

LL054BT36L1

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4-Channel Ultra Low Capacitance ESD Protection Diodes Array: 5.0V

Features

- Working voltages : 5V
- Ultra low capacitance.
- Low leakage current.
- IEC61000-4-2 (ESD) $\pm 30\text{kV}$ (air), $\pm 25\text{kV}$ (contact)
- IEC61000-4-4 (EFT) 40A (5/50ns)
- IEC61000-4-5 (Lightning) 4,5A (8/20 μs)
- Suffix "-H" indicates Halogen-free part, ex.LL054BT36L1-H.

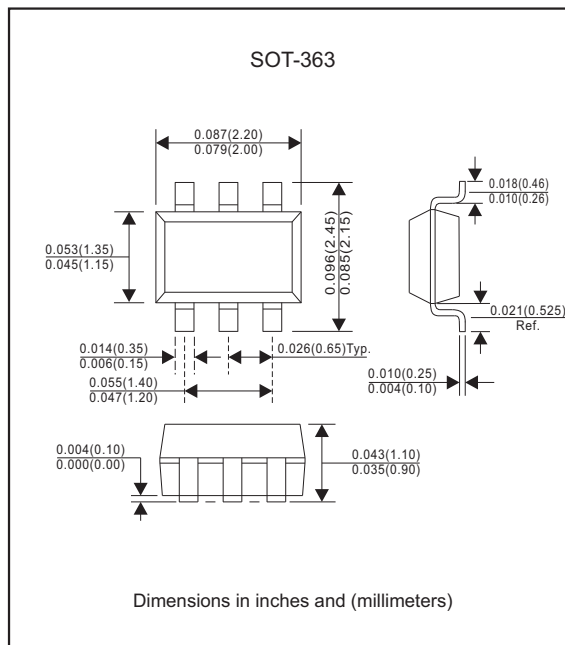
Applications

- Video & Graphics Card.
- Digital Visual Interface (DVI).
- USB 2.0 Power and Data lines protection.
- Notebook and PC Computers.
- Monitors and Flat Panel Displays.

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 Power (According to IEC 61000-4-5)	P _{PP}	56	W
Peak Pulse Current (According to IEC 61000-4-5)	I _{PP}	4.5	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	ESD	± 30 ± 25	KV
Operating junction temperature range	T _J	-55 to +85	$^\circ\text{C}$
Storage temperature range	T _{STG}	-55 to +150	$^\circ\text{C}$

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

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Reverse Stand-Off Voltage		V _{RWM}			5	V
Reverse Breakdown Voltage	I _T =1mA	V _{BR}	6		8.5	V
Reverse Leakage Current	V _{RWM} =5V	I _R			500	nA
Forward Voltage	I _F =10mA	V _F	0.5	0.8	1	V
Clamping Voltage (Note 1)	I _{PP} =4.5A, T _P =8/20 μs	V _C		10.5	12.5	V
Clamping Voltage	I _{PP} =0.4A, T _{LP} =0.2/100ns I _{PP} =16.0A, T _{LP} =0.2/100ns	V _C		9.0 12.6		V
Junction Capacitance	I/O Pin to GND, V _R =0V, f=1MHz	C _J		0.6	1.5	pF
	Between I/O Pins, V _R =0V, f=1MHz			0.3	0.6	
Dynamic Resistance (Note 2'3)	T _{LP} = 0.2/100ns	R _D		0.3		Ω

Note:

1. Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC 61000-4-5.
2. TLP Settings: t_p = 100ns, t_r = 0.2ns, I_{TLP} and V_{TLP} averaging window: t₁ = 70ns to t₂ = 90ns.
3. Dynamic resistance calculated from I_{PP} = 4A to I_{PP} = 16A using "Best Fit"

Rating and characteristic curves(LL054BT36L1)

