Technical Data
Data Sheet N1867 REV. A

RoHS

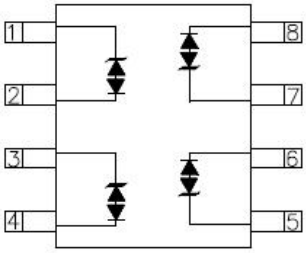
uGuard2804 TVS Arrays

SO-8

Description

The uGuard2804 TVS diode is a low capacitance TVS (Transient Voltage Suppressor) device specifically designed to meet the EOS (Electrical Over-Stress) protection requirements of Gigabit Ethernet interfaces. The uGuard2804 is designed to protect sensitive PHY (physical layer) chips from damage due to EOS events such as electrostatic discharge (ESD), lightning, electrical fast transients (EFT), and cable discharge events (CDE). The uGuard2804 is constructed with a proprietary process that ensures low leakage ("idle") current and low junction capacitance when used in low voltage applications. The device has minimal change in junction capacitance, as a function of bias voltage variations, which facilitates stable operation on GbE lines and interfaces. The uGuard2804 is in an 8-pin SO-8 package with lead-free matte tin lead finish. The combination of low clamping voltage, high surge capability, low "idle" current and low capacitance makes the uGuard2804 an ideal solution for protecting sensitive GbE systems in accordance with the transient protection immunity requirements of GR-1089.

Circuit Diagram



Features

- High ESD withstand Voltage: ±15kV (air), ±8kV (contact) per IEC 61000-4-2
- Multiple surge event capability (1000 events) per IEC 61000-4-2 Level 4
- High peak power capability (120W)
- Flow-through design minimizes parasitic inductance for reduced voltage overshoot
- Protects two line pairs
- Low reverse "idle" current: 30nA typical (VR=2.8V)
- Low variation in capacitance vs. bias voltage: 1.3pF Typical (VR = 0 to 2.8V)
- Low working voltage: 2.8V
- Solid-state silicon design – no inherent wear out mechanism
- Industry standard package footprint

Mechanical Characteristics

- JEDEC SO-8 package
- Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Lead Finish: Matte tin
- Molding compound flammability rating: UL 94V-0
- Marking: Marking code, date code
- Packaging: Tape and Reel

Applications

- 10/100/1000 Ethernet
- Integrated magnetics/RJ-45 connectors
- LAN/WAN Equipment
- User interface
- Integrated Circuit (IC) V_{bus}
- Peripheral power and accessory ports

Ordering Information

Device	Package	Shipping
uGuard2804	SO-8(Pb-Free)	3000pcs / reel

For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.

Technical Data
Data Sheet N1867 REV. A

RoHS

Maximum Ratings @T_A=25°C unless otherwise specified

Parameter	Symbol	Value	Units
Peak Pulse Power (tp = 8/20μs)	P_{pk}	120	W
Peak Pulse Current (tp=8/20μs)	I_{PP}	10	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	+/- 15 +/- 8	KV
Operating Junction Temperature Range	T_J	-40 to + 125	°C
Storage Temperature Range	T_{STG}	-55 to + 150	°C

Electrical Characteristics

Characteristics	Symbol	Condition	Min.	Typ.	Max.	Units
Reverse Breakdown Voltage	V_{BR}	@I_R = 50mA	3.5	-	4.3	V
Reverse Stand-Off Voltage	V_{RWM}	-	-	-	2.8	V
Reverse Leakage Current	I_R	@V_{RWM} = 2.8V	-	0.03	0.05	μA
Clamping Voltage	V_C	@I_{PP} = 1A, tp=8/20μs	-	-	6	V
Clamping Voltage	V_C	@I_{PP} = 10A, tp=8/20μs	-	-	12	V
Variation in capacitance with reverse bias		@V_R = 0 to 2.8V, f_{SIG} = 1MHz Pins 1, 8 to 2, 7 and pins 3, 6 to 4, 5	-	1.3	-	pF
Junction Capacitance	C_j	@V_R = 2.8V, f_{SIG} = 1MHz Pins 1, 8 to 2, 7 and pins 3, 6 to 4, 5	-	3.2	6	pF

