

LL164AT36

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Surface Mount TVS Diode Array For 4 Lines I/O ESD Protection: 5.0V

Features

- Cable discharge event (CDE).
- Each I/O pin can withstand over 1000 ESD strikes for $\pm 8\text{KV}$ contact discharge.
- Cable discharge event (CDE).
- IEC61000-4-2 (ESD) $\pm 20\text{kV}$ (air), $\pm 20\text{kV}$ (contact).
- IEC61000-4-5 (Lightning) 2.0A ($8/20\mu\text{s}$).
- Suffix "-H" indicates Halogen-free part, ex.LL164AT36-H.

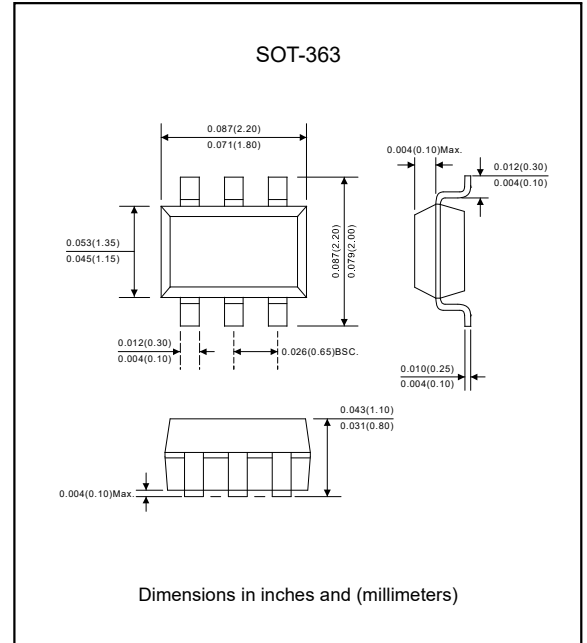
Applications

- USB2.0/3.0.
- LVDS.
- HDMI.
- High Speed Differential Pairs

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

Package outline



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

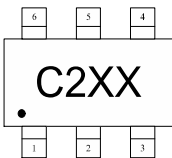
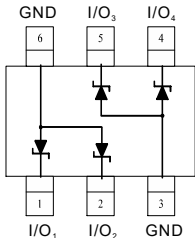
Parameter	Symbol	Value	Unit
Peak pulse current ($t_p=8/20\mu\text{s}$)	P_{PK}	50	W
Peak pulse current ($t_p=8/20\mu\text{s}$)	I_{PP}	2	A
ESD per IEC 61000-4-2 (Contact)	V_{ESD}	± 20	KV
ESD per IEC 61000-4-2 (Air)		± 20	
Operating temperature	T_{OPT}	+125	$^\circ\text{C}$
Storage temperature	T_{STG}	-55 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	16	V
Reverse leakage current	$V_{RWM}=5.0\text{V}$	I_R			0.1	μA
Reverse Breakdown voltage	$I_T=1\text{mA}$	V_{BR}	16.5			V
Clamping voltage	$I_{PP}=2\text{A}$, $t_p=8/20\mu\text{s}$	V_C		24		V
	$I_{PP}=8\text{A}$, $t_p=100\text{ns}$ (Note 1)			25		
	$I_{PP}=16\text{A}$, $t_p=100\text{ns}$ (Note 1)			30		
Junction capacitance	$V_R=0\text{V}$, $f=1\text{MHz}$, (Between V_{CC} and I/O)	C_{ESD}		0.3		pF
	$V_R=0\text{V}$, $f=1\text{MHz}$, (Between I/O and GND)			0.6		

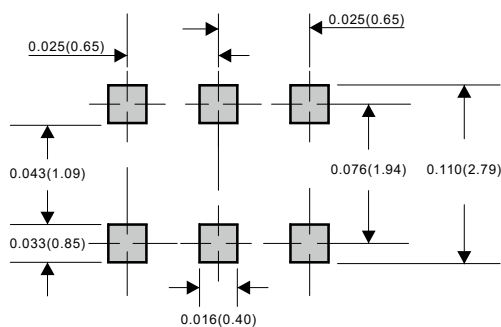
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Pinning information & Marking

Type number	Marking code	Symbol
LL164AT36	 Note: (1) "C2" is part number, fixed. (2) "XX" is internal code.	