FIG.1 Peak Pulse Power vs. Pulse Time

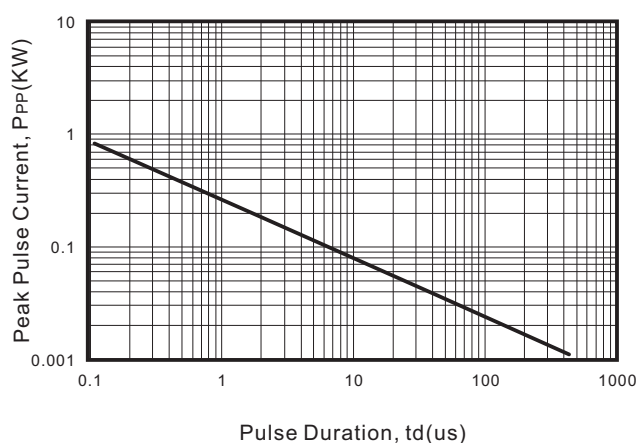


Fig.2 Power derating curve

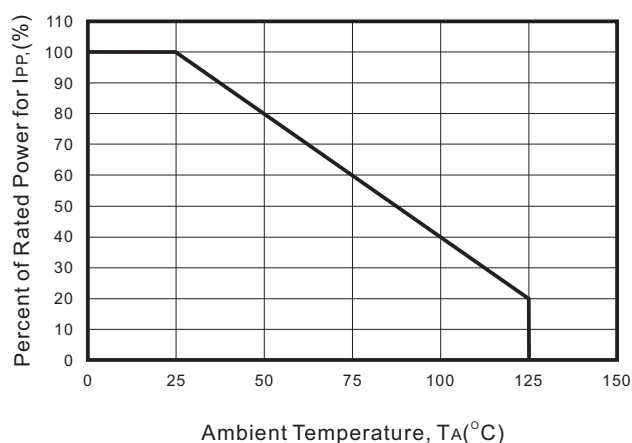


FIG.3 Claming Voltage vs. Peak Pulse Current

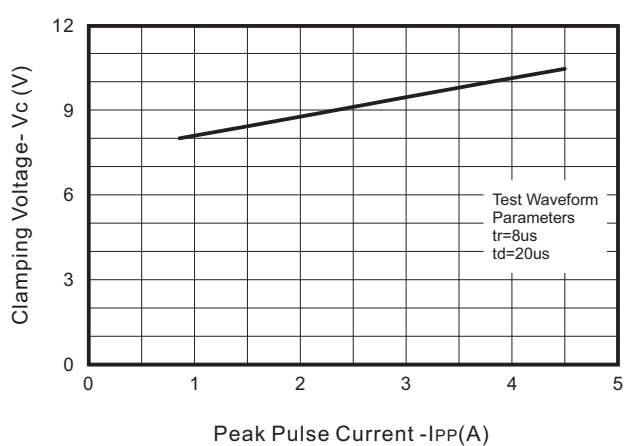


FIG.4 Capacitance between terminals characteristics

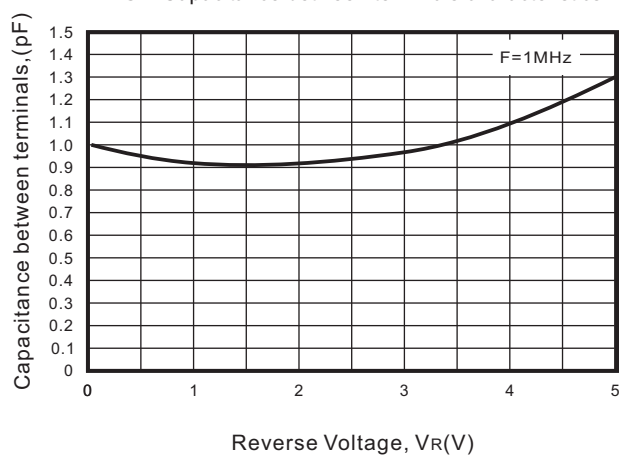


FIG.5 Pulse Waveform

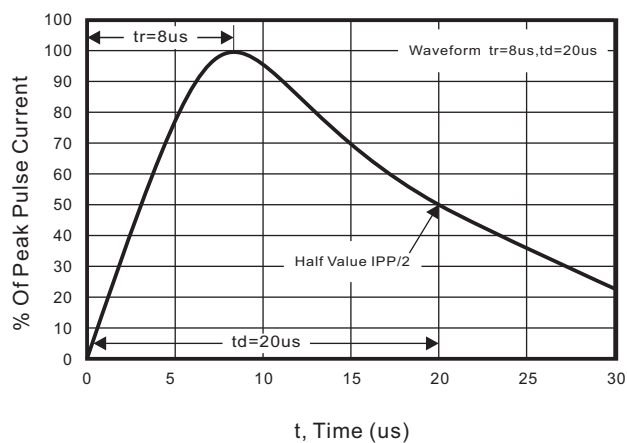
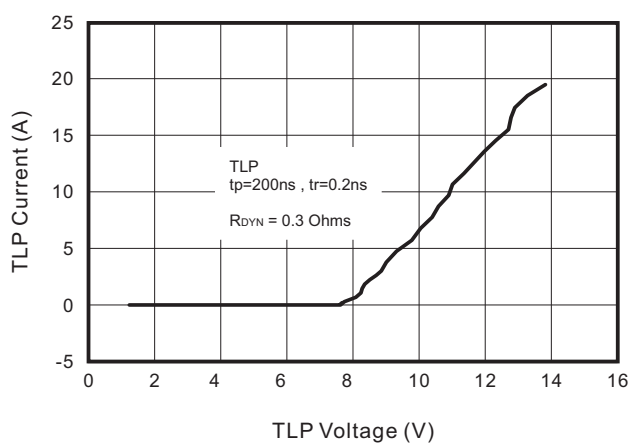
