

LL034BT2510C

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LL034BT2510C

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

Features

- Package optimized for high-speed lines.
- Ultra-small package (2.5mm x 1.0mm x 0.55mm).
- Protects four data lines.
- Low capacitance : 0.18pF Typical (I/O to GND)
- IEC61000-4-2 (ESD) $\pm 17\text{KV}$ (Air), $\pm 8\text{KV}$ (Contact)
- IEC61000-4-2 (EFT) 40A (5/50ns)
- Cable optimized for high-speed lines.
- Low leakage current : $0.1\mu\text{A}$ @ V_{RWM} (Typical)
- Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{KV}$ contact discharge.
- RoHS compliant.
- Suffix "-H" indicates Halogen-free parts, ex. LL034BT2510C-H.

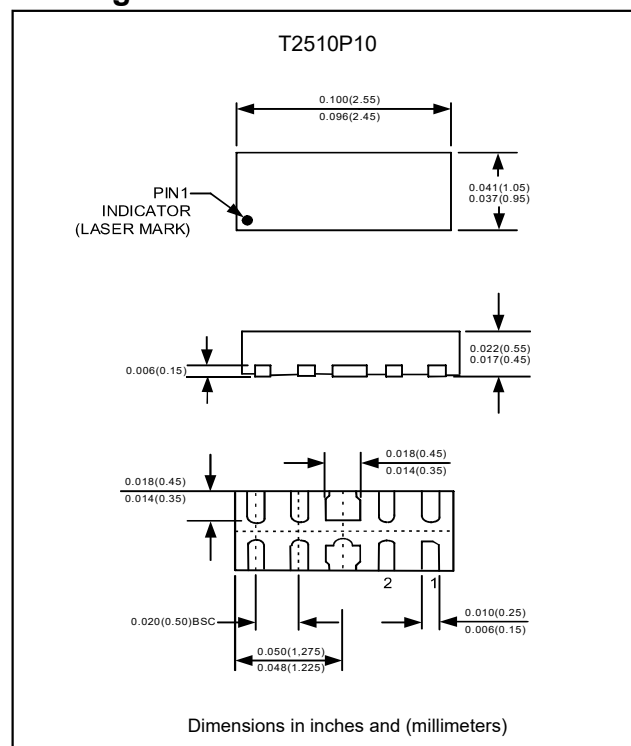
Applications

- Serial ATA.
- MDDI Ports.
- USB2.0 / 3.0 Power and data line protection.
- High definition multi-media interface (HDMI 1.4/2.0).

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)

Parameter	Symbol	Value	Unit
Peak pulse power ($t_p=8/20\mu\text{s}$)	P_{PP}	30	W
Peak pulse current ($t_p=8/20\mu\text{s}$)	I_{PP}	6	A
ESD per IEC 61000-4-2 (Contact)	V_{ESD}	± 8	KV
ESD per IEC 61000-4-2 (Air)		± 17	
Operating temperature	T_{OPT}	+125	$^\circ\text{C}$
Storage temperature	T_{STG}	-55 to +150	$^\circ\text{C}$

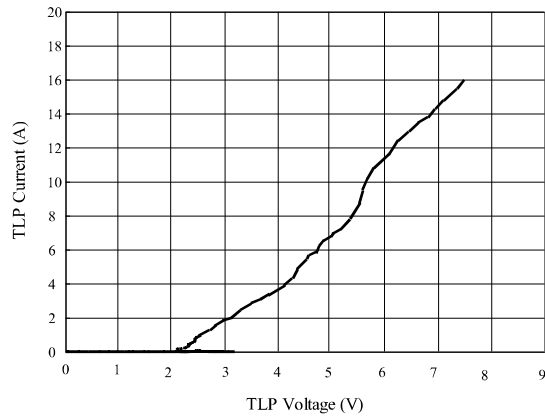
Electrical characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse stand-off voltage		V_{RWM}			3.3	V
Reverse leakage current	$V_{\text{RWM}}=3.3\text{V}$	I_{R}		0.1	1.0	μA
Trigger voltage	$I_{\text{T}}=1\text{mA}$	V_{t1}	6.0		9.0	V
Holding voltage	$I_{\text{T}}=50\text{mA}$	V_{h}	2.0		3.0	V
Clamping voltage	$I_{\text{PP}}=6\text{A}$, $t_p=8/20\mu\text{s}$ (Between I/O and GND)	V_{C}		5.0		V
Clamping voltage	$I_{\text{PP}}=8.0\text{A}$, $t_p=100\text{ns}$ (Note 1)	V_{C}		5.2		V
	$I_{\text{PP}}=16.0\text{A}$, $t_p=100\text{ns}$ (Note 1)			7.5		
Junction capacitance	$V_{\text{R}}=0\text{V}$, $f=1\text{MHz}$, (Between I/O and GND)	C_{ESD}		0.18	0.33	pF
	$V_{\text{R}}=0\text{V}$, $f=1\text{MHz}$, (Between I/O and I/O)			0.1	0.2	

