ESD Protector
Overvoltage Protection Device

PRODUCT: PESD0603-240

DOCUMENT: SCD27256
REV LETTER: I
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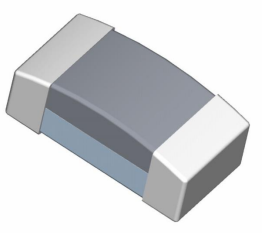
Specification Status: Released

BENEFITS

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

FEATURES



- 0.25 pF (typ) 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 interface
- LCD, HDTV
- Cellular phones
- Antennas (cell phones, GPS…)
- Portable video devices (PDA, DSC, Bluetooth…)
- Printer ports
- High speed Ethernet
- USB 2.0 and IEEE 1394 interfaces
- DVI interface

CAUTION: This device should not be used in Power Bus applications

MATERIALS INFORMATION

RoHS Compliant	ELV Compliant	Halogen Free*	Lead-Free
Directive 2002/95/EC Compliant	Directive 2000/53/EC Compliant	Pb	HF

PART NUMBERING

PESD 0603 - 240

Series

EIA Size

Operating Voltage Designator

$24 \times 10^0 = 24V_{DC}$

* Halogen Free refers to: Br≤900ppm, Cl≤900ppm, Br+Cl≤1500ppm

TYPICAL DEVICE RATINGS AND CHARACTERISTICS

	Max Operating Voltage	Typical TLP Trigger Voltage[1]	Typical TLP Clamping Voltage[1] after 30ns	Typical Capacitance[2] @ 1 MHz, $1V_{rms}$	Typical Leakage Current @$24V_{DC}$	Max Leakage Current @$24V_{DC}$
Symbol	V_{DC}	$V_{T(TLP)}$	$V_{C(TLP\ 30)}$	Cp	$I_{L(Typ)}$	$I_{L(MAX)}$
Unit	V	V	V	pF	µA	µA
Value	24	215	45	0.25	<0.01	10.0

Note 1: TLP test method at 1000V (refer to FIG. 5 on page 5)
Note 2: Typical capacitance @ 0V and 24V

GENERAL CHARACTERISTICS

Operating temperature: -55°C to +125°C
Storage temperature: -55°C to +125°C

ESD voltage capability (tested per IEC 61000-4-2)

- Contact discharge mode: 8kV (typ), 15kV (max)
- Air discharge mode: 15kV (typ), 25kV (max) [1 pulse: per customer request]

ESD pulse withstand: Typically 500 pulses (tested per IEC 61000-4-2, level 4, and contact method)

Environmental Specifications

	Bias Humidity Test	Thermal Shock	Bias Heat Test	Bias Low Temp Test	Solderability	Solder Heat	Vibration	Mechanical Shock	Solvent Resistance
Test Conditions	@ 85ºC @ 85% RH V_{DC} (max) 1000 hours	-55ºC to 125ºC 30min dwell 1000 cycles	@ 125ºC V_{DC} (max) 1000 hours	@ -55ºC V_{DC} (max) 1000 hours	250 ºC +/- 5 ºC 3s +/- 1s	260 ºC, 10s	10 to 50Hz, 60s cycle, 2hrs each in X-Y-Z axis	1500G, 0.5ms, X-Y-Z axis 3 times	IPA ultrasonic 300s
Pass/Fail Criteria	I_L≤10µA	I_L≤10µA	I_L≤10µA	I_L≤10µA	95% coverage	90% coverage	No Physical Damage I_L ≤ 10 µA	No Physical Damage I_L ≤ 10 µA	No Physical Damage I_L ≤ 10 µA

FIG 1: CAPACITANCE VS. FREQUENCY (TYPICAL SAMPLE)

(PESD0603 Flat Response of Capacitance over Frequency Range)

