MA3075WALT1

Preferred Device

Zener Transient Voltage Suppressor

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.

Specification Features:

- SOT–23 Package Allows Two Separate Unidirectional Configurations
- Low Leakage < 1 µA @ 5 Volt
- Breakdown Voltage: 7.2–7.9 Volt @ 5 mA
- Low Capacitance (80 pF typical @ 0 Volts, 1 MHz)
- ESD Protection Meeting: 16 kV Human Body Model
  30 kV Air and Contact Discharge

Mechanical Characteristics:

- Void Free, Transfer–Molded, Thermosetting Plastic Case
- Corrosion Resistant Finish, Easily Solderable
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications

MAXIMUM RATINGS

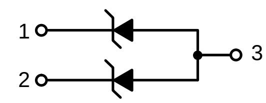
Rating	Symbol	Value	Unit
Peak Power Dissipation @ 100 µs (Note 1)	P_{pk}	15	Watts
Steady State Power Dissipation Derate above 25°C (Note 2)	P_D	225 1.8	mW mW/°C
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	556	°C/W
Maximum Junction Temperature	$R_{\theta JA}$	417	°C/W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	– 55 to +150	°C
ESD Discharge MIL STD 883C – Method 3015–6 IEC61000–4–2, Air Discharge IEC61000–4–2, Contact Discharge	V_{PP}	 16 30 30	kV

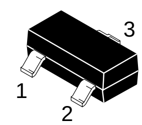
1. Non–repetitive 100 µs pulse width
2. Mounted on FR–5 Board = 1.0 X 0.75 X 0.062 in.

ON Semiconductor™

http://onsemi.com

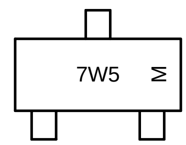
PIN 1. CATHODE
2. CATHODE
3. ANODE





SOT–23
CASE 318
STYLE 12

MARKING DIAGRAM

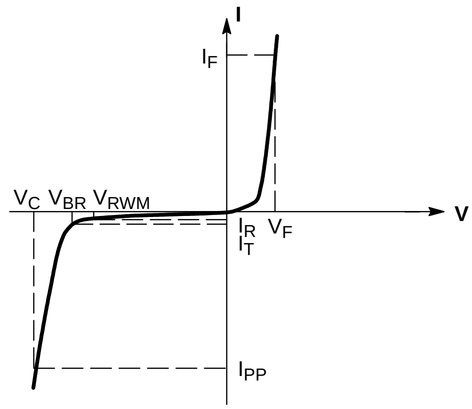


M = Date Code

ORDERING INFORMATION

Device	Package	Shipping
MA3075WALT1	SOT–23	3000/Tape & Reel

Preferred devices are recommended choices for future use and best overall value.



Uni–Directional TVS

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Forward Voltage	V_F	I_F = 10 mA		0.8	0.9	V
Zener Voltage*2	V_Z	I_Z = 5 mA	7.2	7.5	7.9	V
Operating Resistance	R_{ZK}	I_Z = 0.5 mA			120	Ω
	R_Z	I_Z = 5 mA		6	15	Ω
Reverse Current	I_{R1}	V_R = 5 V			1	μA
	I_{R2}	V_R = 6.5 V			60	μA
Temperature Coefficient of Zener Voltage*3	S_Z	I_Z = 5 mA	2.5	4.0	5.3	mV/°C
Terminal Capacitance	C_t	V_R = 0 V		80		pF

