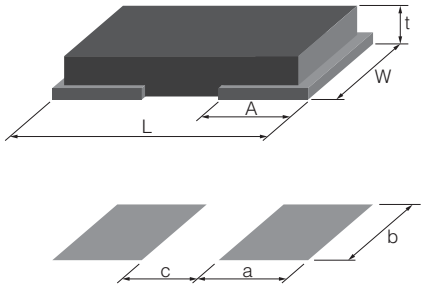


Construction



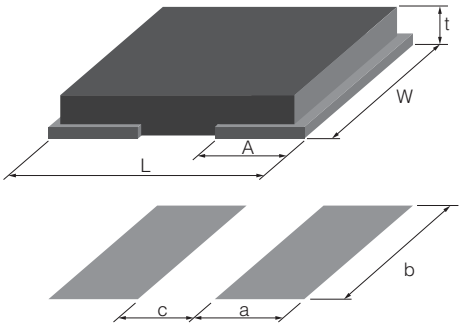
Dimensions in mm (not to scale), Recommended Land Pattern

● ERJMS4S/ERJMS4H

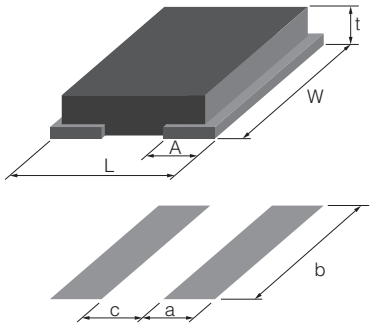


Land Pattern

● ERJMS6S

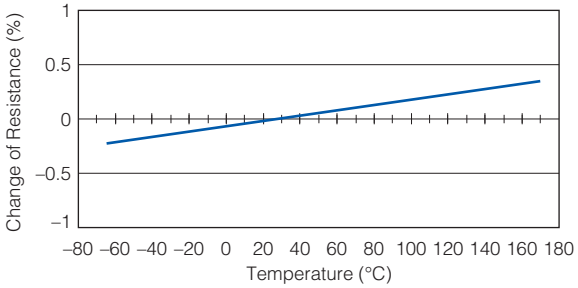


● ERJMB1S

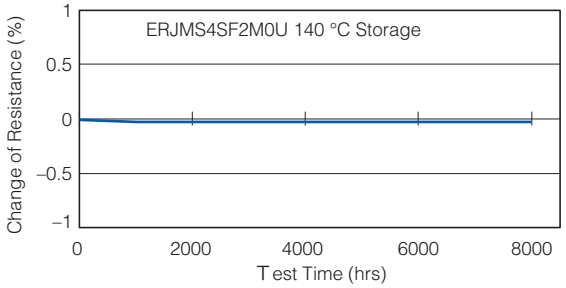


Part No. (inch size)	Dimension (mm)				Recommended Land Pattern (mm)			Mass (Weight) (g/1000 pcs.)
	L	W	A	t	a	b	c	
ERJMS4S (2512)	6.40±0.25	3.20±0.25	2.20±0.25	1.20±0.15	2.7	3.4	2.0	120
ERJMS4H (2512)	6.40±0.25	3.20±0.25	1.25±0.25	1.20±0.15	1.7	3.4	4.0	115
ERJMS6S (2526)	6.40±0.25	6.80±0.25	2.20±0.25	1.20±0.15	2.7	7.0	2.0	260
ERJMB1S (1020)	2.55±0.25	5.00±0.25	$0.68^{+0.15}_{-0.20}$	0.90±0.15	1.15	5.5	1.1	40

