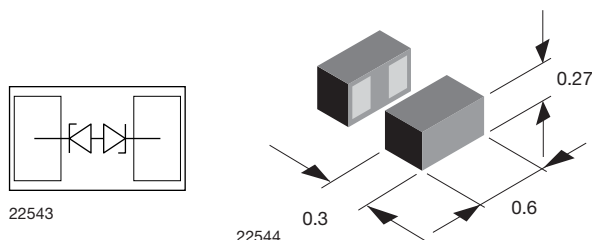


Ultra Low Capacitance Bidirectional Symmetrical (BiSy) Single Line ESD-Protection Diode in Silicon Package



MARKING (example only)



1 = year code

Open circle = month code and pin 1

XY = type code

FEATURES

- Ultra compact CLP0603 package
- Low package height < 0.3 mm
- 1-line ESD-protection
- AEC-Q101 qualified available
- Working range ± 5.5 V
- Low leakage current < 0.1 μ A
- Ultra low load capacitance $C_D = 0.29$ pF typ.
- ESD-protection acc. IEC 61000-4-2
 ± 16 kV contact discharge
 ± 16 kV air discharge
- Lead plating: Au (e4)
- Lead material: Ni
- Backside coating
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

ORDERING INFORMATION

PART NUMBER (EXAMPLE)	ENVIRONMENTAL AND QUALITY CODE			PACKAGING CODE 15K PER 7" REEL (8 mm TAPE) 15K/BOX = MOQ	ORDERING CODE (EXAMPLE)
	AEC-Q101 QUALIFIED	RoHS-COMPLIANT + LEAD (Pb)-FREE TERMINATIONS	GOLD PLATED		
		GREEN			
VBUS05B1-SD0	-	G	4	-08	VBUS05B1-SD0-G4-08
VBUS05B1-SD0	H	G	4	-08	VBUS05B1-SD0HG4-08

PACKAGE DATA

DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	SOLDERING CONDITIONS
VBUS05B1-SD0	CLP0603	5A	0.12 mg	260 °C/10 s at terminals Reflow soldering according JEDEC® STD-020

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	acc. IEC 61000-4-5, 8/20 μ s/single shot	I_{PPM}	2.5	A
Peak pulse power	Pin 1 to pin 2 acc. IEC 61000-4-5; $t_p = 8/20$ μ s; single shot	P_{PP}	45	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 16	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 16	
Operating temperature	Junction temperature	T_J	-55 to +150	°C
Storage temperature		T_{stg}	-55 to +150	°C

**ESD-PROTECTION FOR HIGH-SPEED SIGNAL OR DATA LINES**

The VBUS05B1-SD0 is a Bidirectional and Symmetrical (BiSy) ESD-protection device which clamps positive and negative overvoltage transients to ground. Connected between the signal or data line and the ground the VBUS05B1-SD0 offers a high isolation (low leakage current, low capacitance) within the specified working range. Due to the short leads and small package size of the tiny CLP0603 package the line inductance is very low, so that fast transients like and ESD-strike can be clamped with minimal over- or undershoots. Due to the very low capacitance the VBUS05B1-SD0 can be used for high speed data ports like HDMI, USB 3.0 or Thunderbolt.

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, 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}	-	-	5.5	V
Reverse voltage	at $I_R = 0.1\text{ }\mu\text{A}$	V_R	5.5	-	-	V
Reverse current	at $V_{RWM} = 5.5\text{ V}$	I_R	-	-	0.1	μA
Reverse breakdown voltage	at $I_R = 1\text{ mA}$	V_{BR}	6.0	8.5	10	V
Reverse clamping voltage	at $I_{PP} = 1\text{ A}$	V_C	-	12	14	V
	at $I_{PP} = I_{PPM} = 2.5\text{ A}$	V_C	-	15	18	V
Capacitance	at $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	0.29	0.4	pF
	at $V_R = 3.3\text{ V}$; $f = 1\text{ MHz}$	C_D	-	0.29	-	pF
Clamping voltage	Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$ $I_{TLP} = 8\text{ A}$	V_{C-TLP}	-	20	-	V
	Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$ $I_{TLP} = 16\text{ A}$		-	29	-	
Dynamic resistance	Transmission Line Pulse (TLP); $t_p = 100\text{ ns}$	R_{DYN}	-	1.14	-	Ω



