LL01BT0603

List

LL01BT0603

Ultra Low Capacitance Bi-Directional TVS For ESD Protection 1.0V

Features

- Protects one high-speed data line.
- Transient protection for high-speed data lines.
  IEC 61000-4-2 (ESD) ±12kV(Air), ±10kV(Contact).
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.LL01BT0603-H.

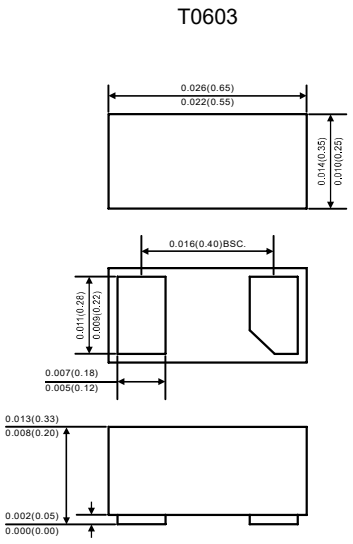
Applications

- HDMI 1.3 / 1.4 and HDMI 2.0.
- USB 2.0 and USB 3.0/3.1/4.0.
- LVDS Interfaces.
- FM Antenna.
- PCI Express.
- MHL.
- eSATA Interfaces.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case: Molded plastic, T0603.

Package outline



Dimensions in inches and (millimeters)

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

Parameter	Symbol	Value	Unit
Peak pulse current (8/20μs)	I_{PP}	4	A
ESD per IEC 61000-4-2 (Air) (Note1)	V_{ESD}	±12	kV
ESD per IEC 61000-4-2 (Contact) (Note1)		±10	
Operating temperature	T_J	+125	℃
Storage temperature range	T_{STG}	-55 to +150	℃

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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse stand-off voltage		V_{RWM}			1	V
Reverse breakdown voltage	I_T=1mA	V_{BR}	1.2			V
Reverse leakage current	V_{RWM}=1V, T=25°C	I_R			0.1	μA
Clamping voltage	I_{PP}=1A, t_P=8/20μs	V_C		3		V
	I_{PP}=4A, t_P=8/20μs			4.3		
	I_{TLP}=8A, t_P=100ns			5		
	I_{TLP}=16A, t_P=100ns			8.4		
Dynamic resistance (Note 2,3,4)	t_P=100ns	R_D		0.43		Ω
Junction capacitance	V_R=0V, f=1.0MHz	C_J		0.15		pF

Note : 1. ESD gun return path connected to ESD ground reference plane.
2. Transmission line pulse test (TLP) settings: t_P=100ns, t_r=0.2ns, I_{TLP} and V_{TLP} averaging window: t_1=70ns to t_2=90ns.
3. Dynamic resistance calculated from I_{TLP}=4A to I_{TLP}=16A.
4. Guaranteed by design. not production tested.

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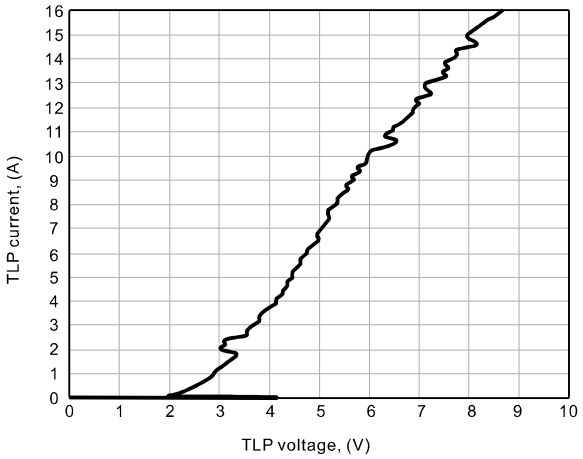
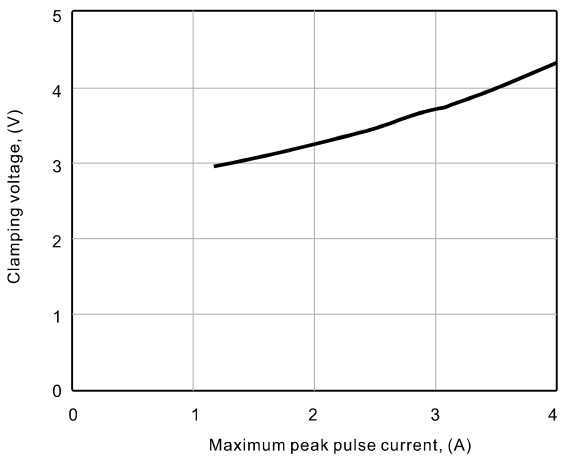
Rating and characteristic curves

