

LL05BT0603G-H

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33W Bi-directional TVS For ESD : 5.0V

Features

- Protects one I/O line.
- Each I/O pin can withstand over 1000 ESD strikes for $\pm 10\text{kV}$ contact discharge.
- Transient protection for high-speed data lines.
IEC 61000-4-2 (ESD) $\pm 10\text{kV}$ (Air), $\pm 10\text{kV}$ (Contact).
IEC 61000-4-5 (Lightning) $6\text{A}(8/20\mu\text{s})$.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

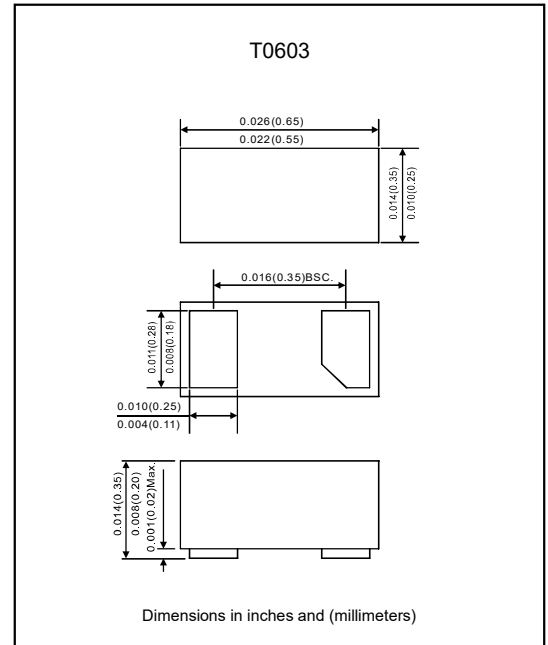
Applications

- Protable applications.
- Communication systems, computers and peripherals.
- High speed data lines: USB 2.0/3.0/3.1, HDMI 1.4/2.0.

Mechanical data

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

Package outline



Maximum ratings (At $T=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Peak pulse power (8/20 μs)	P_{PK}	33	W
Peak pulse current (8/20 μs)	I_{PP}	6	A
ESD per IEC 61000-4-2 (Air)	V_{ESD}	± 10	kV
ESD per IEC 61000-4-2 (Contact)		± 10	kV
Operating junction temperature range	T_{OPT}	+125	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical characteristics (At $T=25^\circ\text{C}$, unless otherwise noted)

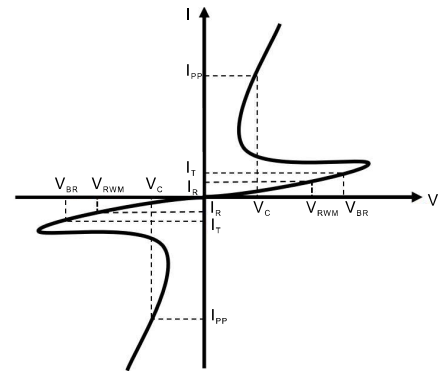
Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
Nominal reverse working voltage	V_{RWM}				5	V
Reverse leakage current	I_R	$V_{RWM}=5\text{V}$, $T=25^\circ\text{C}$		1	10	nA
Breakdown voltage	V_{BR}	$I_T=1\text{mA}$	6.0	7.2		V
Clamping voltage	V_C	$I_{PP}=6\text{A}$, $t_p=8/20\mu\text{s}$		5.5	8	V
Clamping voltage (Note1)	V_C	$I_{PP}=8\text{A}$, $t_p=100\text{ns}$		6.0		V
		$I_{PP}=16\text{A}$, $t_p=100\text{ns}$		8.0		V
Inverse dynamic resistance (Note1)	R_{dyn}	$I_{PP}=12\text{A}$, $t_p=100\text{ns}$		0.3		Ω
Parasitic capacitance	C_{ESD}	$V_R=0\text{V}$, $f=1\text{MHz}$		0.3	0.35	pF

Note : 1. Measurements performed using a 100ns transmission line pulse (TLP) system.

