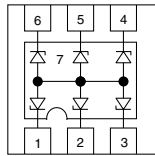
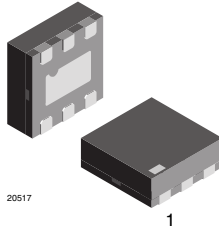


## 6-Line ESD Protection Diode Array in LLP75



19371



20517

1

### MARKING (example only)



Dot = pin 1 marking

XX = date code

YY = type code (see table below)

### DESIGN SUPPORT TOOLS

[click logo to get started](#)


### FEATURES

- Ultra compact LLP75-7L package
- 6-line ESD protection
- Low leakage current  $I_R < 1 \mu A$
- Low load capacitance  $C_D = 40 \text{ pF}$
- ESD immunity acc. IEC 61000-4-2  $\pm 30 \text{ kV}$  contact discharge  $\pm 30 \text{ kV}$  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)



### ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL (8 mm TAPE ON 7" REEL)	MINIMUM ORDER QUANTITY
VESD05A6-HAF	VESD05A6-HAF-GS08	3000	15 000

### PACKAGE DATA

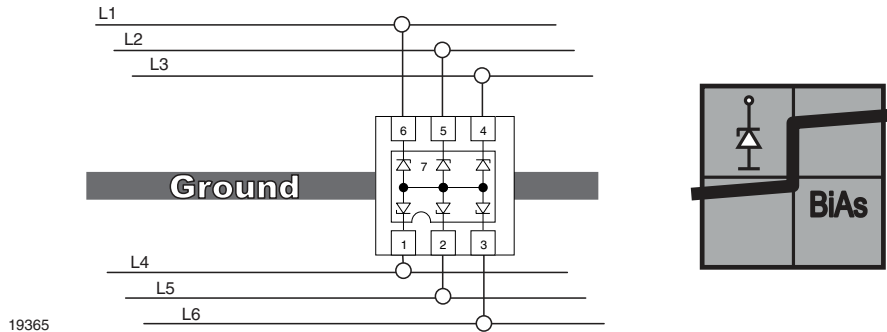
DEVICE NAME	PACKAGE NAME	TYPE CODE	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VESD05A6-HAF	LLP75-7L	AS	4.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C

### ABSOLUTE MAXIMUM RATINGS

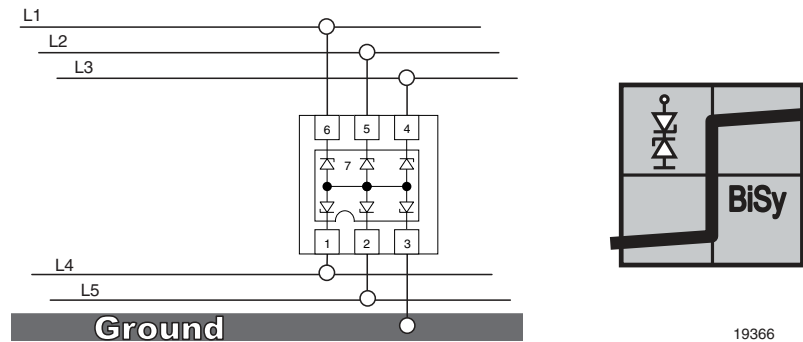
RATING	TEST CONDITION	SYMBOL	VALUE	UNIT	
Peak pulse current	BiAs-mode: each input (pin 1 to pin 6) to ground (pin 2); acc. IEC 61000-4-5; $t_p = 8/20 \mu s$ ; single shot	$I_{PPM}$	5	A	
Peak pulse power	BiAs-mode: each input (pin 1 to pin 6) to ground (pin 2); acc. IEC 61000-4-5; $t_p = 8/20 \mu s$ ; single shot	$P_{PP}$	60	W	
ESD immunity	Acc. IEC61000-4-2; 10 pulses BiAs-Mode: each input (pin 1 to pin 6) to ground (pin 2)	Contact discharge	$V_{ESD}$	$\pm 30$	kV
		Air discharge	$V_{ESD}$	$\pm 30$	kV
Operating temperature	Junction temperature	$T_J$	-40 to +125	°C	
Storage temperature		$T_{STG}$	-55 to +150	°C	

**APPLICATION NOTE:**

a) With the VESD05A6-HAF 6 different signal or data lines can be clamped to ground. Due to the different clamping levels in forward and reverse direction the VESD05A6-HAF clamping behavior is bidirectional and asymmetrical (BiAs).



b) If symmetrical clamping behaviour is required the VESD05A6-HAF can also be used as a bidirectional symmetrical protection device protecting up to 5 lines. In this case pin 7 must not be connected.



