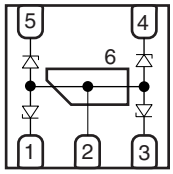
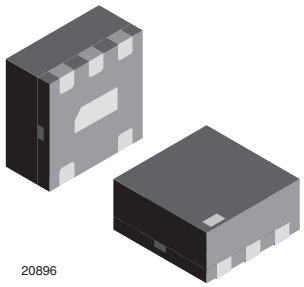
4-Line BUS-Port ESD Protection



20897



20896

FEATURES

- Ultra compact LLP1010-6M package
- Low package height < 0.4 mm
- 4-line USB ESD protection
- Low leakage current
- Low load capacitance C_D = 0.8 pF
- ESD immunity acc. IEC 61000-4-2
  ± 15 kV contact discharge
  ± 15 kV air discharge
- Pin plating NiPdAu (e4) no whisker growth
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

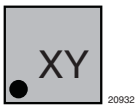
Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

MARKING (example only)



20932

Dot = pin 1 marking
X = date code
Y = type code (see table below)

DESIGN SUPPORT TOOLS

click logo to get started

3D Models Available

ORDERING INFORMATION			
DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL (8 mm TAPE ON 7" REEL)	MINIMUM ORDER QUANTITY
VBUS54DD-HS4	VBUS54DD-HS4-G4-08	5000	5000

PACKAGE DATA						
DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VBUS54DD-HS4	LLP1010-6M	D	1.07 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C

ABSOLUTE MAXIMUM RATINGS VBUS54DD-HS4				
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Pin 1, 3, 4 or 5 to pin 2 or 6 acc. IEC 61000-4-5; t_p = 8/20 µs; single shot	I_{PPM}	3	A
Peak pulse power	Pin 1, 3, 4 or 5 to pin 2 or 6 acc. IEC 61000-4-5; t_p = 8/20 µs; single shot	P_{PP}	57	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 15	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 15	kV
Operating temperature	Junction temperature	T_J	-40 to +125	°C
Storage temperature		T_{STG}	-55 to +150	°C

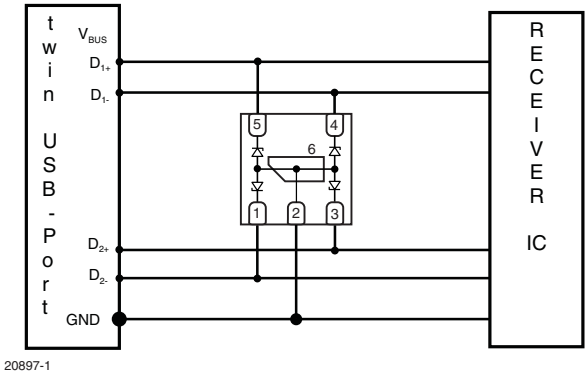
For technical questions, contact: ESDprotection@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

ELECTRICAL CHARACTERISTICS VBUS54DD-HS4 (Pin 1, 3, 4, or 5 to pin 2 or 6) (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	$N_{channel}$	-	-	4	lines
Reverse stand-off voltage		V_{RWM}	-	-	5.5	V
Reverse current	at $V_{IN} = V_{RWM}$ = 5.5 V	I_R	-	< 0.01	0.1	µA
Reverse breakdown voltage	at I_R = 1 mA	V_{BR}	6.9	8	8.7	V
Reverse clamping voltage	at I_{PP} = 3 A acc. IEC 61000-4-5	V_C	-	16	19	V
Forward clamping voltage	at I_F = 3 A acc. IEC 61000-4-5	V_F	-	3.5	4.5	V
Capacitance	V_{IN} = 0 V; any other I/O pin at 3.3 V	C_D	-	0.8	1	pF
	V_{IN} = 2.5 V; any other I/O pin at 3.3 V		-	0.5	0.8	pF

APPLICATION NOTE

With the **VBUS54DD-HS4** a double, high speed USB-port or up to 4 other high speed signal or data lines can be protected against transient voltage signals. Negative transients will be clamped close below the ground level while positive transients will be clamped close above the working range. The high speed data lines, D_1+, D_2+, D_1- and D_2-, are connected to pin **1, 3, 4, and 5,** pin **2 or 6** are connected to ground. As long as the signal voltage on the data lines is between the ground- and the break down level, the low input capacitance of each channel offers a very high isolation to ground and to the other data lines. But as soon as any transient signal exceeds this working range, the VBUS54DD-HS4 clamps the transient to ground or to the avalanche break down voltage level.