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

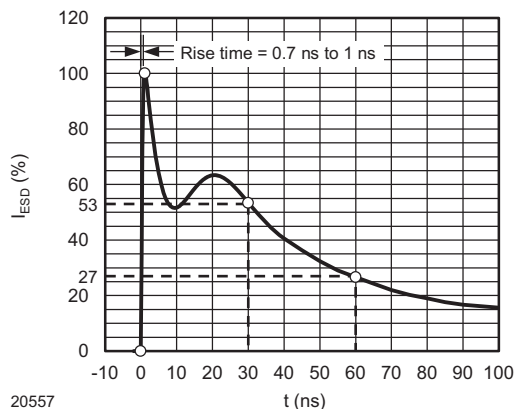


Fig. 1 - ESD Discharge Current Wave Form
acc. IEC 61000-4-2 (330 Ω /150 pF)

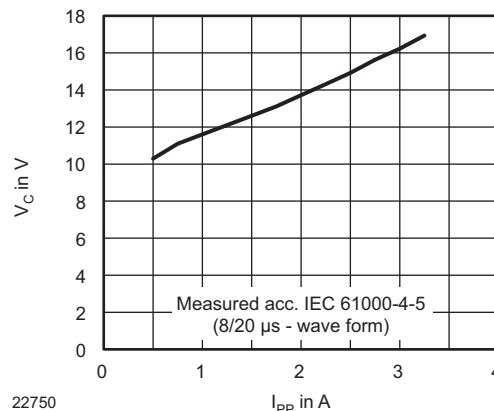


Fig. 4 - Typical Peak Clamping Voltage V_C vs.
Peak Pulse Current I_{PP}

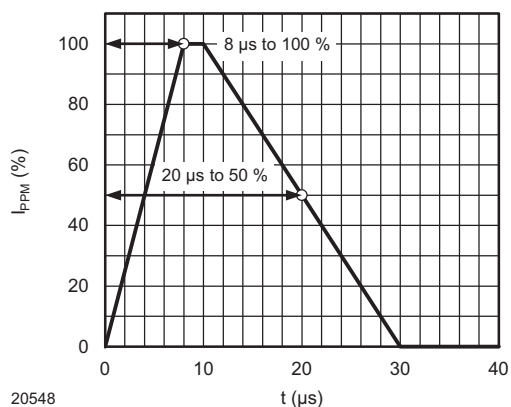


Fig. 2 - 8/20 μ s Peak Pulse Current Wave Form
acc. IEC 61000-4-5

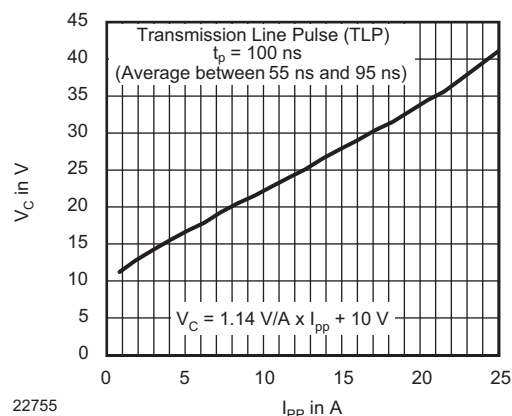


Fig. 5 - Typical Peak Clamping Voltage V_C vs.
Peak Pulse Current I_{PP}

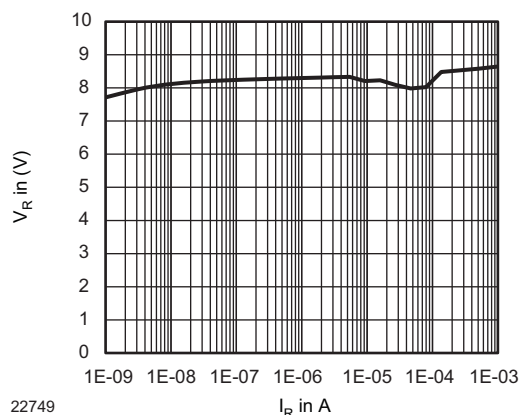


Fig. 3 - Typical Reverse Voltage V_R vs. Reverse Current I_R

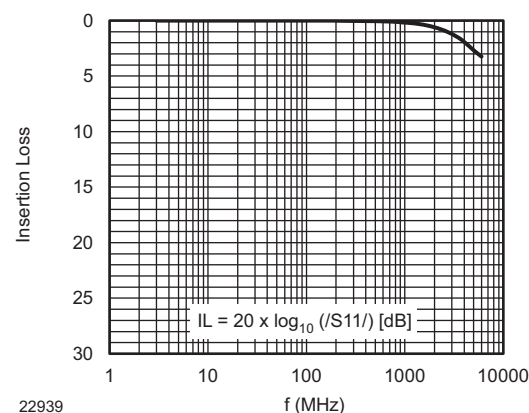
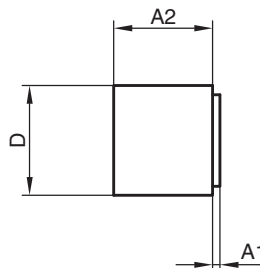
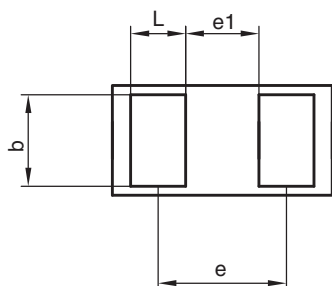
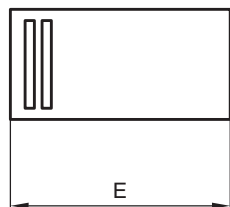
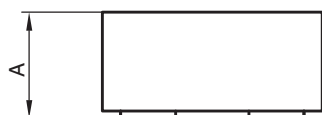


