

LL034BT2510L1

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4-Channel Ultra Low Capacitance ESD Protection Diodes Array- 3.3V

Features

- Solid-state silicon-avalanche technology.
- Low operating and clamping voltage.
- Up to four I/O line of protection.
- Ultra low capacitance : 0.25pF typical (Between I/O Pins).
- IEC61000-4-2 (ESD) $\pm 30\text{KV}$ (Air), $\pm 30\text{KV}$ (Contact).
- IEC61000-4-2 (EFT) 40A (5/50ns).
- IEC61000-4-5 (Lightning) 2.5A (8/20 μs)
- Low leakage.
- Low operating voltage : 3.3V
- Flow - through design.
- RoHS Compliant
- Suffix "-H" indicates Halogen-free parts, ex. LL034BT2510L1-H

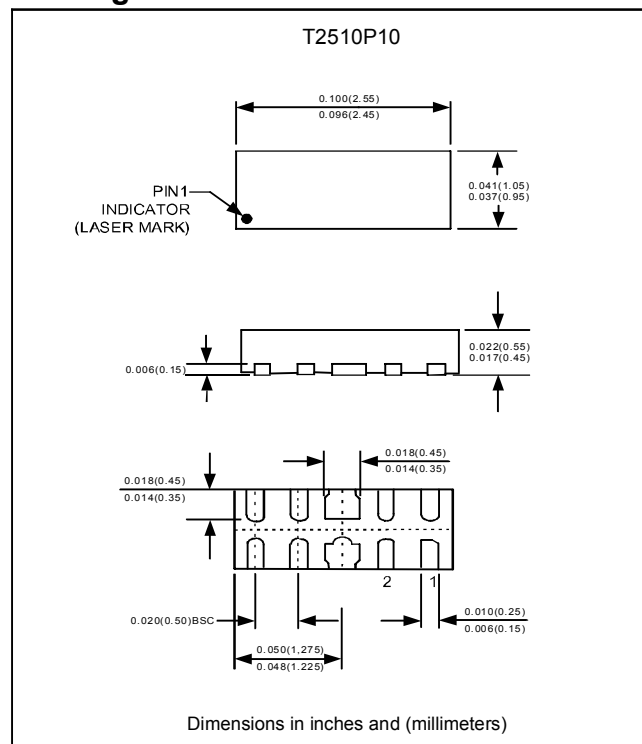
Applications

- Digital Visual Interface(DVI).
- 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 Milligrams (Approximate)

Package outline



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

Rating	Symbol	Value	Unit
Peak pulse power (tp=8/20 μs)	P_{PP}	25	W
Peak pulse current (tp=8/20 μs)	I_{PP}	2.5	A
ESD per IEC 61000-4-2 (Air)	V_{ESD}	± 30	KV
ESD per IEC 61000-4-2 (Contact)		± 30	
Operating Temperature	T_j	-55 to +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	Any I/O pin to ground	V_{RWM}			3.3	V
Reverse breakdown voltage	$I_P=1\text{mA}$, Any I/O pin to ground	V_{BR}	3.7		7.0	V
Reverse leakage current	$V_{RWM}=5\text{V}$, Any I/O pin to ground	I_R			500	nA
Dynamic resistance ^{1,2}	$T_{LP}=0.2/100\text{ns}$			0.4		Ω
Clamping voltage	$I_{PP}=2.5\text{A}$, $t_P=8/20\mu\text{s}$ Any I/O pin to ground	V_C		8.8	12	V
ESD clamping voltage ¹	$I_{PP}=4\text{A}$, $t_P=0.2/100\text{ns}$ (T_{LP})			8.7		
	$I_{PP}=16\text{A}$, $t_P=0.2/100\text{ns}$ (T_{LP})			13.5		
Junction capacitance	$V_R=0\text{V}$, $f=1\text{MHZ}$, I/O pin to GND	C_j		0.5	0.9	pF
	$V_R=0\text{V}$, $f=1\text{MHZ}$, Between I/O pins			0.25	0.4	

Note : 1. T_{LP} Setting : $t_P=100\text{ns}$, $t_r=0.2\text{ns}$, I_{LP} and V_{LP} sample window : $t_r=70\text{ns}$ to $t_r=90\text{ns}$.

