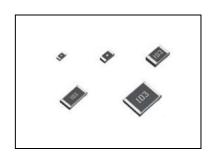


Anti-surge chip resistors

ESR series Datasheet

Features

- 1) Exclusive resistive element pattern and laser trimming technology results in significantly improved surge resistance characteristics.
- 2)2kV to 5kV electrostatic discharge resistance.
- 3) Superior power ratings.
- 4) ROHM resistors have obtained ISO9001 / ISO / TS16949 certification.
- 5) Corresponds to AEC-Q200.



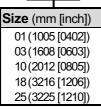
Products list

Part No.	Siz	ze	Rated power	Limiting element	Temperature coefficient	Resistance tolerance	Resista	nce range	Operating temperature	Automotive grade
	(mm)	(inch)	(70°C) (W)	voltage (V)	(ppm/°C)	(%)	(Ω)		range (°C)	available
					±100	F(±1%)	10≦R≦976k	(E24/96 series)		
ESR01	100E	0400	0.20	50	±100	F(±1%)	1M≦R≦2.2M	(E24 series)	EE 14EE	Yes
ESRUI	1005	0402	0.20	50	+500/-250	J(±5%)	1≦R≦9.1	(E24 series)	-55 ~ +155	res
					±200	J(±5%)	10≦R≦10M	(E24 series)		
					±100	D(±0.5%)	10≦R≦1M	(E24/96 series)		
ESR03	1608	0603	0.25	150	±200	F(±1%)	1≦ R< 10	(E24/96 series)	-55 ~ +155	Yes
ESINUS	1000	0000	0.23	.25 150	±100	F(±1%)	10≦R≦10M	(E24/96 series)	-50 ~ +150	165
					±200	J(±5%)	1≦R≦10M	(E24 series)		
					±100	D(±0.5%)	10≦R≦1M	(E24/96 series)		
ESR10	2012	0805	0.40	150	±100	F(±1%)	1≦R≦10M	(E24/96 series)	-55 ~ +155	Yes
					±200	J(±5%)	1≦R≦10M	(E24 series)		
					±100	D(±0.5%)	10≦R≦1M	(E24/96 series)		
ESR18	3216	1206	0.5	200	±100	F(±1%)	1≦R≦10M	(E24/96 series)	-55 ~ +155	Yes
				,	±200	J(±5%)	1≦R≦10M	(E24 series)		
					±100	D(±0.5%)	10≦R≦1M	(E24/96 series)		
ESR25	3225	1210	0.66	200	±100	F(±1%)	1≦R≦10M	(E24/96 series)	-55 ~ +155	Yes
				±200		J(±5%)	1≦R≦10M	(E24 series)		

^{*} E24 : Standard products, E96 : Custom products.

Part Number Description

ESR	
Part No.	
ESR (Anti-surge chip resistors)	

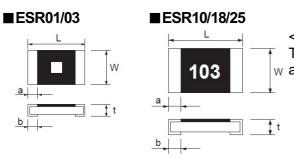


								
Packagi	Packaging specifications code							
Part No.	Code	Packaging specifications	Quantity / Reel					
ESR01	MZP	Paper tape (4mmPitch)	10,000					
ESR03	EZP	Paper tape (4mm Pitch)	5,000					
ESR10	EZP	Paper tape (4mm Pitch)	5,000					
ESR18	EZP	Paper tape (4mm Pitch)	5,000					
ESR25 JZP		Embossed tape (4mm Pitch)	4,000					

Resistance					
olerance					
D(±0.5%) F(±1%) J(±5%)					

		1	0	0					
N	omir	nal r	esis	tance	9				
R€	sista	nce c	ode, 3	3 or 4	digits.				
00	0 der	notes	jumpe	er type	∋				
		sistan olerand		Resis co					
		D,F	:	4 di	gits				
		J	:	3 di	gits				
Ð	()								
	1Ω	= 1R	00 (±	:1%)					
		1F	£) 05	:5%)					
	100	2 = 10	R0 (±	0.5%,	±1%)				
	100 (±5%)								
	1ΜΩ	= 10	04 (±0	0.5%,:	± 1%)				
		10	5 (±	5%)					

•Chip resistor dimensions and markings



<Marking method>

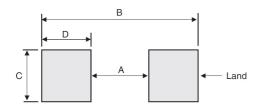
There are three or four digits used for the calculation number waccording to IEC code and "R" is used for the decimal point.

