

## ULTRA LOW CAPACITANCE STEERING DIODE/TVS ARRAY



### DESCRIPTION

The PRUSB05UBK is an ultra low capacitance steering diode/TVS array with integrated resistors at each data line for a dual USB 2.0 port and power bus protection. The device protects against positive ESD and fast surge voltage transients and high negative voltage transients at the data lines such as USB Killer devices plugged into USB ports.

This device is offered in a 14 lead DFN package configuration is rated at 500 Watts peak pulse power (8/20 $\mu$ s) per line. The PRUSB05UBK meets and exceeds the ESD requirements of IEC 61000-4-2 and the EFT requirements of IEC 61000-4-4.

### FEATURES

- Compatible with IEC 61000-4-2 (ESD): Air  $\pm 15$ kV, Contact  $\pm 8$ kV
- Compatible with IEC 61000-4-4 (EFT): 40A, 5/50ns
- Compatible with IEC 61000-4-5 (Surge): 24A, 8/20 $\mu$ s - Level 2(Line-Gnd) & Level 3(Line-Line)
- 500 Watts Peak Pulse Power per Line(tp = 8/20 $\mu$ s)
- ESD Protection > 25 kilovolts
- Low Clamping Voltage
- Protection for 4 Lines
- Ultra Low Capacitance  $C_{(SD)}$ : 2.5pF Typical
- RoHS Compliant
- REACH Compliant

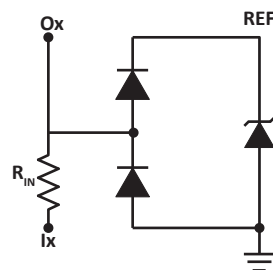
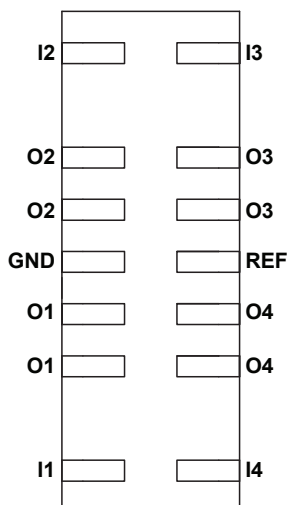
### APPLICATIONS

- Gigabit Ethernet
- Portable Electronics
- Video Card Interfaces
- USB 1.0, USB 2.0
- DVI Interfaces

### MECHANICAL CHARACTERISTICS

- Molded DFN-14 Package
- Approximate Weight: 16 milligrams
- Lead-Free Pure-Tin Plating
- Solder Reflow Temperature:  
Pure-Tin - Sn, 100: 260-270°C
- Flammability Rating UL 94V-0
- 16mm Tape and Reel per EIA Standard 481

### PIN CONFIGURATION & CIRCUIT DIAGRAM



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

| PARAMETER  | SYMBOL           | VALUE               | UNITS |
|--|------------------|---------------------|-------|
| Peak Pulse Power (tp = 8/20μs) at Outputs                | P <sub>PP</sub>  | 500                 | Watts |
| Operating Temperature                                    | T <sub>L</sub>   | -55 to 150          | °C    |
| Storage Temperature                                      | T <sub>STG</sub> | -55 to 150          | °C    |
| Forward Surge Rating (5ms @ 25°C, I <sub>F</sub> = 50mA) | V <sub>F</sub>   | 0.5 Min. - 1.2 Max. | Volts |

**ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified**

| PART NUMBER | DEVICE MARKING | RATED STAND-OFF VOLTAGE (Note 1)<br><br>V <sub>WM</sub><br>VOLTS | MINIMUM BREAKDOWN VOLTAGE (Note 1)<br><br>@ 1mA<br>V <sub>(BR)</sub><br>VOLTS | MAXIMUM CLAMPING VOLTAGE (Fig. 2) (Note 1)<br>@ I <sub>p</sub> = 1A<br>V <sub>C</sub><br>VOLTS | MAXIMUM CLAMPING VOLTAGE (Fig. 2) (Note 1)<br>@ I <sub>p</sub> = 5A<br>V <sub>C</sub><br>VOLTS | MAXIMUM LEAKAGE CURRENT (Note 1)<br><br>@ V <sub>WM</sub><br>I <sub>D</sub><br>μA |
|-------------|----------------|--|---|--|--|---|
| PRUSB05UBK  | 05UBK          | 5.0  | 6.0   | 12.0   | 15.0   | 5   |