Typical Temperature dependence of electrical resistance



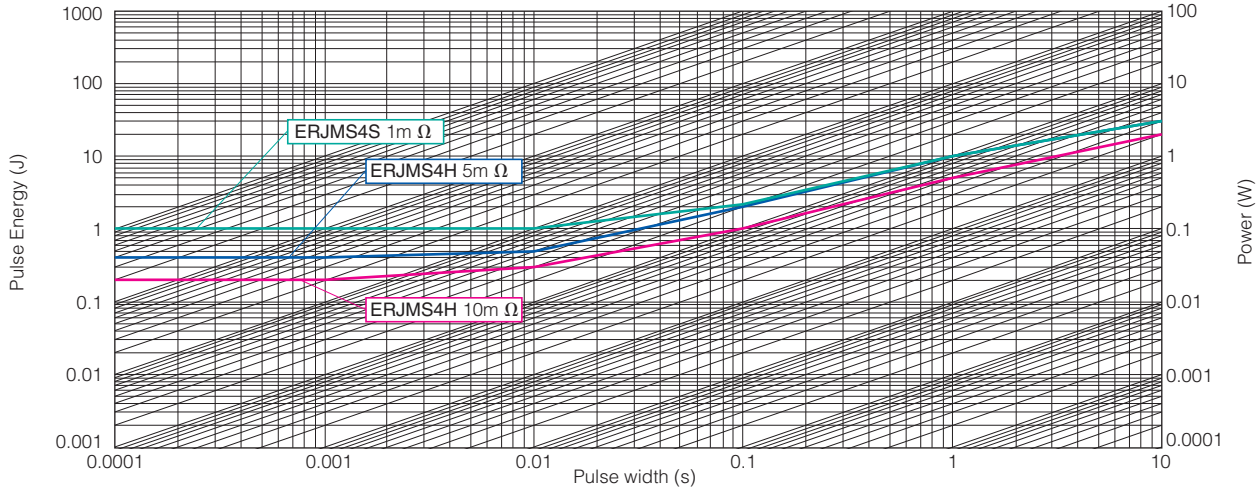
Long-term stability



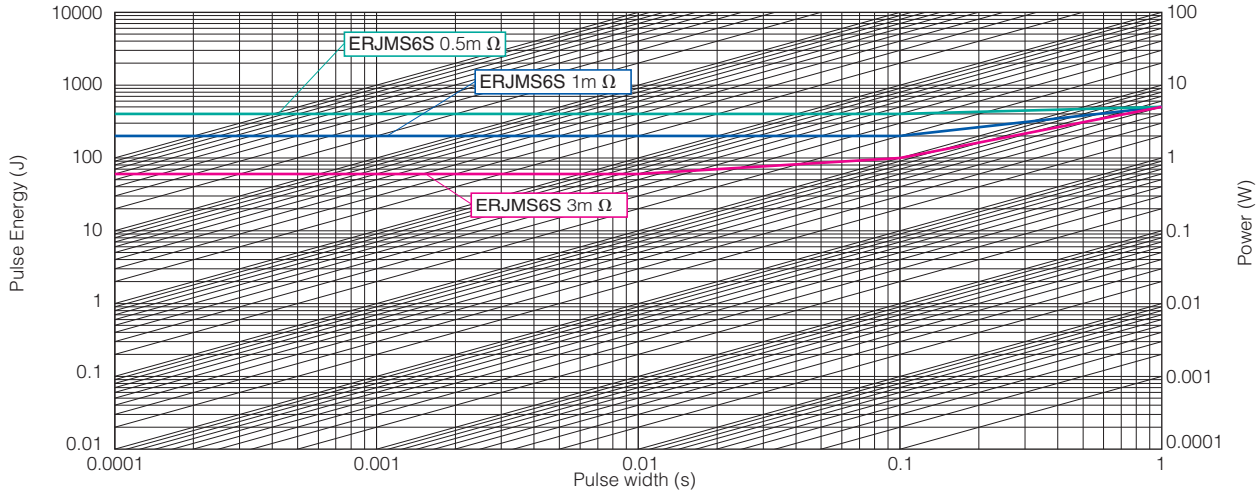
Maximum pulse energy respectively pulse power for continuous operation

Referance Data
Condition : Room Temperature, OFF : 10 s, 1000 cycle, Wave form : Square
Change of Resistance=±1 %

