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
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		

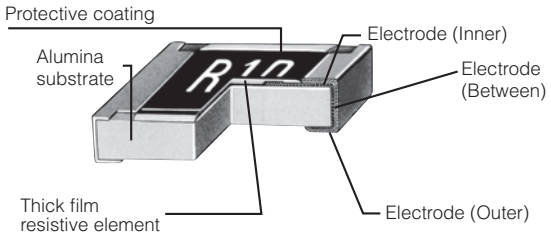
(1) Please contact us when resistors of irregular series are needed.
(2) Use it on the condition that the case temperature is below the upper category temperature.
· Rated Continuous Working Voltage (RCWV) shall be determined from RCWV = $\sqrt{\text{Power Rating} \times \text{Resistance Values}}$.
·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

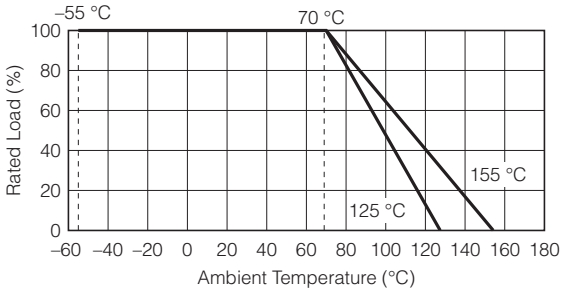
(1) Standard R.V. : 20m Ω, 22m Ω, 33m Ω, 39m Ω, 47m Ω, 50m Ω, 100m Ω, Custom R.V. : Each 1m Ω within upper range.
(2) Use it on the condition that the case temperature is below the upper category temperature.
· Rated Continuous Working Voltage (RCWV) shall be determined from RCWV = $\sqrt{\text{Power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

Construction

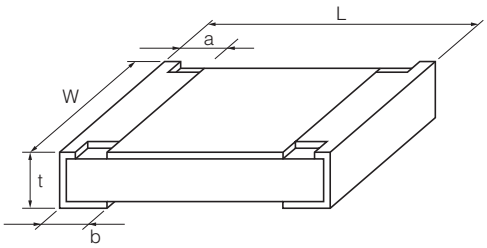


Power Derating Curve

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/1000pcs.]
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/1000pcs.]
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

⚠ Safety Precautions (Common precautions for Surface Mount Resistors)

The following are precautions for individual products. Please also refer to the common precautions for Fixed Resistors in this catalog.

1. Take measures against mechanical stress during and after mounting of Surface Mount Resistors (hereafter called the resistors) so as not to damage their electrodes and protective coatings.
   Be careful not to misplace the resistors on the land patterns. Otherwise, solder bridging may occur.
2. Keep the rated power and ambient temperature within the specified derating curve.
   Some circuit boards, wiring patterns, temperatures of heat generated by adjacent components, or ambient temperatures can become factors in the rise of the temperature of the resistors, regardless of the level of power applied. Therefore, check the conditions before use and optimize them so as not to damage the boards and peripheral components.
   Make sure to contact us before using the resistors under special conditions.
3. If a transient load (heavy load in a short time) like a pulse is expected to be applied, check and evaluate the operations of the resistors when installed in your products before use.
   Never exceed the rated power. Otherwise, the performance and/or reliability of the resistors may be impaired.
4. Before using halogen-based or other high-activity flux, check the possible effects of the flux residues on the performance and reliability of the resistors.
5. When soldering with a soldering iron, never touch the resistors'bodies with the tip of the soldering iron. When using a soldering iron with a high temperature tip, finish soldering as quickly as possible (within three seconds at 350 °C max.).
6. As the amount of applied solder becomes larger, the mechanical stress applied to the resistors increases, causing problems such as cracks and faulty characteristics. Avoid applying an excessive amounts of solder.
7. When the resistors' protective coatings are chipped, flawed, or removed, the characteristics of the resistors may be impaired. Take special care not to apply mechanical shock during automatic mounting or cause damage during handling of the boards with the resistors mounted.
8. Do not apply shock to the resistors or pinch them with a hard tool (e.g. pliers and tweezers). Otherwise, the resistors' protective coatings and bodies may be chipped, affecting their performance.
9. Avoid excessive bending of printed circuit boards in order to protect the resistors from abnormal stress.
10. Do not immerse the resistors in solvent for a long time. Before using solvent, carefully check the effects of immersion.
11. Transient voltage
    If there is a possibility that the transient phenomenon (significantly high voltage applied in a short time) may occur or that a high voltage pulse may be applied, make sure to evaluate and check the characteristics of Fixed Metal (Oxide) Film Resistors mounted on your product rather than only depending on the calculated power limit or steady-state conditions to complete the design or decide to use the resistors.
12. Do not apply excessive tension to the terminals.

