LL054BT2510-1

List

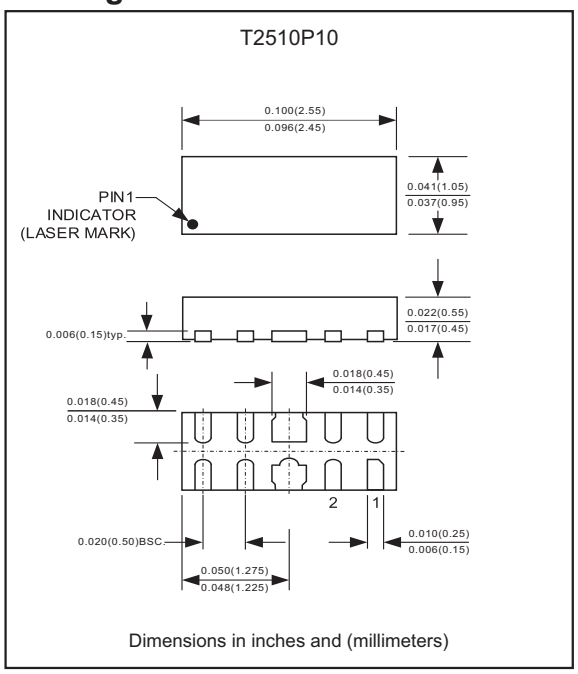
LL054BT2510-1

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

Features

- Solid-state silicon-avalanche technology
- Low operating and clamping voltage
- Up to four I/O line of protection
- Ultra low capacitance : 0.3pF typical (I/O to I/O)
- IEC61000-4-2 (ESD) ±22kV(Contact), ±25kV(Air)
- IEC61000-4-2 (EFT) 40A (5/50ns)
- IEC61000-4-5 (Lightning) 4.5A (8/20μs)
- Low leakage
- Low operating voltage 5V
- Flow - through design
- RoHS compliant
- Suffix "-H" indicates Halogen-free parts, ex. LL054BT2510-1-H

Package outline



Dimensions in inches and (millimeters)

Applications

- Digital visual interface
- MDDI ports
- Display port TM interface
- PCI express
- High definition multi - media interface (HDMI)
- eSATA Interfaces

Mechanical data

- Flammability Rating: UL 94V-0
- Terminal: Matte tin plated
- Case : Molded plastic, T2510P10
- Mounting Position : Any
- Weight : 3.6 Millgrams (Approximate)

Maximum ratings (at T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak pulse power (tp=8/20μs)	P_{PP}	68	W
Peak pulse current (tp=8/20μs)	I_{PP}	4.5	A
ESD per IEC 61000-4-2 (Contact)	V_{ESD}	±22	kV
ESD per IEC 61000-4-2 (Air)		±25	
Operating junction temperature range	T_J	-55 to +125	°C
Storage temperature range	T_{STG}	-55 to +150	°C

Electrical characteristics (at T_A=25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	Any I/O pin to ground	V_{RWM}			5.0	V
Reverse breakdown voltage	I_T=1mA, Any I/O pin to ground	V_{BR}	6.0			V
Reverse leakage current	V_{RWM}=5V, Any I/O pin to ground	I_R			0.5	μA
Clamping voltage	I_{PP}=1A, tp=8/20μs Any I/O pin to ground	V_C			9	V
	I_{PP}=4.5A, tp=8/20μs Any I/O pin to ground				15	
Dynamic resistance (Note 1,2)	T_{LP}=0.2/100ns	R_{DYN}		0.5		Ω
ESD Clamping voltage (Note 1)	I_{PP}=4A, tp=0.2/100ns (T_{LP})	V_C		10		V
	I_{PP}=16A, tp=0.2/100ns (T_{LP})			16		
Junction capacitance	V_R=0V, f=1MHz, I/O pin to GND	C_J			0.8	pF
	V_R=0V, f=1MHz, Between I/O pins			0.3	0.4	

Notes:
1. T_{LP} Setting:tp=100ns, tr=0.2ns, I_{TLP} and V_{TLP} sample window: t1=70ns to t2=90ns
2. Dynamic resistance calculated from I_{PP}=4A to I_{PP}=16A using " Best Fit"

Rating and characteristic curves(LL054BT2510-1)

