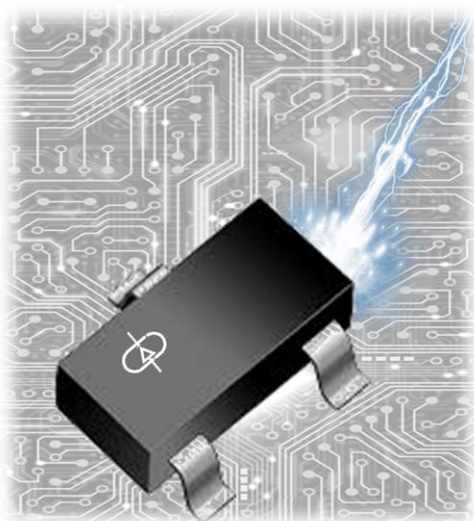


ASYMMETRICAL TVS DIODE FOR EXTENDED COMMON-MODE RS-485

DESCRIPTION:



ALPN07122BT23 Surface mount Asymmetrical TVS Diode for Extended Common-Mode RS-485 features 392 Watts ($t_p = 8/20\mu s$) of power handling capability to accommodate the higher transient voltage levels which may be expected in extended common mode applications. ALPN07122BT23 may be used to protect devices from transient voltages resulting from electrostatic discharge (ESD), electrical fast transients (EFT), and lightning.

ALPN07122BT23 replaces four discrete components by integrating two 12V and two 7V TVS diodes in a single package. The integrated design aids in reducing voltage over-shoot associated with trace inductance. The low clamping voltage of the ALPN07122BT23 minimizes the stress on the protected transceiver. The SOT23 package allows flexibility in the design of "crowded" circuit boards.

FEATURES

- 392 watts peak pulse power ($t_p = 8/20\mu s$)
- Transient protection for asymmetrical data lines to IEC 61000-4-2 (ESD) $\pm 30kV$ (air), $\pm 30kV$ (contact) IEC 61000-4-4 (EFT) 40A (5/50ns) IEC 61000-4-5 (Lightning) 14A (8/20 μs)
- Protects two +12V to -7V lines
- Low capacitance
- Low clamping voltage
- Low leakage current
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex. ALPN07122BT23-H

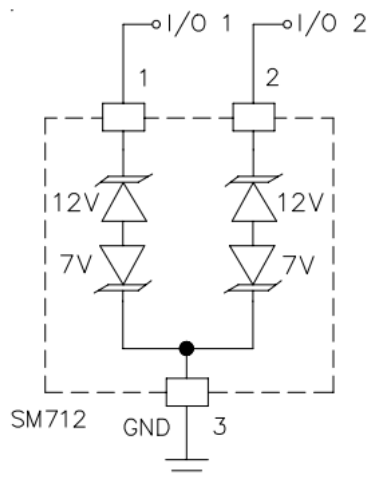
APPLICATIONS

- Protection of RS-485 transceivers with extended common-mode range
- Security systems
- Automatic Teller Machines
- HFC systems
- Networks

MECHANICAL DATA

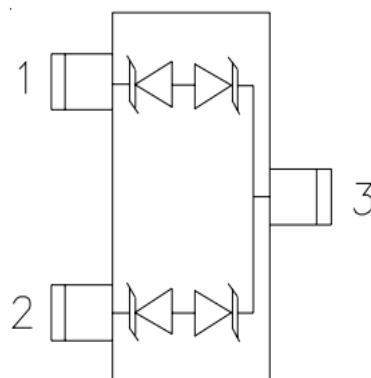
- Molding compound flammability rating: UL 94V-0.
- Case: Molded plastic, SOT-23.
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position: Any.
- Weight: Approximately 0.008 gram.