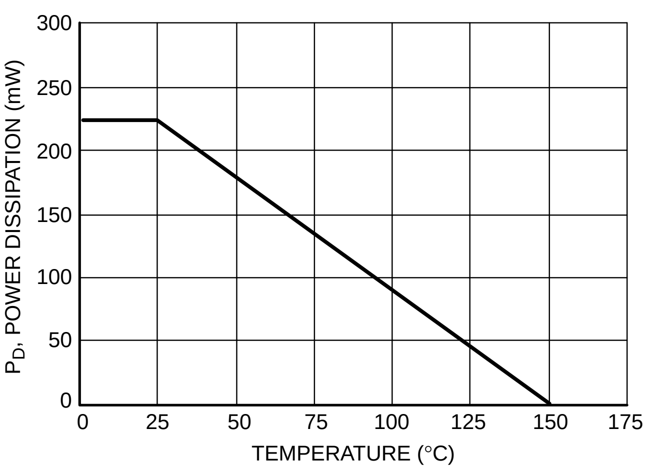


Figure 1. Steady State Power Derating Curve

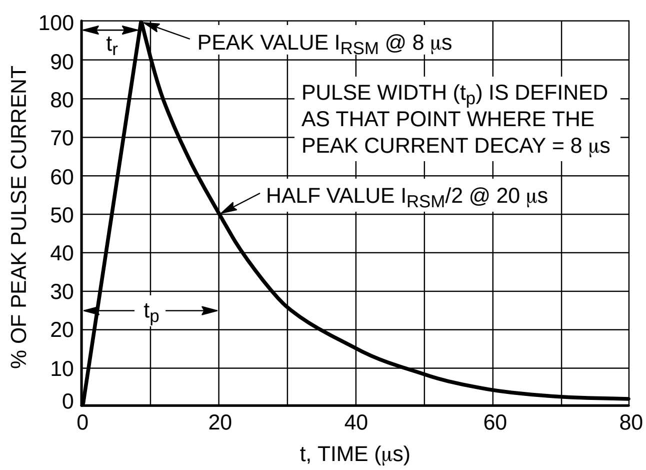


Figure 2. 8 X 20 μs Pulse Waveform

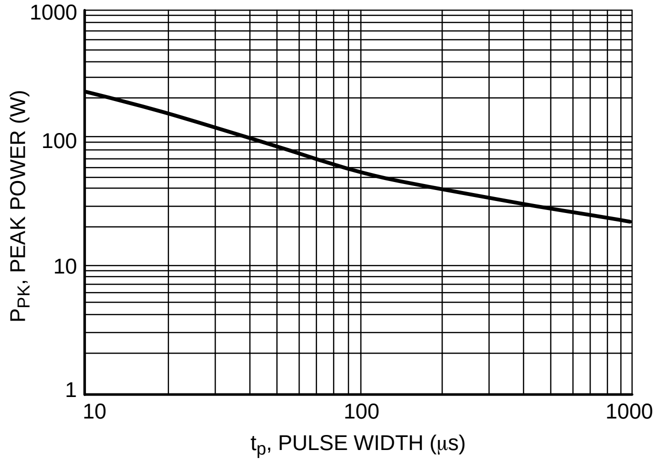


Figure 3. Pulse Rating Curve

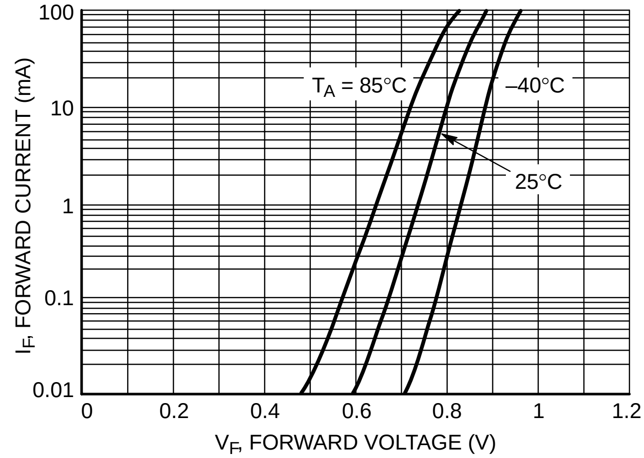


Figure 4. Forward Current versus Forward Voltage

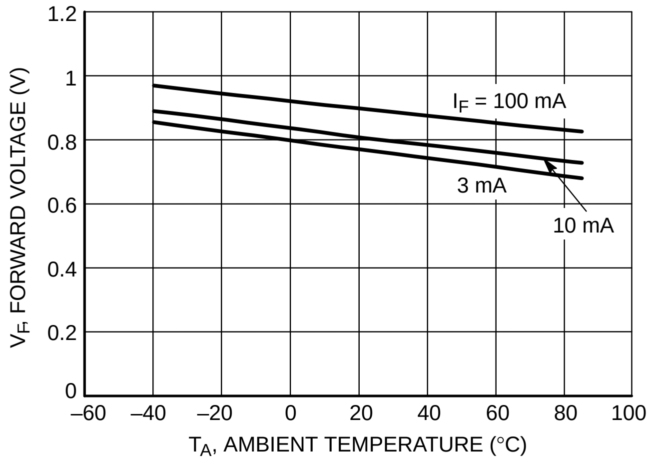


Figure 5. Forward Voltage versus Temperature

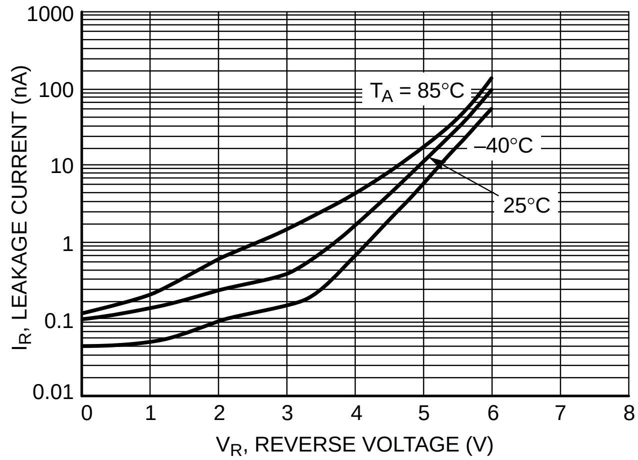


Figure 6. Leakage Current versus Reverse Voltage

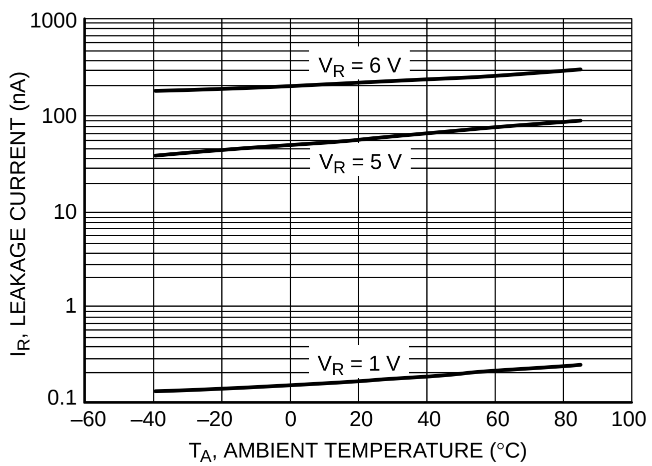


Figure 7. Leakage Current versus Temperature

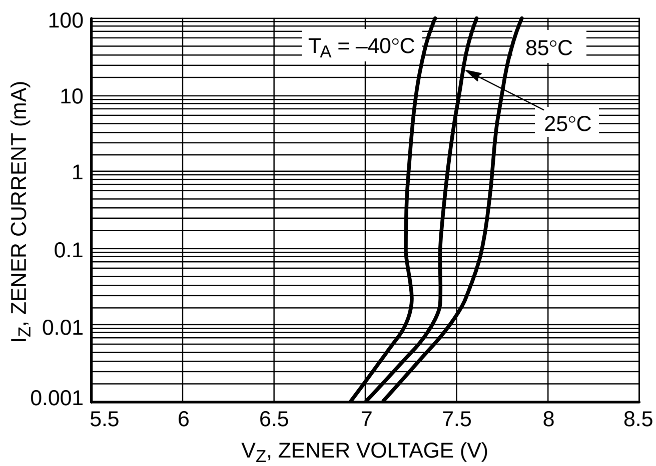


Figure 8. Zener Current versus Zener Voltage

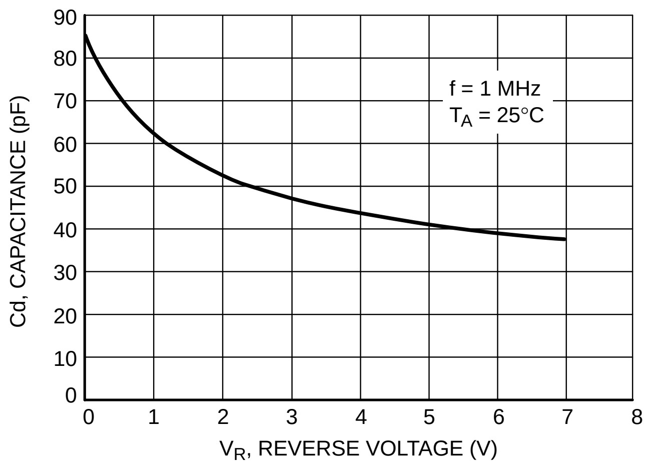


Figure 9. Capacitance

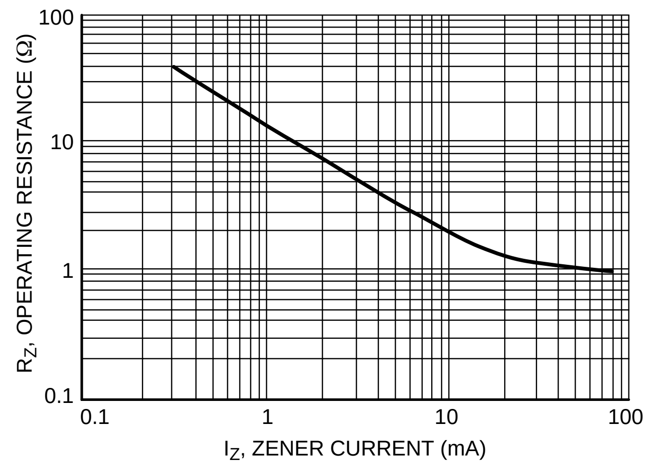
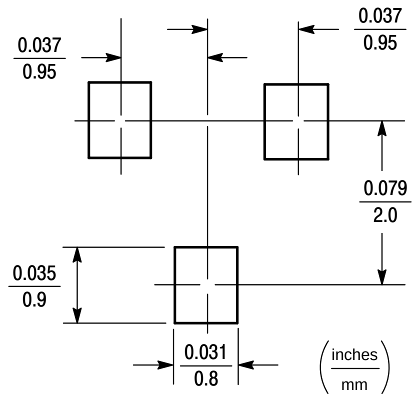


Figure 10. Operating Resistance versus Zener Current

INFORMATION FOR USING THE SOT–23 SURFACE MOUNT PACKAGE

MINIMUM RECOMMENDED FOOTPRINT FOR SURFACE MOUNTED APPLICATIONS

Surface mount board layout is a critical portion of the total design. The footprint for the semiconductor packages must be the correct size to insure proper solder connection interface between the board and the package. With the correct pad geometry, the packages will self align when subjected to a solder reflow process.



SOT–23

SOT–23 POWER DISSIPATION

