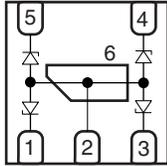
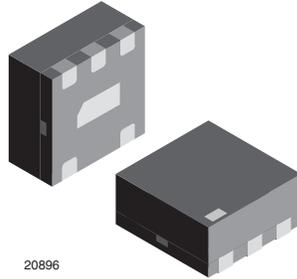


4-Line BUS-Port ESD Protection

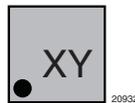


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MARKING (example only)



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

FEATURES

- Ultra compact LLP1010-5L package
- Low package height < 0.4 mm
- 4-line USB ESD-protection
- Low leakage current
- Low load capacitance $C_D = 0.8$ pF
- ESD-protection acc. IEC 61000-4-2
 ± 15 kV contact discharge
 ± 15 kV air discharge
- Pin plating NiPdAu (e4) no whisker growth
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



Note

** Please see document "Vishay Material Category Policy":
www.vishay.com/doc?99902

ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL (8 mm TAPE ON 7" REEL)	MINIMUM ORDER QUANTITY
VBUS054DD-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
VBUS054DD-HS4	LLP1010-6M	C	1.07 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

ABSOLUTE MAXIMUM RATINGS

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; $t_p = 8/20$ μ s; 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; $t_p = 8/20$ μ s; 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

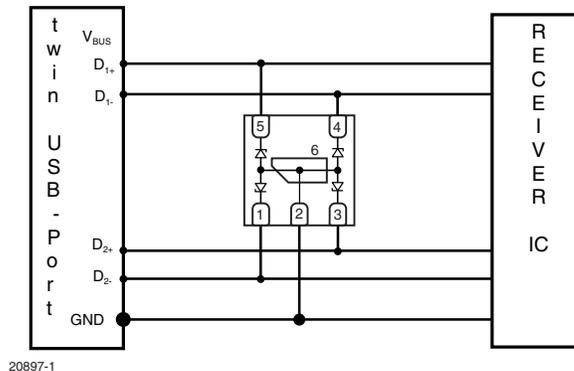
ELECTRICAL CHARACTERISTICS (Pin 1, 3, 4, or 5 to pin 2 or 6)						
PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	N_{channel}	-	-	4	lines
Reverse stand-off voltage		V_{RWM}	-	-	5.5	V
Reverse current	at $V_{\text{IN}} = V_{\text{RWM}} = 5.5 \text{ V}$	I_{R}	-	< 0.01	0.1	μA
Reverse breakdown voltage	at $I_{\text{R}} = 1 \text{ mA}$	V_{BR}	6.9	8	8.7	V
Reverse clamping voltage	at $I_{\text{PP}} = 3 \text{ A}$ acc. IEC 61000-4-5	V_{C}	-	16	19	V
Forward clamping voltage	at $I_{\text{F}} = 3 \text{ A}$ acc. IEC 61000-4-5	V_{F}	-	3.5	4.5	V
Capacitance	$V_{\text{IN}} = 0 \text{ V}$; any other I/O pin at 3.3 V	C_{D}	-	0.8	1	pF
	$V_{\text{IN}} = 2.5 \text{ V}$; any other I/O pin at 3.3 V		-	0.5	0.8	pF

Note

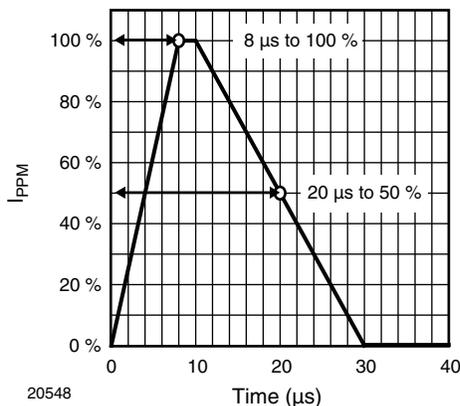
- Ratings at 25 °C, ambient temperature unless otherwise specified.