2. Dynamic resistance calculated from $I_{PP}=4\text{A}$ to $I_{PP}=16\text{A}$ using "Best Fit".

Rating and characteristic curves(LL034BT2510L1)

Figure 1: Peak Pulse Power Vs Pulse Time

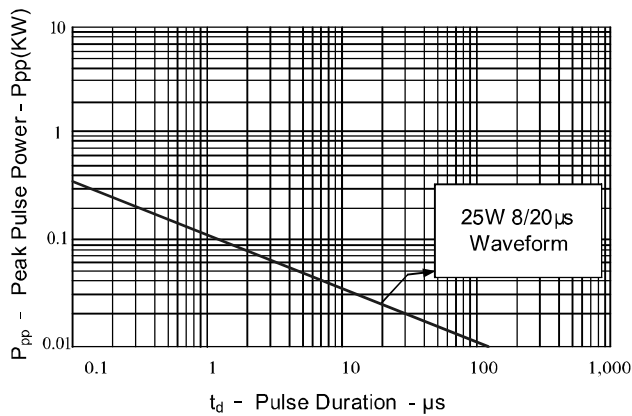


Figure 2: Power Derating Curve

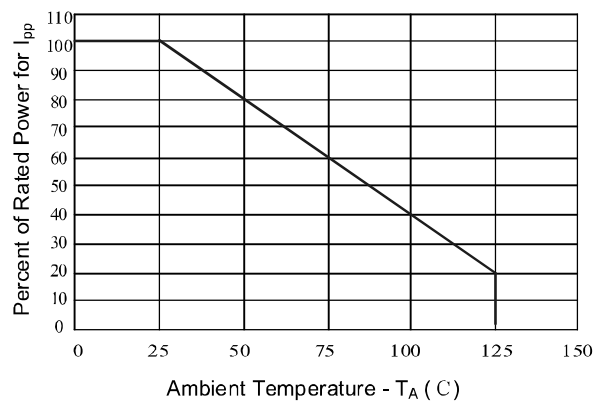


Figure 3: Clamping Voltage vs . Peak Pulse Current

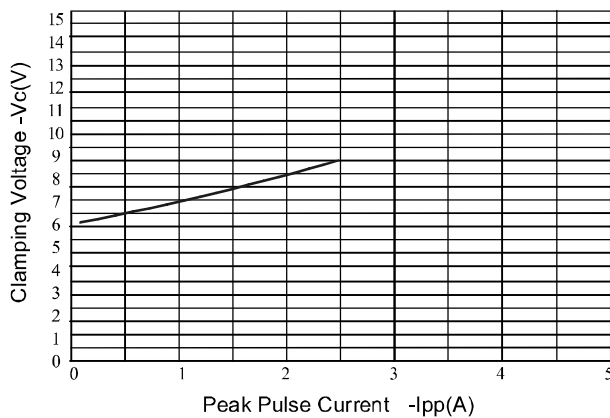


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

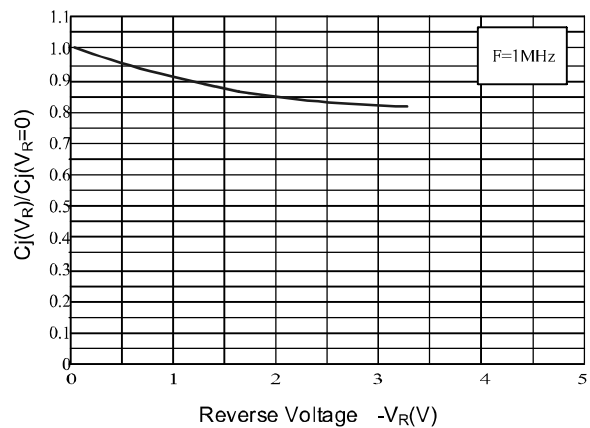


Figure 5: 8/20μs Pulse Waveform

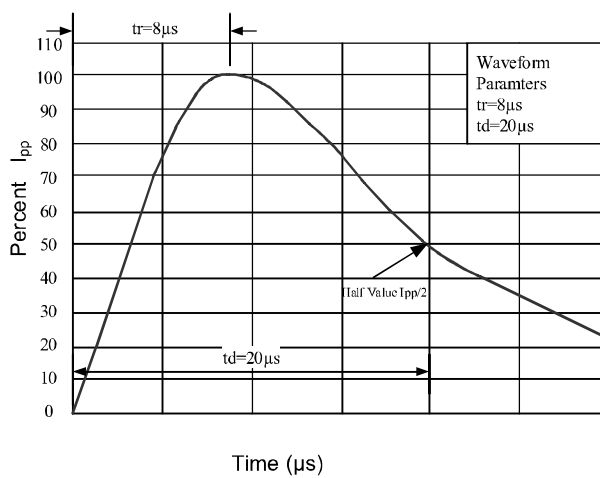
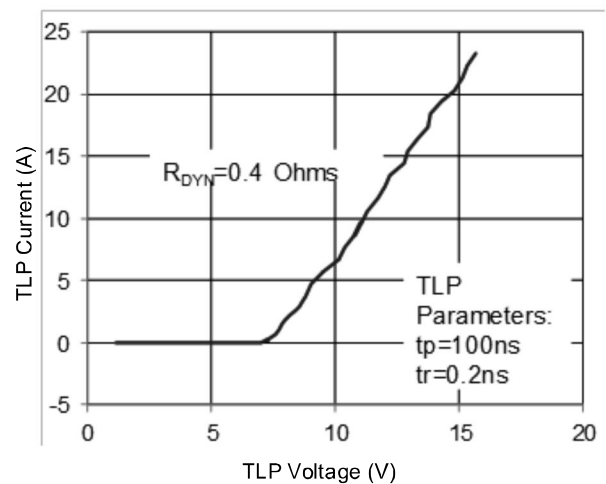


