

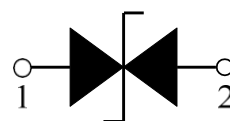
Surface Mount Polymeric ESD Suppressor

ESD Protection Devices

KINGWELL' ESD line of devices help protect I/O ports on HDMI 1.3, portable video players, LCD & plasma TVs, USB 2.0, digital visual interface (DVI), and antenna switches. ESD devices shunt electrostatic discharge away from sensitive circuitry in HDTV equipment, printers, laptops, cellular phones, and other portable devices.

ESD devices offer many advantages over traditional protection devices, such as multi layer varistors (MLVs), which may degrade or distort the signal in high data rate circuits. Compared to transient voltage suppression (TVS) diodes and miniature gas discharge tubes (GDTs), ESD devices provide a more compact form factor and an economical solution for the shrinking profiles of today's compact information appliances.

Available in a range of form factors, our ESD protection devices provide low capacitance, and meet transmission line pulse (TLP) testing, as well as IEC61000-4-2 testing.



Equivalent Circuit

Benefits:

- ESD protection for high frequency applications (HDMI 1.3)
- Smaller form factor for board space savings
- Helps protect sensitive electronic circuits against damage caused by electrostatic discharge (ESD) events
- Assists equipment to pass IEC 61000-4-2, level 4 testing

Features:

- RoHS compliant
- Halogen free
(refers to: Br $\leq$ 900ppm, Cl $\leq$ 900ppm, Br+Cl $\leq$ 1500ppm)
- 0.15 pF (typical) capacitance
- Low-leakage current
- Low-clamping voltage
- Fast response time (<1ns)
- Capable of withstanding numerous ESD strikes
- Compatible with standard reflow installation procedures
- Thick film technology
- Bi-directional protection

Applications:

- HDMI 1.3 interfaces
- LCD & plasma TV
- Cellular phones
- Antennas
- Portable video players
- Portable devices (PDA, DSC, BlueTooth)
- Printer ports
- Satellite radios
- USB 2.0 and IEEE 1394 interfaces
- DVI
- GPS systems

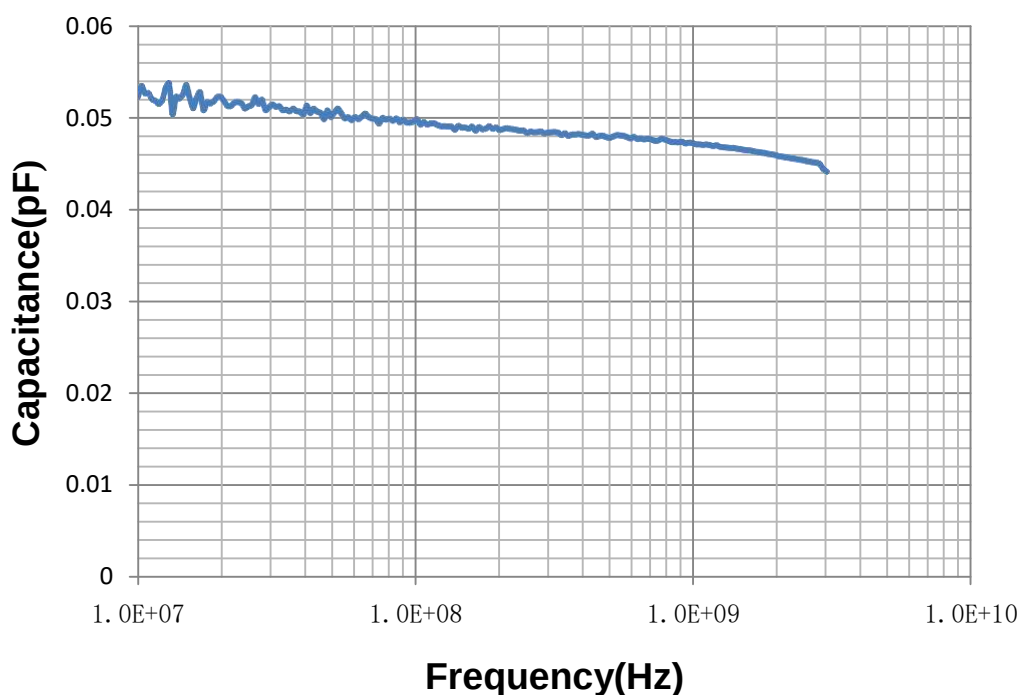
Electrical Characteristics ($T_A=25^{\circ}\text{C}$)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Continuous Operating Voltage	V_{DC}	---	---	---	5	V
Trigger Voltage	V_T	IEC61000-4-2 8KV contact discharge	---	300	---	V
Clamping Voltage	V_C	IEC61000-4-2 8KV contact discharge	---	30	---	V
Leakage Current	I_L	DC 5V shall be applied on component	---	---	10	nA
Capacitance	C_P	Measured at 10MHz	---	0.15	---	pF
ESD Pulse Withstand	Pulses	IEC61000-4-2 8KV contact discharge	1000	---	---	---

