Multilayer Varistor for ESD pulse,Burst pulse

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

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

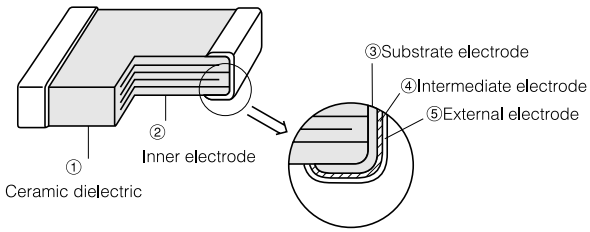
■ Features

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

● Series 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.

● 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.

■ Construction

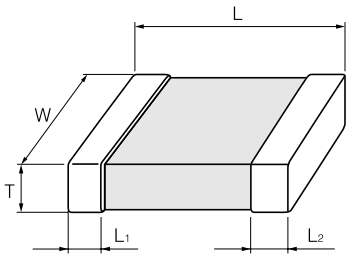


■ Precautions for Handling
see Page 94 to 98

■ 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				
CD-ROM	Pressure switch		Low capacitance (47 to 330 pF)		DC to some tens of GHz Power, Relay. signal line High frequency circuit (USB,IEEE1394,etc)
DSC	Flowmeter				
Cellular teleptone, PHS	SSR	Series EZJS	High capacitance (4700 to 22000 pF)		DC to some hunderds of kHz Power, Relay. Audio signal
PDA	motor				

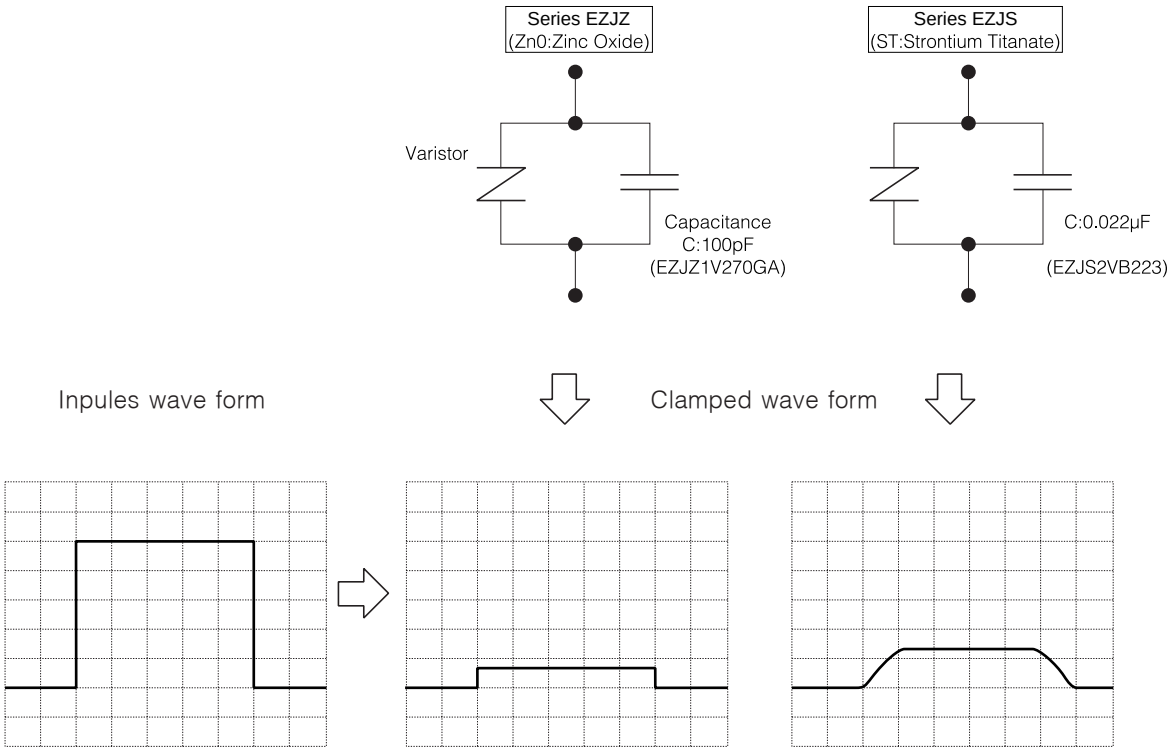
■ Dimmension in mm(not to scale)



