

400 WATT TVS COMPONENT



DESCRIPTION

The P4SMA series is designed to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

FEATURES

- IEC 61000-4-2 (ESD): Level 4: Air $\pm 30\text{kV}$, Contact $\pm 30\text{kV}$
- IEC 61000-4-4 (EFT): 40A 5/50ns
- IEC 61000-4-5 (Surge)
- 400 Watts Peak Pulse Power per Line ($t_p = 10/1000\mu\text{s}$)
- Excellent Clamping Capability
- Low Incremental Surge Resistance
- Low Leakage Current: $< 1\mu\text{A}$ Typical (Min. $V_{BR} > 12\text{V}$)
- Low Profile Package and Optimized Space Saving Footprint
- Whisker Test Per JEDEC JESD201 - Table 4A and 4C
- Bidirectional and Unidirectional Configurations
- Very Fast Response Time
- Available in Multiple Voltages
- RoHS Compliant
- REACH Compliant

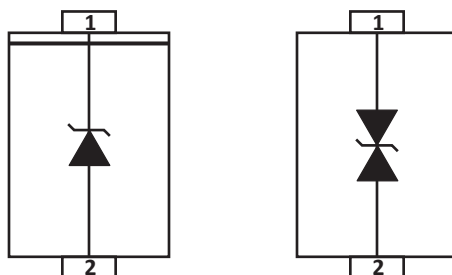
APPLICATIONS

- Power Supply
- AC/DC Applications
- Telecom

MECHANICAL CHARACTERISTICS

- Molded JEDEC DO-214AC Package
- Approximate Weight: 0.06 grams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature:
Pure-Tin - Sn, 100: 260-270°C
- 12mm Tape and Reel Per EIA Standard 481
- Terminal: Solderable per MIL-STD-750, Method 2026
- Flammability Rating UL 94V-0

PIN CONFIGURATIONS



TYPICAL DEVICE CHARACTERISTICS
MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

| PARAMETER | SYMBOL | VALUE | UNITS |
|---|-----------------|------------|-------|
| Operating Temperature | T_A | -65 to 150 | °C |
| Storage Temperature | T_{STG} | -65 to 175 | °C |
| Peak Pulse Power (tp =10/1000µs) - See Figure 1 and Note 1, 2 and 5 | P_{PP} | 400 | Watts |
| Power Dissipation on Infinite Heatsink at $T_L = 50^\circ\text{C}$ | P_D | 3.3 | Watts |
| Peak Forward Surge Current, 8.3ms single half sinewave - Unidirectional Only (Note 3) | I_{FSM} | 60 | Amps |
| Maximum Instantaneous Forward Voltage at 25A - Unidirectional Only (Note 4) | V_F | 3.5/5.0 | V |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 30 | °C/W |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 120 | °C/W |

NOTES

1. Non-repetitive current pulse per Figure 2 and derated above $T_A = 25^\circ\text{C}$ per Figure 3.
2. Mounted on 5.0x5.0mm cooper pad to each terminal.
3. Measured on 8.3ms single half sinewave or equivalent square wave - unidirectional device only.
4. $V_F < 3.5\text{V}$ for single die parts and $V_F < 5.0\text{V}$ for stacked die parts .
5. The P_{PPM} of stacked die parts is 600W. Please contact factory for more information.

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

| PART NUMBER (Notes 1-2) | DEVICE MARKING | | REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS | BREAKDOWN VOLTAGE $V_{(BR)} @ I_T$ VOLTS | | TEST CURRENT @ I_T mA | MAXIMUM CLAMPING VOLTAGE (Fig. 2) @ I_P V_C VOLTS | MAXIMUM REVERSE SURGE CURRENT @ I_{PP} AMPS | MAXIMUM REVERSE LEAKAGE CURRENT @ V_{RWM} I_R µA |
|----------------------------|----------------|------|---|--|-------|-----------------------------------|--|---|---|
| | UNI | BI | | MIN | MAX | | | | |
| P4SMA130A | 130A | 130C | 111.0 | 124.0 | 137.0 | 1 | 179.0 | 2.3 | 1 |
| P4SMA200A | 200A | 200C | 171.0 | 190.0 | 210.0 | 1 | 274.0 | 1.5 | 1 |
| P4SMA350A | 350A | 350C | 300.0 | 332.0 | 368.0 | 1 | 482.0 | 0.9 | 1 |
| P4SMA400A | 400A | 400C | 342.0 | 380.0 | 420.0 | 1 | 548.0 | 0.8 | 1 |

NOTE

1. 5% tolerance.
2. Add suffix 'CA' after part number to specify a bidirectional device.

