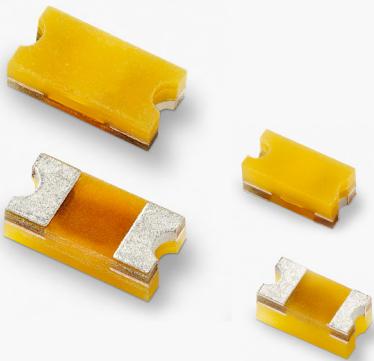


AXGD1 Series



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

| Part Number | Lines Protected | Component Package | Available as Halogen-Free |
|-------------|-----------------|-------------------|---------------------------|
| AXGD10402 | 1 | 0402 | Yes |
| AXGD10603 | 1 | 0603 | Yes |

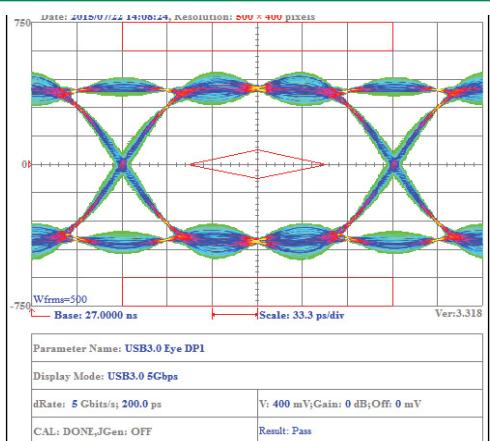
Electrical Characteristics

| 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) Clamping Voltage (typical) | 250V 40V | 400V 40V | Measured per IEC 61000-4-2 8kV Direct Discharge Method |
| Trigger Voltage (typical) Clamping Voltage (typical) | 150V 40V | 300V 28V | Measured using 500V TLP Direct Discharge Method |
| 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 pulses min | 1000 pulses min | Some shifting in characteristics may occur when tested over multiple pulses at a very rapid rate |

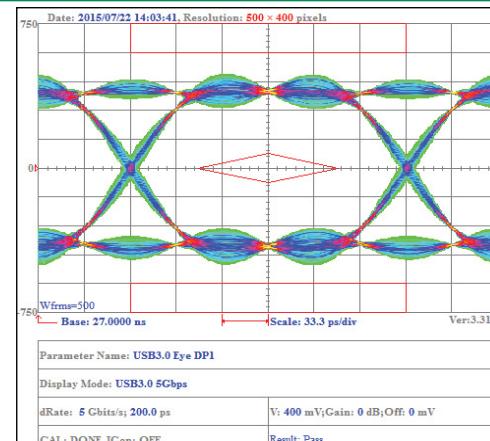
Note: Testing performed on Littelfuse test setup as described in Typical Test Setup Section on page 4 of this document.

