

Multilayer Varistor
for ESD pulse

Series **EZJS** : For Power line
(ST:Strontium Titanate) (High capacitance)



■ Features

- Multilayer monolithic ceramic construction
- Excellent solderability and superior heat resistance
- Large surge current and energy capabilities in withstanding small size.

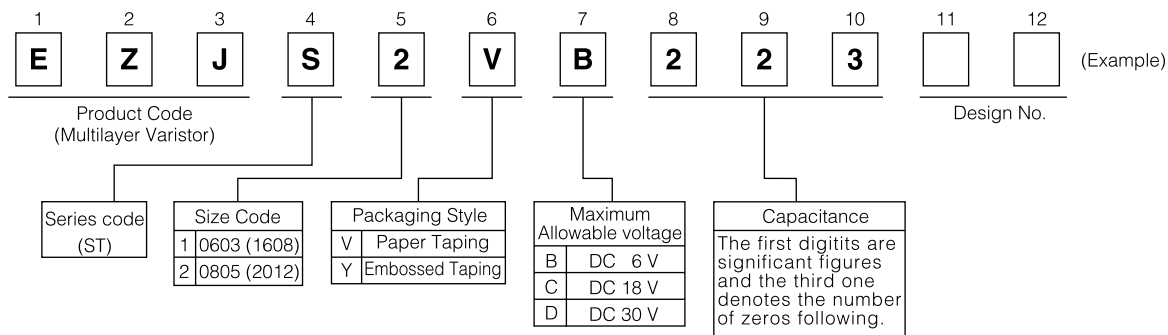
● Series EZJS

- Multilayer varistor of Strontium Titanate ceramic suppresses the pulse noise, especially high frequency noise(ESD, burst-noise) and protects the equipment from the transient surge.
- This Varistor is suitable for low-frequency signal circuit power and audio signal line due to large capacitance.

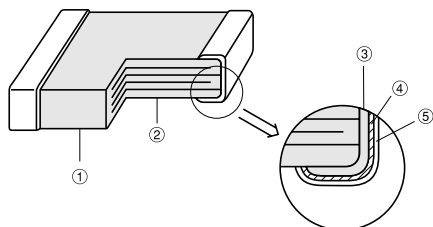
■ Precautions for Handling
see Page 112 to 118

■ Packing method
see Page 111, 182

■ Explanation of Part Numbers

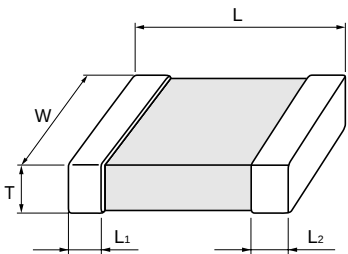


■ Construction



No	Name	
①	Semiconductive Ceramics	
②	Inner electrode	
③	Electrode	Substrate electrode
④		Intermediate electrode
⑤		External electrode

■ Dimmension in mm(not to scale)



(Unit:mm)

Size Code (EIA)	Part Numbers	L	W	T	L1, L2
0603	EZJS1□□□□□	1.60±0.15	0.8±0.1	0.8±0.1	0.3±0.2
0805	EZJS2VB223	2.0±0.2	1.25±0.20	0.8±0.2	0.50±0.25
	EZJS2VB822			1.25±0.20	
	EZJS2YD472				

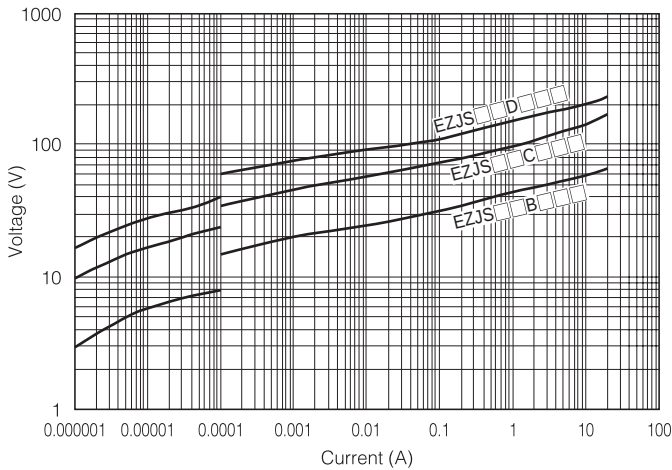
■ Ratings and Characteristics

Size Code (EIA)	Part No.	Maximum Allowable Voltage	Varistor Voltage @ 1mA	Capacitance @ 1 kHz	Maximum ESD IEC61000-4-2
0603	EZJS1VB822	DC 6 V	12 V	8200 pF	Contact Discharge Voltage: 30 kV
	EZJS1VC392	DC 18 V	30 V	3900 pF	
	EZJS1VD182	DC 30 V	50 V	1800 pF	
0805	EZJS2VB223	DC 6 V	12 V	22000 pF	
	EZJZ2YC822	DC 18 V	30 V	8200 pF	
	EZJS2YD472	DC 30 V	50 V	4700 pF	

