

## SM24CANA Series 200W TVS Diode Array

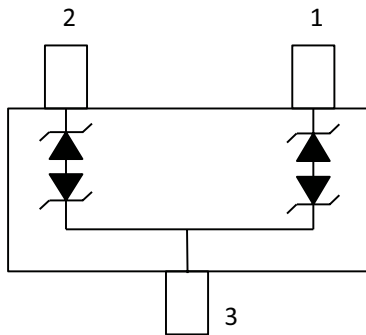


### Description

The SM24CANA TVS Diode Array is designed to protect automotive Controller Area Network (CAN) lines from damage due to electrostatic discharge (ESD), electrical fast transient (EFT), and other overvoltage transients.

The SM24CANA Series can absorb repetitive ESD strikes above the maximum level specified in the IEC 61000-4-2 international standard without performance degradation and safely dissipate 3A of 8/20s surge current (IEC 61000-4-5, 2<sup>nd</sup> Edition) with very low clamping voltages.

### Pinout and Functional Block Diagram



Life Support Note:

**Not Intended for Use in Life Support or Life Saving Applications**

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

### Features

- RoHS compliant and lead-free
- ESD, IEC 61000-4-2, ±24kV contact, ±30kV air
- EFT, IEC 61000-4-4, 50A (5/50ns)
- Lightning, IEC 61000-4-5, 2<sup>nd</sup> Edition, 3A (tp=8/20µs)
- Low clamping voltage
- Low leakage current
- AEC-Q101 qualified
- Moisture Sensitivity Level (MSL-1)

### Applications

- Automotive Applications
- CAN Bus
- Electronic Control Units
- Body Control Units
- ADAS Control Units
- PowerTrain Control Units
- Factory Automation
- Lightning Control (DALI)

### Additional Information



Datasheet



Resources



Samples

**Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
$P_{PK}$	Peak Pulse Power ( $t_p=8/20\mu s$ )	200	W
$I_{PP}$	Peak Pulse Current ( $t_p=8/20\mu s$ )	3.0	A
$T_{OP}$	Operating Temperature	-40 to 125	°C
$T_{STOR}$	Storage Temperature	-55 to 150	°C

Notes:

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.

**SM24CANA Electrical Characteristics ( $T_{OP}=25^\circ C$ )**

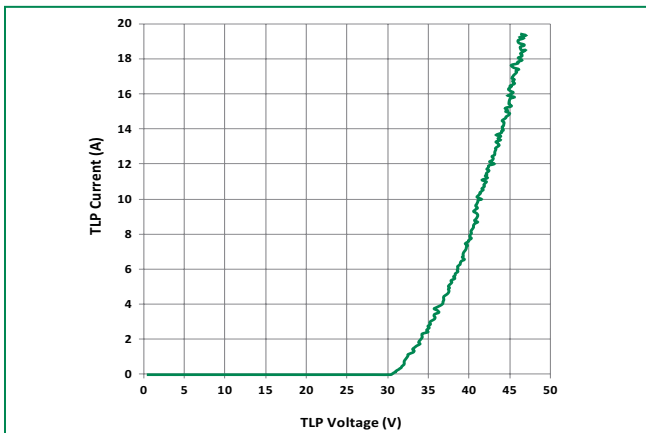
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	$I_R \leq 1\mu A$ , Pin 1 or Pin 2 to Pin 3			24.0	V
Reverse Breakdown Voltage	$V_{BR}$	$I_R = 1mA$ , Pin 1 or Pin 2 to Pin 3	26.7			V
Leakage Current	$I_{LEAK}$	$V_R = 24V$			1.0	$\mu A$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP} = 1A$ , $t_p = 8/20\mu s$ , Pin 1 or Pin 2 to Pin 3			36.0	V
		$I_{PP} = 3A$ , $t_p = 8/20\mu s$ , Pin 1 or Pin 2 to Pin 3			50.0	V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p = 100ns$ , I/O to GND		0.7		$\Omega$
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact Discharge)	$\pm 24$			kV
		IEC 61000-4-2 (Air Discharge)	$\pm 30$			kV
Diode Capacitance <sup>1</sup>	$C_{I/O-GND}$	Reverse Bias=0V, $f=1MHz$ ; Pin 1 or Pin 2 to Pin 3		11	17	pF

Note:

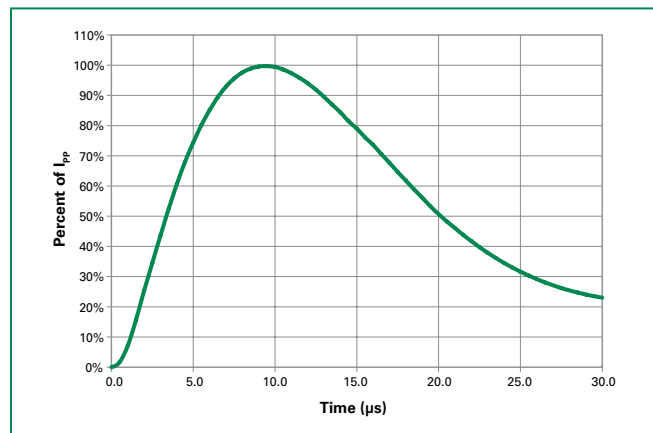
<sup>1</sup> Parameter is guaranteed by design and/or component characterization.

