Anti-Sulfurated Thick Film Chip Resistors

Type: **ERJ S02, S03, S06, S08, S14, S12, S1D, S1T (Au-based inner electrode type)**

Type: **ERJ U01, U02, U03, U06, U08, U14, U12, U1D, U1T, U6S, U6Q (Ag-Pd-based inner electrode type)**

Features

- High resistance to sulfurization achieved by adopting an Au-based inner electrode (ERJS type) and Ag-Pd-based inner electrode (ERJU type)
- High reliability
  Metal glaze thick film resistive element and three layers of electrodes
- Suitable for both reflow and flow soldering
- Low Resistance type···ERJU6S, U6Q : 0.1 Ω to 1.0 Ω
- Reference Standard···IEC 60115-8, JIS C 5201-8, EIAJ RC-2134B
- AEC-Q200 qualified (Exemption ERJU01)
- RoHS compliant

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

Explanation of Part Numbers

- ERJU01 to ERJU1T, ERJS02 to ERJS1T Type

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

Product Code

Thick Film Chip Resistors

Size, Power Rating

Code	Inch	Power R.	Code	Inch	Power R.
U01	0201	0.05 W	S14 U14	1210	0.5 W
S02 U02	0402	0.1 W	S12 U12	1812	0.75 W
S03 U03	0603	0.1 W	S1D U1D	2010	0.75 W
S06 U06	0805	0.125 W	S1T U1T	2512	1 W
S08 U08	1206	0.25 W			

Resistance Tolerance

Code	Tolerance	Code	Tolerance
D	± 0.5 %	J	± 5 %
F	± 1 %	0	Jumper

Resistance Value

The first two or three digits are significant figures of resistance and the third or 4th one denotes number of zeros following. Jumper is expressed by R00.
Three digit type (±5%), four digit type (±0.5%, ±1%)
Example: 222→2.2k Ω, 1002→10k Ω

Packaging Methods

Code	Packaging	Part No.
C	Pressed Carrier Taping 2 mm pitch, 15,000 pcs.	ERJU01
X	Punched Carrier Taping 2 mm pitch, 10,000 pcs.	ERJS02, ERJU02
V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJS03, ERJU03 ERJS06, ERJU06 ERJS08, ERJU08
U	Embossed Carrier Taping 4 mm pitch, 5,000 pcs.	ERJS14, ERJU14 ERJS12, ERJU12 ERJS1D, ERJU1D
	Embossed Carrier Taping 4 mm pitch, 4,000 pcs.	ERJS1T, ERJU1T