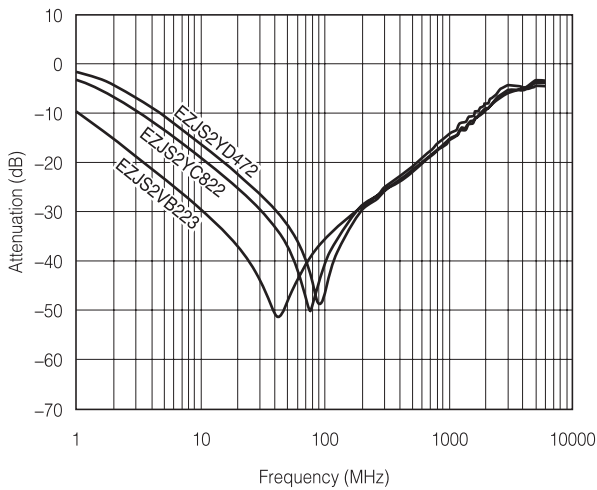
● Operating Temperature Range: -40 to 85 °C

■ Typical Characteristics

● Voltage vs. Current

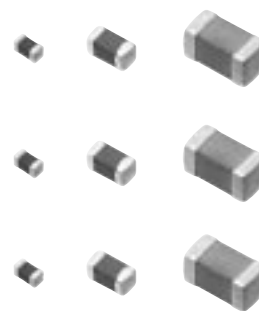


■ Frequency Characteristics



Multilayer Varistor for ESD pulse

Series **EZJZ** : For high speed signal line
(ZnO:Zinc Oxide) (Small capacitance)



■ Features

- Multilayer monolithic ceramic construction
- Excellent solderability and superior heat resistance
- Large surge current and energy capabilities in withstanding small size.

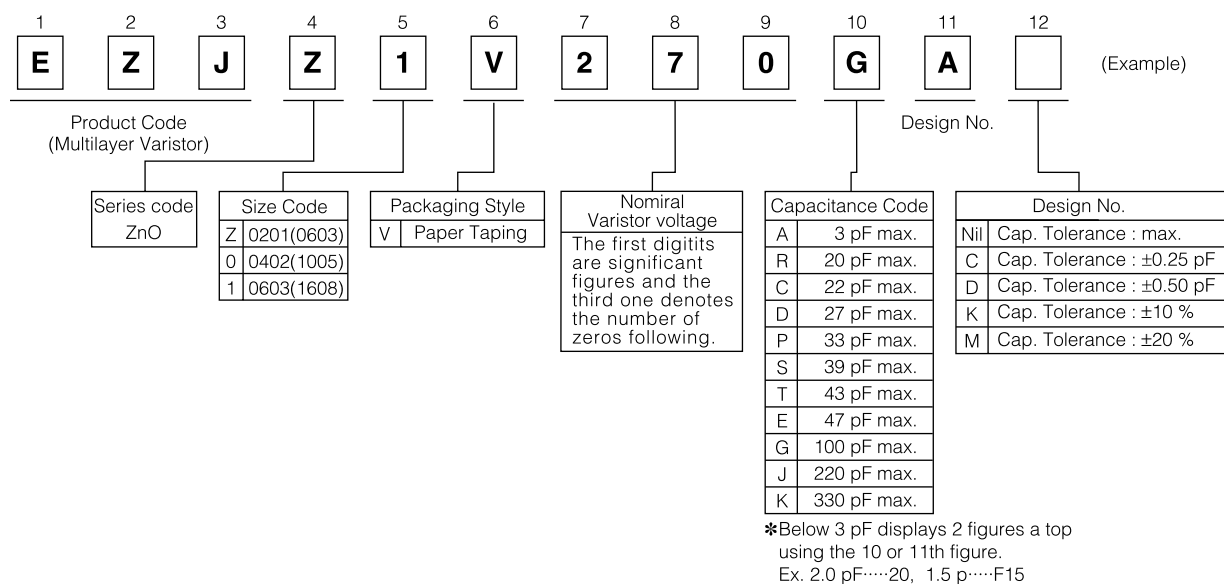
● Series EZJZ

- Multilayer varistor of Zinc oxide ceramic. suppresses the pulse noise(ESD, burst-noise) and protects the equipment from the transient surge.
- This Varistor is suitable for high-speed signal line due to small capacitance.

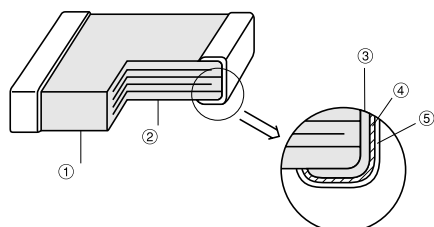
■ Precautions for Handling see Page 112 to 118

■ Packing method see Page 111, 182

■ Explanation of Part Numbers



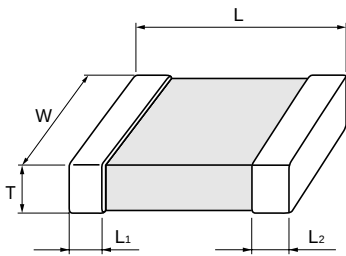
■ Construction



No	Name	
①	Semiconductive Ceramics	
②	Inner electrode	
③	Electrode	Substrate electrode
④		Intermediate electrode
⑤		External electrode

