

ESD Suppressor

EZAEG 1N, 2N type



- Don't use these products in the engine room.
- Don't use these products in any driving applications or any other critical functions that may affect passenger's safety. (e.g. Power train, ABS, Engine ECU, Air bag, and so on.)
- Don't use these products in applications related to the autonomous driving equipment with system level 3 or higher.

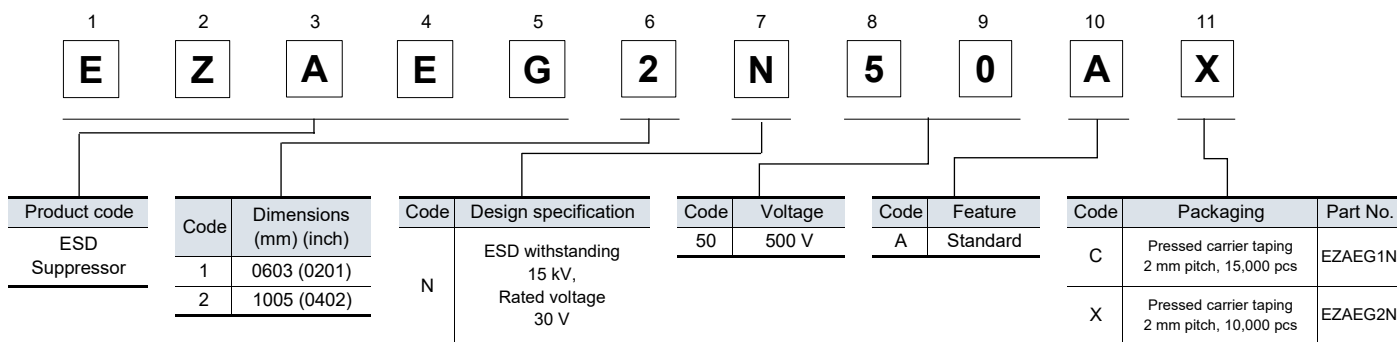
Features

- Good ESD withstanding (IEC61000-4-2 15 kV contact/air Discharge)
- ESD protection of high-speed data lines
- Low capacitance [0603 (0201) size : 0.04 pF, 1005(0402) size : 0.05 pF]
- Good ESD suppression characteristics
- RoHS compliant

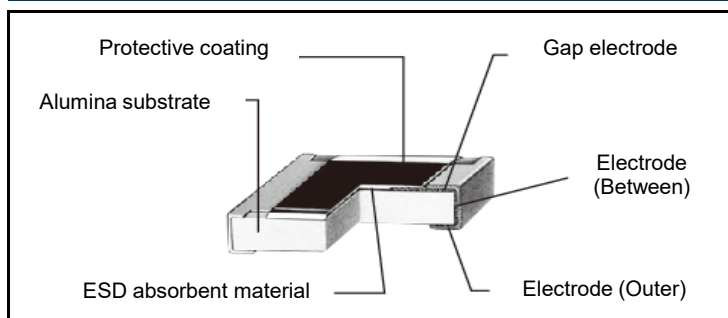
Recommended applications

- Smart phones, Mobile phones, RF Modules, NFC and GPS
- ESD suppression of high-speed differential data line such as Antena circuit, HDMI, SATA, USB, Display Port

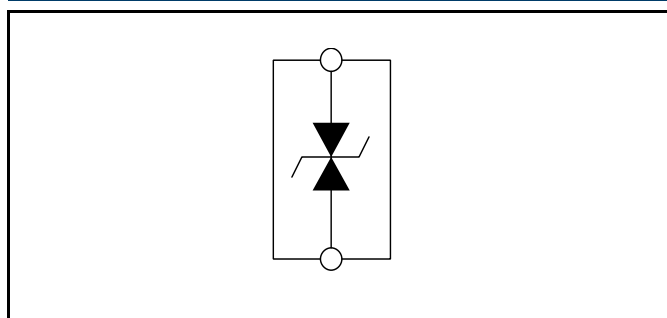
Explanation of part numbers



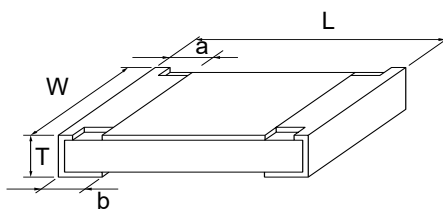
Construction



Circuit configuration



Dimensions (not to scale)



Unit : mm

Part No. (inch size)	Dimensions					Mass (Weight) (g/1000 pcs)
	L	W	a	b	T	
EZAEG1N (0201)	0.60 ± 0.03	0.30 ± 0.03	0.15 ± 0.10	0.15 ± 0.10	0.23 ± 0.03	0.12
EZAEG2N (0402)	1.00 ± 0.10	0.50 ± 0.05	0.20 ± 0.10	0.27 ± 0.10	0.38 ± 0.05	0.60

