

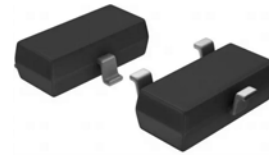
CAN BUS ESD Protection TVS Diode Array

PTT233G12M24B28

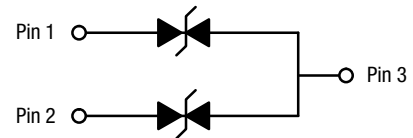


Features

- Low Leakage Current
- Low Clamping Voltages
- Response Time is Typically < 1 ns
- AEC-Q101 Automotive Grade Certified
- Lead free and RoHS compliant
- IEC Compatibility:
 - IEC 61000-4-2, ±30kV contact, ±30kV air
 - IEC 61000-4-4, 40A (5/50ns)
 - IEC 61000-4-5, Lightning, 6A (8/20µs)



SOT23-3L



Pinout and Functional Block Diagram

Applications

- CAN Bus Protection
- Automotive Applications
- Control & Monitoring Systems
- Servers, Notebook, and Desktop PC
- Control & Monitoring Systems

Absolute Maximum Ratings

Parameter	Symbol	Value	Units
Peak Pulse Power (tp=8/20µs)	P _{PP}	280	W
Peak Pulse Current (tp=8/20µs)	I _{PP}	6	A
Operating Temperature	T _J	-40 to 125	°C
Storage Temperature	T _{STG}	-40 to 125	°C

Note:
CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Electrical Characteristics (TA = 25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V _{RWM}	I _R ≤ 1µA, Pin1 or Pin2 to Pin3			24.0	V
Breakdown Voltage	V _{BR}	I _R = 1mA, Pin1 or Pin2 to Pin3	26.7	28.0		V
Leakage Current	I _R	V _R = 24V			0.5	µA
Clamp Voltage ^I	V _C	I _{PP} = 1A, tp = 8/20µs, Pin 1 or Pin 2 to Pin 3		32.7	40.0	V
		I _{PP} = 6A, tp = 8/20µs, Pin 1 or Pin 2 to Pin 3			48.0	V
Dynamic Resistance ^{II}	R _{DYN}	TLP, tp = 100ns, I/O to GND		0.5		Ω
ESD Withstand Voltage ^I	V _{ESD}	IEC 61000-4-2 (Contact)			±30	kV
		IEC 61000-4-2 (Air)			±30	kV
Junction Capacitance	C _J	Reverse Bias = 0V, f = 1MHz; Pin 1 or Pin 2 to Pin 3		12.0	15.0	pF

Note:

I Parameter is guaranteed by design and/or component characterization.

II Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1 = 70ns to t2 = 90ns

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Typical Characteristics

Figure 1: Peak Pulse Power vs. Pulse Time

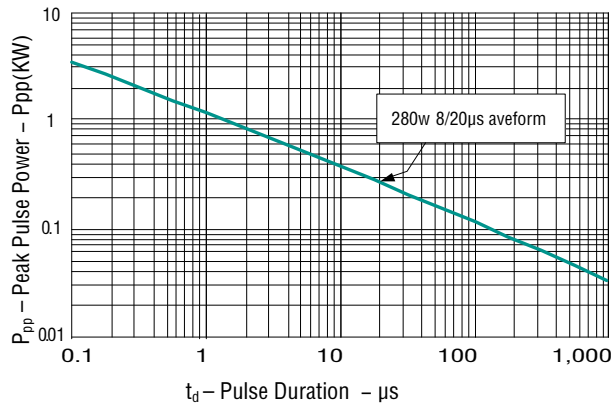


Figure 2: Power Derating Curve

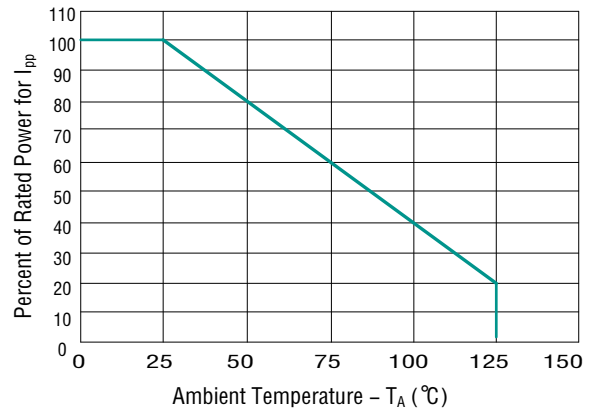


Figure 3: Pulse Waveform

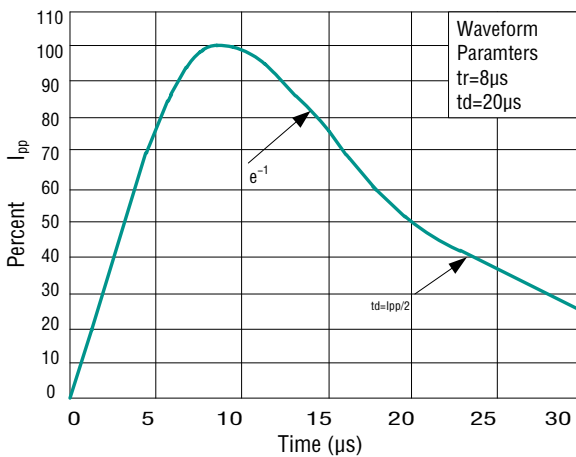
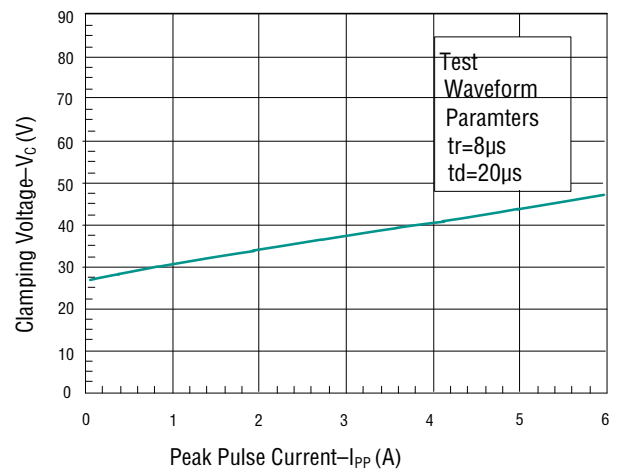
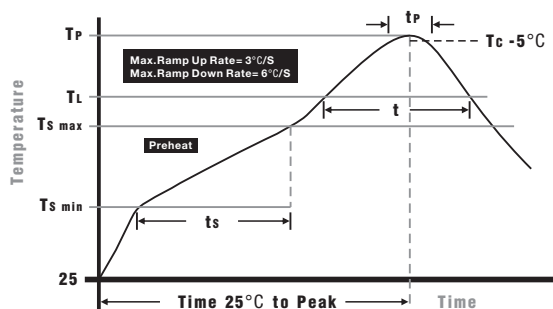


Figure 4: Clamping Voltage vs. Ipp



Soldering Parameters



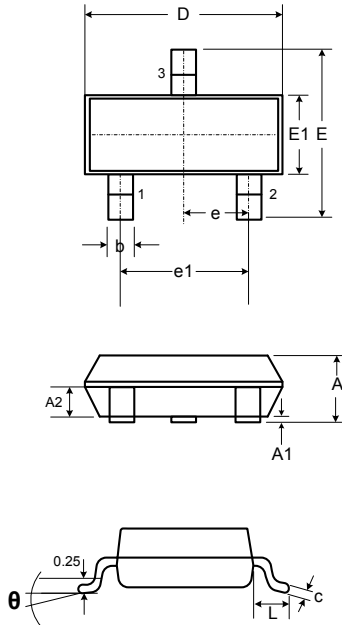
Wave Soldering: 260°C, 10 seconds max.
Infrared Reflow: 260°C, 30 seconds max.

IR Reflow Profile

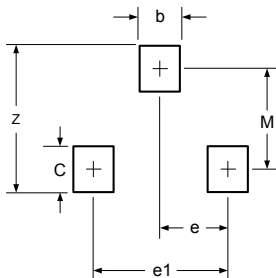
Preheat Heat	
Temperature min (T _{min})	150°C
Temperature max (T _{max})	200°C
Time (T _{min} to T _{max}) (t _s)	60 - 120 seconds
Average ramp-up rate (T_{max} to T_p)	
	3°C/second max.
Liquidous temperature (T_L)	
Time at liquidous (t _l)	60 - 150 seconds
Peak temperature (T_p)	
	260+0/-5°C
Time within 5°C of actual peak Temperature (t_p)	
	10 - 30 seconds
Average ramp-down rate (T_p to T_{max})	
	6°C/second max.
Time 25°C to peak temperature	
	8 minutes max.

PTT233G12M24B28

Package Dimensions

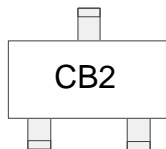


Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.15	0.035	0.045
A1	0.00	0.10	0.000	0.004
A2	0.60	0.70	0.0236	0.0275
b	0.30	0.50	0.012	0.020
c	0.08	0.15	0.003	0.006
D	2.80	3.00	0.110	0.118
E	2.25	2.55	0.089	0.100
E1	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 BSC	
e1	1.80	2.00	0.071	0.079
L	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°



Symbol	Millimeters	Inches
M	2.02	0.0795
C	0.80	0.0315
Z	2.82	0.111
e	0.95 BSC	0.037 BSC
e1	1.9 BSC	0.075 BSC
b	0.80	0.0315

Part Marking

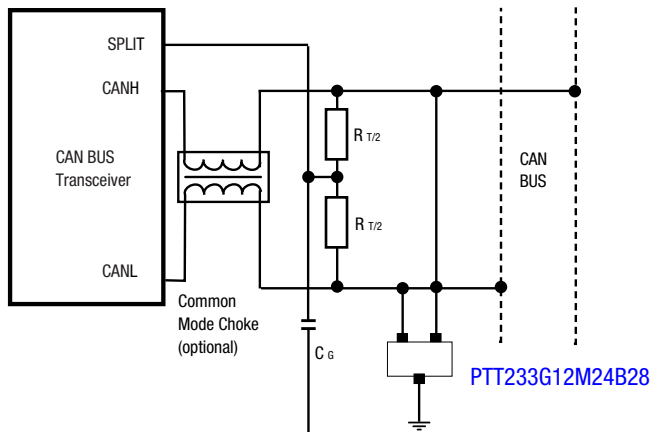


Package Information

Part Number	Package	Packing Quantity	Delivery mode
PTT233G12M24B28	SOT23-3L	3,000 pcs	Tape and Reel

PTT233G12M24B28

The PTT233G12M24B28 can protect automotive Controller Area Network (CAN) lines against damages caused by electrostatic discharge (ESD), electrical fast transient (EFT) and other transients. The PTT233G12M24B28 can absorb repetitive ESD impact above the maximum level stipulated in the international standard IEC 61000-4-2 without performance degradation and can safely withstand 3A surge (8/20 waveshape as defined in IEC 61000-4-5 2nd edition) at a very low clamping voltages. The PTT233G12M24B28 can be used for highspeed and fault-tolerant CAN buses.



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