Suggested solder pad layout

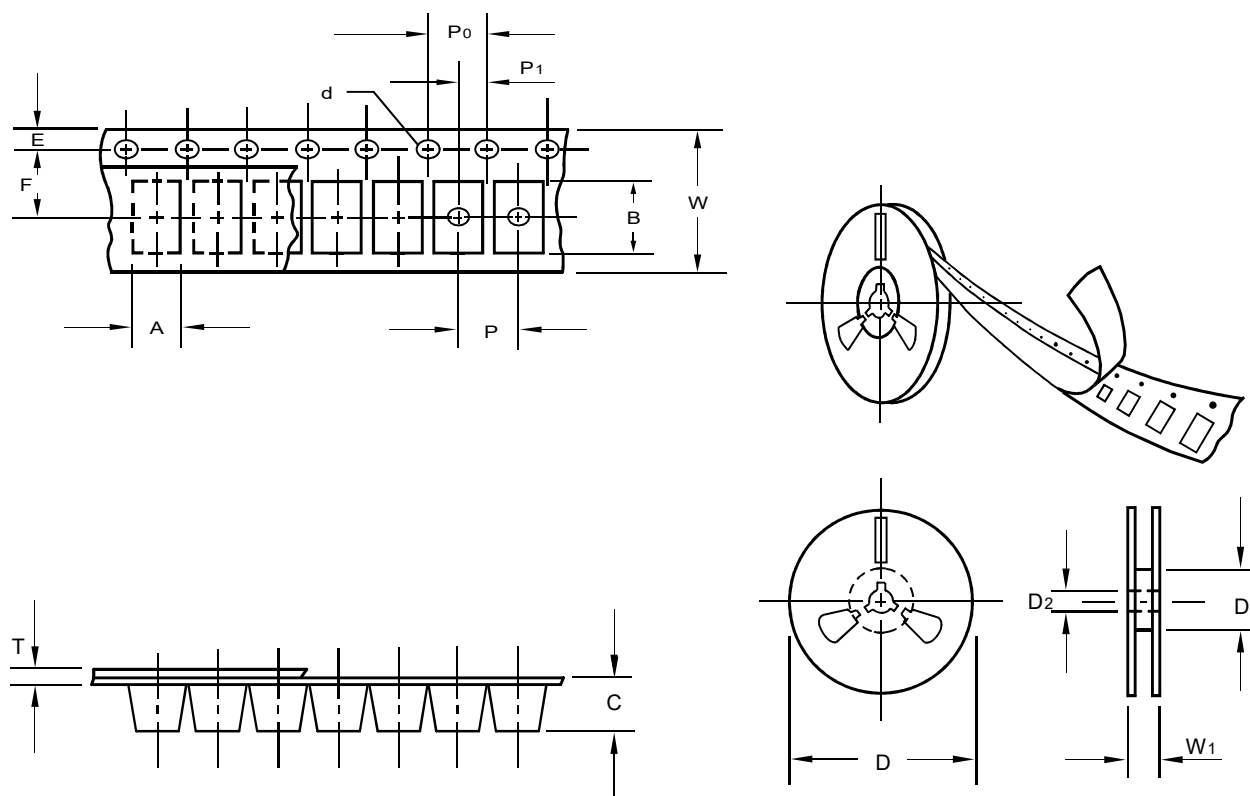
SOT-363



Dimensions in inches and (millimeters)

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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	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	62.00
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	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	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	11.40

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

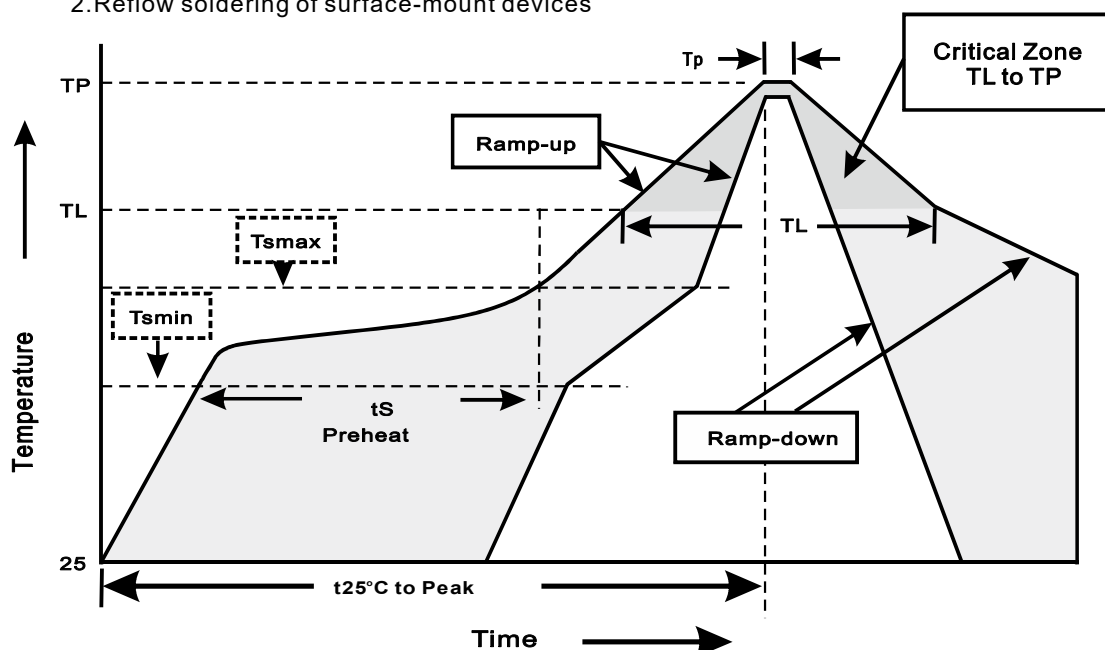
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Reel packing

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)	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 _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

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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	$V_{BR} = V_{BR\text{Min}} * 80\%$ at $T_J = 150^\circ\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{SIG}$ 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