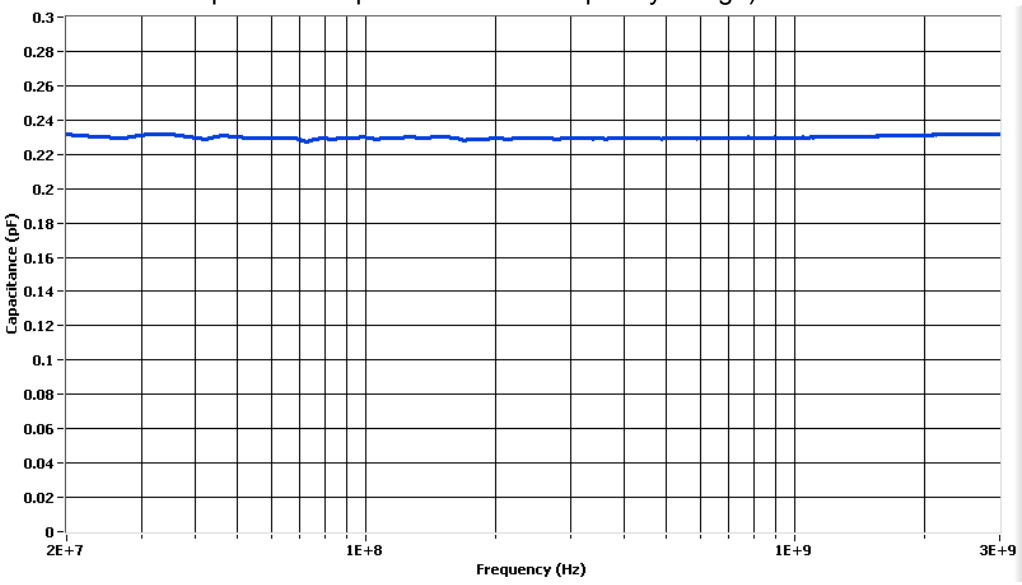


FIG 2: EYE DIAGRAM (TYPICAL SAMPLE)

(PESD0603 Eye Diagram Performance at 3.4 GHz— meets criteria for HDMI 1.3)

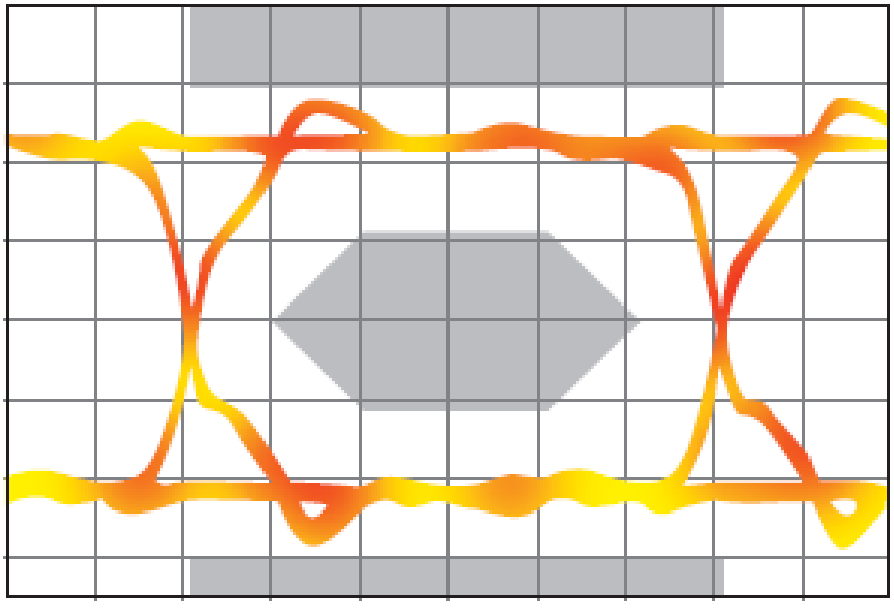


FIG 3: INSERTION LOSS DIAGRAM (TYPICAL SAMPLE)

(PESD0603 Minimal Insertion Loss at 3.4 GHz)

