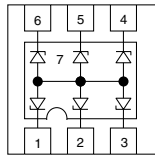
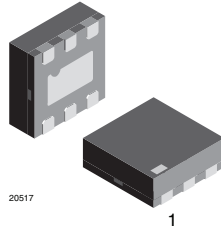


## 6-Line ESD-Protection Diode Array in LLP75



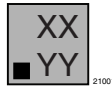
19371



20517

1

### MARKING (example only)



Dot = pin 1 marking

XX = date code

YY = type code (see table below)

### FEATURES

- Ultra compact LLP75-7L package
- 6-line ESD-protection
- Low leakage current  $I_R < 0.1 \mu A$
- Low load capacitance  $C_D = 13 \text{ pF}$
- ESD-immunity acc. IEC 61000-4-2  $\pm 15 \text{ kV}$  contact discharge  $\pm 15 \text{ kV}$  air discharge
- Working voltage range  $V_{RWM} = 5 \text{ V}$
- e4 - precious metal (e.g. Ag, Au, NiPd, NiPdAu) (no Sn)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://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
VESD05A6A-HAF	VESD05A6A-HAF-GS08	3000	15 000

### PACKAGE DATA

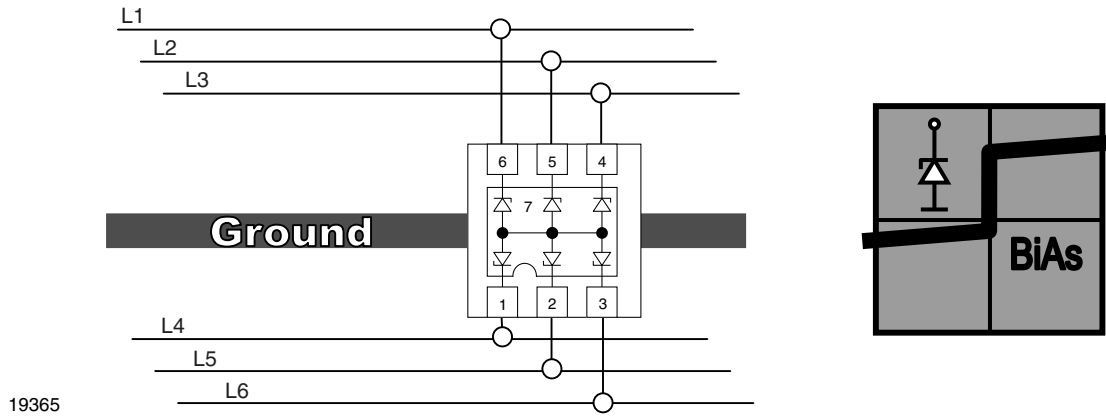
DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VESD05A6A-HAF	LLP75-7L	AT	4.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

### ABSOLUTE MAXIMUM RATINGS VESD05A6A-HAF

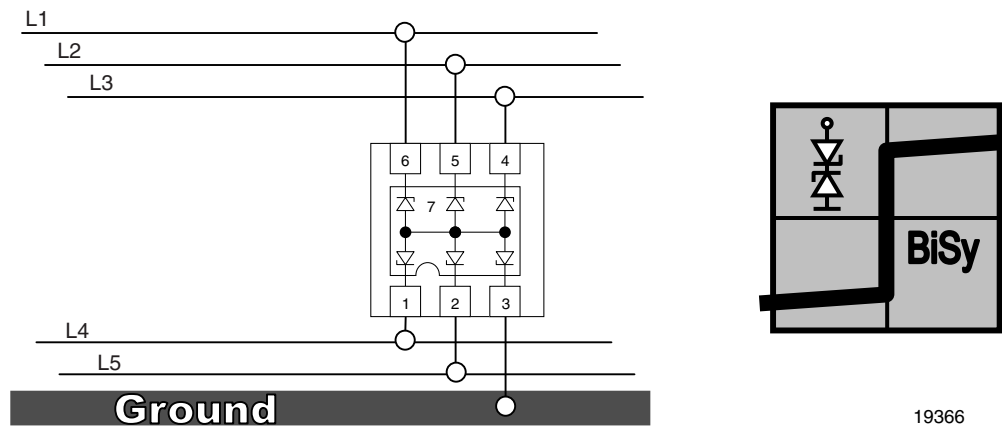
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	BiAs-Mode: each input (pin 1 - pin 6) to ground (pin 2); acc. IEC 61000-4-5; $t_p = 8/20 \mu s$ ; single shot	$I_{PPM}$	2.5	A
	BiSy-mode: each input (pin 1 - pin 6) to any other input pin. Pin 2 not connected. Acc. IEC 61000-4-5; $t_p = 8/20 \mu s$ ; single shot	$I_{PPM}$	2.5	A
Peak pulse power	BiAs-mode: each input (pin 1 - pin 6) to ground (pin 2); acc. IEC 61000-4-5; $t_p = 8/20 \mu s$ ; single shot	$P_{PP}$	33	W
	BiSy-mode: each input (pin 1 - pin 6) to any other input pin. Pin 2 not connected. Acc. IEC 61000-4-5; $t_p = 8/20 \mu s$ ; single shot	$P_{PP}$	43	W
ESD immunity	Acc. IEC61000-4-2; 10 pulses BiAs-mode: each input (pin 1 - pin 6) to ground (pin 2)	Contact discharge	$V_{ESD}$	$\pm 15$ kV
		Air discharge	$V_{ESD}$	$\pm 15$ kV
	Acc. IEC 61000-4-2 ; 10 pulses BiSy-mode: each input (pin 1 - pin 6) to any other input pin. Pin 2 not connected	Contact discharge	$V_{ESD}$	$\pm 10$ kV
		Air discharge	$V_{ESD}$	$\pm 10$ kV
Operating temperature	Junction temperature	$T_J$	-40 to +125	°C
Storage temperature		$T_{STG}$	-55 to +150	°C

