

LL24BT1006E-Q1

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Ultra Low Capacitance Bi-Directional TVS For ESD Protection : 24V

Features

- Low clamping voltage.
- Low leakage current.
- Complies with following standards:
IEC 61000-4-2(ESD) ± 20 kV(Air), ± 15 kV(Contact).
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free parts, ex.LL24BT1006E-Q1-H.

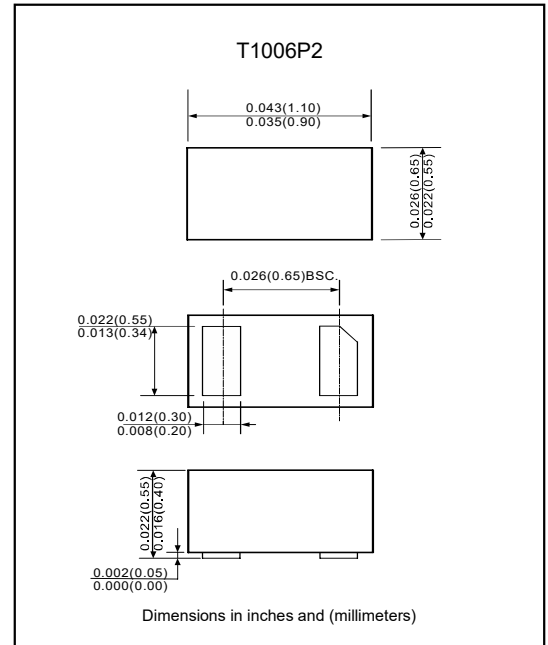
Applications

- Cellular handsets and accessories.
- Personal digital assistants (PDS's) and portable instrumentation.
- Notebooks, handhelds, digital cameras, and audio players.
- Peripherals, and industrial equipment.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case: T1006P2 package.

Package outline



Maximum ratings (At $T_A=25^\circ\text{C}$, RH=45~75%, unless otherwise noted)

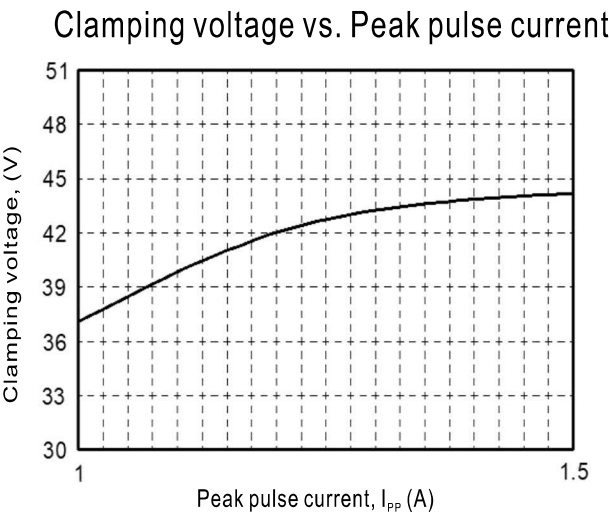
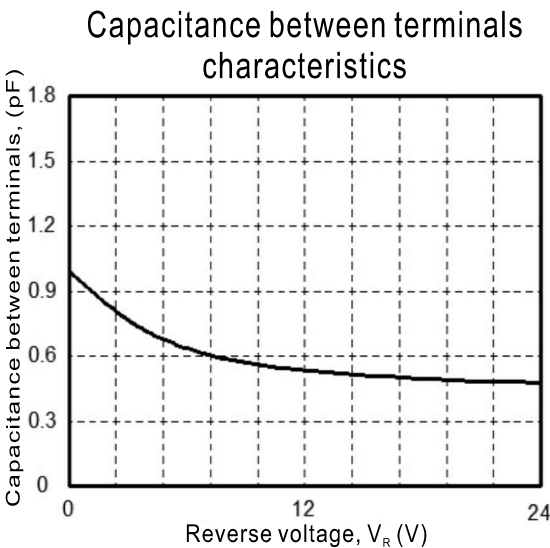
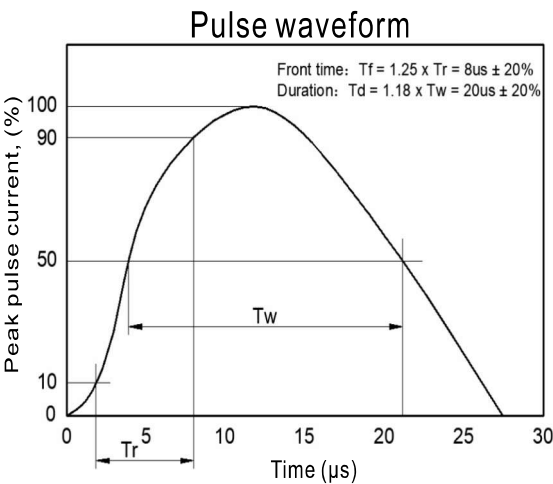
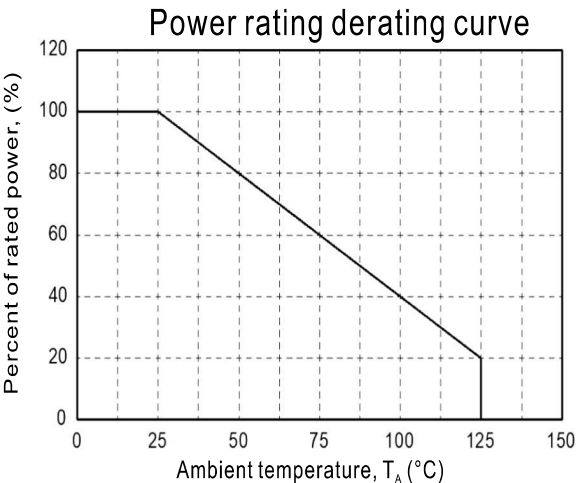
Parameter	Symbol	Ratings	Unit
Peak pulse power (8/20 μ s)	P_{PP}	80	W
Peak pulse current (8/20 μ s)	I_{PP}	1.5	A
ESD per IEC61000-4-2 (Air)	V_{ESD}	± 20	KV
ESD per IEC61000-4-2 (Contact)		± 15	
Junction temperature	T_J	+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical characteristics (At $T_A=25^\circ\text{C}$, RH=45~75%, unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Reverse stand-off voltage		V_{RWM}			24	V
Reverse breakdown voltage	$I_R=1\text{mA}$	V_{BR}	24.5		31	V
Reverse leakage current	$V_{RWM}=24\text{V}$	I_R			0.2	μA
Clamping voltage	$I_{PP}=1\text{A}$, $T_p=8/20\mu\text{s}$	V_C			40	V
	$I_{PP}=1.5\text{A}$, $T_p=8/20\mu\text{s}$				54	V
Junction capacitance	$V_R=0\text{V}$, $f=1.0\text{MHz}$	C_J		0.4	0.6	pF