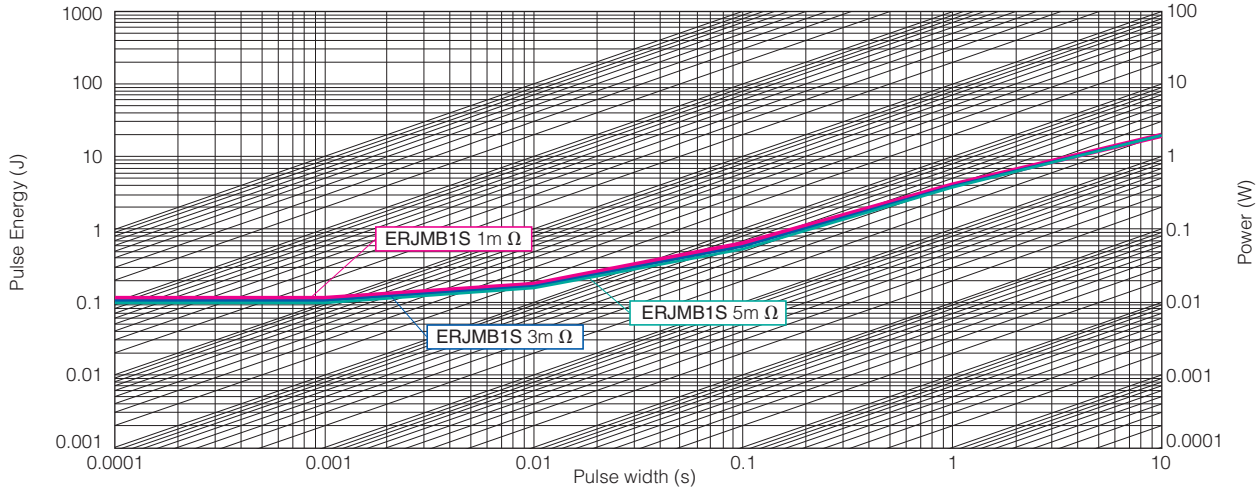
● ERJMS4 type



● ERJMS6 type



● ERJMB1 type



Performance (AEC-Q200)

● ERJMS4, ERJMS6 type

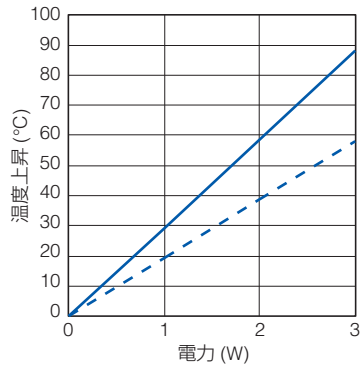
Test Item	Test Condition	Specification	Typical value
Thermal Shock	–55 °C/155 °C, 1000cycles	±1 %	0.20 %
Overload	3 × Rated Power, 5 sec	±0.5 %	0.10 %
Solderability	245 °C, 3 sec	> 95% coverage	> 95% coverage
Resistance to Solvents	MIL-STD-202 method 215, 2.1a, 2.1d	No damage	No damage
Low Temperature Storage and Operation	–65 °C, 24 h	±0.5 %	0.03 %
Resistance to Soldering Heat	MIL-STD-202 method 210 (260 °C, 10s)	±0.5 %	0.10 %
Moisture Resistance	MIL-STD-202 method 106	±0.5 %	0.10 %
Shock	MIL-STD-202 method 213-A	±0.5 %	0.10 %
Vibration, High Frequency	10 to 2000 (Hz)	±0.5 %	0.05 %
Life	70 °C, Rated Power, 2000 h	±1 %	0.30 %
Storage Life at Elevated Temperature	170 °C, 2000 h	±1 %	0.30 %
High Temperature Characteristics	140 °C, 2000 h	±0.5 %	0.05 %
Frequency Characteristics	Inductance	< 5 nH	< 2 nH

