LL054BT23P6

List

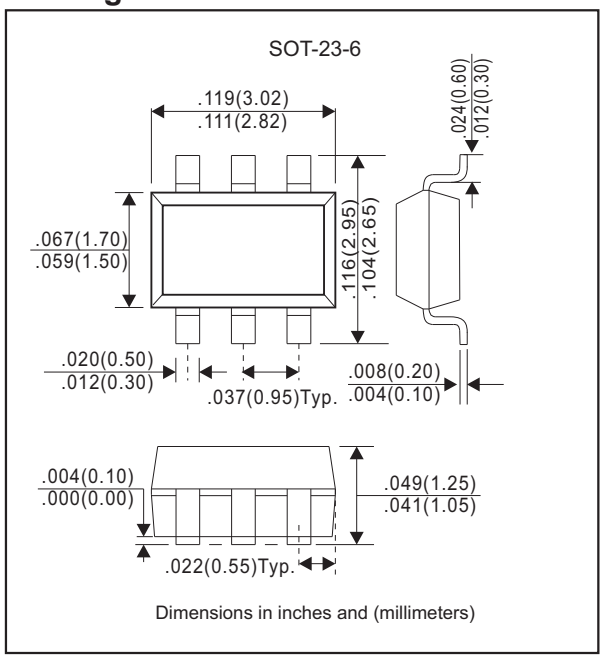
LL054BT23P6

4-Channel Ultra Low Capacitance ESD Protection Diodes Array- 5.0V

Features

- Protects four I/O lines and one Vcc line
- Low capacitance
- Working voltages : 5V
- Low leakage current
- Low capacitance for high-speed interfaces
- No insertion loss to 2.0GHz
- Response time is<1ns
- Solid-state silicon avalanche technology
- RoHS compliant
- Provide transient protection:
  IEC 61000-4-2 (ESD) meets level 4,15kV(Air),8kV(Contact)
  IEC 61000-4-5 (Surge) 5A (8/20us)
- Suffix "-H" indicates Halogen-free parts, ex. LL054BT23P6-H

Package outline



Dimensions in inches and (millimeters)

Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23-6
- Terminals :Matte tin plated
- Mounting Position : Any
- Weight : Approximated 0.013 gram

Applications

- Digital visual interface (DVI)
- USB 1.1/2.0/OTG
- IEEE 1394 firewire ports
- Notebooks & handhelds
- Projection TV & monitors
- Set-top box
- Flat panel displays
- PCI express

Maximum ratings (at T_A=25°C unless otherwise noted)

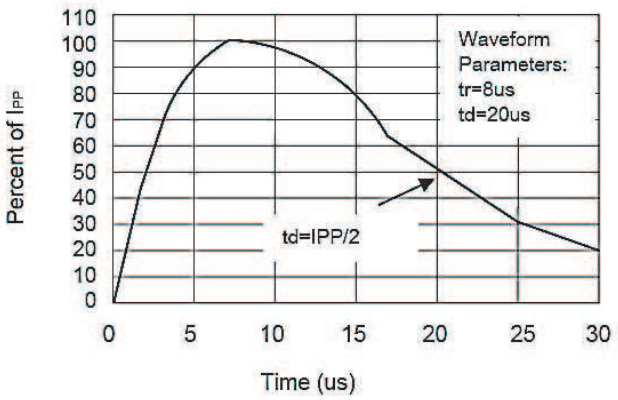
Parameter	Symbol	Value	Unit
Peak pulse power(8/20μs)	P_{PP}	150	W
Peak pulse current (IEC 61000-4-5)	I_{PP}	5	A
ESD per IEC 61000-4-2(Air) ESD per IEC 61000-4-2(Contact)	V_{ESD}	±15 ± 8	kV
Operating junction temperature range	T_J	-55 to +150	°C
Storage temperature range	T_{STG}	-55 to +150	°C

Electrical characteristics (at T_A=25°C unless otherwise noted)

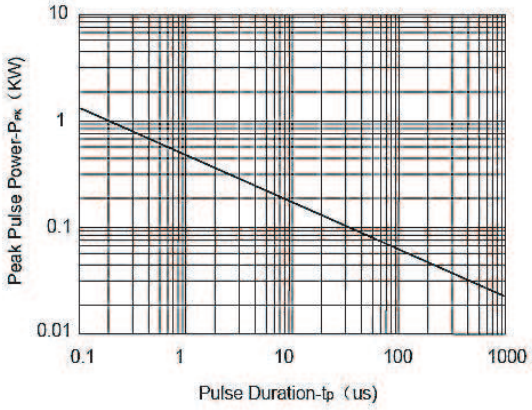
Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse working voltage	any I/O pin to GND	V_{RWM}			5.0	V
Reverse breakdown voltage	I_T = 1mA, any I/O pin to GND	V_{BR}	6.0			V
Reverse leakage current	V_{RWM} =5V,any I/O pin to GND	I_R			1.0	μA
Diode forward voltage	I_F = 15mA	V_F			1.2	V
Clamping voltage	I_{PP}=1A, tp=8/20μs any I/O pin to GND	V_{C1}			15	V
Clamping voltage	I_{PP}=5A, tp=8/20μs any I/O pin to GND	V_{C2}			28	V
Junction capacitance	V_R=0V, f=1MHz,between I/O pins	C_{J1}			0.40	pF
Junction capacitance	V_R=0V, f=1MHz,any I/O pin to GND	C_{J2}			0.80	pF

Note: I/O pins are pin 1,3,4,6.