Ratings

Part number	Capacitance *1 (pF)	Rated voltage	Category temperature range
EZAEG1N50AC	0.04 ^{+0.04} _{-0.03}	30 V max.	-55 °C to +125 °C
EZAEG2N50AX	0.05 ^{+0.05} _{-0.04}		

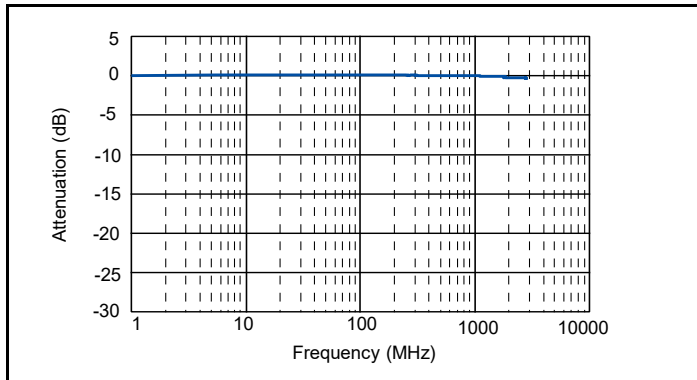
*1: Capacitance = The capacitance value shall be measured under the conditions specified below.

Frequency : 1 MHz ± 10 %, Voltage : 1 Vrms ± 0.2 Vrms, Temperature : 25 °C ± 2 °C

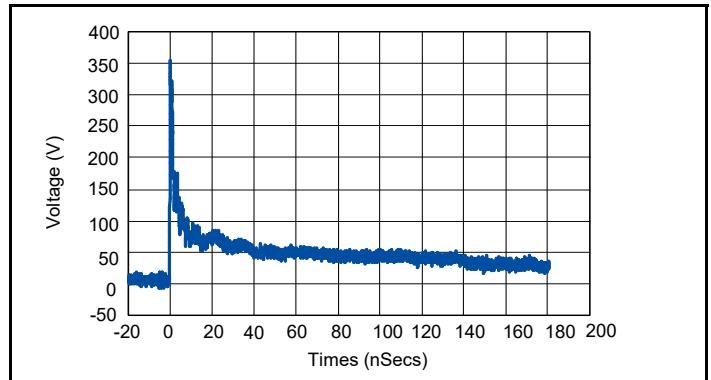
Performance

Test item	Performance requirements	Test conditions
Peak voltage	500 V max.	IEC61000-4-2, contact discharge 8 kV, Peak voltage value
Clamping voltage	100 V max.	IEC61000-4-2, contact discharge 8 kV, voltage at 30 ns after initiation of pulse
Leakage current	1 µA max.	Current at rated voltage (DC 30 V)
ESD withstanding	Leakage current 10 µA max.	IEC61000-4-2, contact discharge 15 kV or air discharge 15 kV, +/- 50 times
Rapid change of temperature		-55 °C (30 min.) / +125 °C (30 min.), 100 cycles
Load life in humidity		60 °C, 90 % to 95 %RH, Rated voltage, 1000 h
Endurance at 85 °C		85 °C, Rated voltage, 1000 h
Resistance to soldering heat		270 °C, 10 s