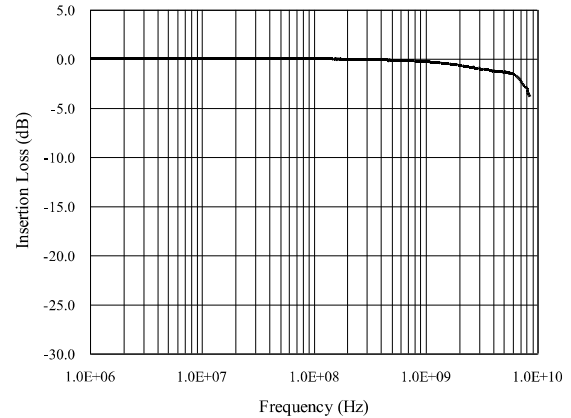
Note : 1. Measurements performed using a 100ns transmission line pulse (TLP) system.

Rating and characteristic curves(LL034BT2510C)

TLP Measurement of I/O to GND

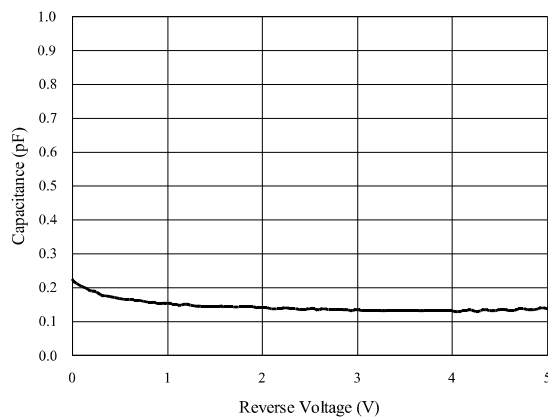


Insertion Loss S21 of I/O to GND

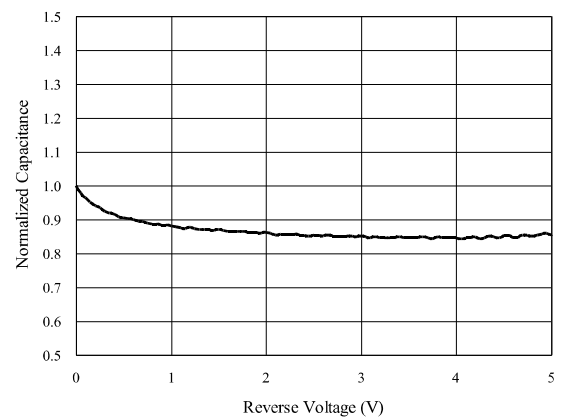


Capacitance vs. Voltage of I/O to GND (f = 1MHz)

