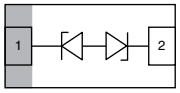
Single-Line Bidirectional ESD-Protection Diode in DFN1006-2B



MARKING (example only)

Bar = pin 1 marking
X = date code
YY = type code (see table below)

LINKS TO ADDITIONAL RESOURCES

3D Models

SPICE Models

FEATURES

- Compact DFN1006-2B package
- Low package height < 0.5 mm
- 1-line bidirectional ESD-protection
- AEC-Q101 qualified available
- OPEN Alliance 100Base-T1 and 1000Base-T1 compliant
- Working range ± 24 V
- Trigger voltage >100 V
- Capacitance < 2 pF
- ESD immunity acc. ISO 10605 and IEC 61000-4-2 (150 pF/330 Ω) ±15 kV (1000 x contact discharge)
- Lead plating: Sn (e3)
  - Including wettable side walls (flanks)
  - Soldering can be checked by standard vision inspection
  - AOI = automated optical inspection
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

ORDERING INFORMATION

PART NUMBER (EXAMPLE)	ENVIRONMENTAL AND QUALITY CODE			REV.	PACKAGING CODE	ORDERING CODE (EXAMPLE)
	AEC-Q101 QUALIFIED	RoHS-COMPLIANT + LEAD (Pb)-FREE TERMINATIONS GREEN	TIN PLATED		10K PER 7" REEL (8 mm TAPE) 10K = MOQ	
VETH100A1DD1	-	G	3	-	08	VETH100A1DD1-G3-08
VETH100A1DD1	H	G	3	-	08	VETH100A1DD1HG3-08

PACKAGE DATA

DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VETH100A1DD1	DFN1006-2B	2S	0.83 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
ESD immunity	Contact discharge acc. ISO 10605 and IEC 61000-4-2 (150 pF/330 Ω); 1000 pulses	V_{ESD}	15	kV
Operating temperature	Junction temperature	T_J	-55 to +150	°C
Storage temperature		T_{stg}	-55 to +150	°C

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITIONS / REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Stand off voltage	Max. working voltage	V_{RWM}	-	-	24	V
Leakage current	At V_R = 24 V	I_R	-	0.001	0.1	µA
Trigger voltage	Transmission line pulse (TLP) = 100 ns; I_{TLP} = 1 A	V_T	100	-	-	V
Clamping voltage	At I_{TLP} = 1 A, t_p = 100 ns (TLP)	V_C	26	31	-	V
	At I_{TLP} = 10 A, t_p = 100 ns (TLP)	V_C	-	34	-	V
Dynamic resistance	t_p = 100 ns (TLP)	r_{dyn}	-	0.4	-	Ω
Capacitance	At V_R = 0 V; f = 1 MHz; V_{AC} ±10 mV	C_D	-	1.7	2.0	pF
	At V_R = 0 V; f = 1 MHz; V_{AC} ±1 V	C_D	-	1.4	-	pF

For technical questions, contact: ESDprotection@vishay.com

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TECHNICAL NOTE

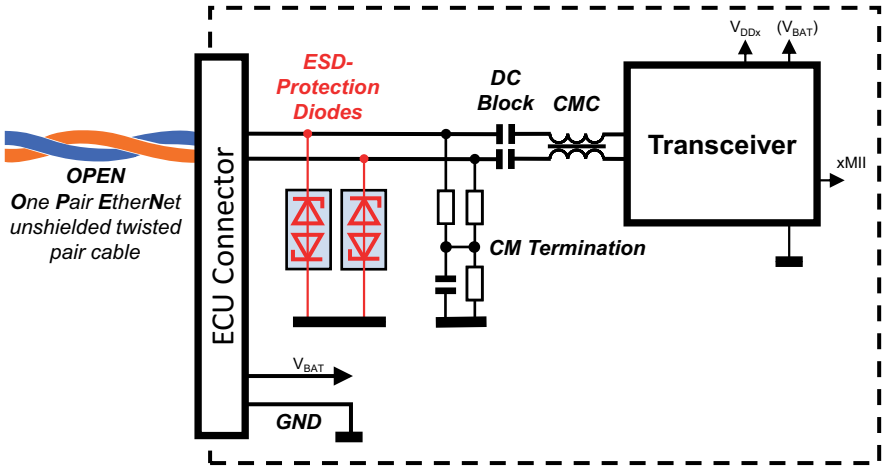
The ESD protection diode VETH100A1DD1 is a one line, bidirectional ESD-protection diode made for Automotive EtherNet which meets the OPEN Alliance specifications IEEE 100BASE-T1 EMC Test Specification for Suppression Devices and IEEE 1000BASE-T1 EMC Test Specification for Suppression Devices.