The power dissipation of the SOT–23 is a function of the drain pad size. This can vary from the minimum pad size for soldering to a pad size given for maximum power dissipation. Power dissipation for a surface mount device is determined by $T_{J(max)}$, the maximum rated junction temperature of the die, $R_{\theta JA}$, the thermal resistance from the device junction to ambient, and the operating temperature, T_A. Using the values provided on the data sheet for the SOT–23 package, P_D can be calculated as follows:

$$P_D = \frac{T_{J(max)} - T_A}{R_{\theta JA}}$$

The values for the equation are found in the maximum ratings table on the data sheet. Substituting these values into the equation for an ambient temperature T_A of 25°C, one can calculate the power dissipation of the device which in this case is 225 milliwatts.

$$P_D = \frac{150°C - 25°C}{556°C/W} = 225 \text{ milliwatts}$$

The 556°C/W for the SOT–23 package assumes the use of the recommended footprint on a glass epoxy printed circuit board to achieve a power dissipation of 225 milliwatts. There are other alternatives to achieving higher power dissipation from the SOT–23 package. Another alternative would be to use a ceramic substrate or an aluminum core board such as Thermal Clad™. Using a board material such as Thermal Clad, an aluminum core board, the power dissipation can be doubled using the same footprint.

SOLDERING PRECAUTIONS

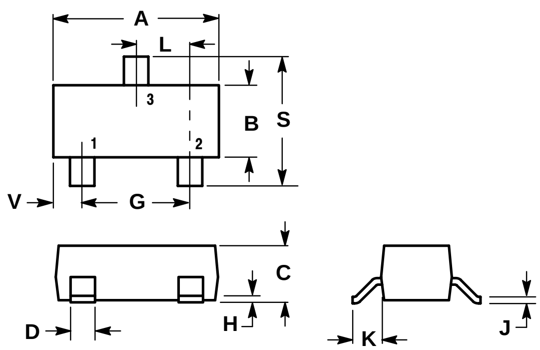
The melting temperature of solder is higher than the rated temperature of the device. When the entire device is heated to a high temperature, failure to complete soldering within a short time could result in device failure. Therefore, the following items should always be observed in order to minimize the thermal stress to which the devices are subjected.

- Always preheat the device.
- The delta temperature between the preheat and soldering should be 100°C or less.*
- When preheating and soldering, the temperature of the leads and the case must not exceed the maximum temperature ratings as shown on the data sheet. When using infrared heating with the reflow soldering method, the difference shall be a maximum of 10°C.
- The soldering temperature and time shall not exceed 260°C for more than 10 seconds.
- When shifting from preheating to soldering, the maximum temperature gradient shall be 5°C or less.
- After soldering has been completed, the device should be allowed to cool naturally for at least three minutes. Gradual cooling should be used as the use of forced cooling will increase the temperature gradient and result in latent failure due to mechanical stress.
- Mechanical stress or shock should not be applied during cooling.

* Soldering a device without preheating can cause excessive thermal shock and stress which can result in damage to the device.

Transient Voltage Suppressors – Surface Mount

SOT–23
TO–236AB
CASE 318–08
ISSUE AF



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.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

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

Notes

Thermal Clad is a trademark of the Bergquist Company

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:
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Email: ONlit@hibbertco.com

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