

LL03BT1006

List

List.....	1
Package outline.....	2
Features.....	2
APPlications.....	2
Mechanical data.....	2
Maximum ratings	2
Electrical characteristics.....	3
Rating and characteristic curves.....	4
Pinning & Marking information.....	5
Suggested solder pad layout.....	5
Package Information.....	6
Reel packing.....	7
Suggested thermal profiles for soldering processes.....	7

LL03BT1006

25W Surface Mount TVS Bi-Directional For ESD Protection-3.3V

Features

- Package optimized for high-speed lines.
- Ultra-small package (1.0mm x 0.6mm x 0.55mm).
- Protects one data, control or power line.
- Low capacitance : 0.15pF (Typical).
- Low leakage current : 0.1 μ A @V_{RWM} (Typical).
- Low clamping voltage.
- Provide transient protection:
IEC 61000-4-2 (ESD) $\pm$ 17KV(Air), $\pm$ 10KV(Contact).
- IEC 61000-4-4 (EFT) 40A (5/50ns) Cable discharge event (CDE).
- Each I/O pin can withstand over 1000 ESD Strikes for $\pm$ 8KV contact discharge.
- We declare that the material of product compliance with RoHS requirements.
- Suffix "-H" indicates Halogen-free parts, ex.LL03BT1006-H

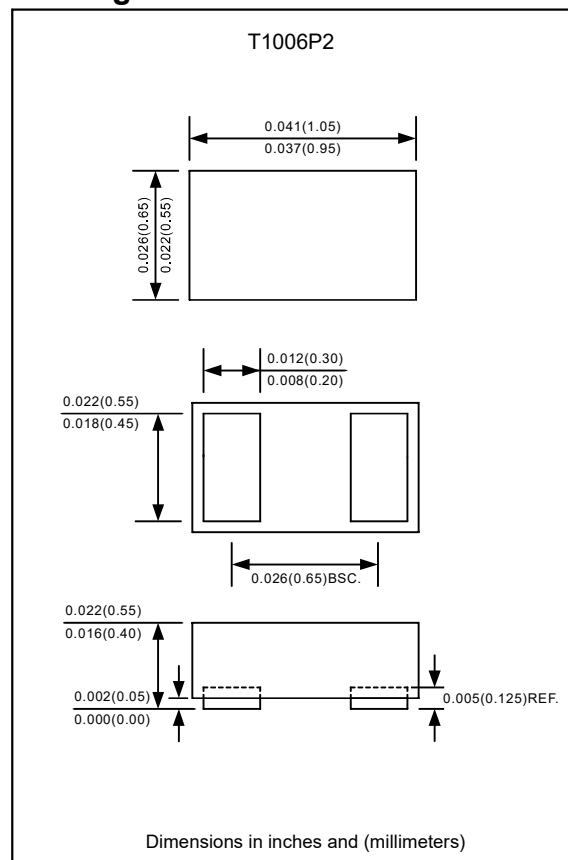
Applications

- Serial ATA.
- PCI Express.
- USB 2.0/3.0/3.1 Power and data line protection.
- HDMI 1.4/2.0.

Mechanical data

- T1006P2 package
- Molding compound flammability rating : UL94V-0
- Packaging : Tape and reel per EIA 481
- RoHS Compliant
- Weight : Approximated 0.73 mg

Package outline



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

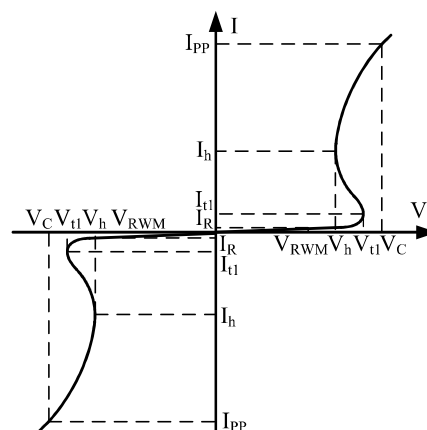
Parameter	Symbol	Value	Unit
Peak pulse power (tp=8/20 μ s)	P _{PP}	25	W
Peak pulse current (tp=8/20 μ s)	I _{PP}	5	A
ESD per IEC 61000-4-2 (Contact)	V _{ESD}	$\pm$ 10	KV
ESD per IEC 61000-4-2 (Air)		$\pm$ 17	
Operating temperature	T _{OPT}	+125	°C
Storage temperature	T _{STG}	-55 to +150	°C