The OPEN Alliance specifications specify various tests with the ESD protection diode mounted on test boards simulating the real environment in Automotive Ethernet application.

The test reports include the device classification according to related test specification such as:

- Mixed mode S-parameter measurement
- Damage from ESD
- ESD discharge current measurement and
- Unwanted clamping effect at RF immunity tests

The test reports are available on request (mail to: ESDprotection@vishay.com)



Connected between data line and ground the VETH100A1DD1 blocks voltages between -100 V and +100 V with low leakage current. Such high voltages can be induced in the unshielded twisted One Pair EtherNet (OPEN) cables by electromagnetic fields from anywhere in and around the vehicle where the in-vehicle-network is installed.

It needs a trigger voltage V_T above 100 V to trigger the voltage snap-back of the ESD-protection diode. In its snap-back state, the VETH100A1DD1 effectively clamps ESD pulses down to around 30 V (at I_{TLP} = 1 A). Additionally with this low dynamic resistance r_{dyn} the clamping voltage is only slightly depending on the current flowing through the diode to ground.

The very low capacitance C_D makes the VETH100A1DD1 invisible for the data signals, so that the data rate on the Automotive EtherNet network will not be affected.

ORDERING INFORMATION TABLE

Device code

V	ETH	100	A	1	DD1
1	2	3	4	5	6

- 1 - **V = V**ishay
- 2 - **ETH = ETH**ernet
- 3 - **100 =** Blocking voltage **100** V
- 4 - **A** = Version number
- 5 - **1 = 1**-line protection
- 6 - **DD1 =** DFN1006-2B package

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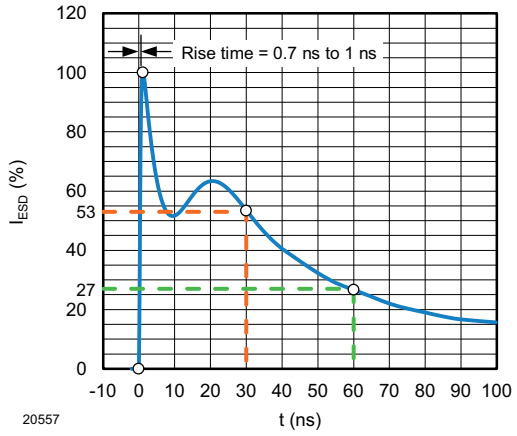

Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω / 150 pF)

