Prisemi®

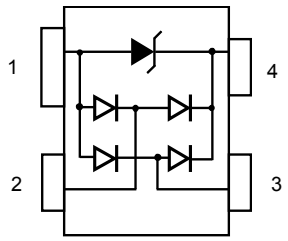
PSR05

# Low Capacitance ESD Protector

## Description

The PSR05 is low capacitance transient voltage suppressor for high speed data interface that designed to protect sensitive electronics from damage or latch-up due to ESD lightning, and other voltage induced transient events.

All pins are rated to withstand 15kV ESD pulses using the IEC61000-4-2 air discharge method, which can meet the requirement of level 4.




## Feature

- 500W Peak Power per Line (tp = 8/20μs)
- SOT-143 package
- ESD Protection > 15 kV
- Unidirectional configurations
- Protects 2 I/O Ports & Power Supply
- Low Capacitance: 4 pF
- Low clamping voltage
- RoHS Compliant in Lead-Free Versions
- Transient protection for data lines to IEC 61000-4-2(ESD) ±15KV(air) ±8KV(contact); IEC 61000-4-4 (EFT) 40A (5/50ns)

## Applications

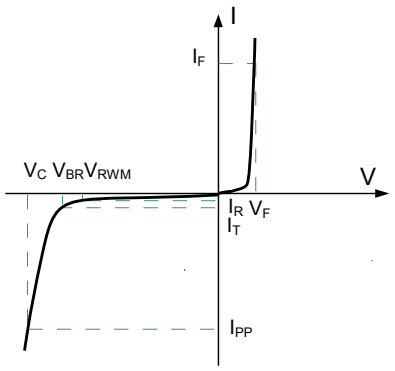
- Ethernet - 10/100 Base T
- Fire wire
- Wireless communications
- USB interface

## Mechanical Characteristics

- Lead finish:100% matte Sn(Tin)
- Mounting position: Any
- Qualified max reflow temperature:260℃
- Device meets MSL 1 requirements
- Pure tin plating: 7 ~ 17 um
- Pin flatness：≤3mil

## Electronics Parameter

| Symbol | Parameter |
|---|---|
| $V_{RWM}$ | Peak Reverse Working Voltage |
| $I_R$ | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$ | Breakdown Voltage @ $I_T$ |
| $I_T$ | Test Current |
| $I_{PP}$ | Maximum Reverse Peak Pulse Current |
| $V_C$ | Clamping Voltage @ $I_{PP}$ |
| $P_{PP}$ | Peak Pulse Power |
| $C_J$ | Junction Capacitance |
| $I_F$ | Forward Current |
| $V_F$ | Forward Voltage @ $I_F$ |



## Electrical characteristics per line@25℃( unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Reverse Stand-off Voltage | $V_{RWM}$ | | | | 5 | V |
| Breakdown Voltage | $V_{BR}$ | $I_t$ = 1mA | 6 | | | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 5V T=25℃ | | | 5 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 1A $t_P$ = 8/20μs | | | 10.0 | V |
| Clamping Voltage | $V_C$ | $I_{PP}$=10A $t_P$ = 8/20μs | | | 24.3 | V |
| Junction Capacitance | $C_j$ | $V_R$=0V f = 1MHz | | 7 | | pF |

## Absolute maximum rating@25℃

| Rating | Symbol | Value | Units |
|---|---|---|---|
| Peak Pulse Power ($t_p$=8/20μs) | $P_{pp}$ | 500 | W |
| Peak Forward Voltage@1A | $V_F$ | 1.5 | V |
| Operating Temperature | $T_J$ | -55 to +150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55 to +150 | ℃ |