LL03BT1006

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}			3.3	V
Reverse leakage current	$V_{RWM}=3.3\text{V}$	I_R		0.1	0.5	μA
Trigger voltage	$I_{t1}=10\mu\text{A}$	V_{t1}	6.5		8.5	V
Holding voltage	$I_h=30\text{mA}$	V_h		2.4		V
Clamping voltage @ I_{pp}	$I_{pp}=1\text{A}, t_p=8/20\mu\text{s}$	V_c			4.0	V
	$I_{pp}=5\text{A}, t_p=8/20\mu\text{s}$				5.0	
Junction capacitance	$V_R=0\text{V}, f=1\text{MHz}$	C_d		0.15	0.19	pF

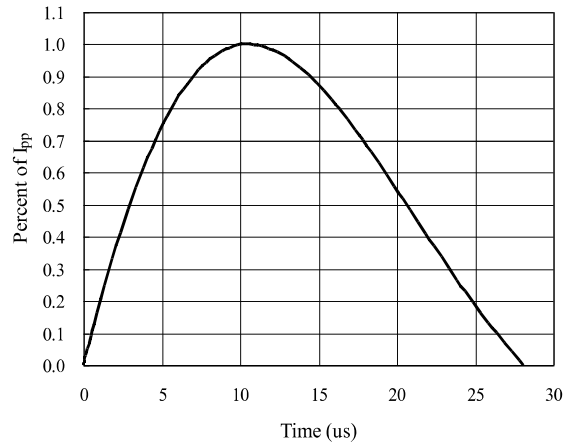
Symbol	Parameter
V_{RWM}	Nominal Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{t1}	Trigger Voltage
I_{t1}	Trigger Current @ V_{t1}
V_h	Holding Voltage
I_h	Holding Current @ V_h
V_c	Clamping Voltage @ I_{pp}
I_{pp}	Maximum Peak Pulse Current
C_d	Diode Capacitance



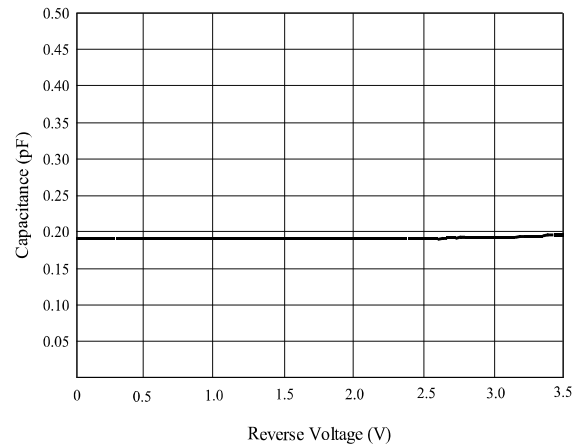
Bi-Directional TVS

Rating and characteristic curves(LL03BT1006)