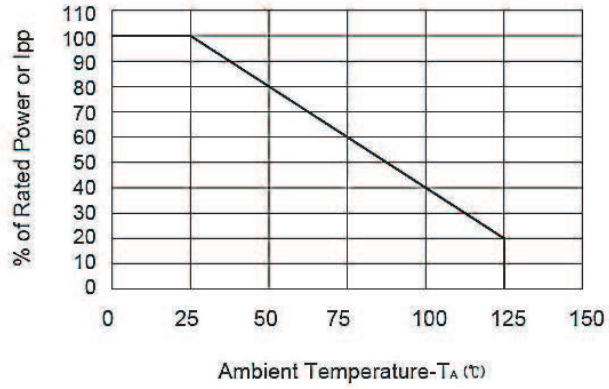
Rating and characteristic curves (LL054BT23P6)



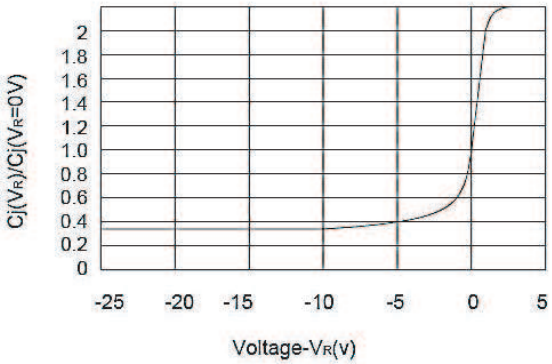
Pulse Waveform



Non-Repetitive Peak Pulse Power vs. Pulse Time



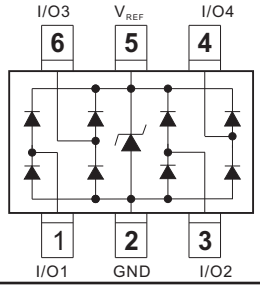
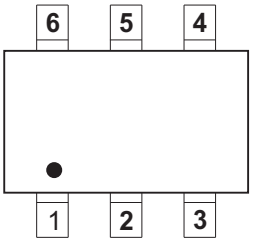
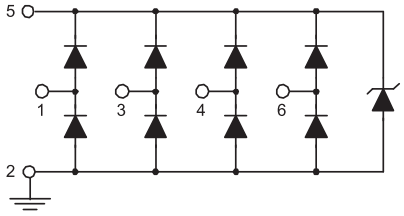
Power Derating Curve