**NOTES**

1. Measured from output to ground.

| TYPICAL CAPACITANCE I/O to GND        | TYPICAL CAPACITANCE I/O to I/O        | MAXIMUM CAPACITANCE I/O to GND        | MAXIMUM CAPACITANCE I/O to I/O        | MAXIMUM RESISTANCE              |
|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------|
| @0V, 1MHz<br>C <sub>J(SD)</sub><br>pF | @0V, 1MHz<br>C <sub>J(SD)</sub><br>pF | @0V, 1MHz<br>C <sub>J(SD)</sub><br>pF | @0V, 1MHz<br>C <sub>J(SD)</sub><br>pF | ±10%<br>R <sub>IN</sub><br>OHMS |
| 3.5                                   | 2.5                                   | 5.0                                   | 4.0                                   | 10                              |

## TYPICAL DEVICE CHARACTERISTICS

FIGURE 1  
PULSE WAVE FORM

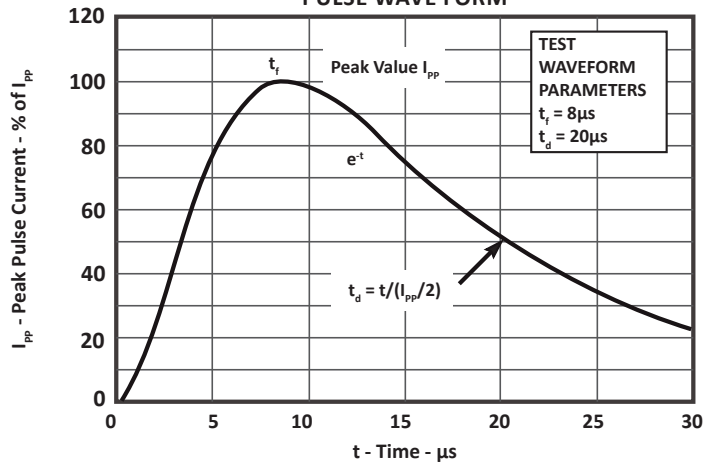
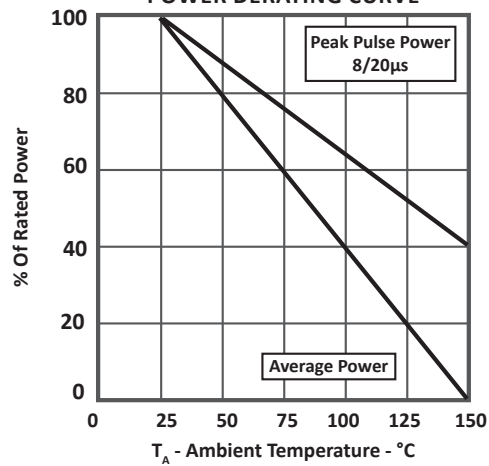


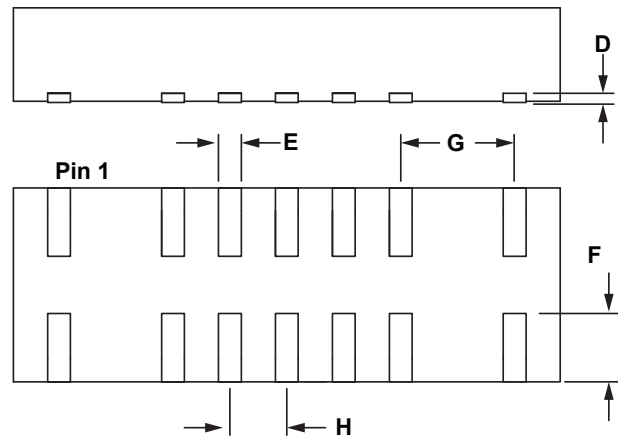
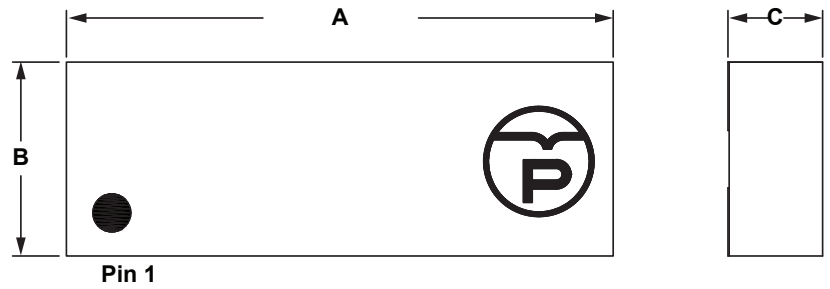
FIGURE 2  
POWER DERATING CURVE