Signal Integrity: USB3.0 5Gbps

Without AXGD Component

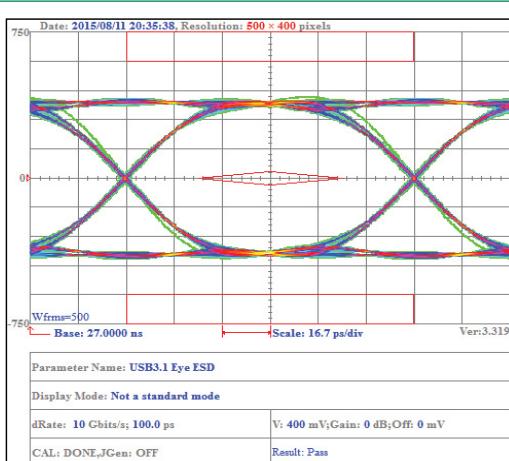


With AXGD Component

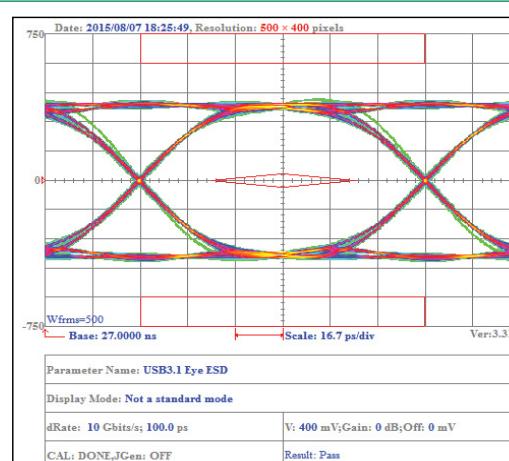


Signal Integrity: USB3.1 10Gbps

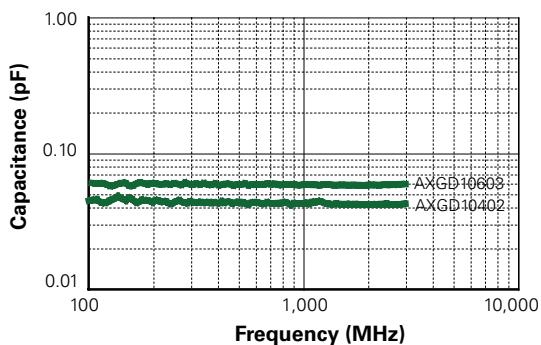
Without AXGD Component



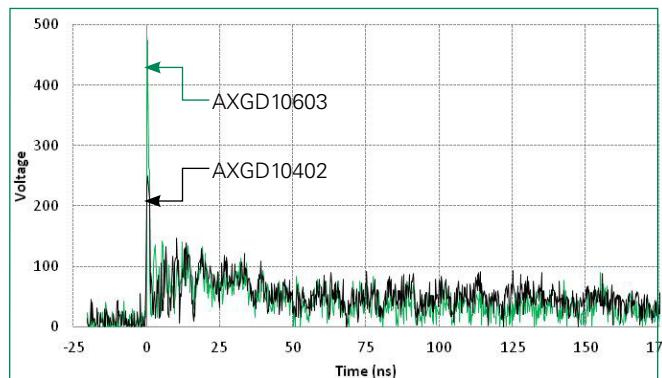
With AXGD Component



Typical Component Capacitance



Typical ESD Response



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-GUARD™ 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-GUARD™ 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.

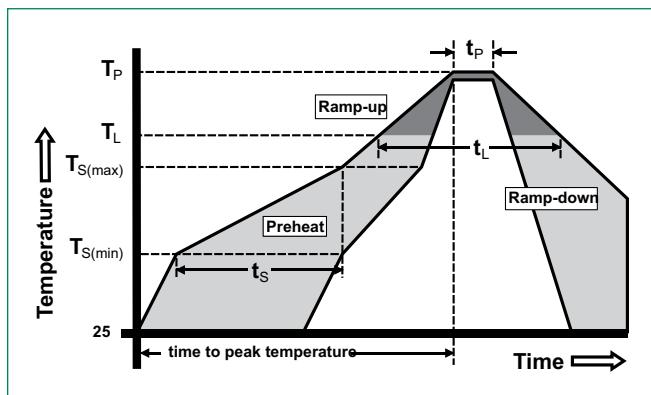
Caution: This device should not be used in Power Bus applications.

Environmental Specifications

| | |
|--|---|
| AEC-Q200 | 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 ramp up rate (Liquidus Temp (T_L) to peak | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | -Temperature (T_L) (Liquidus) | 217°C |
| | -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 |