Junction Capacitance vs. Reverse Voltage

LL054BT23P6

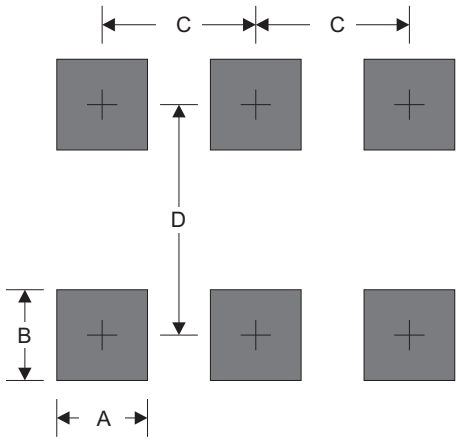
Pinning information

Pin Configuration	Simplified outline	Circuit Diagram
		

Marking

Type number	Marking code
LL054BT23P6	V05,V5L

Suggested solder pad layout

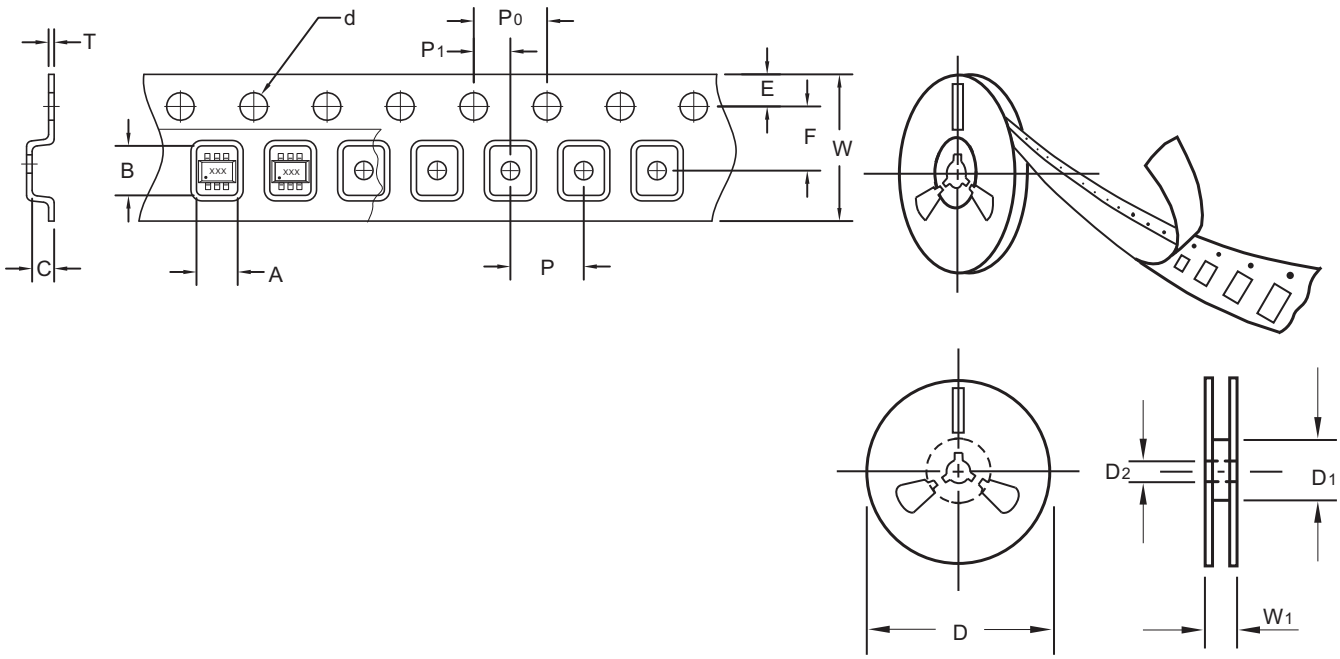


Dimensions in inches and (millimeters)

PACKAGE	A	B	C	D
SOT-23-6	0.028 (0.70)	0.039 (1.00)	0.037(0.95)	0.094(2.40)

LL054BT23P6

Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23-6
Carrier width	A	0.1	3.25
Carrier length	B	0.1	3.20
Carrier depth	C	0.1	1.40
Sprocket hole	d	0.1	1.55
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	54.40
Feed hole diameter	D_2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.05	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P_0	0.1	4.00
Embossment center	P_1	0.05	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W_1	max	12.30

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

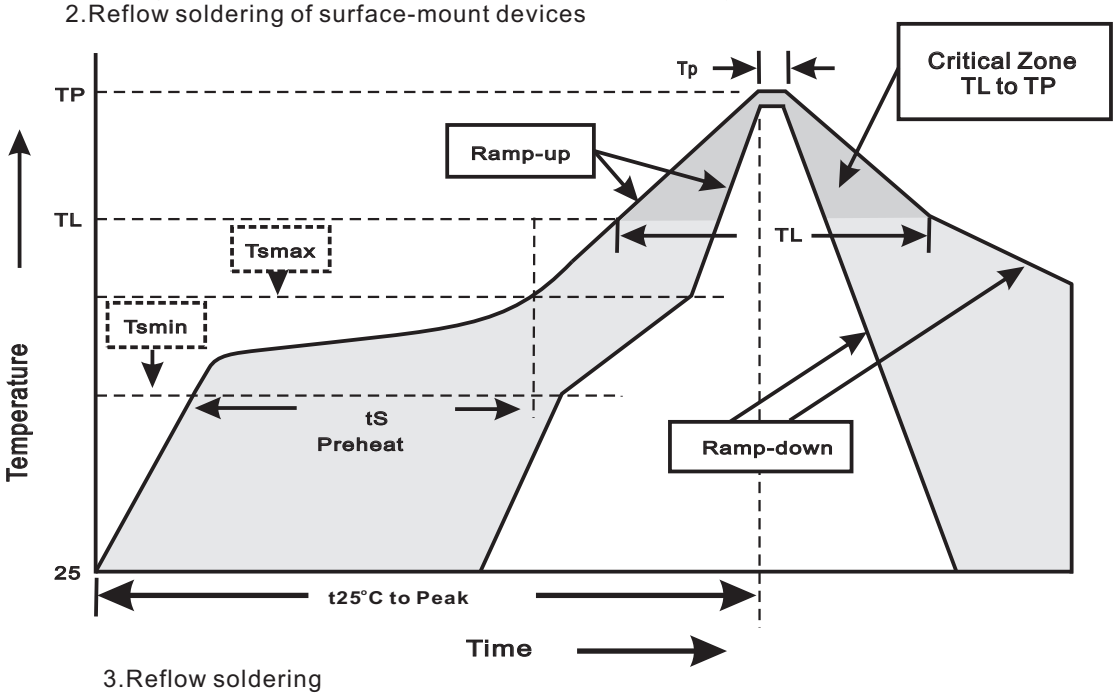
LL054BT23P6

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-23-6	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(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax 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

LL054BT23P6

High reliability test capabilities

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