

## QUAD TVS/ZENER ARRAY FOR ESD AND LATCH-UP PROTECTION

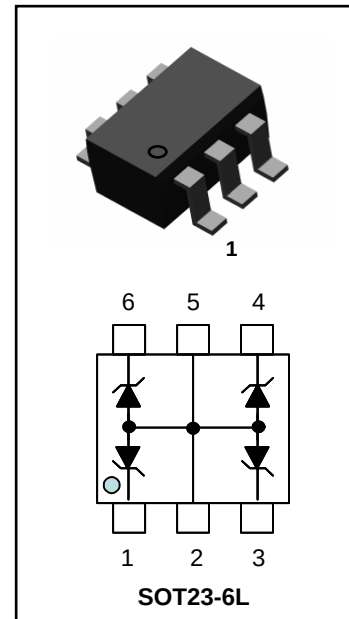
This Quad TVS/Zener Array family have been designed to Protect Sensitive Equipment against ESD and to prevent Latch-Up events in CMOS circuitry operating at 5V, 12V, 15V and 24V. This TVS array offers an integrated solution to protect up to 4 data lines where the board space is a premium.

### SPECIFICATION FEATURES

- 350W Power Dissipation (8/20 $\mu$ s Waveform)
- Low Leakage Current, Maximum of 5 $\mu$ A at rated voltage
- Very Low Clamping Voltage
- IEC61000-4-2 ESD 20kV air, 15kV Contact Compliance
- Industry Standard Surface Mount Package SOT23-6L
- 100% Tin Matte Finish (RoHS Compliance)

### APPLICATIONS

- Personal Digital Assistant (PDA)
- SIM Card Port Protection (Mobile Phone)
- Portable Instrumentation
- Mobile Phones and Accessories
- Memory Card Port Protection



| TVS      | Marking Code |
|----------|--------------|
| PJMSMS05 | M05          |
| PJMSMS12 | M12          |
| PJMSMS15 | M15          |
| PJMSMS24 | M24          |

### MAXIMUM RATINGS (Per Device)

| Rating                                   | Symbol           | Value       | Units |
|------------------------------------------|------------------|-------------|-------|
| Peak Pulse Power (8/20 $\mu$ s Waveform) | P <sub>pp</sub>  | 350         | W     |
| ESD Voltage (HBM)                        | V <sub>ESD</sub> | >25         | kV    |
| Operating Temperature Range              | T <sub>J</sub>   | -50 to +125 | °C    |
| Storage Temperature Range                | T <sub>stg</sub> | -50 to +150 | °C    |

### ELECTRICAL CHARACTERISTICS (Per Device) T<sub>j</sub> = 25°C

#### PJMSMS05

| Parameter                       | Symbol           | Conditions                                           | Min | Typical | Max | Units   |
|---------------------------------|------------------|------------------------------------------------------|-----|---------|-----|---------|
| Reverse Stand-Off Voltage       | V <sub>WRM</sub> |                                                      |     |         | 5   | V       |
| Reverse Breakdown Voltage       | V <sub>BR</sub>  | I <sub>BR</sub> = 1mA                                | 6   |         |     | V       |
| Reverse Leakage Current         | I <sub>R</sub>   | V <sub>R</sub> = 5V                                  |     |         | 5   | $\mu$ A |
| Clamping Voltage (8/20 $\mu$ s) | V <sub>C</sub>   | I <sub>pp</sub> = 5A                                 |     |         | 9.8 | V       |
| Clamping Voltage (8/20 $\mu$ s) | V <sub>C</sub>   | I <sub>pp</sub> = 24A                                |     |         | 13  | V       |
| Off State Junction Capacitance  | C <sub>j</sub>   | 0 Vdc Bias f = 1MHz<br>Between I/O pins and pin 2, 5 |     |         | 225 | pF      |
| Off State Junction Capacitance  | C <sub>j</sub>   | 5 Vdc Bias f = 1MHz<br>Between I/O pins and pin 2, 5 |     |         | 125 | pF      |

**ELECTRICAL CHARACTERISTICS (Per Device)  $T_j = 25^{\circ}\text{C}$** 
**PJSMS12**

| Parameter                              | Symbol    | Conditions                                                    | Min  | Typical | Max | Units         |
|----------------------------------------|-----------|---------------------------------------------------------------|------|---------|-----|---------------|
| Reverse Stand-Off Voltage              | $V_{WRM}$ |                                                               |      |         | 12  | V             |
| Reverse Breakdown Voltage              | $V_{BR}$  | $I_{BR} = 1\text{mA}$                                         | 13.3 |         |     | V             |
| Reverse Leakage Current                | $I_R$     | $V_R = 12\text{V}$                                            |      |         | 1   | $\mu\text{A}$ |
| Clamping Voltage (8/20 $\mu\text{s}$ ) | $V_c$     | $I_{pp} = 5\text{A}$                                          |      |         | 20  | V             |
| Clamping Voltage (8/20 $\mu\text{s}$ ) | $V_c$     | $I_{pp} = 15\text{A}$                                         |      |         | 25  | V             |
| Off State Junction Capacitance         | $C_j$     | 0 Vdc Bias $f = 1\text{MHz}$<br>Between I/O pins and pin 2, 5 |      |         | 100 | pF            |

