

LL052BT143L1

List

List.....	1
Package outline.....	2
Features.....	2
Mechanical data.....	2
Maximum ratings and electrical characteristics	2
Rating and characteristic curves.....	3
Pinning information.....	4
Marking.....	4
Suggested solder pad layout.....	4
Packing information.....	5
Reel packing.....	6
Suggested thermal profiles for soldering processes.....	6
High reliability test capabilities.....	7

LL052BT143L1

Ultra Low Capacitance ESD Protection Diodes Array 5.0V

Features

- Uni-directional ESD protection of two lines
- Low capacitance: 0.8pF(Max)
- Low reverse stand-off voltage: 5V
- Low reverse clamping voltage
- Low leakage current
- Fast response time
- Provide transient protection:
IEC 61000-4-2 (ESD) Level 4
IEC 61000-4-4 (EFT) 40A (8/20 μ s)
- Suffix "-H" for Halogen-free part, ex. LL052BT143L1-H

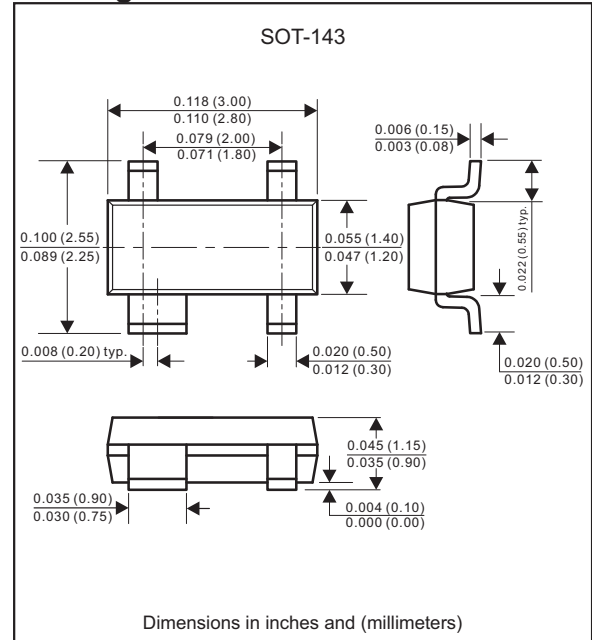
Applications

- USB2.0/3.0 power & data line protection
- WLAN/LAN equipment
- Mobile phone
- Video line protection
- Microcontroller input protection
- ISDN S/T interface
- Other electronics equipments communication systems

Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-143
- Lead Finish : Lead free
- Mounting Position : Any
- Weight : Approximated 0.010 gram

Package outline



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

PARAMETER	Symbol	Limit	UNIT
IEC 61000-4-2 ESD (I/O to GND & VCC to GND) Air Contact	V_{ESD}	± 27 ± 17	kV
Peak pulse current (According to IEC 61000-4-5)	I_{PP}	4	A
Peak pulse power (According to IEC 61000-4-5)	P_{PP}	48	W
Operating junction 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	Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse working voltage		V_{RWM}			5.0	V
Reverse breakdown voltage	$I_T=1\text{mA}$, Between I/O and GND	V_{BR}	6.0	8.0	10	V
Reverse leakage current	$V_{RWM}=5\text{V}$, Between I/O and GND	I_R		0.1	1.0	μA
Clamping voltage(Note 1)	$I_{PP}=1\text{A}$, $t_p=8/20\mu\text{s}$, Between I/O and GND	V_C			11	V
	$I_{PP}=4\text{A}$, $t_p=8/20\mu\text{s}$, Between I/O and GND				12	
Junction capacitance	$V_R=0\text{V}$, $f=1\text{MHz}$, Between I/O and GND	C_J		0.6	0.8	pF
	$V_R=0\text{V}$, $f=1\text{MHz}$, Between I/O and I/O			0.3	0.4	

Note:

1. Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC61000-4-5.

Rating and characteristic curves(LL052BT143L1)

