1.Description

The DT1446-04TS is a high performance device suitable for protecting four high speed I/Os and one VCC. These devices are assembled in SOT23-6 package. They have high ESD surge capability and low capacitance.

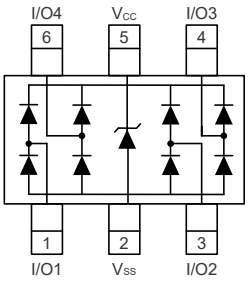
2.Applications

- Typically Used for High Speed Ports such as USB 2.0, IEEE1394, HDMI, Laptop and Personal Computers, Flat Panel Displays, Video Graphics Displays, SIM Ports

3.Features

- IEC 61000-4-2 (ESD): Air – ±19kV, Contact – ±16kV
- ESD Protection for four I/Os and one V_{CC}
- Low Channel Input Capacitance of 0.55pF Max

4.Pinning information



SOT23-6

5.Thermal resistance rating

Parameter	Symbol	Value	Units
Power Dissipation Typical (Note 5)	P_D	300	mW
Thermal Resistance, Junction to Ambient Typical (Note 5)	$R_{\theta JA}$	417	°C/W
Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

6.Absolute Maximum Ratings T_A= 25°C

Parameter	Symbol	Value	Units	Conditions
Peak Pulse Current, per IEC 61000-4-5	$I_{pp_I/O}$	4.7	A	I/O to V_{SS}, 8/20μs
Operating Voltage (DC)	V_{DC}	6	V	V_{CC} to V_{SS}
ESD Protection-Contact Discharge	$V_{ESD_I/O}$	±16	kV	I/O to V_{SS}, per IEC 61000-4-2
	$V_{ESD_}V_{CC}$	±30	kV	V_{CC} to V_{SS}, per IEC 61000-4-2
ESD Protection – Air Discharge, per IEC 61000-4-2	$V_{ESD_I/O}$	±19	kV	I/O to V_{SS}, per IEC 61000-4-2
	$V_{ESD_}V_{CC}$	±30	kV	V_{CC} to V_{SS}, per IEC 61000-4-2

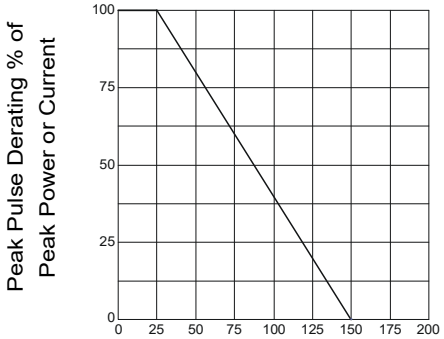
7.Electrical Characteristic (T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Reverse Working Voltage	V_{RWM}	V_{CC} to V_{SS}			5	V
Reverse Current (Note 6)	$I_{RR(Vcc\ to\ Vss)}$	V_R=V_{RWM}=5V, V_{CC} to V_{SS}			5	μA
Reverse Current (Note 6)	$I_{R(IO\ to\ Vss)}$	V_R=V_{RWM}=5V, any I/O to V_{SS}			1	μA
Reverse Breakdown Voltage	V_{BR}	I_R=1mA, V_{CC} to V_{SS}	6		9	V
Forward Clamping Voltage	V_F	I_F=15mA, V_{SS} to V_{CC}		0.8	1	V
Reverse Clamping Voltage	$V_{C_I/O}$	I_{PP}=4.7A, I/O to V_{SS}, 8/20μs		8.5		V
ESD Clamping Voltage	V_{ESD}_V_{CC}	TLP,20A, tp=100ns, V_{CC} to V_{SS}		10		V
	$V_{ESD_I/O}$	TLP,20A, tp=100ns, I/O to V_{SS}		12		V
Dynamic Resistance	R_{DIF_Vcc}	TLP,20A, tp=100ns, V_{CC} to V_{SS}		0.14		Ω
	$R_{DIF_I/O}$	TLP,20A, tp=100ns, I/O to V_{SS}		0.3		Ω
Channel Input Capacitance	$C_{I/O}$ to V_{SS}	V_R=2.5V, V_{CC}=5V, f=1MHz		0.55	0.65	pF
Channel Input Capacitance	$C_{I/O}$ to V_{SS}	V_R=2.5V, V_{CC}=floating, f=1MHz		0.65		pF
Variation of Channel Input Capacitance	$C_{I/OMAX}$-$C_{I/OMIN}$	V_{CC}=5V, V_{SS}=0V, I/O=2.5V, f=1MHz T=+25°C , $C_{I/OMAX}$-$C_{I/OMIN}$		0.03		pF
Variation of Channel Input Capacitance	$C_{I/OMAX}$-$C_{I/OMIN}$	V_{CC}=floating, V_{SS}=0V, I/O=2.5V, f=1MHz T=+25°C , $C_{I/OMAX}$-$C_{I/OMIN}$		0.05		pF