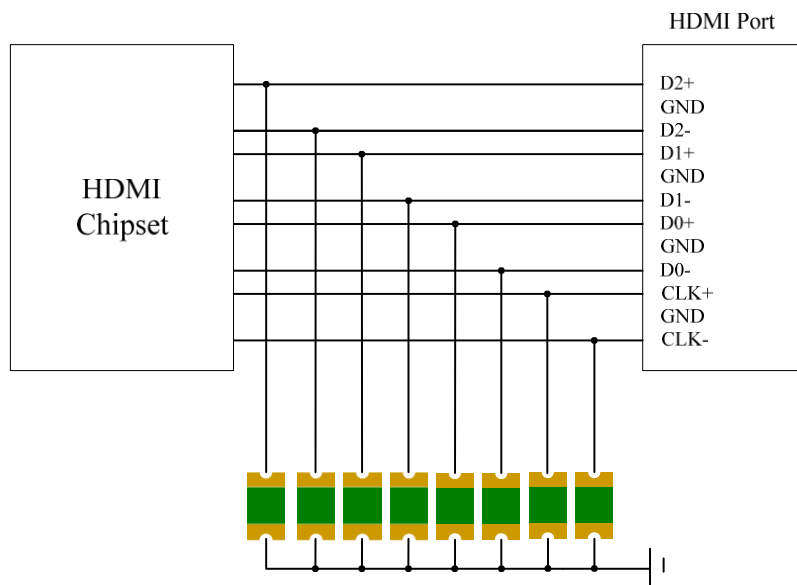
Notes:

1. Trigger and clamping voltage are measured per IEC 61000-4-2, 8KV contact discharge method.
2. After reliability tests such as high Temp storage, Temp cycles, continuous ESD strike etc, the maximum leakage current is less than 1uA.

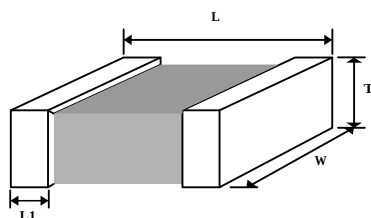
Typical Device Capacitance VS. Frequency



ESD Protection for HDMI

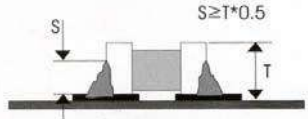
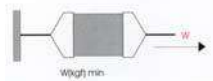
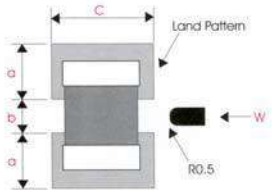
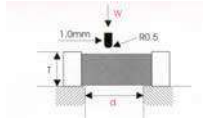


