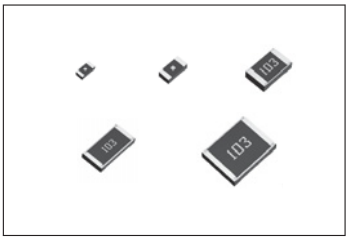
Anti-surge Chip Resistors

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.	Size (mm)	Size (inch)	Rated Power (70°C) (W)	Limiting Element Voltage (V)	Temperature Coefficient (ppm / °C)	Resistance Tolerance (%)	Resistance Range	Operating Temperature Range (°C)	Automotive Grade Available
ESR01	1005	0402	0.2	50	+500 / –250 ±200	J(±5%)	1Ω to 9.1Ω (E24 Series) 10Ω to 10MΩ (E24 Series)	–55 to +155	YES
					±100	F(±1%)	10Ω to 976kΩ (E24,96 Series) 1MΩ to 2.2MΩ (E24 Series)		
ESR03	1608	0603	0.25	150	±200	J(±5%)	1Ω to 10MΩ (E24 Series)		YES
					±200 ±100	F(±1%)	1Ω to 9.76Ω (E24,96 Series) 10Ω to 10MΩ (E24,96 Series)		
					±100	D(±0.5%)	10Ω to 1MΩ (E24,96 Series)		
ESR10	2012	0805	0.4	150	±200	J(±5%)	1Ω to 30MΩ (E24 Series)		YES
					±100	F(±1%)	1Ω to 10MΩ (E24,96 Series)		
					±100	D(±0.5%)	10Ω to 1MΩ (E24,96 Series)		
ESR18	3216	1206	0.33*1	200	±200	J(±5%)	1Ω to 15MΩ (E24 Series)		YES
					±100	F(±1%)	1Ω to 10MΩ (E24,96 Series)		
					±100	D(±0.5%)	10Ω to 1MΩ (E24,96 Series)		
ESR25	3225	1210	0.5*1	200	±200	J(±5%)	1Ω to 10MΩ (E24 Series)		YES
					±100	F(±1%)	1Ω to 10MΩ (E24,96 Series)		
					±100	D(±0.5%)	10Ω to 1MΩ (E24,96 Series)		

*1 Please contact us for the higher rated power.
∗ E24 : Standard products, E96 : Custom products.

●Part Number Description

E S R | 1 0 | E Z P | J | 1 0 0

Part No.
ESR
(Anti-surge chip resistors)

Size (mm [inch])
01 (1005 [0402])
03 (1608 [0603])
10 (2012 [0805])
18 (3216 [1206])
25 (3225 [1210])

Packaging Specifications Code

Part No.	Code	Packaging specifications	Quantity / Reel
ESR01	MZP	Paper tape (4mm Pitch)	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 Tolerance
D (±0.5%)
F (±1%)
J (±5%)

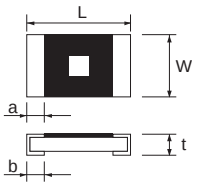
Nominal Resistance
Resistance code, 3 or 4 digits.
000 denotes jumper type.

Resistance tolerance		Resistance code
D,F	:	4 digits
J	:	3 digits

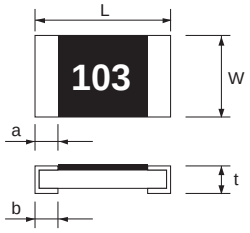
Ex.)
1Ω = 1R00 (±1%)
1R0 (±5%)
10Ω = 10R0 (±0.5%, ±1%)
100 (±5%)
1MΩ = 1004 (±0.5%, ±1%)
105 (±5%)

●Chip Resistor Dimensions and Markings

■ **ESR01 / 03**



■ **ESR10 / 18 / 25**



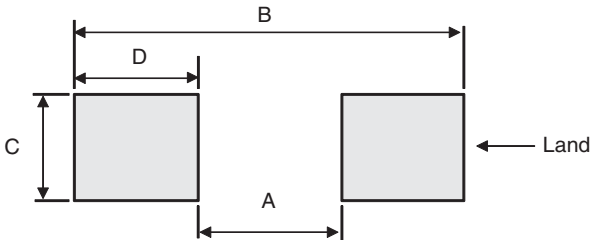
<Marking method>
There are three or four digits used for the calculation number according to IEC code and “R”is used for the decimal point.

(Unit : mm)

Part No.	(mm)	(inch)	L	W	t	a	b	Marking existence
ESR01	1005	0402	1.0±0.05	0.5±0.05	0.35±0.05	0.2±0.1	$0.25^{+0.05}_{-0.1}$	No ∗
ESR03	1608	0603	1.6±0.1	0.8±0.1	0.45±0.1	0.3±0.2	0.3±0.2	No ∗
ESR10	2012	0805	2.0±0.1	1.25±0.1	0.55±0.1	0.3±0.2	0.4±0.2	Yes
ESR18	3216	1206	3.2±0.15	1.6±0.15	0.55±0.1	0.3±0.25	0.5±0.25	Yes
ESR25	3225	1210	3.2±0.15	2.5±0.15	0.55±0.1	0.3±0.25	0.5±0.25	Yes

∗Only with square mark

●Land pattern Example



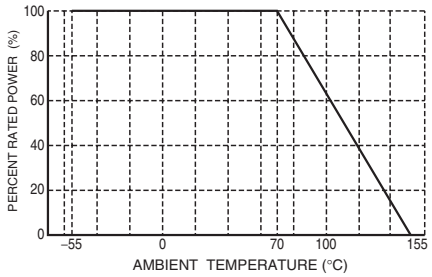
(Unit : mm)

Dimensions / Part No.	A	B	C	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	0.7
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.