<b>ELECTRICAL CHARACTERISTICS</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 $I_R = 1\text{ }\mu\text{A}$	$V_R$	5	-	-	V
Max. reverse current	at $V_R = 5\text{ V}$	$I_R$	-	< 0.1	1	$\mu\text{A}$
Reverse breakdown voltage	at $I_R = 1\text{ mA}$	$V_{BR}$	6	6.6	7.5	V
Reverse clamping voltage	at $I_{PP} = 1\text{ A}$	$V_C$	-	8.1	10	V
	at $I_{PP} = I_{PPM} = 5\text{ A}$	$V_C$	-	11.3	12	V
Forward clamping voltage	at $I_{PP} = 1\text{ A}$	$V_F$	-	1.5	1.8	V
	at $I_{PP} = I_{PPM} = 5\text{ A}$	$V_F$	-	3.2	4.5	V
Line capacitance	at $V_R = 0\text{ V}$ ; $f = 1\text{ MHz}$	$C_D$	-	40	50	pF
	at $V_R = 2.5\text{ V}$ ; $f = 1\text{ MHz}$	$C_D$	-	24	-	pF

**Note**

- BiAs mode (between pin 1, 2, 3, 4, 5 or 6 and pin 7)

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

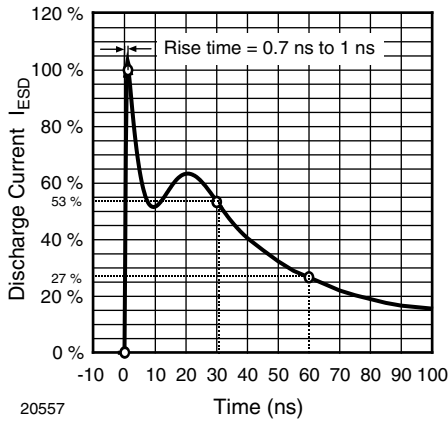


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330  $\Omega$ /150 pF)

