

# LL054BT36

## List

List..... 1

Package outline..... 2

Features..... 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

Packing information..... 5

Reel packing..... 6

Suggested thermal profiles for soldering processes..... 6

High reliability test capabilities.....7

# LL054BT36

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

### Features

- 4 channels of ESD protection
- Provide transient protection:
  - IEC 61000-4-2 (ESD) level 4
  - IEC 61000-4-4 (EFT) 80A (5/50ns)
  - IEC 61000-4-5 (Surge) 5A (8/20 $\mu$ s)
- Channel I/O to GND capacitance: 0.9pF(Max)
- Channel I/O to I/O capacitance: 0.45pF(Max)
- Low clamping voltage
- Low operating voltage
- Improved zener structure
- Optimized package for easy high speed data lines PCB layout
- RoHS compliant
- Suffix "-H" indicates Halogen-free parts, ex. LL054BT36-H

### Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-363
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.006 gram

### Applications

- HDMI / DVI ports
- Display Port interface
- 10M / 100M / 1G Ethernet
- USB 2.0 interface
- VGA interface
- Set-top box
- Flat panel Monitors / Tvs
- PC / Note book

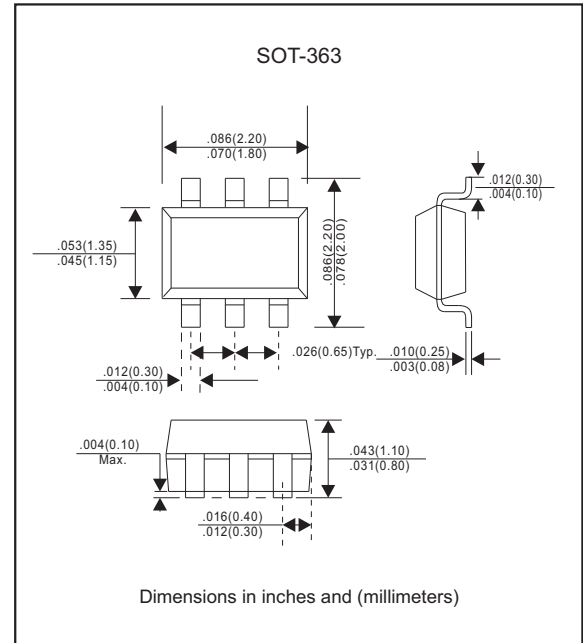
### Maximum ratings (at $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Peak pulse power(8/20 $\mu$ s)	PP	150	W
Peak pulse current IEC 61000-4-5(8/20 $\mu$ s)	IPP	5	A
ESD per IEC 61000-4-2(Air)	VESD	$\pm 15$	kV
ESD per IEC 61000-4-2(Contact)		$\pm 8$	
Typical thermal resistance junction to ambient	R $\theta$ JA	670	$^\circ\text{C}/\text{W}$
Typical thermal resistance junction to case	R $\theta$ JC	370	$^\circ\text{C}/\text{W}$
Operating junction temperature range	T $_{opr}$	-55 to +125	$^\circ\text{C}$
Storage temperature range	T $_{stg}$	-55 to +150	$^\circ\text{C}$