■ ESR01 / 03 / 10 / 18 / 25



●Characteristics

Test Items	Guaranteed Value Resistor Type	Test Conditions
Resistance	See P.1	20°C
Variation of resistance with temperature	See P.1	Measurement : +20 / –55 / +20 / +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. ×2(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 : 25% (Weight) Soldering condition : 235±5°C Duration of immersion : 2.0±0.5s
Resistance to soldering heat	± (1.0%+0.05Ω) 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 to +125°C 5cycle
Damp heat, steady state	± (3.0%+0.1Ω)	40°C, 93%RH (Relative Humidity) Test time : 1,000h to 1,048h
Endurance at 70°C	± (3.0%+0.1Ω)	70°C Rated voltage (current) 1.5h : ON – 0.5h : OFF Test time : 1,000h to 1,048h
Endurance	± (3.0%+0.1Ω)	155°C Test time : 1,000h to 1,048h
Resistance to solvent	± (1.0%+0.05Ω)	23±5°C, Immersion cleaning, 5±0.5min Solvent : 2–propanol
Bend strength of the end face plating	± (1.0%+0.05Ω) Without mechanical damage such as breaks.	–
Static electric characteristics	± (5.0%+0.05Ω)	EIAJ ED-4701 / 300 TEST METHOD304 Voltage : 2kV (ESR01) 3kV (ESR03 / 10 / 18) 5kV (ESR25) C : 100pF R : 1.5kΩ Apply cycle : 1time

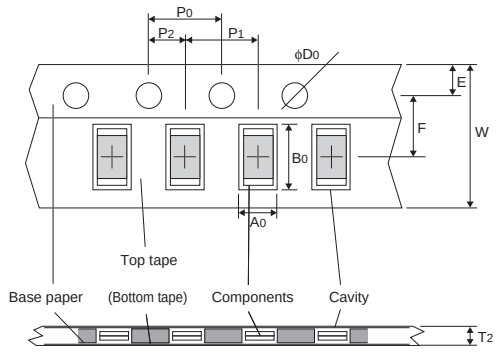
※Maximum overload voltage (Test voltage)

ESR01	ESR03	ESR10	ESR18	ESR25
100V	200V	200V	400V	400V

Compliance Standard(s) : IEC60115–8
JISC 5201–8

●Tape Dimensions

■ Paper Tape

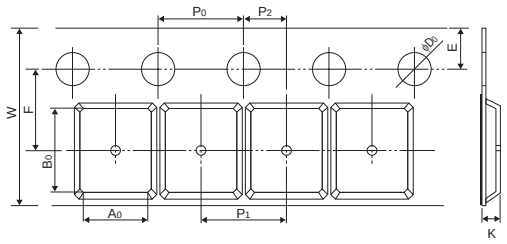


(Unit : mm)

Part No.	W	F	E	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	$\phi1.5^{+0.1}_{0}$	4.0±0.1	2.0±0.05	2.0±0.05	Max 1.1
ESR03	$\phi1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	Max 1.1
ESR10	$\phi1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	Max 1.1
ESR18	$\phi1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	Max 1.1

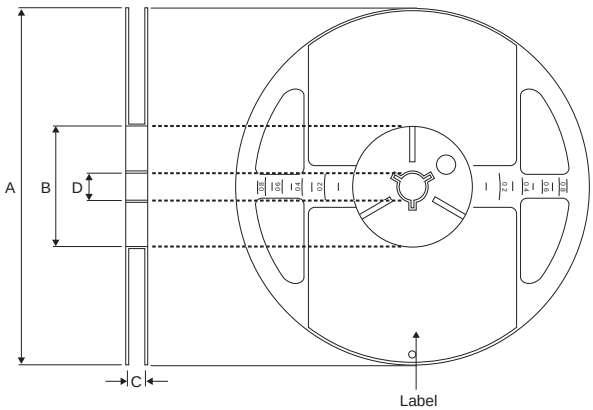
■ Embossed Tape



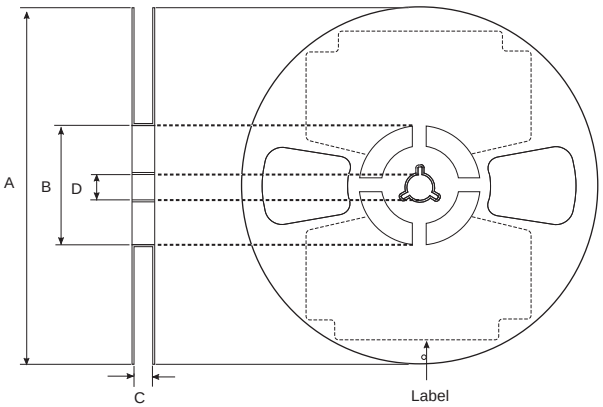
(Unit : mm)

Part No.	W	F	E	A0	B0
ESR25	8.0±0.3	3.5±0.05	1.75±0.1	3.0±0.1	3.5±0.1
	D0	P0	P1	P2	K
	$\phi1.5^{+0.1}_{0}$	4.0±0.1	4.0±0.1	2.0±0.05	Max 1.1

●Reel Dimensions



ACCORDING TO EIAJ ET-7200B



ACCORDING TO EIAJ ET-7200B (RRV)

(Unit : mm)

Part No.	A	B	C	D
ESR01	$\phi180^{0}_{-1.5}$	$\phi60^{+1.0}_{0}$	$9^{+1.0}_{0}$	ϕ13±0.2
ESR03				
ESR10				
ESR18				
ESR25				

Notes

1) The information contained herein is subject to change without notice.

2) Before you use our Products, please contact our sales representative and verify the latest specifications :

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4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

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7) The Products specified in this document are not designed to be radiation tolerant.

8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.

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ROHM SEMICONDUCTOR

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