CIRCUIT DIAGRAM



PIN DESCRIPTION

SOT23 (Top View)



ELECTRICAL CHARACTERISTICS

ELECTRICAL CHARACTERISTICS (at $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)									
PARAMETER	SYMBOL	CONDITIONS	Pins 1 to 3 and 2 to 3 (12V TVS)			Pins 1 to 3 and 2 to 3 (7V TVS)			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Reverse Stand-Off Voltage	V_{RWM}	Pin 3 to 1 or Pin 2 to 1			12			7	V
Reverse Breakdown Voltage	V_{BR}	$I_{PT} = 1\text{mA}$	13.3			7.5			V
Reverse Leakage Current	I_R	$V_R = V_{RWM}$			0.5			0.5	μA
Clamping Voltage 1	V_{C1}	$I_{PP} = 5\text{A}$, $t_p = 8/20\mu\text{s}$			22			16	V
Clamping Voltage 2	V_{C2}	$I_{PP} = 17\text{A}$, $t_p = 8/20\mu\text{s}$			28			20	V
Junction Capacitance 1	C_{J1}	$V_R = 0\text{V}$, $f = 1\text{MHz}$		45	75		45	75	pF
Junction Capacitance 2	C_{J2}	$V_R = V_{RWM}$, $f = 1\text{MHz}$		25			30		pF

ABSOLUTE MAXIMUM RATINGS

ABSOLUTE MAXIMUM RATINGS (at $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
IEC 61000-4-2 (ESD) Air Contact	V_{ESD}	± 30 ± 30	kV
Peak pulse current ($t_p = 8/20\mu\text{s}$ waveform)	I_{PP}	14	A
Peak pulse power ($t_p = 8/20\mu\text{s}$ waveform)	P_{PP}	392	W
Lead Soldering Temperature	T_L	260 (10 sec.)	$^{\circ}\text{C}$
Operating Junction Temperature Range	T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^{\circ}\text{C}$

