BORN SEMICONDUCTOR

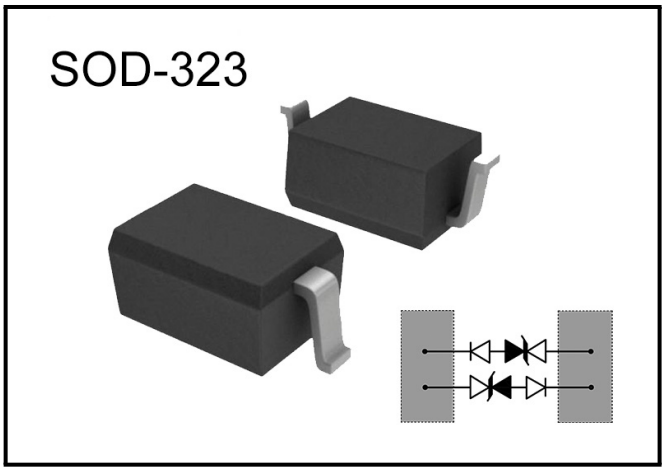
BSP4020-01FTG-C

ESD Protection Diode

Features

- 322Watts peak pulse power (tp = 8/20μs)
- Bidirectional configurations
- Solid-state silicon-avalanche technology
- Low clamping Voltage
- Low leakage current
- Low capacitance (Cj=1.4pF typ.)
- Protection one data/power line
- IEC 61000-4-2 ±30kV contact ; ±30kV air
- 1.2/50μs 12ohm 2kV (GbE PHY side)
- 10/700μs 40ohm 4kV (GbE PHY side)

Package



Applications

- 10/100/1000M Ethernet
- Intergated Magnetics/RJ45Connectors
- LAN/WAN Equipment
- Notebooks, Desktops, and Servers
- Portable Instrumentation

Mechanical Characteristics

- SOD-323 package
- Molding compound flammability rating: UL 94V-0
- Packaging: Tape and Reel
- RoHS/WEEE Compliant

Marking

Ordering information

Order code	Package	Base qty	Delivery mode
BSP4020-01FTG-C	SOD-323	3k	Tape and reel

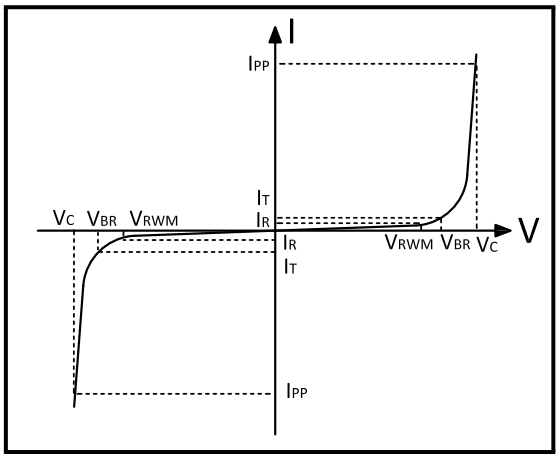
Revision: 2022-Jan-1-A

BSP4020-01FTG-C

ESD Protection Diode

Electrical Parameters (T_A = 25°C unless otherwise noted)

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Peak Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current



Note:8/20us pulse Waveform.

Absolute Maximum Rating

Rating	Symber	Value	Units
Peak Pulse Power (tp =8/20μs)	P_{PP}	322	Watts
Peak Pulse Current (tp =8/20μs)	I_{PP}	14	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	30 30	KV
Lead Soldering Temperature	T_L	260(10seconds)	°C
Junction Temperature	T_J	-55 to + 150	°C
Storage Temperature	T_{stg}	-55 to + 150	°C

Electrical Characteristics

Parameter	Symber	Conditions	Min	Typical	Max	Units
Reverse Stand-Off Voltage	V_{RWM}	–	–	–	3.3	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	4.2	–	–	V
Reverse Leakage Current	I_R	V_{RWM}=3.3V,T=25°C	–	–	0.2	uA
Clamping Voltage	V_C	I_{PP}=7A, tp =8/20us	–	–	13	V
Clamping Voltage	V_C	I_{PP}=14A, tp =8/20us	–	20	23	V
Junction Capacitance	C_j	V_R=0V,T=25°C,f=1MHZ	–	1.4	1.6	pF