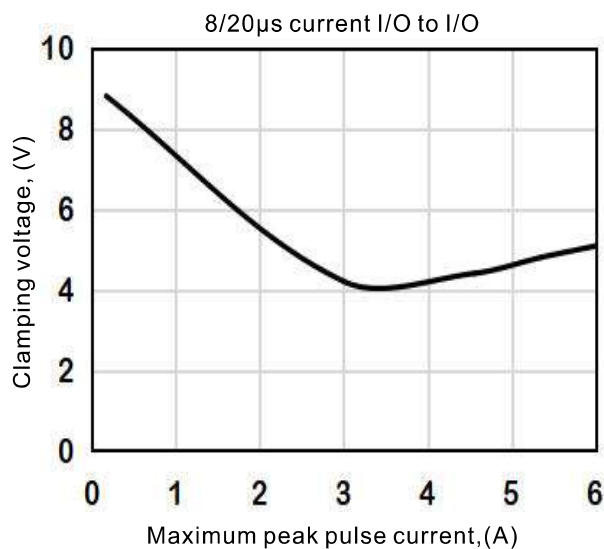
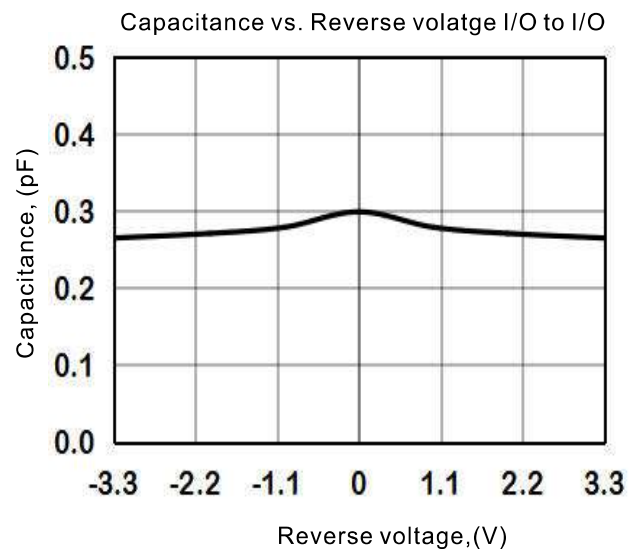
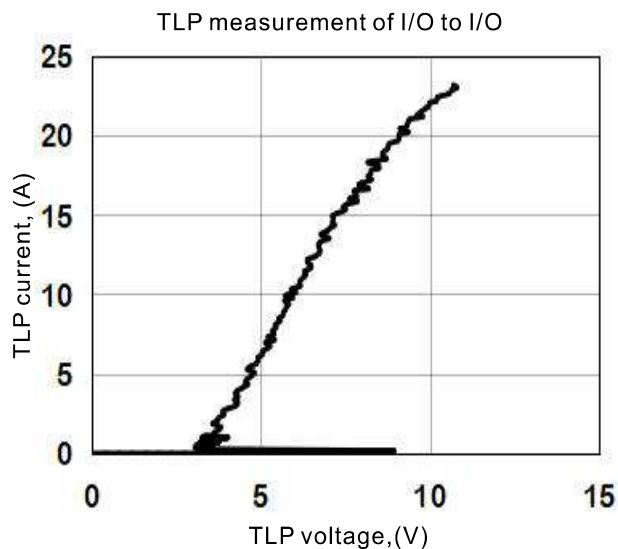
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Rating and characteristic curves

Symbol	Parameter
V_{RWM}	Normalized reverse working voltage
I_R	Reverse leakage current @ V_{RWM}
V_{BR}	Reverse breakdown voltage @ I_T
I_T	Test current for reverse breakdown
V_C	Clamping voltage @ I_{PP}
I_{PP}	Maximum peak pulse current
C_{ESD}	Parasitic capacitance
R_{dyn}	Dynamic resistance

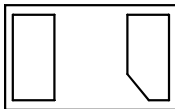


Bi-directional TVS



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Pinning information

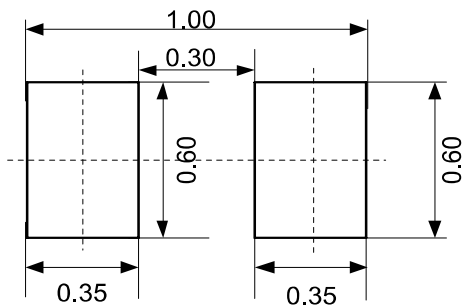
Pin	Simplified outline	Symbol
Bi-directional	 Top view  Bottom view	