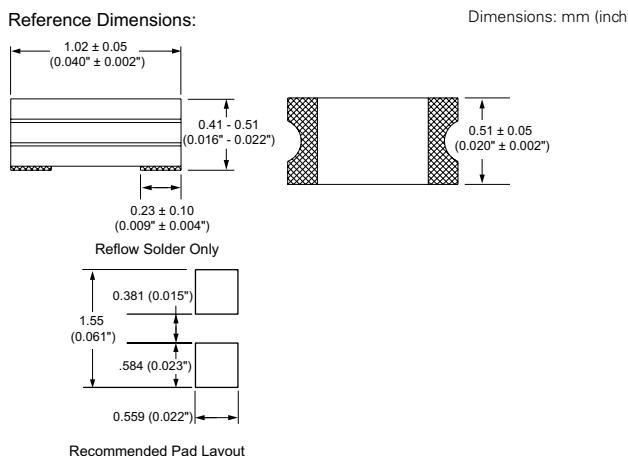
Based on IPC/JEDEC J-STD-020

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) |

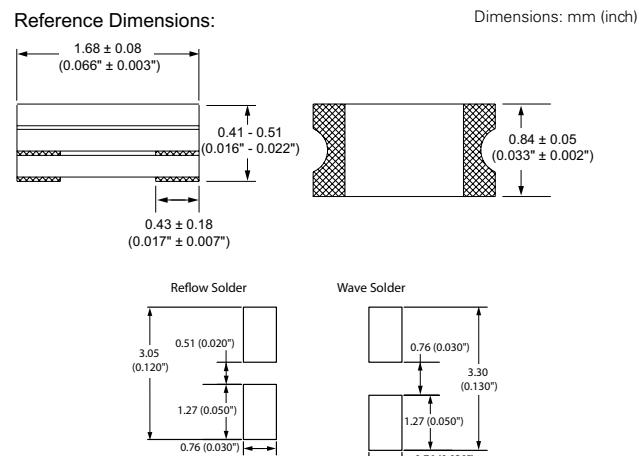
Dimensions

0402 Component

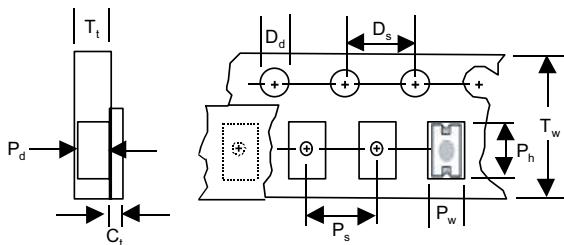


Recommended Pad Layout

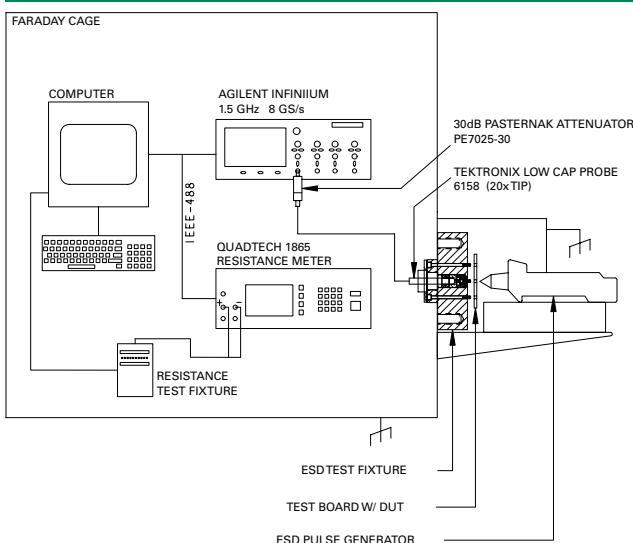
0603 Component



Tape and Reel Specifications



Typical Test Setup



| 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 |

Part Numbering System

AXGD 1 0603 NR

LEAD-FREE
AUTO GRADE
XTREME-GUARD™
ESD SUPPRESSORS
LINES PROTECTED:
1 = 1 line

QUANTITY &
PACKAGING CODE:

MR = 1000 pieces, tape & reel
NR = 5000 pieces, tape & reel
KR = 10,000 pieces, tape & reel

DEVICE SIZE CODE:

0402 = 0402 (1005)
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.