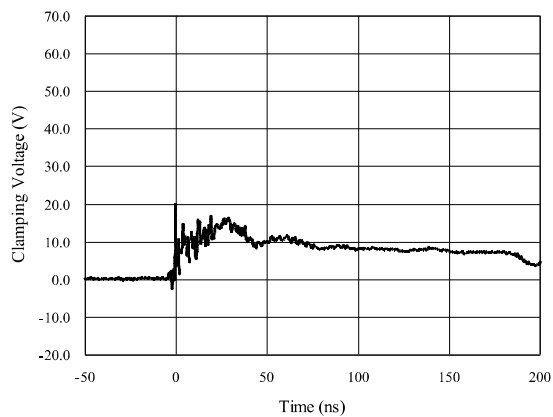
Capacitance vs. Reverse Voltage



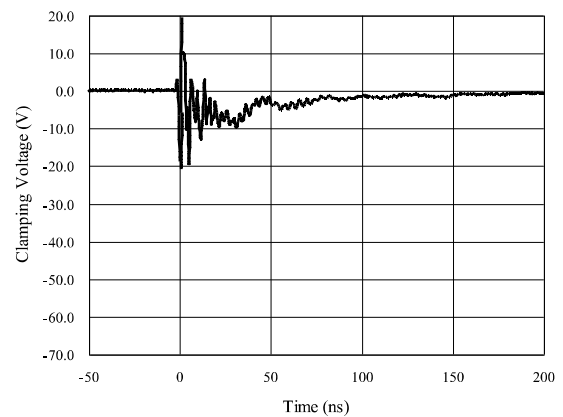
Normalized Capacitance vs. Reverse Voltage



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)

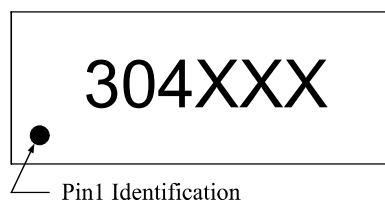


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Pinning information

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

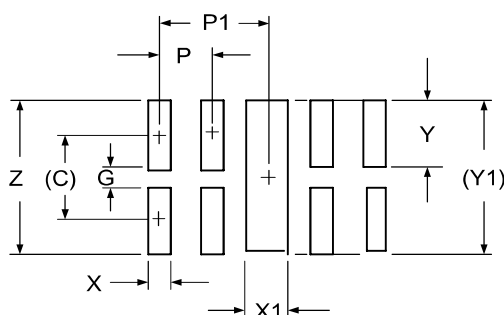
Marking



Note:

- (1) "304" is part number fixed.
- (2) "XXX" is the last 3 characters of the wafer's Lot No.

