

N032BT23A

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N032BT23A

2-Channel Bi-Directional

TVS For ESD Protection : 3.3V

Features

- Protects two I/O lines.
- Each I/O pin can withstand over 1K ESD strikes for $\pm 8\text{kV}$ contact discharge.
- Transient protection for high-speed data lines:
 - IEC 61000-4-2(ESD) $\pm 25\text{kV}$ (Air).
 - IEC 61000-4-2(ESD) $\pm 17\text{kV}$ (Contact).
 - IEC 61000-4-4(EFT) 40A(5/50ns).
 - Cable discharge event(CDE).
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free parts, ex. N032BT23A-H.

Applications

- Serial ATA.
- PCI express.
- Desktops, servers and notebooks.
- MDDI ports.
- Display ports.
- Digital visual interfaces (DVI).

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-23.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

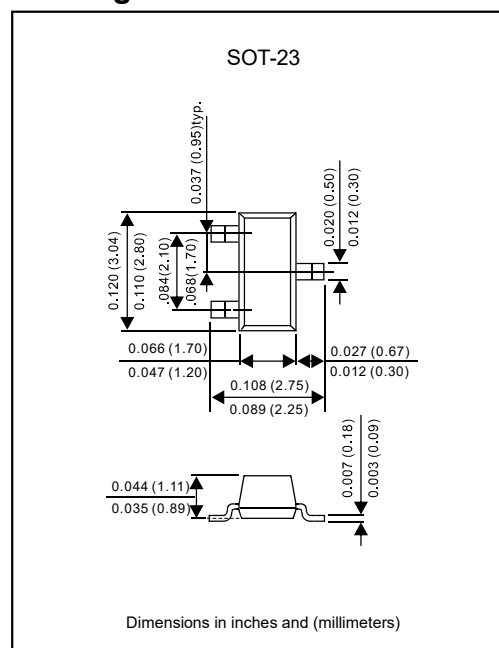
Maximum ratings (at T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Units
Peak pulse current (8/20μs)	I _{PP}	5	A
ESD per IEC61000-4-2 (Air)	V _{ESD}	±25	kV
ESD per IEC61000-4-2 (Contact)		±17	
Operating temperature range	T _J	-55 to +125	°C
Storage temperature range	T _{STG}	-55 to +150	°C

Electrical Characteristics (At T_A=25°C unless otherwise noted)

Parameter	Test Condition	Symbol	Min.	Typ.	Max.	Units
Reverse working voltage		V_{RWM}			3.3	V
Reverse leakage current	$V_{RWM}=3.3V$, $T=25^{\circ}C$ between I/O and GND	I_R		0.1	1	μA
Reverse breakdown voltage	$I_T=1mA$, between I/O and GND	V_{BR}	3.8		6	V
Clamping voltage	$I_{PP} = 1A$, $t_p=8/20\mu s$ between I/O and GND	V_C			5	V
	$I_{PP} = 5A$, $t_p=8/20\mu s$ between I/O and GND				7	
Parasitic capacitance	$V_R=0V$, $f=1.0MHz$, between I/O and GND	C_{ESD}		12	15	pF

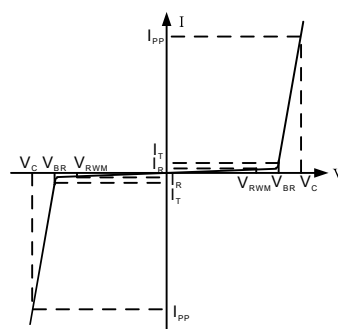
Package outline



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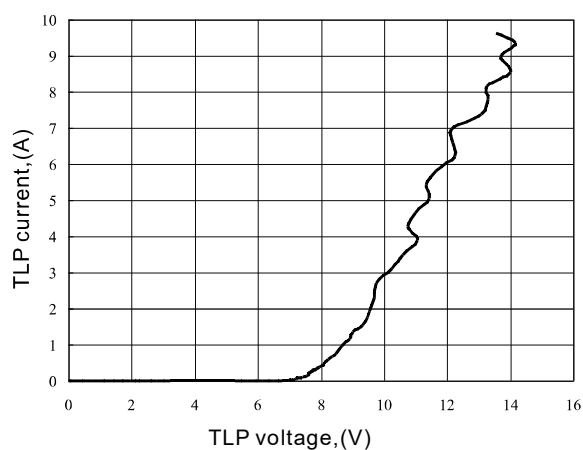
Rating and characteristic curves