<sup>2</sup> Transmission Line Pulse (TLP) with 100ns width and 200ps rise time.

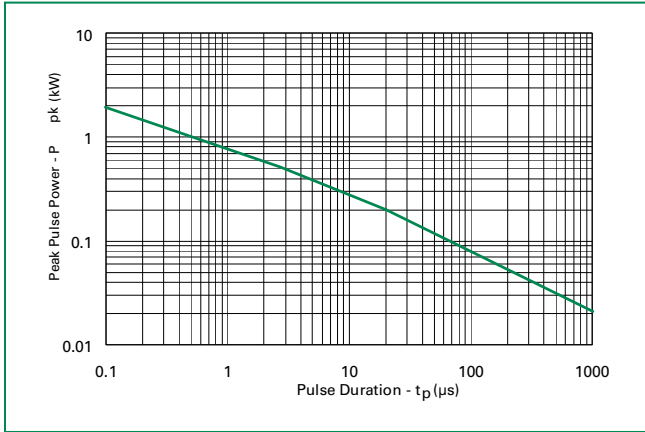
**Transmission Line Pulsing (TLP) Plot**



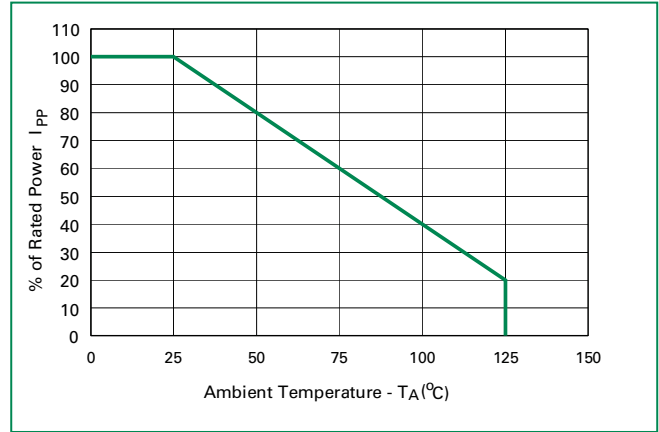
**Pulse Waveform**



**Non-Repetitive Peak Pulse Power vs. Pulse Time**

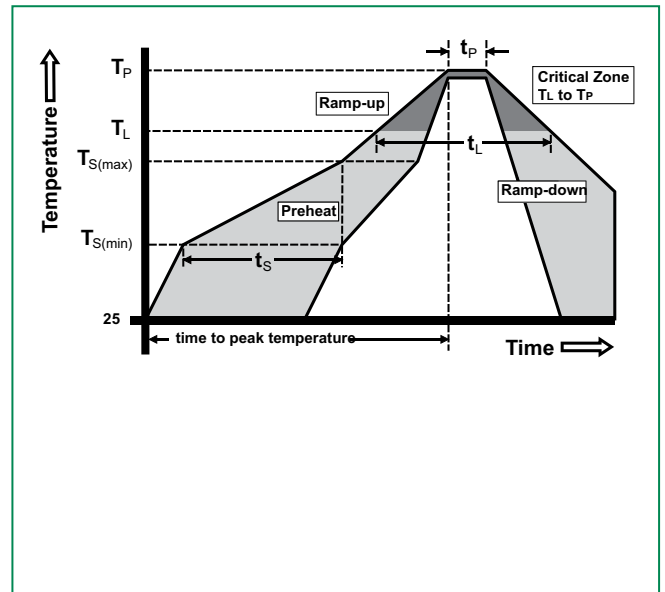


**Power Derating Curve**

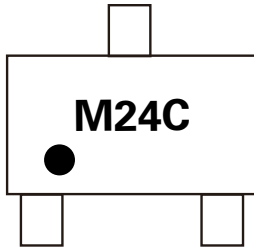


**Soldering Parameters**

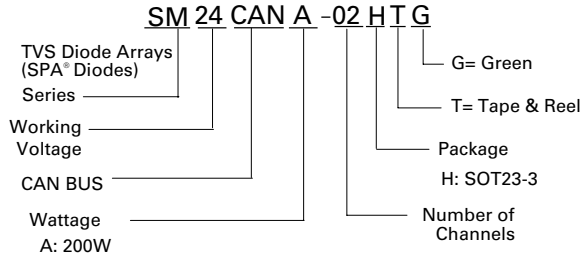
Reflow Condition	Pb – Free assembly	
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus) Temp ( $T_L$ ) to peak	3°C/second max	
$T_{s(max)}$ to $T_L$ - Ramp-up Rate	3°C/second max	
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_L$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )	260 $^{+0.5}$ °C	
Time within 5°C of actual peak Temperature ( $t_p$ )	20 – 40 seconds	
Ramp-down Rate	6°C/second max	
Time 25°C to peak Temperature ( $T_p$ )	8 minutes Max.	
Do not exceed	260°C	