- ERJU6S, U6Q Type

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

Product Code

Thick Film Chip Resistors

Size, Power Rating

Code	Inch	Power R.
U6	0805	0.25 W

Resistance Value

Code	Res. Value
S	0.1 Ω to 0.2 Ω
Q	0.22 Ω to 1 Ω

Resistance Tolerance

Code	Tolerance
F	±1 %
G	±2 %
J	±5 %

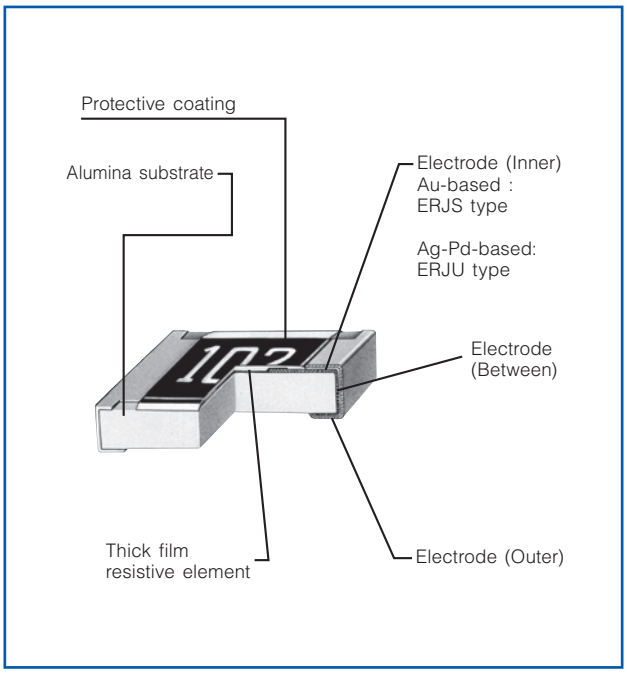
Resistance Value

Shown by 3 digits or letters.
(Example)
R20 : 0.20 Ω=200m Ω
1R0 : 1.0 Ω=1000m Ω

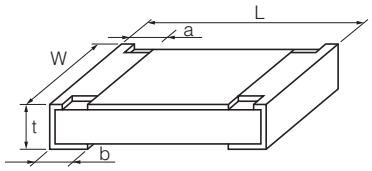
Packaging Methods

Code	Packaging	Part No.
V	Punched Carrier Taping 4 mm pitch, 5,000 pcs.	ERJU6S ERJU6Q

Construction



Dimensions in mm (not to scale)



Part No.	Dimensions (mm)					Mass (Weight) [g/1000 pcs.]
	L	W	a	b	t	
ERJU01	$0.60^{\pm0.03}$	$0.30^{\pm0.03}$	$0.10^{\pm0.05}$	$0.15^{\pm0.05}$	$0.23^{\pm0.03}$	0.15
ERJS02 ERJU02	$1.00^{\pm0.05}$	$0.50^{\pm0.05}$	$0.20^{\pm0.10}$	$0.25^{\pm0.10}$	$0.35^{\pm0.05}$	0.8
ERJS03 ERJU03	$1.60^{\pm0.15}$	$0.80^{+0.15}_{-0.05}$	$0.30^{\pm0.20}$	$0.30^{\pm0.15}$	$0.45^{\pm0.10}$	2
ERJS06 ERJU06	$2.00^{\pm0.20}$	$1.25^{\pm0.10}$	$0.40^{\pm0.20}$	$0.40^{\pm0.20}$	$0.60^{\pm0.10}$	4
ERJU6□	$2.00^{\pm0.20}$	$1.25^{\pm0.10}$	$0.45^{\pm0.20}$	$0.45^{\pm0.20}$	$0.55^{\pm0.10}$	6
ERJS08 ERJU08	$3.20^{+0.05}_{-0.20}$	$1.60^{+0.05}_{-0.15}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	10
ERJS14 ERJU14	$3.20^{\pm0.20}$	$2.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	16
ERJS12 ERJU12	$4.50^{\pm0.20}$	$3.20^{\pm0.20}$	$0.50^{\pm0.20}$	$0.50^{\pm0.20}$	$0.60^{\pm0.10}$	27
ERJS1D ERJU1D	$5.00^{\pm0.20}$	$2.50^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.10}$	27
ERJS1T ERJU1T	$6.40^{\pm0.20}$	$3.20^{\pm0.20}$	$0.65^{\pm0.20}$	$0.60^{\pm0.20}$	$0.60^{\pm0.10}$	45

Ratings

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
ERJU01 (0201)	0.05	25	50	±1	10 to 1M (E24, E96)	<10 Ω: −100 to +600 10 Ω to 1M Ω: ±200(±5%) ±100(±0.5, ±1%)* *ERJU01, ERJS02, ERJU02 : ±200 1M Ω<: −400 to +150	−55 to +125	–
				±5	1 to 1M (E24)			
ERJS02 ERJU02 (0402)	0.1	50	100	±0.5, ±1	1 to 1M (E24, E96)		−55 to +155	Grade 0
				±5	1 to 3.3M (E24)			
ERJS03 ERJU03 (0603)	0.1	75	150	±0.5, ±1	1 to 1M (E24, E96)		−55 to +155	Grade 0
				±5	1 to 10M (E24)			
ERJS06 ERJU06 (0805)	0.125	150	200	±0.5, ±1	1 to 1M (E24, E96)		−55 to +155	Grade 0
				±5	1 to 10M (E24)			
ERJS08 ERJU08 (1206)	0.25	200	400	±0.5, ±1	1 to 1M (E24, E96)		−55 to +155	Grade 0
				±5	1 to 10M (E24)			
ERJS14 ERJU14 (1210)	0.5	200	400	±0.5, ±1	1 to 1M (E24, E96)		−55 to +155	Grade 0
				±5	1 to 10M (E24)			
ERJS12 ERJU12 (1812)	0.75	200	500	±0.5, ±1	1 to 1M (E24, E96)		−55 to +155	Grade 0
				±5	1 to 10M (E24)			
ERJS1D ERJU1D (2010)	0.75	200	500	±0.5, ±1	1 to 1M (E24, E96)		−55 to +155	Grade 0
				±5	1 to 10M (E24)			
ERJS1T ERJU1T (2512)	1.0	200	500	±0.5, ±1	1 to 1M (E24, E96)		−55 to +155	Grade 0
				±5	1 to 10M (E24)			