Symbol	Parameter
V_{RWM}	Nominal 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
I_F	Forward current
V_F	Forward voltage @ I_F
V_R	Reverse voltage
f	Small signal frequency

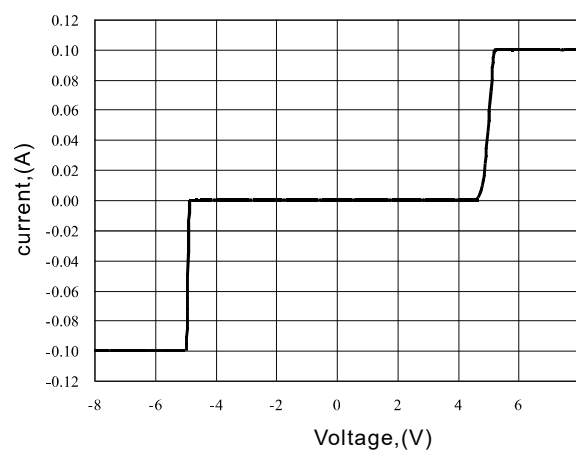


Bi-directional TVS

TLP Measurement of I/O to GND

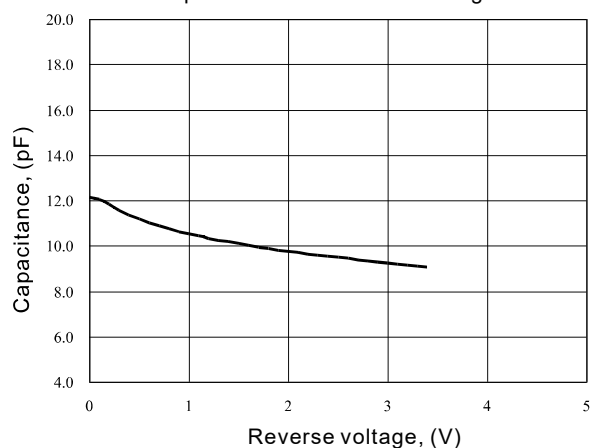


Voltage sweeping of I/O to GND

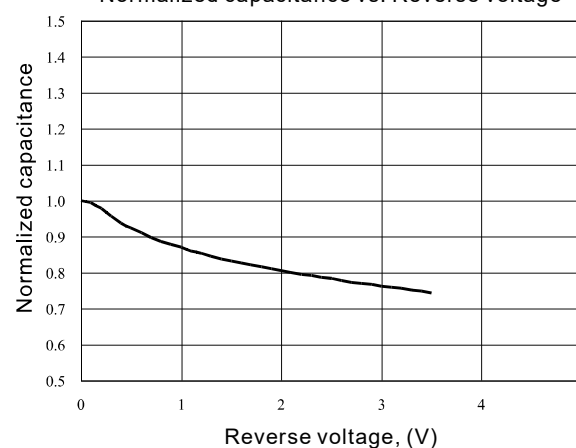


Capacitance vs. Voltage of I/O to GND (f=1.0MHz)