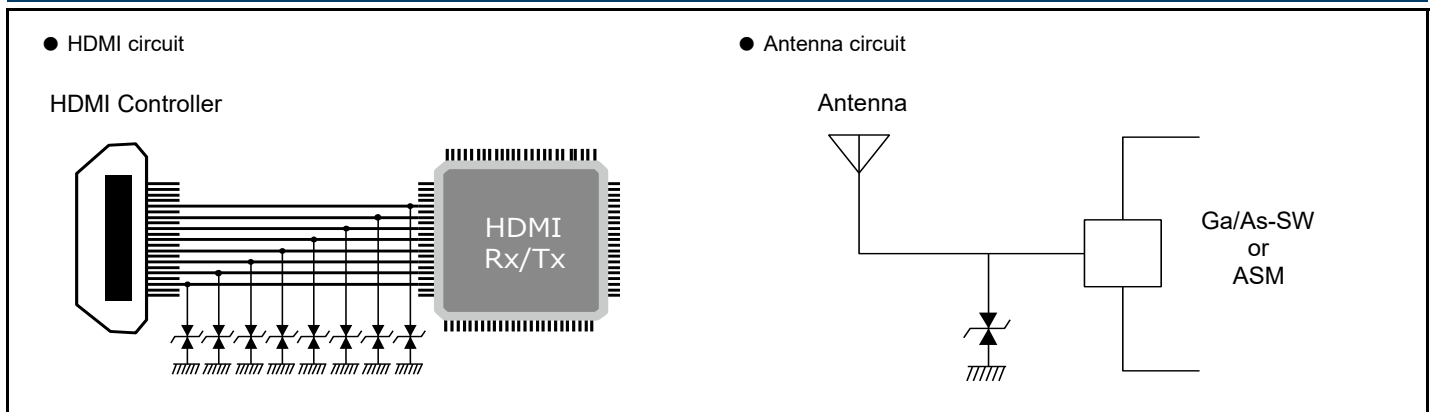
Frequency characteristics



ESD Suppression voltage waveform

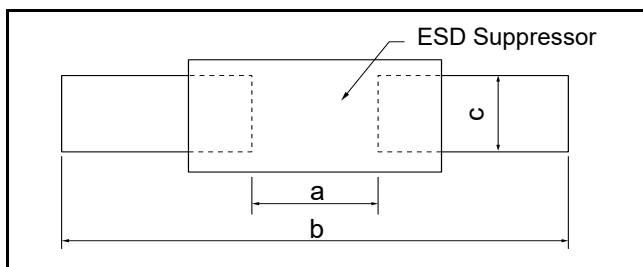


Typical circuits requiring protection



Recommended land pattern

Recommended land pattern design for ESD Suppressor is shown below.



Unit : mm

Part number	Dimensions		
	a	b	c
EZAEG1N	0.3 to 0.4	0.8 to 0.9	0.25 to 0.35
EZAEG2N	0.5 to 0.6	1.4 to 1.6	0.40 to 0.60

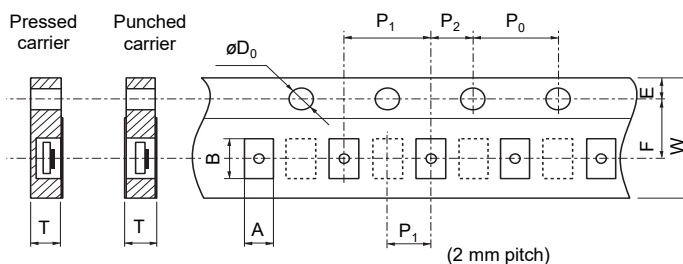
■ As for packaging methods, soldering conditions and safety precautions, please see data files.

Packaging methods (Taping)

● Standard quantity

Part number	Size (inch)	Type	Kind of taping	Pitch (P ₁) (mm)	Quantity (pcs / reel)
EZAEG1N	0201	Single	Pressed carrier taping	2	15000
EZAEG2A,2N	0402				10000
EZAEG3A	0603		Array	Punched carrier taping	4
EZAEG3W	0603	4000			
EZAEGCA	0805	5000			

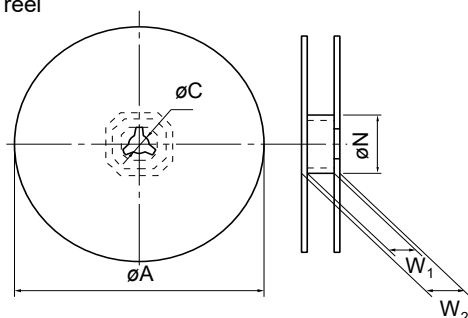
● Carrier taping



Unit : mm

Part number	Size(inch)	A	B	W	F	E	P ₁	P ₂	P ₀	ϕD_0	T
EZAEG1N	0201	0.38±0.05	0.68±0.05	8.00±0.20	3.50±0.05	1.75±0.10	2.00±0.10	2.00±0.05	4.00±0.10	1.5 ^{+0.1} ₀	0.42±0.05
EZAEG2A,2N	0402	0.70±0.05	1.20±0.05				0.60±0.05				
EZAEG3A	0603	1.10±0.10	1.90±0.10	8.00±0.20	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.5 ^{+0.1} ₀	0.70±0.05
EZAEG3W	0603	0.91±0.10	1.82±0.10								1.08±0.10
EZAEGCA	0805	1.55±0.15	2.30±0.20				0.85±0.05				