Package Dimension



CODE	DIMENSION (mm)			
	L	W	T	L1
0402	1.0±0.05	0.5±0.05	0.5±0.05	0.2+0.15/-0.1

PERFORMANCE

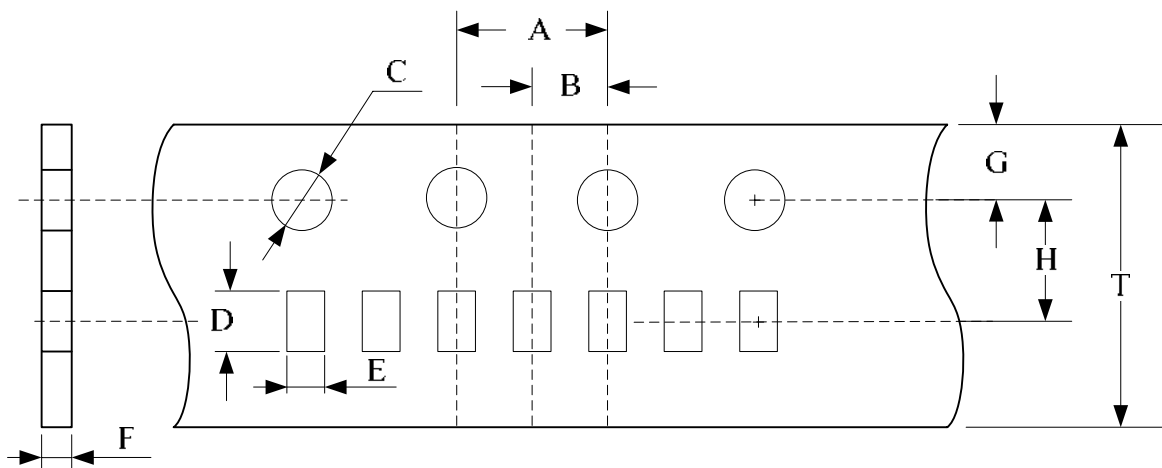
ITEM	REQUIREMENTS	TEST CONDITION
Operating temperature range	-25°C ~ +85°C	—
Storage temp. & humidity range	-25°C ~ +85°C, 70% RH max.	—
Resistance to solder heat	1. No damage such as cracks should be caused in chip element. 2. More than 75% of the terminal electrode shall be covered with new solder	Preheat temperature : 100 to 150°C preheat time : 1 min. Solder temperature : 260 ±10°C dipping time : 10± 0.5sec
Solderability	1. More than 90% of the terminal shall be covered with new solder.	Preheat temperature : 100 to 150°C preheat time : 1 min. Solder temperature : 230 ±10°C dipping time : 3± 1 sec.
Reflow soldering	1. More than 50% of the terminal electrode shall be covered with new solder. 	Preheat temperature : 150°C preheat time : 1 min. Solder temperature : 230°C soldering time : 10 sec.max (Reflow soldering profile)
Tensile strength (terminal strength)	1. No mechanical damage	
	W	0.5 kg
Adhesion of terminal electrode (Flexure strength)	1. No mechanical damage	
	a	
	b	
	c	
	W	
Body strength (bending strength)	1. The body shall not be damaged by forces applied on the right	
	d	
	W	

ITEM	REQUIREMENTS	TEST CONDITION
Thermal shock (Temperature cycle)	1. No mechanical damage 2. Leakage current change : within 10μA	Step 1. -40±3°C 30±3min. Step 2. 85±3°C 30±3min. Number of cycle : 100 times
Heat load resistance	1. No mechanical damage 2. Leakage current change : within 10μA	Temperature : 85±2°C Applied Voltage : working voltage Time : 1,000 hours Measured at room ambient temperature after placing for 24 hours
Low temp. resistance	1. No mechanical damage 2. Leakage current change : within 10μA	Temperature : -40±5°C Time : 1,000 hours Measured at room ambient temperature after placing for 24 hours
Humidity resistance	1. No mechanical damage 2. Leakage current change : within 10μA	Temperature : 40±2°C Humidity : 90 ~ 95%RH Time : 500 hours Measured at room ambient temperature after placing for 24 hours
Humidity load resistance	1. No mechanical damage 2. Leakage current change : within 10μA	Temperature : 40±2°C Humidity : 90~ 95%RH Applied voltage :Working Voltage Time : 500 hours Measured at room ambient temperature after placing for 24 hours