(Unit:mm)

Part No.	(mm)	(inch)	L	W	t	а	b	Marking existence
ESR01	1005	0402	1.00 ±0.05	0.50 ±0.05	0.35±0.05	0.20 ±0.10	0.25 ^{+0.05} _{-0.10}	No*
ESR03	1608	0603	1.60 ±0.10	0.80 ±0.10	0.45±0.10	0.30 ±0.20	0.30±0.20	No*
ESR10	2012	0805	2.00 ±0.10	1.25±0.10	0.55±0.10	0.30 ±0.20	0.40 ±0.20	Yes
ESR18	3216	1206	3.20 ±0.15	1.60 ±0.15	0.55±0.10	0.30±0.25	0.50±0.25	Yes
ESR25	3225	1210	3.20 ±0.15	2.50 ±0.15	0.55±0.10	0.30±0.25	0.50±0.25	Yes

*Only with spuare mark

● Land pattern example



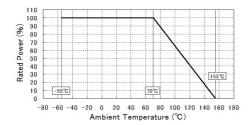
(Unit:mm)

Dimensions Part No.	А	В	С	D
ESR01	0.5	1.3	0.5	0.4
ESR03	1.0	2.0	0.8	0.5
ESR10	1.2	2.6	1.15	0.70
ESR18	2.2	4.0	1.5	0.9
ESR25	2.2	4.0	2.3	0.9

Derating curve

When the ambient temperature exceeds 70°C, power dissipation must be adjusted according to the derating curves below.

■ESR 01 / 03 / 10 / 18 / 25



Characteristics

Took House	Guaranteed balue	Test conditions		
Test items	Resistor type	Test conditions		
Resistance	See P.1	20°C		
Variation of resistance with temperature	See P.1	Measurement: +25/-55, +25/+125°C		
Overload	±(2.0%+0.1Ω)	Test voltage is the smaller one of ① or ② ① Rated voltage(current)×2.5,(ESR03/10/18/25) 2s Rated voltage(current)×2.0,(ESR01) 2s ② Maximum overload voltage ※		
Solderability	A new uniform coating of minimum of 95% of the surface being immersed and no soldering damage.	Rosin-ethanol solution(25% w eight) Soldering condition: 245±5°c Duration of immersion: 2.0±0.5s		
Resistance to soldering heat	$\pm (1.0\% + 0.05\Omega)$ No remarkable abnormality on the appearance.	Soldering condition: 260±5°C Duration of immersion: 10±1s		
Rapid change of temperature	±(1.0%+0.05Ω)	Test temp: -55°C ~+125°C 5cycle		
Damp heat, steady state	±(3.0%+0.1Ω)	40°c, 93%(Relative humidity) Test time: 1,000h		
Endurance at 70°C	±(3.0%+0.1Ω)	Rated voltage(current),70°C 1.5h:ON-0.5h:OFF Test time: 1,000h		
Endurance	±(3.0%+0.1Ω)	155°C Test time: 1000h		
Resistance to solvent	±(1.0%+0.05Ω)	23±5°C _E0057 Solvent: 2-propanol		
Bend strength of the end face plating	$\pm (1.0\% + 0.05\Omega)$ Without mechanical damage such as breaks.	-		
Static electric characteristics	±(5.0%+0.05Ω)	BAJ ED-4701/300 Test method 304 Voltage: 2kV(ESR01) 3kV(ESR03/10/18) 5kV(ESR25) C: 100pF R: 1.5kΩ Apply cycle: Times.		

Compliance Standard(s): IEO60115-8

JISC 5201-8

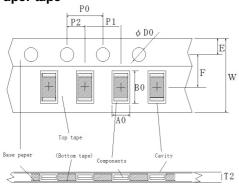
※Maximum overload voltage (Test voltage)

Miras in an area reliage (iset reliage)								
ESR01	ESR03	ESR10	ESR18	ESR25				
100V	200V	200V	400V	400V				



●Tape dimensions

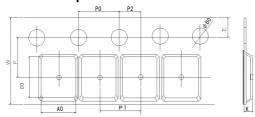
■Paper tape



					(Unit:mm)
Part No.	W	F	Е	A0	B0
ESR01	8.0±0.3	3.5±0.05	1.75±0.1	0.7±0.1	1.2±0.1
ESR03	8.0±0.3	3.5±0.05	1.75±0.1	1.1±0.1	1.9±0.1
ESR10	8.0±0.3	3.5±0.05	1.75±0.1	1.65 ^{+0.2} -0.1	2.4 ^{+0.2} -0.1
ESR18	8.0±0.3	3.5±0.05	1.75±0.1	1.95 ^{+0.1} _{-0.05}	3.5 ^{+0.15} _{-0.05}

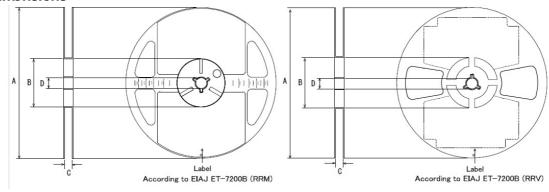
Part No.	D0	P0	P1	P2	T2
ESR01	Ф1.5 ^{+0.1}	4.0±0.1	2.0±0.05	2.0±0.05	MAX1.1
ESR03	Ф1.5 ^{+0.1}	4.0±0.1	4.0±0.1	2.0±0.05	MAX1.1
ESR10	Ф1.5 ^{+0.1}	4.0±0.1	4.0±0.1	2.0±0.05	MAX1.1
ESR18	Ф1.5 ^{+0.1}	4.0±0.1	4.0±0.1	2.0±0.05	MAX1.1

