

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

 Directive 2002/95/EC
 Compliant

ELV Compliant

 Directive 2000/53/EC
 Compliant

Halogen Free*

Lead-Free


PART NUMBERING

PESD 0603 - 240

Series

Operating Voltage Designator

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

EIA Size

* 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)}	C _p	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: -40°C to +85°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	@ 85°C @ 85% RH V _{DC} (max) 1000 hours	-55°C to 125°C 30min dwell 1000 cycles	@ 125°C V _{DC} (max) 1000 hours	@ -55°C V _{DC} (max) 1000 hours	250 °C +/- 5 °C 3s +/- 1s	260 °C, 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)

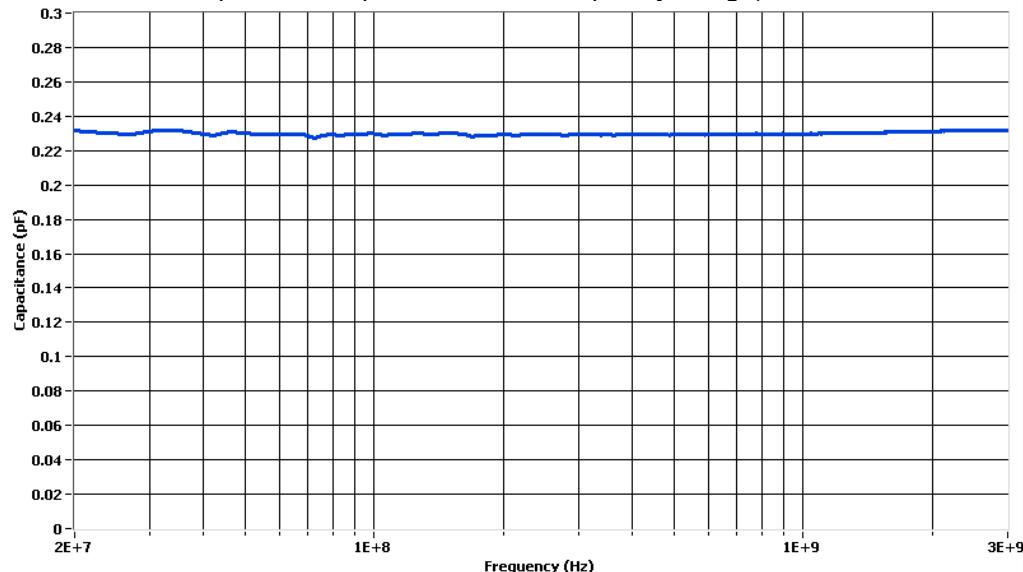


FIG 2: EYE DIAGRAM (TYPICAL SAMPLE)

