SM12AT1

Product Preview

Transient Voltage Suppressor Diode Array

SOT−23 Dual Common Anode Zeners for ESD Protection

These dual monolithic silicon zener diodes are designed for applications requiring transient overvoltage protection capability. They are intended for use in voltage and ESD sensitive equipment such as computers, printers, business machines, communication systems, medical equipment and other applications. Their dual junction common anode design protects two separate lines using only one package. These devices are ideal for situations where board space is at a premium.

Features

- SOT−23 Package Allows Either Two Separate Unidirectional Configurations or a Single Bidirectional Configuration
- Working Peak Reverse Voltage Range − 12 V
- Peak Power − 450 W (8 X 20 μs)
- Low Leakage
- Flammability Rating UL 94 V−0
- ESD Rating:
  IEC 61000−4−2 (ESD) 15 kV (air) 8 kV (contact)
  IEC 61000−4−4 (EFT) 50 A (5 x 50 ns)
  IEC 61000−4−5 (Lighting) 12 A (8 x 20 μs)
- Human Body Model − Up to 16 kV
- Machine Model − Up to 400 V
- Pb−Free Package is Available

Mechanical Characteristics:

CASE: Void-free, transfer-molded, thermosetting plastic case
FINISH: Corrosion resistant finish, easily solderable
MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:
260°C for 10 Seconds
Package designed for optimal automated board assembly
Small package size for high density applications

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

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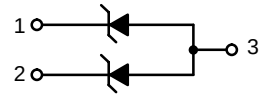
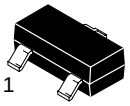
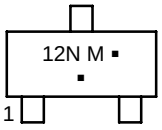
PIN 1. CATHODE
2. CATHODE
3. ANODE





SOT−23
CASE 318
STYLE 12

MARKING DIAGRAM



12N = Device Code
M = Date Code*
▪ = Pb−Free Package
(Note: Microdot may be in either location)
*Date Code orientation and/or overbar may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
SM12AT1	SOT−23	3000/Tape & Reel
SM12AT1G	SOT−23 (Pb−Free)	3000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation @ 20 μs @ $T_L \le 25°C$ (Note 1)	P_{pk}	450	W
IEC 61000−4−2 (ESD) Air Contact		±15 ±8.0	kV
IEC 61000−4−4 (EFT)		50	A
IEC 61000−4−5 (Lightning)		12	A
Total Power Dissipation on FR−5 Board (Note 2) @ $T_A = 25°C$ Derate above 25°C Thermal Resistance Junction−to−Ambient	P_D $R_{\theta JA}$	225 1.8 556	mW mW/°C °C/W
Total Power Dissipation on Alumina Substrate (Note 3) @ $T_A = 25°C$ Derate above 25°C Thermal Resistance Junction−to−Ambient	P_D $R_{\theta JA}$	300 2.4 417	mW mW/°C °C/W
Junction and Storage Temperature Range	T_J, T_{stg}	− 55 to +150	°C
Lead Solder Temperature − Maximum (10 Second Duration)	T_L	260	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Non−repetitive current pulse per Figure 3
2. FR−5 = 1.0 x 0.75 x 0.62 in.
3. Alumina = 0.4 x 0.3 x 0.024 in., 99.5% alumina

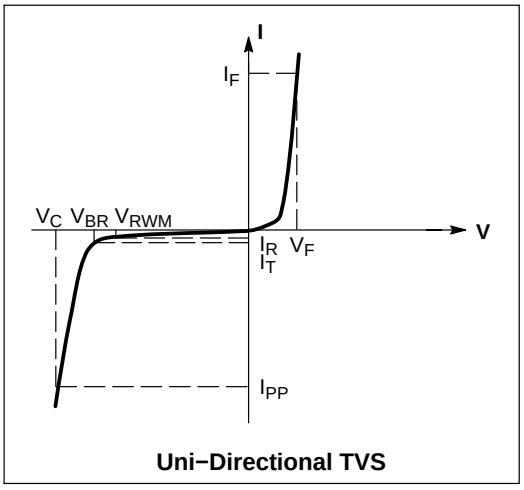
*Other voltages may be available upon request

ELECTRICAL CHARACTERISTICS

(T_A = 25°C unless otherwise noted)

UNIDIRECTIONAL (Circuit tied to Pins 1 and 3 or 2 and 3)

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
ΘV_{BR}	Maximum Temperature Coefficient of V_{BR}
I_F	Forward Current
V_F	Forward Voltage @ I_F
Z_{ZT}	Maximum Zener Impedance @ I_{ZT}
I_{ZK}	Reverse Current
Z_{ZK}	Maximum Zener Impedance @ I_{ZK}



Uni−Directional TVS

ELECTRICAL CHARACTERISTICS

Device	Device Marking	V_{RWM} (Volts)	I_R @ V_{RWM} (μA)	V_{BR}, Breakdown Voltage (Volts) Min	Max	I_T mA	V_C @ I_{PP} = 1 A (Note 4) (Volts)	Max I_{PP} (Note 4) (Amps)	Typical Capacitance (pF) Pin 1 to 3 @ 0 V
SM12AT1	12N	12	1.0	13.3	15.75	1.0	19	18	120