TYPICAL DEVICE CHARACTERISTICS

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

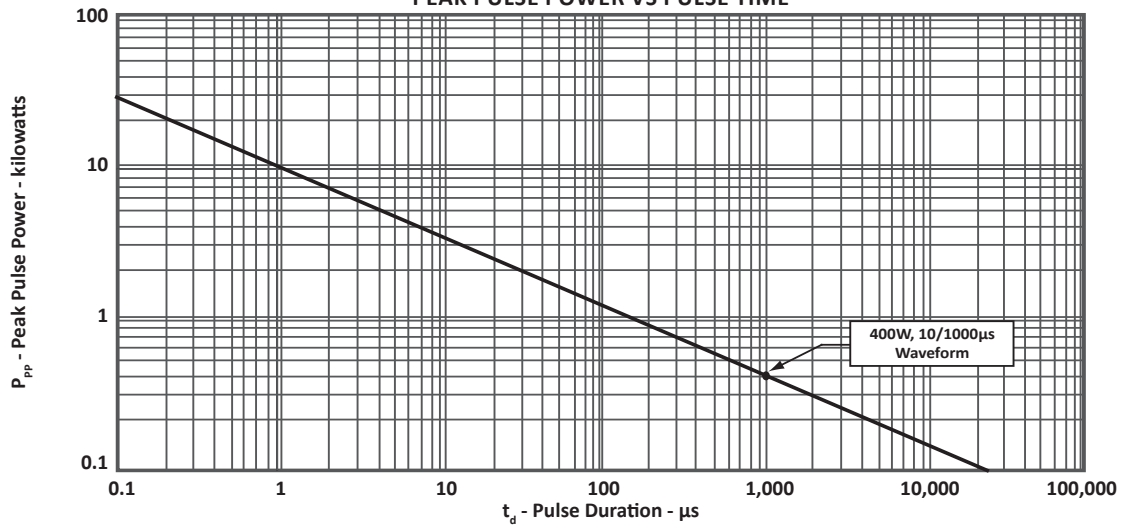


FIGURE 2
PULSE WAVEFORM

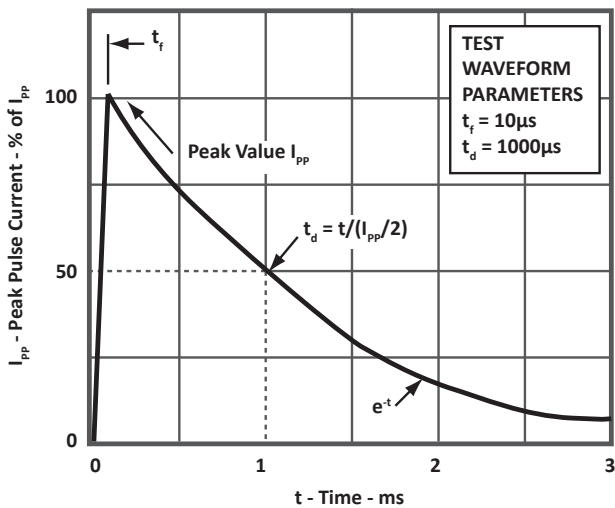
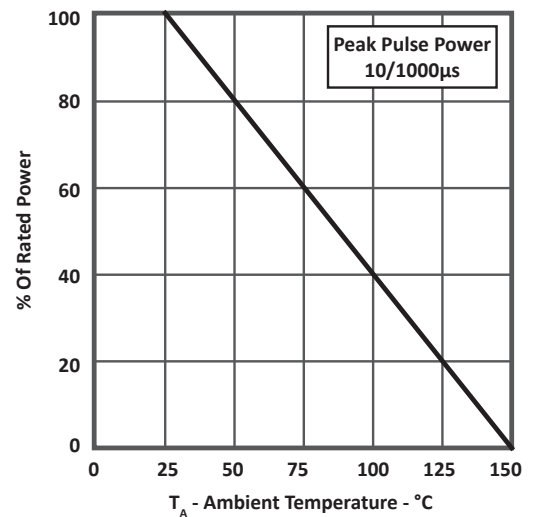