Fig.1 VOLTAGE SWEEPING OF I/O TO GND

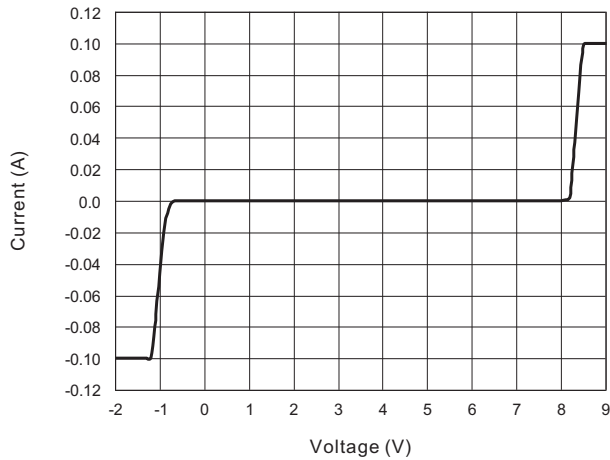


Fig.2 INSERTION LOSS S₂₁ of I/O to GND

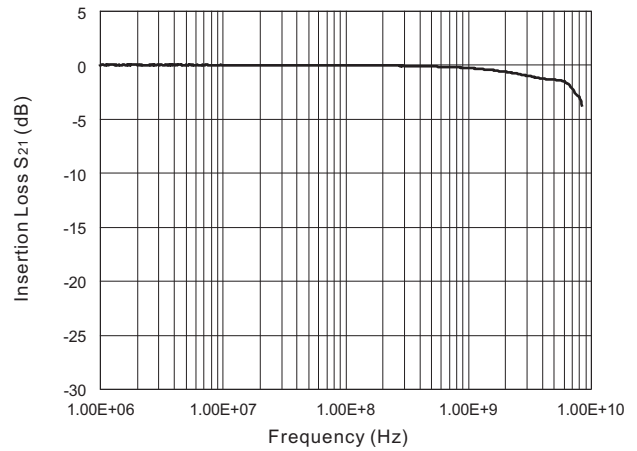


Fig.3 CAPACITANCE VS. REVERSE VOLTAGE

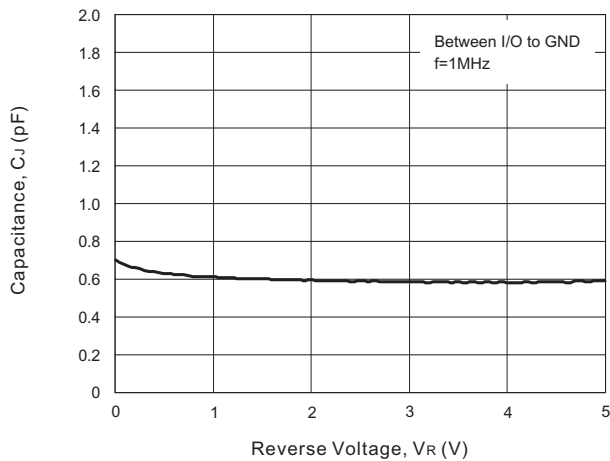


Fig.4 NORMALIZED CAPACITANCE VS. REVERSE VOLTAGE

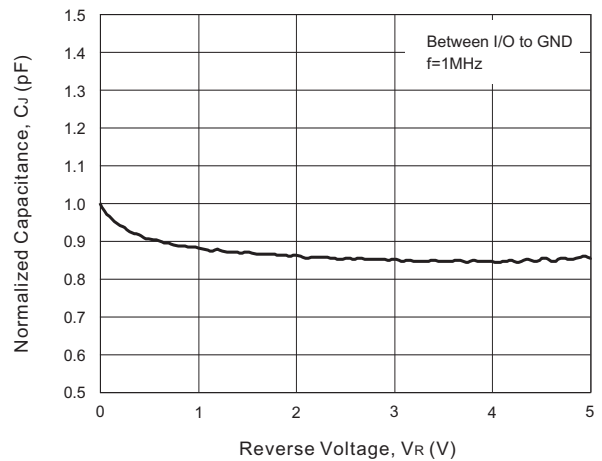


Fig.5 ESD CLAMPING OF I/O TO GND
(+8KV CONTACT PER IEC 61000-4-2)