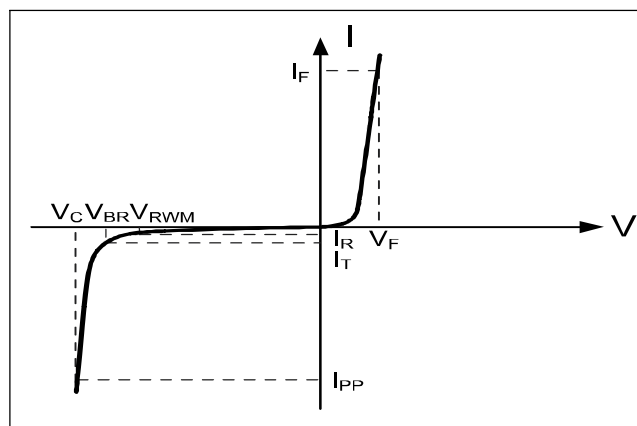
Figure 6: TLP I-V Curve



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Electrical Parameters ($T_A=25^\circ\text{C}$)

Symbol	Parameter
I_{PP}	Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Peak Reverse Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_F	Forward Current
V_F	Forward Voltage @ I_F



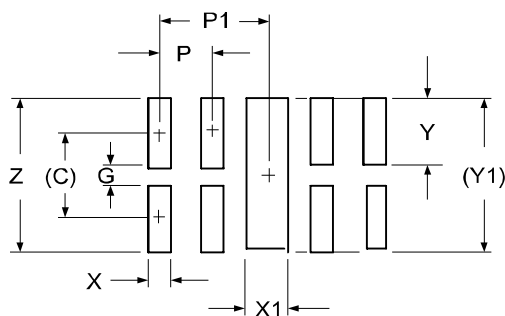
Pinning information

Pin Configuration	Simplified outline	Circuit Diagram
1,2,4,5 Input Lines 6,7,9,10 Output Lines (No Internal Connection) 3,8 Ground		