TYPICAL CHARACTERISTICS T_{amb} = 25 °C, unless otherwise specified

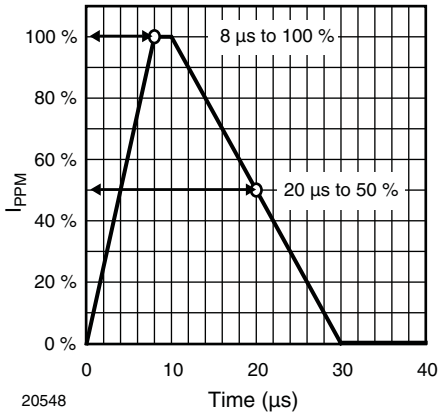


Fig. 1 - 8/20 µs Peak Pulse Current Wave Form acc. IEC 61000-4-5

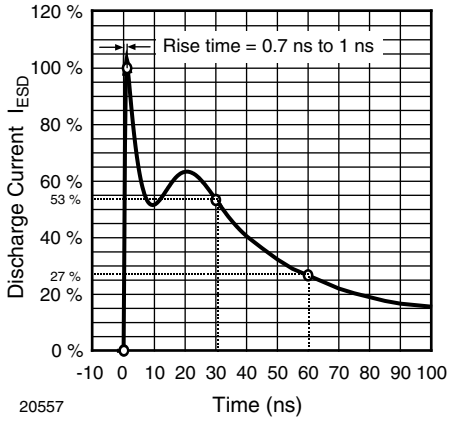


Fig. 2 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω/150 pF)

For technical questions, contact: ESDprotection@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