(Unit:mm)

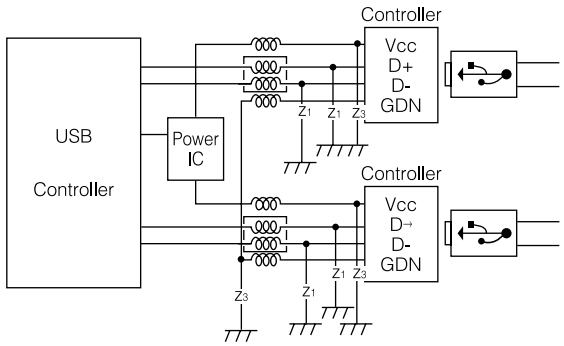
Size Code (EIA)	Part Numbers	L	W	T	L1, L2
0402	EZJZ0□□□□□A	1.00±0.10	0.50±0.10	0.50±0.10	0.20±0.10
0603	EZJZ1□□□□□A	1.60±0.15	0.80±0.10	0.80±0.20	0.30±0.20
0805	EZJS2VB233	2.00±0.20	1.25±0.20	0.80±0.10	0.50±0.25
	EZJS2Y□□□			1.25±0.20	

■ Equivalent and Impules suppression

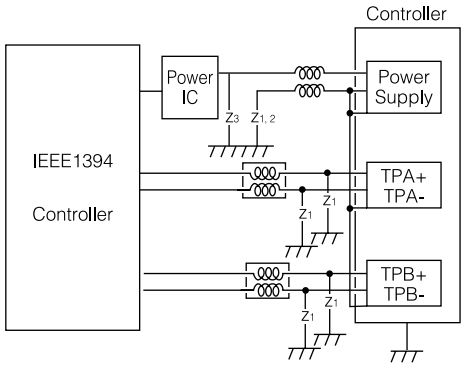


■ Typical circuits requiring protection

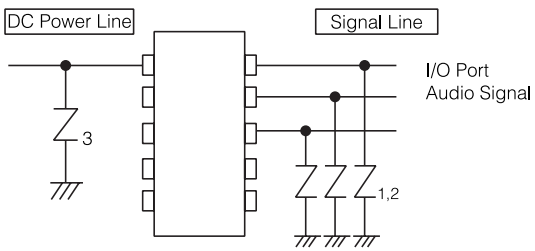
● USB Interface Circuit



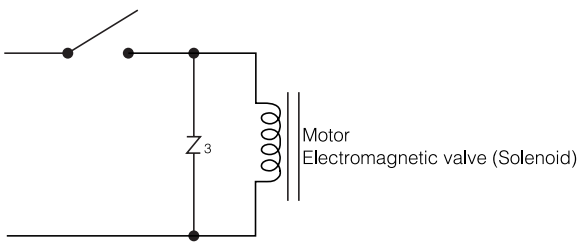
● IEEE1394 Interface Circuit



● IC Protection



● Motor or Electromagnetic surge absorption



Z_1 : EZJZ Series(EZJZ□V171AA)
Z_2 : EZJZ Series
Z_3 : EZJZ Series or EZJS Series

Multilayer Varistor

Series: **EZJZ (ZnO)**

■ Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	Z	J	Z	1	V	2	7	0	G	A	

Product Code (Multilayer Varistor)

Design No.

Series code
ZnO

Size Code	
0	0402
1	0603 (1608)
2	0805 (2012)

Packaging Style	
V	Paper Taping

Nomiral Varistor voltage

The first digitits are significant figures and the third one denotes the number of zeros following.