**Part Marking System**



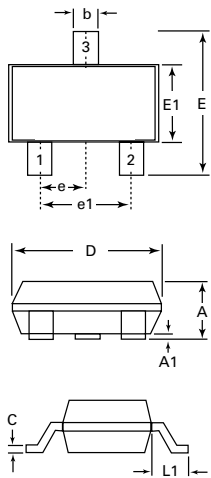
**Part Numbering System**



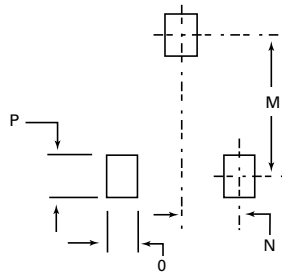
**Ordering Information**

Part Number	Package	Marking	Min. Order Qty.
SM24CANA-02HTG	SOT23-3	M24C	3000

**Package Dimensions – SOT23-3**

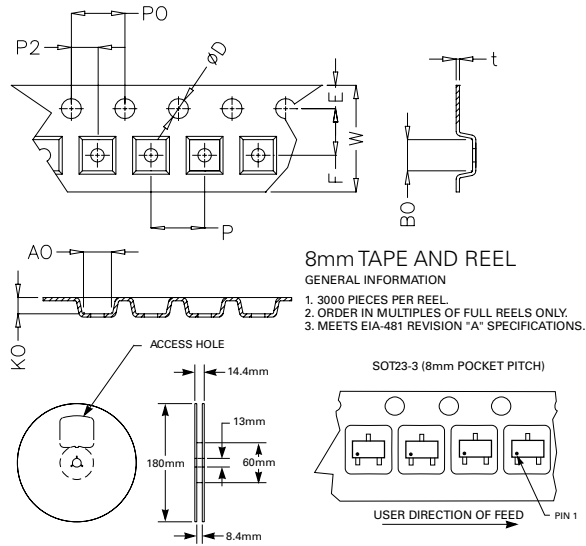


Recommended Pad Layout

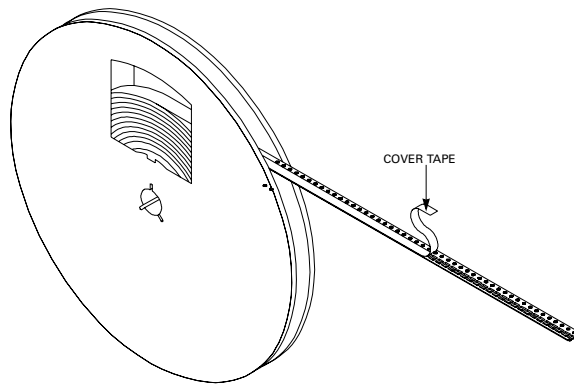


Package	SOT23-3			
Pins	3			
JEDEC	TO-236			
	Millimeters		Inches	
	Min	Max	Min	Max
<b>A</b>	0.89	1.12	0.035	0.044
<b>A1</b>	0.01	0.10	0.0004	0.004
<b>b</b>	0.30	0.50	0.012	0.020
<b>c</b>	0.08	0.2	0.003	0.008
<b>D</b>	2.80	3.04	0.110	0.120
<b>E</b>	2.10	2.64	0.083	0.104
<b>E1</b>	1.20	1.40	0.047	0.055
<b>e</b>	0.95 BSC		0.038 BSC	
<b>e1</b>	1.90 BSC		0.075 BSC	
<b>L1</b>	0.54 REF		0.021 REF	
<b>M</b>		2.29		0.090
<b>N</b>		0.95		0.038
<b>O</b>		0.78		0.030TYP
<b>P</b>		0.78		0.030TYP

**Embossed Carrier Tape & Reel Specification – SOT23-3**



Symbol	Millimetres		Inches	
	Min	Max	Min	Max
<b>E</b>	1.65	1.85	0.065	0.073
<b>F</b>	3.40	3.60	0.134	0.142
<b>P2</b>	1.90	2.10	0.075	0.083
<b>D</b>	1.40	1.60	0.055	0.063
<b>P0</b>	3.90	4.10	0.154	0.161
<b>W</b>	7.70	8.30	0.303	0.327
<b>P</b>	3.90	4.10	0.154	0.161
<b>A0</b>	3.05	3.25	0.120	0.128
<b>B0</b>	2.67	2.87	0.105	0.113
<b>K0</b>	1.12	1.32	0.044	0.052
<b>t</b>	0.22	0.24	0.009	0.009



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