⚠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.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Panasonic:

ERJ-12ZQJR68U ERJ-8RQFR82V ERJ-3RSFR10V ERJ-12ZQJR27U ERJ-6RQFR51V ERJ-6RQFR56V ERJ-3RQF5R1V ERJ-1TRQFR24U ERJ-1TRQF1R2U ERJ-1TRQF1R0U ERJ-8RQJR22V ERJ-6RQJR47V ERJ-1TRQFR27U ERJ-1TRSJR10U ERJ-8RSJR12V ERJ-1TRQF1R6U ERJ-2BQFR22X ERJ-1TRQJR36U ERJ-1TRQF2R0U ERJ-2BSFR10X ERJ-L08KJ47MV ERJ-8RQFR68V ERJ-3RQFR82V ERJ-6RQF1R5V ERJ-8RQF4R7V ERJ-3RQF8R2V ERJ-6RQF3R3V ERJ-12ZQJR43U ERJ-8RSFR10V ERJ-L06KF50MV ERJ-8RQF2R4V ERJ-1TRQFR30U ERJ-14RQJ1R2U ERJ-3BQF1R5V ERJ-3BQF3R9V ERJ-L03KF10CV ERJ-L03KF47MV ERJ-L03KF50MV ERJ-L03KJ10CV ERJ-L03KJ47MV ERJ-L03KJ50MV ERJ-L03UF75MV ERJ-L03UJ75MV ERJ-L08KF10CV ERJ-L08KF47MV ERJ-L08KF50MV ERJ-L08KJ50MV ERJ-L08UF75MV ERJ-L08UJ75MV ERJ-L1DKF10CU ERJ-L1DKF47MU ERJ-L1DUF75MU ERJ-L1WKF47MU ERJ-L1WKJ47MU ERJ-14RQJR27U ERJ-14RQJR39U ERJ-14RQJR56U ERJ-14RQJR82U ERJ-14RSJR18U ERJ-2BQFR27X ERJ-2BWJR047X ERJ-2BWJR051X ERJ-2BWJR056X ERJ-2BWJR062X ERJ-2BWJR068X ERJ-2BWJR075X ERJ-2BWJR082X ERJ-2BWJR091X ERJ-3RQFR27V ERJ-3RQFR68V ERJ-3RQF1R2V ERJ-3RQF1R5V ERJ-3RQF1R8V ERJ-3RQF2R2V ERJ-3RQF2R7V ERJ-3RQF3R3V ERJ-3RQF3R9V ERJ-3RQF5R6V ERJ-3RQF6R8V ERJ-3RQJR27V ERJ-3RQJR39V ERJ-3RQJR47V ERJ-3RQJR56V ERJ-3RQJR68V ERJ-3RQJR82V ERJ-3RSFR12V ERJ-3RSFR15V ERJ-3RSFR18V ERJ-3RSJR12V ERJ-3RSJR15V ERJ-3RSJR18V ERJ-6RQFR39V ERJ-6RQJR22V ERJ-6RQJR27V ERJ-6RQJR33V ERJ-6RQJR39V ERJ-6RQJR68V ERJ-6RQJR82V ERJ-6RSJR18V ERJ-8RQFR27V