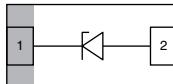


Single-Line Unidirectional ESD-Protection Diode in DFN1006-2A



MARKING (example only)



Bar = pin 1 marking

X = date code

YY = type code (see table below)

FEATURES

- Compact DFN1006-2A package
- Low package height < 0.5 mm
- 1-line unidirectional ESD-protection
- AEC-Q101 qualified available
- Working range 14 V; 28 V
- ESD immunity acc. IEC 61000-4-2
±15 kV to ±30 kV contact discharge
±15 kV to ±30 kV air discharge
- Lead plating: Sn (e3)
- 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



RoHS
COMPLIANT
HALOGEN FREE
GREEN
(5-2008)

LINKS TO ADDITIONAL RESOURCES



Soldering Recommendations for DFN Packages:

please see Application Note: www.vishay.com/doc?86198

ORDERING INFORMATION

PART NUMBER (EXAMPLE)	AEC-Q101 QUALIFIED	ENVIRONMENTAL AND QUALITY CODE			ORDERING CODE (EXAMPLE)	
		RoHS COMPLIANT + LEAD (Pb)-FREE TERMINATIONS		TIN PLATED		
		GREEN	10K PER 7" REEL (8 mm TAPE)			
VMMBZ16C1HD1	-	G	3	-08	VMMBZ16C1HD1-G3-08	
VMMBZ16C1HD1	H	G	3	-08	VMMBZ16C1HD1HG3-08	

PACKAGE DATA

DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VMMBZ16C1HD1	DFN1006-2A	2X	0.83 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C
VMMBZ33C1HD1	DFN1006-2A	2L	0.83 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C

ABSOLUTE MAXIMUM RATINGS VMMBZ16C1HD1
 $(T_{amb} = 25 \text{ }^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Acc. IEC 61000-4-5, 8/20 μs /single shot	I_{PPM}	4	A
Peak pulse power	Acc. IEC 61000-4-5, 8/20 μs /single shot ⁽¹⁾	P_{PP}	108	W
Peak pulse current	$t_p = 10/1000 \mu\text{s}$ ⁽¹⁾	I_{PPM}	0.7	A
Peak pulse power	$t_p = 10/1000 \mu\text{s}$ ⁽¹⁾	P_{PP}	16	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses ⁽¹⁾	V_{ESD}	30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses ⁽¹⁾		30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature		T_{stg}	-55 to +150	$^{\circ}\text{C}$

Note
⁽¹⁾ Guaranteed by design; tested during device characterization

ABSOLUTE MAXIMUM RATINGS VMMBZ33C1HD1
 $(T_{amb} = 25 \text{ }^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Acc. IEC 61000-4-5, 8/20 μs /single shot	I_{PPM}	1.7	A
Peak pulse power	Acc. IEC 61000-4-5, 8/20 μs /single shot ⁽¹⁾	P_{PP}	100	W
Peak pulse current	$t_p = 10/1000 \mu\text{s}$ ⁽¹⁾	I_{PPM}	0.3	A
Peak pulse power	$t_p = 10/1000 \mu\text{s}$ ⁽¹⁾	P_{PP}	15	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses ⁽¹⁾	V_{ESD}	15	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses ⁽¹⁾		15	kV
Operating temperature	Junction temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature		T_{stg}	-55 to +150	$^{\circ}\text{C}$

Note
⁽¹⁾ Guaranteed by design; tested during device characterization

ELECTRICAL CHARACTERISTICS VMMBZ16C1HD1
 $(T_{amb} = 25 \text{ }^{\circ}\text{C}$, 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
Reverse stand off voltage	Max. reverse working voltage	V_{RWM}	-	-	14	V
Reverse voltage	At $I_R = 10 \text{ nA}$	V_R	14	-	-	V
Reverse current	At $V_R = 14 \text{ V}$	I_R	-	< 1	10	nA
	At $V_R = 14 \text{ V}$; $T_J = 150 \text{ }^{\circ}\text{C}$ ⁽¹⁾		-	0.06	10	μA
Reverse breakdown voltage	At $I_R = 1 \text{ mA}$	V_{BR}	15.2	16	16.8	V
	At $I_R = 1 \text{ mA}$; $T_J = -40 \text{ }^{\circ}\text{C}$ to $+150 \text{ }^{\circ}\text{C}$ ⁽¹⁾		14.3	-	19.0	V
Reverse clamping voltage	At $I_{PP} = I_{PPM} = 4 \text{ A}$, $t_p = 8/20 \mu\text{s}$	V_C	19	23	27	V
	$t_p = 100 \text{ ns}$ (TLP); $I_{TLP} = 16 \text{ A}$ ⁽¹⁾	V_{C_TLP}	-	24	-	V
Dynamic resistance	$t_p = 100 \text{ ns}$ (TLP) ⁽¹⁾	r_{dyn}	-	0.48	-	Ω
Capacitance	At $V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$	C_D	24.6	29	33.4	pF

