

LL054BT2510G

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LL054BT2510G

4-Channel Ultra Low Capacitance TVS For ESD Protection Array 5.0V

Features

- Protects four I/O lines.
- Each I/O pin can withstand over 1000 ESD strikes for 8±kV (Contact discharge).
- Array of surge rated diodes with internal TVS diode.
- Transient protection for high-speed data lines
 - IEC61000 -4-2 (ESD) ±15kV (Air), ±15kV (Contact).
 - IEC 61000-4-5 (Lightning) 5.0A (8/20μs) .
- Cable discharge event (CDE).
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates halogen-free parts, ex.LL054BT2510G-H

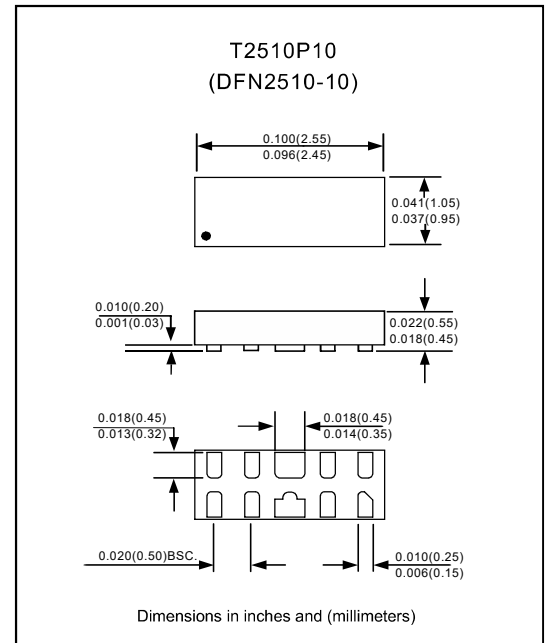
Applications

- Digital video interface (DVI) and notebook computers.
- Monitors, flat panel displays, set-top box and video graphics cards.
- USB 3.0, HDMI 1.4/2.0 , MDDI, SATA ports.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, T2510P10 (DFN2510-10).
- Mounting Position : Any.

Package outline



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

Parameter	Symbol	Value	Unit
Peak pulse current (8/20μs)	I_{PP}	5	A
Peak pulse power (8/20μs)	P_{PK}	20	W
ESD per IEC61000-4-2 (Air)	V_{ESD}	±15	KV
ESD per IEC61000-4-2 (Contact)		±15	
Operating temperature	T_J	+125	°C
Storage temperature range	T_{STG}	-55 to +150	°C

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

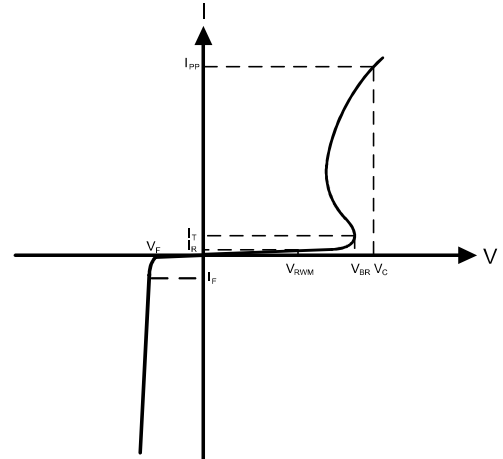
Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse working voltage		V_{RWM}			5	V
Reverse leakage current	$V_{RWM}=5$, $T_A=25^\circ\text{C}$ (Between I/O and GND)	I_R		0.1	1	μA
Reverse breakdown voltage	$I_T=1\text{mA}$ (Between I/O and GND)	V_{BR}	6	7		V
Clamping voltage	$I_{PP}=5\text{A}$, $t_p=8/20\mu\text{s}$ (Between I/O and GND)	V_C		3.5		V
Clamping voltage	$I_{PP}=8.0\text{A}$, $t_p=100\text{ns}$ (Note1)	V_C		3.5		V
	$I_{PP}=16.0\text{A}$, $t_p=100\text{ns}$ (Note1)			5.2		
Inverse dynamic resistance	$I_{PP}=12.0\text{A}$, $t_p=100\text{ns}$ (Note1)	R_{dyn}		0.22		Ω
Parasitic Capacitance	$V_R=2.5\text{V}$, $f=1.0\text{MHz}$ (Between I/O and GND)	C_{ESD}		0.5		pF
	$V_R=2.5\text{V}$, $f=1.0\text{MHz}$ (Between I/O and I/O)			0.25		

Notes : 1. Measurements performed using a 100ns transmission line pulse(TLP) system, between I/O and GND.