## APPLICATION NOTE

With the VESD05A6A-HAF 6 different signal or data lines can be clamped to ground. Due to the different clamping levels in forward and reverse direction the VESD05A6A-HAF clamping behavior is bidirectional and asymmetrical (BiAs).



If symmetrical clamping behaviour is required the VESD05A6A-HAF can also be used as a bidirectional symmetrical protection device protecting up to 5 lines. In this case pin no. 7 must not be connected.



<b>ELECTRICAL CHARACTERISTICS VESD05A6A-HAF</b> (Between pin 1, 2, 3, 4, 5 or 6, and pin 7) ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	6	lines
Reverse stand-off voltage	Max. reverse working voltage	$V_{RWM}$	-	-	5	V
Reverse voltage	at $I_R = 0.1\text{ }\mu\text{A}$	$V_R$	5	-	-	V
Reverse current	at $V_R = 5\text{ V}$	$I_R$	-	< 0.01	0.1	$\mu\text{A}$
Reverse breakdown voltage	at $I_R = 1\text{ mA}$	$V_{BR}$	6	6.7	7.5	V
Reverse clamping voltage	at $I_{PP} = 1\text{ A}$	$V_C$	-	9	10	V
	at $I_{PP} = I_{PPM} = 2.5\text{ A}$	$V_C$	-	12	13	V
Forward clamping voltage	at $I_{PP} = 1\text{ A}$	$V_F$	-	2	2.5	V
	at $I_{PP} = I_{PPM} = 2.5\text{ A}$	$V_F$	-	3.2	4	V
Capacitance	at $V_R = 0\text{ V}$ ; $f = 1\text{ MHz}$	$C_D$	-	13	15	pF
	at $V_R = 2.5\text{ V}$ ; $f = 1\text{ MHz}$	$C_D$	-	8	-	pF



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

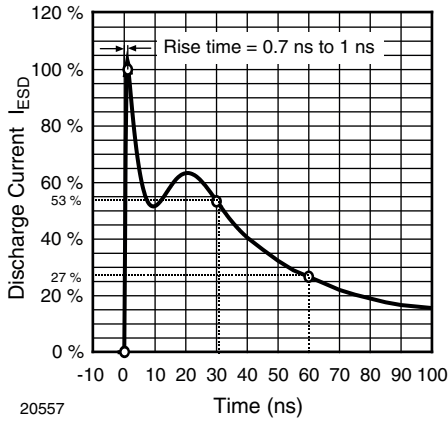


Fig. 1 - ESD Discharge Current Wave Form  
acc. IEC 61000-4-2 (330  $\Omega$ /150 pF)