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

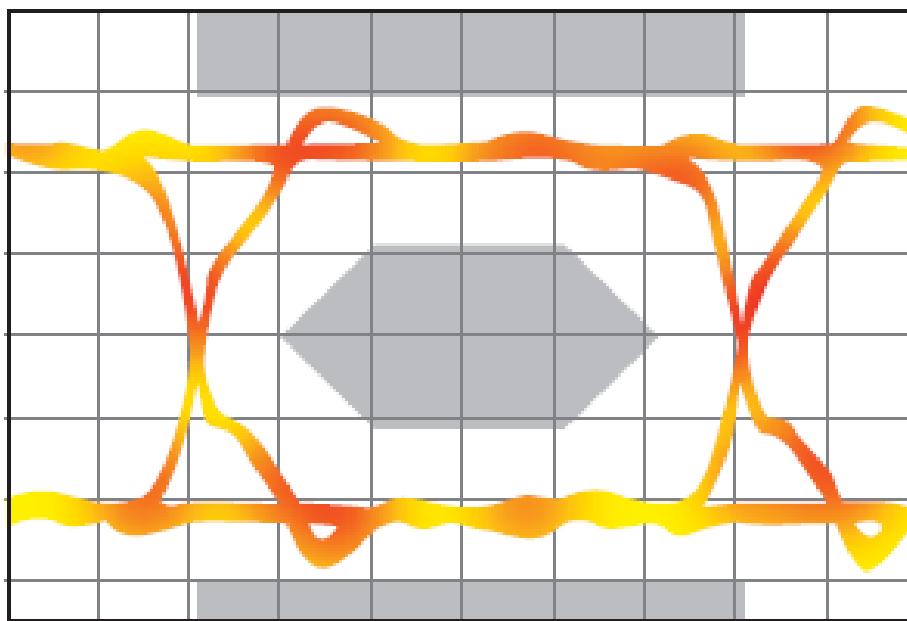


