

LL052CT523

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LL052CT523

2-Channel Ultra Low Capacitance

TVS For ESD Protection : 5.0V

Features

- Protects two data lines.
- Each I/O pin can withstand over 1K ESD strikes for $\pm 8\text{kV}$ contact discharge.
- Meets moisture sensitivity (MSL) : Level 3.
- Transient protection for high-speed data lines:
 - IEC 61000-4-2(ESD) $\pm 25\text{kV}$ (Air).
 - IEC 61000-4-2(ESD) $\pm 17\text{kV}$ (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.LL052CT523-H.

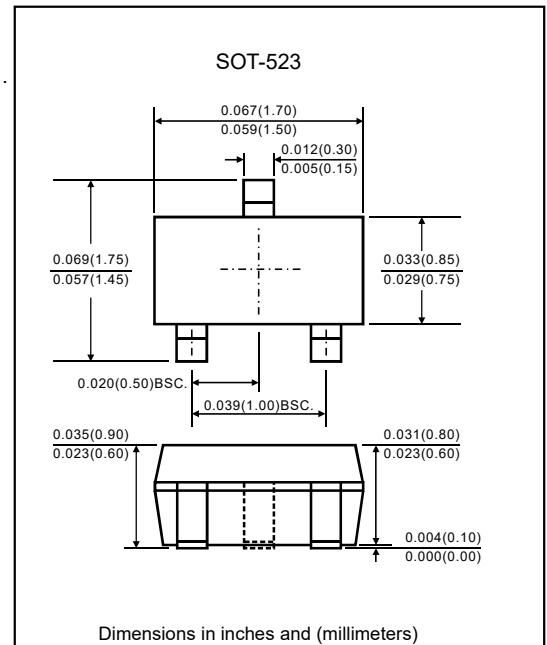
Applications

- Serial ATA.
- PCI express.
- Desktops, servers and notebooks.
- MDDI ports, USB2.0 power and data line protection, display ports.
- Digital visual interfaces (DVI) .

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-523.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline



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

Parameter	Symbol	Value	Units
Peak pulse current (8/20 μs)	I_{PP}	2	A
ESD per IEC61000-4-2 (Air)	V_{ESD}	± 25	kV
ESD per IEC61000-4-2 (Contact)		± 17	
Operating temperature range	T_J	-55 to +125	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

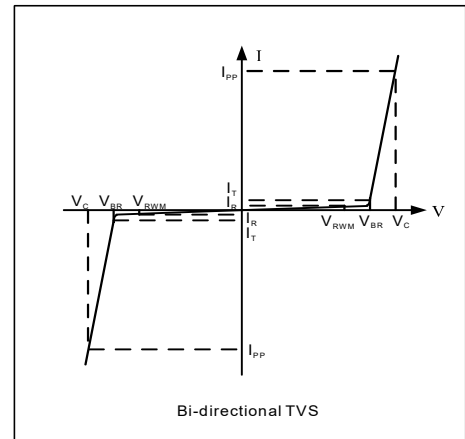
Electrical Characteristics (At $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Test Condition	Symbol	Min.	Typ.	Max.	Units
Reverse working voltage		V_{RWM}			5	V
Reverse leakage current	$V_{RWM}=5\text{V}$, $T=25^\circ\text{C}$ 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		9	V
Clamping voltage	$I_{PP}=1\text{A}$, $t_p=8/20\mu\text{s}$ between I/O and GND	V_C			12	V
	$I_{PP}=2\text{A}$, $t_p=8/20\mu\text{s}$ between I/O and GND				15	
Parasitic capacitance	$V_R=0\text{V}$, $f=1.0\text{MHz}$, between I/O and GND	C_{ESD}		0.6	0.8	pF