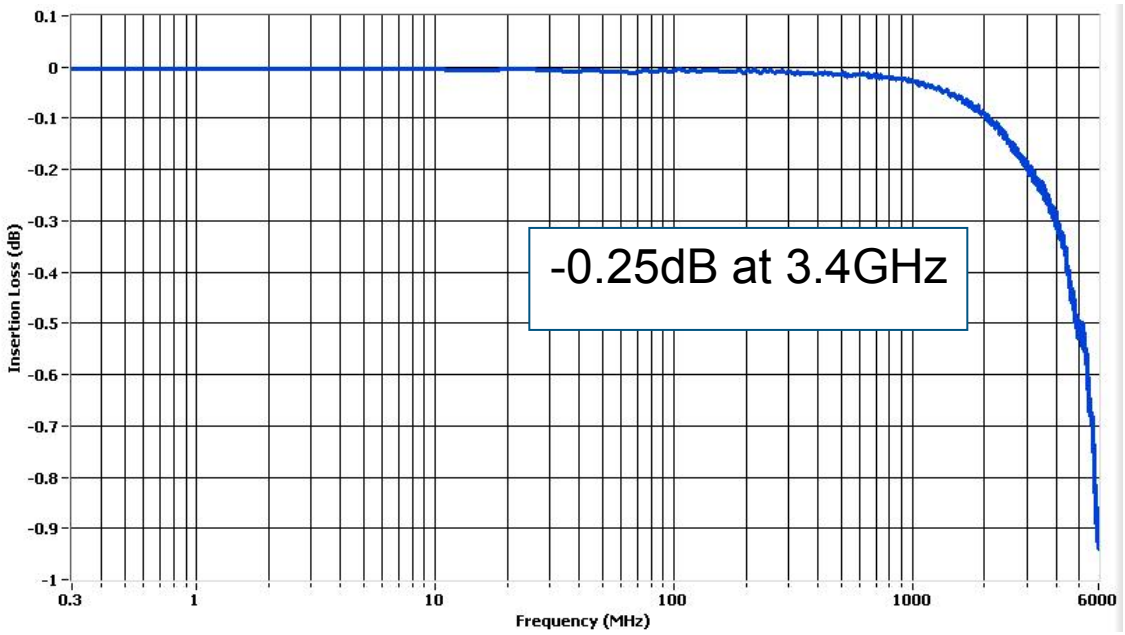


FIG 4: ESD PROTECTION FOR HDMI

(PESD0603 Reference Layout and Test Results available)

