

LL054BT36B

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LL054BT36B

Surface Mount TVS Diode Array For 4 Lines I/O ESD Protection: 5.0V

Features

- Protects four data lines
- Low capacitance : 0.3pF I/O
- Low leakage current: 0.1 μ A @ V_{RWM} (Typical)
- Low clamping voltage
- Each I/O pin can withstand over 1000 ESD strikes for ± 8 kV contact discharge.
- IEC61000-4-2 (ESD) ± 25 kV (air), ± 17 kV (contact)
- IEC61000-4-4 (EFT) 40A (5/50ns), Cable discharge event (CDE).
- Suffix "-H" indicates Halogen-free part, ex.LL054BT36B-H.

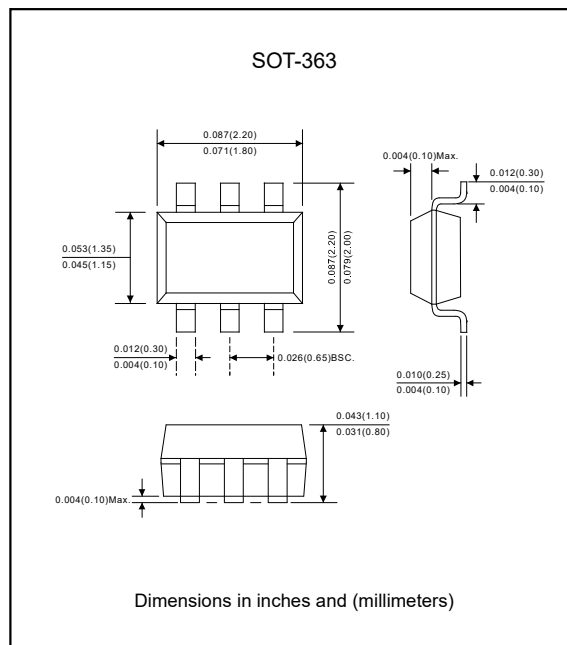
Applications

- Video graphics cards.
- Desktops, servers and notebooks.
- IEEE 1394 ports.
- USB2.0 Power and data line protection.
- SIM Ports.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-363
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.006 gram

Package outline



Maximum ratings (at $T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak pulse current ($t_p=8/20\mu\text{s}$)	I_{PP}	5	A
ESD per IEC 61000-4-2 (Contact)	V_{ESD}	± 17	KV
ESD per IEC 61000-4-2 (Air)		± 25	
Operating temperature	T_{OPT}	+125	$^\circ\text{C}$
Storage temperature	T_{STG}	-55 to +150	$^\circ\text{C}$

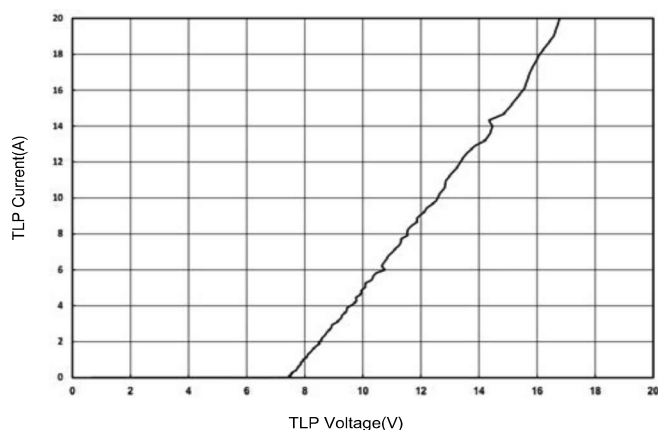
Electrical characteristics (at $T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse stand-off voltage		V_{RWM}			5.0	V
Reverse leakage current	$V_{RWM}=5.0\text{V}$, (Between I/O and GND)	I_R		0.1	1.0	μA
Reverse Breakdown voltage	$I_T=1\text{mA}$, (Between I/O and GND)	V_{BR}	6.0		9.0	V
Clamping voltage	$I_{PP}=5\text{A}$, $t_p=8/20\mu\text{s}$, (Between I/O and GND)	V_C			12	V
	$I_{PP}=10\text{A}$, $t_p=8/20\mu\text{s}$, (Between V_{CC} and GND)				12	
Junction capacitance	$V_R=0\text{V}$, $f=1\text{MHz}$, (Between V_{CC} and GND)	C_{ESD}			150	pF
	$V_R=0\text{V}$, $f=1\text{MHz}$, (Between I/O and GND)			0.6	0.8	
	$V_R=0\text{V}$, $f=1\text{MHz}$, (Between I/O and I/O)			0.3	0.4	

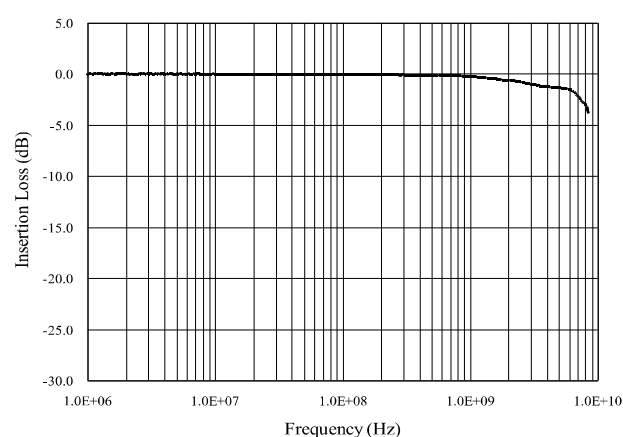
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Rating and characteristic curves