Fig.1Peak Pulse Power vs. Pulse Time

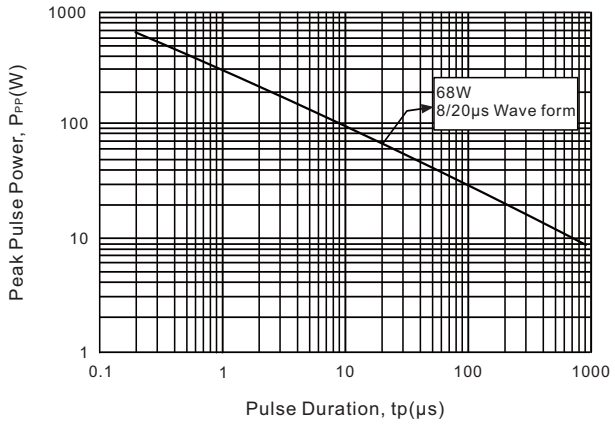


Fig.2 Power Derating Curve

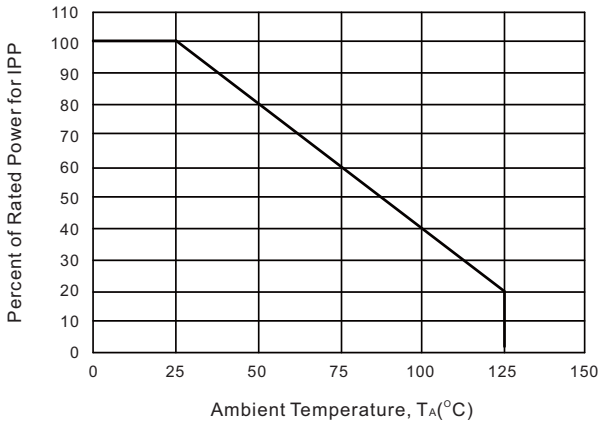


Fig.3 Clamping Voltage vs. Peak Pulse Current

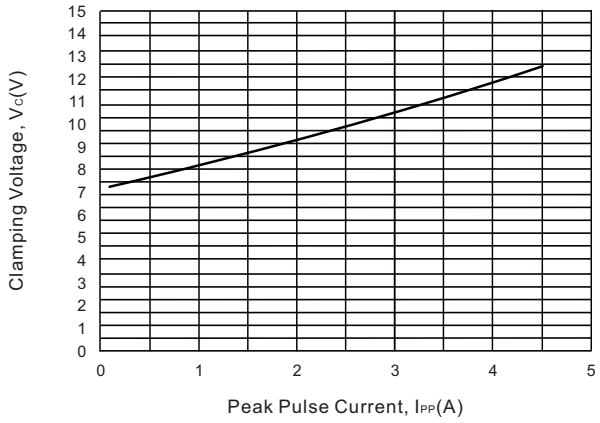


Fig.4 Normalized Junction Capacitance vs Reverse Voltage

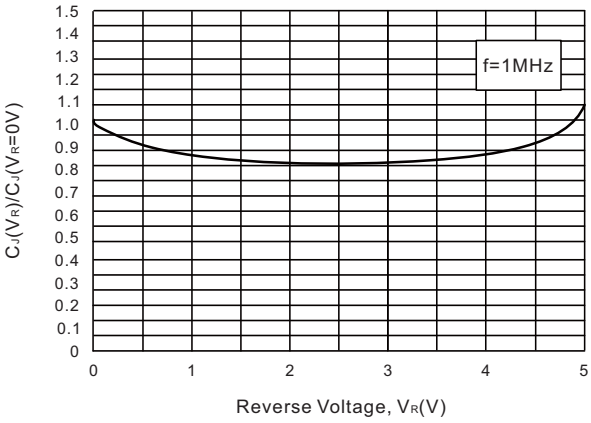


Fig.5 Pulse Waveform

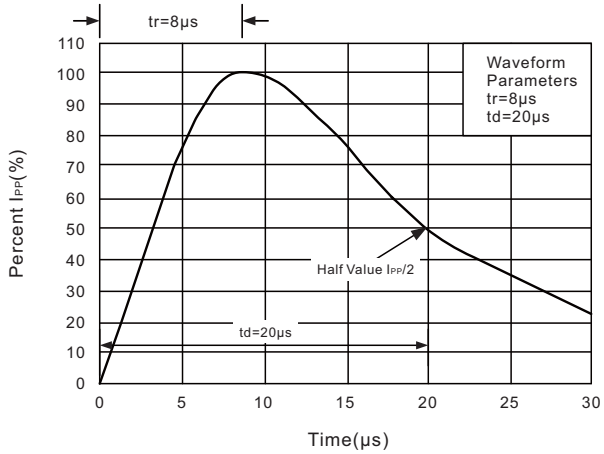
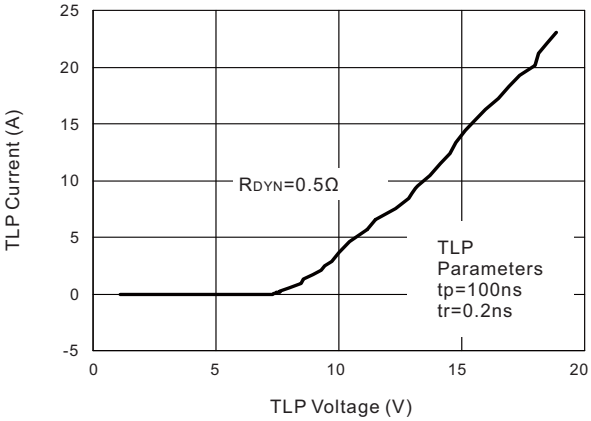