APPLICATION NOTE

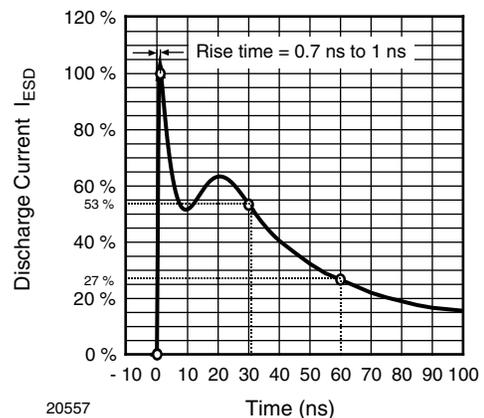
With the **VBUS54DD-HS4** a double, high speed USB-port or up to 4 other high speed signal or data lines can be protected against transient voltage signals. Negative transients will be clamped close below the ground level while positive transients will be clamped close above the working range. The high 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 VBUS054DD-HS4 clamps the transient to ground or to the avalanche break down voltage level.



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


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


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

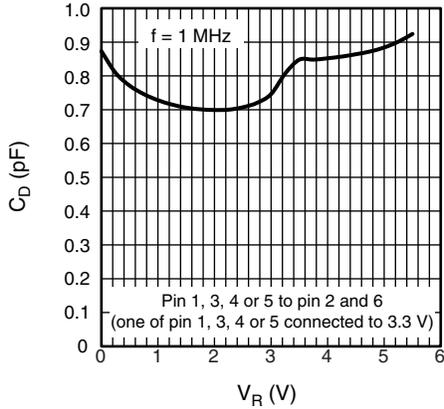


Fig. 3 - Typical Capacitance C_D vs. Reverse Voltage V_R

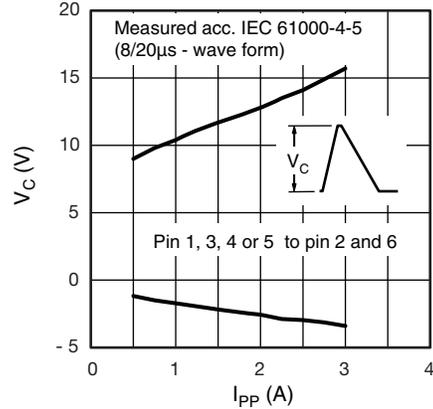


Fig. 6 - Typical Peak Clamping Voltage V_C vs. Peak Pulse Current I_{PP}

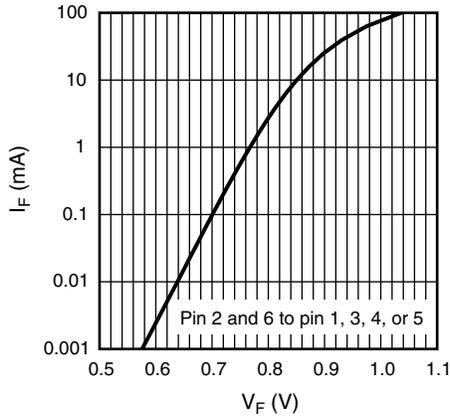


Fig. 4 - Typical Forward Current I_F vs. Forward Voltage V_F

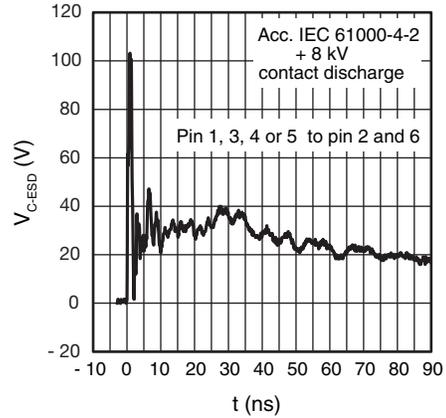


Fig. 7 - Typical Clamping Performance at + 8 kV Contact Discharge (acc. IEC 61000-4-2)

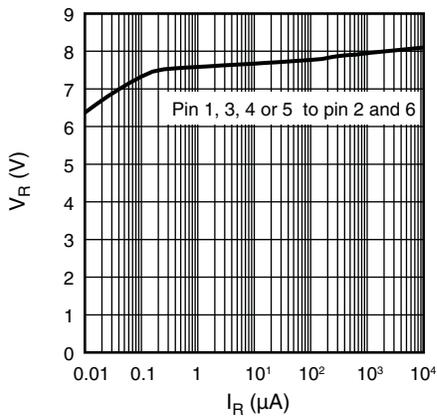


Fig. 5 - Typical Reverse Voltage V_R vs. Reverse Current I_R

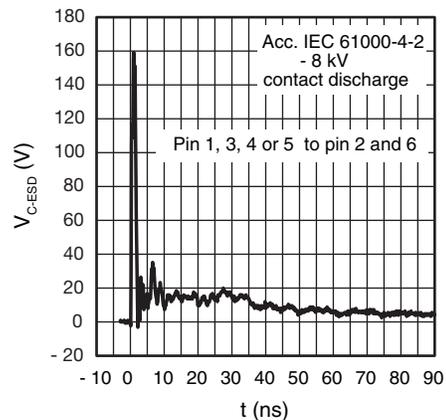
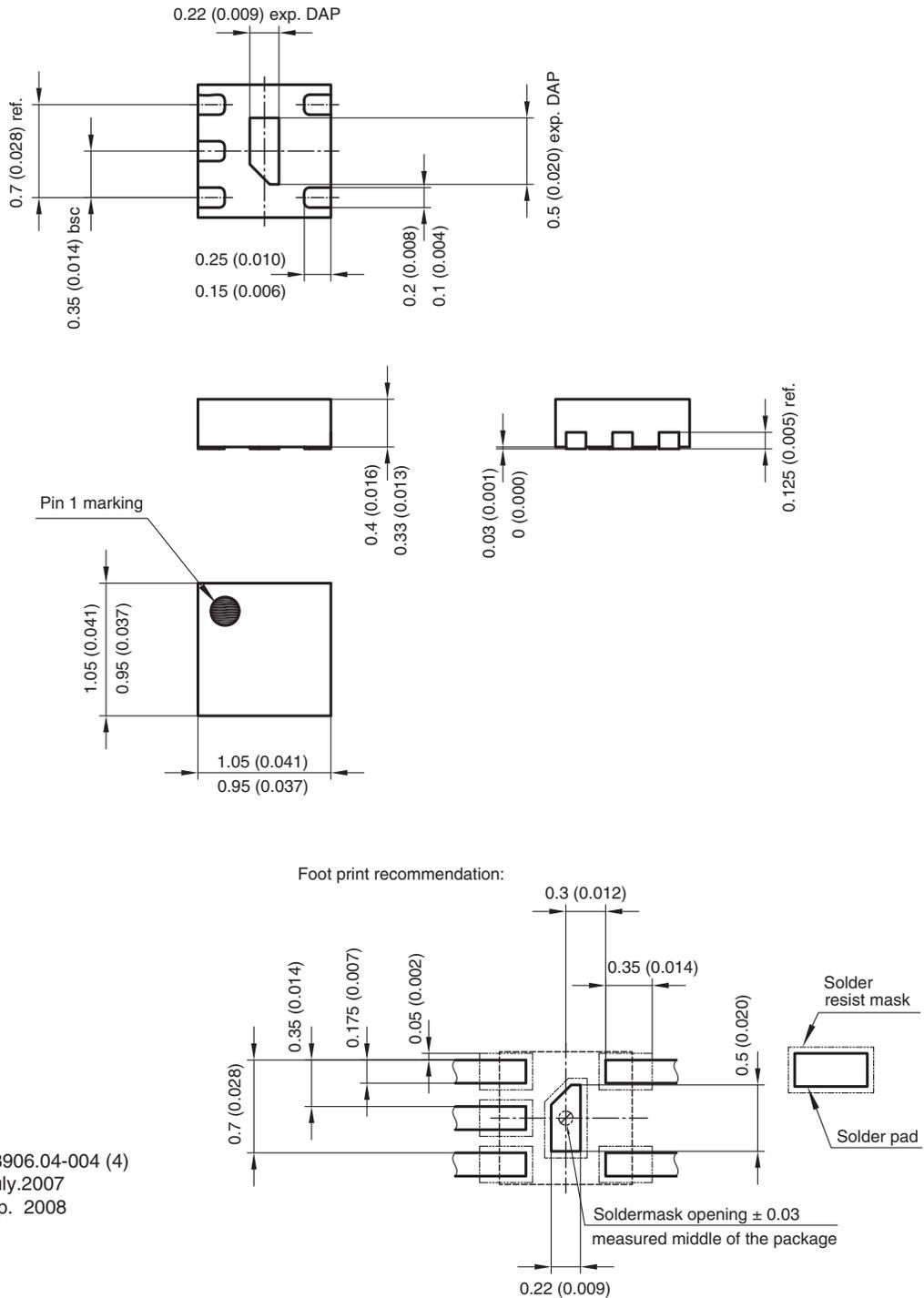


Fig. 8 - Typical Clamping Performance at - 8 kV Contact Discharge (acc. IEC 61000-4-2)



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



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20899



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