■ Dimension in mm(not to scale)

(Unit:mm)



Size Code (EIA)	Part Numbers	L	W	T	L1, L2
0201	EZJZZ□□□□□A	0.60±0.03	0.30±0.03	0.30±0.03	0.15±0.05
0402	EZJZ0□□□□□A	1.00±0.50	0.50±0.05	0.50±0.05	0.2±0.1
0603	EZJZ1□□□□□A	1.6±0.1	0.8±0.1	0.8±0.1	0.3±0.2

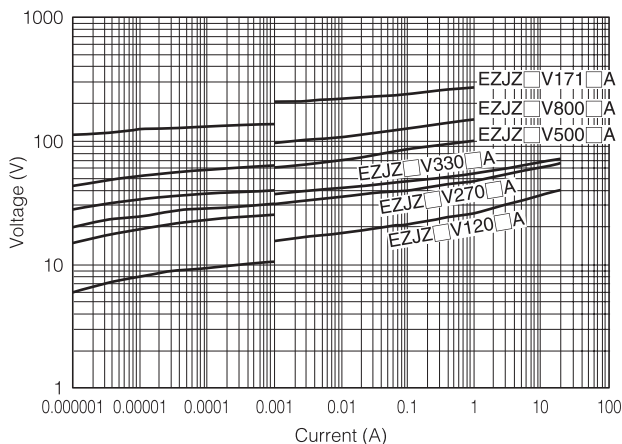
■ Ratings and Characteristics

Type	Size Code (EIA)	Part No.	Maximum Allowable Voltage	Varistor Voltage @ 1mA	Capacitance @ 1 MHz	Maximum Peak Current @ 8/20 μs	Maximum ESD IEC61000-4-2
Ultra low capacitance	0201	EZJZZV800AA	DC 5 V	80 V	3 pF max.	—	Contact Discharge Voltage: 8 kV Air Gap Discharge Voltage: 15 kV
	0402	EZJZ0V80015D	DC 5 V	80 V	1.5±0.5 pF	—	
		EZJZ0V500AA	DC 5 V	50 V	3 pF max.	—	
		EZJZ0V800AA	DC 18 V	80 V	3 pF max.	—	
		EZJZ0V171AA	DC 18 V	170 V	3 pF max.	—	
	0603	EZJZ1V500AA	DC 5 V	50 V	3 pF max.	—	
		EZJZ1V800AA	DC 18 V	80 V	3 pF max.	—	
Low capacitance	0201	EZJZZV120EA	DC 6.7 V	12 V	47 pF max.	1 A	
		EZJZZV270RA	DC 16 V	27 V	20 pF max.	1 A	
	0402	EZJZ0V120JA	DC 6.7 V	12 V	220 pF max.	10 A	
		EZJZ0V270RA	DC 16 V	27 V	20 pF max.	3 A	
		EZJZ0V270EA	DC 16 V	27 V	47 pF max.	10 A	
	0603	EZJZ1V120KA	DC 6.7 V	12 V	330 pF max.	20 A	
		EZJZ1V270GA	DC 16 V	27 V	100 pF max.	20 A	
		EZJZ1V330GA	DC 26 V	33 V	100 pF max.	20 A	

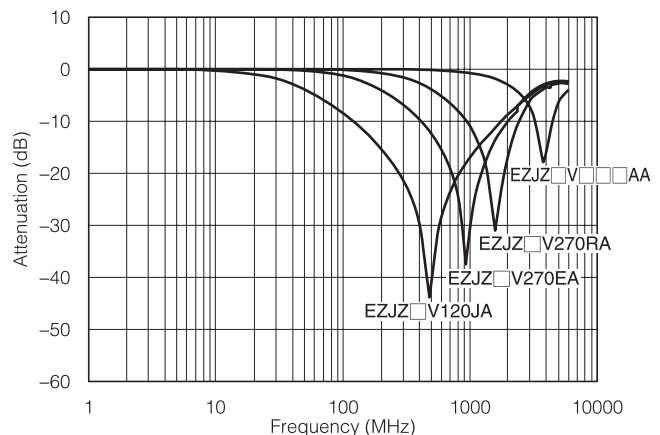
● Operating Temperature Range: -40 to 85 °C

■ Typical Characteristics

● Voltage vs. Current

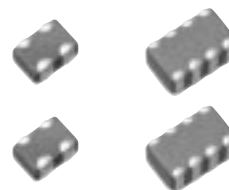


■ Frequency Characteristics



Multilayer Varistor for ESD pulse

Series **EZJZS**
Series **EZJZR**



■ Features

- Multilayer monolithic ceramic construction
- Excellent solderability and superior heat resistance
- Large surge current and energy capabilities in withstanding small size.