## PACKAGE INFORMATION

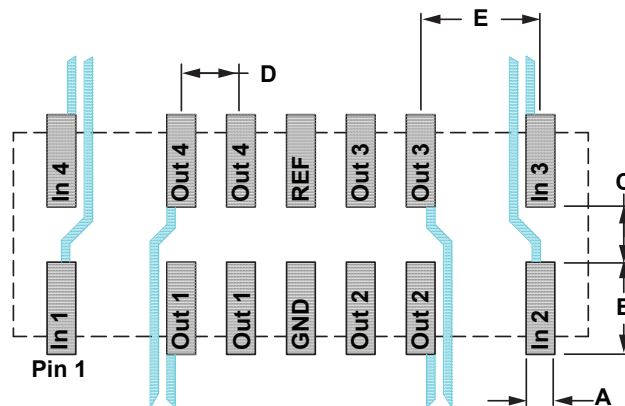
## OUTLINE DIMENSIONS

| DIM | MILLIMETERS |       | INCHES |       |
|-----|-------------|-------|--------|-------|
|     | MIN         | MAX   | MIN    | MAX   |
| A   | 12.14       | 12.24 | 0.477  | 0.483 |
| B   | 4.27        | 4.37  | 0.167  | 0.173 |
| C   | 2.06        | 2.16  | 0.080  | 0.089 |
| D   | 0.18        | 0.22  | 0.007  | 0.009 |
| E   | 0.46        | 0.56  | 0.018  | 0.022 |
| F   | 1.48        | 1.57  | 0.058  | 0.062 |
| G   | 2.54        |       | 0.100  |       |
| H   | 1.27        |       | 0.050  |       |

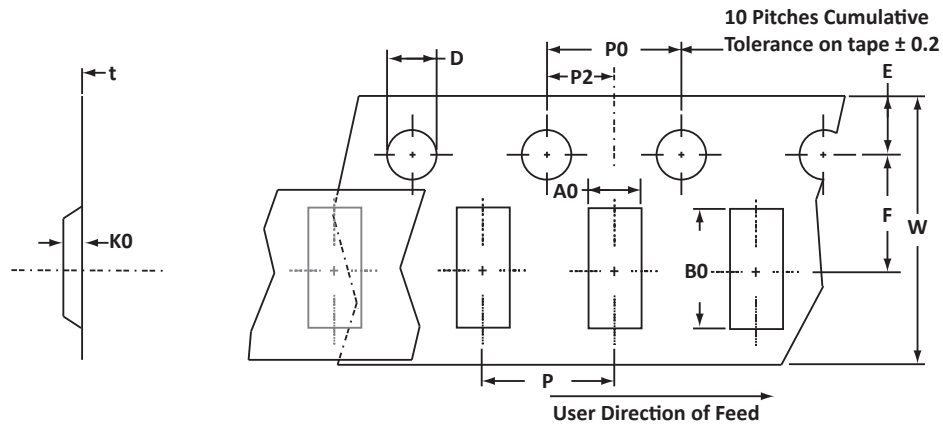


## PAD LAYOUT DIMENSIONS

| DIM | MILLIMETERS | INCHES  |
|-----|-------------|---------|
|     | NOMINAL     | NOMINAL |
| A   | 0.61        | 0.024   |
| B   | 1.96        | 0.077   |
| C   | 1.17        | 0.046   |
| D   | 1.27        | 0.050   |
| E   | 2.54        | 0.100   |



## TAPE AND REEL



## SPECIFICATIONS

| REEL DIA.  | TAPE WIDTH | A0          | B0           | K0          | D           | E           | F           | W           | P0          | P2          | P           | tmax |
|------------|------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------|
| 178mm (7") | 16mm       | 4.45 ± 0.10 | 12.35 ± 0.10 | 2.26 ± 0.10 | 1.50 ± 0.10 | 1.75 ± 0.10 | 3.50 ± 0.05 | 8.00 ± 0.30 | 4.00 ± 0.10 | 2.00 ± 0.05 | 4.00 ± 0.10 | 0.25 |

## NOTES

- Dimensions are in millimeters.
- Surface mount product is taped and reeled in accordance with EIA-481.
- Suffix - T7 = 7" Reel - 1,000 pieces per 16mm tape.
- Marking on Part - marking code (see page 2) and pin one defined by dot on package.

## ORDERING INFORMATION

| BASE PART NUMBER | LEADFREE SUFFIX | TAPE SUFFIX | QTY/REEL | REEL SIZE | TUBE QTY |
|------------------|-----------------|-------------|----------|-----------|----------|
| PRUSB05UBK       | n/a             | -T7         | 1,000    | 7"        | n/a      |

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

## COMPANY INFORMATION

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### 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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