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Typical Characteristics

Figure 1: Peak Pulse Power vs. Pulse Time

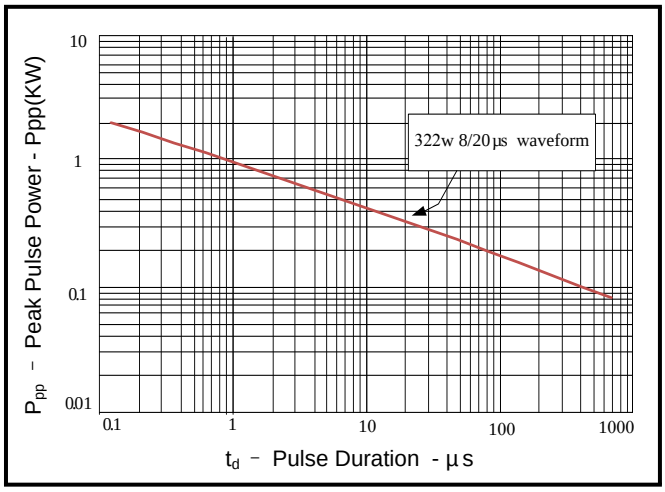


Figure 2: Power Derating Curve

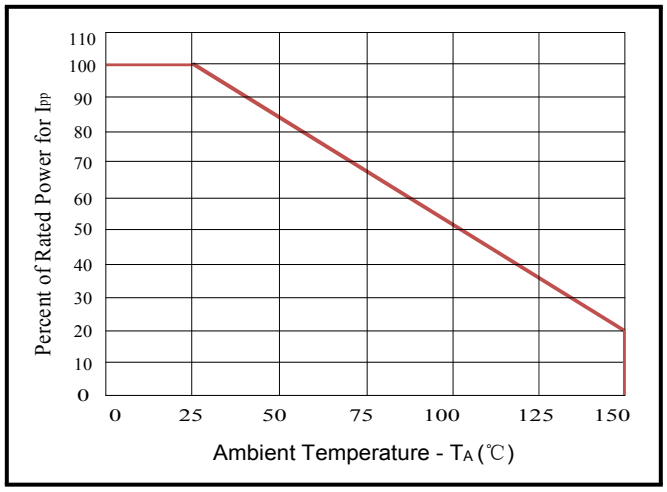


Figure 3: Pulse Waveform

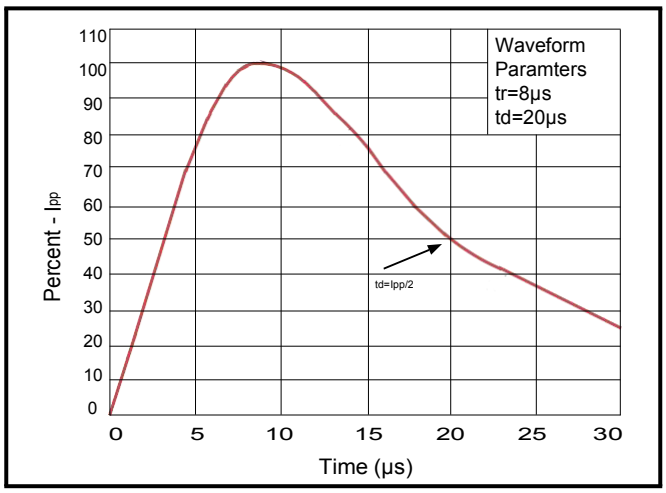
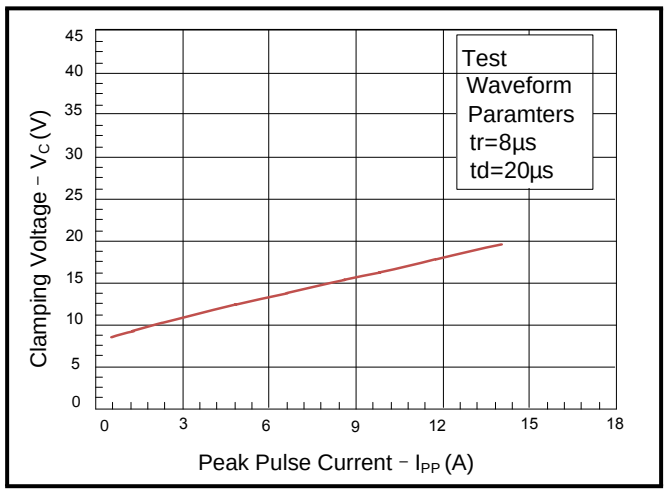


Figure 4: Clamping Voltage vs. I_{PP}



Lightning Surge Test Results for Gigabit Ethernet

During the metallic (line-to-line) surge test, the line being stressed is tied to the surge generator with the remaining lines tied together and connected to the generator ground. Current will flow through the line transformer transferring energy to the PHY side of the transformer. Figure 5 shows the test set-up for measuring the clamping voltage of the device. This set up is designed to test the surge in an actual gigabit Ethernet (GbE) circuit. Two 4.7 Ohm resistors is usedfor decoupling. The clamping voltage of the BSP4020-01FTG-C for a metallic mode 4KV (10/ 700μs) surge.The clamping voltage, measured at less than 13 volts, provides sufficient clamping margin to minimize electrical stress and is well below the failure voltage range of typical GbE PHY chips .