TLP Measurement of I/O to GND

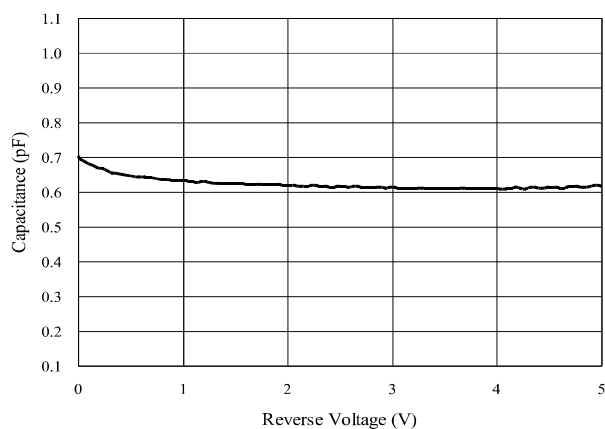


Insertion Loss S21 of I/O to GND

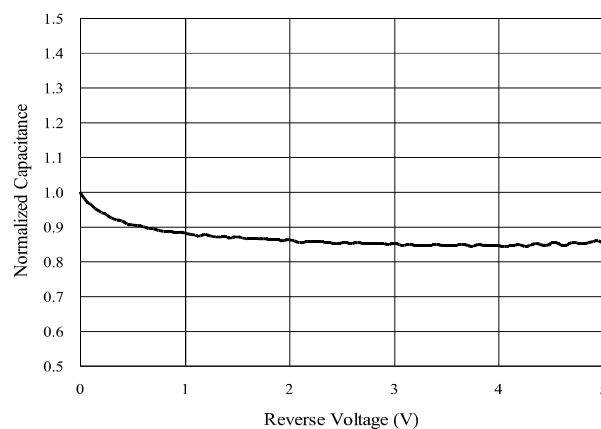
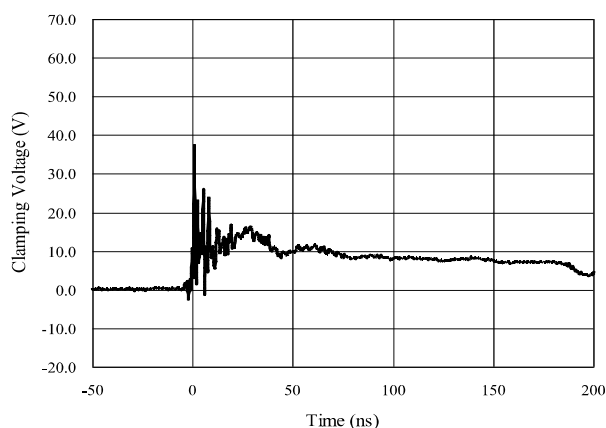
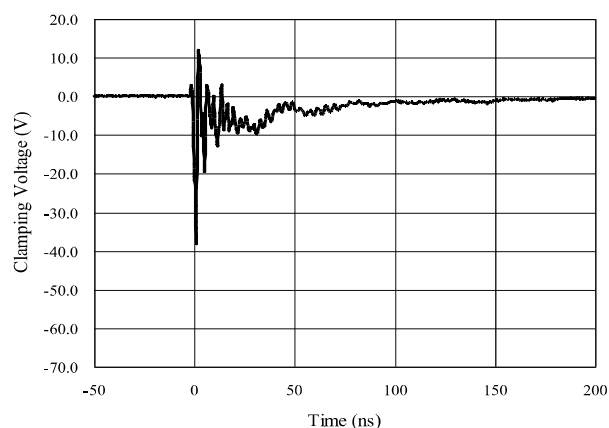


Capacitance vs. Voltage of I/O to GND (f = 1MHz)

Capacitance vs. Reverse Voltage

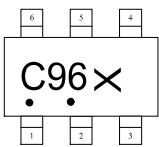
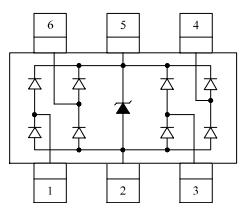


Normalized Capacitance vs. Reverse Voltage

ESD Clamping of I/O to GND
(+8kV Contact per IEC 61000-4-2)ESD Clamping of I/O to GND
(-8kV Contact per IEC 61000-4-2)

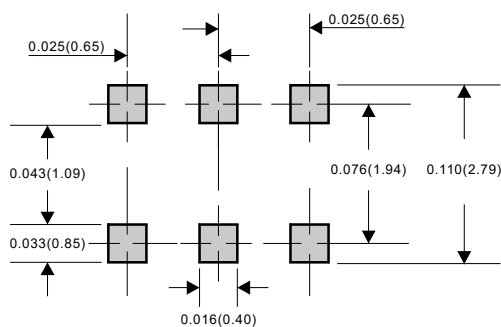
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Pinning information