Note
⁽¹⁾ Guaranteed by design; tested during device characterization

ELECTRICAL CHARACTERISTICS VMMBZ33C1HD1
 $(T_{amb} = 25 \text{ }^{\circ}\text{C}$, 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
Reverse stand off voltage	Max. reverse working voltage	V_{RWM}	-	-	28	V
Reverse voltage	At $I_R = 10 \text{ nA}$	V_R	28	-	-	V
Reverse current	At $V_R = 28 \text{ V}$	I_R	-	< 1	10	nA
	At $V_R = 28 \text{ V}; T_J = 150 \text{ }^{\circ}\text{C}$ ⁽¹⁾		-	0.1	10	μA
	At $I_R = 1 \text{ mA}$		31.3	33	34.7	V
Reverse breakdown voltage	At $I_R = 1 \text{ mA}; T_J = -40 \text{ }^{\circ}\text{C} \text{ to } +150 \text{ }^{\circ}\text{C}$ ⁽¹⁾	V_{BR}	29	-	39	V
	At $I_{PP} = I_{PPM} = 1.7 \text{ A}, t_p = 8/20 \mu\text{s}$		V_C			V
Reverse clamping voltage	$t_p = 100 \text{ ns (TLP)}; I_{TLP} = 16 \text{ A}$ ⁽¹⁾	V_{C_TLP}	-	85	-	V
	At $I_{PP} = I_{PPM} = 1.7 \text{ A}, t_p = 8/20 \mu\text{s}$		r_{dyn}	-	0.34	Ω
Capacitance	At $V_R = 0 \text{ V}; f = 1 \text{ MHz}$	C_D	13.6	16.1	18.6	pF

Note
⁽¹⁾ Guaranteed by design; tested during device characterization

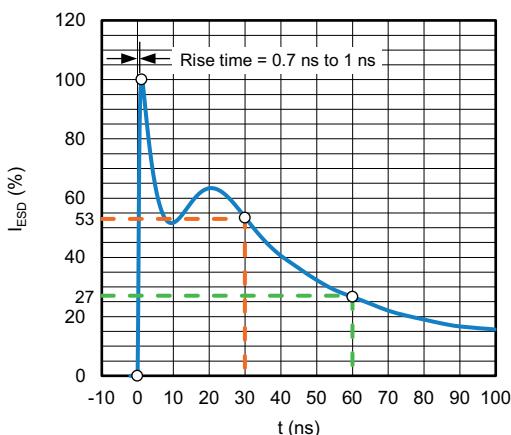
TYPICAL CHARACTERISTICS ($T_{amb} = 25 \text{ }^{\circ}\text{C}$, unless otherwise specified)