4. 8 × 20 μs pulse waveform per Figure 3

TYPICAL CHARACTERISTICS

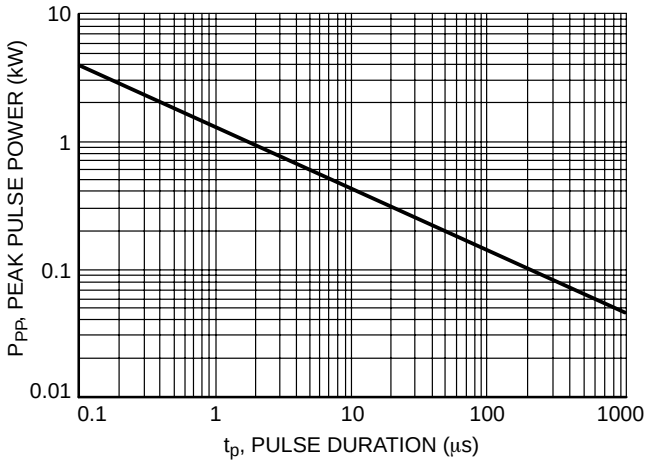


Figure 1. Non−Repetitive Peak Pulse Power versus Pulse Time

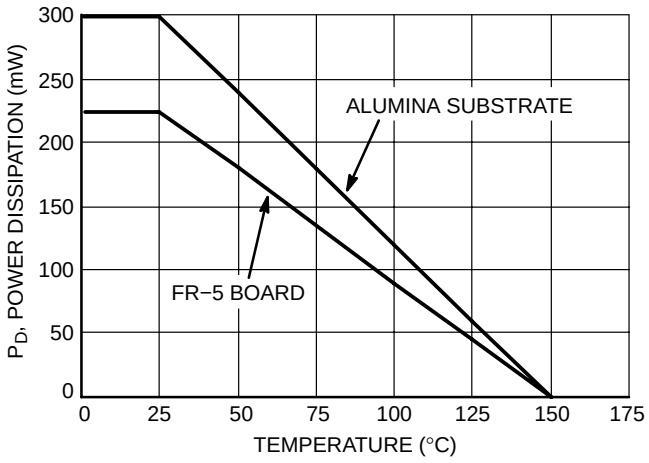


Figure 2. Steady State Power Derating Curve

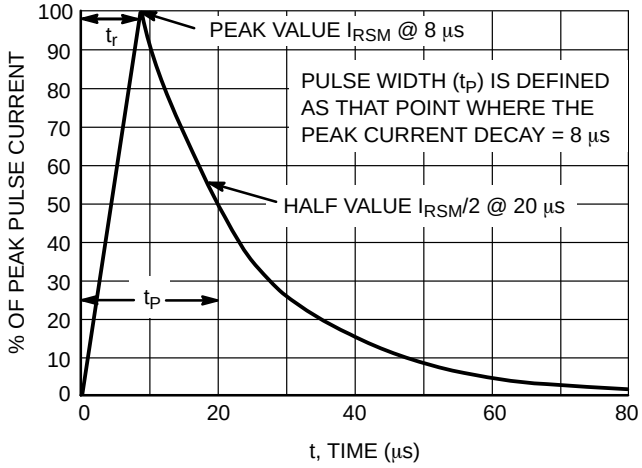
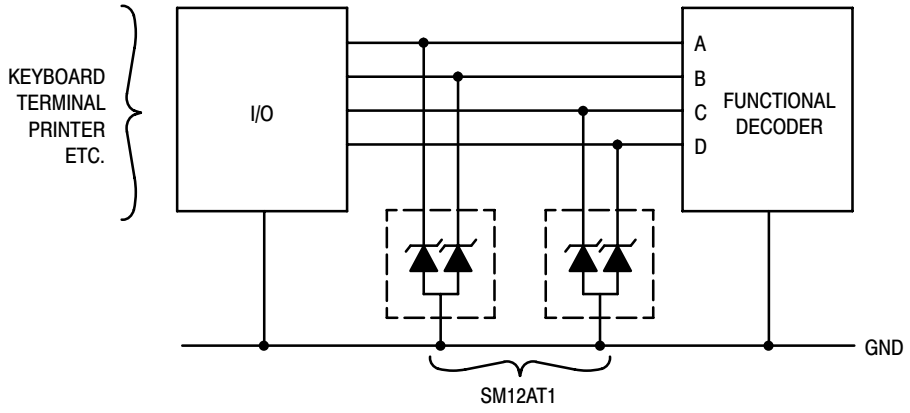