Fig. 6 - Typical Insertion Loss (IL) vs. Frequency

PACKAGE DIMENSIONS in millimeters (mils): **CLP0603-2L**


Package = chip dimensions in mm



	Millimeters			mils		
	min.	nom.	max.	min.	nom.	max.
A	0.25	0.28	0.30	9.84	11.02	11.81
A1	0.01	0.01	0.02	0.39	0.39	0.79
A2	0.24	0.27	0.28	9.45	10.63	11.02
b	0.22	0.25	0.28	8.66	9.84	11.02
D	0.27	0.30	0.33	10.62	11.81	12.99
E	0.57	0.60	0.63	22.44	23.62	24.80
e		0.40			15.75	
e1		0.25			9.84	
L	0.12	0.15	0.18	4.72	5.91	7.09

22740

2 terminal leadless package (CLP0603-2L LLP)

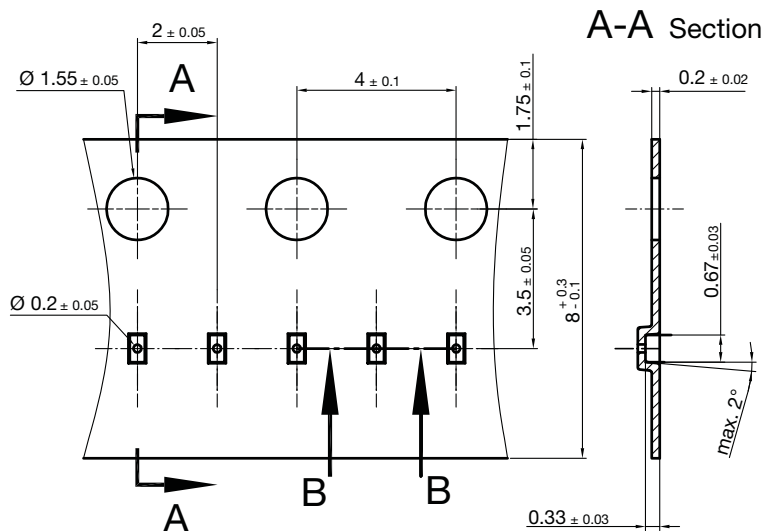
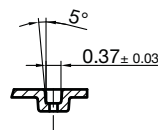
Document no.: S8-V-3906.04-023 (4)

Created - Date: 22. Nov. 2010

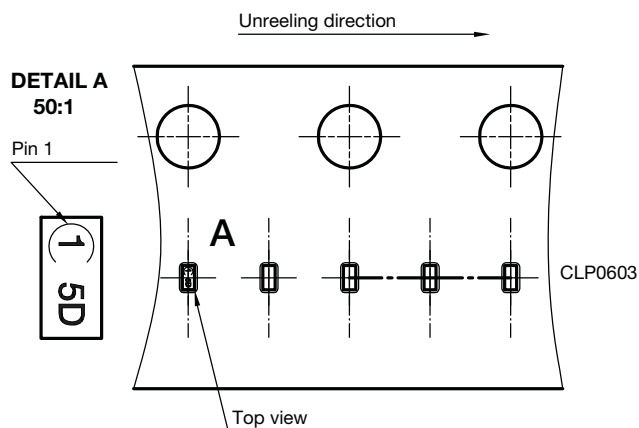
Rev.7 - Date: 23. Feb. 2016

Footprint and soldering recommendation:

please see Application Note: www.vishay.com/doc?85917

CARRIER TAPE in millimeters: **CLP0603**

B-B Section

Cumulative tolerances of 10 sprocket holes is $\pm 0.2\text{mm}$

22591
Document no. S8-V-3906.04-0025 (4)
Created - Date: 22. Nov. 2010

ORIENTATION IN CARRIER CLP0603


22607

Orientation in Carrier Tape (CLP0603)
S8-V-3906.04-026 (4)
22.10.2010



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