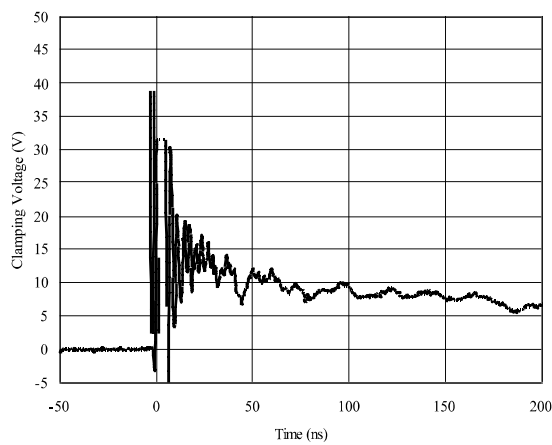
8/20 μ s Pulse Waveform



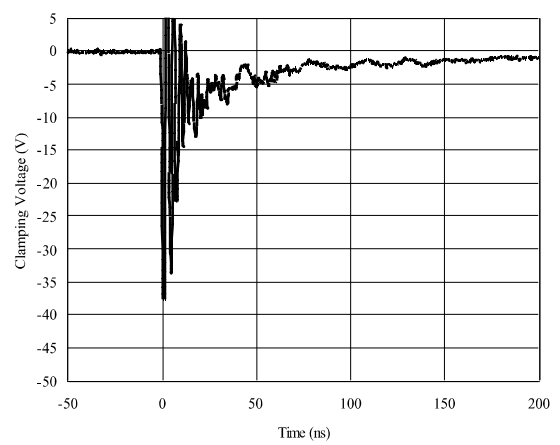
Capacitance vs. Reverse Voltage



ESD Clamping of I/O to G ND
(+8kV Contact per IEC 61000-4-2)

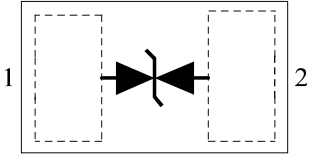


ESD Clamping of I/O to G ND
(-8kV Contact per IEC 61000-4-2)