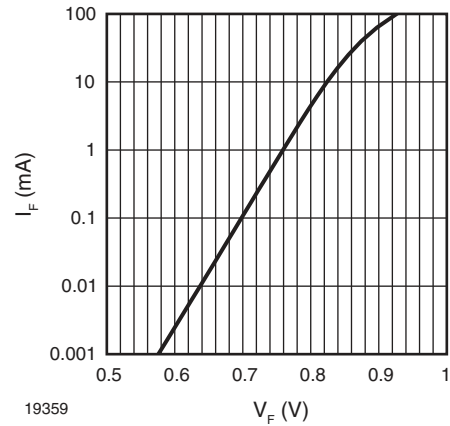


Fig. 4 - Typical Forward Current  $I_F$  vs. Forward Voltage  $V_F$

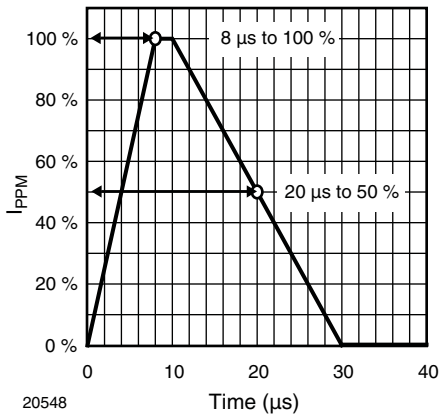


Fig. 2 - 8/20  $\mu\text{s}$  Peak Pulse Current Wave Form acc. IEC 61000-4-5

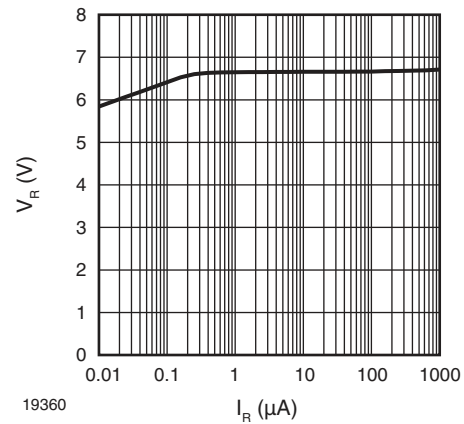


Fig. 5 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

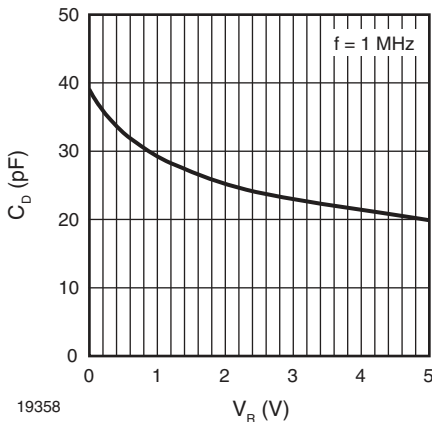


Fig. 3 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

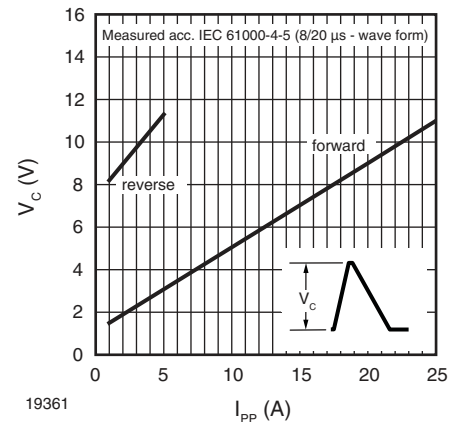


Fig. 6 - Typical Peak Clamping Voltage  $V_C$  vs. Peak Pulse Current  $I_{PP}$

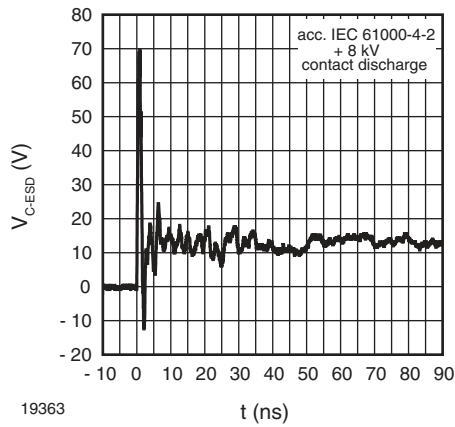


Fig. 7 - Typical Clamping Performance at + 8 kV Contact Discharge (acc. IEC 61000-4-2)

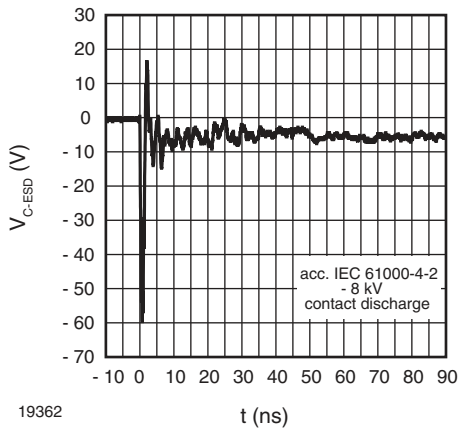


Fig. 8 - Typical Clamping Performance at - 8 kV Contact Discharge (acc. IEC 61000-4-2)