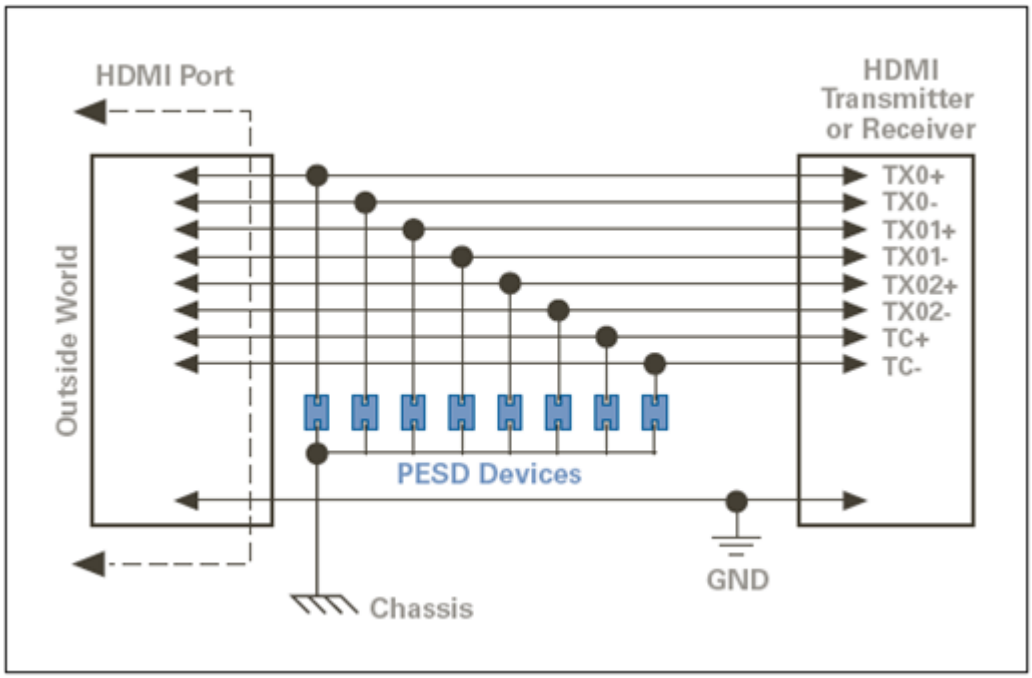
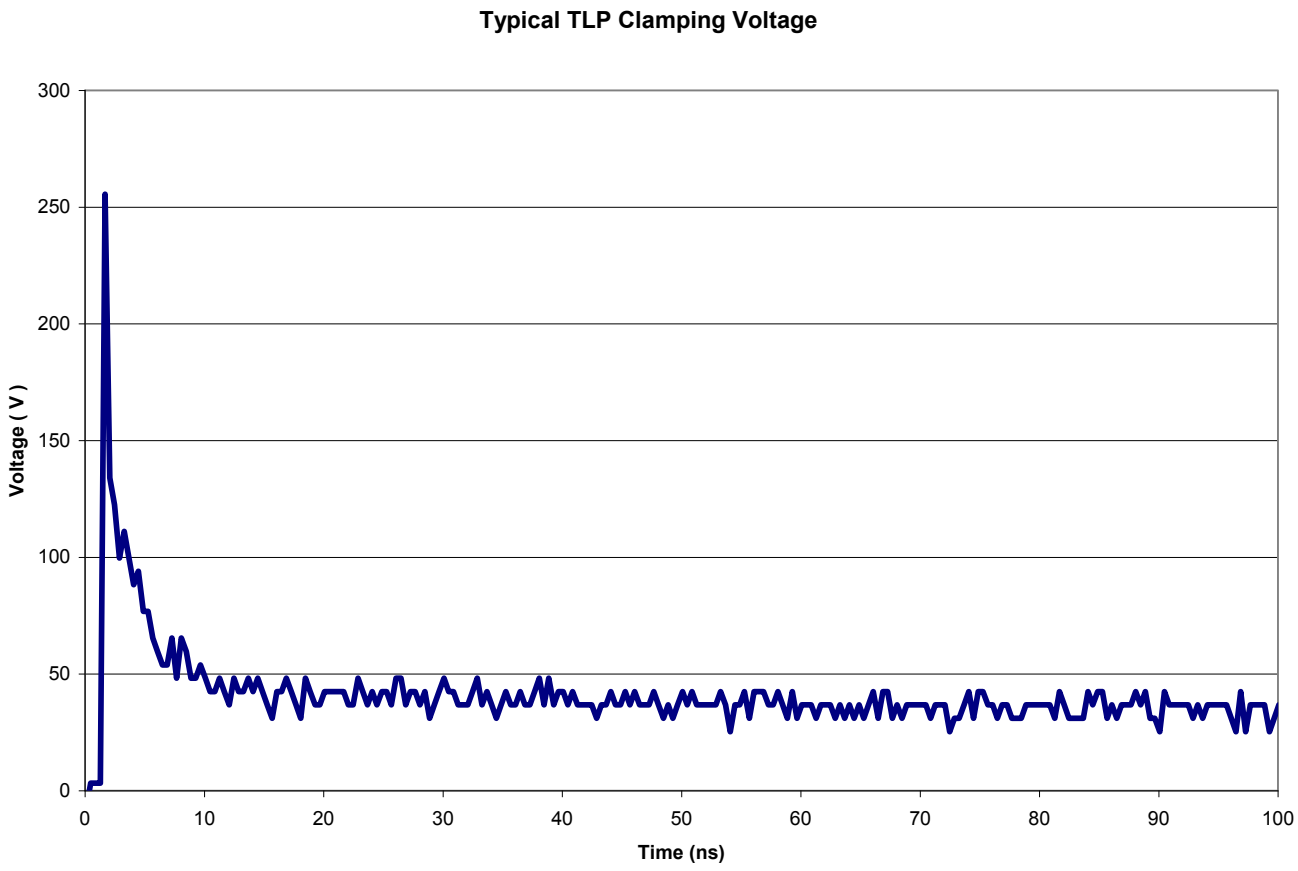