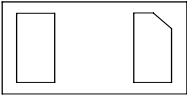
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Rating and characteristic curves



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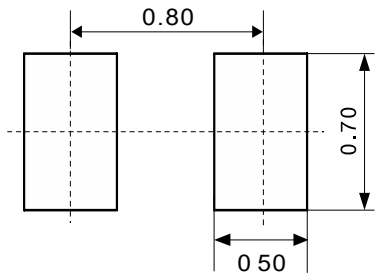
Pinning information

Pin	Simplified outline	Symbol
Bi-directional	 Top view  Bottom view	

Marking

Type number	Marking code
LL24BT1006E-Q1	24U

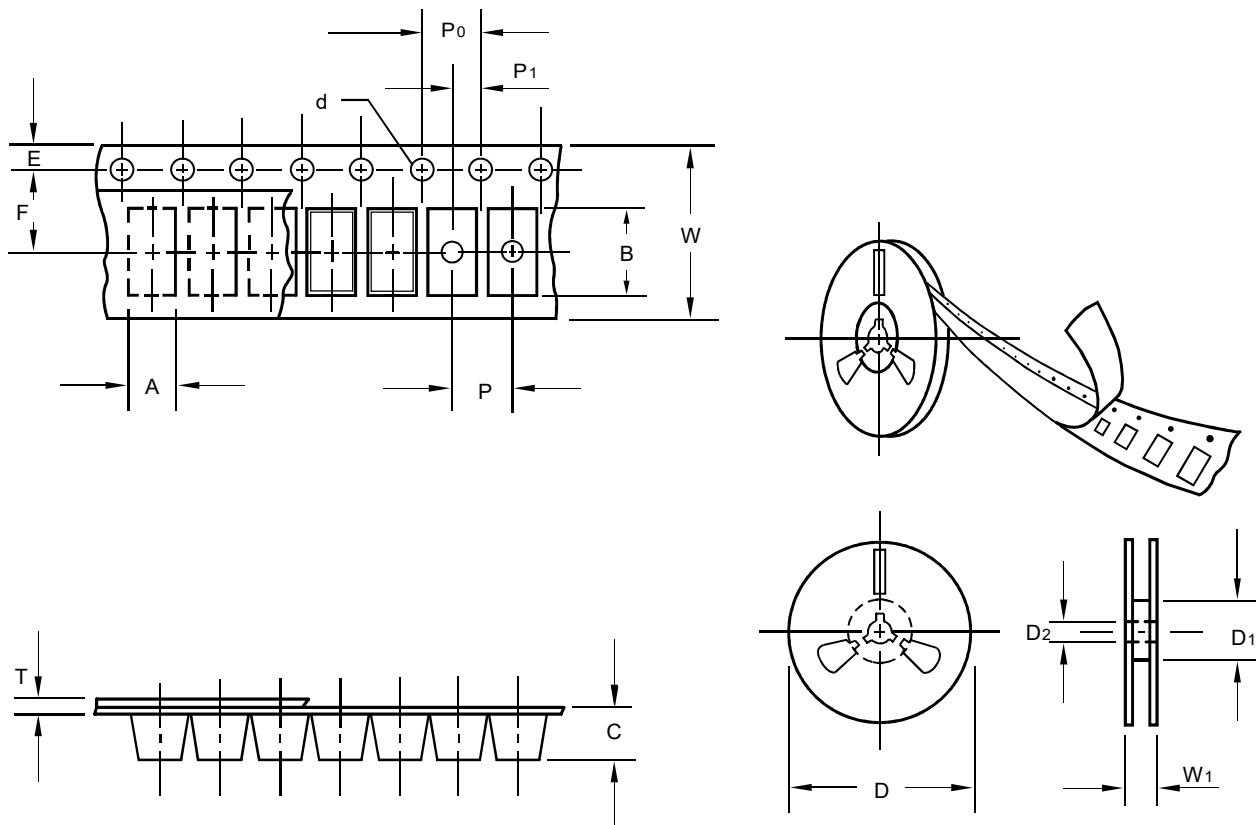
Suggested solder pad layout



Dimensions in millimeters

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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	1.55
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	53.40
Feed hole diameter	D ₂	1.0	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	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	12.30

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

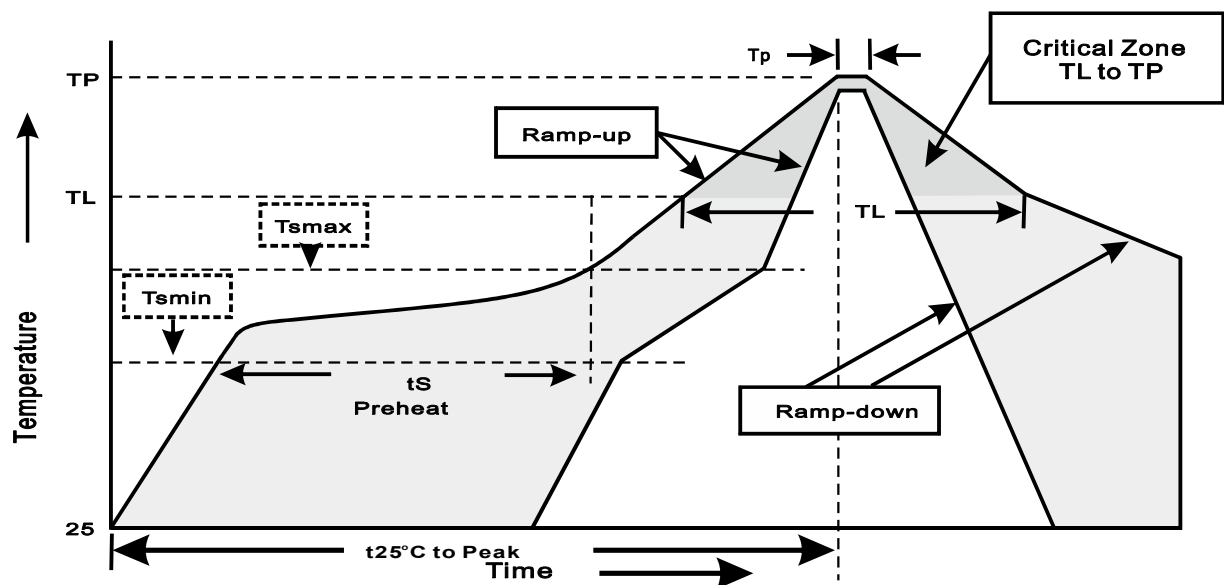
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Reel packing

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)
T1006P2	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)	$<3^{\circ}\text{C/sec}$
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	$<3^{\circ}\text{C/sec}$
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	$<6^{\circ}\text{C/sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$

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High reliability test capabilities

Item Test	Conditions	Reference
1. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. High Temperature Reverse Bias	$V_{BR}=V_{BR\ MIN}*80\% (T_J=T_{J\ max.})$ Test Duration:1000hrs	JESD22-A108
3. High Temperature Storage Life	$T_a=150^{\circ}C$ Test Duration:1000hrs	JESD22 A-103
4. Temperature Cycle	$-55^{\circ}C(15min)$ to $150^{\circ}C(15min)$ Test Cycles:1000cycles	JESD22 A-104
5. Autoclave	$P=2atm$ $T_a=121^{\circ}C$ $RH=100\%$ Test Duration:96hrs	JESD22 A-102
6. Solderability	$245\pm5^{\circ}C$ for 5sec	J-STD-002
7. Moisture Resistance	$T_a=85^{\circ}C/85\%$ Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
8. Resistance To Solder Heat	$260\pm5^{\circ}C$ for 10sec	JESD22 B-106
9. High Temperature High Humidity Reverse Bias	$T_a=85^{\circ}C$, 85%RH, with device reverse biased at 80% of rated breakdown voltage up to a maximum of 100V or limit of chamber Test Duration:1000hrs	JESD22-A101