

LL052AT1006P3B

List

List.....	1
Package outline.....	2
Features.....	2
Applications.....	2
Mechanical data.....	2
Maximum ratings.....	2
Electrical characteristics.....	2
Rating and characteristic curves.....	3
Pinning information.....	4
Marking.....	4
Suggested solder pad layout.....	4
Package Information.....	5
Reel packing.....	6
Suggested thermal profiles for soldering processes.....	6

LL052AT1006P3B

2-Channel Ultra Low Capacitance Uni-Directional TVS For ESD Protection 5.0V

Features

- Package optimized for high-speed lines.
- Protects two data, control or power lines.
- Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{kV}$ contact discharge.
- Transient protection for high-speed data lines:
IEC 61000-4-2 (ESD) $\pm 25\text{kV}$ (Air), $\pm 17\text{kV}$ (Contact).
IEC 61000-4-4 (EFT) 40A (5/50ns).
Cable discharge event (CDE).
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates halogen-free parts, ex.LL052AT1006P3B-H.

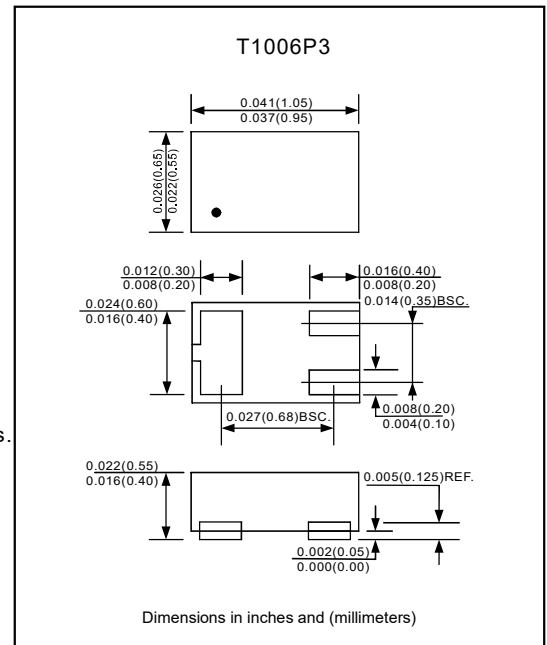
Applications

- Serial ATA, PCI express, desktops, servers, notebooks and cellular phones.
- MDDI ports, USB2.0 power and data line protection.
- Display ports and digital visual interface. (DVI)

Mechanical data

- Epoxy: UL94V-0 rated flame retardant.
- Case : Molded plastic, T1006P3 (DFN-1006-3).

Package outline



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

Parameter	Symbol	Ratings	Units
Peak pulse current (8/20 μs)	I_{PP}	3.5	A
ESD per IEC 61000-4-2 (Contact)	V_{ESD}	± 17	KV
ESD per IEC 61000-4-2 (Air)		± 25	
Charged device model	CDM	± 1000	V
Machine model	MM	± 200	V
Operating temperature range	T_J	+125	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

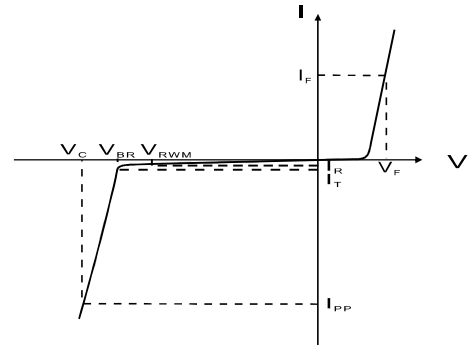
Electrical characteristics (At $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Reverse stand-off voltage		V_{RWM}			5	V
Reverse leakage current	$V_{RWM}=5\text{V}$, $T_A=25^\circ\text{C}$ (Between I/O and GND)	I_R		0.001	1	μA
Breakdown voltage	$I_T=1\text{mA}$ (Between I/O and GND)	V_{BR}	6	8	10	V
Clamping voltage	$I_{PP}=1\text{A}$, $t_p=8/20\mu\text{s}$ (Between I/O and GND)	V_C		8.4	12	V
	$I_{PP}=3.5\text{A}$, $t_p=8/20\mu\text{s}$ (Between I/O and GND)			9.8	12	
Parasitic capacitance	$V_R=0\text{V}$, $f=1.0\text{MHz}$ (Between I/O and GND)	C_{ESD}		0.67	0.8	pF
	$V_R=0\text{V}$, $f=1.0\text{MHz}$ (Between I/O and I/O)			0.36	0.5	