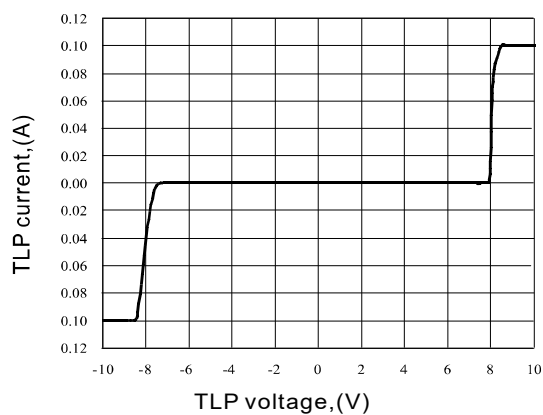
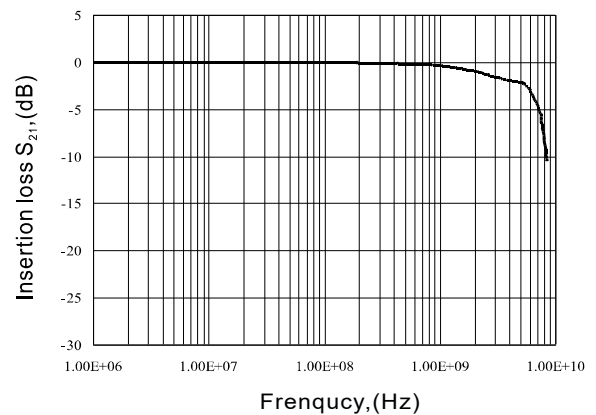
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Rating and characteristic curves

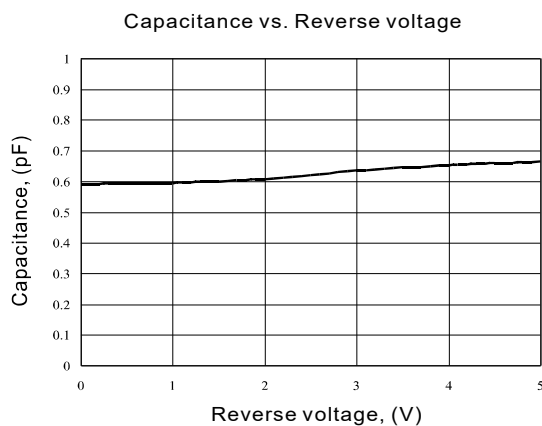
Symbol	Parameter
V_{RWM}	Nominal reverse working voltage
I_R	Reverse leakage current @ V_{RWM}
V_{BR}	Reverse breakdown voltage@ I_T
I_T	Test current for reverse breakdown
V_C	Clamping voltage@ I_{PP}
I_{PP}	Maximum peak pulse current
C_{ESD}	Parasitic capacitance
I_F	Forward current
V_F	Forward voltage@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



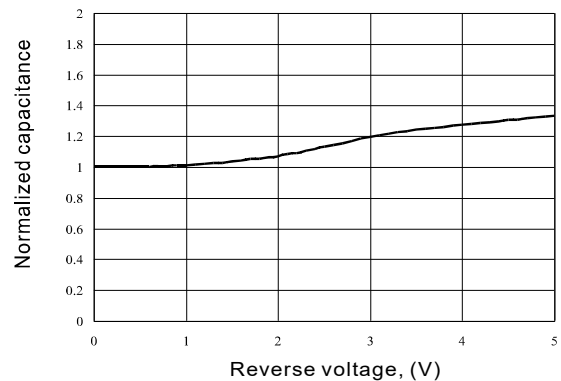
Voltage sweeping of I/O to GND

Insertion loss S₂₁ of I/O to GND

Capacitance vs. Voltage of I/O to GND (f=1.0MHz)