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

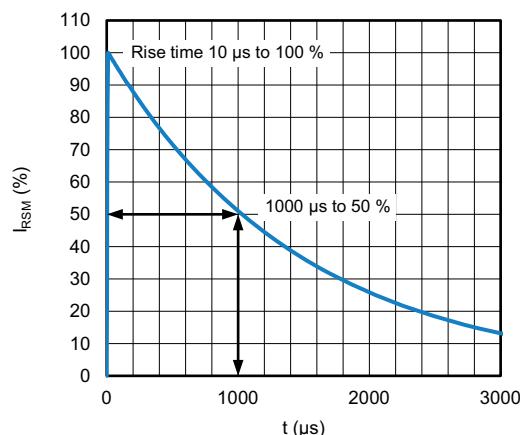


Fig. 3 - 10/1000 μ s Peak Pulse Current Wave Form

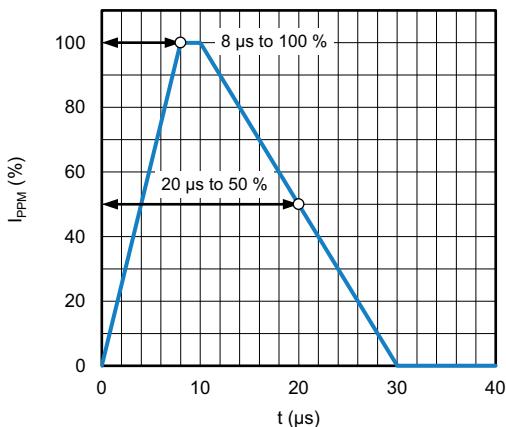


Fig. 2 - 8/20 μ s Peak Pulse Current Wave Form
According to IEC 61000-4-5

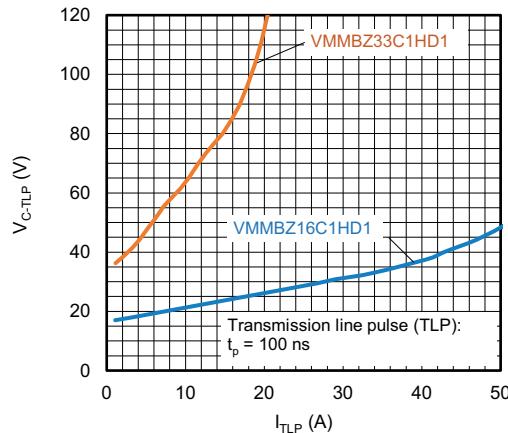


Fig. 4 - Typical Clamping Voltage vs. Peak Pulse Current

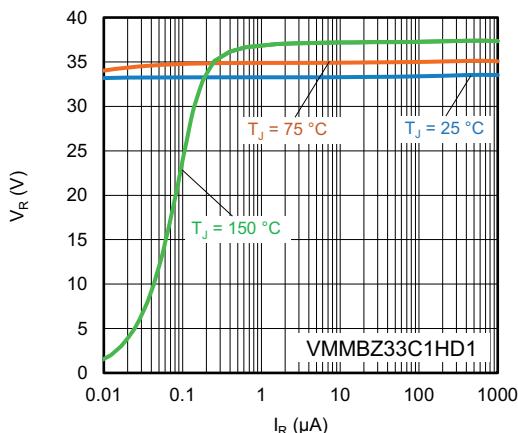


