

## 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 :  $\pm 75 \times 10^{-6} / ^\circ\text{C}$  (ERJ6CW, 8CW)
- Low Resistance Value : Thick film resistors available from 5m  $\Omega$  (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	Code	Inch	Power Rating	Resistance Value	Resistance Tolerance		Resistance Value	Packaging Methods			
					Code	Tolerance		Code	Packaging	Part No.	
Thick Film Chip Resistors	2LW	0402	0.2 W	10m $\Omega$	D	$\pm 0.5\%$ *	Shown by 4 digits or letters. (Ex.) R047 : 0.047 $\Omega$ =47m $\Omega$	X	Pressed Carrier Taping 2 mm pitch, 10,000 pcs.	ERJ2LW	
	3LW	0603	0.25 W	5m $\Omega$ , 10m $\Omega$	F	$\pm 1\%$				ERJ2BW	
	6LW	0805	0.5 W	5, 6, 7, 8, 9m $\Omega$	G	$\pm 2\%$		V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ3LW	
	2BW	0402	0.25 W	47m $\Omega$ to 100m $\Omega$	J	$\pm 5\%$				ERJ6LW	
	3BW	0603	0.33 W	20m $\Omega$ to 100m $\Omega$	* Please refer to the rating table for the resistance tolerance					ERJ3BW	
	6BW	0805	0.5 W	10m $\Omega$ to 100m $\Omega$						ERJ6BW	
	8BW	1206	1 W	10m $\Omega$ to 100m $\Omega$						ERJ8BW	
	6CW	0805	0.5 W	10m $\Omega$ to 30m $\Omega$						ERJ6CW	
8CW	1206	1 W	10m $\Omega$ to 50m $\Omega$	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	Size, Power Rating			Resistance Value		Resistance Tolerance		Packaging Methods		
Thick Film Chip Resistors	Type	Inch	Power R.	Code	Res. Value	Code	Tolerance	Code	Packaging	Part No.
	2B	0402	0.166 W	S	0.1 Ω to 0.2 Ω	D	± 0.5 %*	X	Punched Carrier Taping 2 mm pitch, 10,000 pcs.	ERJ2B
	3B	0603	0.25 W	Q	0.22 Ω to 9.1 Ω*	F	± 1 %	V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ3B/3R ERJ6D/6B/6R ERJ8B/8R
	3R	0603	0.1 W	* 2B : 0.22 Ω to 1.0 Ω		G	± 2 %	U	Embossed Carrier Taping 4 mm pitch, 5,000 pcs.	ERJ14B/14R ERJ12R ERJ12Z
	6D	0805	0.5 W			J	± 5 %			
	6B	0805	0.33 W			* Please refer to the rating table for the resistance tolerance		U	Embossed Carrier Taping 4 mm pitch, 4,000 pcs.	ERJ1TR
	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	
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	

- 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	Size, Power Rating			Resistance Value		Resistance Tolerance		Packaging Methods			
Thick Film Chip Resistors	Type	Inch	Power R.	Code	Res. Value	Code	Tolerance	Code	Packaging	Part No.	
	L03	0603	0.2 W	K	Std. 20m Ω, 22m Ω, 33m Ω, 39m Ω, 47m Ω, 50m Ω, 100m Ω	F	± 1 %	V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJL03 ERJL06 ERJL08	
	L06	0805	0.25 W								
	L08	1206	0.33 W	U	20m Ω to 100m Ω*	J	± 5 %	U	Embossed Carrier Taping 4 mm pitch, 5,000 pcs.	ERJL14 ERJL12 ERJL1D	
	L14	1210	0.33 W								
	L12	1812	0.5 W	* L03, L06, L08 : 47m Ω to 100m Ω L1D, L1W : 40m Ω to 100m Ω							
	L1D	2010	0.5 W								
	L1W	2512	1 W								

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

## Ratings

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

Part No. (inch size)	Power Rating <sup>(2)</sup> at 70 °C (W)	Resistance Tolerance (%)	Resistance <sup>(1)</sup> Range (Ω)	T.C.R. (× 10 <sup>-6</sup> /°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 = √ Power Rating × 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 <sup>(2)</sup> at 70 °C (W)	Resistance Tolerance <sup>(3)</sup> (%)	Resistance <sup>(1)</sup> Range (Ω)	T.C.R. (× 10 <sup>-6</sup> /°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  $OTV = \text{Specified Magnification (refer to performance)} \times RCWV$ .