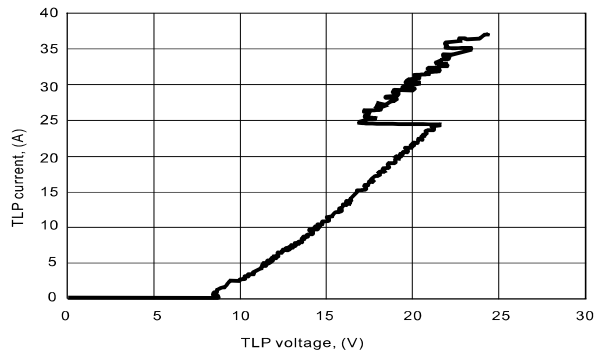
LL052AT1006P3B

Rating and characteristic curves

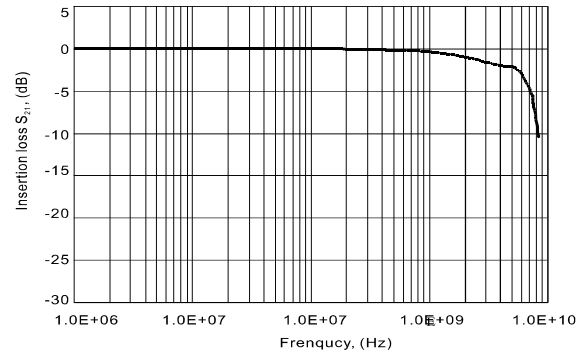
Symbol	Parameter
V_{RWM}	Nominal reverse working voltage
I_R	Reverse leakage current @ V_{RWM}
V_{BR}	Reverse breakdown voltage @ I_T
I_T	Test current for reverse breakdown
V_C	Clamping voltage @ I_{PP}
I_{PP}	Maximum peak pulse current
C_{ESD}	Parasitic capacitance
V_R	Reverse voltage
f	Small signal frequency



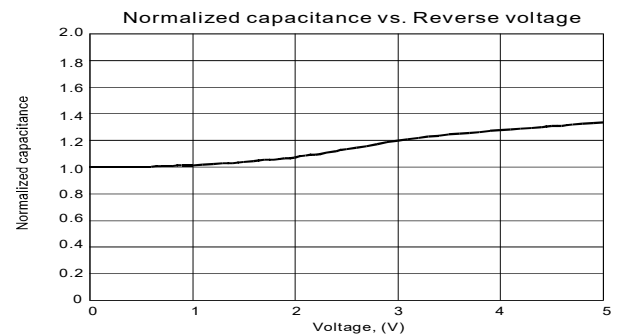
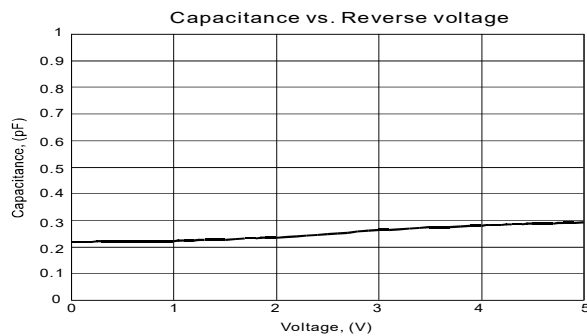
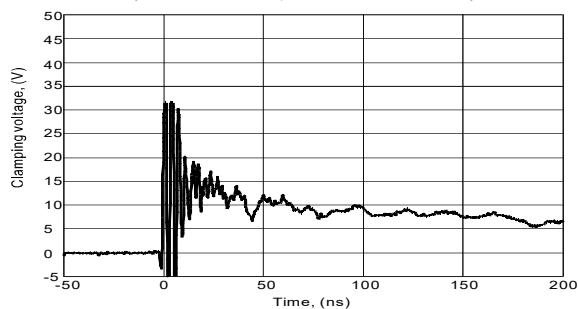
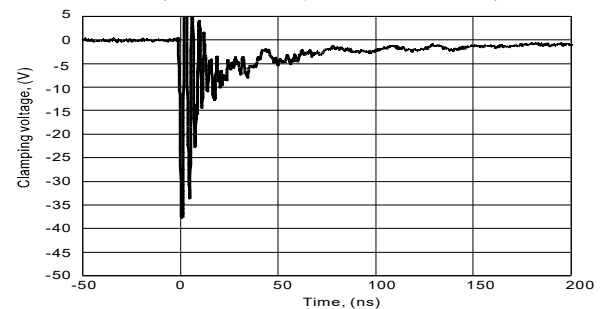
TLP Measurement of I/O to I/O