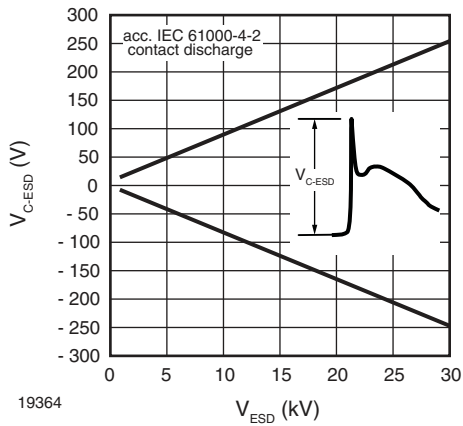
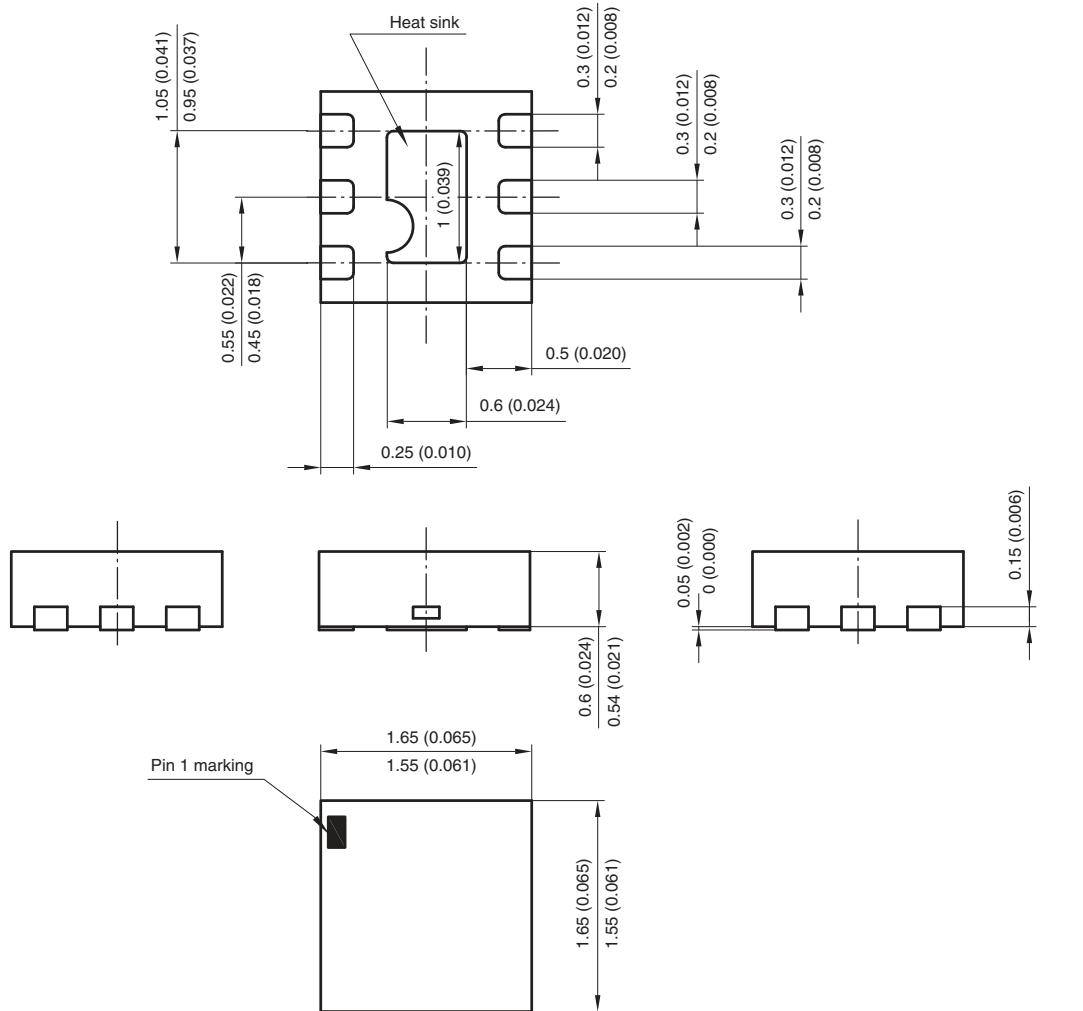
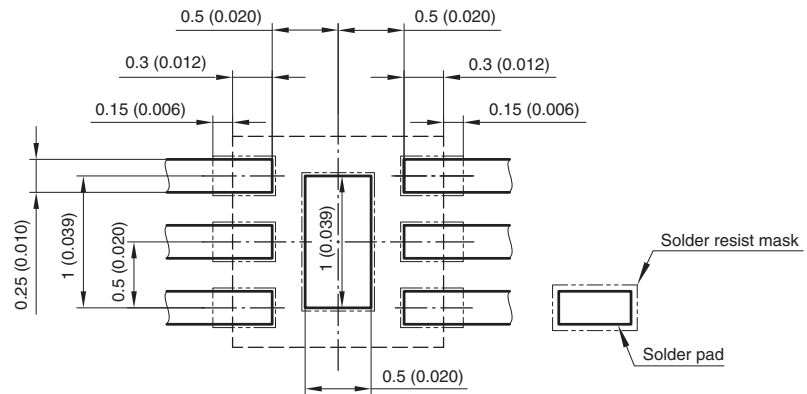


Fig. 9 - Typical Peak Clamping Voltage at ± ESD Contact Discharge (acc. IEC 61000-4-2)

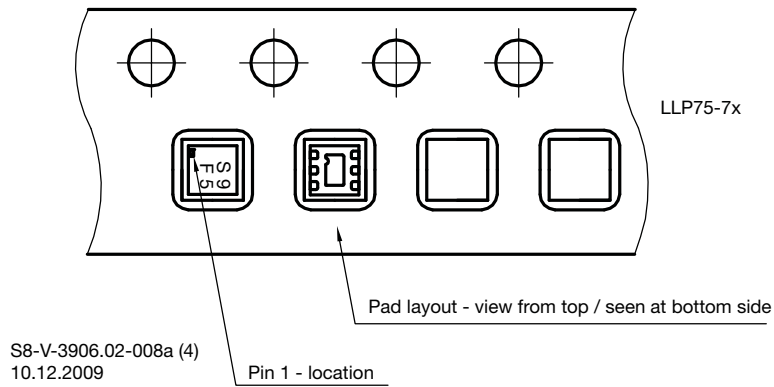
**PACKAGE DIMENSIONS** in millimeters (Inches): **LLP75-7L**



Foot print recommendation:



Document no.:S8-V-3906.02-014 (4)  
 Created - Date: 04. April 2006  
 20500





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