

Anti-Sulfurated Thick Film Chip Resistors

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102 102 102

ERJ S (Au-based inner electrode type)

Series: ERJ S02, S03, S06, S08, S14, S12, S1D, S1T

ERJ U (Ag-Pd-based inner electrode type)

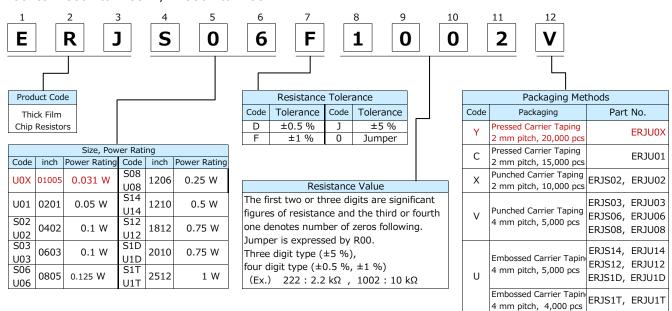
Series: ERJ UOX, U01, U02, U03, U06, U08, U14, U12, U1D, U1T, U6S, U6Q

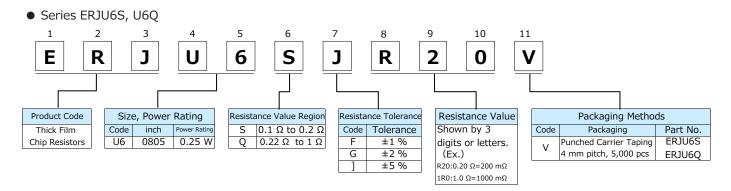
Features

- High resistance to sulfurization achieved by adopting an Au-based inner electrode (Series ERJS) and Ag-Pd-based inner electrode (Series ERJU)
- High reliability...Metal glaze thick film resistive element and three layers of electrodes
- Suitable for both reflow and flow soldering
- ullet Low Resistance type ···Series ERJU6S, U6Q : 0.1 Ω to 1 Ω
- Reference Standard ··· IEC 60115-8, JIS C 5201-8, JEITA RC-2134C
- AEC-Q200 compliant (except ERJU0X, ERJU01)
- RoHS compliant
- As for Packaging Methods, Land Pattern, Soldering Conditions and Safety Precautions, Please see Data Files

Explanation of Part Numbers

Series ERJS02 to ERJS1T, ERJU0X to ERJU1T





Ratings									
Part No. (inch size)	Power Rating at 70 °C ⁽¹⁾ (W)	Limiting Element Voltage ⁽²⁾ (V)	Maximum Overload Voltage ⁽³⁾ (V)	Resistance Tolerance (%)	Ra	stance nge Ω)	T.C.R. (×10 ⁻⁶ /K)	Category Temperature Range (℃)	AEC- Q200 Grade
ERJU0X (01005)	0.031	15	30	±1 ±5	10 to 1 M	(E24, E96)	R<10 Ω : -100 to +600 10 Ω≤R<100 Ω : ±300 100 Ω≤R : ±200	-55 to +125	-
ERJU01 (0201)	0.05	25	50	±1 ±5	10 to 1 M	,	R<10 Ω: -100 to +600	-55 to +125	_
ERJS02 ERJU02 (0402)	0.1	50	100	±0.5, ±1 ±5	1 to 1 M 1 to 3.3 M	(E24, E96) (E24)	10 Ω to 1 MΩ : ±200 1 MΩ <r :<br="">-400 to +150</r>	-55 to +155	Grade 0
ERJS03 ERJU03 (0603)	0.1	75	150	±0.5, ±1 ±5	1 to 1 M 1 to 10 M	(E24, E96) (E24)		-55 to +155	Grade 0
ERJS06 ERJU06 (0805)	0.125	150	200	±0.5, ±1 ±5	1 to 1 M 1 to 10 M	(E24, E96) (E24)	R<10 Ω :	-55 to +155	Grade 0
ERJS08 ERJU08 (1206)	0.25	200	400	±0.5, ±1 ±5	1 to 1 M 1 to 10 M	(E24, E96) (E24)	-100 to $+600$ 10Ω to $1 M\Omega$: $\pm 200 (\pm 5 \%)$ $\pm 100 (\pm 0.5 \%, \pm 1 \%)$ $1 M\Omega < R$:	-55 to +155	Grade 0
ERJS14 ERJU14 (1210)	0.5	200	400	±0.5, ±1 ±5	1 to 1 M 1 to 10 M			-55 to +155	Grade 0
ERJS12 ERJU12 (1812)	0.75	200	500	±0.5, ±1 ±5	1 to 1 M 1 to 10 M	(E24, E96) (E24)		-55 to +155	Grade 0
ERJS1D ERJU1D (2010)	0.75	200	500	±0.5, ±1 ±5	1 to 1 M 1 to 10 M	(E24, E96) (E24)		-55 to +155	Grade 0
ERJS1T ERJU1T (2512)	1.0	200	500	±0.5, ±1 ±5	1 to 1 M 1 to 10 M	(E24, E96) (E24)		-55 to +155	Grade 0