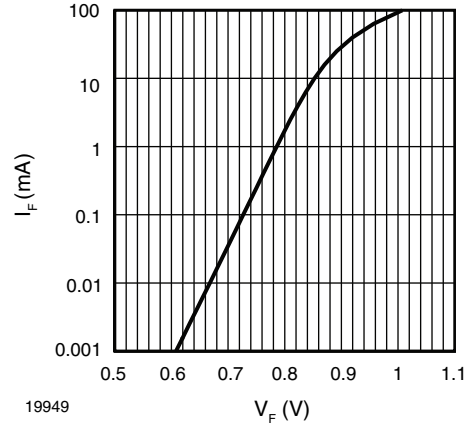


Fig. 4 - Typical Forward Current  $I_F$  vs. Forward Voltage  $V_F$

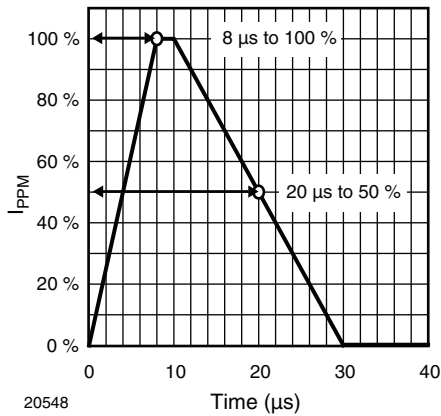


Fig. 2 - 8/20  $\mu\text{s}$  Peak Pulse Current Wave Form  
acc. IEC 61000-4-5

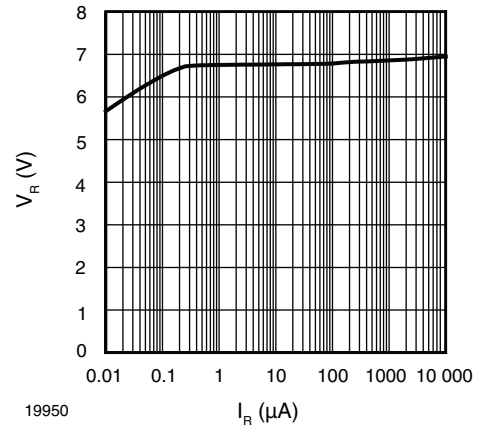


Fig. 5 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

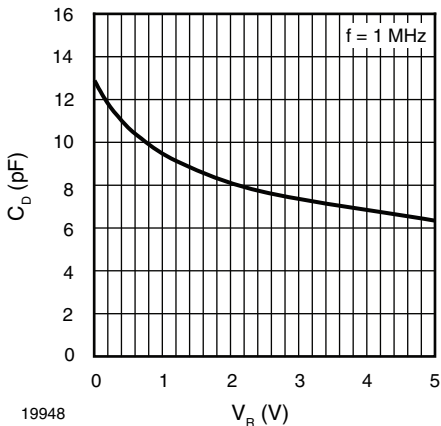


Fig. 3 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

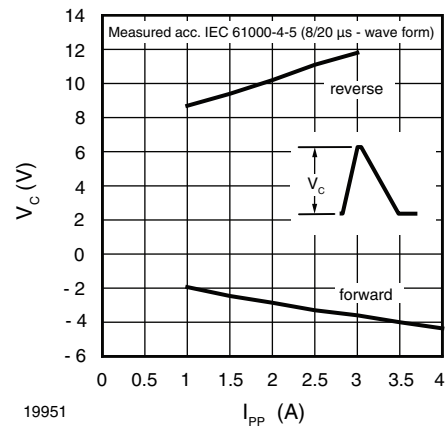


Fig. 6 - Typical Peak Clamping Voltage  $V_C$  vs. Peak Pulse Current  $I_{PP}$

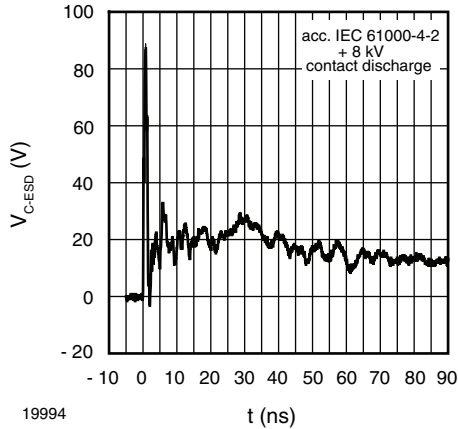


Fig. 7 - Typical Clamping Performance at + 8 kV Contact Discharge (acc. IEC 61000-4-2)

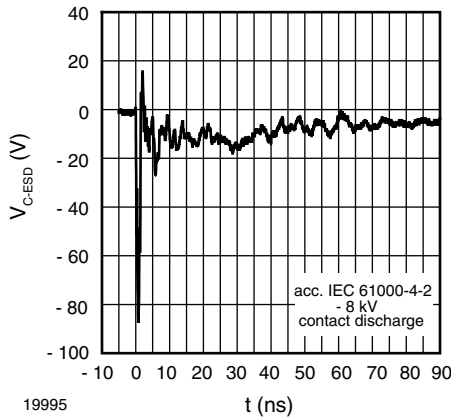


Fig. 8 - Typical Clamping Performance at - 8 kV Contact Discharge (acc. IEC 61000-4-2)

