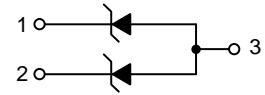


These dual monolithic silicon surge protection diodes are designed for applications requiring transient overvoltage protection capability. They are intended for use in voltage and ESD sensitive equipment such as computers, printers, business machines, communication systems, medical equipment and other 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.



PIN 1. CATHODE  
2. CATHODE  
3. ANODE

**Specification Features:**

- SOT–23 Package Allows Either Two Separate Unidirectional Configurations or a Single Bidirectional Configuration
- Working Peak Reverse Voltage Range – 5.0 V to 36 V
- Peak Power – 300 Watt (8/20  $\mu$ s)
- Low Leakage – 1.0 $\mu$ A
- Flammability Rating UL 94 V–0
- These are Pb–Free Devices

**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

**MAXIMUM RATINGS**

| Rating  | Symbol          | Value                | Unit  |
|---|-----------------|----------------------|---|
| Peak Power Dissipation @ 20 $\mu$ s (Note 1) @ $T_L \leq 25^\circ\text{C}$                            | $P_{pk}$        | 300                  | W   |
| IEC 61000–4–2 (ESD)<br>Air Contact  |                 | $\pm 15$<br>$\pm 26$ | kV  |
| IEC 61000–4–4 (EFT)   |                 | 40                   | A   |
| IEC 61000–4–5 (Lightning)   |                 | 12                   | A   |
| Total Power Dissipation on FR–5 Board (Note 2) @ $T_A = 25^\circ\text{C}$<br>Derate above 25°C        | $P_D$           | 225                  | mW  |
| Thermal Resistance, Junction–to–Ambient   | $R_{\theta JA}$ | 1.8<br>556           | $\text{mW}/^\circ\text{C}$<br>$^\circ\text{C}/\text{W}$ |
| Total Power Dissipation on Alumina Substrate (Note 3) @ $T_A = 25^\circ\text{C}$<br>Derate above 25°C | $P_D$           | 300                  | mW  |
| Thermal Resistance, Junction–to–Ambient   | $R_{\theta JA}$ | 2.4<br>417           | $\text{mW}/^\circ\text{C}$<br>$^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range  | $T_J, T_{stg}$  | – 55 to +150         | $^\circ\text{C}$  |
| Lead Solder Temperature – Maximum (10 Second Duration)  | $T_L$           | 260                  | $^\circ\text{C}$  |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Non–repetitive current pulse per Figure 3

2. FR–5 = 1.0 x 0.75 x 0.62 in.

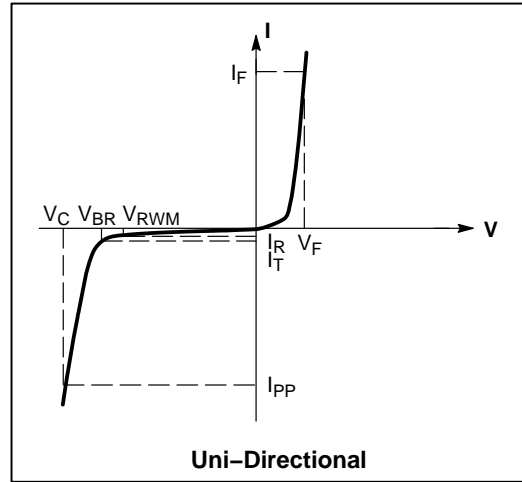
3. Alumina = 0.4 x 0.3 x 0.024 in., 99.5% alumina

NOTE: Other voltages may be available upon request

**ELECTRICAL CHARACTERISTICS**

**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                                |
| $\Theta V_{BR}$ | 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 @ $I_{ZK}$          |



**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Device* | Device Marking | $V_{RWM}$<br>(Volts) | $I_R$ @ $V_{RWM}$<br>( $\mu\text{A}$ ) | $V_{BR}$ , Breakdown Voltage<br>(Volts) |       | $I_T$<br>mA | $V_C$ @<br>$I_{PP} = 1$ Amp<br>(Volts) | Max $I_{PP}$<br>(Note 4)<br>(Amps) | Typical Capacitance     |
|---------|----------------|----------------------|--|---|-------|-------------|--|------------------------------------|-------------------------|
|         |                |                      |  | Min                                     | Max   |             |  |                                    | (pF)                    |
|         |                |                      |  |   |       |             |  |                                    | Pin 1 to 3<br>@ 0 Volts |
| SM05T1G | 05M            | 5                    | 10                                     | 6.2                                     | 7.3   | 1.0         | 9.8                                    | 17                                 | 225                     |
| SM12T1G | 12M            | 12                   | 1.0                                    | 13.3                                    | 15.75 | 1.0         | 19                                     | 12                                 | 95                      |
| SM15T1G | 15M            | 15                   | 1.0                                    | 16.7                                    | 19.6  | 1.0         | 24                                     | 10                                 | 100                     |
| SM24T1G | 24M            | 24                   | 1.0                                    | 26.7                                    | 31.35 | 1.0         | 43                                     | 5.0                                | 60                      |
| SM36T1G | 36M            | 36                   | 1.0                                    | 40.0                                    | 46.95 | 1.0         | 60                                     | 4.0                                | 45                      |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. 8/20  $\mu\text{s}$  pulse waveform per Figure 3

