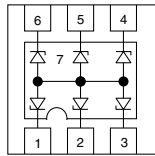
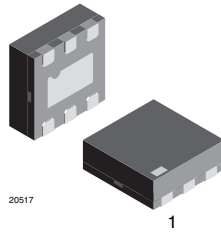


6-Line ESD Protection Diode Array in LLP75



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 $I_R < 0.1 \mu A$
- 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


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

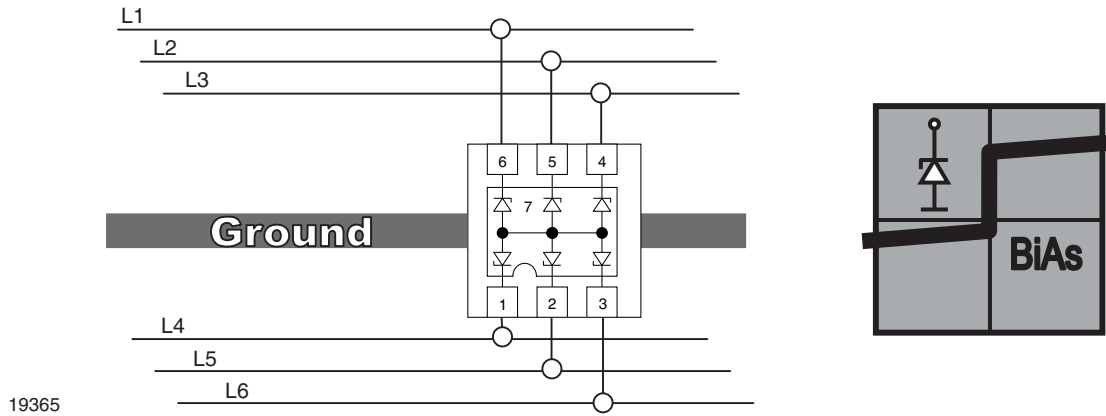
| DEVICE NAME | PACKAGE NAME | TYPE CODE | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
|---------------|--------------|-----------|--------|---|--------------------------------------|------------------------------|
| VESD05A6A-HAF | LLP75-7L | AT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

ABSOLUTE MAXIMUM RATINGS VESD05A6A-HAF

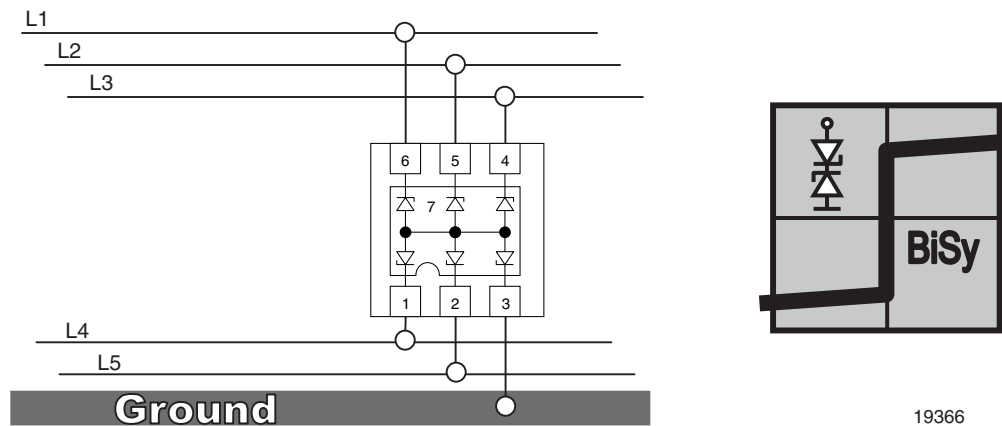
| PARAMETER | TEST CONDITIONS | SYMBOL | VALUE | UNIT |
|-----------------------|--|-------------------|-------------|------|
| Peak pulse current | BiAs-Mode: each input (pin 1 - pin 6) to ground (pin 2); acc. IEC 61000-4-5; $t_p = 8/20 \mu s$; single shot | I_{PPM} | 2.5 | A |
| | BiSy-mode: each input (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. IEC 61000-4-2; 10 pulses BiAs-mode: each input (pin 1 - pin 6) to ground (pin 2) | Contact discharge | ± 15 | kV |
| | | Air discharge | ± 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 | ± 10 | kV |
| | | Air discharge | ± 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.



| ELECTRICAL CHARACTERISTICS VESD05A6A-HAF (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 | μA |
| 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)

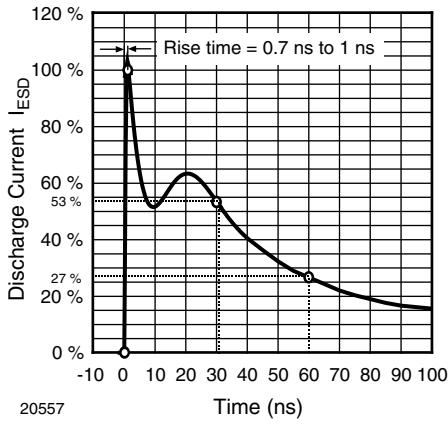


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω /150 pF)