Fig. 5 - Typical Reverse Voltage vs. Reverse Current

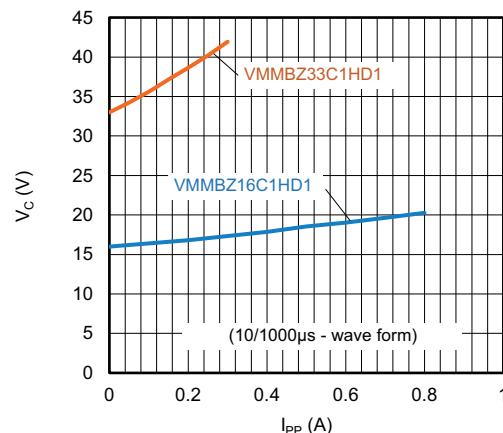


Fig. 8 - Typical Peak Clamping Voltage vs. Peak Pulse Current

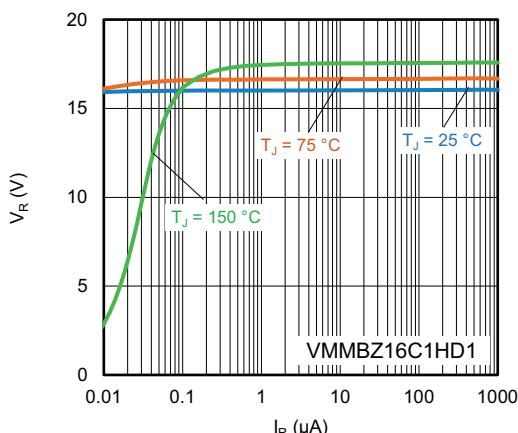


Fig. 6 - Typical Reverse Voltage vs. Reverse Current

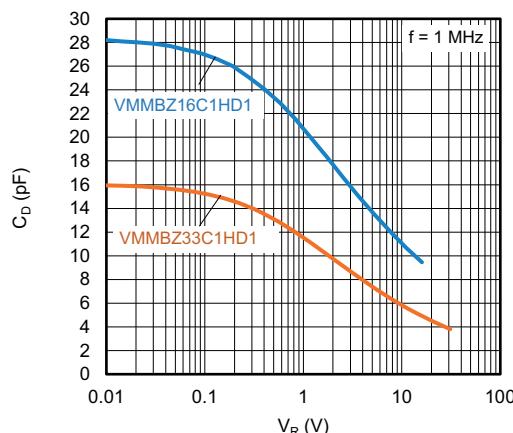


Fig. 9 - Typical Capacitance vs. Reverse Voltage

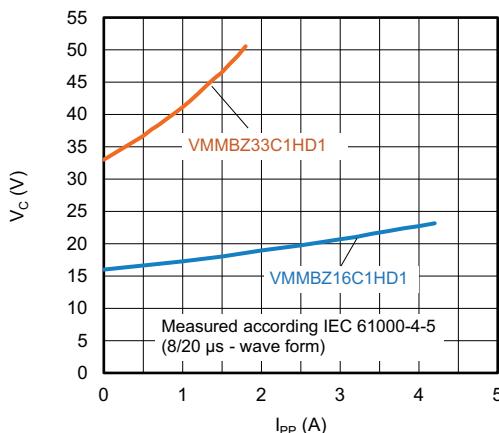
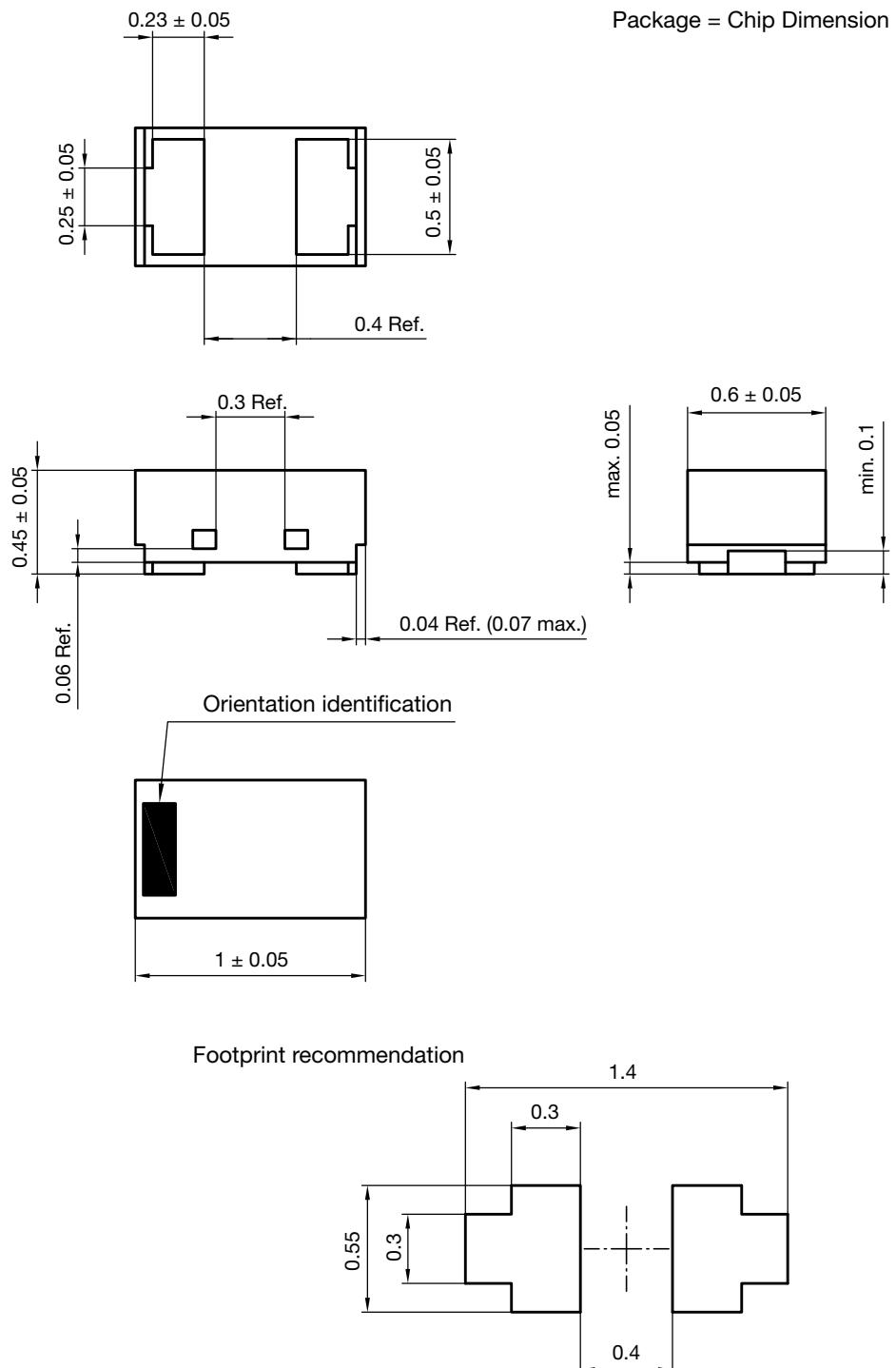