<Standard type>

Part No. (inch size)	Power Rating <sup>(2)</sup> at 70 °C (W)	Resistance Tolerance <sup>(3)</sup> (%)	Resistance <sup>(1)</sup> Range (Ω)	T.C.R. (× 10 <sup>-6</sup> /°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  $OTV = \text{Specified Magnification (refer to performance)} \times RCWV$ .

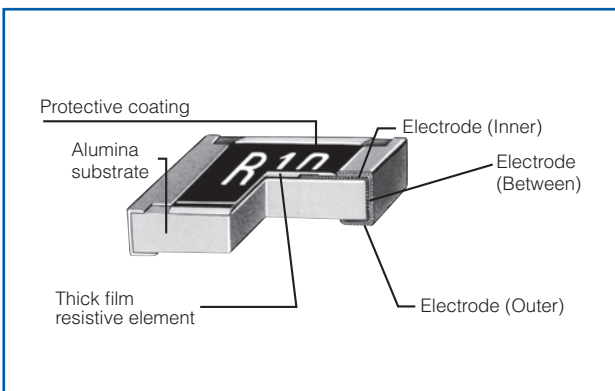
<Low TCR type>

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

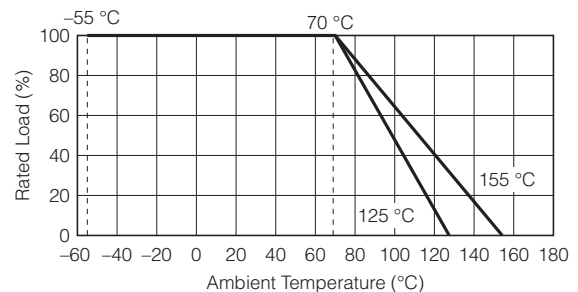
- Rated Continuous Working Voltage (RCWV) shall be determined from  $\text{RCWV} = \sqrt{\text{Power Rating} \times \text{Resistance Values}}$ .
- Overload Test Voltage (OTV) shall be determined from  $\text{OTV} = \text{Specified Magnification (refer to performance)} \times \text{RCWV}$ .