**PJSMS15**

| Parameter                              | Symbol    | Conditions                                                    | Min  | Typical | Max | Units         |
|----------------------------------------|-----------|---------------------------------------------------------------|------|---------|-----|---------------|
| Reverse Stand-Off Voltage              | $V_{WRM}$ |                                                               |      |         | 15  | V             |
| Reverse Breakdown Voltage              | $V_{BR}$  | $I_{BR} = 1\text{mA}$                                         | 16.7 |         |     | V             |
| Reverse Leakage Current                | $I_R$     | $V_R = 15\text{V}$                                            |      |         | 1   | $\mu\text{A}$ |
| Clamping Voltage (8/20 $\mu\text{s}$ ) | $V_c$     | $I_{pp} = 5\text{A}$                                          |      |         | 24  | V             |
| Clamping Voltage (8/20 $\mu\text{s}$ ) | $V_c$     | $I_{pp} = 12\text{A}$                                         |      |         | 29  | V             |
| Off State Junction Capacitance         | $C_j$     | 0 Vdc Bias $f = 1\text{MHz}$<br>Between I/O pins and pin 2, 5 |      |         | 80  | pF            |

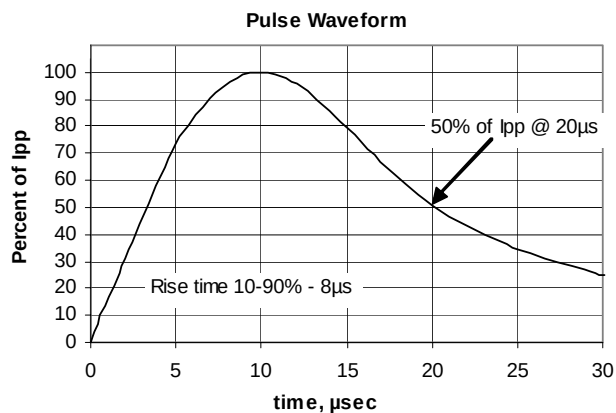
**PJSMS24**

| Parameter                              | Symbol    | Conditions                                                    | Min  | Typical | Max | Units         |
|----------------------------------------|-----------|---------------------------------------------------------------|------|---------|-----|---------------|
| Reverse Stand-Off Voltage              | $V_{WRM}$ |                                                               |      |         | 24  | V             |
| Reverse Breakdown Voltage              | $V_{BR}$  | $I_{BR} = 1\text{mA}$                                         | 26.7 |         |     | V             |
| Reverse Leakage Current                | $I_R$     | $V_R = 24\text{V}$                                            |      |         | 1   | $\mu\text{A}$ |
| Clamping Voltage (8/20 $\mu\text{s}$ ) | $V_c$     | $I_{pp} = 5\text{A}$                                          |      |         | 40  | V             |
| Clamping Voltage (8/20 $\mu\text{s}$ ) | $V_c$     | $I_{pp} = 8\text{A}$                                          |      |         | 44  | V             |
| Off State Junction Capacitance         | $C_j$     | 0 Vdc Bias $f = 1\text{MHz}$<br>Between I/O pins and pin 2, 5 |      |         | 60  | pF            |

