

1. Description

The ESD5325E is a low capacitance TVS (Transient Voltage Suppressor) array designed to protect high speed data interfaces. It has been specifically designed to protect sensitive electronic components which are connected to data and transmission lines from over-stress caused by ESD (Electrostatic Discharge).

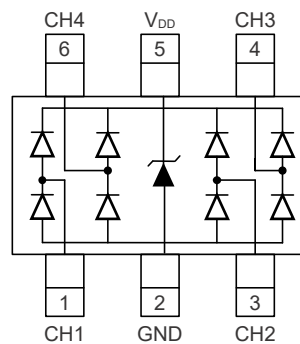
2. Applications

- USB 2.0
- Video Graphics Cards
- DVI
- IEEE 1394
- Monitors and Flat Panel Displays
- 10/100 Ethernet
- Notebooks

3. Features

- Reverse stand-off voltage: 6V max. (VDD to GND)
- Transient protection for each line according to IEC61000-4-2 (ESD): $\pm 30\text{kV}$ (contact discharge)
IEC61000-4-5 (surge): 6A (8/20 μs)
- Low capacitance: $C_{\text{I/O-GND}} = 1.0\text{pF typ.}$
- Ultra-low leakage current: $I_{\text{R}} < 1\text{nA typ.}$
- Low clamping voltage: $V_{\text{CL I/O-GND}} = 12.5\text{V}$
@ $I_{\text{PP}} = 16\text{A (TLP)}$