Notes:

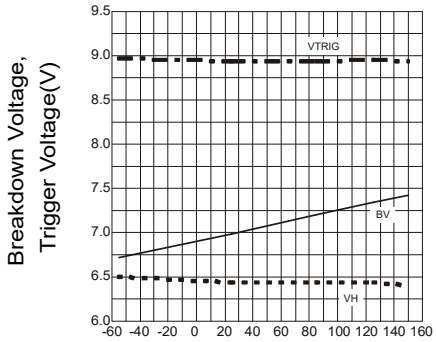
1. Device mounted on FR-4 PCB pad layout.
2. Short duration pulse test used to minimize self-heating effect.
3. Clamping voltage value is based on an 8x20μs peak pulse current (Ipp) waveform.

8.1Typical characteristic



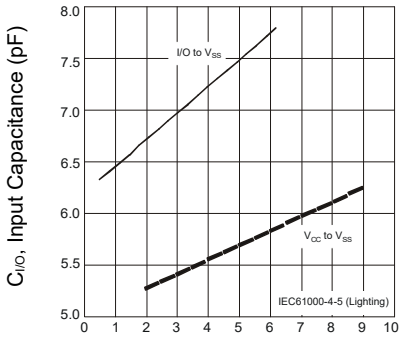
T_A, Ambient Temperature (°C)

Figure 1: Pulse Derating Curve



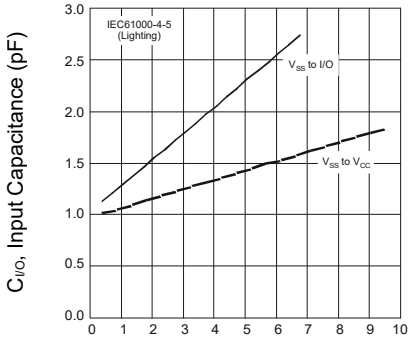
T_A, Ambient Temperature (°C)

Figure 2: BV, Trigger Voltage vs. Ambient Temperature



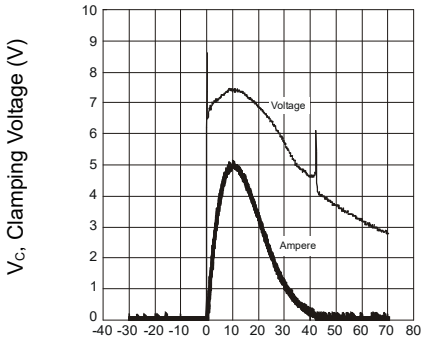
$V_{I/O}$ Input Voltage(V)

Figure 3: Input Capacitance vs. Input Voltage



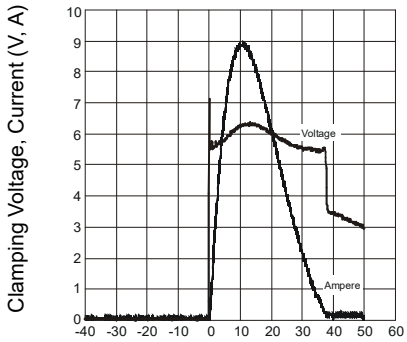
$V_{I/O}$ Input Voltage(V)

Figure 4: Input Capacitance vs. Input Voltage



Current From I/O TO V_{SS}(A)

Figure 5: Clamping Voltage Characteristic



t,Time (μs)

Figure 6: Waveform of Clamping Voltage, Current vs. Time (8/20μs, I/O to V_{SS})