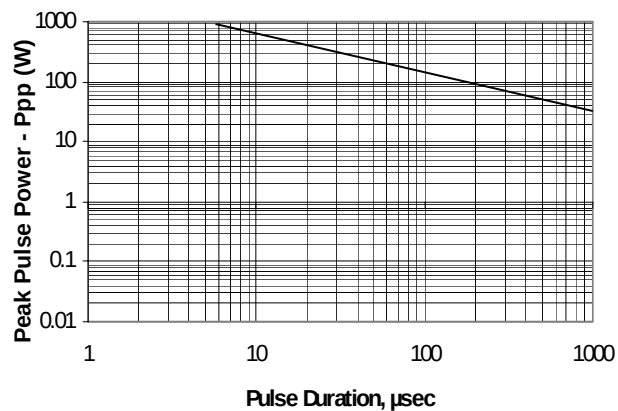


## TYPICAL CHARACTERISTICS $T_J = 25^\circ\text{C}$ unless otherwise noted

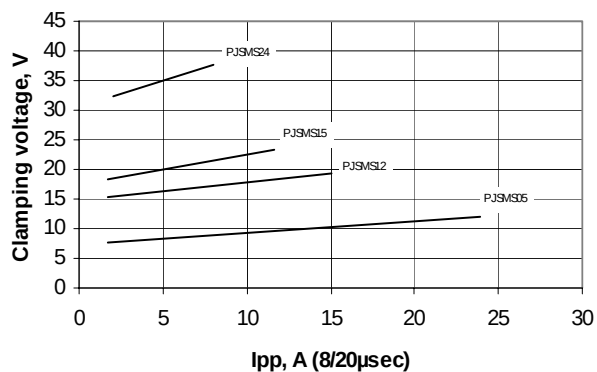
### Surge Pulse Waveform Definition



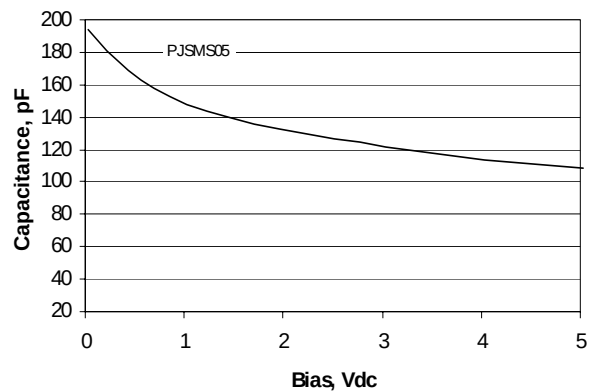
### Non-Repetitive Peak Pulse Power vs Pulse Time



### Clamping Voltage vs. Peak current

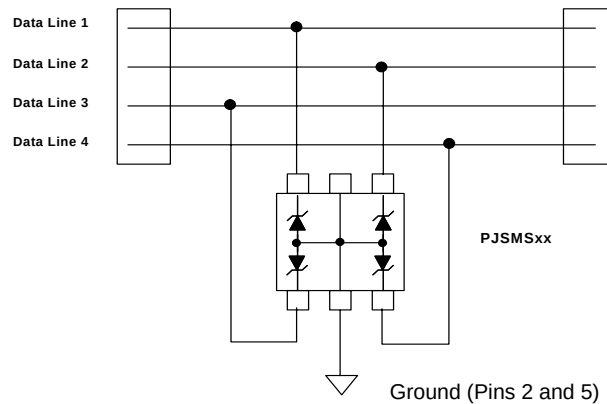


### Off-State Capacitance per Device - 1MHz



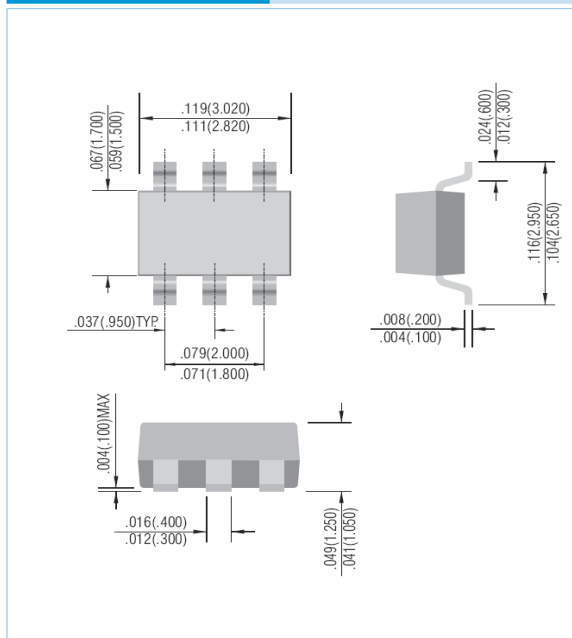


## TYPICAL APPLICATION EXAMPLE AND PACKAGE DIMENSIONS



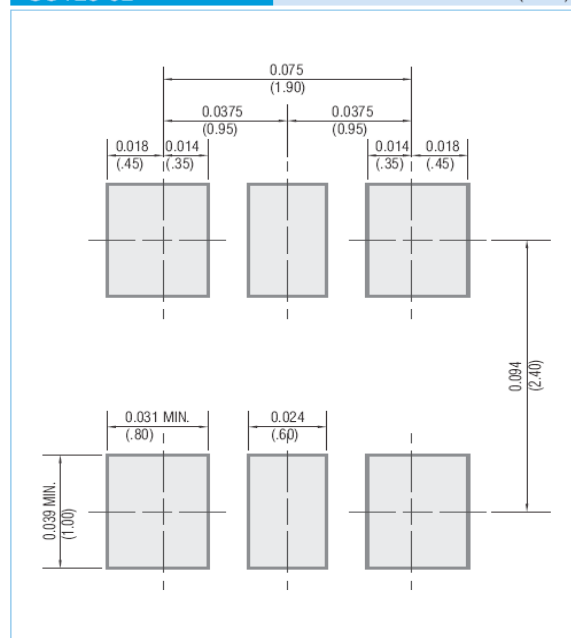
SOT-23-6L

Unit: inch ( mm )



SOT23-6L

Unit: inch ( mm )



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