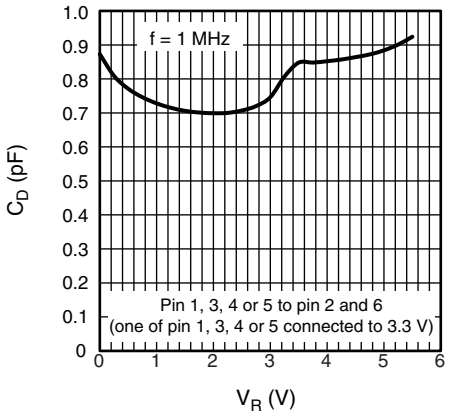


Fig. 3 - Typical Capacitance C_D vs. Reverse Voltage V_R

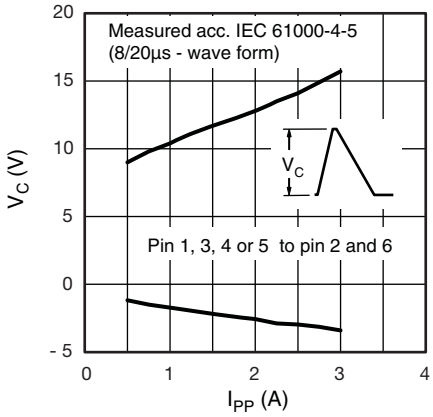


Fig. 6 - Typical Peak Clamping Voltage V_C vs. Peak Pulse Current I_{PP}

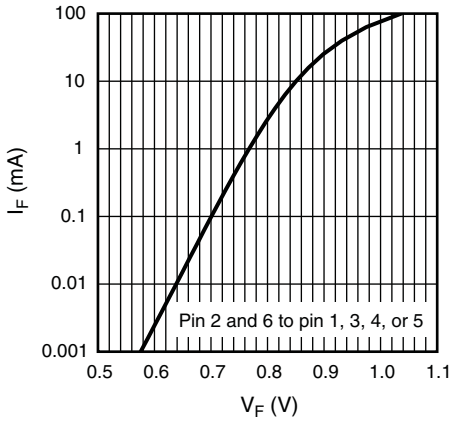


Fig. 4 - Typical Forward Current I_F vs. Forward Voltage V_F

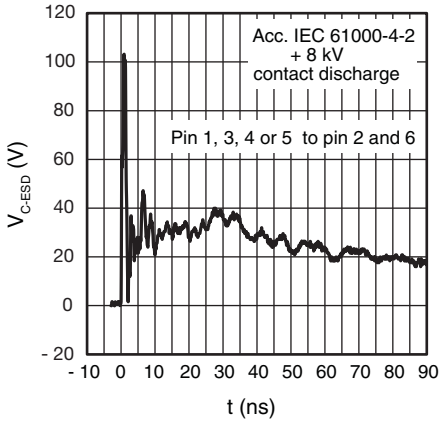


Fig. 7 - Typical Clamping Performance at + 8 kV Contact Discharge (acc. IEC 61000-4-2)

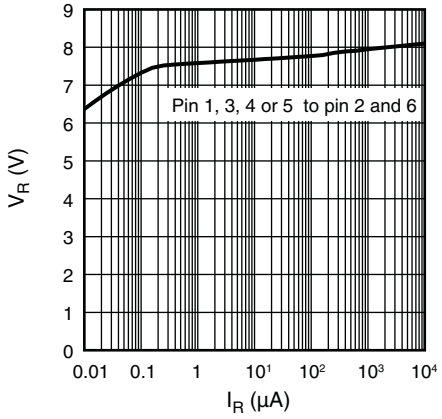


Fig. 5 - Typical Reverse Voltage V_R vs. Reverse Current I_R

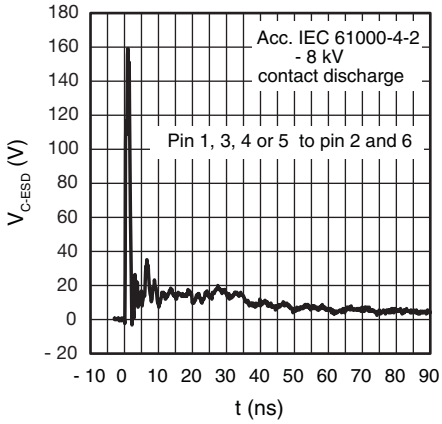
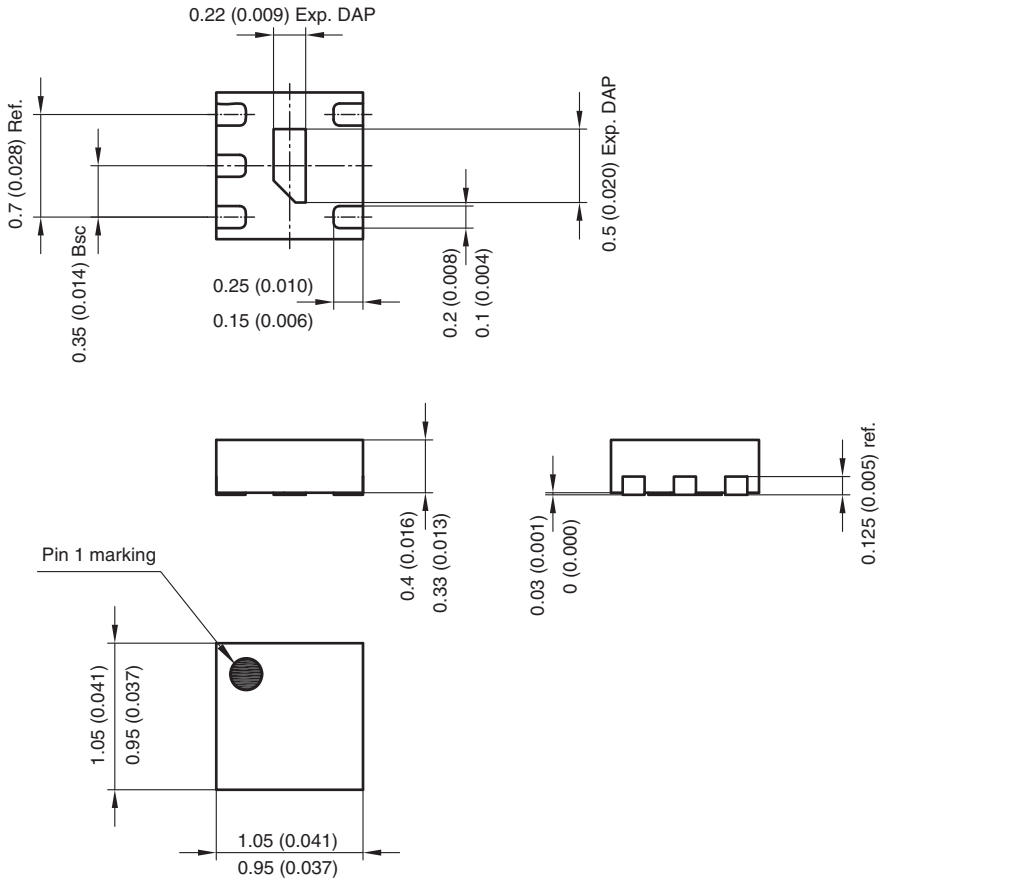