8.2Typical characteristic

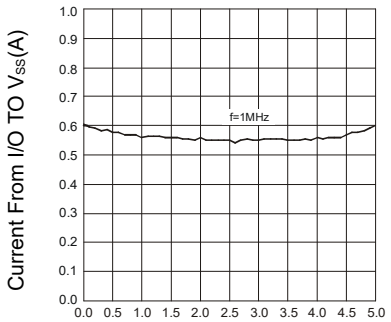


Figure 7: Transmission Line Pulsing(TLP) Measureent Current vs.Voltage

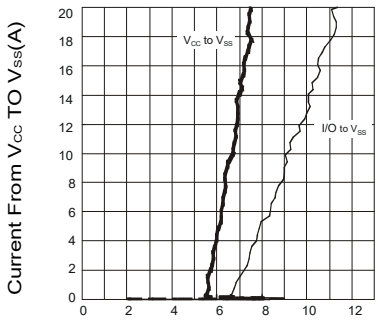
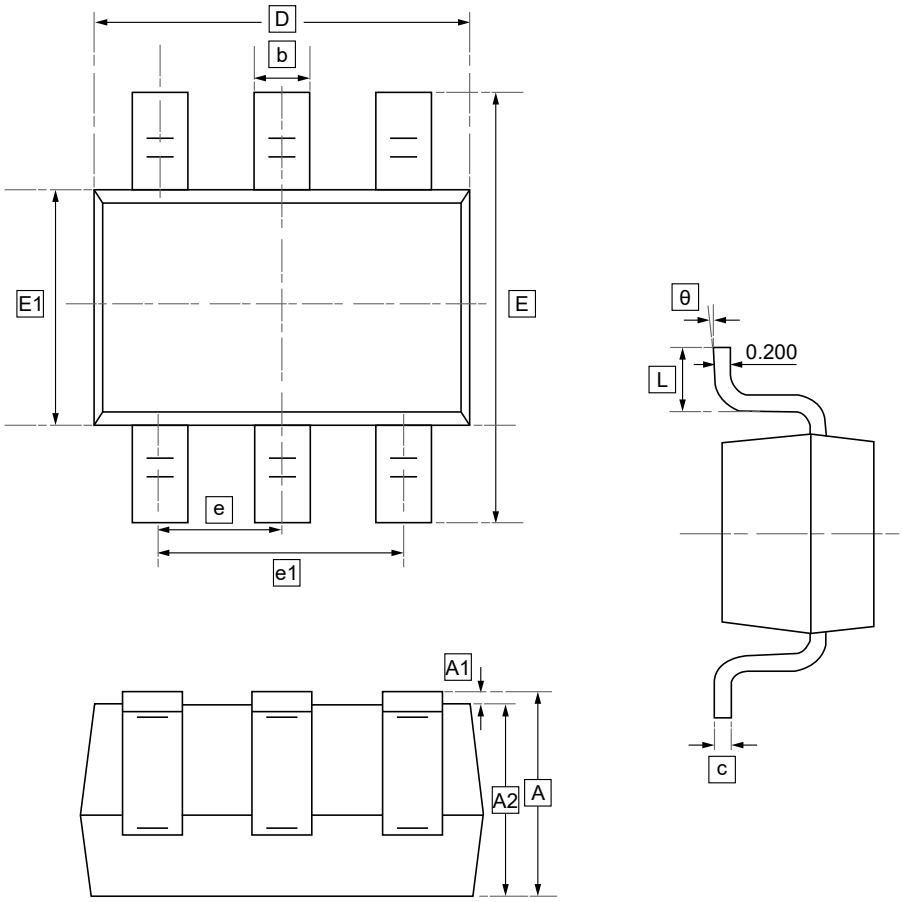


Figure 8: Transmission Line Pulsing(TLP) Measureent Current vs.Voltage

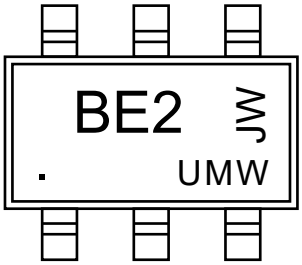
9.SOT-23-6 Package Outline Dimensions



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°

10.Ordering Information



W: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW DT1446-04TS-7	SOT23-6	3000	Tape and reel

11.Disclaimer

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