TYPICAL DEVICE CHARACTERISTICS CURVES

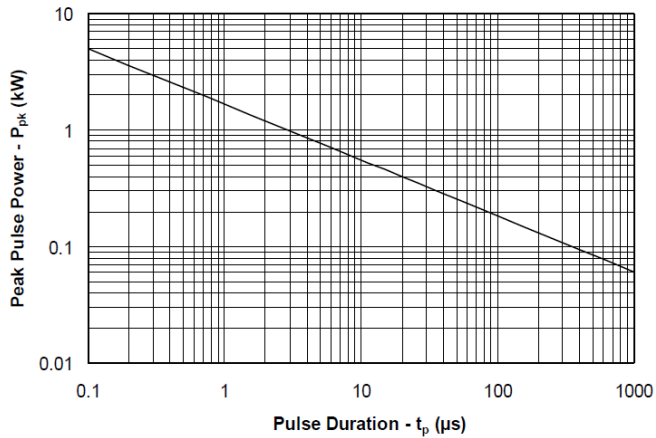


Fig1. Peak Pulse Power vs. Pulse Time

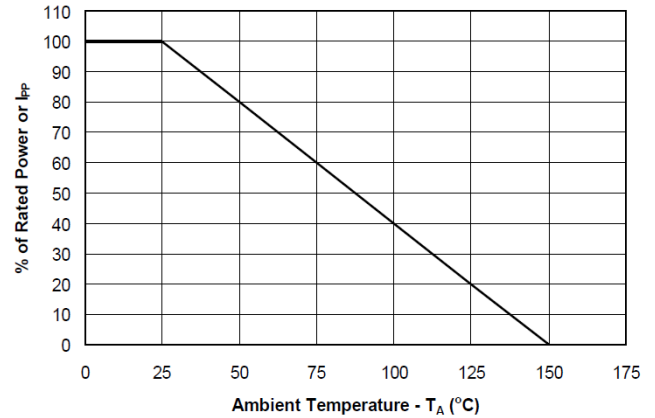


Fig2. Power Derating Curve

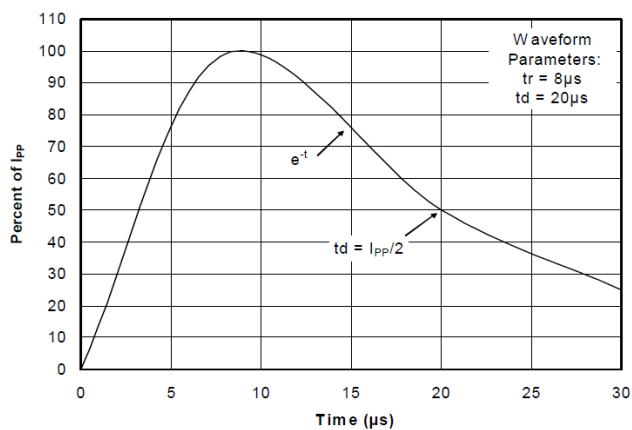


Fig3. Pulse Waveform

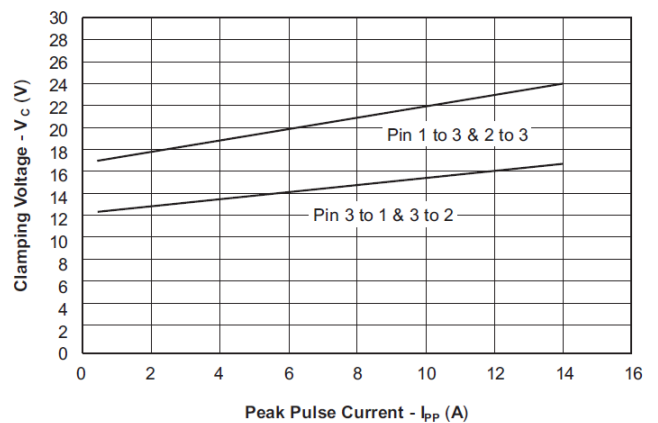


Fig4. Clamping Voltage vs. Peak Pulse Current

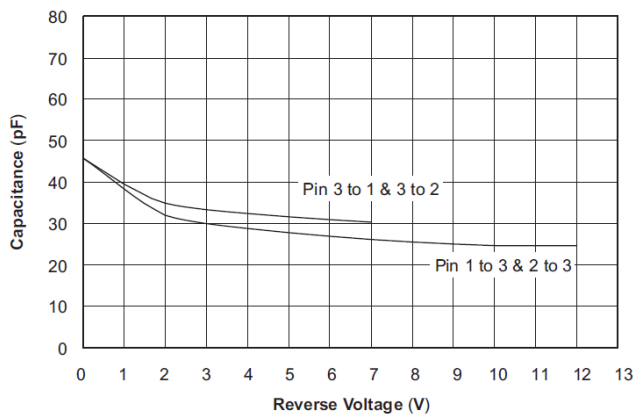
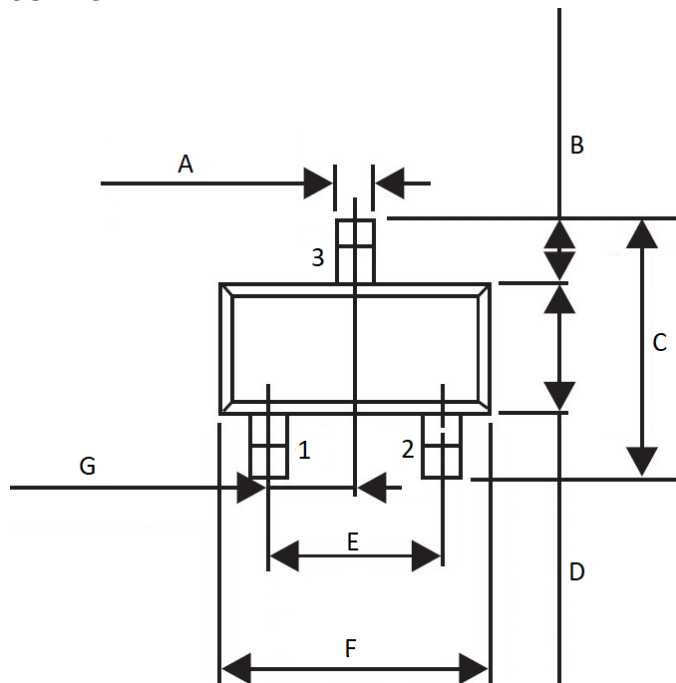
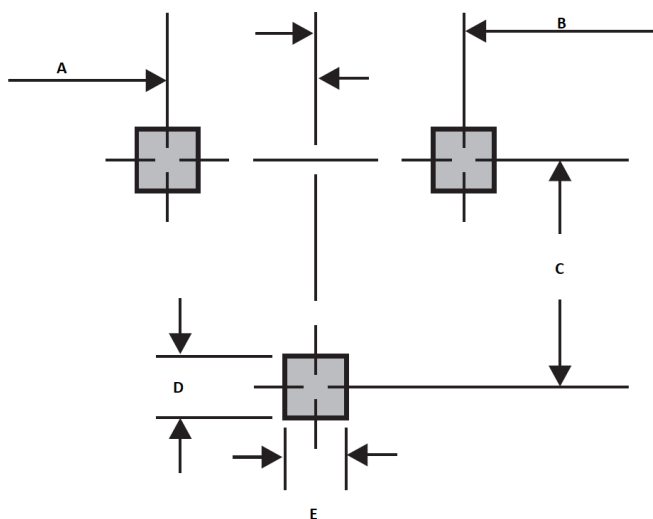