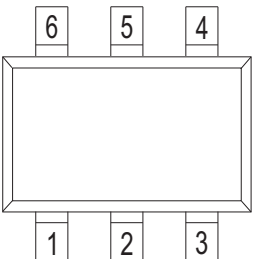
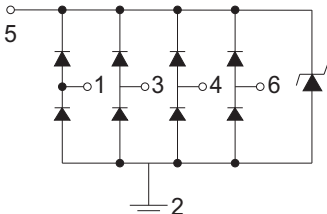


FIG.6 TLP Measurement

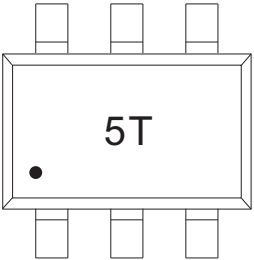


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Pinning information

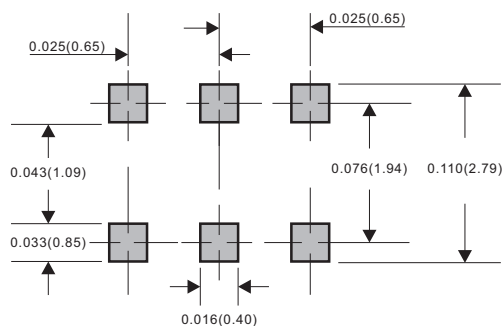
Pin Configuration	Simplified outline	Circuit Diagram
1, 3, 4, 6 I/O 5 VRWM 2 GND		

Marking

Type number	Marking code
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Suggested solder pad layout