Figure 5: Clamping VoltageTestSet-Up

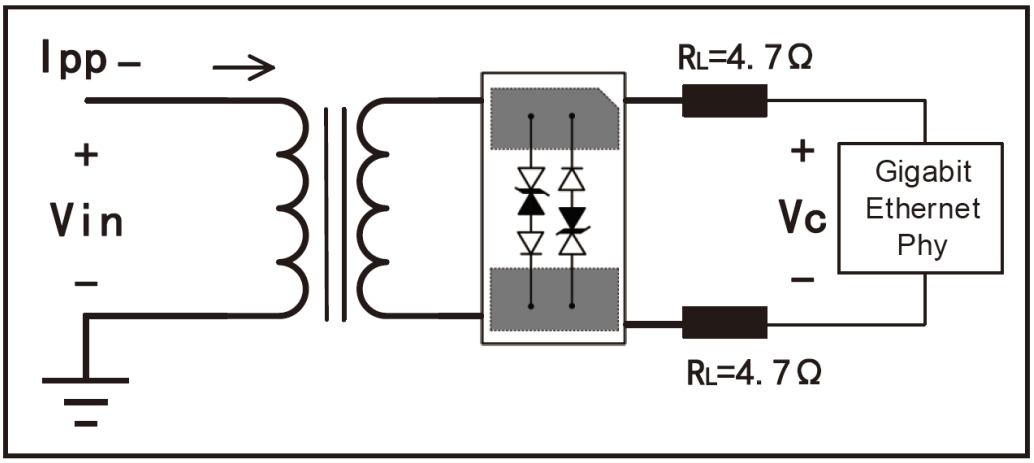
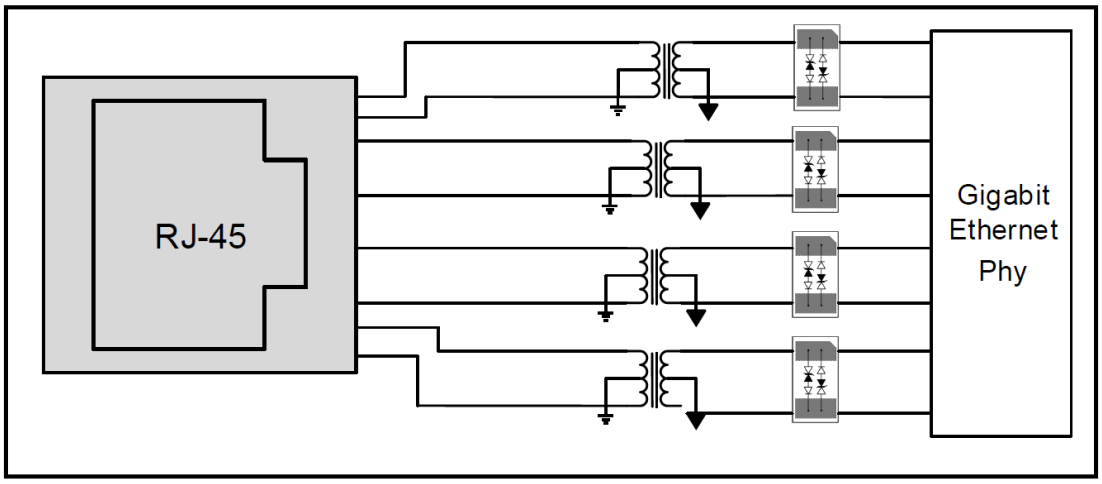