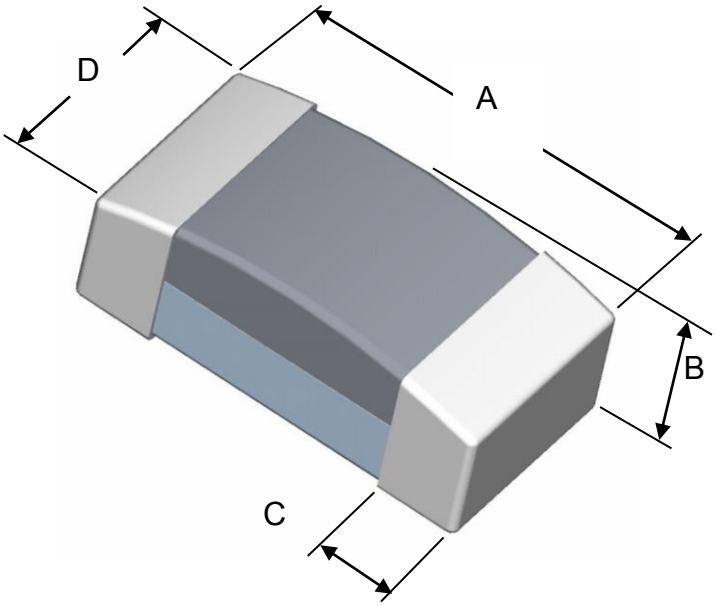


