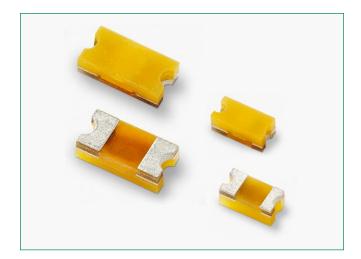
Xtreme-Guard™ ESD Suppressors Surface Mount Polymeric Electrostatic Discharge Suppressors

AXGD1 Series



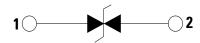






Equivalent Circuits

0402 and 0603 Components



Life Support Note:

Not Intended for Use in Life Support or Life Saving Applications

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

Product Characteristics

Lines Protected	Component Package	Available as Halogen-Free
1	0402	Yes
1	0603	Yes
		Protected Package 1 0402

Description

XTREME-GUARD™ ESD Suppressors protect sensitive electronic equipment against extreme ESD conditions, in very small 0402 and 0603 footprints. This product series is specifically designed to suppress fast-rising ESD transients up to 30kV while adding virtually no capacitance to the circuit, which helps preserve signal integrity and minimize data loss. It is RoHS compliant, halogen free and Pb free ESD Suppressor.

Features

- AEC-Q200 Qualified
- High ESD Rating up to 30kV Contact/Air Discharge
- RoHS compliant, lead-free and halogen-free
- Ultra-low capacitance
- Low leakage current
- Fast response time
- Bi-directional
- Withstands multiple

- ESD strikes
- Compatible with pick-and-place processes
- Available in 1000, 5000, and 10000 piece reels (EIA-RS481)
- High rated voltage up to 32V maximum
- High operating temperature at 125°C

Applications

- Infotainment
- High Speed Interface
- High Frequency (i.e. RF, Antenna System, Ethernet, USB, DVI, LVDS)
- Satellite Navigation
- GPS Tracker
- CarTV
- Telematics Box
- IVN (In Vehicle Navigation)
- Portable Navigation

Electrical Characteristics

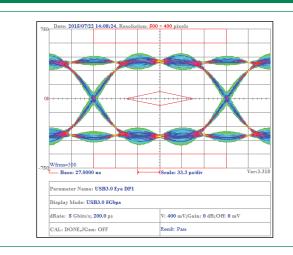
Specification	AXGD10402	AXGD10603	Notes
ESD Capability: IEC 61000-4-2 Contact Discharge (typical) IEC 61000-4-2 Air Discharge (typical)	30kV 30kV	30kV 30kV	The ESD capability measured by direct and air discharge method is subject to testing equipment and conditions. Numerous factors could affect the reliability and reproducibility of the direct and air discharge test results.
Trigger Voltage (typical)	250V	400V	Measured per IEC 61000-4-2
Clamping Voltage (typical)	40V	40V	8kV Direct Discharge Method
Trigger Voltage (typical)	150V	300V	Measured using 500VTLP Direct Discharge Method
Clamping Voltage (typical)	40V	28V	ivieasured using 5000 TEF Direct Discharge iviethod
Rated Voltage (maximum)	24V max	32V max	
Capacitance (typical)	0.04 pF	0.09 pF	Measured at 250MHz
Response Time	<1nS	<1nS	
Leakage Current (typical)	<1nA @24V	<1nA @24V	
ESD Pulse Withstand	1000	1000	Some shifting in characteristics may occur when tested over multiple
LOD Fuise vvitristariu	pulses min	pulses min	pulses at a very rapid rate

Note: Testing performed on Littelfuse test setup as described in Typical Test Setup Section on page 4 of this document.

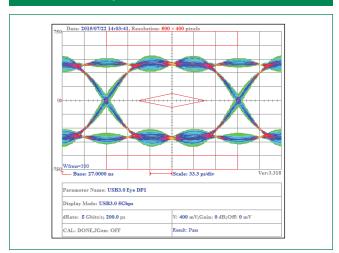
Xtreme-Guard™ ESD SuppressorsSurface Mount Polymeric Electrostatic Discharge Suppressors

Signal Integrity: USB3.0 5Gbps

Without AXGD Component

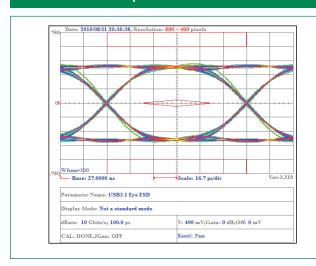


With AXGD Component

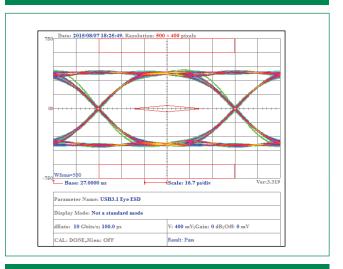


Signal Integrity: USB3.1 10Gbps

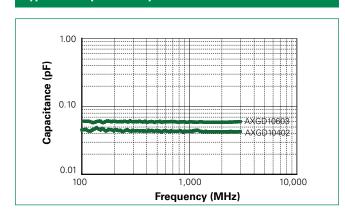
Without AXGD Component



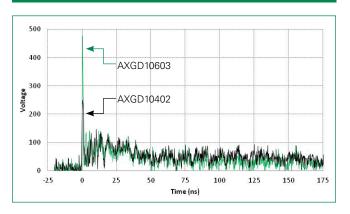
With AXGD Component



Typical Component Capacitance



Typical ESD Response



Xtreme-Guard™ ESD Suppressors Surface Mount Polymeric Electrostatic Discharge Suppressors