Figure 6: GbE Protection to Lightning, ESD, and CDE



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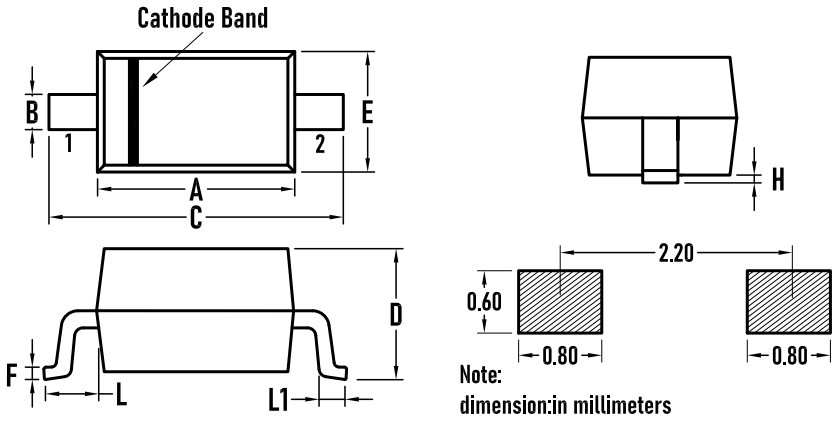
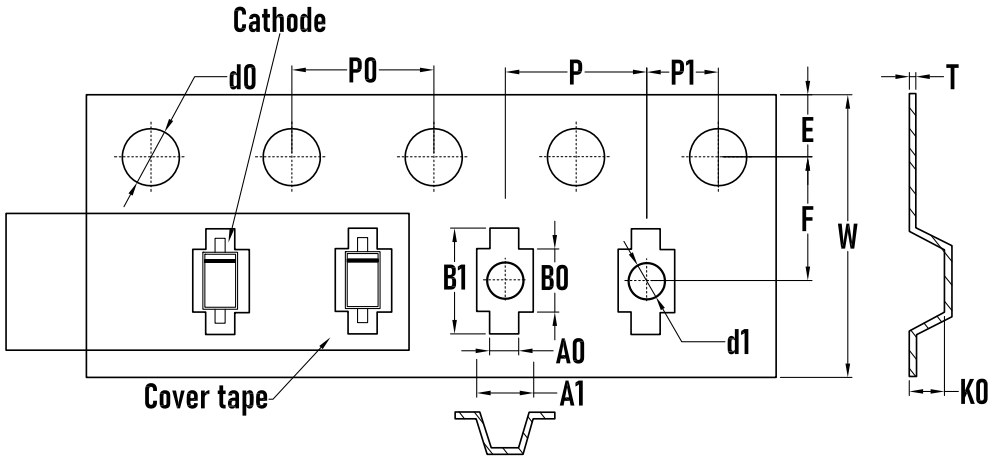
Outline Drawing – SOD-323



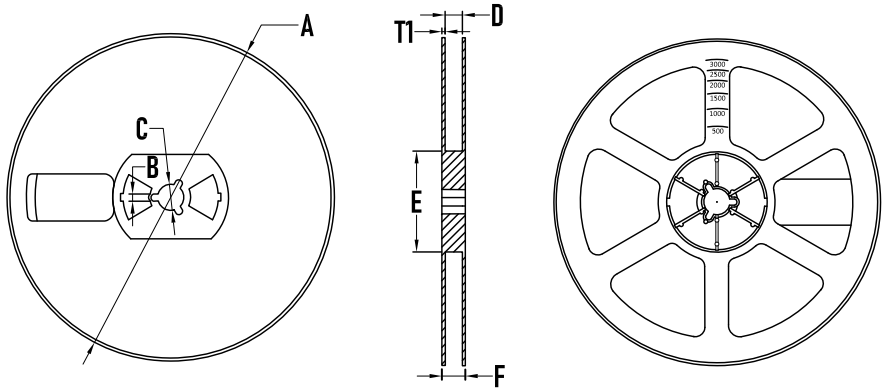
SYMBOL	MILLIMETER		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	1.600	1.800	0.063	0.071
B	0.250	0.350	0.010	0.014
C	2.400	2.800	0.094	0.110
D	–	1.100	–	0.043
E	1.100	1.500	0.043	0.059
F	0.080	0.150	0.003	0.006
L	0.475REF		0.019REF	
L1	0.250	0.400	0.010	0.016
H	0.000	0.100	0.000	0.004

Packaging Tape - SOD-323



SYMBOL	MILLIMETER
A0	0.80±0.10
A1	1.48±0.10
B0	1.80±0.10
B1	3.00±0.10
d0	1.55±0.10
d1	1.00±0.05
E	1.75±0.10
F	3.50±0.10
K0	1.05±0.10
P	4.00±0.10
P0	4.00±0.10
P1	2.00±0.10
W	8.00±0.30
T	0.25 ±0.05

Packaging Reel



SYMBOL	MILLIMETER
A	177.8±0.2
B	2.7±0.2
C	13.5±0.2
D	9.6±0.3
E	54.5±0.2
F	12.3±0.3
T1	1.0±0.2
Quantity	3000PCS