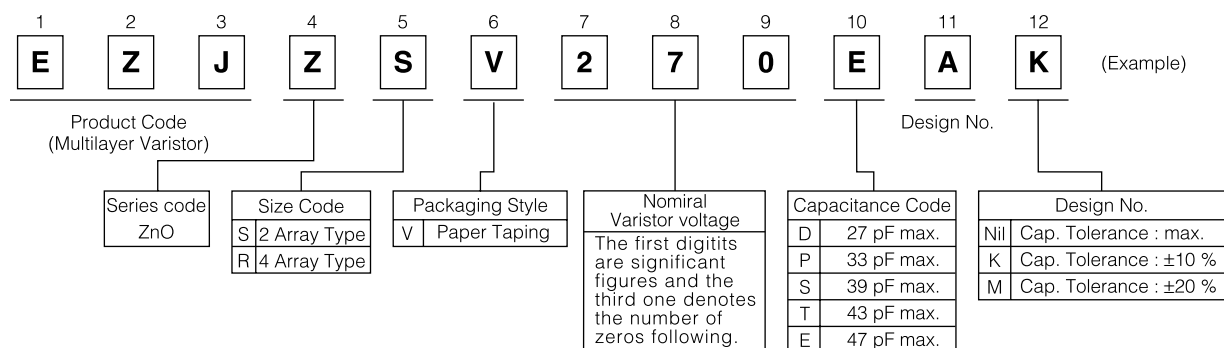
■ Precautions for Handling see Page 112 to 118

■ Packing method see Page 111, 182

● Series EZJZS, R

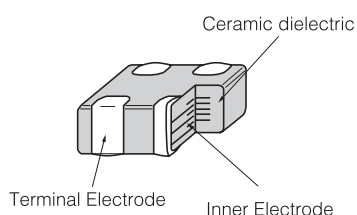
- Multilayer varistor of Zinc oxide ceramic.
suppresses the pulse noise(ESD, burst-noise) and
protects the equipment from the transient surge.
- This Varistor is suitable for high-speed signal line
due to small capacitance.
-

■ Explanation of Part Numbers

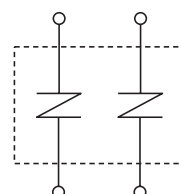


■ Construction

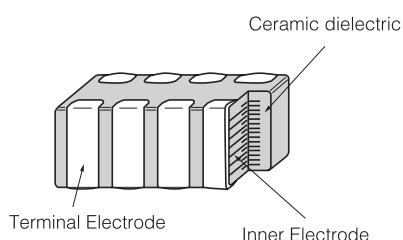
[2 Array Type]



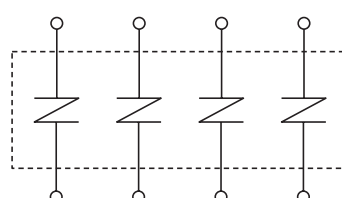
Schematic



[4 Array Type]

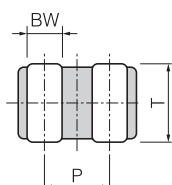
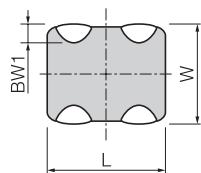


Schematic

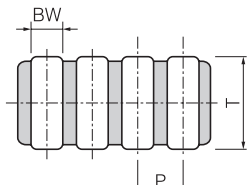
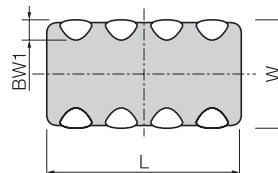


■ Dimension in mm(not to scale)

[2 Array Type]



[4 Array Type]



(Unit:mm)

Type	Part Numbers	L	W	T	BW	BW1	P
2 Array Type	EZJZS□□□□□A	1.37±0.15	1.0±0.1	0.60±0.06	0.36±0.10	0.2±0.1	0.64±0.10
4 Array Type	EZJZR□□□□□A	2.00±0.15	1.25±0.15	0.85±0.10	0.25±0.10	0.2 ^{+0.3} _{-0.1}	0.5±0.1

■ Ratings and Characteristics

Type	Size Code (EIA)	Part Numbers	Maximum Allowable Voltage	Varistor Voltage @ 1mA	Capacitance @ 1MHz	Maximum Peak Current @8/20 μs	Maximum ESD IEC61000-4-2
2 Array Type	0504	EZJZSV120JA	DC 6.7 V	12 V	220 pF max.	5 A	Contact Discharge Voltage: 8 kV Air Gap Discharge Voltage: 15 kV
		EZJZSV270RA	DC 16 V	27 V	20 pF max.	3 A	
		EZJZSV270EA	DC 16 V	27 V	47 pF max.	5 A	
		EZJZSV800AA	DC 18 V	80 V	3 pF max.	—	
		EZJZSV171AA	DC 18 V	170 V	3 pF max.	—	
4 Array Type	0805	EZJZRV120JA	DC 6.7 V	12 V	220 pF max.	5 A	Contact Discharge Voltage: 8 kV Air Gap Discharge Voltage: 15 kV
		EZJZRV270RA	DC 16 V	27 V	20 pF max.	3 A	
		EZJZRV270EA	DC 16 V	27 V	47 pF max.	5 A	
		EZJZRV800AA	DC 18 V	80 V	3 pF max.	—	
		EZJZRV171AA	DC 18 V	170 V	3 pF max.	—	