Type number	Marking code	Symbol
LL054BT36B	 Note: (1) "C96" is part number, fixed. (2) X is date code (3) A dot under the C and 6	

Suggested solder pad layout

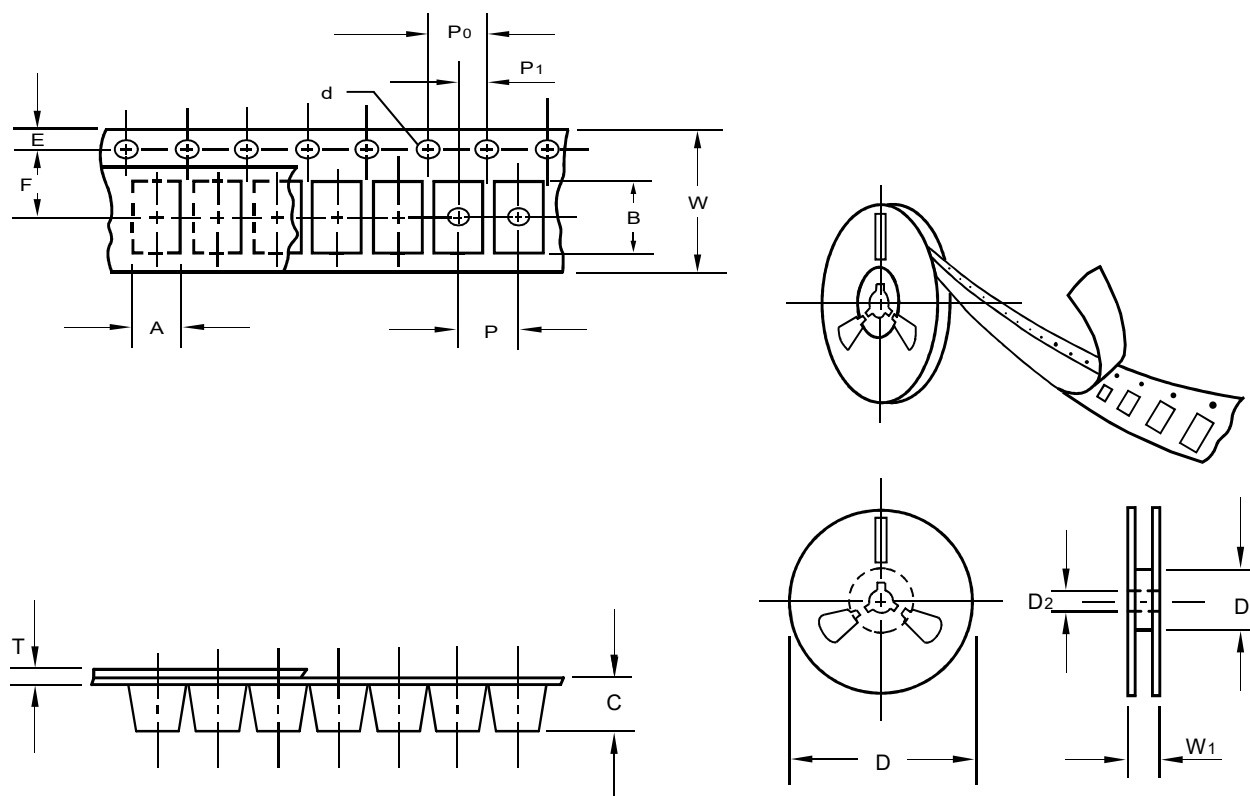
SOT-363



Dimensions in inches and (millimeters)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-363
Carrier width	A	0.1	2.36
Carrier length	B	0.1	2.40
Carrier depth	C	0.1	1.20
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	62.00
Feed hole diameter	D ₂	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	11.40

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

Reel packing

Suggested thermal profiles for soldering processes

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Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	$<3^{\circ}\text{C}/\text{sec}$
Preheat -Temperature Min(T_{min}) -Temperature Max(T_{max}) -Time(min to max)(t_s)	150°C 200°C $60\sim 120\text{sec}$
T_{max} to T_L -Ramp-upRate	$<3^{\circ}\text{C}/\text{sec}$
Time maintained above: -Temperature(T_L) -Time(t_L)	217°C $60\sim 260\text{sec}$
Peak Temperature(T_P)	$255^{\circ}\text{C}-0/+5^{\circ}\text{C}$
Time within 5°C of actual Peak Temperature(t_P)	$10\sim 30\text{sec}$
Ramp-down Rate	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$

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High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at $260 \pm 5^\circ\text{C}$ for $10 \pm 2\text{sec.}$	MIL-STD-750D METHOD-2031
2. Solderability	at $245 \pm 5^\circ\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_{BR} = V_{BR\text{Min}} * 80\%$ at $T_J = 150^\circ\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{SIG}$ at $T_A = 121^\circ\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to $+125^\circ\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at $T_A = 85^\circ\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031