TYPICAL CHARACTERISTICS

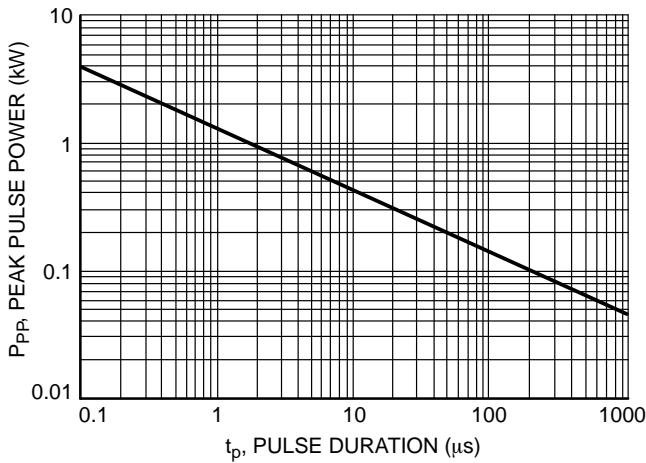


Figure 1. Non-Repetitive Peak Pulse Power versus Pulse Time

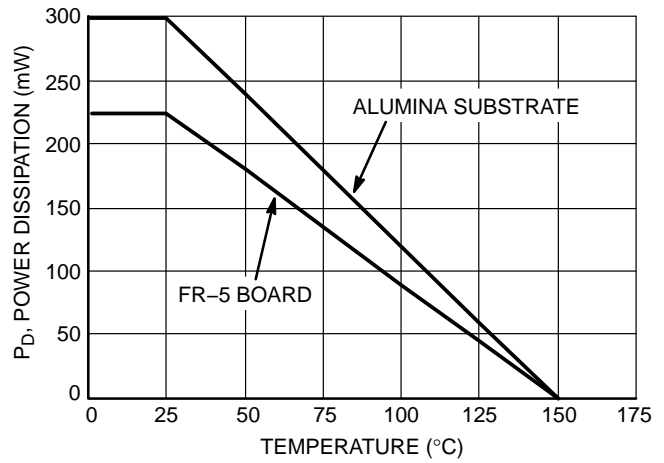


Figure 2. Steady State Power Derating Curve

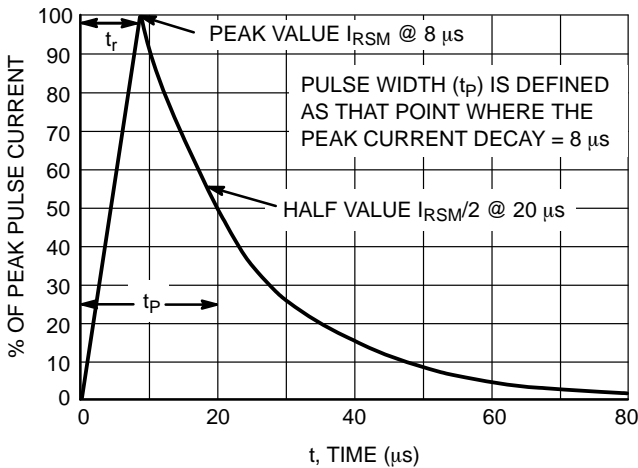


Figure 3. 8/20 μs Pulse Waveform

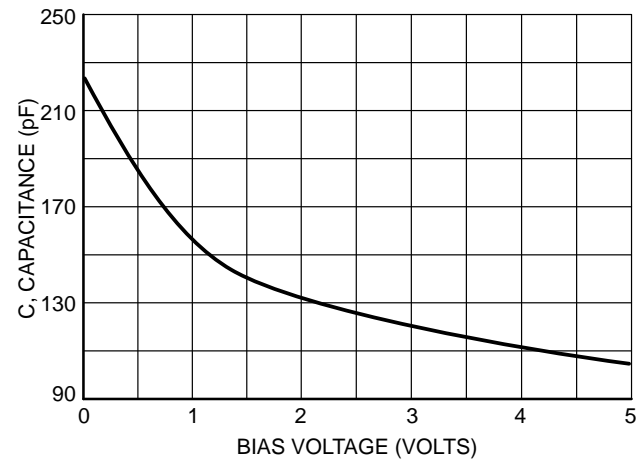


Figure 4. Typical Diode Capacitance (SM05)