FIG 5:TYPICAL TRANSMISSION LINE PULSE RESPONSE GRAPH



DIMENSIONS



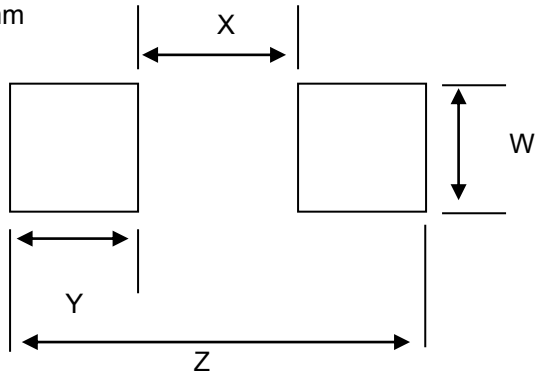
Drawing Not To Scale

	Length A		Height B		Terminal Width C		Width D	
	Min	Max	Min	Max	Min	Max	Min	Max
mm	1.50	1.70	0.45	0.55	0.10	0.50	0.70	0.95
in*	(0.059)	(0.067)	(0.018)	(0.022)	(0.004)	(0.020)	(0.028)	(0.037)

* Round off approximation

RECOMMENDED LAND PATTERN:

Solder thickness 0.15 to 0.2mm

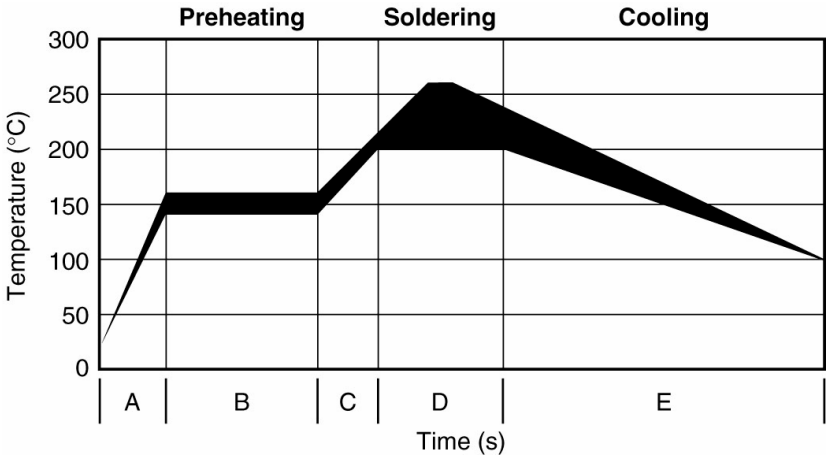


	W		X		Y		Z	
	Min	Max	Min	Max	Min	Max	Min	Max
mm	0.90	1.00	0.50	0.60	1.00	1.10	2.70	2.80
in*	(0.035)	(0.039)	(0.020)	(0.024)	(0.039)	(0.043)	(0.106)	(0.110)

* Round off approximation

SOLDER REFLOW RECOMMENDATIONS:

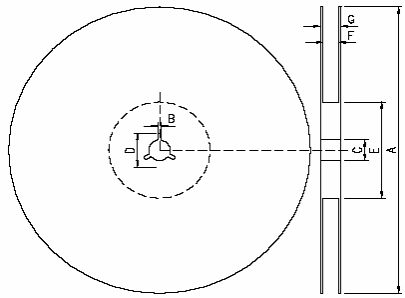
A	Temperature ramp up 1	From ambient to Preheating temperature	30s to 60s
B	Preheating	140°C - 160°C	60s to 120s
C	Temperature ramp up 2	From Preheating to Main heating temperature	20s to 40s
D	Main heating	at 200°C at 220°C at 240°C at 260°C	60s ~ 70s 50s ~ 60s 30s ~ 40s 5s ~ 10s
E	Cooling	From main heating temperature to 100°C	max 4°C/s



PACKAGING

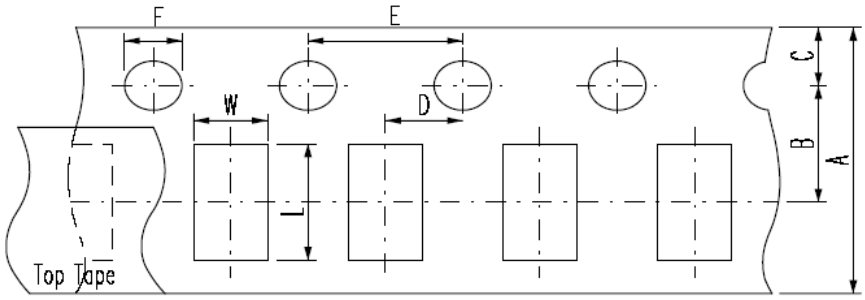
Packaging	Tape & Reel	Standard Box
PESD0603-240	5,000	25,000

EIA referenced Reel Dimensions for PESD Devices



Reel Dimensions (mm):

	A	B	C	D	E	F	G
0603 Devices	178.0 ±2.0	2.0 ±0.5	13.0±0.5	21.0±0.8	62.0±1.5	9.0±0.5	13.0±1.0



Carrier Dimensions (mm):

	A	B	C	D	E	F	L	W	T[1]
0603 Devices	8.0±0.3	3.5±0.05	1.75±0.1	2.0±0.05	4.0±0.1	1.5±0.1	2.02±0.20	1.27±0..15	0.60±0.03

Note 1: Carrier thickness

Product Orientation – always face up (meaning the substrate is at the bottom), but parts do not have polarity mark.