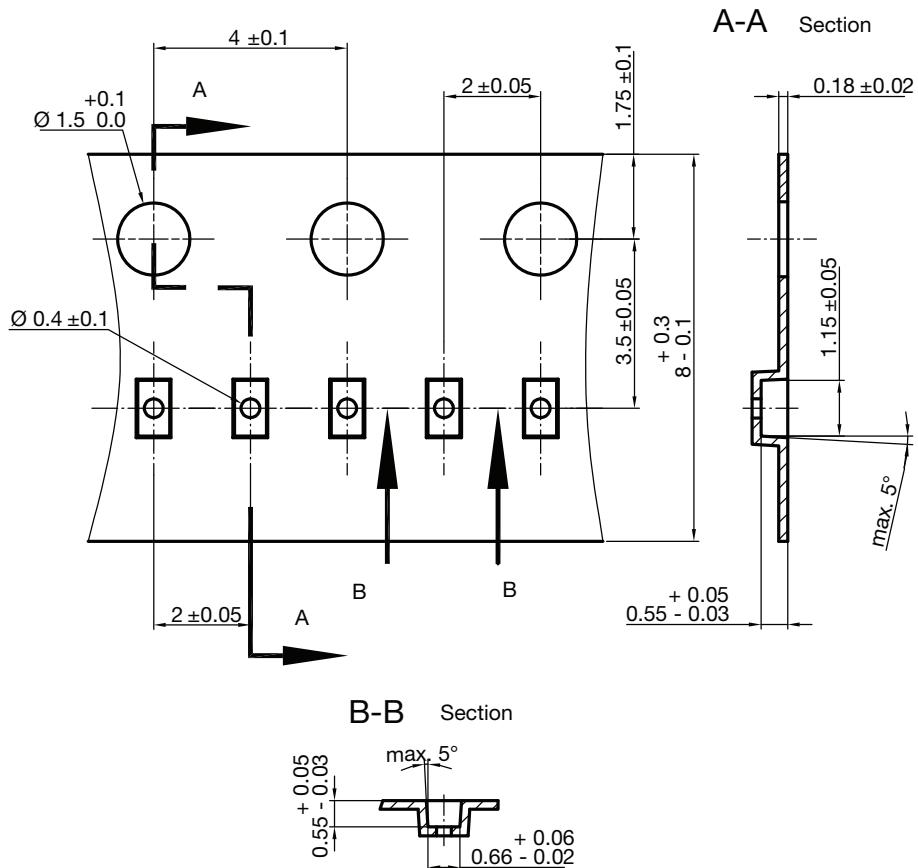
Fig. 7 - Typical Peak Clamping Voltage vs. Peak Pulse Current

PACKAGE DIMENSIONS in millimeters (Inches): **DFN1006-2A**


Document no.: S8-V-3906.04-059 (4)
 Created - Date: 11-Jul-2018
 Rev.5 - Date: 17-Sep-2021

23191

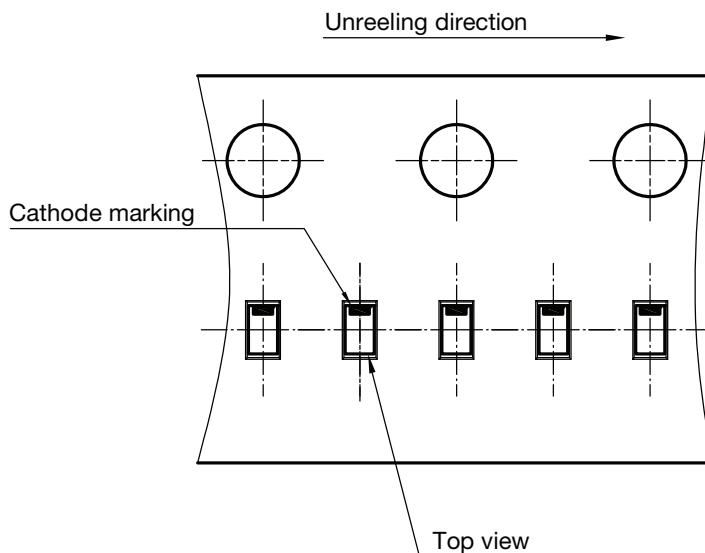
CARRIER TAPE DFN1006-2A



S8-V-3906.04-063 (4)
created 28.10.2019

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

ORIENTATION IN CARRIER TAPE DFN1006-2A



S8-V-3906.04-064 (4)
created 28.10.2019

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