## Typical Characteristics

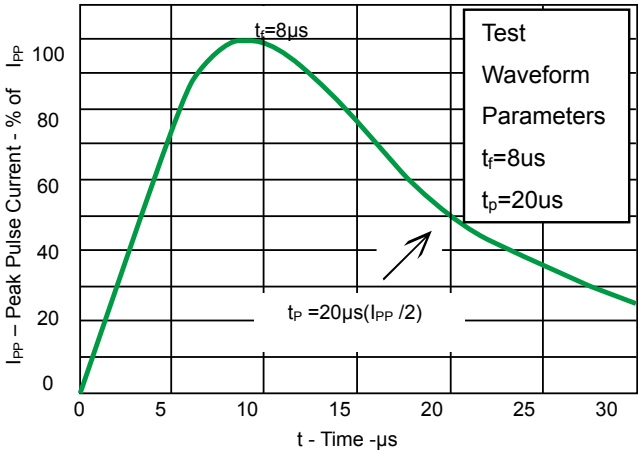



Fig 1.Pulse Waveform

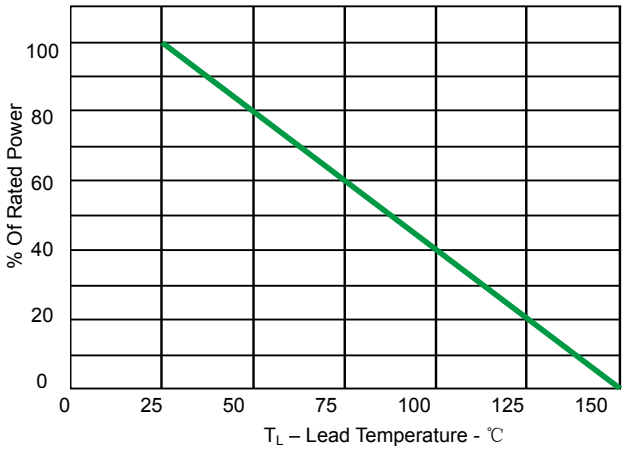



Fig 2.Power Derating Curve

