DESCRIPTION

The PTA03-3.3ULC is a high power, low capacitance TVS hybrid array; designed to protect high speed data line applications from the damaging effects of ESD, EFT and secondary transient threats. This device is available in an SOIC-8 package configuration and has a peak pulse power rating of 2000 Watts (8/20µs waveshape). The PTA03-3.3ULC is designed to provide low capacitance, even at higher temperatures (T_J = 75°C), when connected in differential mode. This device meets the IEC 61000-4-2, IEC 61000-4-4 and IEC 61000-4-5 requirements.

FEATURES

- Compatible with IEC 61000-4-2 (ESD): Air ±15kV, Contact ±8kV
- Compatible with IEC 61000-4-4 (EFT): 40A - 5/50ns
- Compatible with IEC 61000-4-5 (Surge): 70A, 8/20µs
- 100A (2/10µs) per Bellcore GR1089 (Intra-Building)
- ESD Protection > 30kV, Contact per IEC 61000-4-2
- 2000 Watts Peak Pulse Power per Line (tp = 8/20µs)
- Low Capacitance: Max 2.4pF (I/O to I/O)
- Telecom/Diode Bridge Configuration
- RoHS Compliant
- REACH Compliant

APPLICATIONS

- Ethernet 10/100/1000 Base T
- xDSL Interfaces
- Set Top Box Interfaces
- T1/E1 Line Cards
- ISDN U-Interfaces & ISDN S/T Interfaces

MECHANICAL CHARACTERISTICS

- Molded JEDEC SO-8 Package
- Approximate Weight: 70 milligrams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature:
  Pure-Tin - Sn, 100: 260-270°C
- 12mm Tape and Reel Per EIA Standard 481
- Flammability Rating UL 94V-0

PIN CONFIGURATION

PCB layout configuration: Rail-to-Rail in differential mode.
### Typical Device Characteristics

#### Maximum Ratings @ 25°C Unless Otherwise Specified

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>$T_l$</td>
<td>-55 to 150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{stg}$</td>
<td>-55 to 150</td>
<td>°C</td>
</tr>
<tr>
<td>Peak Pulse Power ($t_P = 8/20\mu s$) - See Figure 1</td>
<td>$P_{tp}$</td>
<td>2000</td>
<td>Watts</td>
</tr>
</tbody>
</table>

#### Electrical Characteristics Per Line @ 25°C Unless Otherwise Specified

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DEVICE MARKING</th>
<th>RATED STAND-OFF VOLTAGE</th>
<th>MINIMUM SNAPBACK VOLTAGE</th>
<th>MAXIMUM CLAMPING VOLTAGE (Fig. 2) (Note 1)</th>
<th>@8/20µs</th>
<th>MAXIMUM LEAKAGE CURRENT (Note 1) @0V, 1MHz C</th>
<th>MAXIMUM CAPACITANCE (Note 2) @0V, 1MHz C</th>
<th>MAXIMUM CAPACITANCE (Note 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTA03-3.3ULC</td>
<td>PTA33</td>
<td>3.3</td>
<td>2.2</td>
<td>29.0</td>
<td>8.0V @ 10A</td>
<td>0.1</td>
<td>1.2</td>
<td>2.4</td>
</tr>
</tbody>
</table>

**NOTES**
1. For an 8/20µs waveform, apply positive pulse between pin 1 to pin 4 and pin 5 to pin 8, individually.
2. Measured between IO pins (pin 1 to pin 4 and pin 5 to pin 8).
3. Measured between IO pins 1 and 4, connecting via PCB trace; pin 1 to 8 and pin 4 to 5 (see page 1).

**Figure 1**

**Peak Pulse Power vs Pulse Time**

- 2000W, 8/20µs Waveform
FIGURE 2
PULSE WAVE FORM

TEST WAVEFORM PARAMETERS

- $t_f = 8\mu s$
- $t_d = 20\mu s$

$I_{PP}$ - Peak Pulse Current - % of $I_{PP}$

$\tau = t/(I_{PP}/2)$

FIGURE 3
POWER DERATING CURVE 8X20μs

% Of Rated Power vs $T_a$ - Ambient Temperature - °C

FIGURE 4
TYPICAL CAPACITANCE VS TEMPERATURE
(0V BIAS, 1MHz)

Capacitance - µF vs Temperature - °C

Between pin 1 and pin 4 or pin 5 and pin 8
**FIGURE 5**
TYPICAL CAPACITANCE VS BIAS
(@TJ = 70°C)