Fig.6 TLP I-V Curve



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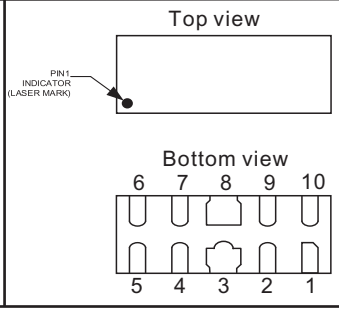
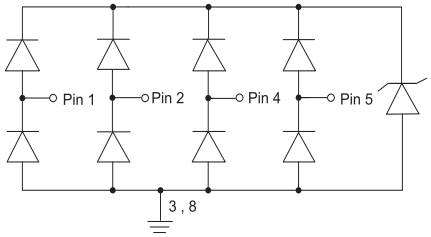
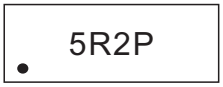
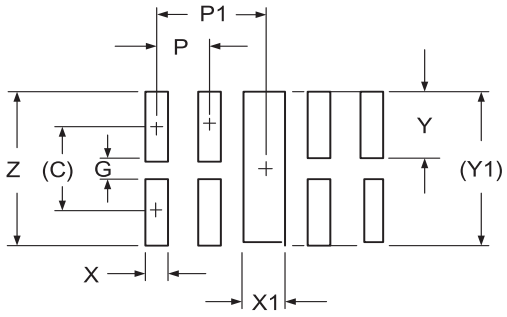
Pinning information

Pin	Simplified outline	Symbol
1,2,4,5 Input Lines 6,7,9,10 Out Lines (No Internal Connection) 3,8 Ground		

Marking

Type number	Marking code
LL054BT2510-1	

Suggested solder pad layout



DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	(.034)	(0.875)
G	.008	0.20
P	.020	0.50
P1	.039	1.00
X	.010	0.25
X1	.018	0.45
Y	.027	0.675
Y1	(.061)	(1.55)
Z	.061	1.55

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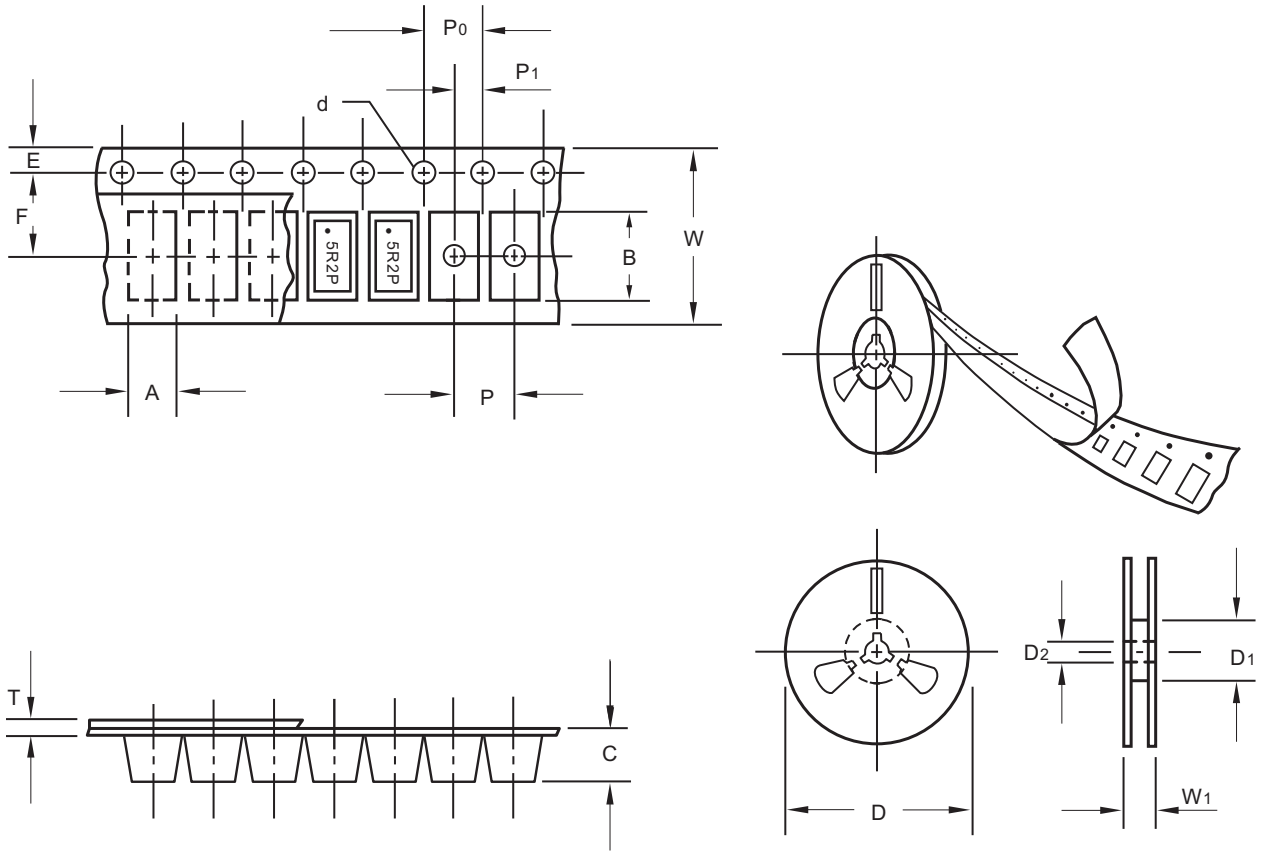
Packing information