## Construction

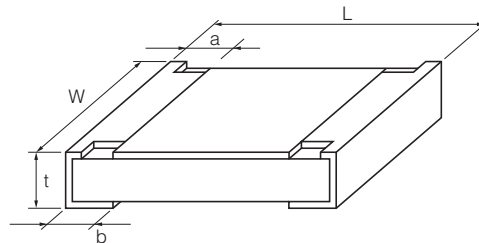


## Power Derating Curve

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)					Mass(Weight) [g/1000 pcs.]
	L	W	a	b	t	
ERJ2LW	1.00 $^{+0.10}$	0.50 $^{-0.05}$	0.25 $^{+0.10}$	0.25 $^{+0.10}$	0.40 $^{+0.05}$	0.8
ERJ2BW	1.00 $^{+0.10}$	0.50 $^{-0.05}$	0.24 $^{+0.10}$	0.24 $^{+0.10}$	0.35 $^{+0.05}$	0.8
ERJ2BS	1.00 $^{+0.10}$	0.50 $^{-0.05}$	0.20 $^{+0.10}$	0.27 $^{+0.10}$	0.35 $^{+0.05}$	0.8
ERJ2BQ			0.20 $^{+0.10}$	0.27 $^{+0.10}$	0.35 $^{+0.05}$	
ERJ3LW (5m Ω)	1.60 $^{+0.15}$	0.80 $^{+0.15}$	0.50 $^{+0.20}$	0.50 $^{+0.20}$	0.55 $^{+0.10}$	3
ERJ3LW (10m Ω)	1.60 $^{+0.15}$	0.80 $^{+0.15}$	0.40 $^{+0.20}$	0.40 $^{+0.20}$	0.55 $^{+0.10}$	3
ERJ3BW			0.40 $^{+0.20}$	0.40 $^{+0.20}$	0.55 $^{+0.10}$	
ERJ3R	1.60 $^{+0.15}$	0.80 $^{+0.15}$	0.30 $^{+0.20}$	0.30 $^{+0.15}$	0.45 $^{+0.10}$	2
ERJ3B			0.30 $^{+0.20}$	0.30 $^{+0.15}$	0.45 $^{+0.10}$	
ERJL03	2.00 $^{+0.20}$	1.25 $^{+0.20}$	0.63 $^{+0.20}$	0.63 $^{+0.20}$	0.70 $^{+0.10}$	6
ERJ6LW			0.63 $^{+0.20}$	0.63 $^{+0.20}$	0.70 $^{+0.10}$	
ERJ6BW	2.00 $^{+0.20}$	1.25 $^{+0.20}$	0.55 $^{+0.20}$	0.55 $^{+0.20}$	0.65 $^{+0.10}$	6
ERJ6CW (10 to 13m Ω)			0.60 $^{+0.20}$	0.60 $^{+0.20}$	0.65 $^{+0.10}$	
ERJ6CW (15 to 30m Ω)	2.05 $^{+0.20}$	1.30 $^{+0.20}$	0.45 $^{+0.20}$	0.45 $^{+0.20}$	0.65 $^{+0.10}$	6
ERJ6D			0.45 $^{+0.20}$	0.45 $^{+0.20}$		
ERJ6R	2.00 $^{+0.20}$	1.25 $^{+0.10}$	0.40 $^{+0.20}$	0.55 $^{+0.25}$	0.60 $^{+0.10}$	5
ERJ6B			0.40 $^{+0.20}$	0.55 $^{+0.25}$	0.60 $^{+0.10}$	
ERJL06			0.40 $^{+0.20}$	0.40 $^{+0.20}$	0.60 $^{+0.10}$	

Part No.	Dimensions (mm)					Mass(Weight) [g/1000 pcs.]
	L	W	a	b	t	
ERJ8BW	3.20 $^{+0.20}$	1.60 $^{+0.20}$	1.00 $^{+0.20}$	1.00 $^{+0.20}$	0.65 $^{+0.10}$	13
ERJ8CW (10 to 16m Ω)	3.20 $^{+0.20}$	1.60 $^{+0.20}$	1.10 $^{+0.20}$	1.10 $^{+0.20}$	0.65 $^{+0.10}$	13
ERJ8CW (18 to 50m Ω)			0.60 $^{+0.20}$	0.60 $^{+0.20}$	0.65 $^{+0.10}$	
ERJ8R	3.20 $^{+0.05}$ $^{-0.20}$	1.60 $^{+0.05}$ $^{-0.15}$	0.50 $^{+0.20}$	0.50 $^{+0.20}$	0.60 $^{+0.10}$	10
ERJ8B			0.50 $^{+0.20}$	0.50 $^{+0.20}$	0.60 $^{+0.10}$	
ERJL08	3.20 $^{+0.20}$	2.50 $^{+0.20}$	0.50 $^{+0.20}$	0.50 $^{+0.20}$	0.60 $^{+0.10}$	16
ERJ14R			0.50 $^{+0.20}$	0.50 $^{+0.20}$	0.60 $^{+0.10}$	
ERJ14B	4.50 $^{+0.20}$	3.20 $^{+0.20}$	0.50 $^{+0.20}$	0.50 $^{+0.20}$	0.60 $^{+0.10}$	27
ERJL12			0.50 $^{+0.20}$	0.50 $^{+0.20}$	0.60 $^{+0.10}$	
ERJ12Z	5.00 $^{+0.20}$	2.50 $^{+0.20}$	0.60 $^{+0.20}$	0.60 $^{+0.20}$	0.60 $^{+0.10}$	27
ERJL1D			0.60 $^{+0.20}$	0.60 $^{+0.20}$	0.60 $^{+0.10}$	
ERJ1TR	6.40 $^{+0.20}$	3.20 $^{+0.20}$	0.65 $^{+0.20}$	0.60 $^{+0.20}$	0.60 $^{+0.10}$	45
ERJL1W	6.40 $^{+0.20}$	3.20 $^{+0.20}$	0.65 $^{+0.20}$	1.30 $^{+0.20}$	1.10 $^{+0.10}$	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