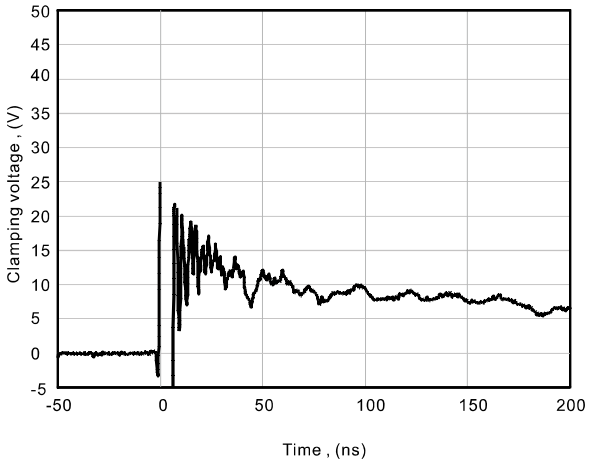
TLP Measurement of I/O to I/O



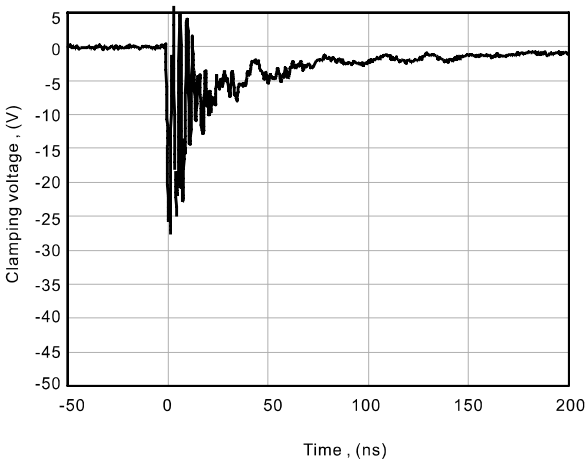
8/20μs current I/O to I/O



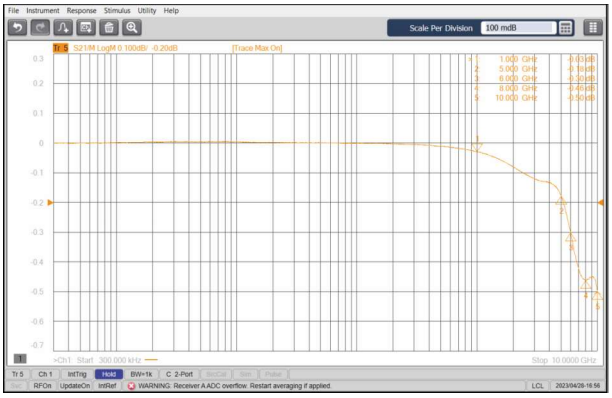
ESD clamping of I/O to GND
(+8kV contact per IEC 61000-4-2)



ESD clamping of I/O to GND
-8kV contact per IEC 61000-4-2)



Insertion Loss S21 of I/O to I/O



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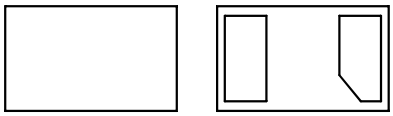
Pinning information

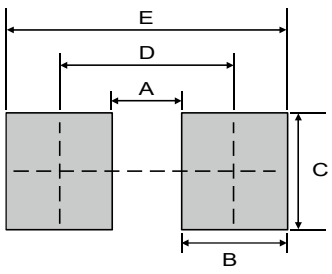
Pin	Simplified outline	Symbol
Bi-directional	 Top view Bottom view	

Marking

Type number	Marking code
LL01BT0603	TX

* "T" is part number, fixed.
"X" is the internal code.

Suggested solder pad layout



Size	T0603	
	(mm)	(inch)
A	0.15	0.006
B	0.23	0.009
C	0.30	0.012
D	0.38	0.015
E	0.61	0.024