Capacitance Code	
A	3 pF max.
E	47 pF max.
G	100 pF max.
J	220 pF max.
K	330 pF max.

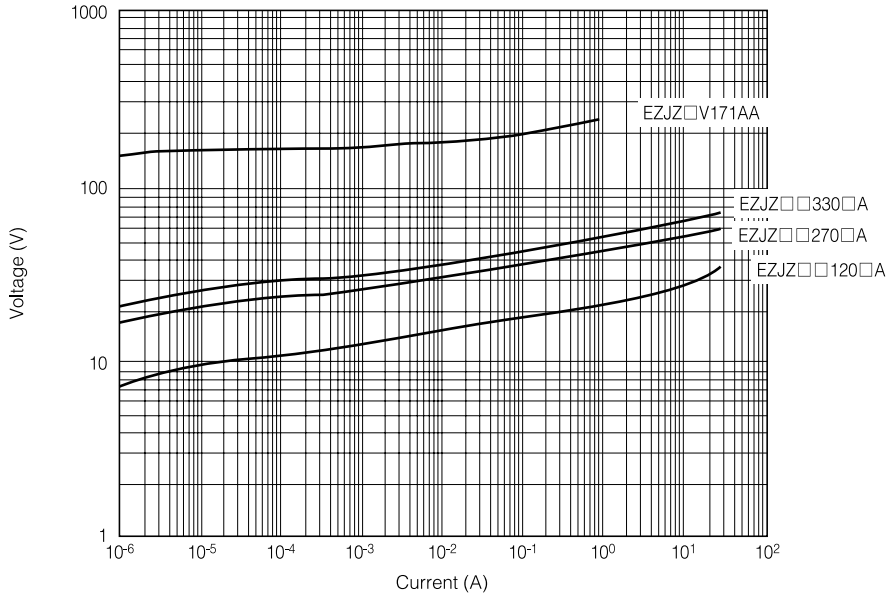
■ Ratings and Characteristics

Type	Part No.	Maximum Allowable Voltage	Varistor Voltage @ 1mA	Capacitance @ 1 MHz	Maximum Peak Current @ 8/20 µs
Ultra low capacitance	EZJZ0V171AA	DC 18 V	170 V	3 pF max.	———
	EZJZ1V171AA	DC 18 V	170 V	3 pF max.	———
Low capacitance	EZJZ0V120JA	DC 6.7 V	12 V	220 pF max.	10 A
	EZJZ0V270EA	DC 16 V	27 V	47 pF max.	10 A
	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



Multilayer Varistor

Series: **EZJS (ST)**

■ Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	Z	J	S	2	V	B	2	2	3		

Product Code (Multilayer Varistor)

Design No.

Series code
(ST)

Size Code	
2	0805 (2012)

Packaging Style	
V	Paper Taping
Y	Embossed Taping

Maximum Allowable voltage	
B	DC 6 V
C	DC 18 V
D	DC 30 V

Capacitance
The first digitits are significant figures and the third one denotes the number of zeros following.