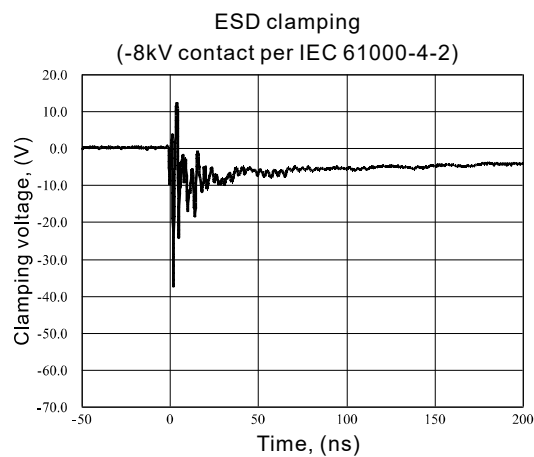
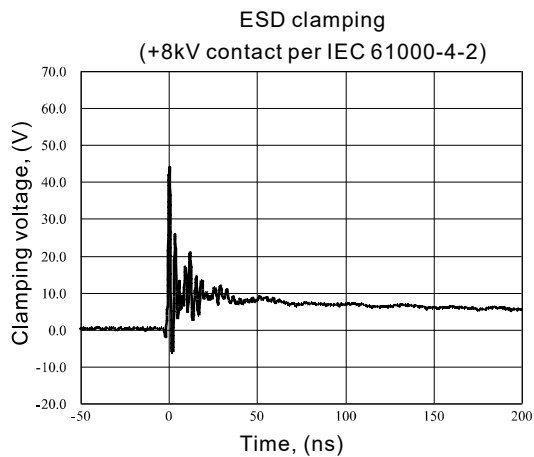


Normalized capacitance vs. Reverse voltage



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Rating and characteristic curves