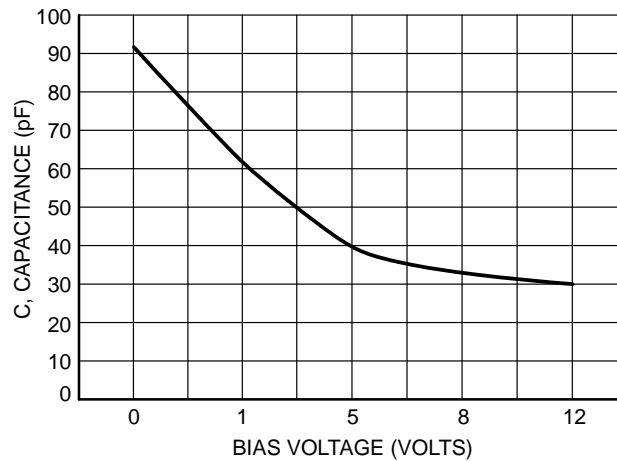


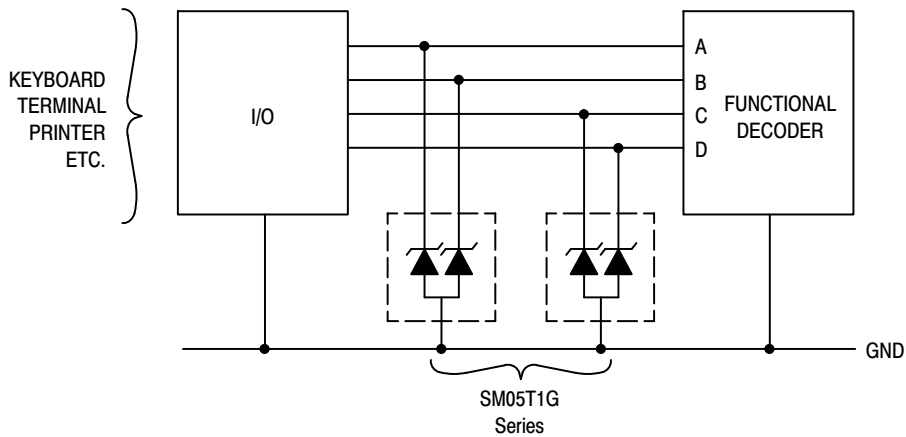
Figure 5. Typical Diode Capacitance (SM12)

**TYPICAL COMMON ANODE APPLICATIONS**

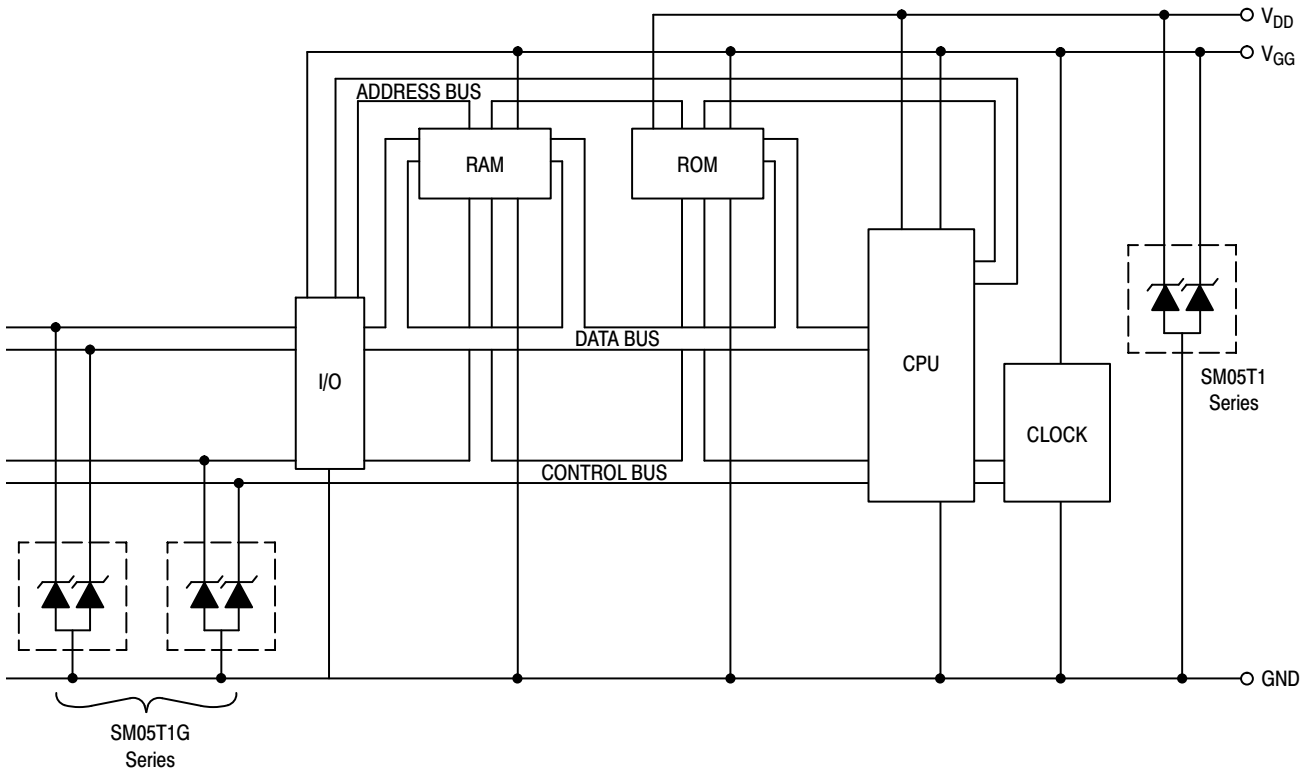
A quad junction common anode design in a SOT-23 package protects four separate lines using only one package. This adds flexibility and creativity to PCB design especially