Capacitance vs. Reverse voltage

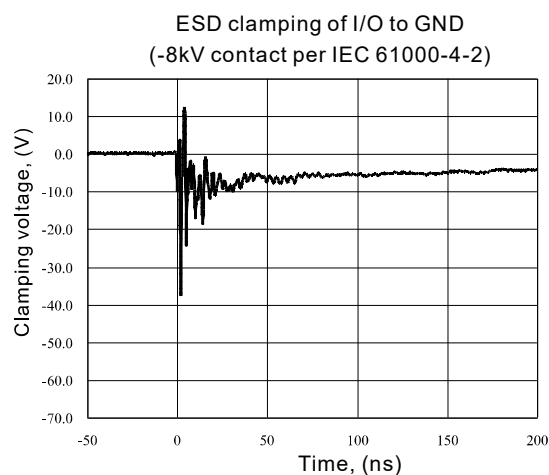
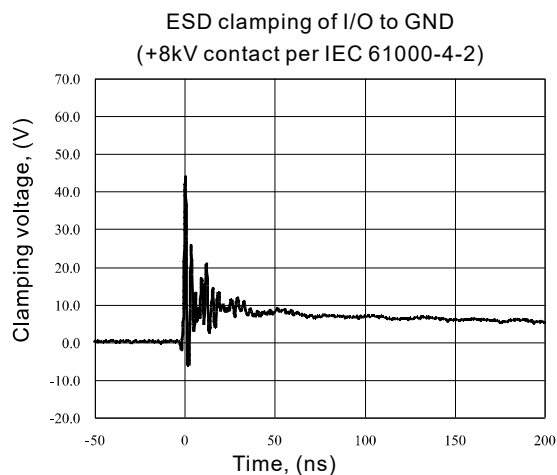


Normalized capacitance vs. Reverse voltage



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Rating and characteristic curves



Pinning information

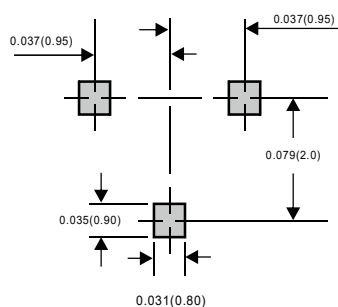
Pin	Simplified outline	Circuit diagram
Pin 1 I/O Pin 2 I/O Pin 3 GND		