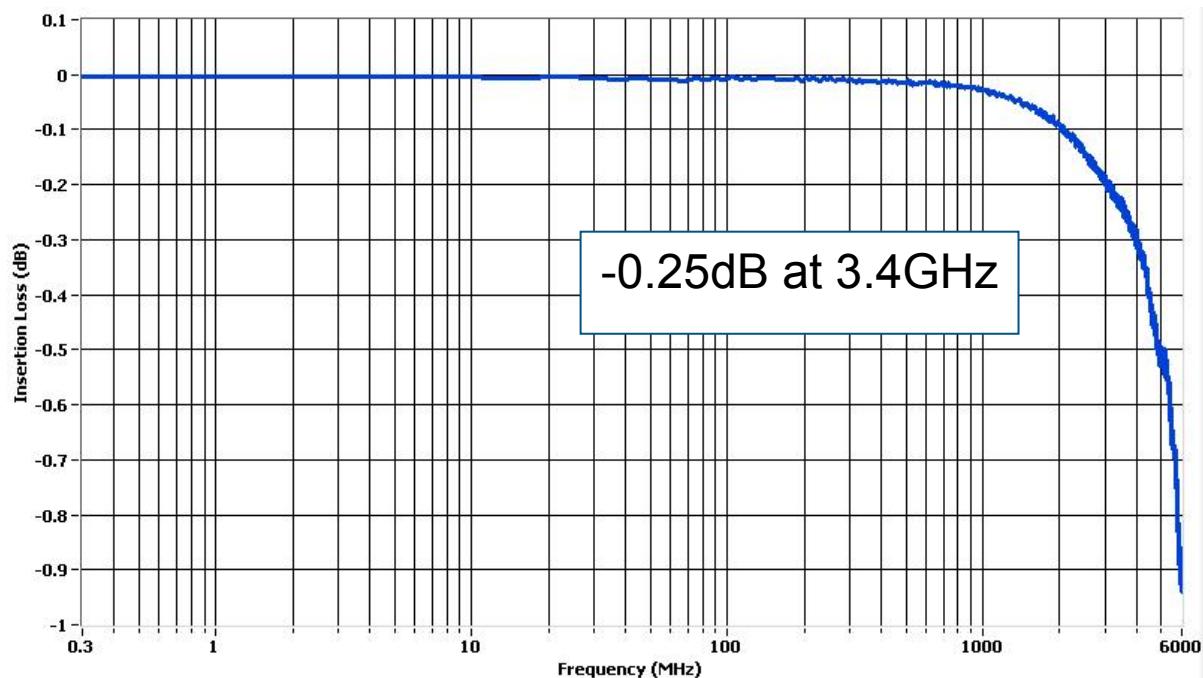
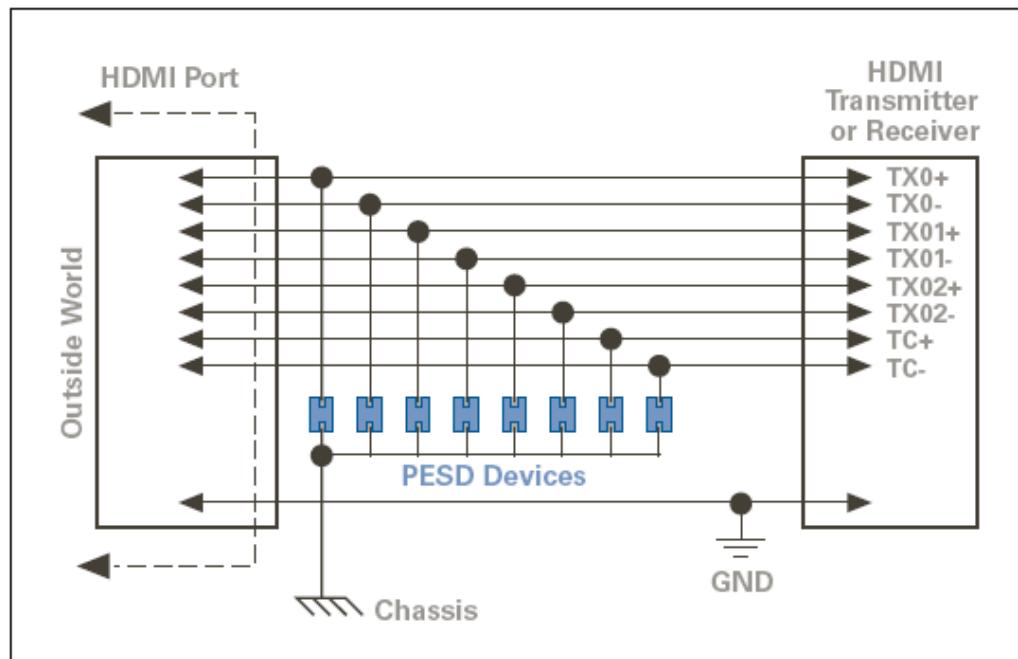
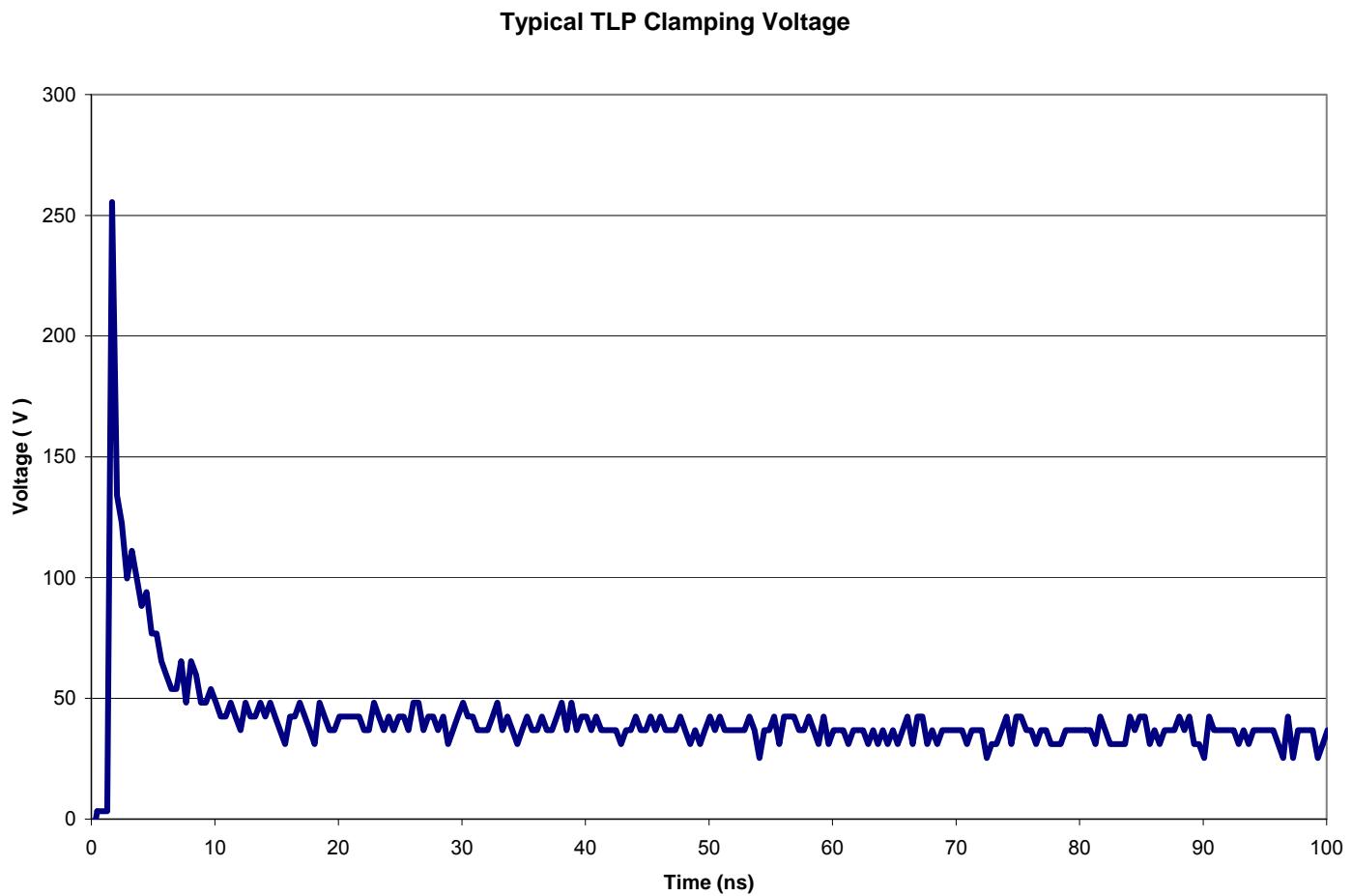
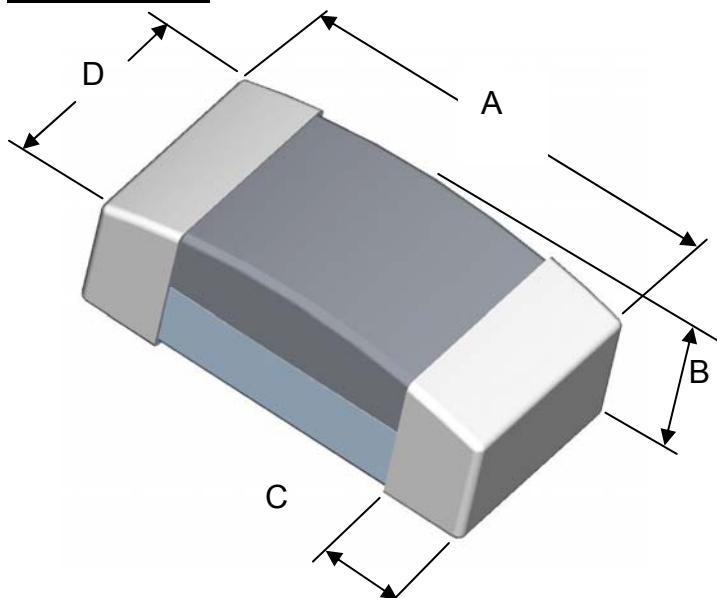
FIG 3: INSERTION LOSS DIAGRAM (TYPICAL SAMPLE) (PESD0603 Minimal Insertion Loss at 3.4 GHz)