■Embossed tape



	_			_	(Unit:mm)
Part No.	W	F	Е	A0	B0
	8.0±0.3	3.5±0.05	1.75±0.1	3.0±0.1	3.5±0.1
ESR25	D0	P0	P1	P2	T2
	Ф1.5 ^{+0.1}	4.0±0.1	4.0±0.1	2.0±0.05	MAX1.1

•Reel dimensions



				(Unit:mm)
Part No.	Α	В	С	D
ESR01				
ESR03	0	.4	14.0	
ESR10	Ф180 ⁰ -1.5	Ф60 0	9 +1.0	Ф13±0.2
ESR18	-1.5			
ESR25				

Notice

Precaution on using ROHM Products

1. If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment^(Note 1), aircraft/spacecraft, nuclear power controllers, etc.) and whose malfunction or failure may cause loss of human life, bodily injury or serious damage to property ("Specific Applications"), please consult with the ROHM sales representative in advance. Unless otherwise agreed in writing by ROHM in advance, ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of any ROHM's Products for Specific Applications.

(Note1) Medical Equipment Classification of the Specific Applications

JAPAN	USA	EU	CHINA
CLASSIII	CLASSIII	CLASS II b	CLASSIII
CLASSIV	CLASSIII	CLASSIII	CLASSIII

- 2. ROHM designs and manufactures its Products subject to strict quality control system. However, semiconductor products can fail or malfunction at a certain rate. Please be sure to implement, at your own responsibilities, adequate safety measures including but not limited to fail-safe design against the physical injury, damage to any property, which a failure or malfunction of our Products may cause. The following are examples of safety measures:
 - [a] Installation of protection circuits or other protective devices to improve system safety
 - [b] Installation of redundant circuits to reduce the impact of single or multiple circuit failure
- 3. Our Products are not designed under any special or extraordinary environments or conditions, as exemplified below. Accordingly, ROHM shall not be in any way responsible or liable for any damages, expenses or losses arising from the use of any ROHM's Products under any special or extraordinary environments or conditions. If you intend to use our Products under any special or extraordinary environments or conditions (as exemplified below), your independent verification and confirmation of product performance, reliability, etc, prior to use, must be necessary:
 - [a] Use of our Products in any types of liquid, including water, oils, chemicals, and organic solvents
 - [b] Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
 - [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl2, H2S, NH3, SO2, and NO2
 - [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
 - [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
 - [f] Sealing or coating our Products with resin or other coating materials
 - [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
 - [h] Use of the Products in places subject to dew condensation
- 4. The Products are not subject to radiation-proof design.
- 5. Please verify and confirm characteristics of the final or mounted products in using the Products.
- 6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
- 7. De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.
- 8. Confirm that operation temperature is within the specified range described in the product specification.
- ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

Precaution for Mounting / Circuit board design

- 1. When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.
- 2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

Precautions Regarding Application Examples and External Circuits

- 1. If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.
- 2. You agree that application notes, reference designs, and associated data and information contained in this document are presented only as guidance for Products use. Therefore, in case you use such information, you are solely responsible for it and you must exercise your own independent verification and judgment in the use of such information contained in this document. ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of such information.

Precaution for Electrostatic

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of lonizer, friction prevention and temperature / humidity control).

Precaution for Storage / Transportation

- 1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
 - [a] the Products are exposed to sea winds or corrosive gases, including Cl2, H2S, NH3, SO2, and NO2
 - [b] the temperature or humidity exceeds those recommended by ROHM
 - [c] the Products are exposed to direct sunshine or condensation
 - [d] the Products are exposed to high Electrostatic
- Even under ROHM recommended storage condition, solderability of products out of recommended storage time
 period may be degraded. It is strongly recommended to confirm solderability before using Products of which
 storage time is exceeding the recommended storage time period.
- 3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
- 4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

Precaution for Product Label

QR code printed on ROHM Products label is for ROHM's internal use only.

Precaution for Disposition

When disposing Products please dispose them properly using an authorized industry waste company.

Precaution for Foreign Exchange and Foreign Trade act

Since concerned goods might be fallen under listed items of export control prescribed by Foreign exchange and Foreigntrade act, please consult with ROHM in case of export.

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Rev.001 Notice – WE



ESR01MZPF - Web Page

Distribution Inventory

Part Number	ESR01MZPF
Package	
Unit Quantity	10000
Minimum Package Quantity	10000
Packing Type	Taping
Constitution Materials List	inquiry
RoHS	Yes