Fig5. Capacitance vs. Reverse Voltage

PACKAGE INFORMATION
SOT-23


OUTLINE DIMENSIONS				
SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.30	0.50	0.012	0.020
B	0.55 (Ref)		0.022 (Ref)	
C	2.25	2.55	0.089	0.100
D	1.20	1.40	0.047	0.055
E	1.80	2.00	0.071	0.079
F	2.80	3.00	0.110	0.118
G	0.95 (Ref)		0.037 (Ref)	

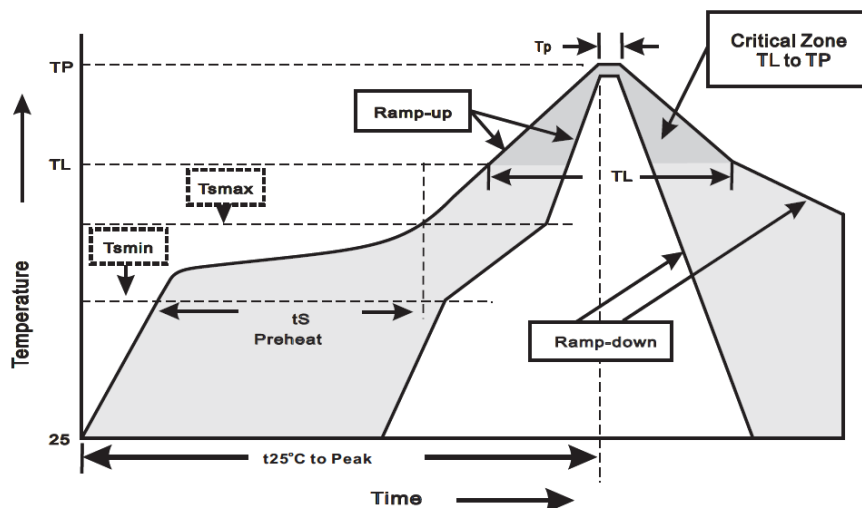
PAD LAYOUT


OUTLINE DIMENSIONS		
SYMBOL	MILLIMETERS	INCHES
A	0.95	0.037
B	0.95	0.037
C	2.00	0.079
D	0.90	0.035
E	0.80	0.031

SOLDERING PARAMETERS

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 (TL to TP)	<3 °C/sec
Preheat	
- Temperature Min (Tmin)	150 °C
- Temperature Max (Tmax)	200 °C
- Time (min to max) (ts)	60 ~ 120 sec
Tmax to TL	
- Ramp-upRate	<3 °C/sec
Time maintained above:	
- Temperature (TL)	217 °C
- Time(tL)	60 ~ 260 sec
Peak Temperature (TP)	255 °C-0/+5 °C
Time within 5 °C of actual Peak Temperature(tp)	10 ~ 30 sec
Ramp-down Rate	<6 °C/sec
Time 25 °C to Peak Temperature	<6 minutes



beyond boundaries...

ALPN07122BT23

SOT-23

PRODUCT HIGH RELIABILITY TEST CAPABILITIES

ITEM	TEST CONDITIONS	STANDARD
Solder Resistance	At 260±5°C for 10±Sec.	MIL-STD-750D METHOD-2031
Solderability	At 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
High Temperature Reverse Bias	$V_{BR} = V_{BR\ Min} * 80\%$ at $T_J = 150^\circ\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
Pressure Cooker	15P _{SIG} at $T_A = 121^\circ\text{C}$ for 4Hrs	JESD22-A102
Temperature Cycling	-55°C to +125°C dwelled for 30min and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
Humidity	At $T_A = 85^\circ\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
High Temperature Storage Life	At 150°C for 1000hrs.	MIL-STD-750D METHOD-1031



beyond boundaries...

ALPN07122BT23

SOT-23

CUSTOMER NOTE:

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2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).



sales@alpinesemi.com
www.alpinesemi.com