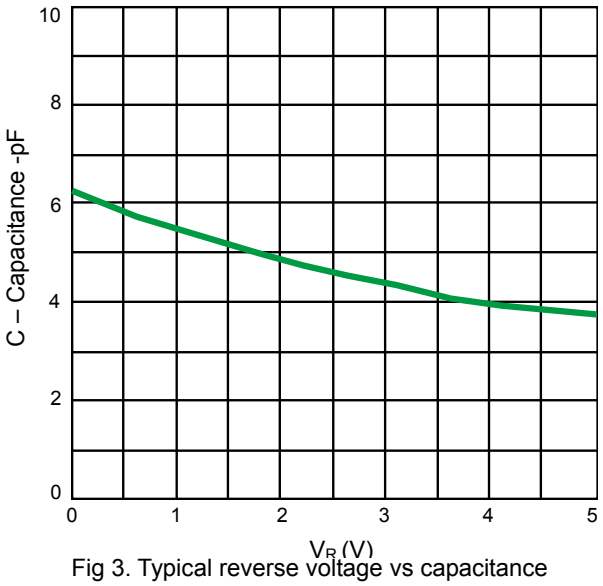



Fig 3. Typical reverse voltage vs capacitance

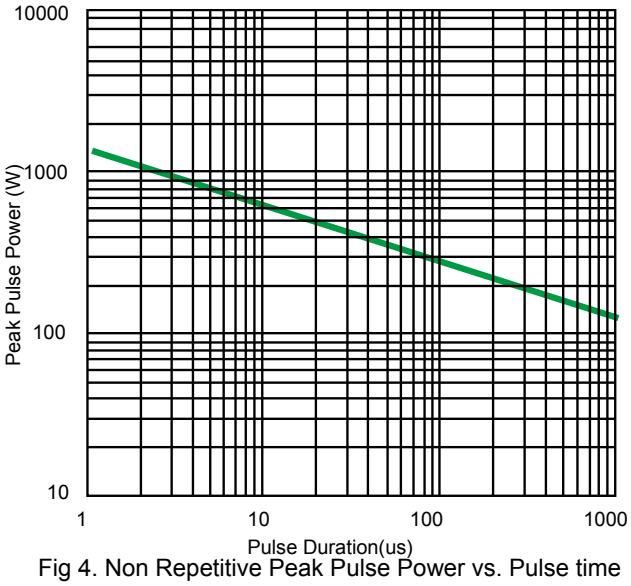
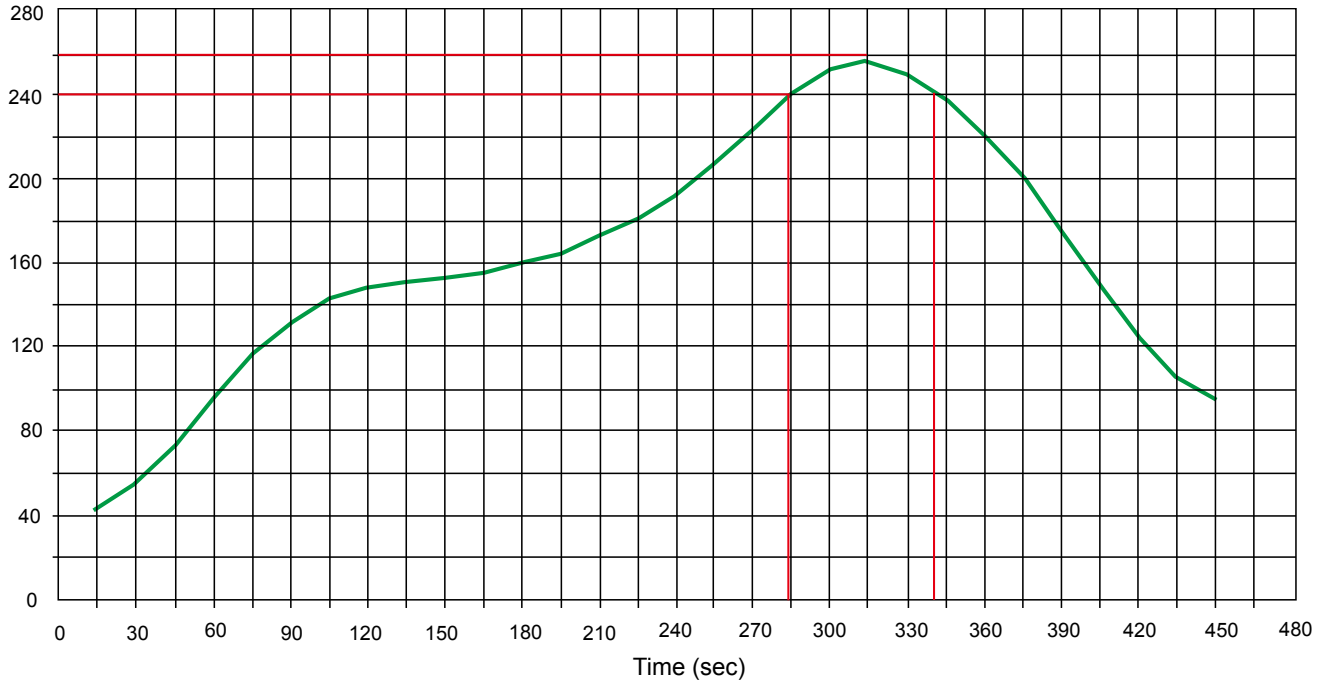