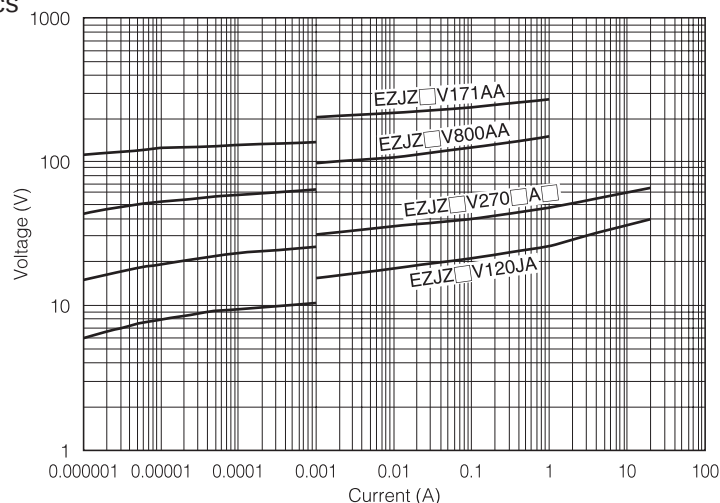
Type	Size Code (EIA)	Part Numbers	Maximum Allowable Voltage	Varistor Voltage @ 1mA	Capacitance @ 1MHz	Maximum Peak Current @8/20 μs	Maximum ESD IEC61000-4-2
2 Array Capacitance Control Type	0504	EZJZSV270DA□	DC 16 V	27 V	27 pF	5 A	Contact Discharge Voltage: 8 kV Air Gap Discharge Voltage: 15 kV
		EZJZSV270PA□			33 pF		
		EZJZSV270SA□			39 pF		
		EZJZSV270TA□			43 pF		
		EZJZSV270EA□			47 pF		

● Operating Temperature Range: -40 to 85 °C

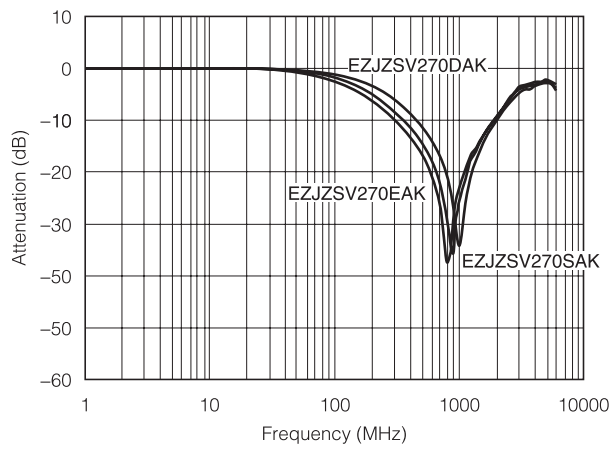
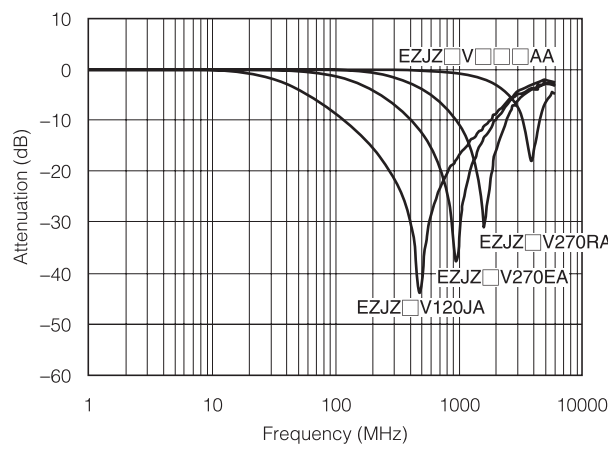
● □:Capacitance Tolerance Code (K:±10 %, M:±20 %)