- (1) Use it on the condition that the case temperature is below the upper category temperature.
- (2) Rated Continuous Working Voltage (RCWV) shall be determined from RCWV= $\sqrt{\text{Power Rating}} \times \text{Resistance Value}$, or Limiting Element Voltage listed above, whichever less.
- (3) Overload Test Voltage (OTV) shall be determined from OTV=Specified Magnification (refer to performance) × RCWV or Maximum Overload Voltage listed above, whichever less.

[Low Resistance type]

Part No. (inch size)	Power Rating at 70 °C ⁽¹⁾ (W)	Resistance Tolerance (%)	Resistar Rang (Ω)		T.C.R. (×10 ⁻⁶ /K)	Category Temperature Range (℃)	AEC- Q200 Grade
ERJU6S (2012)	0.25	±1, ±2, ±5	0.1 to 0.2	(E24)	0 to +150	-55 to +155	Grade 0
ERJU6Q (2012)	0.25	11, 12, 13	0.22 to 1	(E24)	0 10 +130	-33 to +133	Grade 0

- (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= $\sqrt{\text{Power Rating} \times \text{Resistance Value.}}$
 - · Overload Test Voltage (OTV) shall be determined from OTV=Specified Magnification (refer to performance) × RCW.

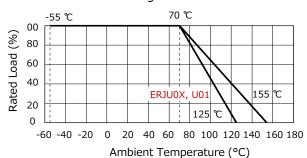
(For Jumper)

ti oi Jullipe	<u> </u>					
Part No.	Resistance(Ω)	Rated Current(A)	Maximum Overload Current (A) ⁽¹⁾			
ERJU0X		0.5	1			
ERJU01		0.5	1			
ERJS02 ERJU02		1	2			
ERJS03 ERJU03		1	2			
ERJS06 ERJU06	100 mΩ or less					
ERJS08 ERJU08	100 11132 01 1033					
ERJS14 ERJU14		2	4			
ERJS12 ERJU12		2	7			
ERJS1D ERJU1D						
ERJS1T ERJU1T						

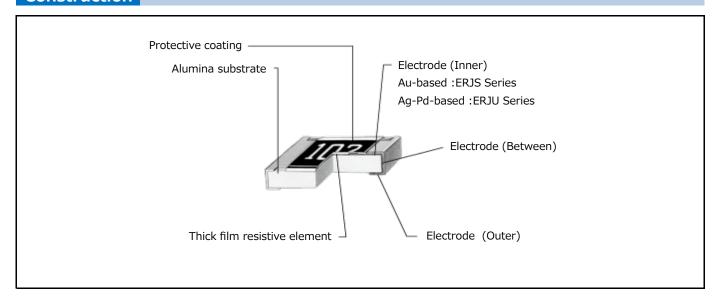
(1) Overload test current

Power Derating Curve

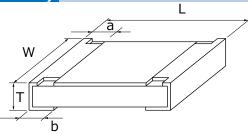
For resistors operated in ambient temperatures above 70 °C, power rating shall be derated in accordance with the figure below.



Construction



Dimensions in mm (not to scale)



Part No.	Dimensions (mm)						
rait No.	L	W	a	b	Т	(g/1000 pcs)	
ERJU0X	0.40±0.02	0.20±0.02	0.10±0.03	0.10±0.03	0.13±0.02	0.04	
ERJU01	0.60±0.03	0.30±0.03	0.10±0.05	0.15±0.05	0.23±0.03	0.15	
ERJS02 ERJU02	1.00±0.05	0.50±0.05	0.20±0.10	0.25±0.10	0.35±0.05	0.8	
ERJS03 ERJU03	1.60±0.15	0.80+0.15/-0.05	0.30±0.20	0.30±0.15	0.45±0.10	2	
ERJS06 ERJU06	2.00±0.20	1.25±0.10	0.40±0.20	0.40±0.20	0.60±0.10	4	
ERJU6□	2.00±0.20	1.25±0.10	0.45±0.20	0.45±0.20	0.55±0.10	6	
ERJS08 ERJU08	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	
ERJS14 ERJU14	3.20±0.20	2.50±0.20	0.50±0.20	0.50±0.20	0.60±0.10	16	
ERJS12 ERJU12	4.50±0.20	3.20±0.20	0.50±0.20	0.50±0.20	0.60±0.10	27	
ERJS1D ERJU1D	5.00±0.20	2.50±0.20	0.60±0.20	0.60±0.20	0.60±0.10	27	
ERJS1T ERJU1T	6.40±0.20	3.20±0.20	0.65±0.20	0.60±0.20	0.60±0.10	45	