Taping Specification

1. Tap Dimension

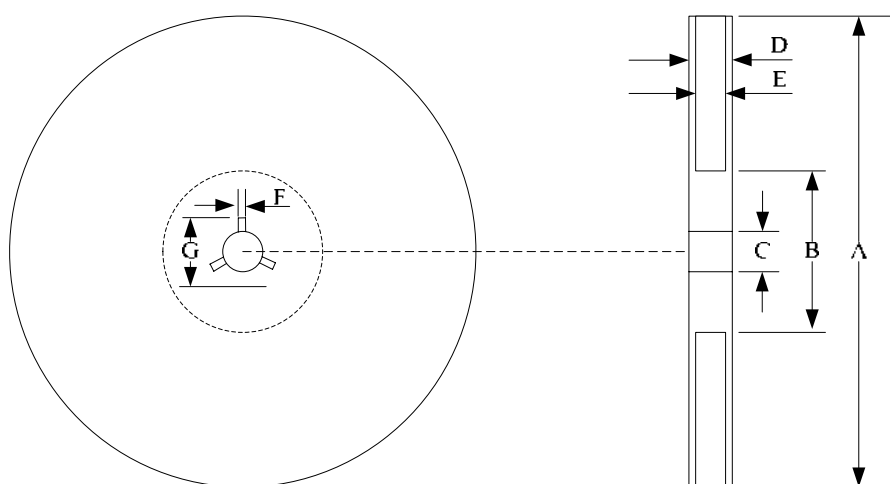
Unit: Millimeters



A		C	D	E	F	G	H	T
4.00±0.10	2.00±0.10	Ø1.55±0.10	1.90±0.05	1.0±0.05	0.48±0.05	1.75±0.10	3.50±0.05	8.00±0.30

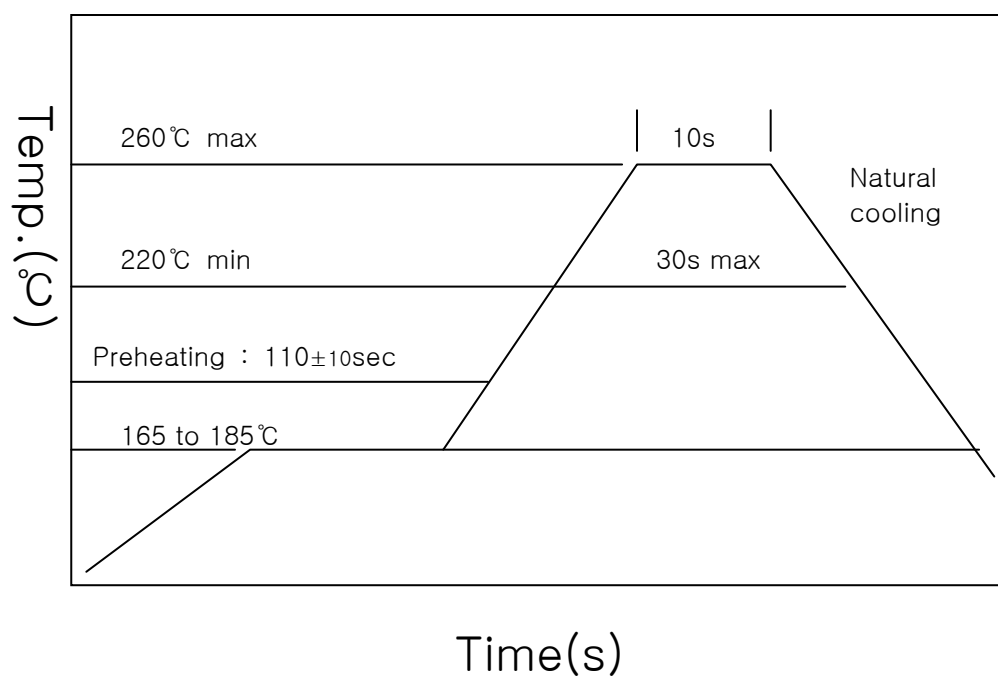
2. Ree Dimension

Unit: Millimeters

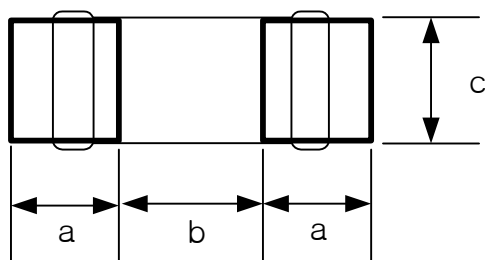


A	B min.	C	D	E	F	G
178.0 ±2.0	50.0	13.0±0.5	13.0±1.0	9.40±1.0	2.0 ±0.5	21.0±0.8

Soldering Parameters



Land Pattern



Size	a	b	c
0402	0.4~0.6	0.4~0.5	0.4~0.6