4. Pinning information

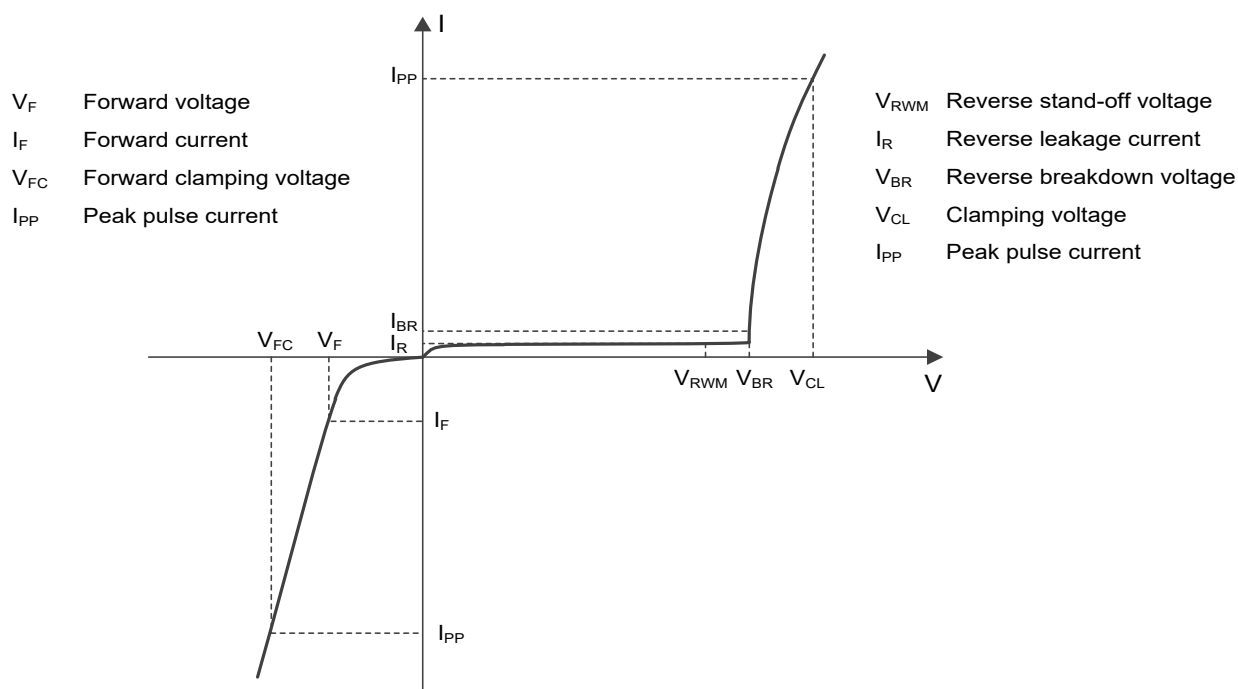


SOT23-6



5. Absolute Maximum Ratings $T_A = 25^\circ\text{C}$

Parameter	Symbol	Maximum	Units
Peak Pulse Power (8/20 μs)	P_{pk}	70	W
Peak Pulse Current (8/20 μs)	I_{pp}	6	A
Operating Supply Voltage (VDD to GND)	V_{DC}	6	V
ESD according to IEC61000-4-2 air discharge(I/O pins)	V_{ESD}	± 30	kV
ESD according to IEC61000-4-2 contact discharge(I/O pins)		± 30	kV
Junction temperature	T_J	125	$^\circ\text{C}$
Operation temperature	T_{OP}	-40 to 85	$^\circ\text{C}$
Storage temperature	T_{STG}	-55 to 150	$^\circ\text{C}$
Lead temperature	T_L	260	$^\circ\text{C}$



Definitions of electrical characteristics



6. Electrical Characteristic ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
I/O Pins						
Reverse stand-off voltage	V_{RWM}				5	V
Reverse leakage current	I_R	$V_{RWM}=5\text{V}$		<1	100	nA
Reverse breakdown voltage	V_{BR}	$I_{BR}=1\text{mA}$	7	8	9	V
Forward voltage	V_F	$I_F=10\text{mA}$	0.6	0.9	1.2	V
Clamping voltage ¹⁾	V_{CL}	$I_{PP}=16\text{A}$, $t_p=100\text{ns}$		12.5		V
Dynamic resistance ¹⁾	R_{DYN}	$t_p=100\text{ns}$		0.24		Ω
Clamping voltage ²⁾	V_{CL}	$V_{ESD}=8\text{kV}$		12.5		V
		$I_{PP}=1\text{A}$, $t_p=8/20\mu\text{s}$		8.5		V
		$I_{PP}=6\text{A}$, $t_p=8/20\mu\text{s}$		11.5		V
Junction capacitance	$C_{I/O - GND}$	$V_R=0\text{V}$, $f=1\text{MHz}$, Any I/O to GND		1	1.6	pF
	$C_{I/O - I/O}$	$V_R=0\text{V}$, $f=1\text{MHz}$, Any I/O to I/O		0.5	0.8	pF
VDD Pin						
Reverse stand-off voltage	V_{RWM}				6	V
Reverse leakage current	I_R	$V_{RWM}=6\text{V}$			1	μA
Reverse breakdown voltage	V_{BR}	$I_{BR}=1\text{mA}$	7	8	9	V
Forward voltage	V_F	$I_F=10\text{mA}$	0.6	0.9	1.2	V
Clamping voltage ¹⁾	V_{CL}	$I_{PP}=16\text{A}$, $t_p=100\text{ns}$		12		V
Dynamic resistance ¹⁾	R_{DYN}	$t_p=100\text{ns}$		0.21		Ω
Clamping voltage ²⁾	V_{CL}	$V_{ESD}=8\text{kV}$		12		V
Clamping voltage ³⁾	V_{CL}	$I_{PP}=1\text{A}$, $t_p=8/20\mu\text{s}$		8.5		V
		$I_{PP}=6\text{A}$, $t_p=8/20\mu\text{s}$		11		V

Notes:

1) TLP parameter: $Z_0=50\Omega$, $t_p=100\text{ns}$, $t_r=2\text{ns}$, averaging window from 60ns to 80ns. R_{DYN} is calculated from 4A to 16A.