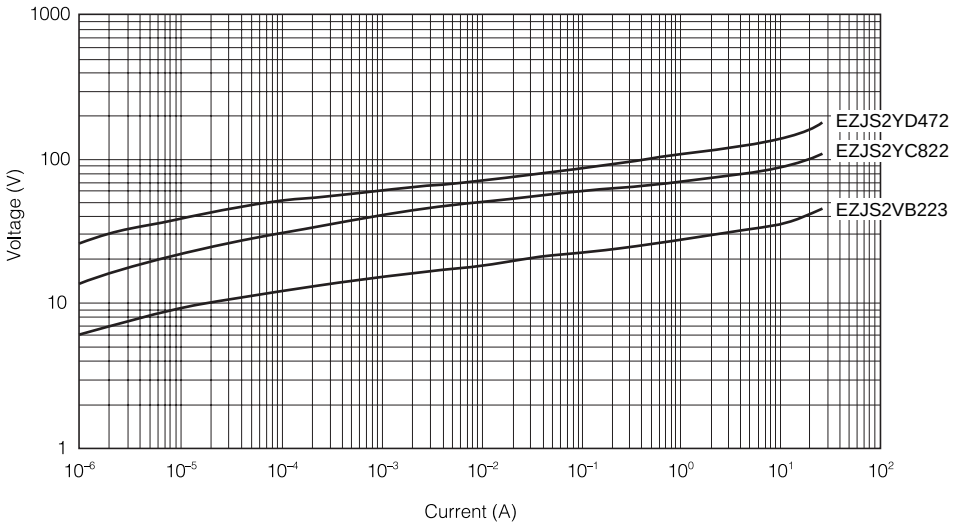
■ Ratings and Characteristics

Part No.	Maximum Allowable Voltage	Varistor Voltage ($V_{0.1mA}$)	Capacitance at 1 kHz (Typical)	Maximum ESD IEC61000-4-2
EZJS2VB223	DC 6 V	12 V	22000 pF	30 kV
EZJS2YC822	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



■ 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_{cmA}. 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 ±10% when impressing 10 times of ESD (five times of positive-negatives for each polarity) which is based on IEC61000-4-2	To meet the specified value.
Temperature coefficient Varistor Voltage	Coefficient indicating dependency of V-I characteristics on temperature. This is shown by the change of V_{cmA} 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 230±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.	No remarkable mechanical $\Delta V_c/V_c \leqq \pm 10$ %

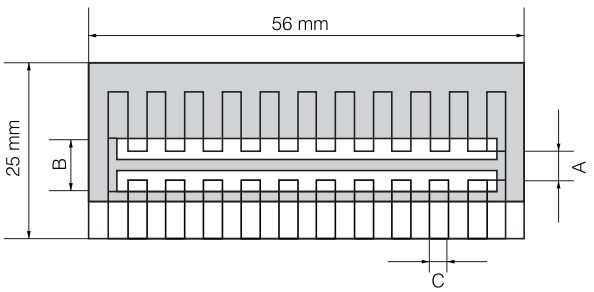
Step	Temperature	Period
1	80 to 100 °C	300 to 360 s
2	150 to 200 °C	300 to 360 s

■ Performance Characteristics
● Environmental

Characteristics	Test Methods	Specifications
Temperature Cycle	Solder the specimen to the testing jig shown in Fig.1. Condition the specimen to each temperature from step 1 to 4 in this order for the period shown in the table of specifications. Before the measurement after test, the specimen shall be left to stand and mechanical damage shall be examined. T_L : Lower operating temperature T_U : Upper operating temperature	No remarkable mechanical damage $\Delta V_c/V_c \leqq \pm 10$ %
Damp Heat Load	Solder the specimen to the testing jig shown in Fig.1. The max. 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 Vc and mechanical damage shall be examined. Ambient condition :40±2 °C, 90 to 95 %RH Period : 500+24 hours -0	No remarkable mechanical damage $\Delta V_c/V_c \leqq \pm 10$ %
High Temperature Load (Dry Heat Load)	Solder the specimen to the testing jig shown in Fig.1. The max. 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 $\Delta V_c/V_c \leqq \pm 10$ %

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.	