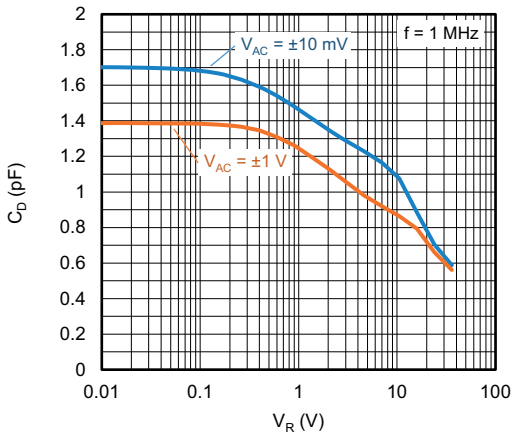

Fig. 2 - Typical Capacitance vs. Reverse Voltage

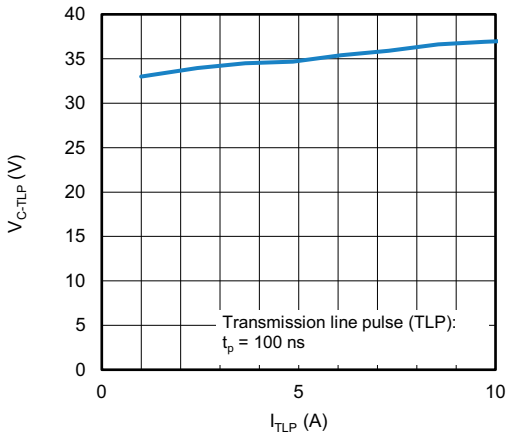

Fig. 3 - Typical Clamping Voltage vs. Peak Pulse Current

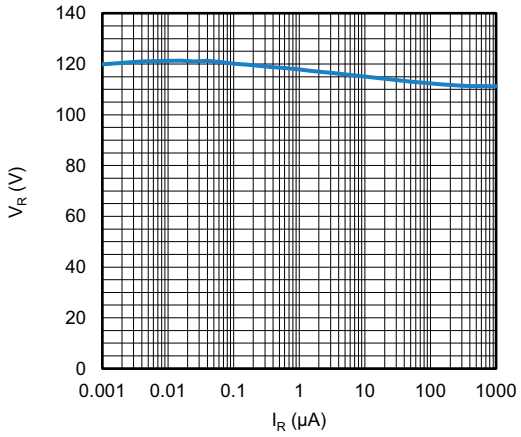

Fig. 4 - Typical Reverse Voltage vs. Reverse Current

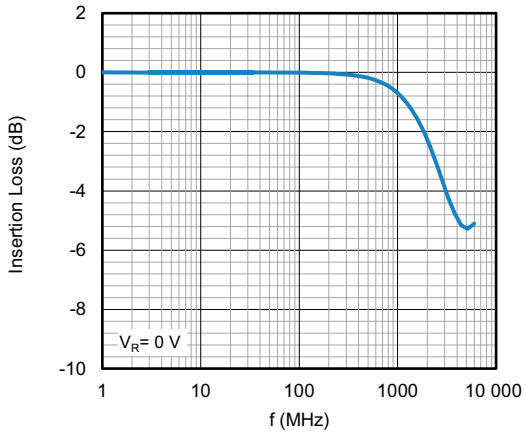