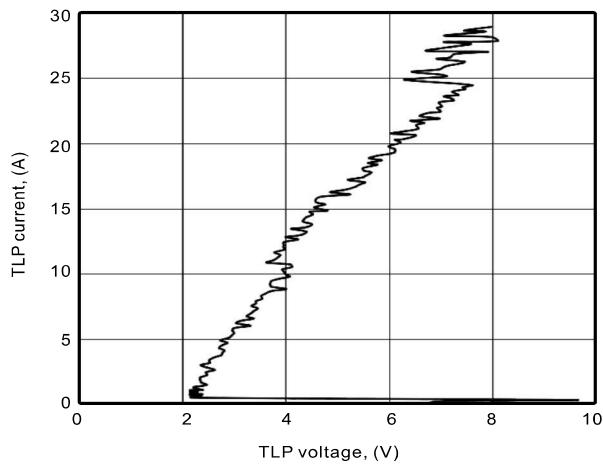
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Rating and characteristic curves

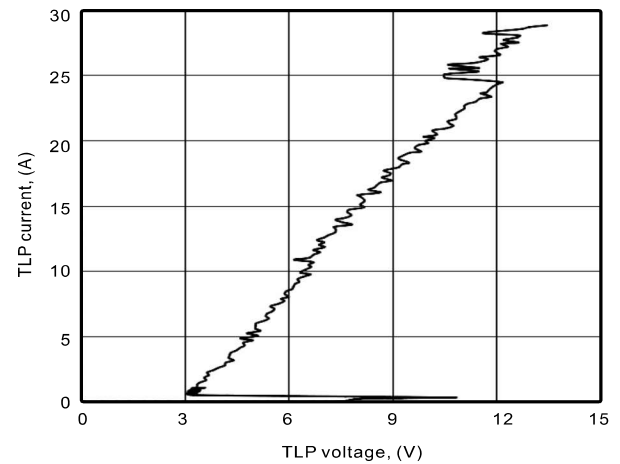
Symbol	Parameter
V_{RWM}	Nominal reverse working voltage
I_R	Reverse leakage current@ V_{RWM}
V_{BR}	Reverse breakdown voltage@ I_T
I_T	Test current for reverse breakdown
V_C	Clamping voltage@ I_{PP}
I_{PP}	Maximum peak pulse current
C_{ESD}	Parasitic capacitance
I_F	Forward current
V_F	Forward voltage @ I_F