Insertion loss S21 of I/O to I/O

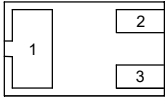
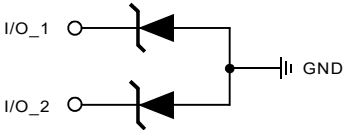


Capacitance vs. Voltage of I/O to I/O (f=1MHz)

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)

LL052AT1006P3B

Pinning information

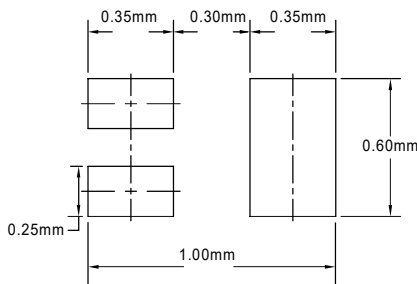
Pin	Simplified outline	Symbol
Pin 1 GND Pin 2 I/O_1 Pin 3 I/O_2	 Top view  Bottom view	

Marking

Type number	Marking code
LL052AT1006P3B	3X

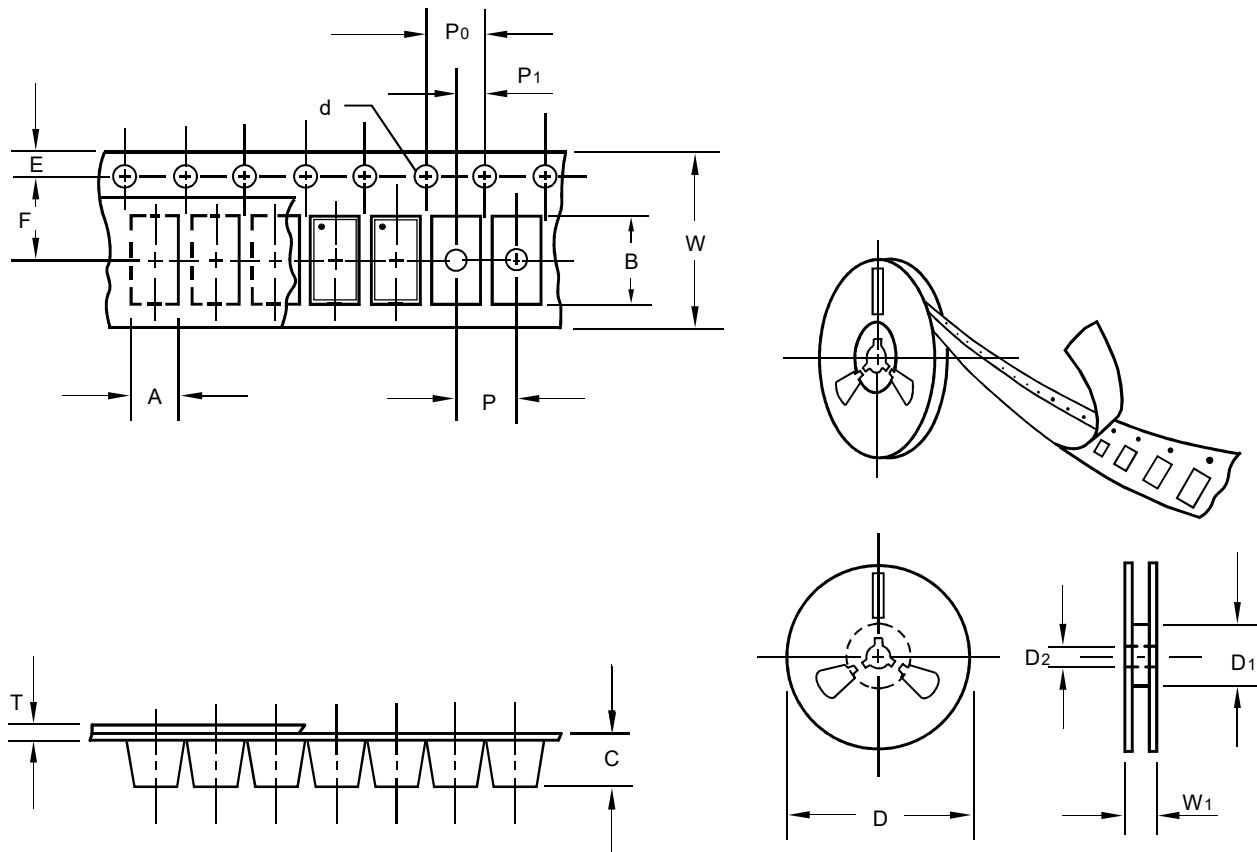
**3" is part number, fixed.
"X" is the internal code.