Fig 4. Non Repetitive Peak Pulse Power vs. Pulse time

## Solder Reflow Recommendation

Peak Temp=257℃, Ramp Rate=0.802deg. ℃/sec

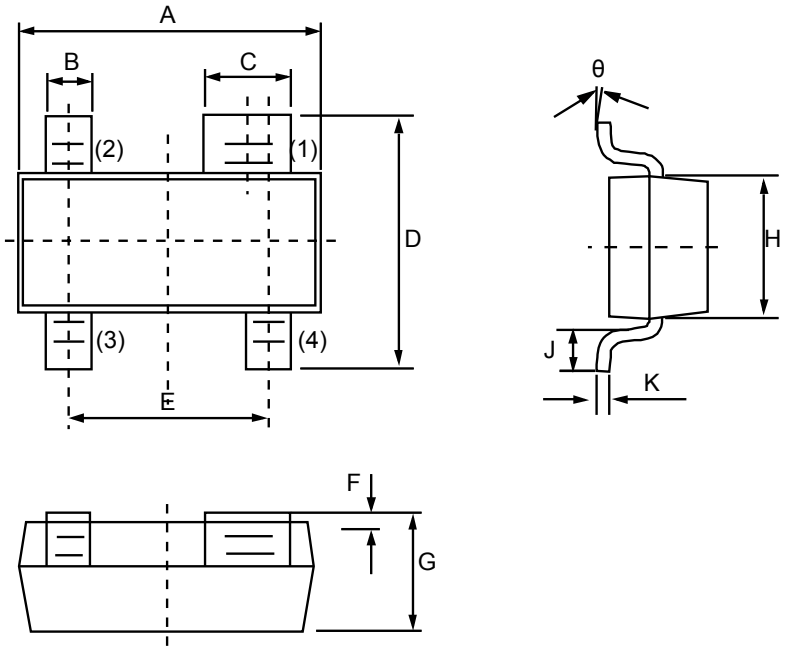



## PCB Design

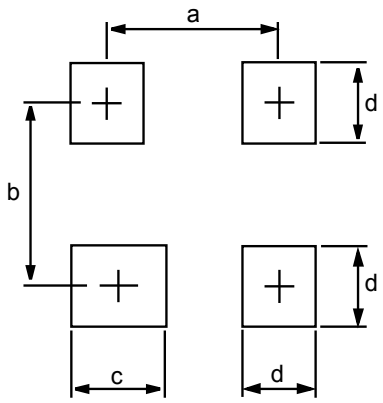
For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

- Do not use stubs, but place the cathode of the TVS diode directly on the signal trace.
- Do not make false economies and save copper for the ground connection.
- Place via holes to ground as close as possible to the anode of the TVS diode.
- Use as many via holes as possible for the ground connection.
- Keep the length of via holes in mind! The longer the more inductance they will have.

## Product dimension (SOT-143)




| Dim | Millimeters | | Inches | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 2.800 | 3.000 | 0.110 | 0.118 |
| B | 0.300 | 0.500 | 0.012 | 0.020 |
| C | 0.750 | 0.900 | 0.030 | 0.035 |
| D | 2.250 | 2.550 | 0.089 | 0.100 |
| E | 1.800 | 2.000 | 0.071 | 0.079 |
| F | 0.000 | 0.100 | 0.000 | 0.004 |
| G | 0.900 | 1.150 | 0.035 | 0.045 |
| H | 1.200 | 1.400 | 0.047 | 0.055 |
| J | 0.300 | 0.500 | 0.012 | 0.020 |
| K | 0.080 | 0.150 | 0.003 | 0.006 |
| θ | 0° | 8° | 0° | 8° |




| Dim | Millimeters | |
|---|---|---|
| | MIN | MAX |
| a | -- | 2.1 |
| b | -- | 1.9 |
| c | -- | 1.0 |
| d | -- | 0.6 |

## Ordering information

| Device | Package | Shipping |
|---|---|---|
| PSR05 | SOT-143 (Pb-Free) | 3000 / Tape & Reel |

**IMPORTANT NOTICE**

and Prisemi® are registered trademarks of **Prisemi Electronics Co., Ltd (**Prisemi**)** ,Prisemi reserves the right to make changes without further notice to any products herein. Prisemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Prisemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. “Typical” parameters which may be provided in Prisemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including “Typicals” must be validated for each customer application by customer’s technical experts. Prisemi does not convey any license under its patent rights nor the rights of others. The products listed in this document are designed to be used with ordinary electronic equipment or devices, Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

Website: http://www.prisemi.com

For additional information, please contact your local Sales Representative.