FIGURE 3
POWER DERATING CURVE



TYPICAL DEVICE CHARACTERISTICS

FIGURE 4
TYPICAL JUNCTION CAPACITANCE

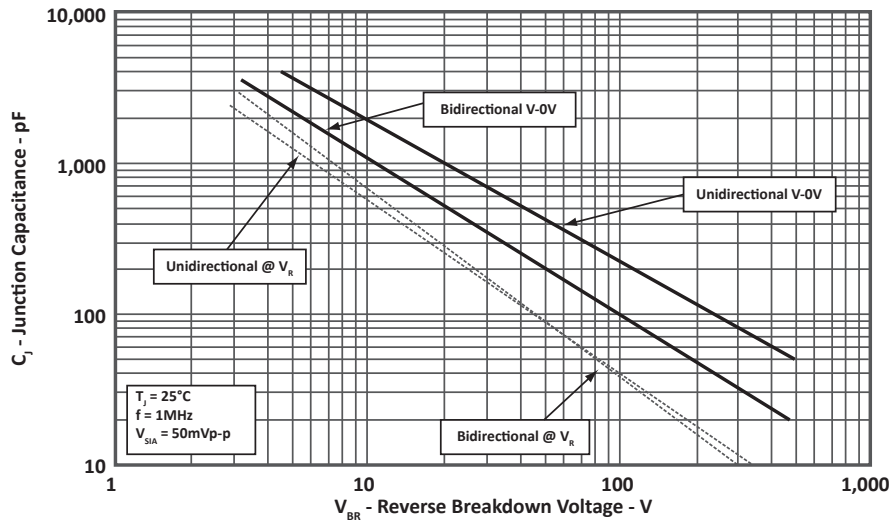


FIGURE 5
MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

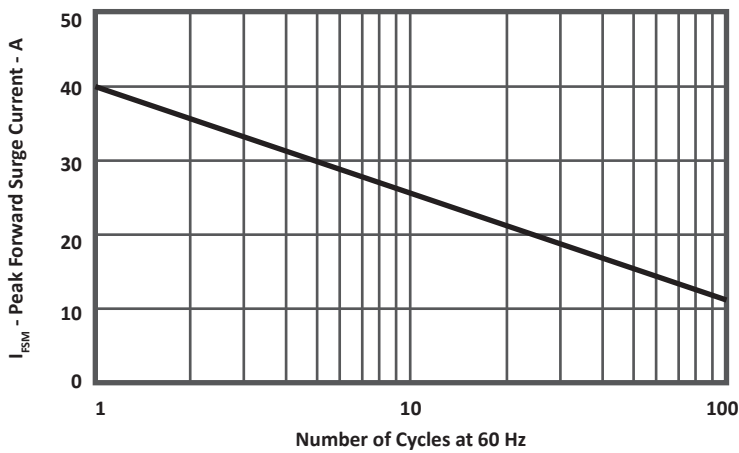
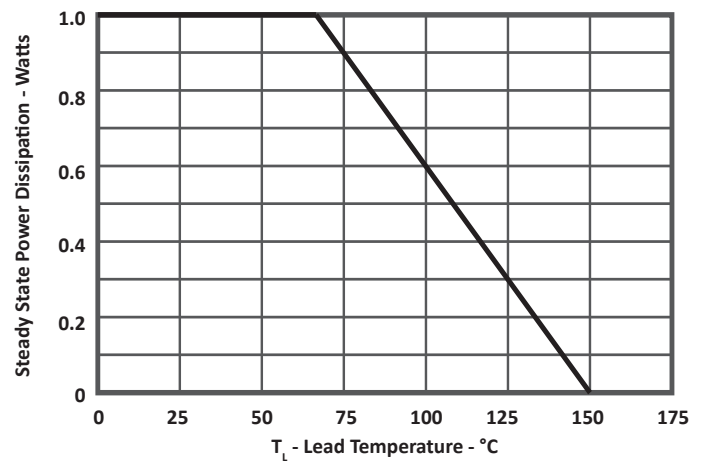


FIGURE 6
STEADY STATE POWER DERATING CURVE



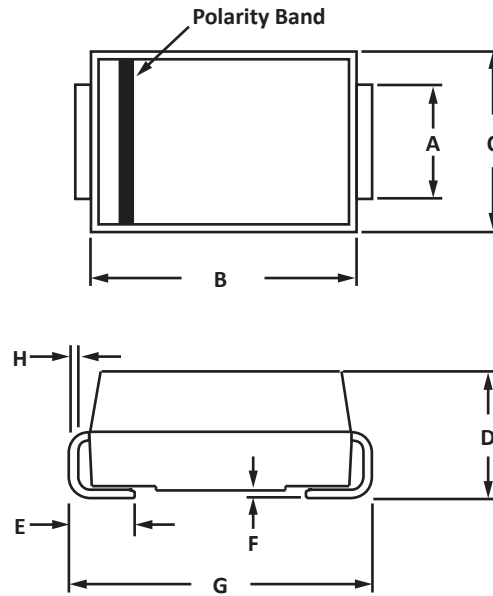
DO-214AC PACKAGE INFORMATION

OUTLINE DIMENSIONS

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.23 | 1.63 | 0.049 | 0.064 |
| B | 4.10 | 4.55 | 0.162 | 0.179 |
| C | 2.51 | 2.76 | 0.099 | 0.109 |
| D | 1.96 | 2.26 | 0.077 | 0.089 |
| E | 0.75 | 1.51 | 0.03 | 0.06 |
| F | 0.00 | 0.20 | 0.000 | 0.008 |
| G | 4.87 | 5.22 | 0.192 | 0.206 |
| H | 0.15 | 0.30 | 0.006 | 0.012 |