unit:mm

Item	Symbol	Tolerance	T2510P10
Carrier width	A	0.05	1.20
Carrier length	B	0.05	2.70
Carrier depth	C	0.05	0.70
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	60.00
Feed hole diameter	D_2	0.2	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	0.05	2.00
Overall tape thickness	T	0.1	0.20
Tape width	W	0.3	8.00
Reel width	W_1	1.0	13.1

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

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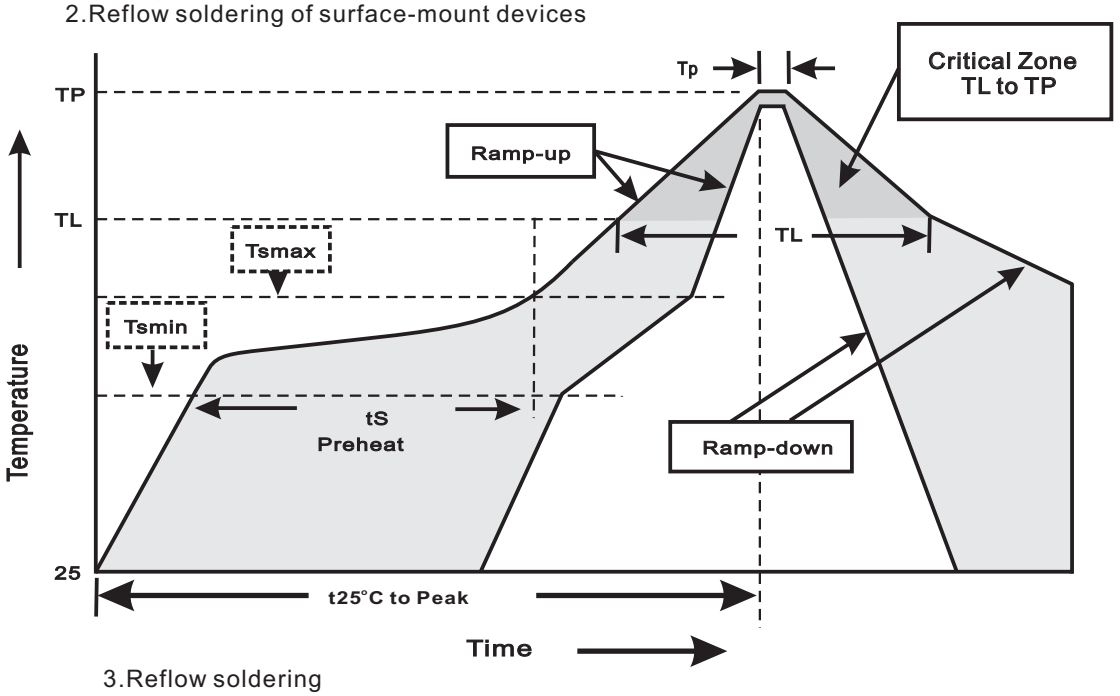
Reel packing

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)
T2510P10	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000

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(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax 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±5°C for 10±2sec.	MIL-STD-750D METHOD-2031
2. Solderability	at 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	V_{BR}=V_{BR} MIN*80% at T_J=125°C for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	15P_{SIG} at T_A=121°C for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to +125°C dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at T_A=85°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