7.1 Typical characteristic

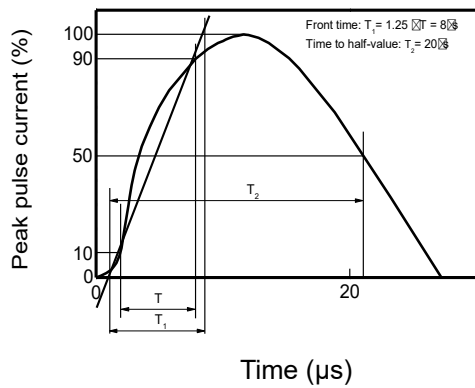


Figure 1: 8/20μs waveform per IEC61000-4-5

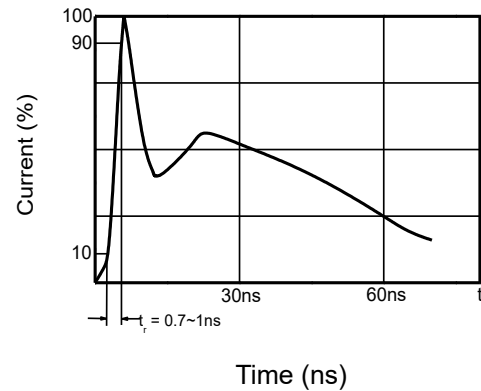


Figure 2: Contact discharge current waveform per IEC61000-4-2

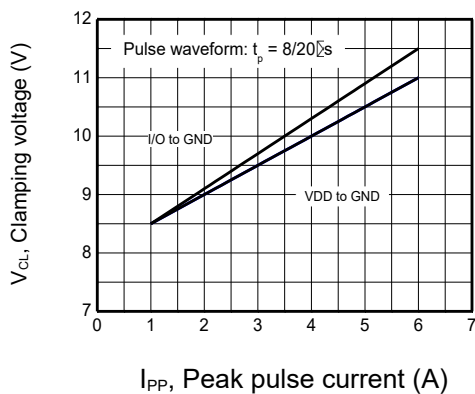


Figure 3: Clamping voltage vs. Peak pulse current

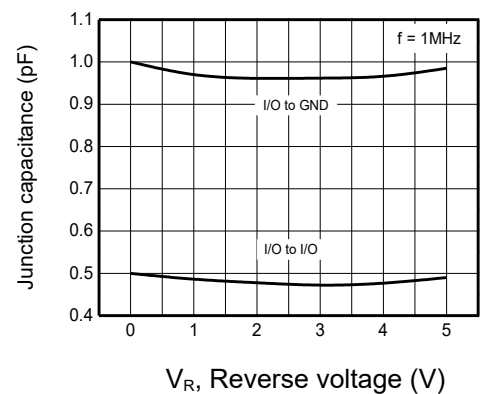


Figure 4: Capacitance vs. Reverse voltage

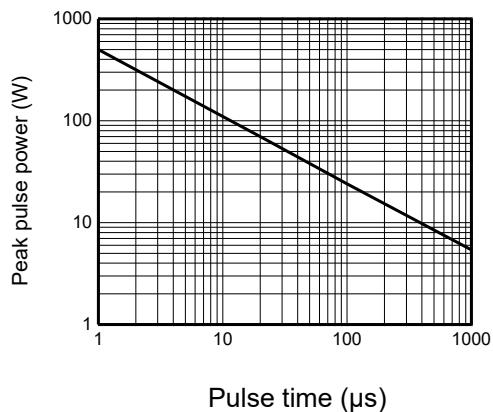


Figure 5: Non-repetitive peak pulse power vs. Pulse time

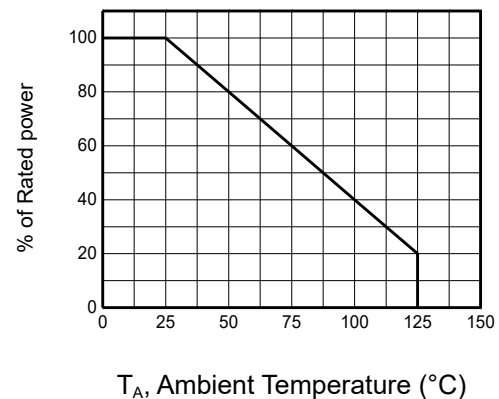


Figure 6: Power derating vs. Ambient temperature

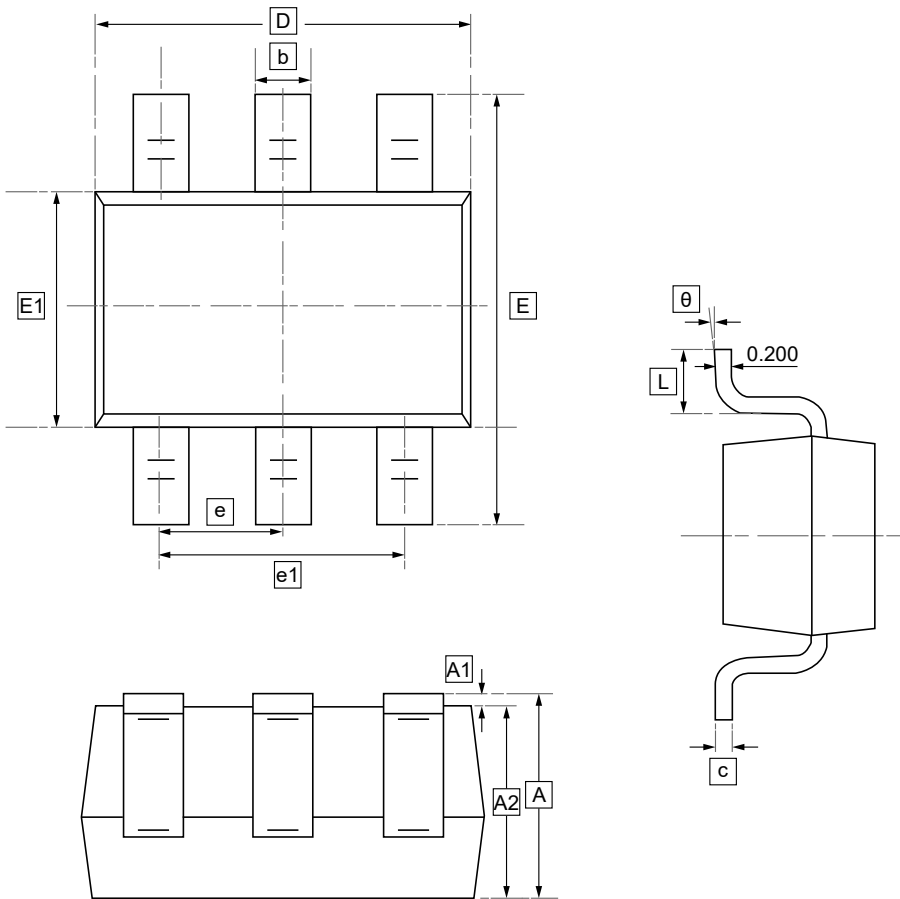


7.2Typical characteristic

Figure 7: ESD clamping (+8kV contact discharge per IEC61000-4-2)	Figure 8: ESD clamping (-8kV contact discharge per IEC61000-4-2)
R_G , Gate Resistance (Ω)	V_{SD} , Source-To-Drain Voltage (V)
Figure 9: ESD clamping - VDD to GND (+8kV contact discharge per IEC61000-4-2)	Figure 10: ESD clamping - VDD to GND (-8kV contact discharge per IEC61000-4-2)
Figure 11: TLP Measurement - I/O to GND	Figure 12: TLP Measurement - VDD to GND



8.SOT-23-6 Package Outline Dimensions

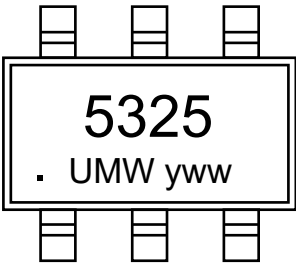


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E1	E	e	e1	L	θ
Min	1.050	0.000	1.050	0.300	0.100	2.820	1.500	2.650	0.950	1.800	0.300	0°
Max	1.250	0.100	1.150	0.500	0.200	3.020	1.700	2.950	BSC	2.000	0.600	8°



9.Ordering Information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW ESD5325E	SOT23-6	3000	Tape and reel



10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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