Anti-Sulfurated Thick Film Chip Resistors

Performance

• Series ERJS02 to ERJS1T, ERJU0X to ERJU1T

Test Item	Performance Re	equirements ⊿R	Test Conditions		
rest item	Resistor type	Jumper type			
Resistance	Within Specified	100 mΩ or less	20 °C		
Resistance	Tolerance	100 11175 01 1622	20 °C		
T. C. R.	Within Specified	200 mΩ or less	+25 °C/+155 °C (ERJU0X,U01 : +25 °C/+125 °C)		
	T. C. R.				
Overload	±2 %	100 mΩ or less	Rated Voltage× 2.5, 5 s		
Overload	12 /0	100 11132 01 1633	Jumper type: Max. Overload Current, 5 s		
Resistance to	±1 %	100 mΩ or less	270 °C, 10 s		
Soldering Heat	1 1 70	100 11132 01 1635	270 C, 103		
Rapid Change of	Rapid Change of ±1 %		-55 °C (30min.)/+155 °C (ERJU0X,U01 : +125 °C)		
Temperature	1 1 70	100 m Ω or less	(30min.), 100 cycles		
High Temperature	±1 %	100 mΩ or less	+155 °C (ERJU0X,U01 : +125 °C), 1000 h		
Exposure	1 1 70	100 11132 01 1655			
Damp Heat, Steady	±1 %	100 mΩ or less	60 °C, 90 % to 95 %RH, 1000 h		
State	ate ±1 70		00 C, 90 % to 95 % Kii, 1000 II		
Load Life in Humidity	±3 %	100 mΩ or less	60 °C, 90 % to 95 %RH, Rated Voltage (Jumper type :		
Load Life in Flamilaity	15 70	100 11132 01 1033	Rated Current), 1.5 h ON / 0.5 h OFF cycle, 1000 h		
Endurance at 70 °C	±2.0/.	100 mΩ or less	70 °C, Rated Voltage (Jumper type :Rated Current),		
Endurance at 70 °C	±3 %	TOO HIS OF IESS	1.5 h ON / 0.5 h OFF cycle, 1000 h		

• Series ERJU6S, U6Q

Test Item Performance Requirements ⊿R		Test Conditions			
Resistance	Within Specified	0 °C			
Resistance	Tolerance	<u> </u>			
T. C. R.	Within Specified	+25 °C/+125 °C			
1. C. N.	T. C. R.	+23 ⁻ C/+123 ⁻ C			
Overload	±1 %	Rated Voltage× 2.5, 5 s			
Resistance to ±1 %		270.9C 10.c			
Soldering Heat	±1 70	270 °C, 10 s			
Rapid Change of Temperature ±1 %		-55 °C (30 min.) / +125 °C(30min.), 100 cycles			
		-55 °C (50 min.) / +125 °C(50min.), 100 cycles			
High Temperature	±1 %	+155 °C, 1000 h			
Exposure	±1 /0				
Damp Heat, Steady	±1 %	60 °C, 90 % to 95 %RH, 1000 h			
State	±1 /0				
Load Life in Humidity	±3 %	60 °C, 90 % to 95 %RH, Rated Voltage,			
Load Life in Humbley	±3 %	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			

Guidelines and precautions regarding the technical information and use of our products described in this online catalog.

- If you want to use our products described in this online catalog for applications requiring special qualities or reliability, or for applications where the failure or malfunction of the products may directly jeopardize human life or potentially cause personal injury (e.g. aircraft and aerospace equipment, traffic and transportation equipment, combustion equipment, medical equipment, accident prevention, anti-crime equipment, and/or safety equipment), it is necessary to verify whether the specifications of our products fit to such applications. Please ensure that you will ask and check with our inquiry desk as to whether the specifications of our products fit to such applications use before you use our products.
- The quality and performance of our products as described in this online catalog only apply to our products when used in isolation. Therefore, please ensure you evaluate and verify our products under the specific circumstances in which our products are assembled in your own products and in which our products will actually be used.
- If you use our products in equipment that requires a high degree of reliability, regardless of the application, it is recommended that you set up protection circuits and redundancy circuits in order to ensure safety of your equipment.
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- The technical information in this online catalog provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.
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< Regarding the Certificate of Compliance with the EU RoHS Directive/REACH Regulations>

- The switchover date for compliance with the RoHS Directive/REACH Regulations varies depending on the part number or series of our products.
- When you use the inventory of our products for which it is unclear whether those products are compliant with the RoHS Directive/REACH Regulation, please select "Sales Inquiry" in the website inquiry form and contact us.