■ Typical Characteristics

● Voltage vs. Current



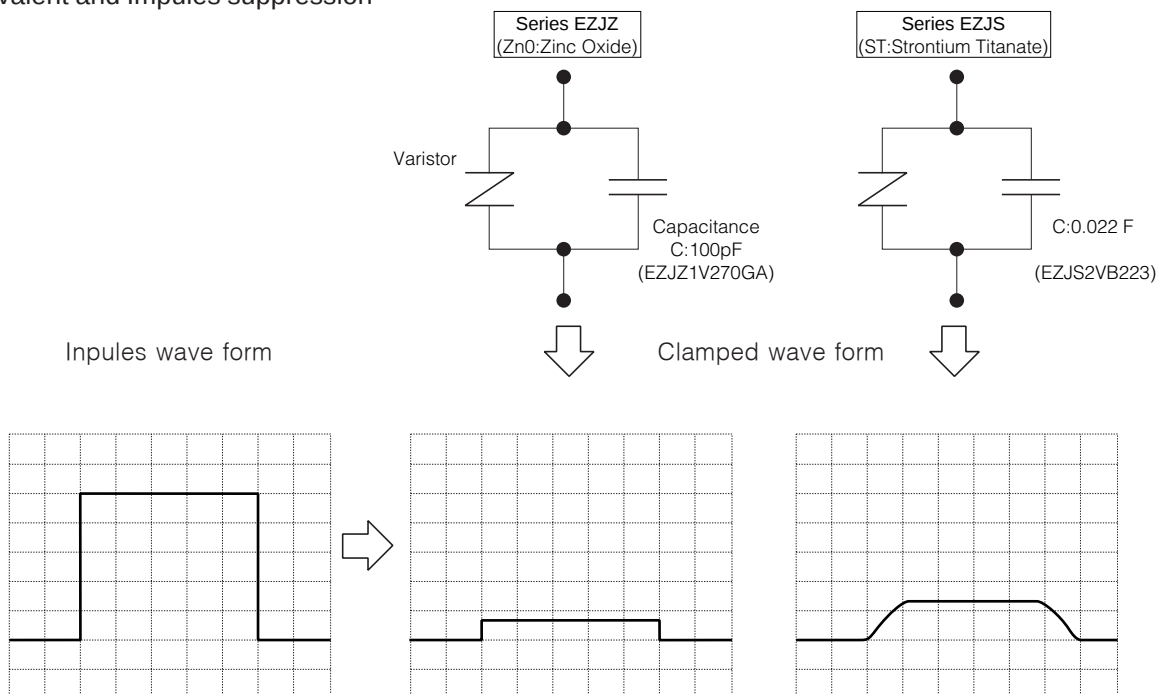
■ Frequency Characteristics



Recommended Applications

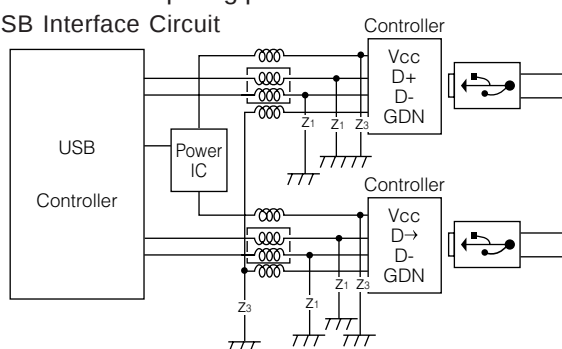
Applications Examples		Series		Recommended Applications	
				DC 1k 1M 1G (Hz)	
PC mother board	Photoelectric sensor	Series EZJZ	Ultra low capacitance (3 pF max.)		DC to some tens of GHz Power, Relay. signal line High frequency circuit (USB, IEEE1394, etc)
HDD	Proximity sensor		Low capacitance (20 to 330 pF)		DC to some tens of GHz Power, Relay. signal line High frequency circuit (RC232C, etc)
CD-ROM	Pressure switch		High capacitance (1800 to 22000 pF)		DC to some hundreds of kHz Power, Relay. Audio signal
DSC	Flowmeter	Series EZJS	High capacitance (1800 to 22000 pF)		DC to some hundreds of kHz Power, Relay. Audio signal
Cellular telephone, PHS	SSR				
PDA	motor				

Equivalent and Impulses suppression

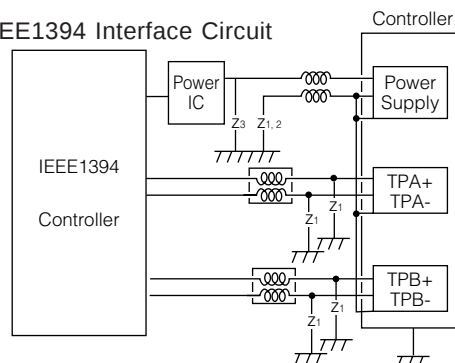


Typical circuits requiring protection

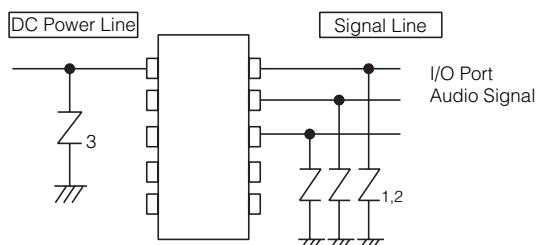
USB Interface Circuit



IEEE1394 Interface Circuit

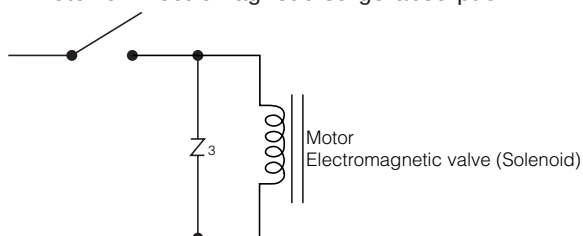


IC Protection



Z₁ : EZJZ Series (EZJZ□V171AA)
 Z₂ : EZJZ Series
 Z₃ : EZJZ Series or EZJS Series