* Pulse width < 300 μs, duty cycle < 2%

Ratings and Characteristics Curves

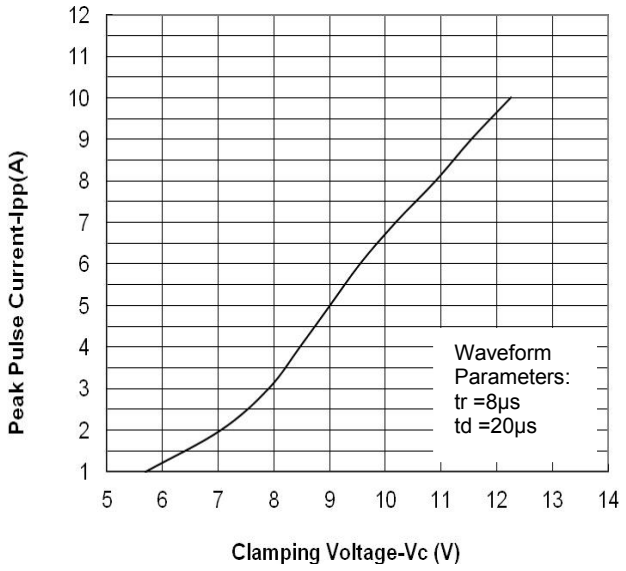


Fig. 1 Typical Clamping Voltage vs. Peak Pulse Current

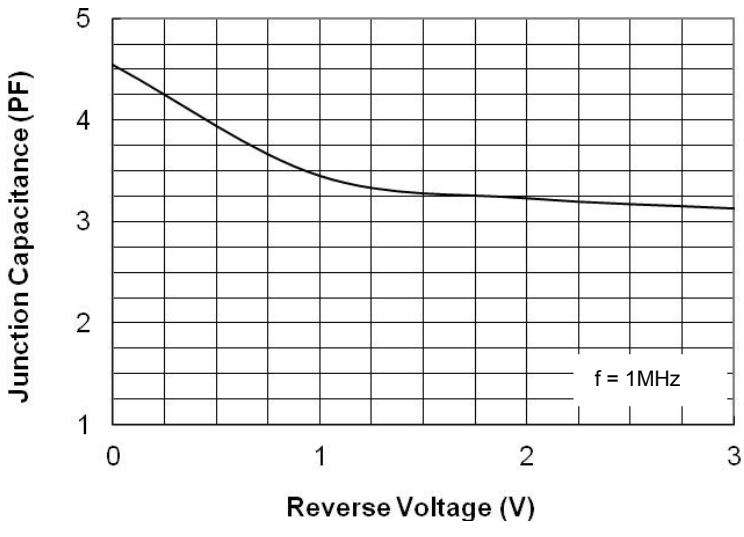


Fig. 2 Junction Capacitance vs. Reverse Voltage

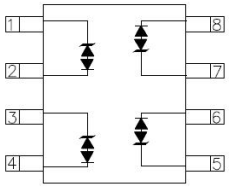
uGuard2804

Technical Data
Data Sheet N1867 REV. A

RoHS

Circuit Diagram

The uGuard2804 is designed to protect four high-speed data lines (two differential pairs) from transient over-voltages which result from lightning and ESD. Data line inputs/outputs are connected at pins 1 and 8, 2 and 7, 3 and 6, and 4 and 5.

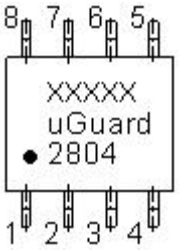


Part Name Information

uGuard 28 04

- 04 = Number of lines: 04=4Data Lines
- 28 = Max Stand-off Voltage: 28=2.8V_{RWM} (Volts)
- uGuard = TVS Arrays Product

Marking Diagram

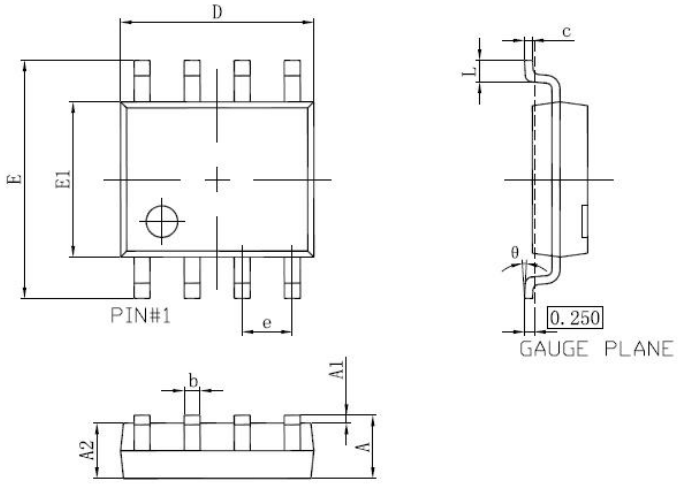


Where XXXXX is YYWWL

Guard2804 = Part Name
YY = Year
WW = Week
L = Lot Number

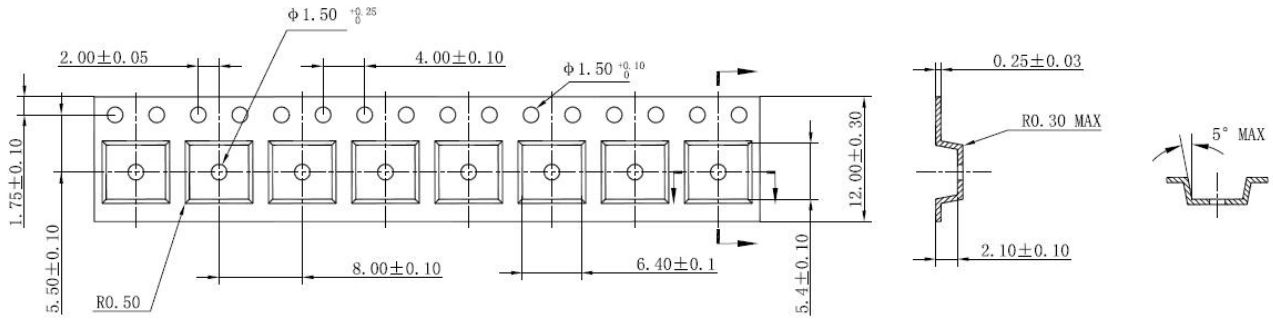
Cautions: Molding resin
Epoxy resin UL:94V-0

Mechanical Dimensions SO-8



SYMBOL	Millimeters		Inches	
	MIN.	MAX.	MIN.	MAX.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.031
θ	0°	8°	0°	8°

Carrier Tape & Reel Specification SO-8



Technical Data
Data Sheet N1867 REV. A

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