● ERJMB1 type

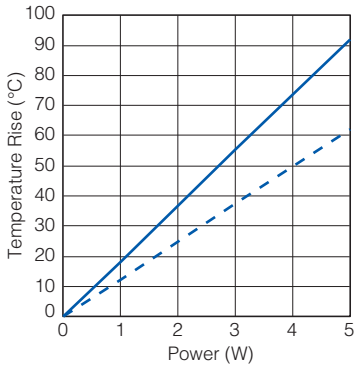
Test Item	Test Condition	Specification	Typical value
Thermal Shock	–55 °C/155 °C, 1000cycles	±1 %	0.30 %
Overload	2.5 × Rated Power, 5 sec	±1 %	0.30 %
Solderability	245 °C, 3 sec	> 95% coverage	> 95% coverage
Resistance to Solvents	MIL-STD-202 method 215, 2.1a, 2.1d	No damage	No damage
Low Temperature Storage and Operation	–65 °C, 24 h	±0.5 %	0.03 %
Resistance to Soldering Heat	MIL-STD-202 method 210 (260 °C, 10s)	±0.5 %	0.10 %
Moisture Resistance	MIL-STD-202 method 106	±0.5 %	0.10 %
Shock	MIL-STD-202 method 213-A	±0.5 %	0.10 %
Vibration, High Frequency	10 to 2000 (Hz)	±0.5 %	0.05 %
Life	70 °C, Rated Power, 2000 h	±1 %	0.30 %
Storage Life at Elevated Temperature	170 °C, 2000 h	±1 %	0.30 %
High Temperature Characteristics	140 °C, 2000 h	±0.5 %	0.05 %
Frequency Characteristics	Inductance	< 5 nH	< 2 nH

Temperature Rise

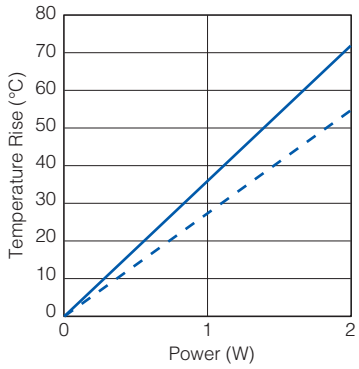
● ERJMS4HF5M0U



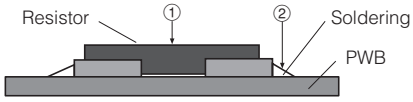
● ERJMS6SF2M0U



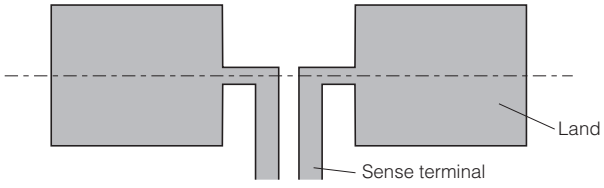
● ERJMB1SF3M0U



<Condition>
Base material : FR-4 (t1.6mm)
Copper Thickness : 70 µm, Two layer



Sense terminal-Layout



Current Sensing Resistors, Metal Plate Type

Type: **ERJM1W**

Features

- Low resistance values and high precision (1 mΩ to 20 mΩ)
- Stable resistance not influenced by measurement position
- High heat emission
- Low profile, strong body
- Inductance less than 1.0 nH for the metal plate structure
- RoHS compliant

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

Please see Data Files

Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	R	J	M	1	W	S	F	3	M	0	U

Product Code
Thick Film Chip Resistors

Size, Power Rating		
Code	Inch	Power R.
M1W	2512	1 W

Code	Type
S	General type
T	Wide terminal type

Resistance Tolerance	
Code	Tolerance
F	± 1 %
J	± 5 %

Packaging Methods	
Code	Packaging
U	Embossed Carrier Taping 4 mm pitch, 3,000 pcs.

Resistance Value
Shown by 3 digits or letters. Decimal point is expressed by M as 3 mΩ=3M0, 10 mΩ=10M

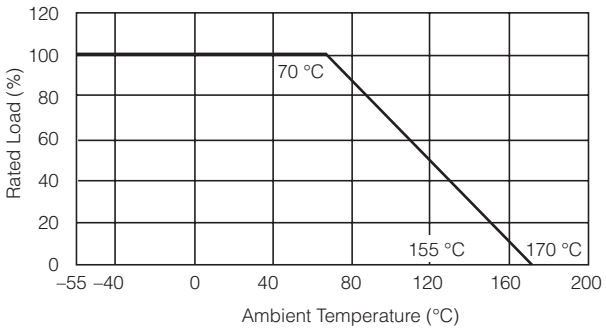
Ratings

Part No. (inch size)	Power Rating at 70 °C (W)	Standard Resistance (mΩ)	Resistance Tolerance (%)	T.C.R. ($\times 10^{-6}$/°C)	Category Temperature Range (°C)	Circuit board of use
ERJM1WS (2512)	1	3, 4	F: ±1, J: ±5	±350	–55 to +170	You should use the aluminum substrate when the added wattage exceeds 0.5 W.
		5, 6, 10, 15, 20		±100		
ERJM1WT (2512)		1, 1.5		350±100		
		2, 3, 4		100±50		

