

N03BT0603B

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N03BT0603B

Surface Mount Bi-directional TVS For ESD Protection 3.3V

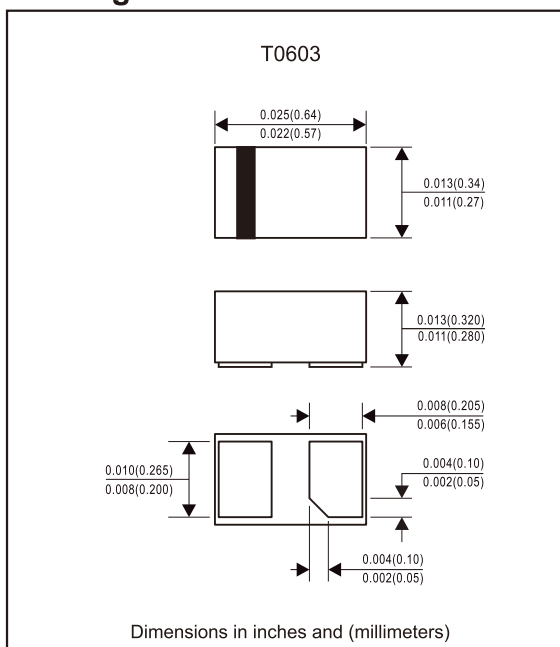
Features

- Bi-directional ESD Protection.
- Provide transient protection:
 - IEC 61000-4-2 (ESD) Contact $\pm 30\text{KV}/\text{Air } \pm 30\text{KV}$
 - IEC 61000-4-4 (FET) 40A (5/50ns)
 - IEC 61000-4-5 (Lighting) 10A (8/20us)
- Small body outline dimensions.
- Low leakage
- We declare that the material of product compliance with RoHS requirements.
- Suffix "-H" indicates Halogen-free parts, ex.N03BT0603B-H

Mechanical data

- Case : Molded plastic, T0603
- Terminals : Sn/Au plated, solderable per MIL-STD-750, method 2026
- Mounting Position : Any
- Weight : Approximated 1 mg

Package outline



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

Parameter	Symbol	Value	Unit
Peak Pulse Power (According to IEC 61000-4-5)	PP	90	W
Peak Pulse Current (According to IEC 61000-4-5)	IP	10	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	ESD	± 30 ± 30	KV
Operating junction temperature range	TJ	-55 to +125	$^\circ\text{C}$
Storage temperature range	TSTG	-55 to +150	$^\circ\text{C}$

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

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Reverse Stand-Off Voltage		VRWM			3.3	V
Reverse Breakdown Voltage	IT=1mA	VBR	3.5		7	V
Reverse Leakage Current	VRWM=3.3V	IR			100	nA
Clamping Voltage (Note 1)	IPP=10A, TP=8/20us	VC		7	9	V
Clamping Voltage	IPP=4.0A, TLP=0.2/100ns IPP=16.0A, TLP=0.2/100ns	VC		6.0 8.5		V
Junction Capacitance	Between I/O Pin and GND, VR=0V, f=1MHz	CJ			20	pF
Dynamic Resistance (Note 2'3)	Dynamic Resistance	RD		0.21		Ω

Note:

- Non-repetitive current pulse 8/20 us exponential decay waveform according to IEC 61000-4-5.
- TLP Settings: tp = 100ns, tr = 0.2ns, ITLP and VTLP averaging window: t1 = 70ns to t2 = 90ns.
- Dynamic resistance calculated from ITLP = 4A to ITLP = 16A using "Best Fit"

Rating and characteristic curves(N03BT0603B)