when board space is at a premium. Two simplified examples of surge protection applications are illustrated below.

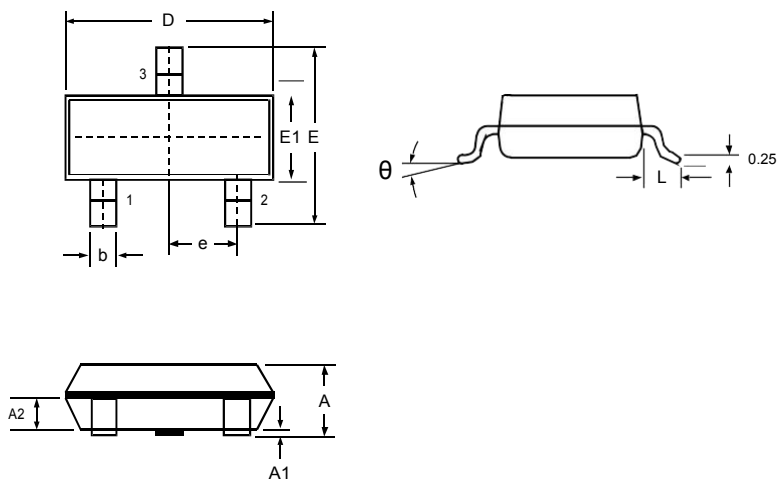
**Computer Interface Protection**



**Microprocessor Protection**



### Outline Drawing – SOT-23



| SYMBOL | DIMENSIONS |       |           |       |
|--------|------------|-------|-----------|-------|
|        | MILLIMETER |       | INCHES    |       |
|        | MIN        | MAX   | MIN       | MAX   |
| A      | 0.900      | 1.150 | 0.035     | 0.045 |
| A1     | 0.000      | 0.100 | 0.000     | 0.004 |
| A2     | 0.900      | 1.050 | 0.035     | 0.041 |
| D      | 2.800      | 3.000 | 0.110     | 0.118 |
| b      | 0.300      | 0.500 | 0.012     | 0.020 |
| E      | 2.250      | 2.550 | 0.089     | 0.100 |
| E1     | 1.200      | 1.400 | 0.047     | 0.055 |
| e      | 0.950 BSC  |       | 0.037 BSC |       |
| L      | 0.500      | 0.675 | 0.020     | 0.027 |
| θ      | 0          | 8°    | 0         | 8°    |

### Marking



### Ordering information

| Order code  | Package | Baseqty | Delivery mode |
|-------------|---------|---------|---------------|
| UMW SM05T1G | SOT-23  | 3000    | Tape and reel |
| UMW SM12T1G | SOT-23  | 3000    | Tape and reel |
| UMW SM15T1G | SOT-23  | 3000    | Tape and reel |
| UMW SM24T1G | SOT-23  | 3000    | Tape and reel |
| UMW SM36T1G | SOT-23  | 3000    | Tape and reel |