(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.

[Low Resistance type]

Part No. (inch size)	PowerRating(1) at 70 °C (W)	Resistance Tolerance (%)	Resistance Range (Ω)	T.C.R. ($\times10^{-6}$/°C)	Category Temperature Range (°C)	AEC-Q200 Grade
ERJU6S (0805)	0.25	±1, ±2, ±5	0.1 to 0.2 (E24)	±150	−55 to +155	Grade 0
ERJU6Q (0805)			0.22 to 1 (E24)			

(1) 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.

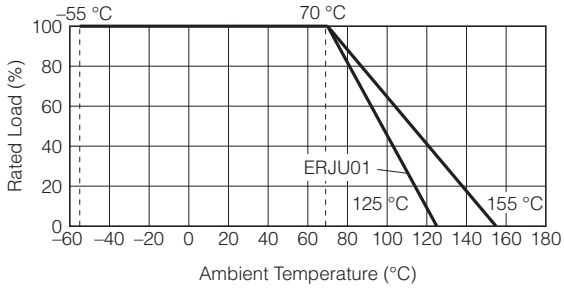
[For Jumper]

Part No. (inch size)	Rated Current (A)	Maximum Overload Current (1) (A)
ERJU01 (0201)	0.5	1
ERJS02 ERJU02 (0402)	1	2
ERJS03 ERJU03 (0603)		
ERJS06 ERJU06 (0805)	2	4
ERJS08 ERJU08 (1206)		
ERJS14 ERJU14 (1210)		
ERJS12 ERJU12 (1812)		
ERJS1D ERJU1D (2012)		
ERJS1T ERJU1T (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.



Performance

● ERJU01 to ERJU1T, ERJS02 to ERJS1T Type

Test Item	Performance Requirements		Test Conditions
	Resistor type	Jumper type	
Resistance	Within Specified Tolerance	100m Ω or less	20 °C
T. C. R.	Within Specified T. C. R.	200m Ω or less	+25 °C/+155 °C (ERJU01 : +25 °C/+125 °C)
Overload	±2%	100m Ω or less	Rated Voltage × 2.5, 5s Jumper type : Max. Overload Current, 5 s
Resistance to Soldering Heat	±1%	100m Ω or less	270 °C, 10 s
Rapid Change of Temperature	±1%	100m Ω or less	–55 °C (30min.) / +155 °C (ERJU01: +125 °C) (30min.), 100 cycles
High Temperature Exposure	±1%	100m Ω or less	+155 °C (ERJU01 : +125 °C), 1000 h
Damp Heat, Steady State	±1%	100m Ω or less	60 °C, 90% to 95 %RH, 1000 h
Load Life in Humidity	±3%	100m Ω or less	60 °C, 90% to 95 %RH, Rated Voltage (Jumper type : Rated Current), 1.5 h ON/0.5 h OFF cycle, 1000h
Endurance at 70 °C	±3%	100m Ω or less	70 °C, Rated Voltage (Jumper type : Rated Current), 1.5 h ON/0.5 h OFF cycle, 1000 h

● ERJU6S, U6Q 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	±1%	Rated Voltage × 2.5, 5 s
Resistance to Soldering Heat	±1%	270 °C, 10 s
Rapid Change of Temperature	±1%	–55 °C (30min.) / +125 °C (30min.), 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