We do not take any responsibility for the use of our products outside the scope of the specifications, descriptions, guidelines and precautions described in this online catalog.





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 under the actual conditions for use.
- 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
- * 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
- * Systems equipped with an arresting the spread of fire or preventing glitch.

(1) Precautions for use

- These products are designed and manufactured for general and standard use in general elec tron ic equipment. (e.g. AV equipment, home electric appliances, office equipment, information and communication equipment) For applications in which special quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or cause threat of personal injury (such as for aircraft and aerospace equipment, traffic and transport equipment, combustion equipment, medical equipment, accident prevention and anti-theft devices, and safety equipment), please be sure to consult with our sales representative in advance and to exchange product specifications which conform to such applications.
- 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_X .
 - 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 and Radioactive Environment.
 - Avoid any environment where strong electromagnetic waves and radiation 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.
- Do not apply flux to these products after soldering. The activity of flux may be a cause of failures in these products.
- Refer to the recommended soldering conditions and set the soldering condition. High peak temperature or long heating time may impair the performance or the reliability of these products.
- · Recommended soldering condition is for the guideline for ensuring the basic characteristics of the products, not for the stable soldering conditions. Conditions for proper soldering should be set up according to individual conditions.

- Do not reuse any products after removal from mounting boards.
- Do not drop these products. If these products are dropped, do not use them. Such products may have received mechanical or electrical damage.
- If any doubt or concern to the safety on these products arise, make sure to inform us immediately and conduct technical examinations at your side.

(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.

- In salty air or in air with a high concentration of corrosive gas, such as Cl₂, H₂S, NH₃, SO₂, or NO_X.
- 2. In direct sunlight.

(3) AEC-Q200 Compliant

The products are tested based on all or part of the test conditions and methods defined in AEC-Q200. Please consult with Panasonic for the details of the product specification and specific evaluation test results, etc., and please review and approve Panasonic's product specification before ordering.

<Package markings>

Package markings include the product number, quantity, and country of origin.

In principle, the country of origin should be indicated in English.



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.

- 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.
- 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 temper a tures 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 op timize them so as not to damage the boards and peripheral components.
 - Make sure to contact us before using the resistors under special conditions.
- 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.
- 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 resistors mounted on your product rather than only depending on the calculated power limit or steady-state conditions.
- 5. If the resistors are to be used in high frequency circuits, carefully check the operation before use. Such circuits change the electrical characteristics of the resistors.
- Before using halogen-based or other high-activity flux, check the possible effects of the flux residues on the 6. performance and reliability of the resistors.
- 7. 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.).
- Mounting of the resistors with excessive or insufficient wetting amount of solder may affect the connection reliability or the performance of the resistors. Carefully check the effects and apply a proper amount of solder for use.
- When the resistors' protective coatings are chipped, flawed, or removed, the characteristics of the 9. 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.
- 10. 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.
- 11. Avoid excessive bending of printed circuit boards in order to protect the resistors from abnormal stress.
- 12. Do not immerse the resistors in solvent for a long time. Before using solvent, carefully check the effects of immersion.
- 13. Do not apply excessive tension to the terminals.

Mouser Electronics

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U14F3830U ERJ-U14F38R3U ERJ-U14F3903U ERJ-U14F3923U ERJ-U14F4021U ERJ-U14F4120U ERJ-
U14F3922U ERJ-U14F4020U ERJ-U14F40R2U ERJ-U14F3603U ERJ-U14F3653U ERJ-U14F3741U ERJ-
U14F3602U ERJ-U14F3652U ERJ-U14F3740U ERJ-U14F37R4U ERJ-U14F3833U ERJ-U14F3902U ERJ-
U14F36R5U ERJ-U14F3743U ERJ-U14F3832U ERJ-U14F3901U ERJ-U14F3921U ERJ-U14F39R2U ERJ-
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U03F3601V ERJ-U03F3651V ERJ-U03F36R5V ERJ-U03F3743V ERJ-U03F3832V ERJ-U03F3901V ERJ-
U03F3602V ERJ-U03F3652V ERJ-U03F3740V ERJ-U03F3480V ERJ-U03F34R0V ERJ-U03F3572V ERJ-
U03F3303V ERJ-U03F3323V ERJ-U03F3401V ERJ-U03F3481V ERJ-U03F34R8V ERJ-U03F3573V ERJ-
U03F3403V ERJ-U03F3483V ERJ-U03F3571V ERJ-U03F3600V ERJ-U03F3650V ERJ-U03F36R0V ERJ-
U14F3323U ERJ-U14F3401U ERJ-U14F3481U ERJ-U03F3301V ERJ-U03F3321V ERJ-U03F33R2V ERJ-
U14F3301U ERJ-U14F3321U ERJ-U14F3161U ERJ-U14F3240U
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