Fig. 8 - Typical Clamping Performance at - 8 kV Contact Discharge (acc. IEC 61000-4-2)

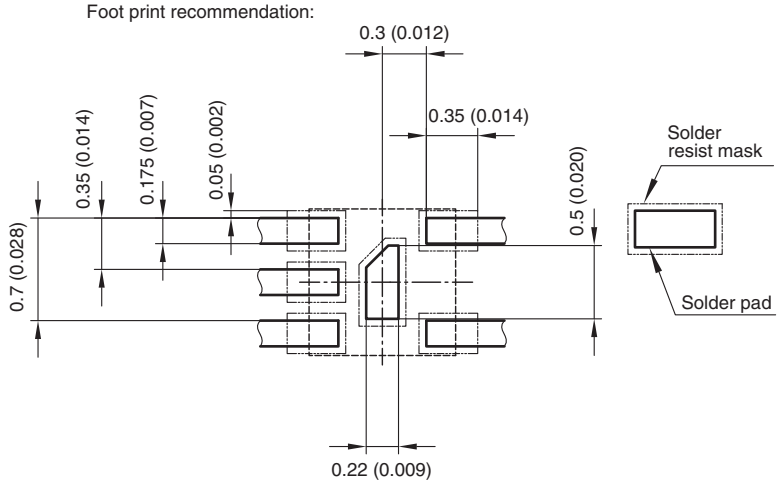
For technical questions, contact: ESDprotection@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

PACKAGE DIMENSIONS in millimeters (inches): **LLP1010-6M**



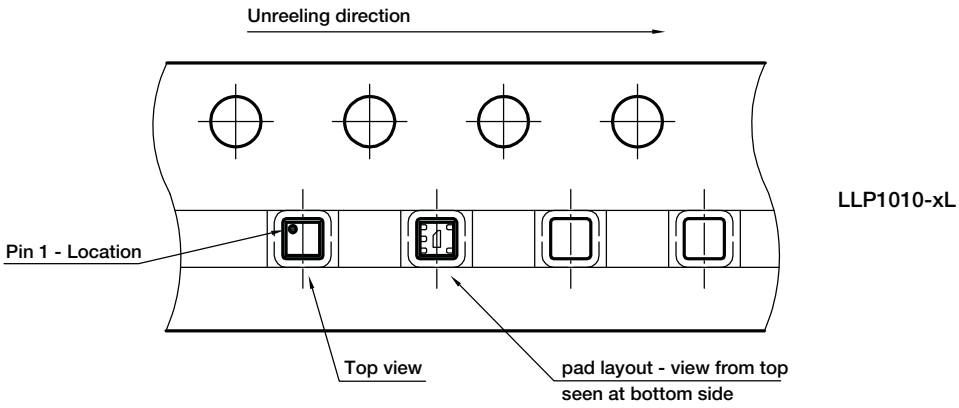
Foot print recommendation:



Document no.:S8-V-3906.04-004 (4)
Created - Date: 17.July.2007
Rev. 5 - Date: 11.May.2016
20899

For technical questions, contact: ESDprotection@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

ORIENTATION IN CARRIER TAPE - LLP1010-xL



Document no.: S8-V-3906.04-015 (4)
Created - Date: 11.Jun. 2008
Rev. 4 - Date: 28. Jan. 2010
22669

For technical questions, contact: ESDprotection@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

© 2017 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED