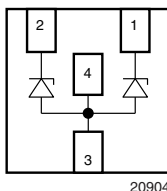
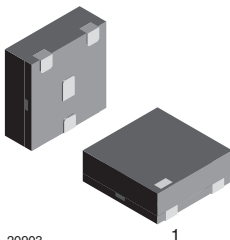


Low Capacitance, 2-Line ESD Protection Diode



20904



20903

1

MARKING (example only)



21001

Dot = pin 1 marking

YY = type code (see table below)

XX = date code

DESIGN SUPPORT TOOLS

[click logo to get started](#)

3D
Models
Available

FEATURES

- Compact LLP75-4L package
- Low package height < 0.6 mm
- 2-line ESD protection
- Low leakage current < 0.1 μ A
- Low load capacitance $C_D = 1.5$ pF
- ESD immunity acc. IEC 61000-4-2
 ± 15 kV contact discharge
 ± 15 kV air discharge
- High surge current acc. IEC 61000-4-5 $I_{PP} > 3$ A
- Soldering can be checked by standard vision inspection. no X-ray necessary
- e4 - precious metal (e.g. Ag, Au, NiPd, NiPdAu) (no Sn)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL (8 mm TAPE ON 7" REEL)	MINIMUM ORDER QUANTITY
VBUS052BD-HTF	VBUS052BD-HTF-GS08	3000	15 000

PACKAGE DATA

DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VBUS052BD-HTF	LLP75-4L	U7	4.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C

ABSOLUTE MAXIMUM RATINGS VBUS052BD-HTF

RATING	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Acc. IEC 61000-4-5, $t_p = 8/20$ μ s/single shot	I_{PPM}	3	A
Peak pulse power	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}	± 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}	-40 to +150	°C

APPLICATION NOTE

The VBUS052BD-HTF is a two-line ESD protection device with the characteristic of a Z-diode with a high ESD immunity and a very low capacitance which makes it usable for high frequency applications like USB2.0 or HDMI.

With the VBUS052BD-HTF two high speed data lines can be protected against transient voltage signals like ESD (electro static discharge). Connected to the data line (pin 1 and 2) and to ground (pin 3) negative transients will be clamped close below the ground level while positive transients will be clamped close above the 5 V working range. The clamping behavior of the VBUS052BD-HTF is bidirectional but asymmetrical (BiAs) and so it offers the best protection for applications running up to 5 V.

ELECTRICAL CHARACTERISTICS VBUS052BD-HTF

PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	N_{channel}	-	-	2	lines
Reverse stand-off voltage	at $I_R = 0.1 \mu\text{A}$; pin 1 or pin 2 to pin 3	V_{RWM}	-	-	5	V
Reverse current	at $V_R = V_{\text{RWM}} = 5 \text{ V}$; pin 1 or pin 2 to pin 3	I_R	-	< 0.01	0.1	μA
Reverse breakdown voltage	at $I_R = 1 \text{ mA}$; pin 1 or pin 2 to pin 3	V_{BR}	6.9	7.9	8.7	V
Reverse clamping voltage	at $I_{\text{PP}} = 3 \text{ A}$, acc. IEC 61000-4-5; pin 1 or pin 2 to pin 3	V_C	-	-	16	V
Forward clamping voltage	at $I_F = 3 \text{ A}$, acc. IEC 61000-4-5; pin 3 to pin 1 or pin 2	V_F	-	4.8	6	V
Capacitance	at $V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$; pin 1 or pin 2 to pin 3	C_D	-	1.5	2.5	pF

Note

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

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

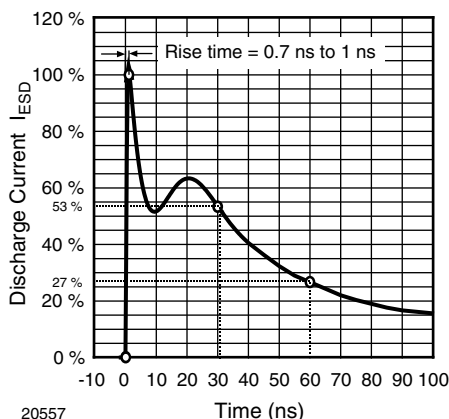


Fig. 1 - ESD Discharge Current Wave Form
acc. IEC 61000-4-2 (330 Ω /150 pF)

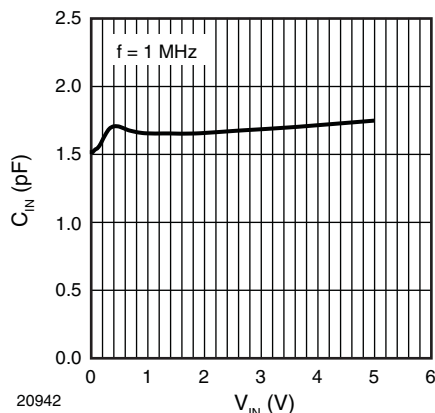


Fig. 3 - Typical Capacitance C_D vs. Reverse Voltage V_R

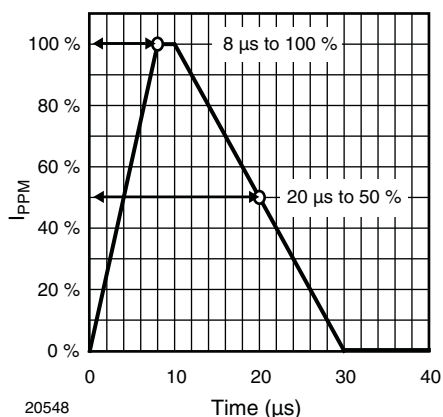


Fig. 2 - 8/20 μs Peak Pulse Current Wave Form
acc. IEC 61000-4-5

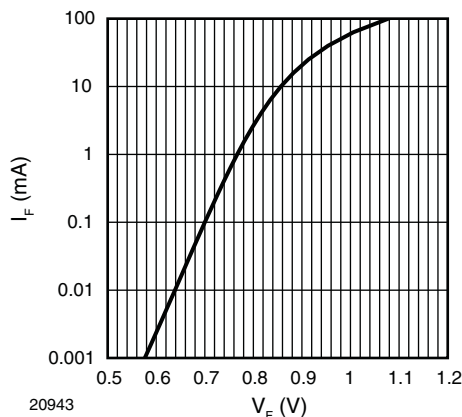


Fig. 4 - Typical Forward Current I_F vs. Forward Voltage V_F

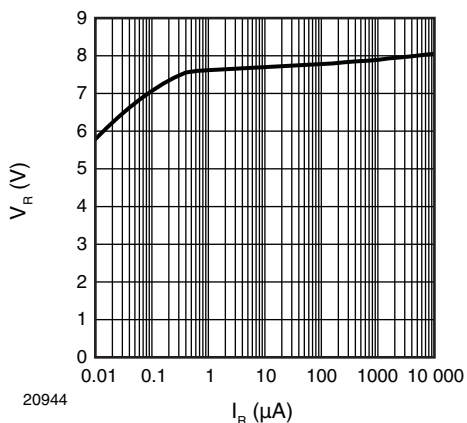


Fig. 5 - Typical Reverse Voltage V_R vs. Reverse Current I_R

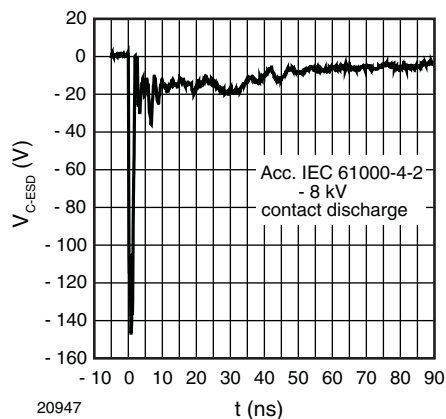


Fig. 8 - Typical Clamping Performance at - 8 kV Contact Discharge (acc. IEC 61000-4-2)

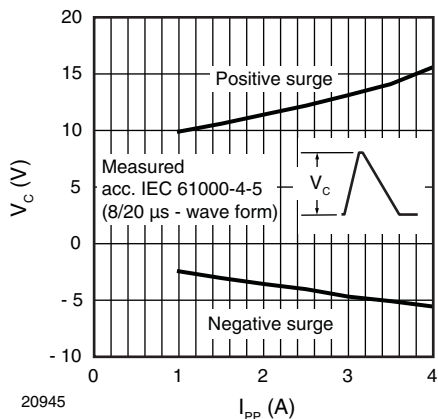


Fig. 6 - Typical Clamping Voltage vs. Peak Pulse Current I_{PP}

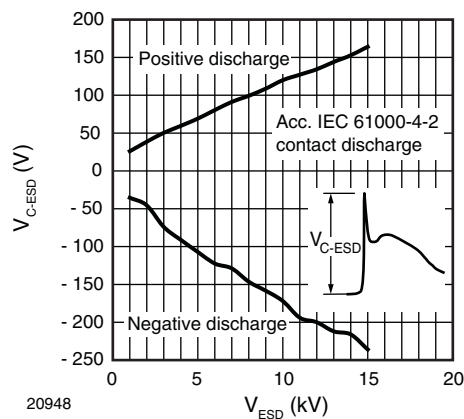


Fig. 9 - Typical Peak Clamping Voltage at $\pm$ ESD Contact Discharge (acc. IEC 61000-4-2)

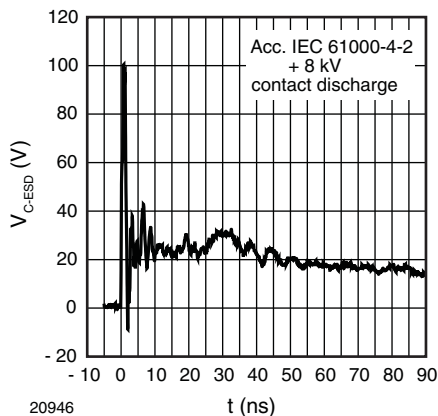
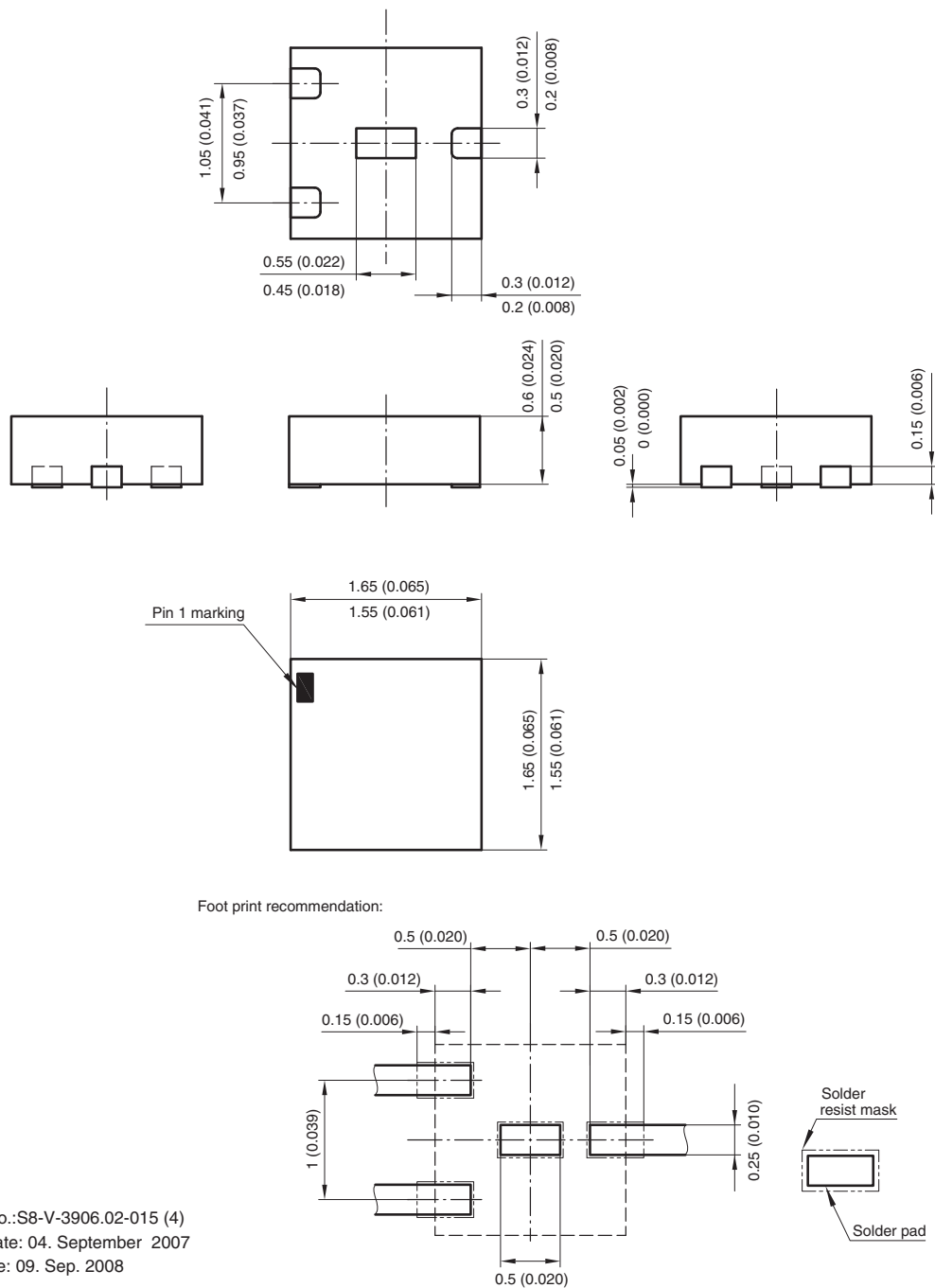
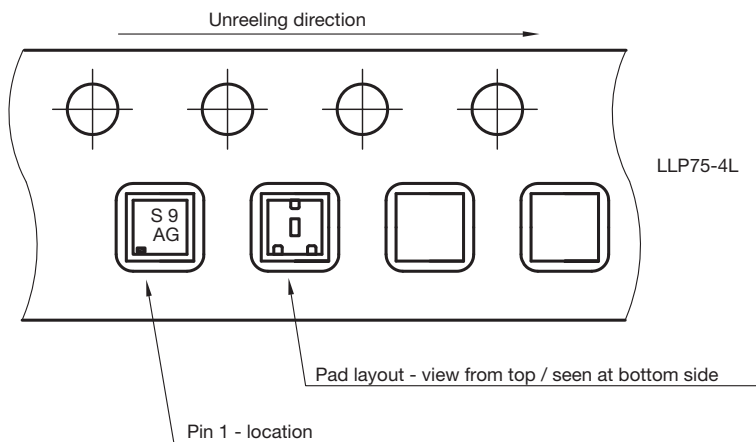


Fig. 7 - Typical Clamping Performance at + 8 kV Contact Discharge (acc. IEC 61000-4-2)

PACKAGE DIMENSIONS in millimeters (inches): LLP75-4L



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 20906





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