Fig.1



Material : Glass epoxy/PC board
: Copper foil (0.035 mm in thickness)
: Solder resist

(Unit: mm)

Size code(EIA)	A	B	C
0402	0.4	1.5	0.5
0603	1.0	3.0	1.2
0805	1.2	4.0	1.65

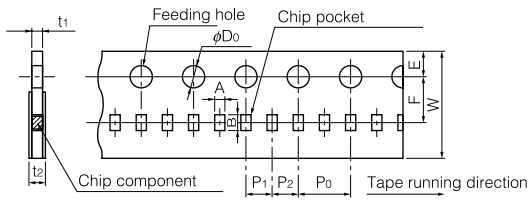
■ Packaging Specifications

● Standard Packing Quantity

Series	Size Code (EIA)	Thickness	Paper taping	Embossed taping
EZJZ	0402	0.6 mm max.	Pitch: 2 mm 10,000 pcs./reel	—
	0603	0.9 mm max.	Pitch: 4 mm 4,000 pcs./reel	—
EZJS	0805	1.0 mm max.	Pitch: 4 mm 5,000 pcs./reel	—
		1.45 mm max.	—	Pitch: 4 mm 2,000 pcs./reel

● Paper Taping

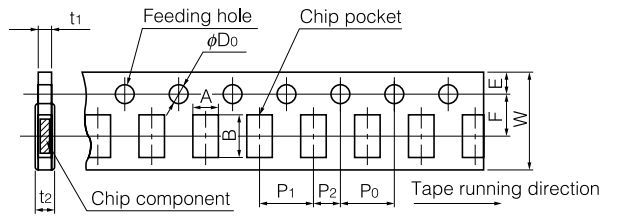
P_1: 2mm



(Unit: mm)

Symbol / Size Code	A	B	W	F	E	P_1	P_2	P_0	φD	t_1	t_2
0402	0.65 ±0.05	1.15 ±0.05	8.0 ±0.2	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.0 ±0.1	1.5 +0.1 0	0.7 max.	1.0 max.

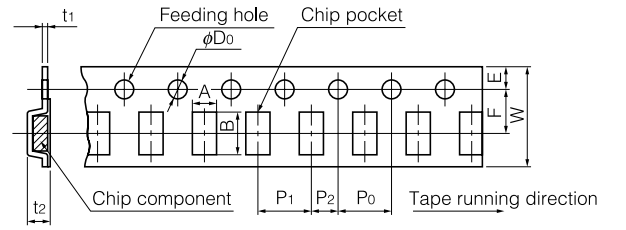
P_1: 4mm



(Unit: mm)

Symbol / Size Code	A	B	W	F	E	P_1	P_2	P_0	φD	t_1	t_2
0603	1.1 ±0.1	1.9 ±0.1	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 ±0.20	2.4 ±0.2									

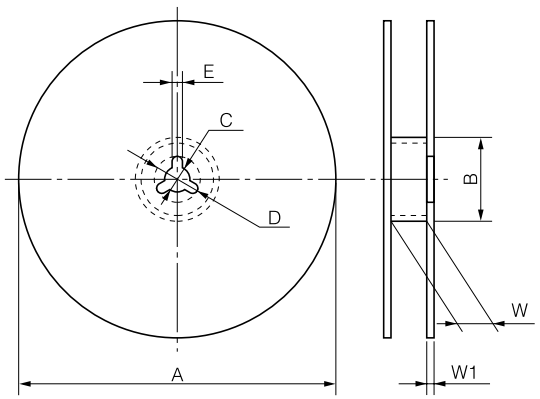
● Embossed Taping



(Unit: mm)

Symbol / Size Code	A	B	W	F	E	P_1	P_2	P_0	φD	t_1	t_2
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.

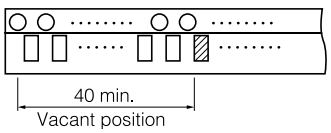
● Reel



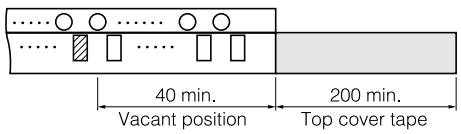
Symbol	A	B	C	D	E	W	W_1
Dim. (mm)	φ180 $^{0}_{-1}$	φ60.0±0.5	13.0±0.5	21.0±0.8	2.0±0.5	9.0±0.3	1.3±0.2

● Leader Part and Taped End

Tape end



Leader part



Unit : mm