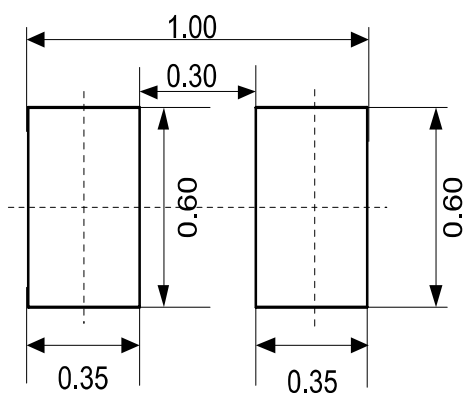


LL03BT1006

Pinning & information

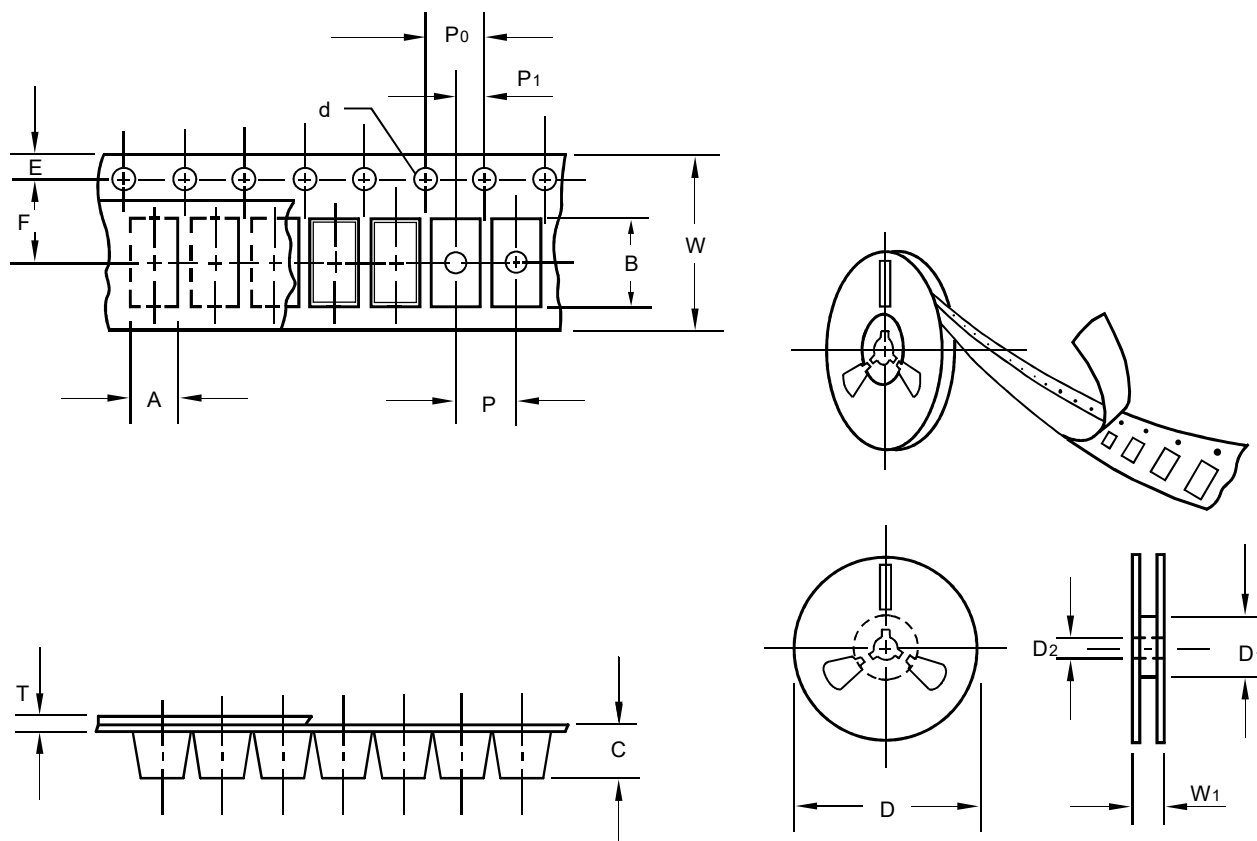
Marking Code	Symbol
	

Suggested solder pad layout



LL03BT1006

Packing information



unit:mm

Item	Symbol	Tolerance	T1006P2
Carrier width	A	0.1	0.66
Carrier length	B	0.1	1.15
Carrier depth	C	0.1	0.66
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	55.00
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	2.00
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	9.50

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

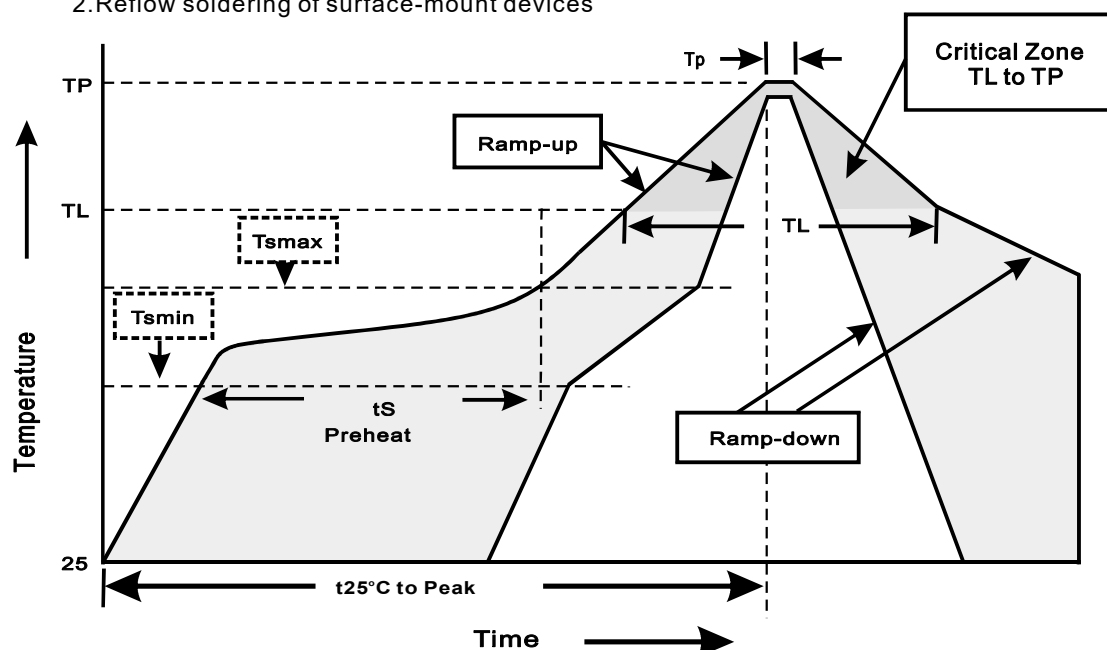
LL03BT1006

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)
T1006P2	7"	10,000	4.0	100,000	183*123*183	178	382*257*387	800,000	15.0

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 _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} 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