Motor or Electromagnetic surge absorption



■ Performance Characteristics

● Electrical

Characteristics	Test Method	Specifications
Standard Test Condition	Unless otherwise specified all test and measurements shall be made at a temperature of 15 to 35 °C and at a relative humidity of 45 to 75 %RH. If results obtained are doubted a further test should be carried out at a temperature of 20±2 °C and a relative humidity of 60 to 70 %RH.	——
Maximum allowable Voltage	The maximum DC voltage that can be applied continuously in the specified operating temperature.	To meet the specified value.
Varistor voltage	The voltage between two terminals with the specified measuring current C_{mA} DC applied is called V_c or $V_{c mA}$. The measurement shall be made as fast as possible to avoid heat affection.	
Capacitance	Capacitance shall be measured with the specified measuring frequency, 0.2 to 2.0 Vms., 0V bias and 20 °C.	
Maximum peak current	The Maximum current within the varistor voltage change of ±10 % when a standard impulse current of 8/20 μs is applied two times with an interval of 5 minutes.	
Maximum ESD	The maximum ESD within the varistor voltage change of ±30% when impressing 10 times of ESD (five times of positive-negatives for each polarity) which is based on IEC61000-4-2	
Temperature coefficient Varistor Voltage	Coefficient indicating dependency of V-I characteristics on temperature. This is shown by the change of $V_{c mA}$ per °C at the ambient operating temperature.	EZJZ Series: ±0.1 %/°C EZJS Series: ±0.3 %/°C
Temperature coefficient capacitance	This is shown by the maximum capacitance change at the ambient operating temperature.	EZJZ Series: ±20 % EZJS Series: ±10 %

● Mechanical requirements

Characteristics	Test Method	Specifications									
Solderability	After securing the specimen by the body with tweezers and dipping in to the specified soldering flux, the specimen shall be completely immersed into a soldering bath having a temperature of 235±5 °C for 4±1 seconds. And then the specimen shall be visually examined. Use the specified soldering flux and solder following: Soldering Flux: Ethanol solution of rosin about 25 % by weight Solder: Eutectic solder (Sn 63 : Pb 37)	Approximately 75 % of the terminals shall be covered with new solder uniformly,									
Resistance to soldering heat	After preheating the specimen according to the following conditions in Table-1, the specimen shall be completely immersed into a soldering bath having a temperature of 270±5 °C for 3±0.5 seconds. And then be stored at room temperature for 24±2 hours. Thereafter, the change of V_c and the mechanical damage shall be examined. <table border="1" data-bbox="587 1798 1046 1886"> <thead> <tr> <th>Step</th><th>Temperature</th><th>Period</th></tr> </thead> <tbody> <tr> <td>1</td><td>80 to 100 °C</td><td>300 to 360 s</td></tr> <tr> <td>2</td><td>150 to 200 °C</td><td>300 to 360 s</td></tr> </tbody> </table>	Step	Temperature	Period	1	80 to 100 °C	300 to 360 s	2	150 to 200 °C	300 to 360 s	No remarkable mechanical $\Delta V_c / V_c \leq \pm 10 \%$
Step	Temperature	Period									
1	80 to 100 °C	300 to 360 s									
2	150 to 200 °C	300 to 360 s									

- Performance Characteristics
- Environmental

Characteristics	Test Methods	Specifications																	
Temperature Cycle	Before the measurement after test, the specimen shall be left to stand and mechanical damage shall be examined. <table><tr><th>Step</th><th>Temperature</th><th>Period</th><th>Cycles</th></tr><tr><td>1</td><td>T_L</td><td>30 min.</td><td rowspan="4">5 cycles</td></tr><tr><td>2</td><td>Room Temp.</td><td>15 min.</td></tr><tr><td>3</td><td>T_U</td><td>30 min.</td></tr><tr><td>4</td><td>Room Temp.</td><td>15 min.</td></tr></table> T_L : Lower operating temperature T_U : Upper operating temperature	Step	Temperature	Period	Cycles	1	T _L	30 min.	5 cycles	2	Room Temp.	15 min.	3	T _U	30 min.	4	Room Temp.	15 min.	To meet the specified value.
Step	Temperature	Period	Cycles																
1	T _L	30 min.	5 cycles																
2	Room Temp.	15 min.																	
3	T _U	30 min.																	
4	Room Temp.	15 min.																	
Damp Heat Load	Allowable Voltage shall be applied continuously to the specimen at specified conditions for specified period and then stored at room temperature and normal humidity for 24±2 hours. Thereafter, the change of V_c and mechanical damage shall be examined. Ambient condition :40±2 °C, 90 to 95 %RH Period : 500+24 hours -0	No remarkable mechanical damage ΔV_c/V_c ≤ ±10 %																	
High Temperature Load (Dry Heat Load)	Allowable Voltage shall be applied continuously to the specimen at specified conditions for specified period and then stored at room temperature and normal humidity for 24±2hours. Thereafter, the change of V_c and mechanical damage shall be examined. Ambient temp. : Upper operating temperature Period : 500+24 hours -0	No remarkable mechanical damage ΔV_c/V_c ≤ ±10 %																	