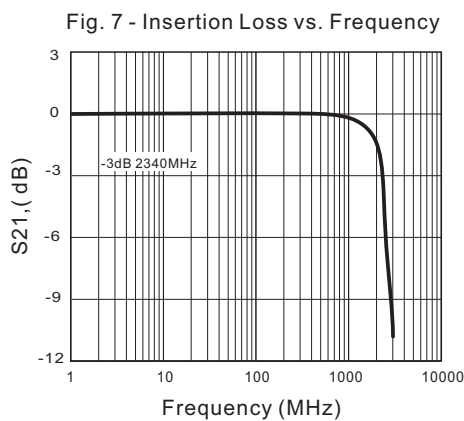
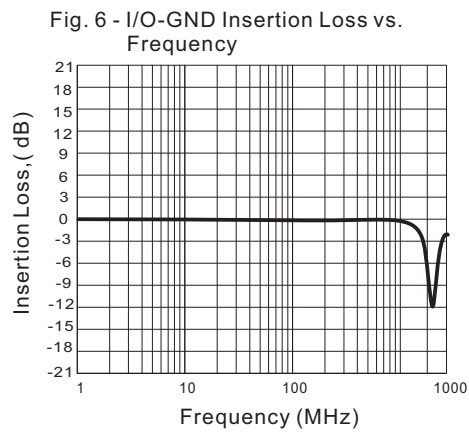
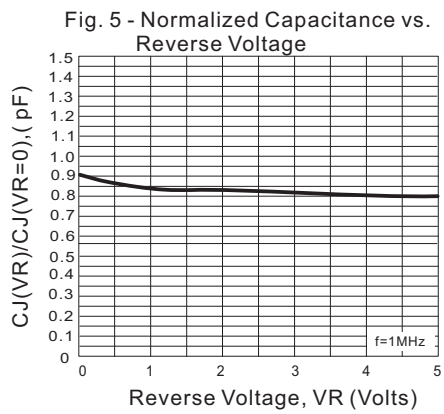
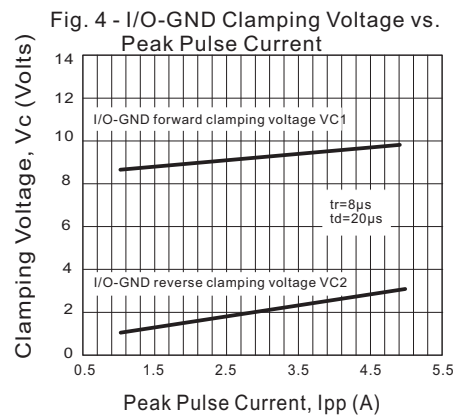
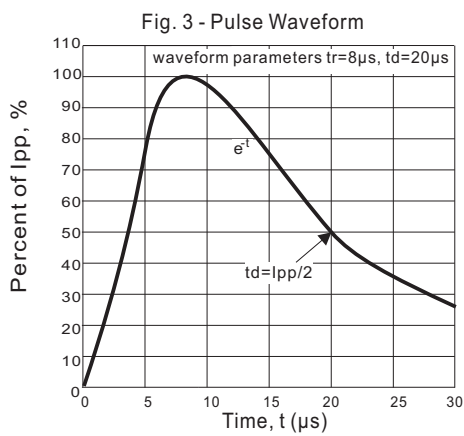
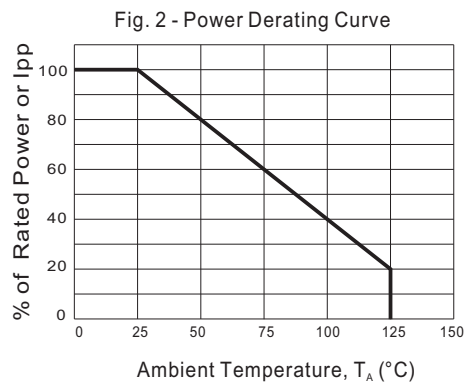
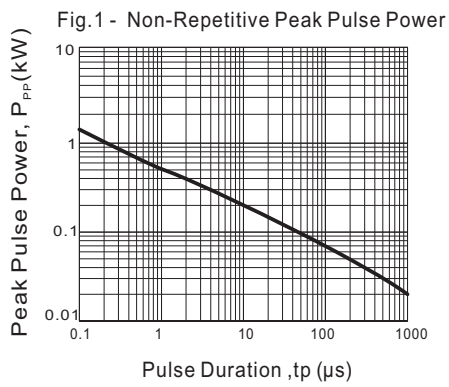
### Electrical characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse working voltage	any I/O pin to GND	V $_{RWM}$			5.0	V
Reverse breakdown voltage	I $_{BV}$ =1mA, Any I/O pin to GND	V $_{BR}$	6.0		10.0	V
Reverse leakage current	V $_{RWM}$ =5V,Any I/O pin to GND	I $_R$			1.0	$\mu\text{A}$
Positive clamping voltage	I $_{PP}$ =1A, tp=8/20 $\mu$ s,positive pulse; any I/O pin to GND	V $_{C1}$		8.5	12.0	V
Negative clamping voltage	I $_{PP}$ =1A, tp=8/20 $\mu$ s,negative pulse; any I/O pin to GND	V $_{C2}$		1.8		V
Junction capacitance Between channel	V $_R$ =0V, f=1MHz,between I/O pins	C $_{J1}$		0.35	0.45	pF
Junction capacitance Between I/O and GND	V $_R$ =0V, f=1MHz,any I/O pin to GND	C $_{J2}$			0.9	pF