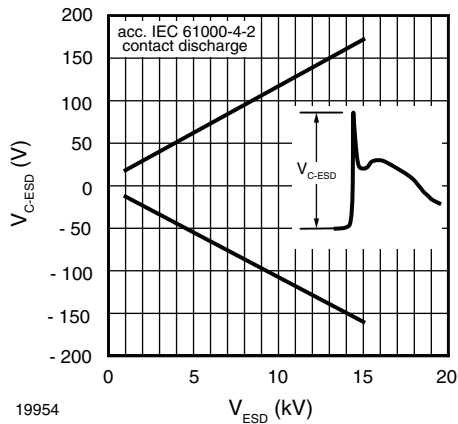
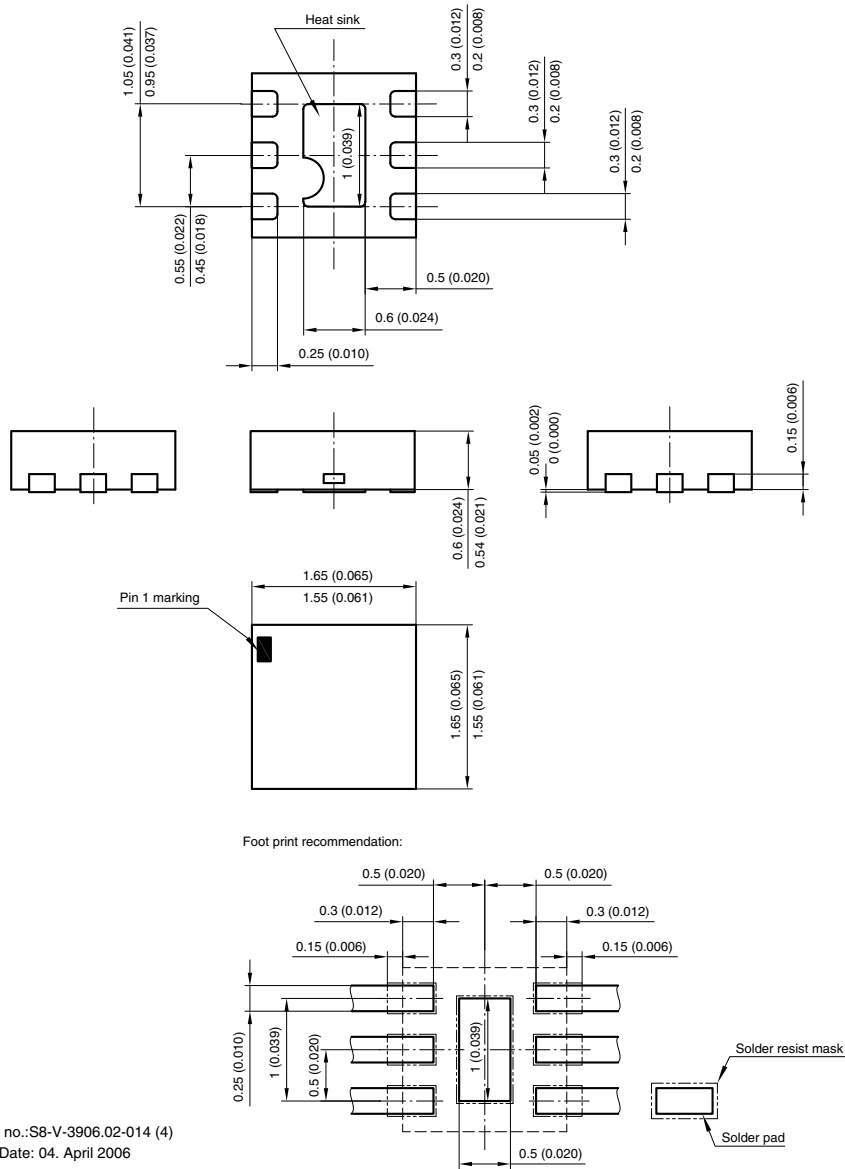
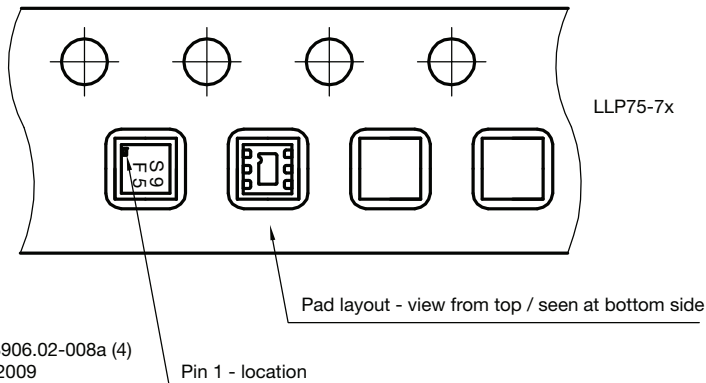


Fig. 9 - Typical max. Clamping Voltage at ESD Contact Discharge (acc. IEC 61000-4-2)

**PACKAGE DIMENSIONS** in millimeters (Inches): **LLP75-7L**



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Created - Date: 04. April 2006  
20500



S8-V-3906.02-008a (4)  
10.12.2009



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