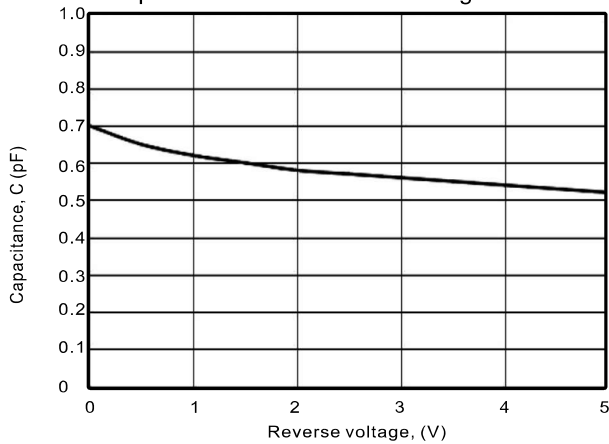
TLP measurement of I/O to GND



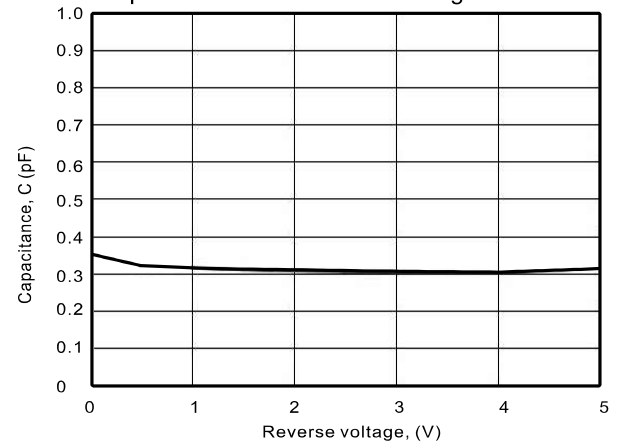
TLP measurement of I/O to I/O



Capacitance vs. Reverse voltage I/O to GND

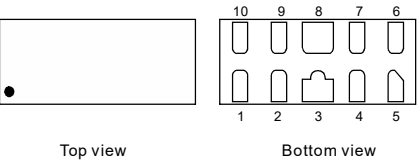
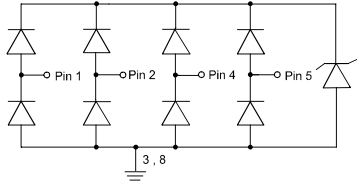


Capacitance vs. Reverse voltage I/O to I/O



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Pinning information

Pin	Simplified outline	Circuit Diagram
Pin 1, 2, 4, 5 I/O Pin 3, 8 GND Pin 6, 7, 9, 10 NC	 Top view Bottom view	

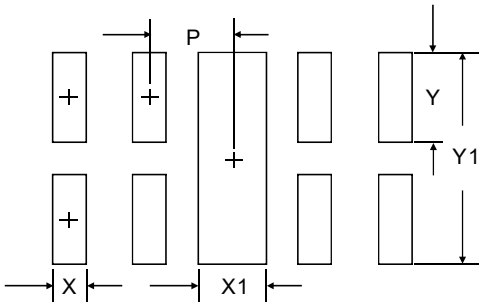
Marking

Type number	Marking code
LL054BT2510G	1XXXXX

* "11" is part number, fixed.
"XXXXX" is ther wafer lot code.