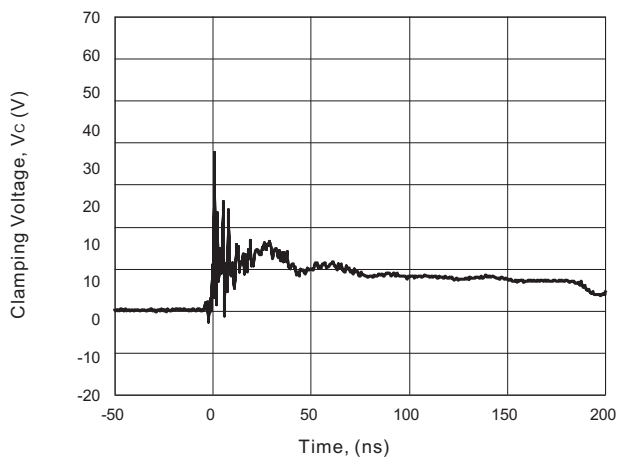
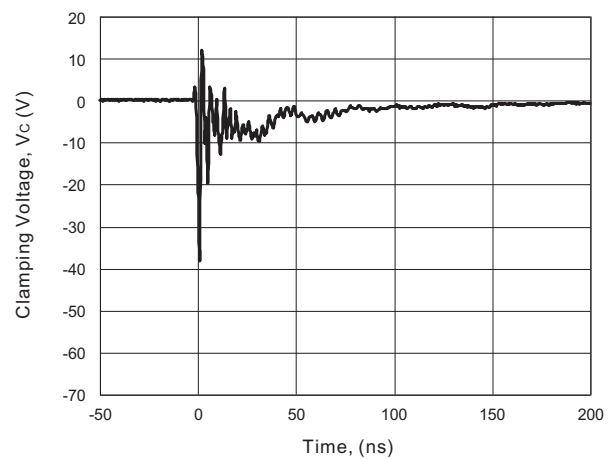
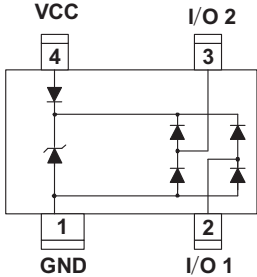
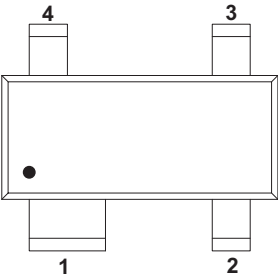
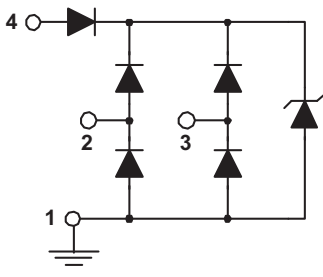


Fig.6 ESD CLAMPING OF I/O TO GND
(-8KV CONTACT PER IEC 61000-4-2)

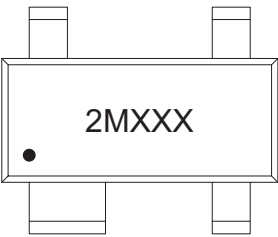


LL052BT143L1

Pinning information

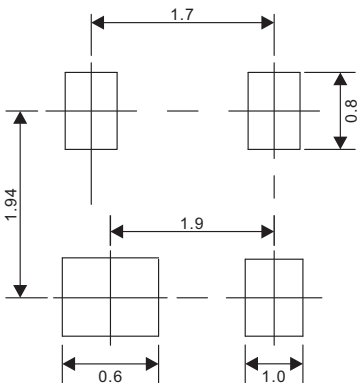
Pin Configuration	Simplified outline	Circuit Diagram
		

Marking

Type number	Marking code
LL052BT143L1	

Note:
1. P/N code: “2M”
2. Internal code: “XXX”