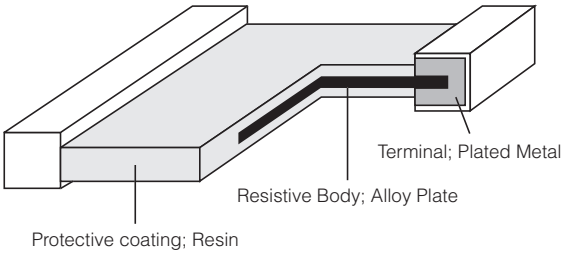
✻ Please contact the factory for other values and the range

Power Derating Curve

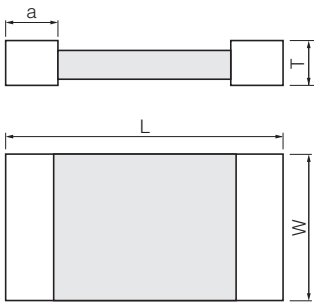
For resistors operated in ambient temperatures above 70 °C, power rating shall be derated in accordance with the figure on the right.



Construction



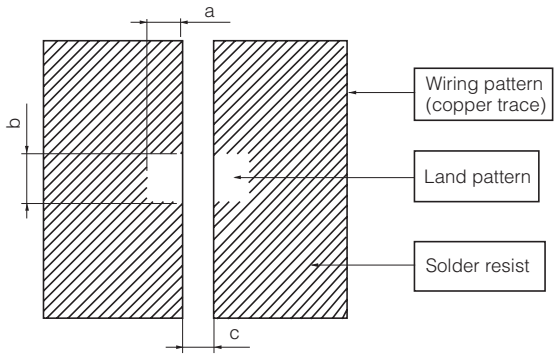
Dimensions in mm (not to scale)



Type	Part No. (inch size)	Dimensions (mm)				
		L	W	T	a	Mass (Weight) [g/1000 pcs.]
S Type	ERJM1WS (2512)	$6.40^{\pm0.25}$	$3.20^{\pm0.25}$	$0.80^{\pm0.30}$	$1.00^{\pm0.25}$	70
T Type	ERJM1WT (2512)	$6.40^{\pm0.40}$			$2.10^{\pm0.30}$	90

Recommended Land Pattern

● An example of a land pattern



Part No.	Dimensions (mm)		
	a	b	c
ERJM1WS	2.1	3.4	4.2
ERJM1WT	3.1	3.4	2.2

Current Sensing Resistors, Metal Foil Type

Type: ERJ MFBA

Features

- Suitable for current sensing for smartphones and other small devices
- Unique metal foil process achieved high power and low temperature coefficient
- RoHS compliant
- ISO9001 certified

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

Please see Data Files

Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	R	J	M	F	B	A	F	1	0	M	X

Product Code
Metal Foil Chip Resistors

Size, Power Rating		
Code	Inch	Power R.
BA	0402	0.33 W

Resistance Tolerance	
Code	Tolerance
F	±1 %

Resistance Value
Shown by 3 digits or letters. Decimal point is expressed by M as 5M0=5m Ω, 10M=10m Ω

Packaging Methods	
Code	Packaging
X	Punched Carrier Taping 2 mm pitch, 10,000 pcs.

Ratings

Part No. (inch size)	Power Rating at 70 °C (W)	Resistance Range* (mΩ)	Resistance Tolerance (%)	T.C.R. (×10^{-6}/°C)	Category Temperature Range (°C)
ERJMFBA (0402)	0.33	5, 10, 20	F : ±1	±150	–55 to +125

✻ Use it on the condition that the case temperature is below 125 °C.

Power Derating Curve

If the ambient temperature of the resistor is more than ambient temperature upper limit value of the rated table, please reduce the rated power according to the Power Derating Curve shown in the figure on the right.