![Capacitance vs Bias Graph]

**FIGURE 6**
CLAMPING VOLTAGE VS PEAK PULSE CURRENT
(8/20μs)

![Clamping Voltage vs Peak Pulse Current Graph]
**PACKAGE INFORMATION**

### OUTLINE DIMENSIONS

<table>
<thead>
<tr>
<th>DIM</th>
<th>MILLIMETERS</th>
<th>INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIN</td>
<td>MAX</td>
</tr>
<tr>
<td>A</td>
<td>4.80</td>
<td>5.00</td>
</tr>
<tr>
<td>B</td>
<td>3.80</td>
<td>4.00</td>
</tr>
<tr>
<td>C</td>
<td>1.35</td>
<td>1.75</td>
</tr>
<tr>
<td>D</td>
<td>0.35</td>
<td>0.49</td>
</tr>
<tr>
<td>F</td>
<td>0.40</td>
<td>1.25</td>
</tr>
<tr>
<td>G</td>
<td>1.27 BSC</td>
<td>0.05 BSC</td>
</tr>
<tr>
<td>J</td>
<td>0.18</td>
<td>0.25</td>
</tr>
<tr>
<td>K</td>
<td>0.10</td>
<td>0.25</td>
</tr>
<tr>
<td>P</td>
<td>5.80</td>
<td>6.20</td>
</tr>
<tr>
<td>R</td>
<td>0.25</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**NOTES**

1. -T- = Seating plane and datum surface.
2. Dimensions “A” and “B” are datum.
3. Dimensions “A” and “B” do not include mold protrusion.
4. Maximum mold protrusion is 0.015” (0.380mm) per side.
6. Dimensions are exclusive of mold flash and metal burrs.

### PAD LAYOUT DIMENSIONS

<table>
<thead>
<tr>
<th>DIM</th>
<th>MILLIMETERS</th>
<th>INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIN</td>
<td>MAX</td>
</tr>
<tr>
<td>A</td>
<td>1.14</td>
<td>1.40</td>
</tr>
<tr>
<td>B</td>
<td>0.64</td>
<td>0.89</td>
</tr>
<tr>
<td>C</td>
<td>6.22</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td>3.94</td>
<td>4.17</td>
</tr>
<tr>
<td>E</td>
<td>1.02</td>
<td>1.27</td>
</tr>
</tbody>
</table>

**NOTES**

### TAPE AND REEL

**User Direction of Feed**

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>REEL DIA.</th>
<th>TAPE WIDTH</th>
<th>A0</th>
<th>B0</th>
<th>K0</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>W</th>
<th>P0</th>
<th>P2</th>
<th>P</th>
<th>Tmax</th>
</tr>
</thead>
<tbody>
<tr>
<td>178mm (7&quot;)</td>
<td>12mm</td>
<td>6.50 ± 0.10</td>
<td>5.40 ± 0.10</td>
<td>2.00 ± 0.10</td>
<td>1.50 ± 0.10</td>
<td>1.75 ± 0.10</td>
<td>5.50 ± 0.05</td>
<td>12.00 ± 0.30</td>
<td>4.00 ± 0.12</td>
<td>2.00 ± 0.10</td>
<td>8.00 ± 0.10</td>
<td>0.25</td>
</tr>
</tbody>
</table>

**NOTES**

1. Dimensions are in millimeters.
2. Surface mount product is taped and reeled in accordance with EIA-481.
3. Marking on Part - marking code (see page 2), date code, logo and pin one defined by dot on top of package.

### ORDERING INFORMATION

<table>
<thead>
<tr>
<th>BASE PART NUMBER</th>
<th>LEADFREE SUFFIX</th>
<th>TAPE SUFFIX</th>
<th>QTY/REEL</th>
<th>REEL SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTA03-3.3ULC</td>
<td>n/a</td>
<td>-T7</td>
<td>1,000</td>
<td>7&quot;</td>
</tr>
</tbody>
</table>

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

In business more than 30 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection that include Transient Voltage Suppressor (TVS) Arrays, Steering Diode Array Hybrids, High-power Components and Modules, as well as Steering Diodes, EMI Filter/TVS Arrays and Thyristor Surge Suppressors. These components deliver circuit protection in electronic systems from numerous overvoltage events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices is an ISO 9001 certified company.

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