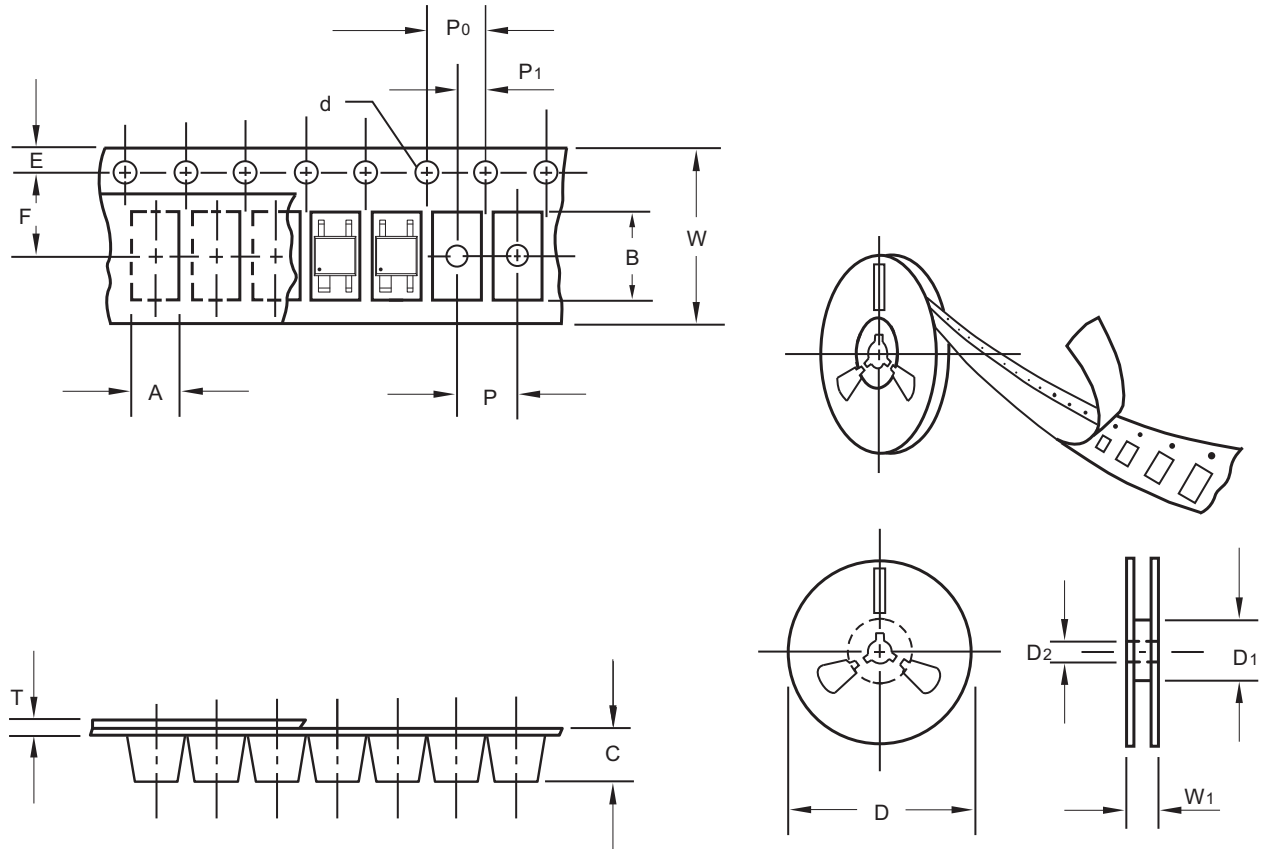
Suggested solder pad layout



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: 0.05mm.
3. The pad layout is for reference purposes only.

LL052BT143L1

Packing information



unit:mm

Item	Symbol	Tolerance	SOT-143
Carrier width	A	0.1	3.19
Carrier length	B	0.1	2.80
Carrier depth	C	0.1	1.31
Sprocket hole	d	0.1	1.50
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	54.40
Feed hole diameter	D ₂	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	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.22
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	9.50

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

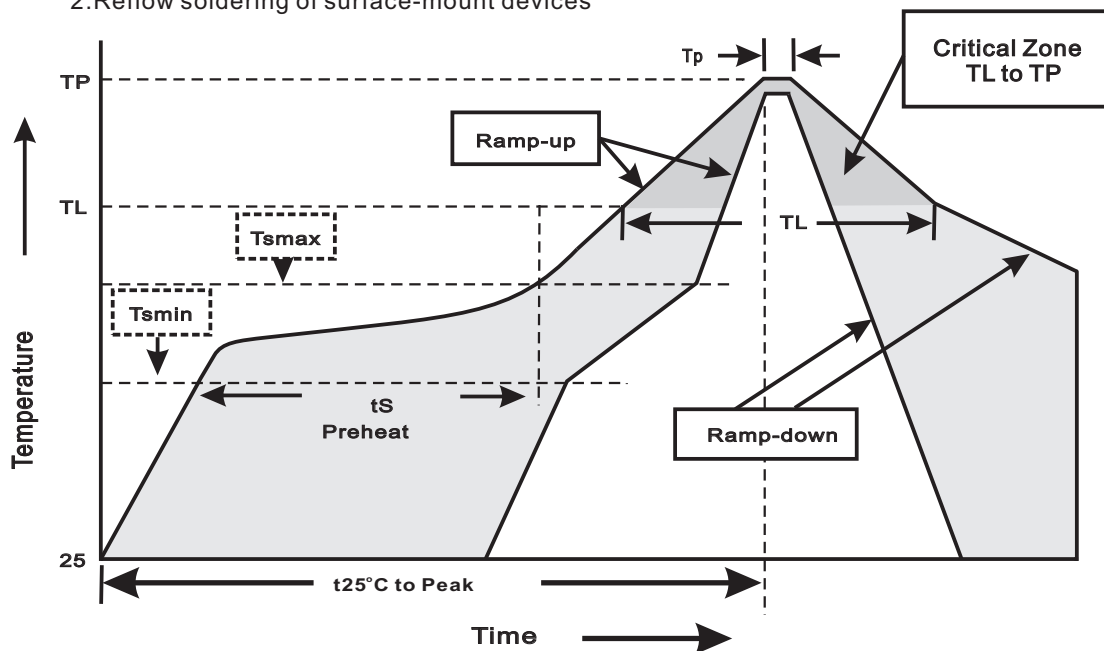
LL052BT143L1

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-143	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°C/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°C/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°C/sec
Time 25°C to Peak Temperature	<6minutes

LL052BT143L1

High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at $260 \pm 5^\circ\text{C}$ for $10 \pm 2\text{sec.}$	MIL-STD-750D METHOD-2031
2. Solderability	at $245 \pm 5^\circ\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_{\text{BR}} = V_{\text{BR Min}} * 80\%$ at $T_J = 150^\circ\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{\text{SIG}}$ at $T_A = 121^\circ\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to $+125^\circ\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at $T_A = 85^\circ\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031