### Package outline

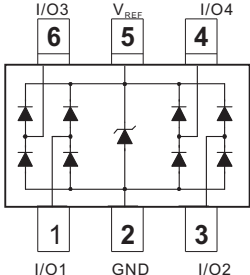
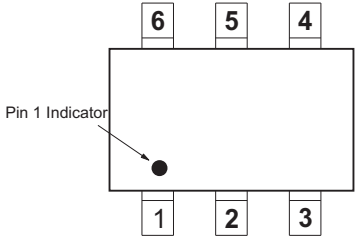
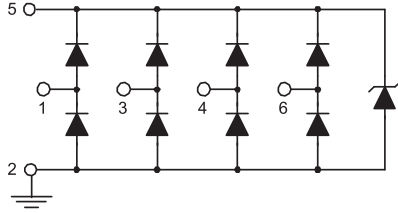


## Rating and characteristic curves (LL054BT36)



# LL054BT36

## Pinning information

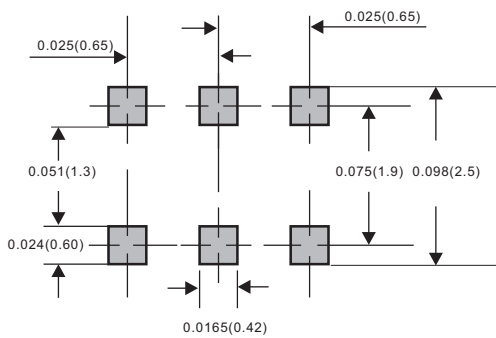
Pin Configuration	Simplified outline	Circuit Diagram
		