Figure 3. 8 × 20 μs Pulse Waveform

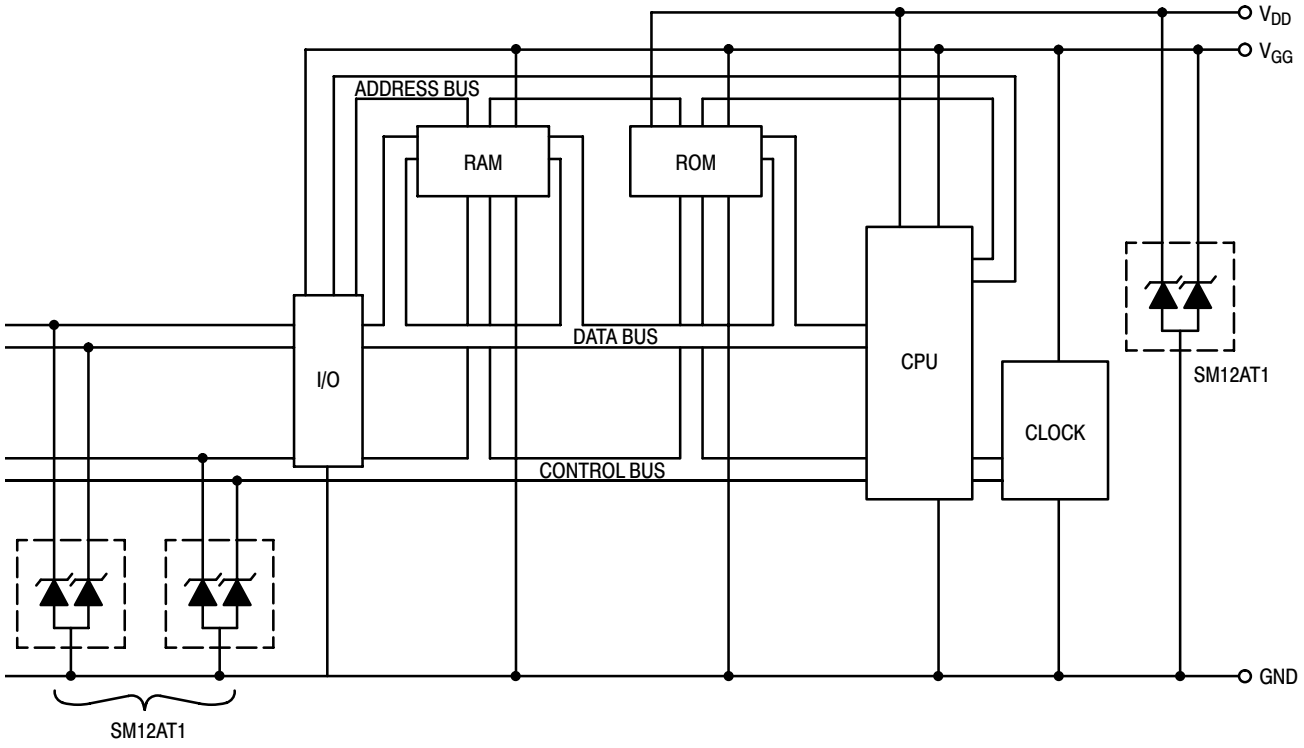
TYPICAL COMMON ANODE APPLICATIONS

A quad junction common anode design in a SOT−23 package protects four separate lines using only one package. This adds flexibility and creativity to PCB design especially when board space is at a premium. Two simplified examples of TVS applications are illustrated below.

Computer Interface Protection

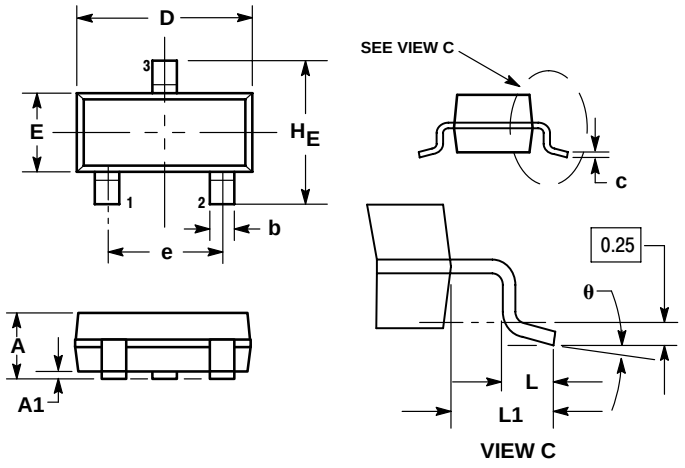


Microprocessor Protection



PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AN

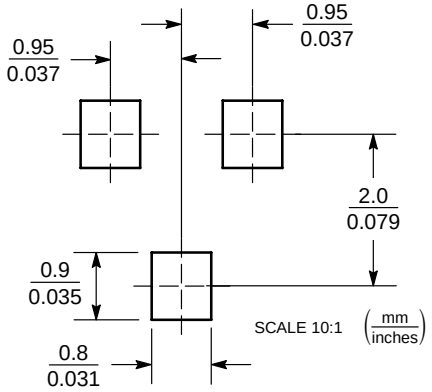


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318−01 THRU −07 AND −09 OBSOLETE, NEW STANDARD 318−08.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.40	2.64	0.083	0.094	0.104

STYLE 12:
PIN 1. CATHODE
2. CATHODE
3. ANODE

SOLDERING FOOTPRINT*



*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
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Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

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