Marking

Type number	Marking code
N032BT23A	32M

Suggested solder pad layout

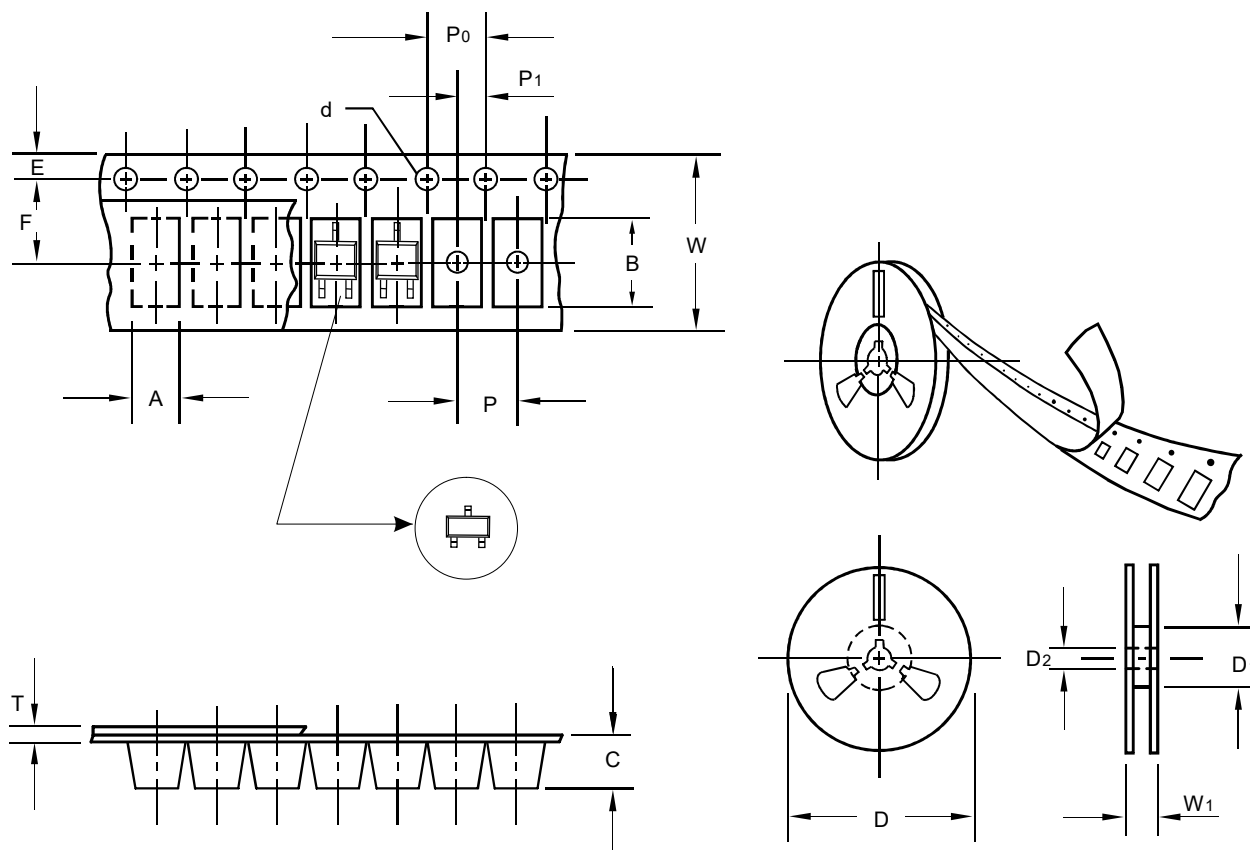
SOT-23



Dimensions in inches and (millimeters)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.1	3.15
Carrier length	B	0.1	2.77
Carrier depth	C	0.1	1.22
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	62.00
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	4.00
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	3.0	8.00
Reel width	W1	3.0	11.40

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

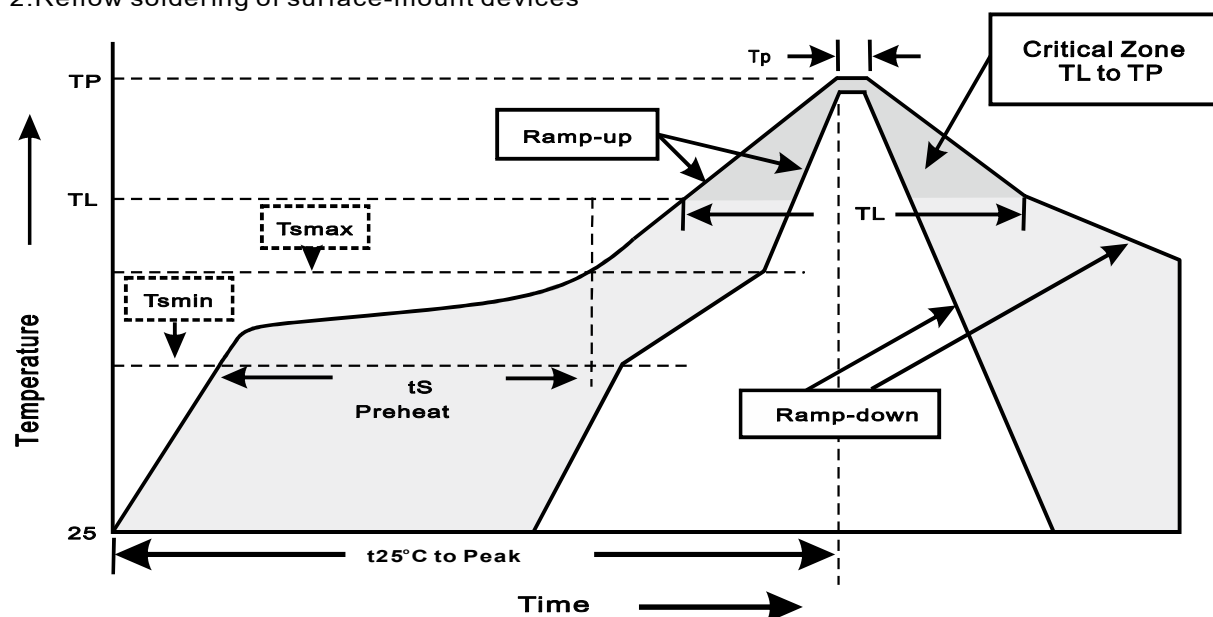
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Reel packing

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)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000

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