Suggested solder pad layout



LL052AT1006P3B

Packing information



unit:mm

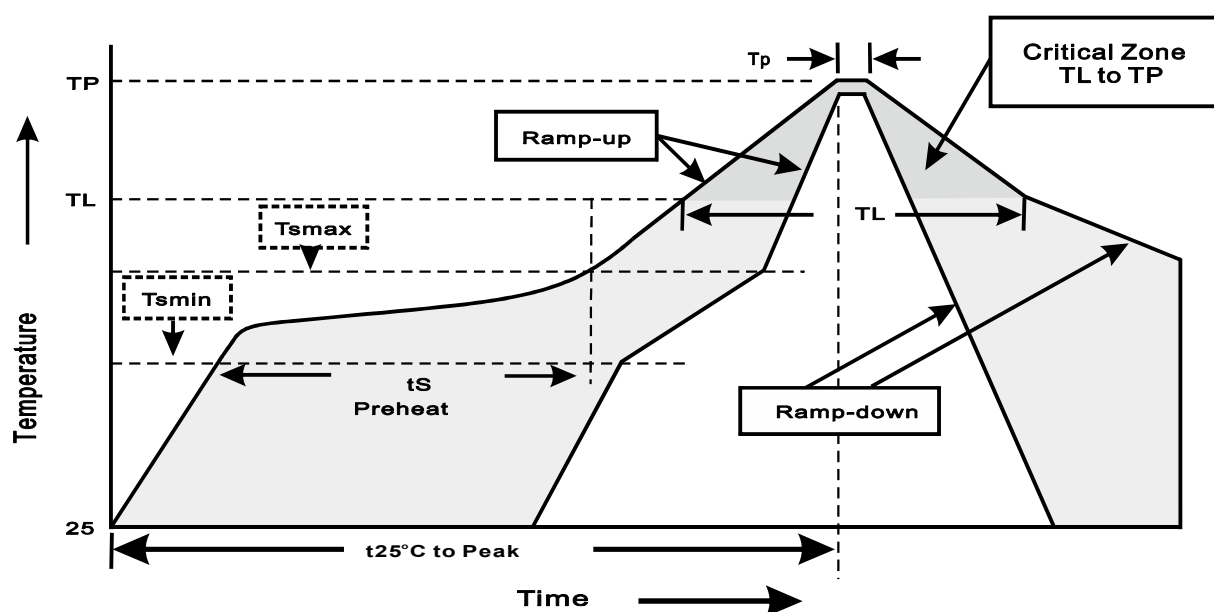
Item	Symbol	Tolerance	T1006P3
Carrier width	A	0.1	0.70
Carrier length	B	0.1	1.15
Carrier depth	C	0.1	0.55
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	55.00
Feed hole diameter	D ₂	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	2.00
Sprocket hole pitch	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.20
Tape width	W	0.3	8.00

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

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)
T1006P3	7"	10,000	4.0	100,000	183*123*183	178	382*257*387	800,000

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



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 $60\sim 120\text{sec}$
T_{max} to T_L -Ramp-upRate	$<3^{\circ}\text{C}/\text{sec}$
Time maintained above: -Temperature(T_L) -Time(t_L)	217°C $60\sim 260\text{sec}$
Peak Temperature(T_P)	$255^{\circ}\text{C}-0/+5^{\circ}\text{C}$
Time within 5°C of actual Peak Temperature(t_P)	$10\sim 30\text{sec}$
Ramp-down Rate	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$