Suggested solder pad layout

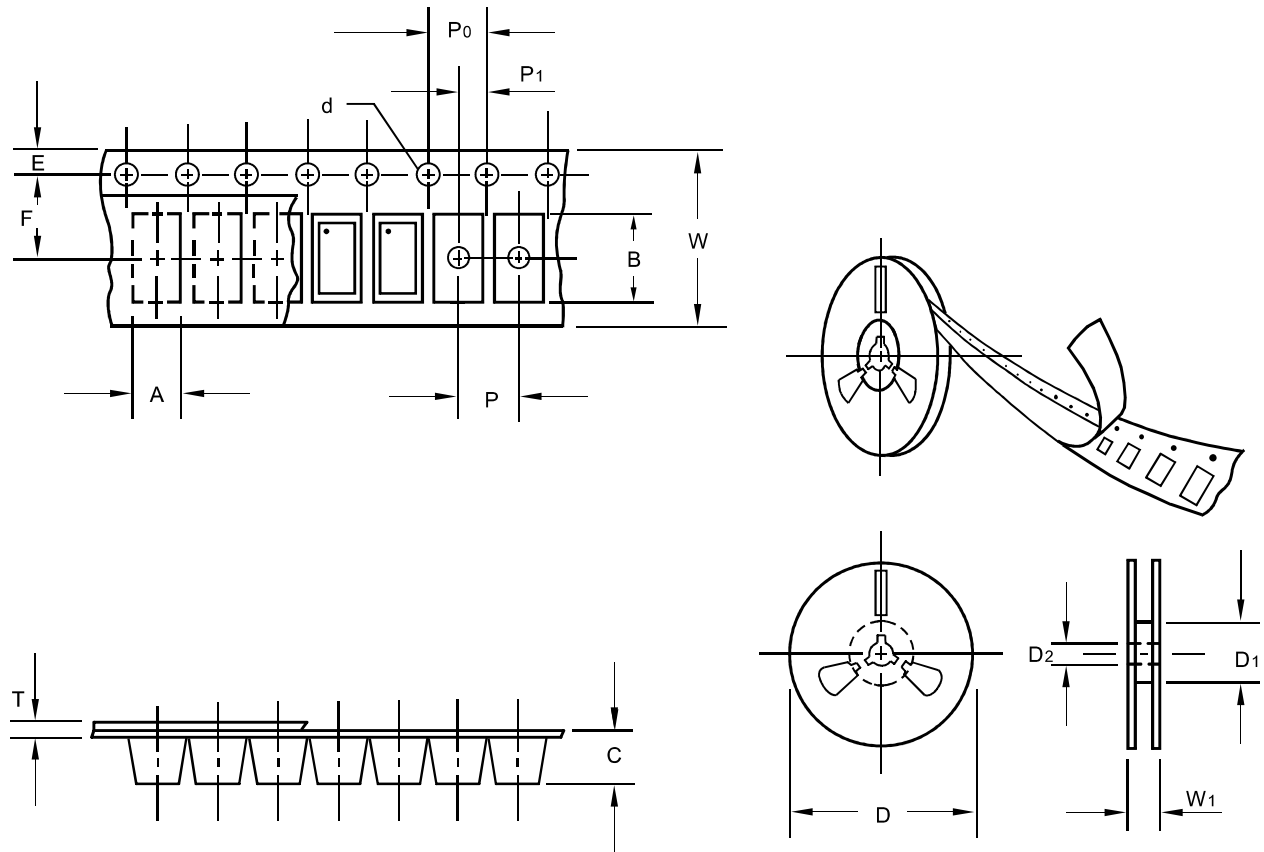
T2510P10



DIMENSIONS		
DIM	INCHES	MILLIMETERS
P	0.020	0.50
X	0.012	0.30
X1	0.016	0.40
Y	0.019	0.48
Y1	0.047	1.20

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Packing information



unit:mm

Item	Symbol	Tolerance	T2510P10
Carrier width	A	0.1	1.23
Carrier length	B	0.1	2.70
Carrier depth	C	0.1	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	D2	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	0.1	2.00
Overall tape thickness	T	0.1	0.25
Tape width	W	0.3	8.00

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

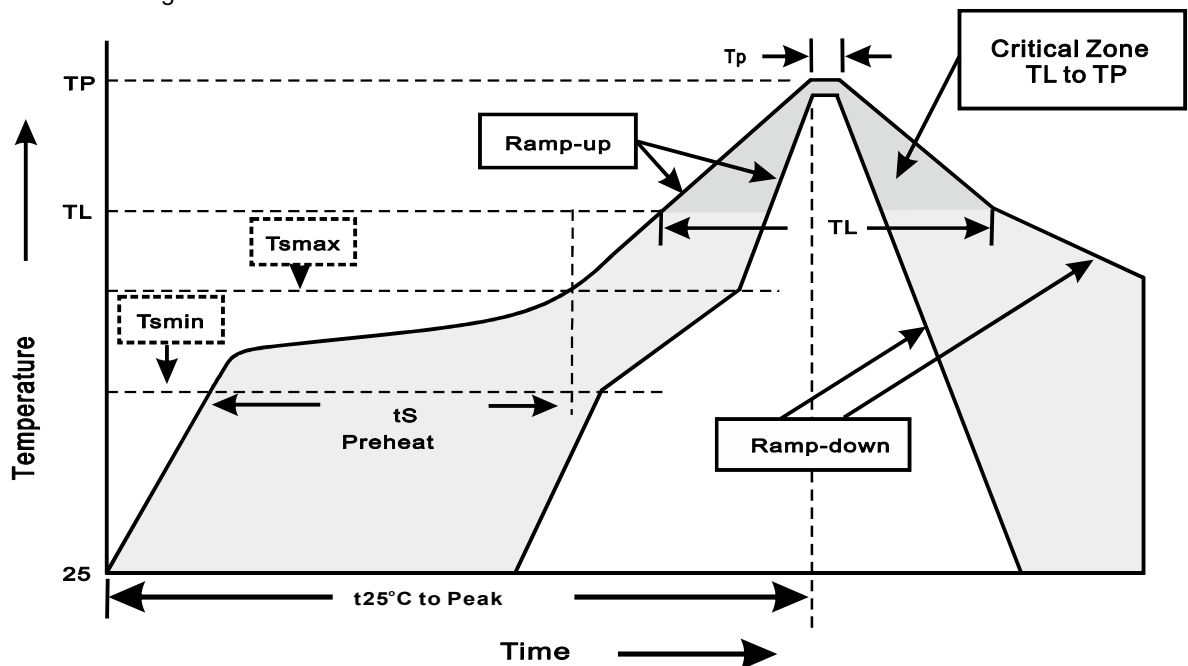
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Reel packing

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_{min}) -Temperature Max(T_{max}) -Time(min to max)(t_s)	150°C 200°C 60~120sec
T_{max} to T_L -Ramp-upRate	$<3^{\circ}\text{C}/\text{sec}$
Time maintained above: -Temperature(T_L) -Time(t_L)	217°C 60~260sec
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	$<6\text{minutes}$