Physical Specifications

Materials	Body: Glass Epoxy Terminations: Copper/Nickel/Tin
Solderability	MIL-STD-202, Method 208
Soldering Parameters	Wave solder - 260°C, 10 seconds maximum Reflow solder - 260°C, 30 seconds maximum

Design Consideration

Because of the fast rise-time of the ESD transient, proper placement of XTREME-GUARDTM suppressors are a key design consideration to achieving optimal ESD suppression. The components should be placed on the circuit board as close to the source of the ESD transient as possible. Install XTREME-GUARDTM suppressors (connected from signal/data line to ground) directly behind the connector so that they are the first board-level circuit component encountered by the ESD transient.

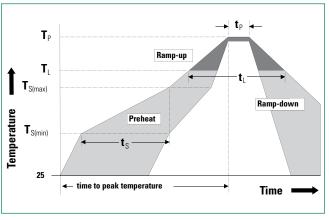
Caution: This device should not be used in Power Bus applications.

Environmental Specifications

AEC-Q200	C-Q200 AEC-Q200 RevD Table 10	
Operating and Storage Temperature	-65°C to +125°C	
Moisture Resistance	0402 and 0603 series: 85°C, 85% RH, 1000 hours 40°C, 95% RH, 1000 hours	
Thermal Shock	MIL-STD-202, Method 107, -65°C to 125°C, 30 min. cycle, 10 cycles	
Vibration	MIL-STD-202, Method 201, (10 to 55 to 10 Hz, 1 min. cycle, 2 hrs each in X-Y-Z)	
Chemical Resistance	MIL-STD-202, Method 215	

Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	-Temperature Min (T _{s(min)})	150°C
	-Temperature Max (T _{s(max)})	200°C
	-Time (min to max) (t _s)	60 – 180 seconds
Average ran	Average ramp up rate (Liquidus Temp (T _L) to peak	
T _{S(max)} to T _L - Ramp-up Rate		3°C/second max
Reflow	-Temperature (T _L) (Liquidus)	217°C
nellow	-Temperature (t _L)	60 – 150 seconds
Peak Temperature (T _P)		260°C
Time within 5°C of actual peak Temperature (t _p)		10 – 30 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T _P)		8 minutes max



Based on IPC/JEDEC J-STD-020

Packaging

Part Number	Quantity & Packaging Code	Quantity	Packaging Option	Packaging Specification
AXGD10402	KR	10000	Tape & Reel (7" reel)	EIA RS-481-1 (IEC 286, part 3)
AXGD10603	MR	1000	Tape & Reel (7" reel)	EIA RS-481-1 (IEC 286, part 3)
AXGD10603	NR	5000	Tape & Reel (7" reel)	EIA RS-481-1 (IEC 286, part 3)

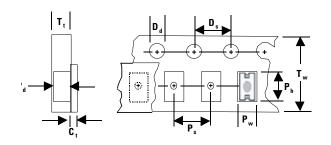


Dimensions 0402 Component 0603 Component Dimensions: mm (inch) Dimensions: mm (inch) **Reference Dimensions: Reference Dimensions:** 1.02 ± 0.05 (0.040" ± 0.002") 1.68 ± 0.08 (0.066" ± 0.003") 0.46 ± 0.05 0.46 ± 0.05 (0.018" ± 0.002") 0.51 ± 0.05 0.84 ± 0.05 (0.020" ± 0.002") 0.23 ± 0.10 (0.009" ± 0.004") 0.43 ± 0.18 (0.017" ± 0.007") Reflow Solder Only Reflow Solder 0.381 (0.015") 1.55 (0.061") 0.51 (0.020")

Tape and Reel Specifications

0.559 (0.022")

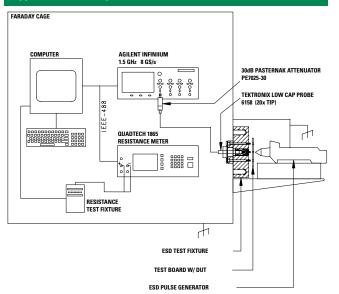
Recommended Pad Layout



Description	0402 Series (mm)	0603 Series (mm)
C _t - Cover tape thickness	0.05	0.05
D _d - Drive hole diameter	1.50	1.50
D _s - Drive hole spacing	4.00	4.00
P _d - Pocket depth	0.56	0.58
P _h - Pocket height	1.14	1.85
P _s - Pocket spacing	2.00	4.00
P _w - Pocket width	0.62	1.02
T _t - Carrier tape thickness	0.65	0.65
T _w - Carrier tape width	8.00	8.00

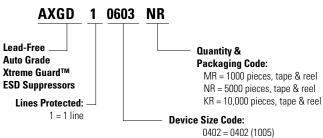
1.27 (0.050")

Typical Test Setup



Part Numbering System

1.27 (0.050"



0603 = 0603 (1608)

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.