Fig. 5 - Typical Insertion Loss in a 50 Ω - System

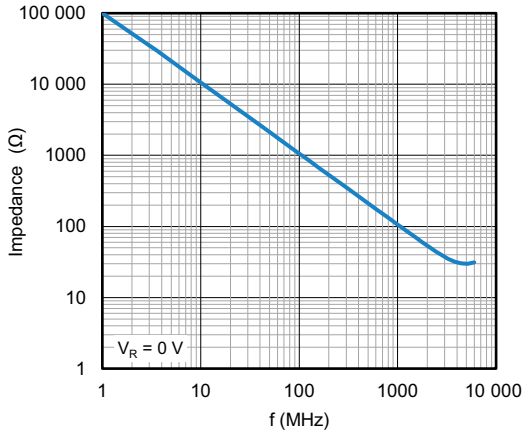

Fig. 6 - Typical Device Impedance vs. Frequency

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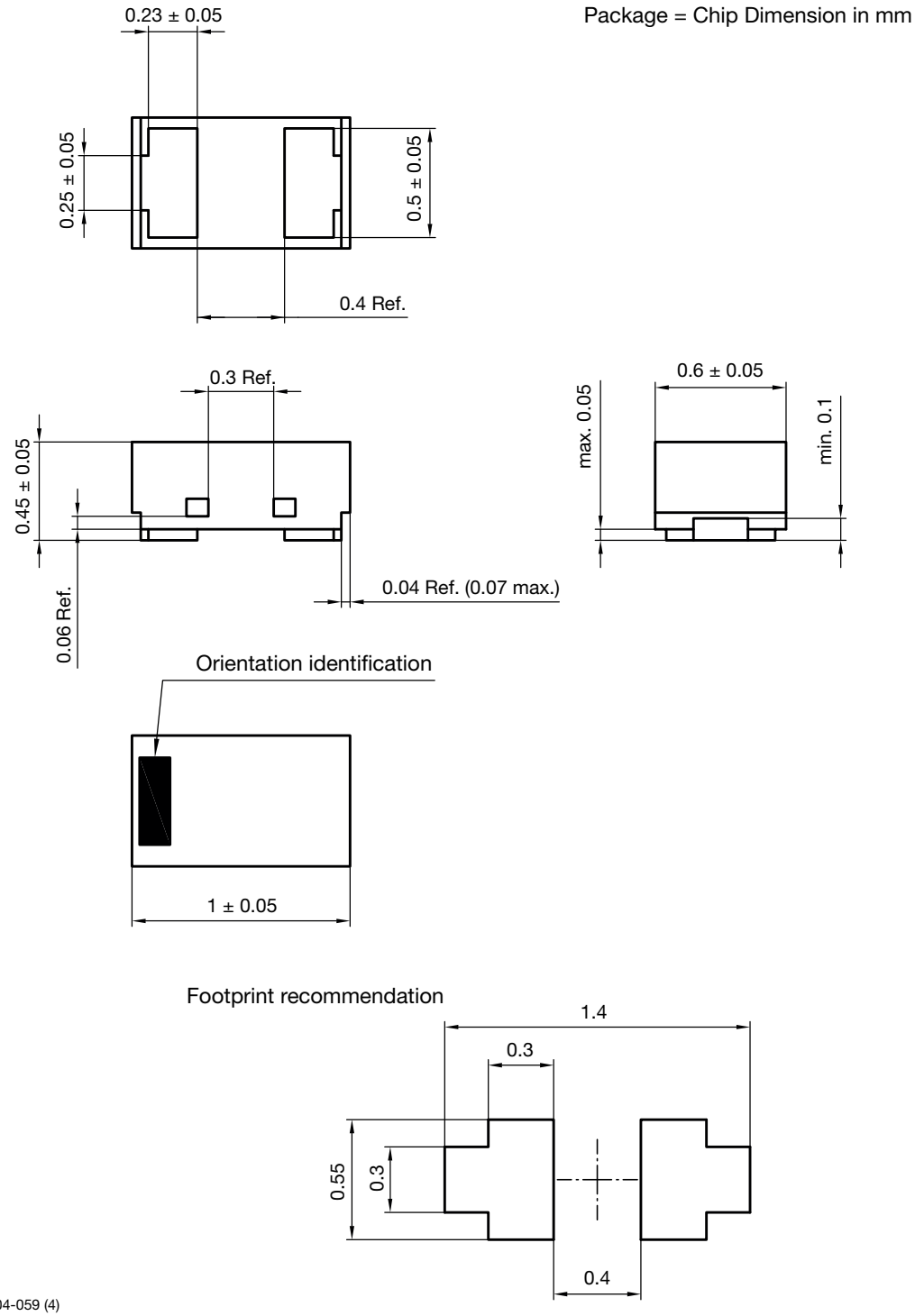
PACKAGE DIMENSIONS in millimeters (inches): **DFN1006-2B**