● Taping reel



Dimensions		
ϕA	ϕN	ϕC
180.0 ⁰ _{-1.5}	60.0 ^{+1.0} ₀	13.0±0.2

Dimensions	
W ₁	W ₂
9.0 ^{+1.0} ₀	11.4±1.0

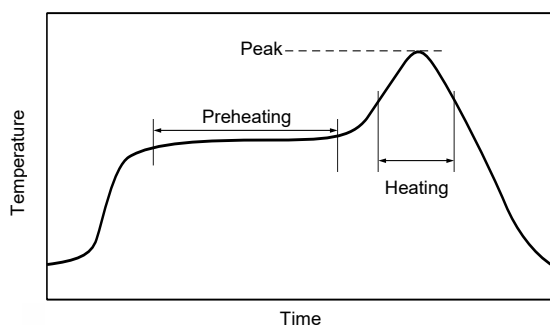
Unit : mm

Recommended soldering conditions

Recommendations and precautions are described below

● Recommended soldering conditions for reflow

- Reflow soldering shall be performed a maximum of two times.
- Please contact us for additional information when used in conditions other than those specified.
- Please measure the temperature of the terminals and study every kind of solder and printed circuit board for solderability before actual use.



For soldering (Example : Sn/Pb)

	Temperature	Time
Preheating	140 °C to 160 °C	60 s to 120 s
Main heating	Above 200 °C	30 s to 40 s
Peak	235 ± 5 °C	max. 10 s

For lead-free soldering (Example : Sn/Ag/Cu)

	Temperature	Time
Preheating	150 °C to 180 °C	60 s to 120 s
Main heating	Above 230 °C	30 s to 40 s
Peak	max. 260 °C	max. 10 s

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.
- Please ensure the safety by means of protection circuit, redundant circuit etc. in your system design in order to prevent the occurrence of life crisis and other serious damages due to the failure of our products.
- The products and product specifications described in this online catalog are subject to change for improvement without prior notice. Therefore, please be sure to request and confirm the latest product specifications which explain the specifications of our products in detail, before you finalize the design of your applications, purchase, or use our products.
- 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.
- If any of our products, product specifications and/or technical information in this catalog is to be exported, the laws and regulations of the exporting country, especially with regard to security and export control, shall be observed.

<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.

Please note that we do not owe any liability and responsibility if our products are used beyond the description of this catalog or without complying with precautions in this catalog.

⚠ Application Guidelines (ESD Suppressor)

1. Safety precautions

- Make sure to exchange product specifications before using this product, regardless of the intended use.
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.
- If a malfunction of this product may result in the loss of human life or other serious damage in transportation equipment (trains, automobiles, ships, etc.), signaling equipment, medical equipment, aerospace equipment, electric heating equipment, combustion and gas equipment, rotating equipment, disaster prevention and security equipment, and other equipment, ensure safety by implementing a fail-safe design with the following system.
 - * 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 fault.

2. Precautions for use

- These products are designed and manufactured for general and standard use in general electronic equipment (e.g. AV equipment, home electric appliances, office equipment, information and communication equipment)
If the product is to be used in an application that requires special quality and reliability and where failure or malfunction of the product may directly threaten human life or cause bodily harm (e.g., aerospace equipment, transportation equipment, combustion equipment, medical equipment, disaster prevention and security equipment, safety devices, etc.), be sure to consult with our sales office in advance and exchange product specifications appropriate for the application.
- 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.

3. 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 +40 °C and a relative humidity of 15 % to 75 %.

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.

1. 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.

<Package markings>

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

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

4. Precaution specific to this product

1. If a large electric surge (especially, one which is larger than an ESD) is expected to be applied, be sure to test and confirm proper ESD Suppressor (hereafter called the suppressors) functionality when mounted on your board. When the applied load is more than the allowable rated power under normal load conditions, it may impair performance and/or the reliability of the suppressors. Never exceed the rated power. If the product will be used under these special conditions, be sure to contact a Panasonic representative first.
2. Do not use halogen-based or other high-activity flux. Otherwise, the residue may impair the suppressors' performance and/or reliability.
3. When soldering with a soldering iron, never touch the suppressors' 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.).
4. If the amount of solder is too much or too little, the connection reliability and performance may be affected. Check the performance and reliability of the product and use the proper amount of solder.
5. When the suppressors' protective coatings are chipped, flawed, or removed, the characteristics of the suppressors may be impaired. Take special care not to apply mechanical shock during automatic mounting or cause damage during handling of the boards with the suppressors mounted
6. Do not apply shock to the suppressors or pinch them with a hard tool (e.g. pliers and tweezers). Otherwise, the suppressors' protective coatings and bodies may be chipped, affecting their performance.
7. Avoid excessive bending of printed circuit boards in order to protect the suppressors from abnormal stress.
8. Do not immerse the suppressors in solvent for a long time. Before using solvent, carefully check the effects of immersion.
9. Do not apply excessive tension to the terminals.

5. AEC-Q200 Compliant (ESD Suppressor, High withstanding:EZAEG3W type)

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., make sure to exchange product specifications for each product when placing an order.