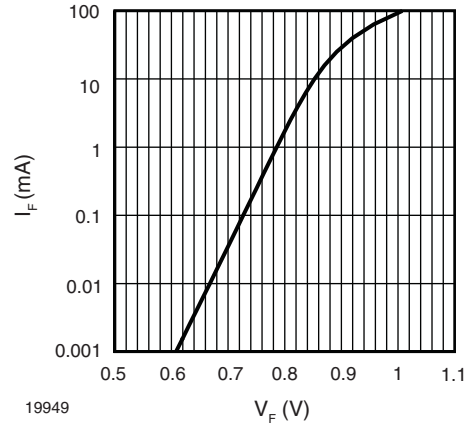


Fig. 4 - Typical Forward Current I_F vs. Forward Voltage V_F

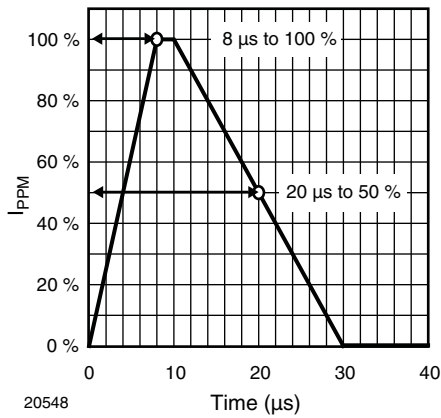


Fig. 2 - 8/20 μs Peak Pulse Current Wave Form acc. IEC 61000-4-5

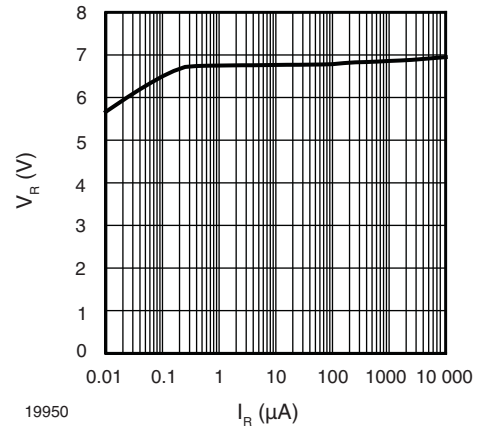


Fig. 5 - Typical Reverse Voltage V_R vs. Reverse Current I_R

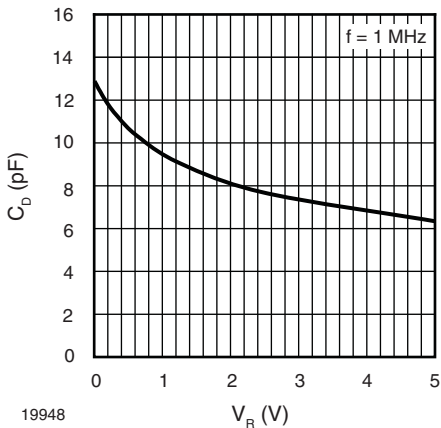


Fig. 3 - Typical Capacitance C_D vs. Reverse Voltage V_R

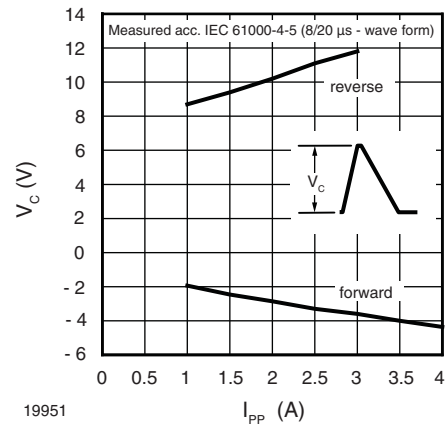


Fig. 6 - Typical Peak Clamping Voltage V_C vs. Peak Pulse Current I_{PP}

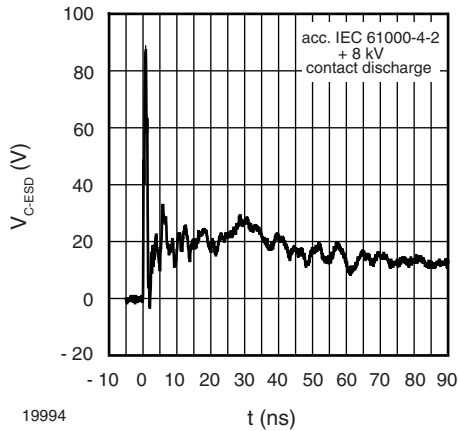


Fig. 7 - Typical Clamping Performance at + 8 kV Contact Discharge (acc. IEC 61000-4-2)

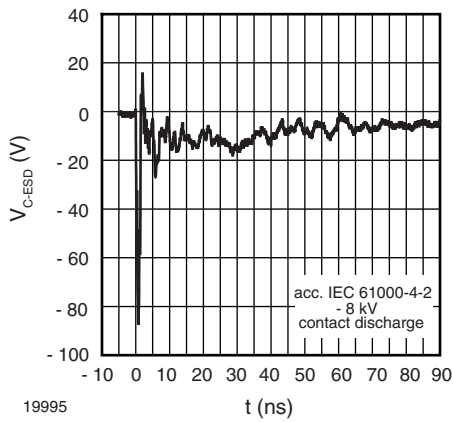


Fig. 8 - Typical Clamping Performance at - 8 kV Contact Discharge (acc. IEC 61000-4-2)

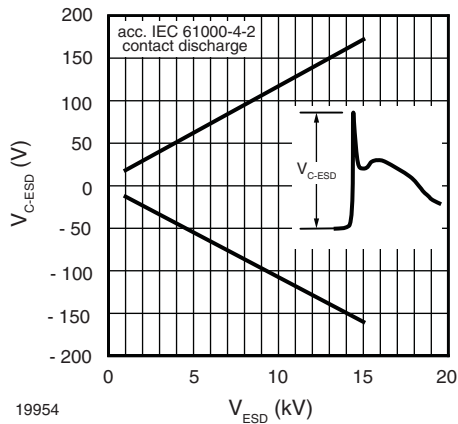


Fig. 9 - Typical max. Clamping Voltage at ESD Contact Discharge (acc. IEC 61000-4-2)



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