FIG 4: ESD PROTECTION FOR HDMI (PESD0603 Reference Layout and Test Results available)


FIG 5:TYPICAL TRANSMISSION LINE PULSE RESPONSE GRAPH



DIMENSIONS


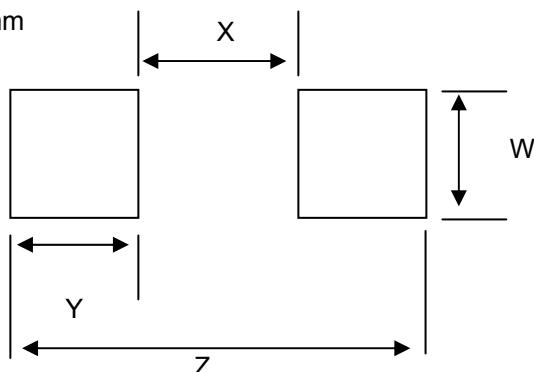
Drawing Not To Scale

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

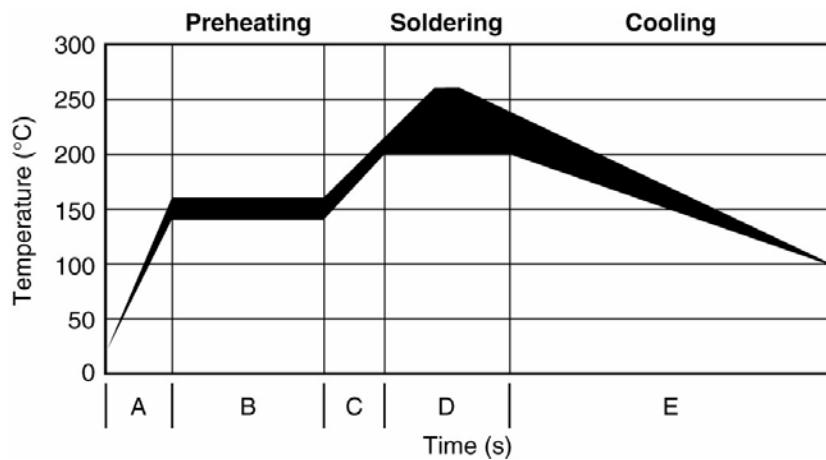


W		X		Y		Z		
Min	Max	Min	Max	Min	Max	Min	Max	
mm	0.90	1.00	0.50	0.60	1.00	1.10	2.70	2.80
in*	(0.035)	(0.039)	(0.020)	(0.024)	(0.039)	(0.043)	(0.106)	(0.110)

* Round off approximation

SOLDER REFLOW RECOMMENDATIONS:

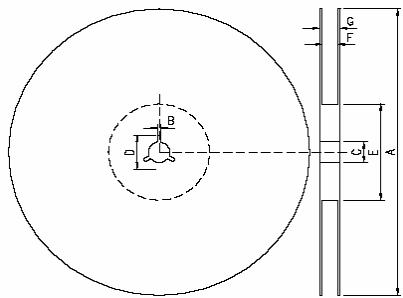
A	Temperature ramp up 1	From ambient to Preheating temperature	30s to 60s
B	Preheating	140°C - 160°C	60s to 120s
C	Temperature ramp up 2	From Preheating to Main heating temperature	20s to 40s
D	Main heating	at 200°C at 220°C at 240°C at 260°C	60s ~ 70s 50s ~ 60s 30s ~ 40s 5s ~ 10s
E	Cooling	From main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



PACKAGING

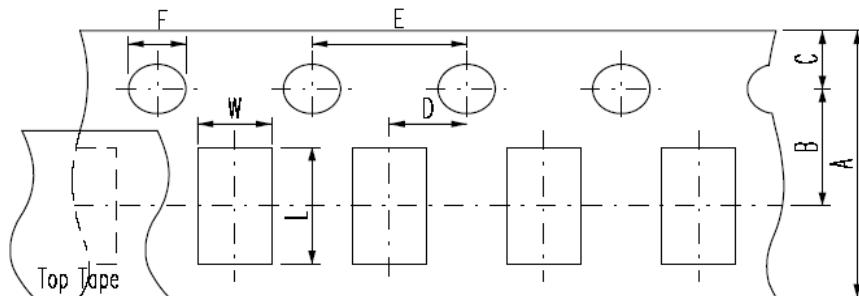
Packaging	Tape & Reel	Standard Box
PESD0603-240	5,000	25,000

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.

Leader & Trailer: The leader is 180mm in length & consists of empty cavities with sealed cover tape.
 The trailer is 350mm in length & consists of empty cavities with sealed cover tape.

POST REFLOW, CLEANING CONDITIONS

A 5% saponifier combined with water during wash.

For the ultrasonic process water temperature should be at 50°C and board should be submerged for a minimum of one minute in the solutions, then rinse and dry.

For in-line washing, the temperature of the water sprayed should be at 45°C, rinse and drying is done in-line.



Warning: Application Limitations for PESD0603-240. This part is not intended to be used on power lines or for power bus applications. Users should independently evaluate the suitability of and test each product selected for their own applications

All information, including illustrations, is believed to be accurate and reliable. Users, however, should independently evaluate the suitability of and test each product selected for their application. Tyco Electronics Corporation and/or its Affiliates in the TE Connectivity Ltd. family of companies ("TE") makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use. TE's only obligations are those in the TE Standard Terms and Conditions of Sale and in no case will TE be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of its products. Specifications are subject to change without notice. In addition, TE reserves the right to make changes to materials or processing that do not affect compliance with any applicable specification without notification to Buyer. Without expressed written consent by an officer of TE, TE does not authorize the use of any of its products as components in nuclear facility applications, aerospace, or in critical life support devices or systems.

HDMI is a trademark of HDMI Licensing LLC

Bluetooth is a trademark of Bluetooth SIG

TE Connectivity (logo), TE Connectivity (logo) and TE (logo) are trademarks