Marking

Type number	Marking code
LL034BT2510L1	3R2P

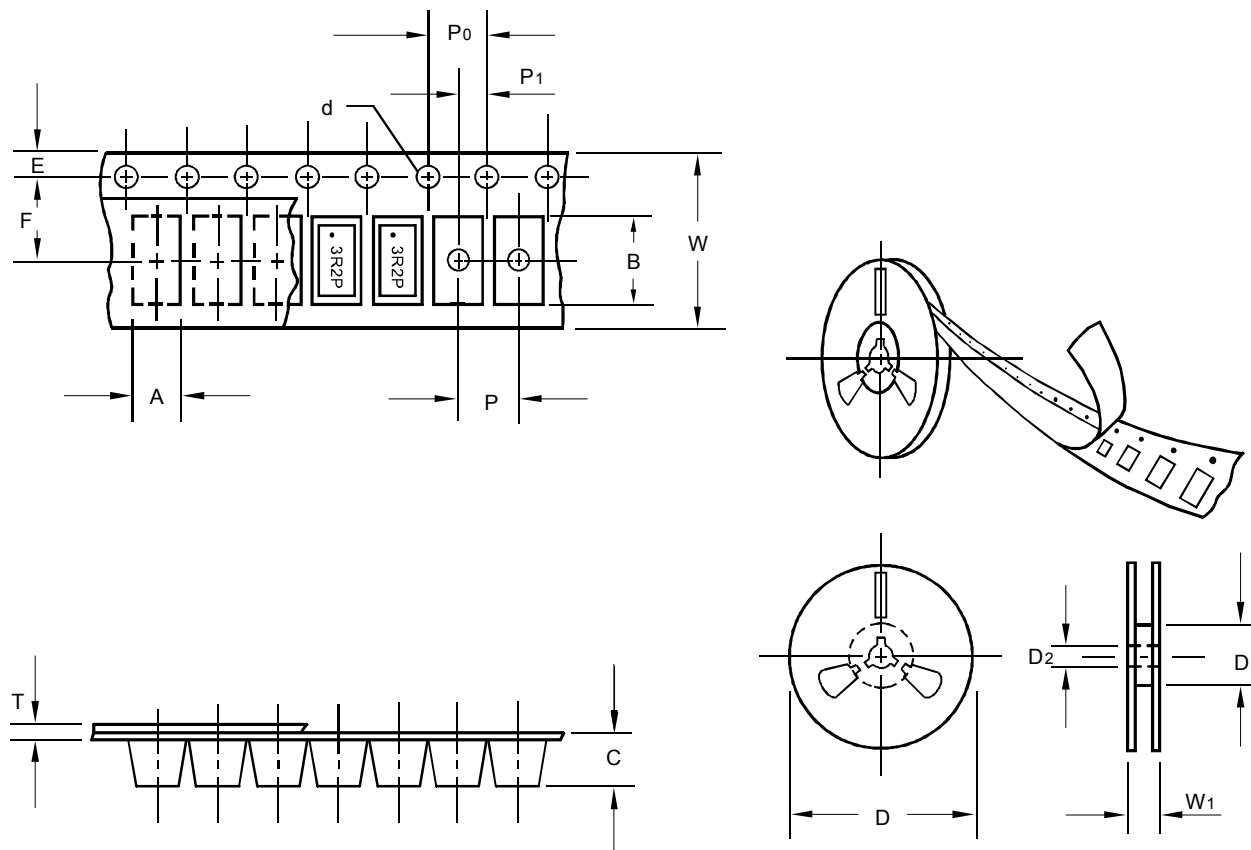
Suggested solder pad layout



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	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	60.00
Feed hole diameter	D2	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	P0	0.1	4.00
Embossment center	P1	0.05	2.00
Overall tape thickness	T	0.1	0.20
Tape width	W	0.3	8.00
Reel width	W1	1.0	13.1

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

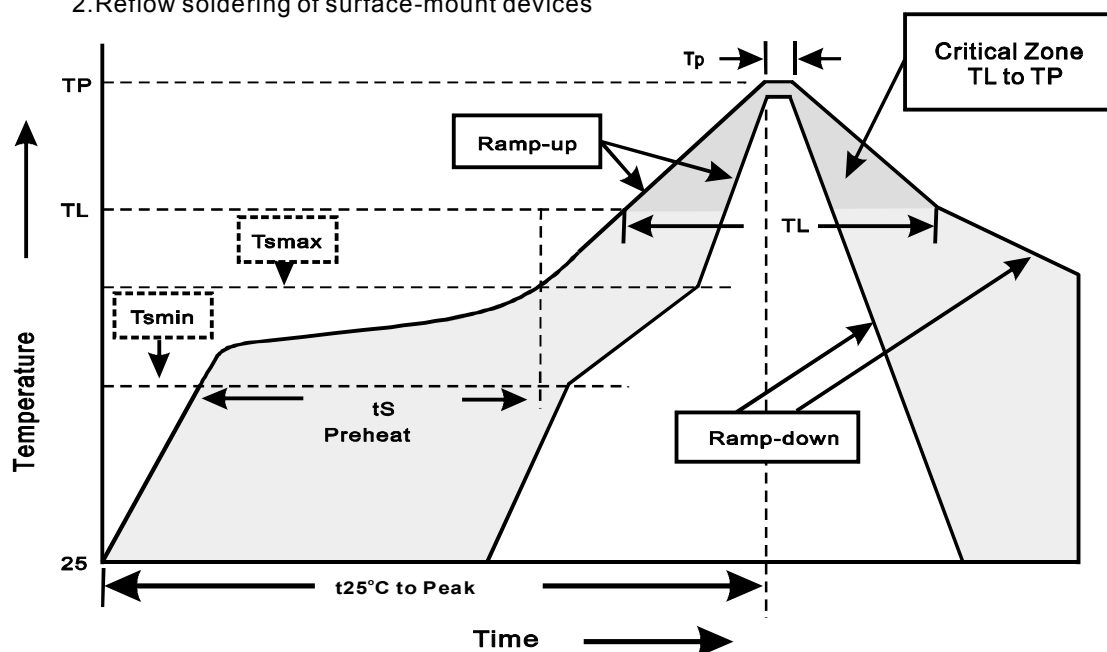
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Reel packing

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)
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)	$<3^{\circ}\text{C}/\text{sec}$
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	$<3^{\circ}\text{C}/\text{sec}$
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	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$