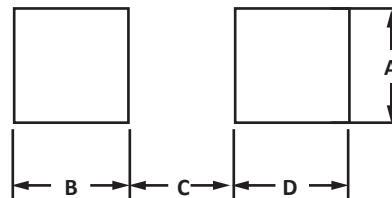
NOTES

1. Dimensions are exclusive of mold flash and metal burrs.

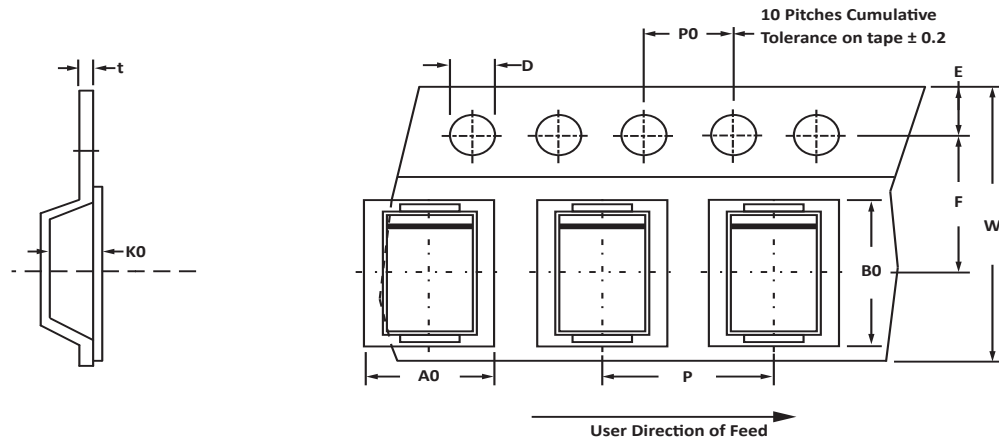


PAD LAYOUT DIMENSIONS

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.57 | - | 0.062 | - |
| B | 1.55 | - | 0.061 | - |
| C | - | 2.28 | - | 0.090 |
| D | 1.55 | - | 0.061 | - |



TAPE AND REEL



SPECIFICATIONS

| REEL DIA. | TAPE WIDTH | A0 | B0 | K0 | D | E | F | W | P0 | P | tmax |
|-------------|------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|-------------|-------------|------|
| 330mm (13") | 12mm | 2.79 ± 0.10 | 5.33 ± 0.10 | 2.36 ± 0.10 | 1.55 ± 0.10 | 1.75 ± 0.10 | 5.5 ± 0.05 | 12.00 ± 0.30 | 4.00 ± 0.10 | 4.00 ± 0.10 | 0.4 |

NOTES

- Dimensions are in millimeters.
- Surface mount product is taped and reeled in accordance with EIA-481.
- Suffix - T13 = 13" Reel - 7,500 pieces and T500 = 7" Reel - 500 pieces per 16mm tape.
- Marking on Part - marking code (see page 2), date code, logo and cathode defined by polarity band.

ORDERING INFORMATION

| BASE PART NUMBER (Voltage = xx) | LEADFREE SUFFIX | TAPE SUFFIX | QTY/REEL | REEL SIZE | TUBE QTY |
|------------------------------------|-----------------|-------------|----------|-----------|----------|
| P4SMAxxA | N/A | -T13 | 7,500 | 13" | N/A |
| P4SMAxxCA | N/A | -T13 | 7,500 | 13" | N/A |
| P4SMAxxA | N/A | -T500 | 500 | 7" | N/A |
| P4SMAxxCA | N/A | -T500 | 500 | 7" | N/A |

This device is only available in a Lead-Free configuration.

COMPANY INFORMATION

COMPANY PROFILE

In business more than 20 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection and overcurrent protection components. These include transient voltage suppressor array (TVS arrays) avalanche breakdown diode, steering diode TVS array and electronics SMD chip fuses. These components deliver circuit protection in electronic systems from numerous overvoltage and overcurrent events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices also offers LED wafer die for ESD protection and related high frequency products.

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