Marking

Type number	Marking code
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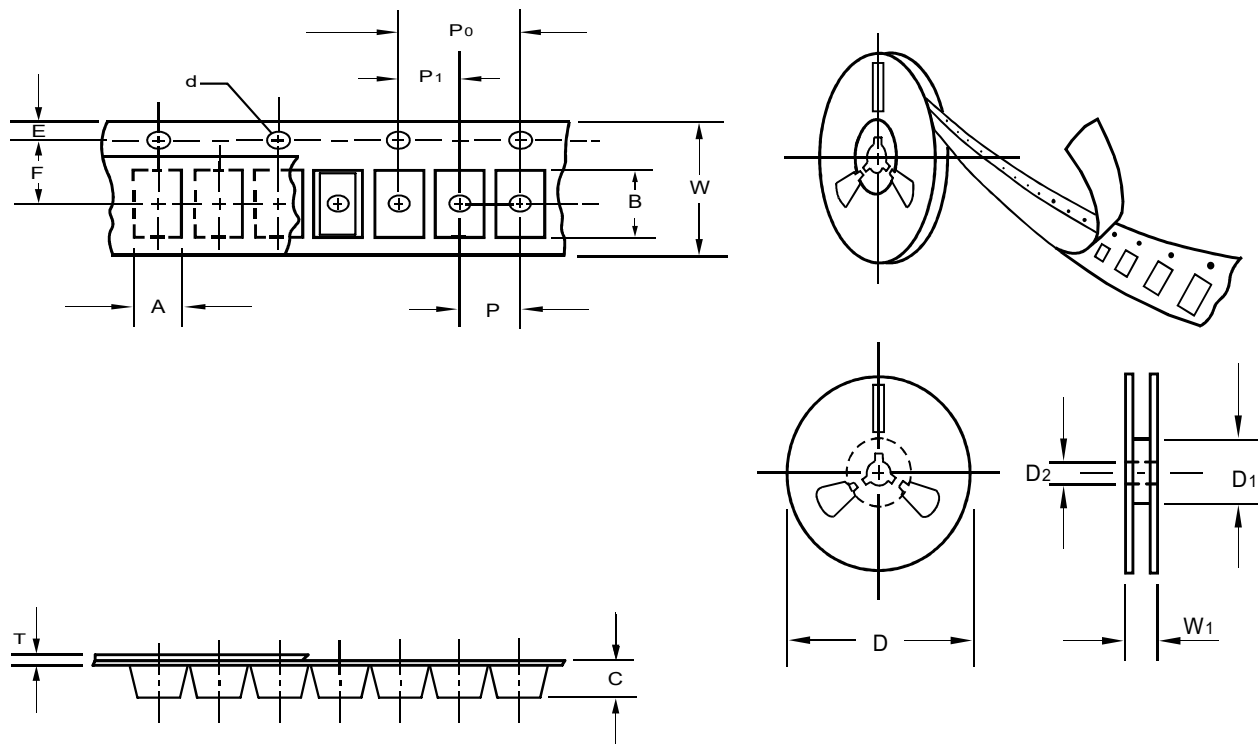
* "S" is part number.
"X" is the internal code.

Suggested solder pad layout



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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	D1	min	-
7" Reel outside diameter	D	2.0	178.0
7" Reel inner diameter	D1	min	60.0
Feed hole diameter	D2	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	P0	0.1	4.0
Embossment center	P1	0.1	2.0
Overall tape thickness	T	0.1	0.18
Tape width	W	0.3	8.0

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

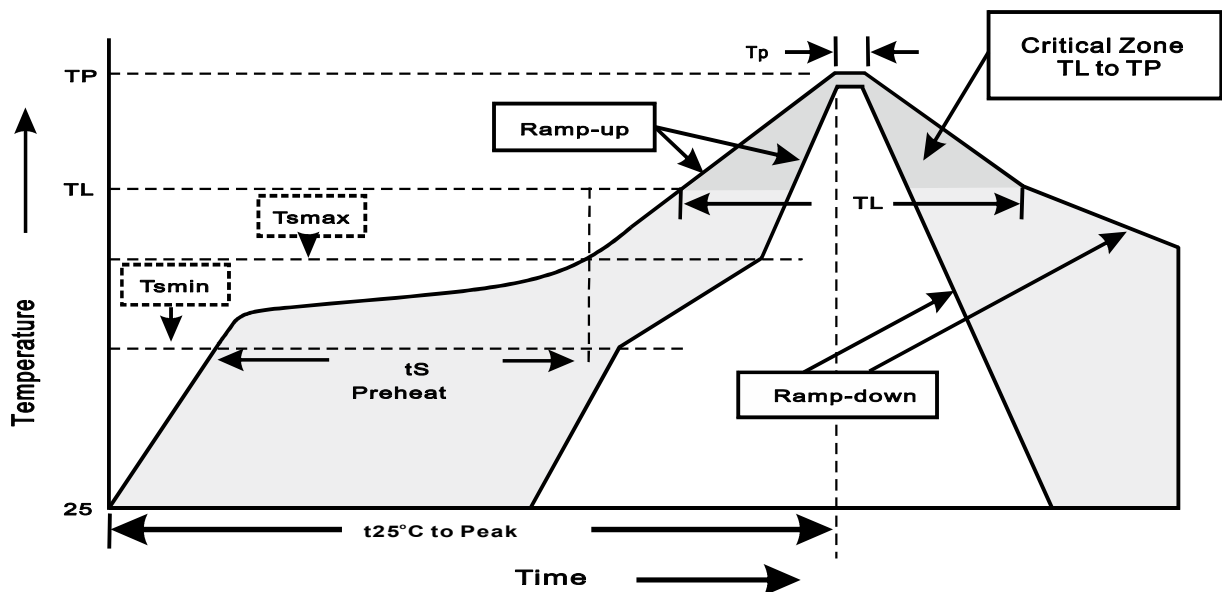
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Reel packing

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