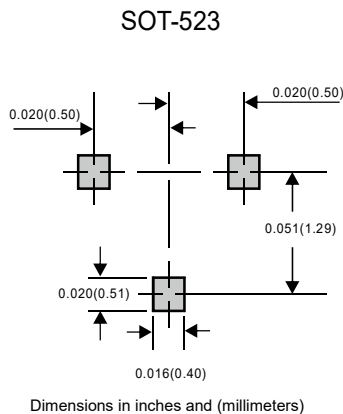
Pinning information

Pin	Simplified outline	Circuit diagram
Pin 1 I/O Pin 2 I/O Pin 3 GND		

Marking

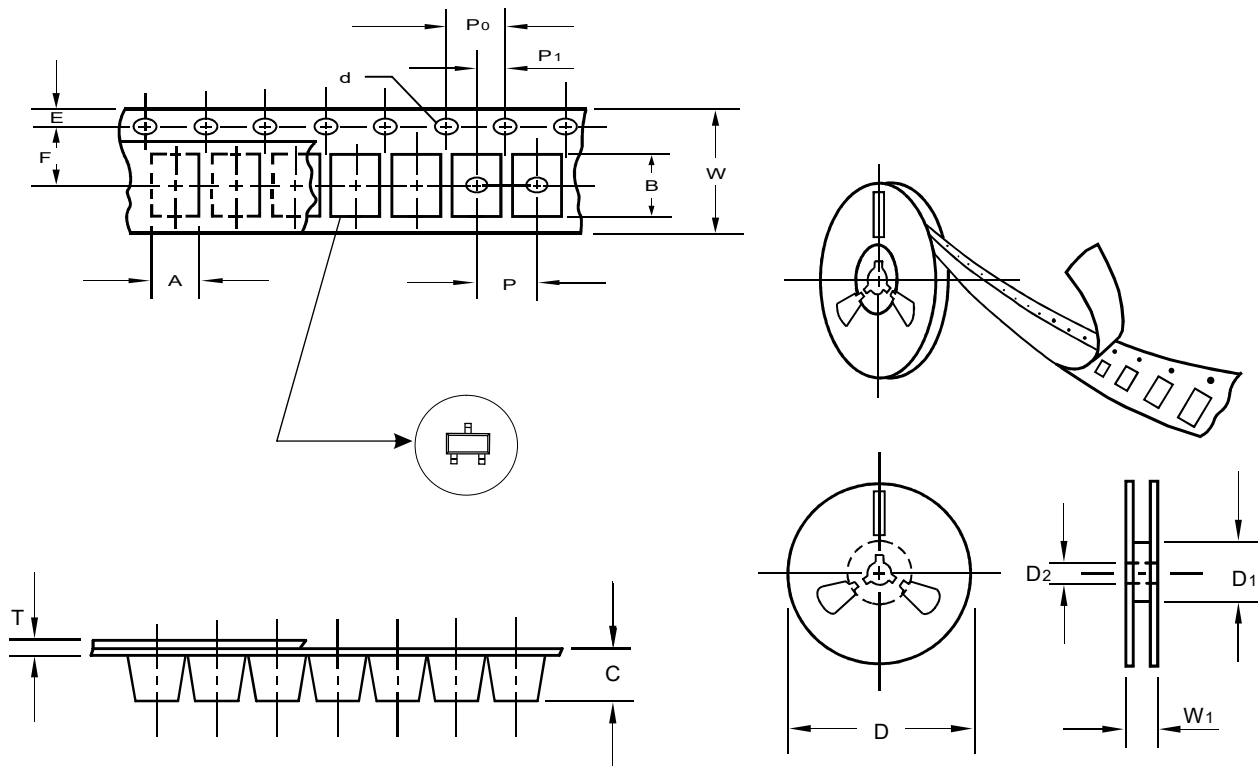
Type number	Marking code
LL052CT523	52T

Suggested solder pad layout



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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-523
Carrier width	A	0.1	1.85
Carrier length	B	0.1	1.85
Carrier depth	C	0.1	0.875
Sprocket hole	d	0.1	1.5
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	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	9.50

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

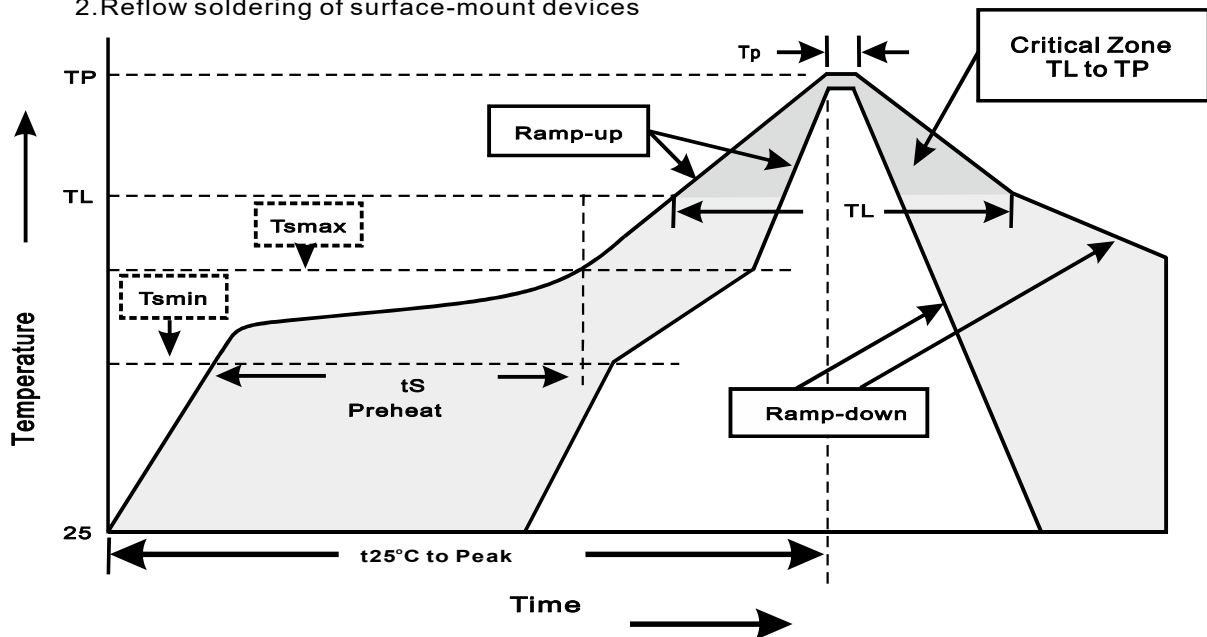
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Reel packing

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)
SOT-523	7"	3,000	4.0	30,000	183*183*123	178	382*262*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