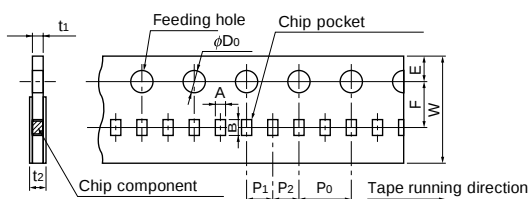
Packaging Specifications

Standard Packing Quantity

Series	Size Code (EIA)	Thickness	Paper taping	Embossed taping
EZJZ	0201	0.3 mm	Pitch: 2 mm 15,000 pcs./reel	—
	0402	0.5 mm	Pitch: 2 mm 10,000 pcs./reel	—
	0603	0.8 mm	Pitch: 4 mm 4,000 pcs./reel	—
	2 Array Type	0.6 mm	Pitch: 4 mm 4,000 pcs./reel	—
	4 Array Type	0.85 mm	Pitch: 4 mm 4,000 pcs./reel	—
EZJS	0603	0.8 mm	Pitch: 4 mm 4,000 pcs./reel	—
	0805	0.8 mm	Pitch: 4 mm 5,000 pcs./reel	—
		1.25 mm	—	Pitch: 4 mm 2,000 pcs./reel

Paper Taping

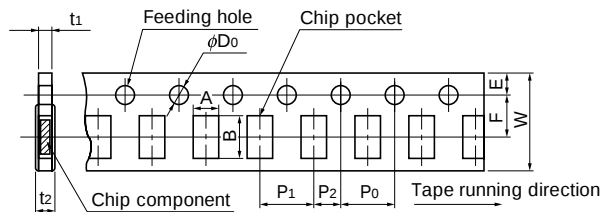
P₁: 2mm



(Unit: mm)

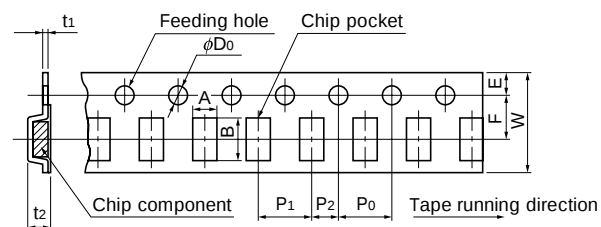
Symbol	A	B	W	F	E	P ₁	P ₂	P ₀	φD	t ₁	t ₂
Size Code											
0201	0.37 ±0.03	0.67 ±0.03	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.00 ±0.05	1.5 +0.1 0	0.5 max.	0.8 max.
0402	0.62 ±0.05	1.12 ±0.05	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.00 ±0.05	1.5 +0.1 0	0.7 max.	1.0 max.

P₁: 4mm



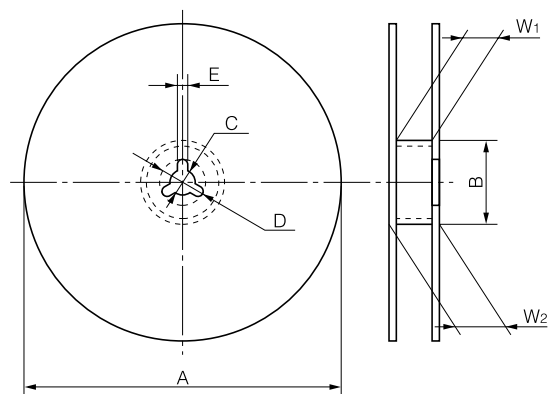
(Unit: mm)

Symbol	A	B	W	F	E	P ₁	P ₂	P ₀	φD	t ₁	t ₂
Size Code											
0603	1.0 ±0.10	1.8 ±0.10	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	4.0 ±0.1	2.00 ±0.05	4.0 ±0.1	1.5 +0.1 0	1.1 max.	1.4 max.
0805	1.65 ±0.2	2.4 ±0.2	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	4.0 ±0.1	2.00 ±0.05	4.0 ±0.1	1.5 +0.1 0	1.1 max.	1.4 max.
4 Array Type											
0504	1.18 ±0.10	1.63 ±0.10	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	4.0 ±0.1	2.00 ±0.05	4.0 ±0.1	1.5 +0.1 0	1.1 max.	1.4 max.
2 Array Type											

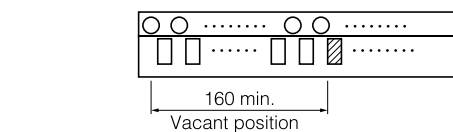
Embossed Taping


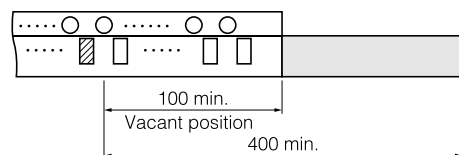
(Unit: mm)

Symbol	A	B	W	F	E	P ₁	P ₂	P ₀	φD	t ₁	t ₂
Size Code											
0805	1.55 ±0.20	2.35 ±0.20	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	4.0 ±0.1	2.00 ±0.05	4.0 ±0.1	1.5 +0.1 0	0.6 max.	1.5 max.

Reel


Symbol	A	B	C	D	E	W ₁	W ₂
Dim. (mm)	φ180 ⁺⁰ ₋₁	φ60.0±0.5	13.0±0.5	21.0±0.8	2.0±0.5	9.0±0.3	11.4±1.00

Leader Part and Taped End


Leader part


Unit : mm