FIG.1 Non-Repetitive Peak Pulse Power vs. Pulse Time

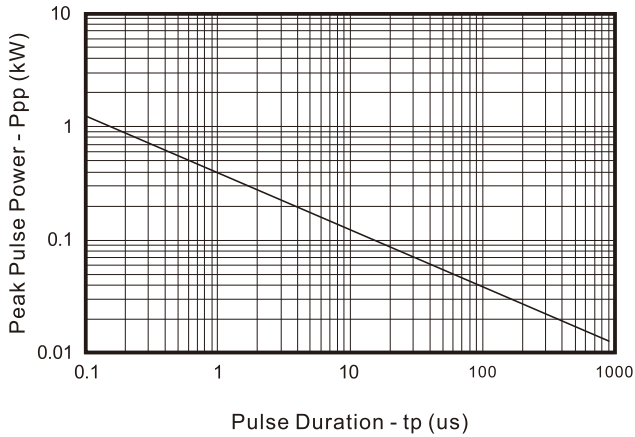


FIG.2 Power Derating Curve

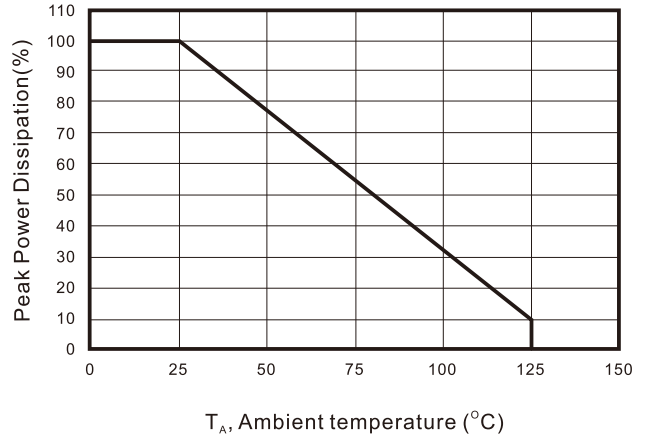


FIG.3 Clamping Voltage vs. Peak Pulse Current

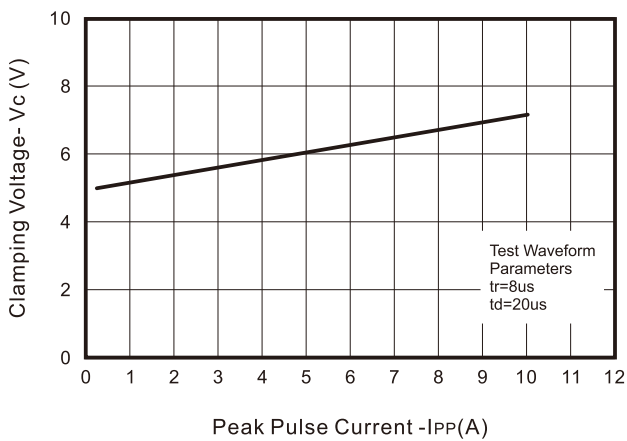


FIG.4 Normalized Junction Capacitance vs. Reverse Voltage

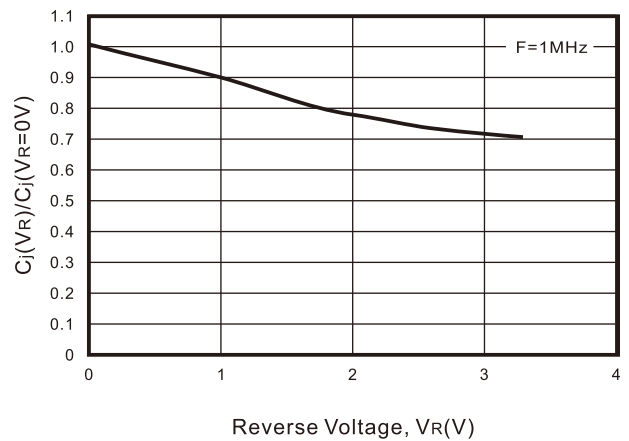


FIG.5 TLP Positive I-V Curve

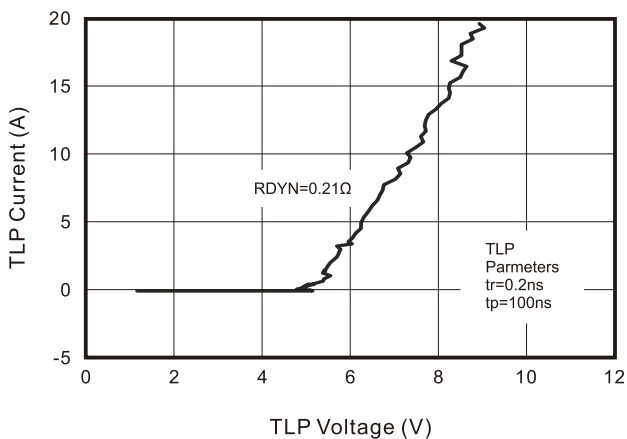
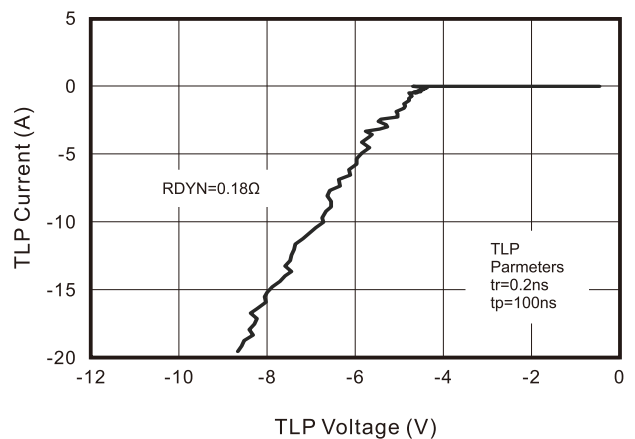


FIG.6 TLP Negative I-V Curve



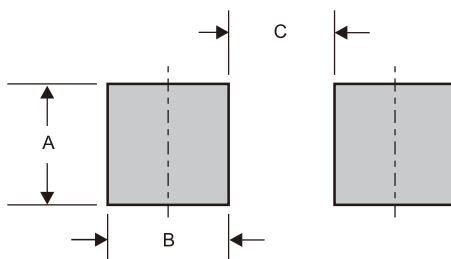
N03BT0603B**Pinning information**

Pin	Simplified outline	Symbol
Bi-Directional		

Marking

Type number	Marking code
N03BT0603B	

Note: Σ is internal control code.