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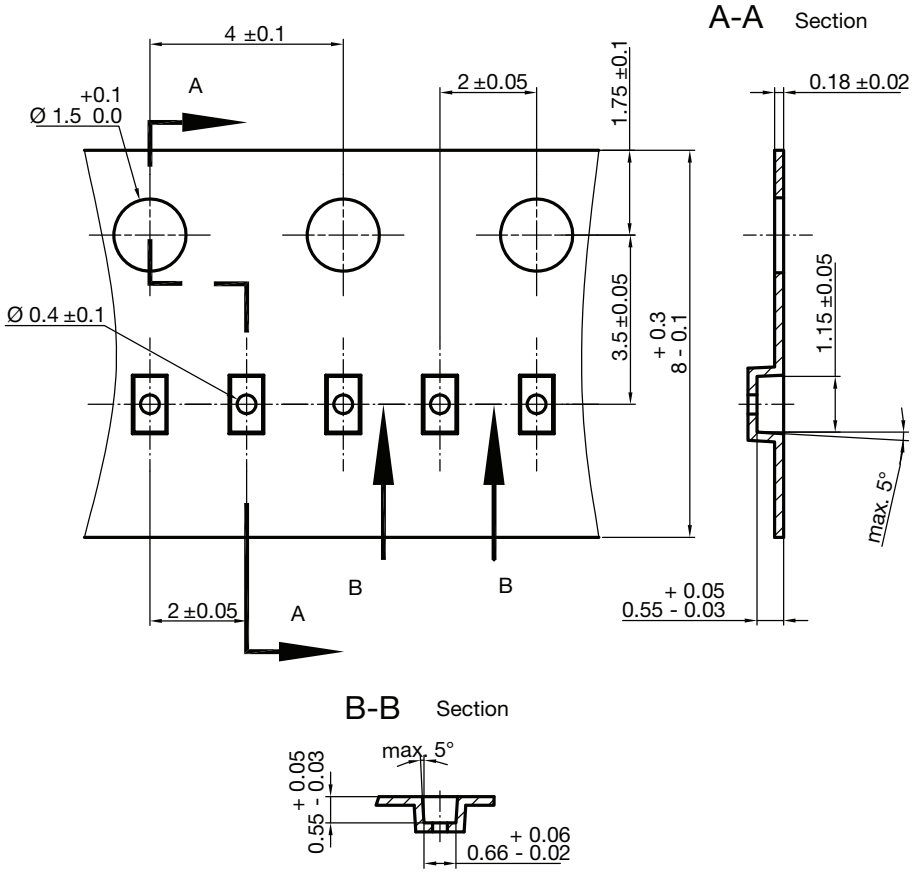
CARRIER TAPE DFN1006-2B



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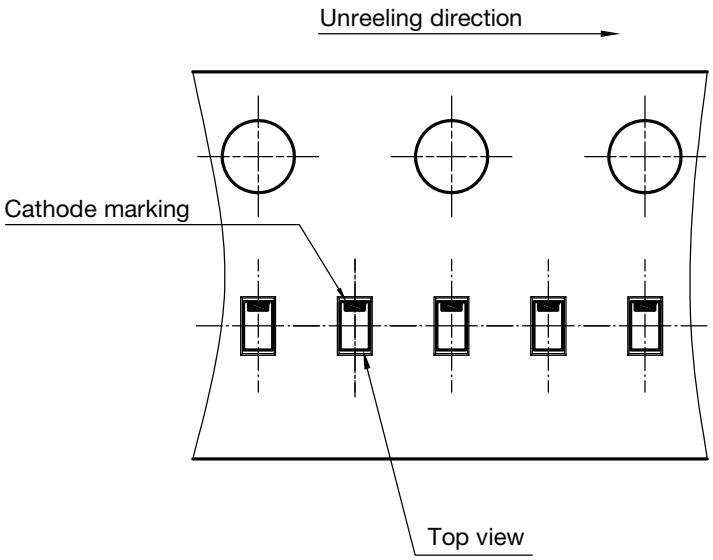
created 28.10.2019

surface resistance: 10^5 - 10^{11} $\frac{\text{OHMS}}{\text{SQ}}$
Cummulative tolerances of 10 sprocket holes is ± 0.2 mm

ORIENTATION IN CARRIER TAPE DFN1006-2B



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