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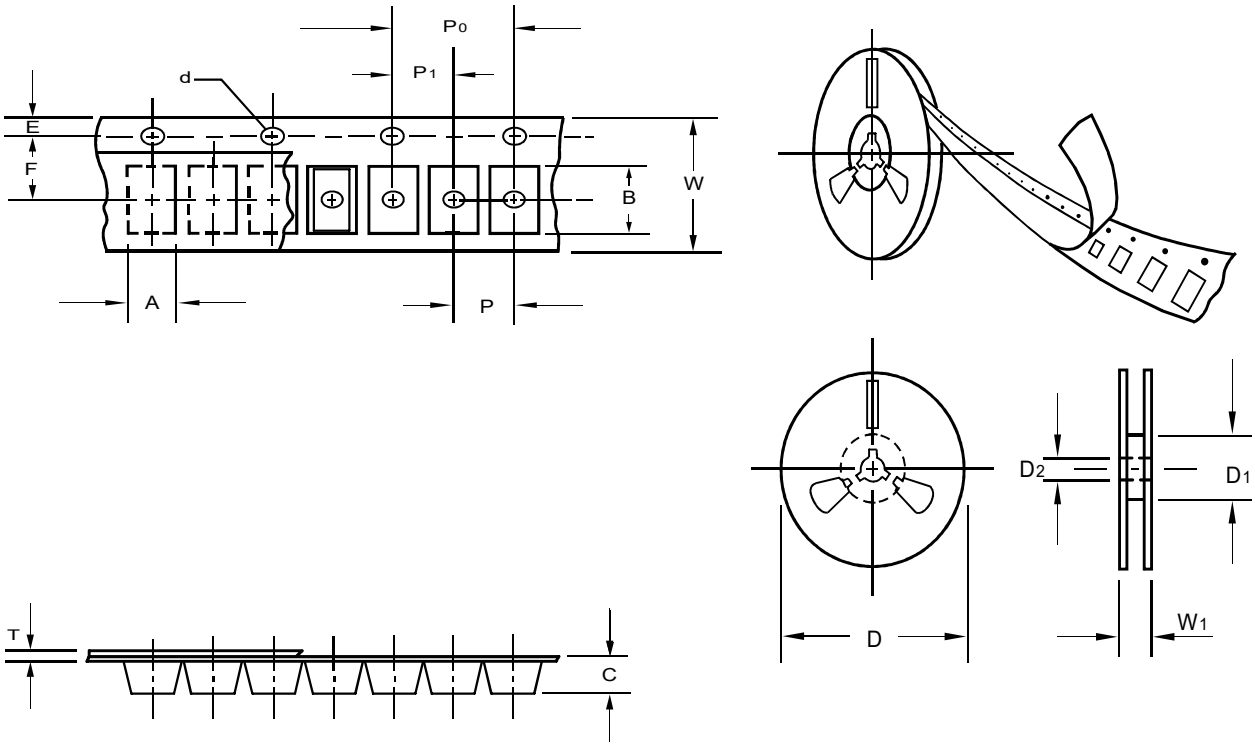
Packing information



unit:mm

Item	Symbol	Tolerance	DFN0603 (T0603)
Carrier width	A	0.1	0.37
Carrier length	B	0.1	0.67
Carrier depth	C	0.1	0.32
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	178.0
7" Reel inner diameter	D_1	min	60.0
Feed hole diameter	D_2	0.5	13.5
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.5
Punch hole pitch	P	0.1	2.0
Sprocket hole pitch	P_0	0.1	4.0
Embossment center	P_1	0.1	2.0
Overall tape thickness	T	0.1	0.2
Tape width	W	0.3	8.0

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

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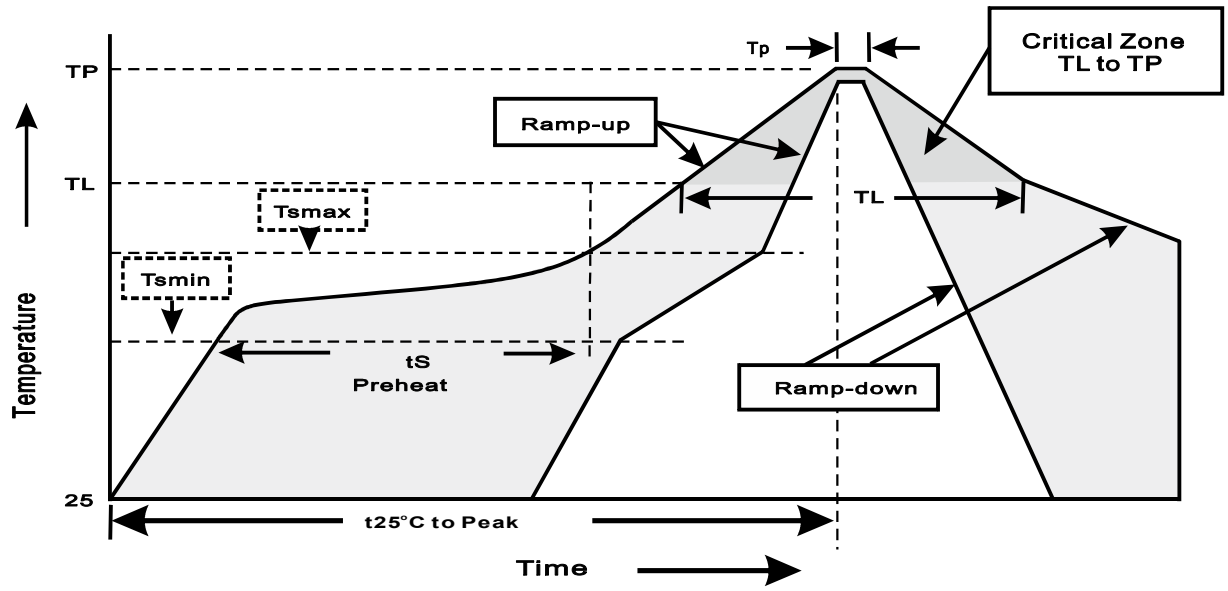
Reel packing

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)
DFN0603 (T0603)	7"	10,000	4.0	100,000	183*123*183	178	382*257*387	800,000

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