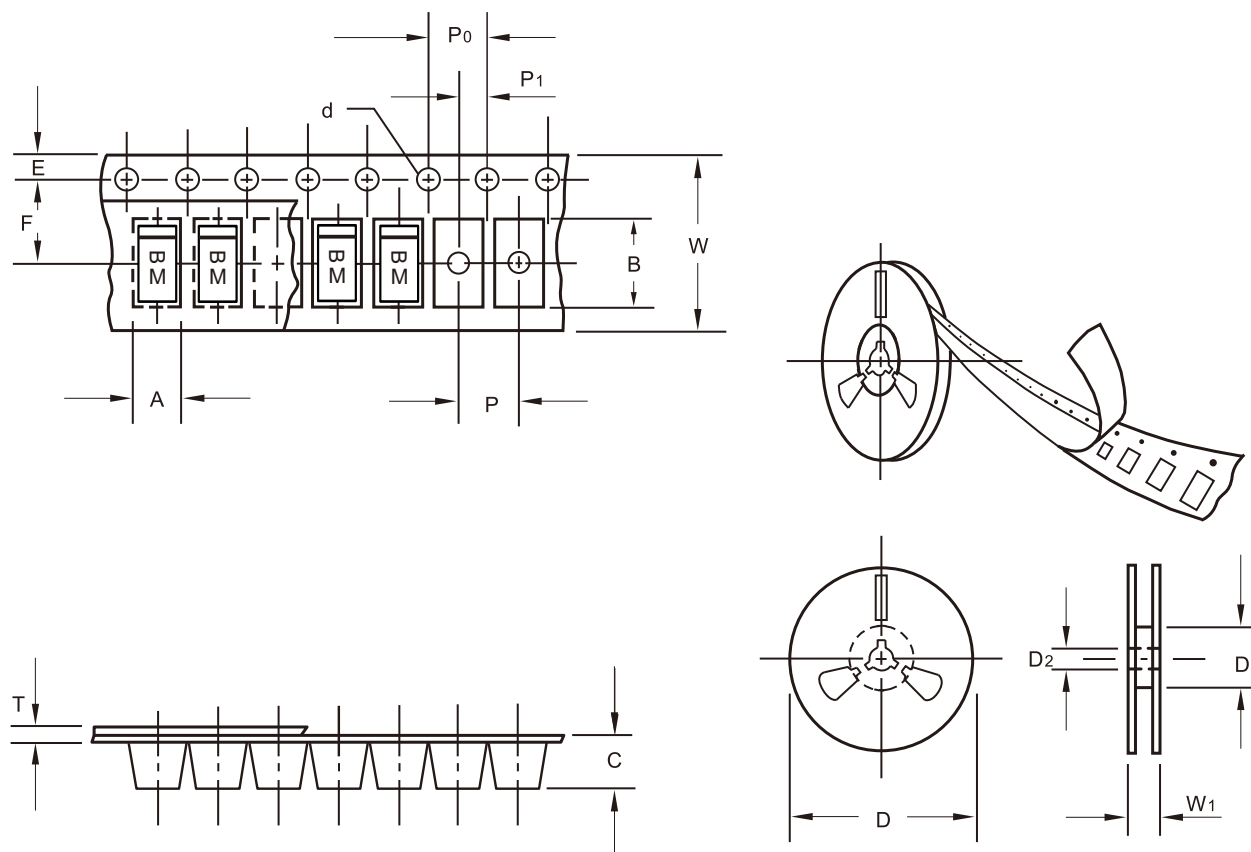
Suggested solder pad layout

Dimensions in inches and (millimeters)

PACKAGE	A	B	C
T0603	0.012 (0.30)	0.010 (0.26)	0.006 (0.15)

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Packing information



unit:mm

Item	Symbol	Tolerance	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
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	60.00
Feed hole diameter	D ₂	0.2	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	0.18
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	10.50

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

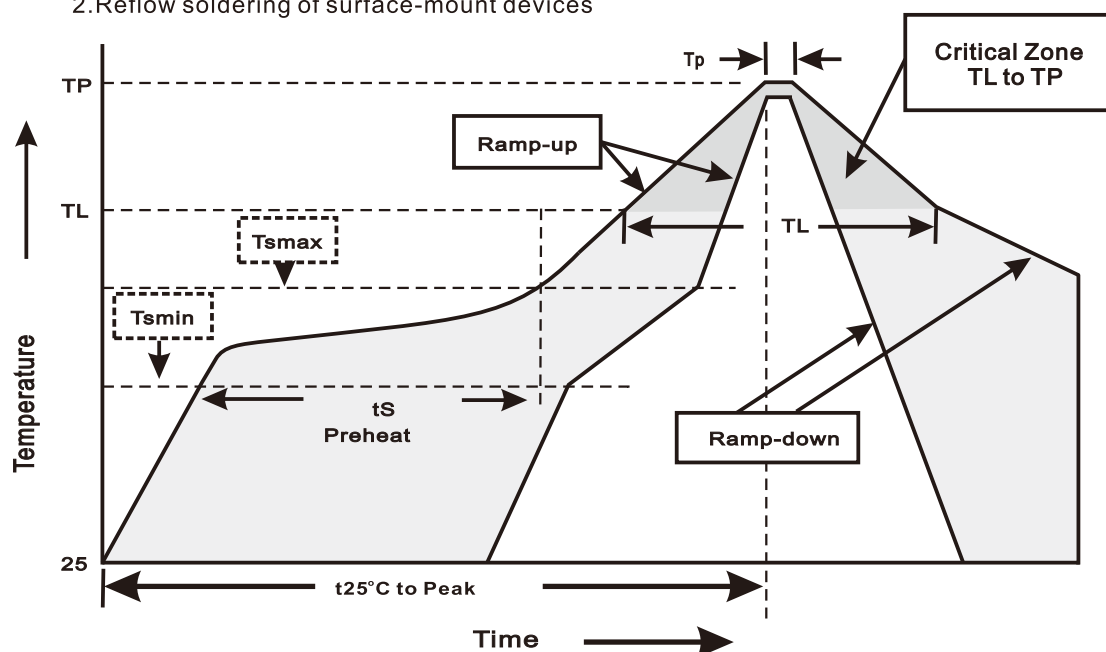
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Reel packing

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)
T0603	7"	15,000	4.0	150,000	183*123*183	178	382*257*387	1,200,000

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 _{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

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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	$V_{\text{BR}} = V_{\text{BR Min}} * 80\%$ at $T_{\text{J}} = 125^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{\text{SIG}}$ at $T_{\text{A}} = 121^{\circ}\text{C}$ 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 $T_{\text{A}} = 85^{\circ}\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 150°C for 1000 hrs.	MIL-STD-750D METHOD-1031