## Marking

Type number	Marking code
LL054BT36	C96

## Suggested solder pad layout

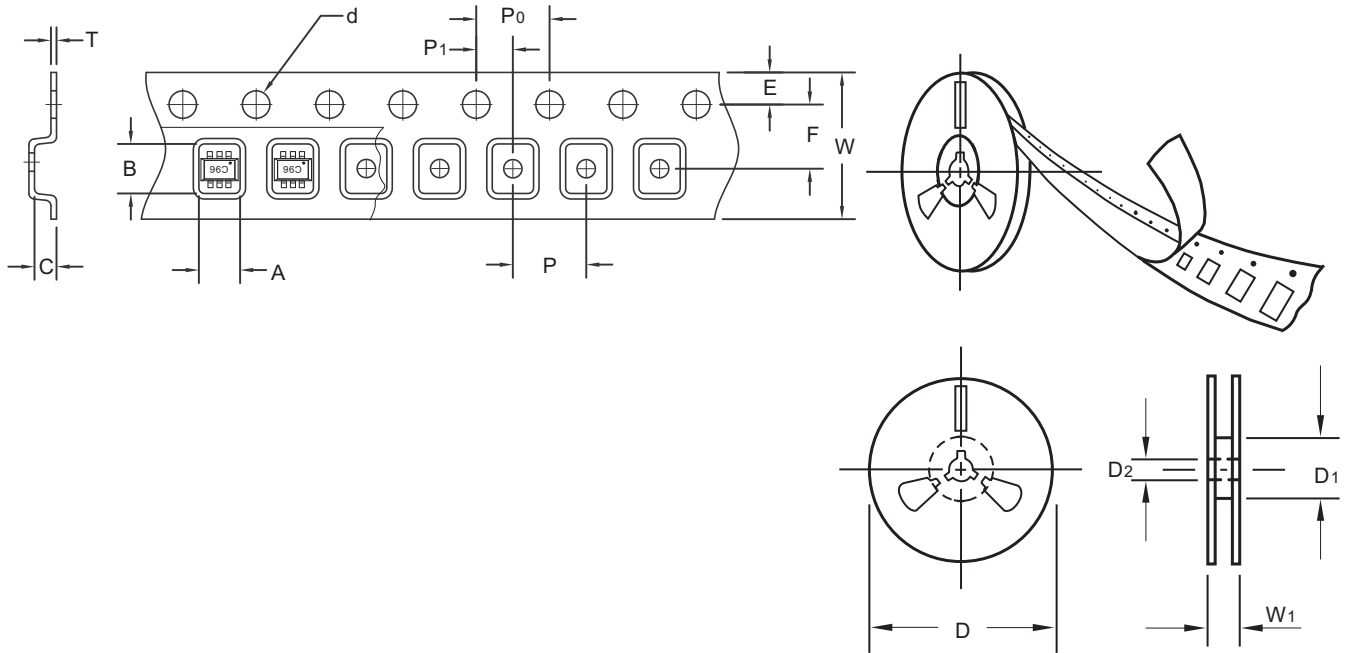
SOT-363



Dimensions in inches and (millimeters)

# LL054BT36

## Packing information



unit:mm

Item	Symbol	Tolerance	SOT-363
Carrier width	A	0.1	2.36
Carrier length	B	0.1	2.40
Carrier depth	C	0.1	1.20
Sprocket hole	d	0.1	1.50
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	62.00
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	11.40

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

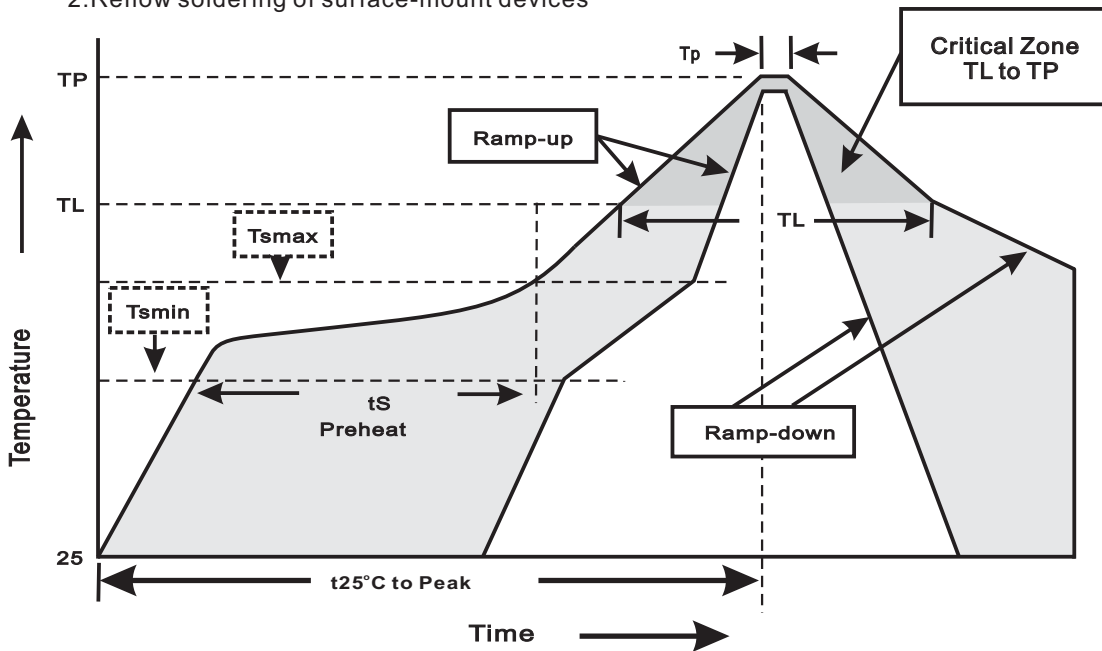
# LL054BT36

## 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)	APPROX. GROSS WEIGHT (kg)
SOT-363	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	9.50

## 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 <sub>L</sub> to T <sub>P</sub> )	<3°C/sec
Preheat -Temperature Min(T <sub>smmin</sub> ) -Temperature Max(T <sub>smmax</sub> ) -Time(min to max)(t <sub>s</sub> )	150°C 200°C 60~120sec
T <sub>smmax</sub> to T <sub>L</sub> -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T <sub>L</sub> ) -Time(t <sub>L</sub> )	217°C 60~260sec
Peak Temperature(T <sub>P</sub> )	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t <sub>P</sub> )	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

# LL054BT36

## 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 $T_J=125^\circ\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	15P <sub>SIG</sub> at $T_A=121^\circ\text{C}$ 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 $T_A=85^\circ\text{C}$ , 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