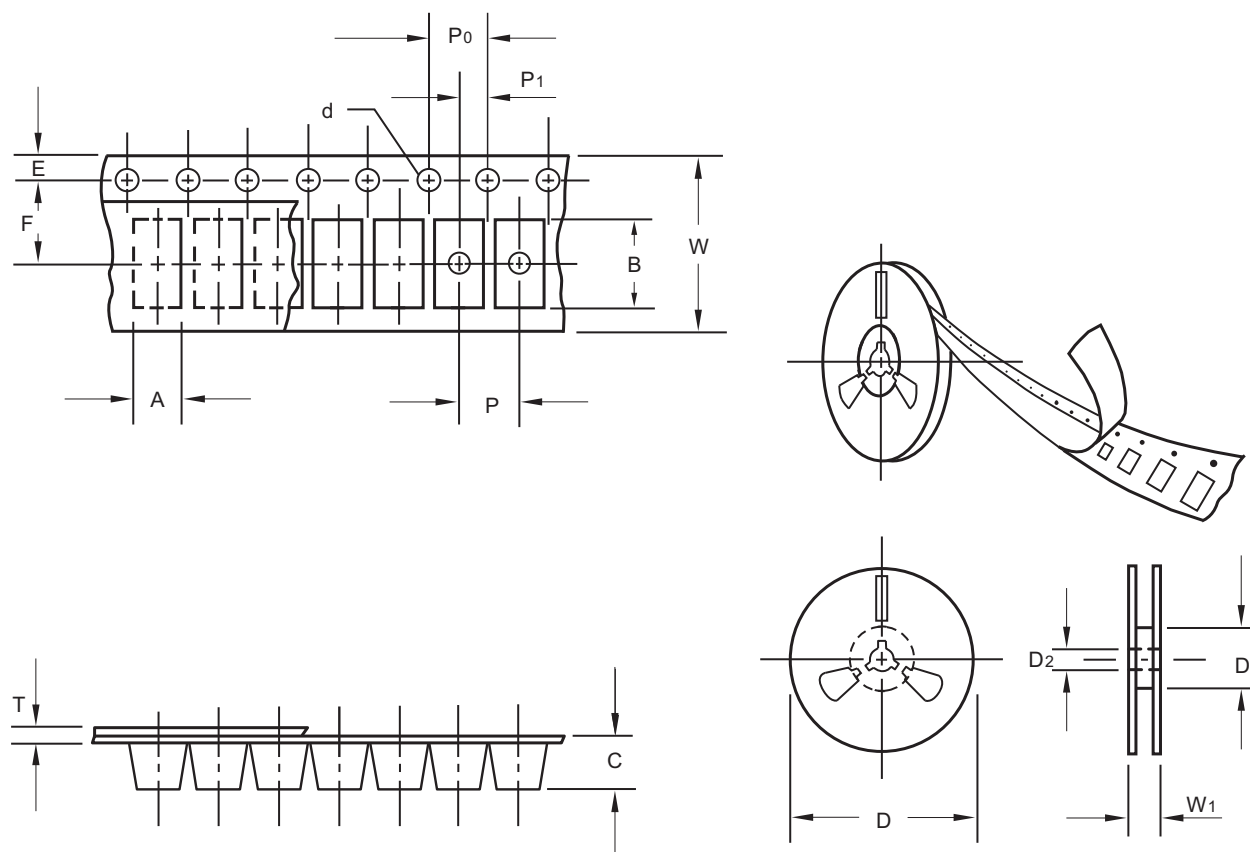
SOT-363



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	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	62.00
Feed hole diameter	D2	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	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	11.40

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

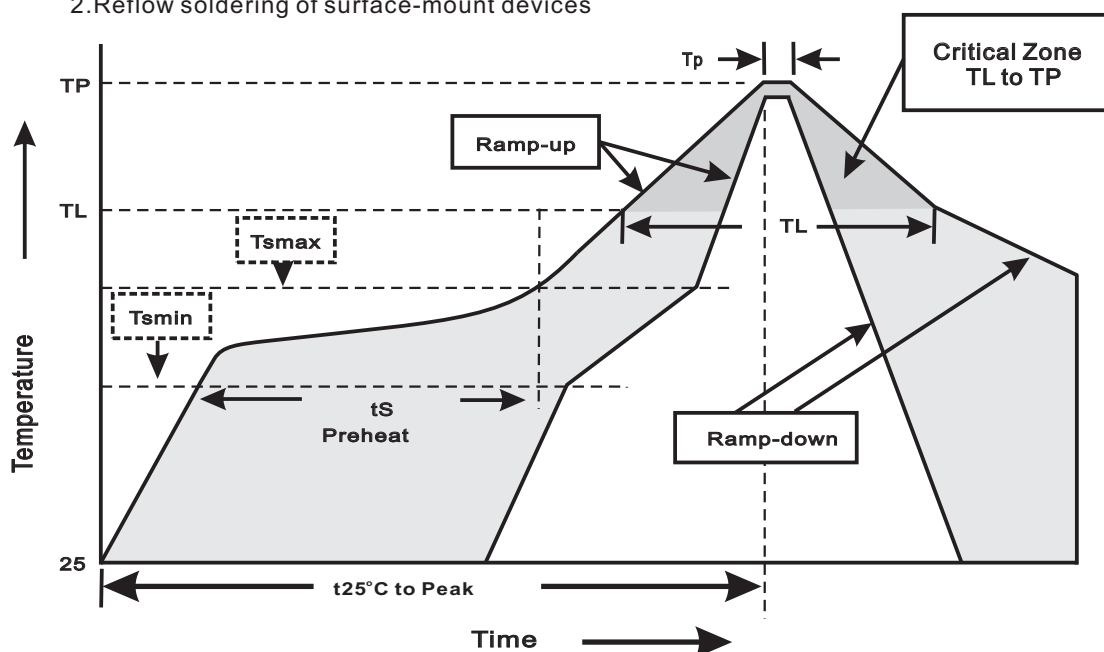
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-363	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	9.50

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{Smin}) -Temperature Max(T _{Smax}) -Time(min to max)(t _S)	150°C 200°C 60~120sec
T _{Smax} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _P)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

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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