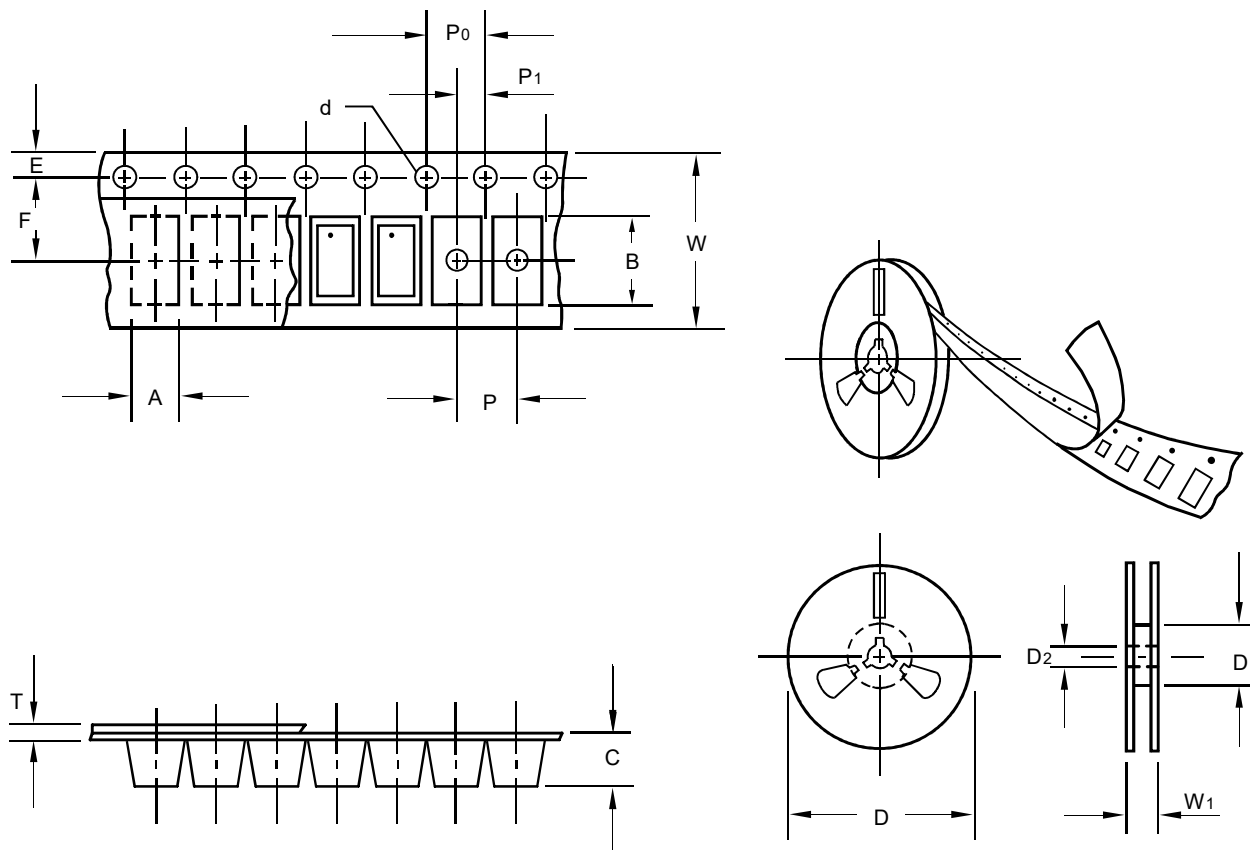
Suggested solder pad layout



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.

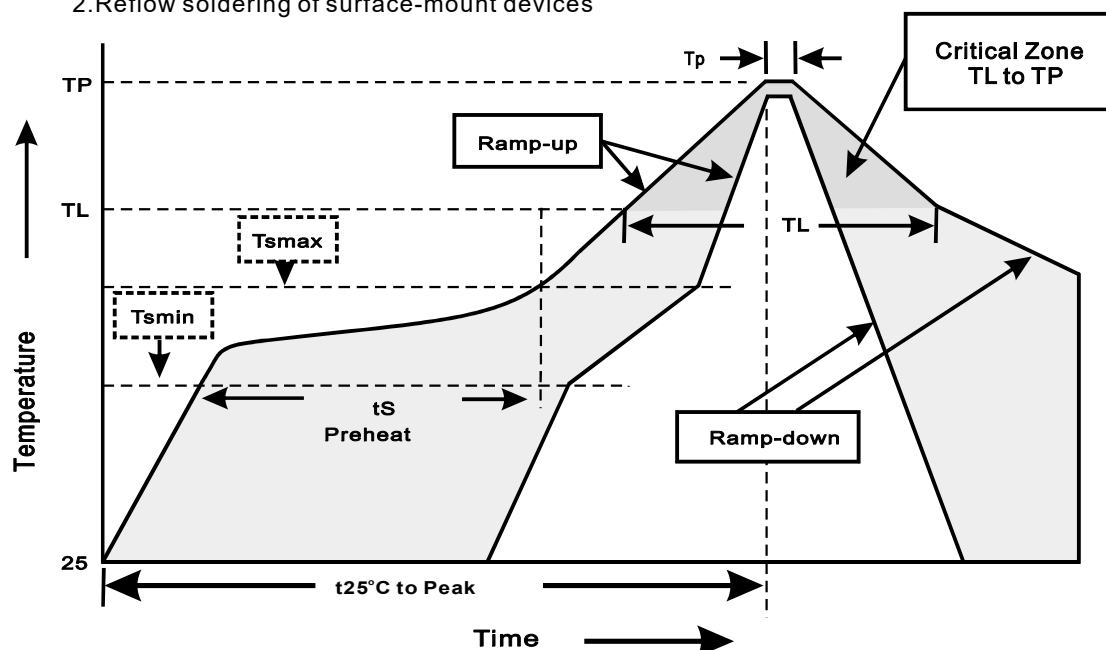
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Reel packing

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(TL to TP)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(ts)	150°C 200°C 60~120sec
Tsmax to TL -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(TL) -Time(tL)	217°C 60~260sec
Peak Temperature(TP)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(tp)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes