

**ULTRA LOW CAPACITANCE STEERING DIODE/THYRISTOR ARRAY**
**RTCA DO-160G COMPLIANT PRODUCT**

**DESCRIPTION**

The PGBT2504 and PGBT3304 are differential-mode, fast transient protection hybrid Steering Diode/Thyristor arrays that features ultra low capacitance and very low clamping voltage. These devices allow for more current handling and protects two-pair data lines. The PGBT2504 and PGBT3304 are ideally suited for Gigabit Ethernet interfaces in Aerospace and Military applications. These devices, with the external addition of 10 Ohm resistors per data line, can withstand pin injection levels per DO-160G requirements. In addition, the PGBT2504 and PGBT3304 meet the IEC 61000-4-2, 61000-4-2 and 61000-4-5 requirements.

**FEATURES**

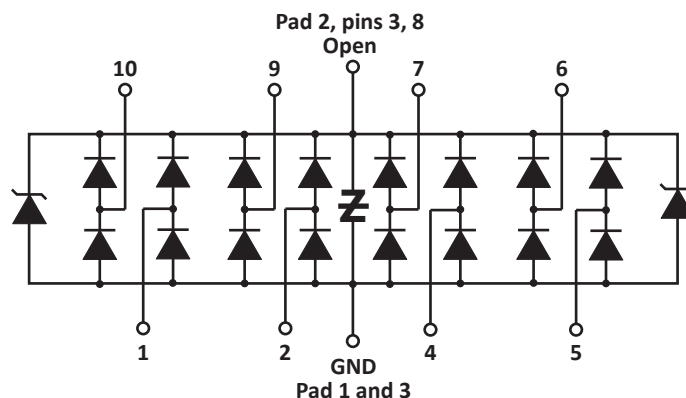
- Compatible with IEC 61000-4-2 (ESD): Air  $\pm 15\text{kV}$ , Contact  $\pm 8\text{kV}$
- Compatible with IEC 61000-4-4 (EFT): 40A, 5/50ns
- Compatible with IEC 61000-4-5 (Surge): 30A, 8/20 $\mu\text{s}$ , Level 2 (WF5A), with 10 Ohm Resistor per Line (external)
- 500 Watts Peak Pulse Power I/O - I/O( $t_p = 8/20\mu\text{s}$ )
- ESD Protection > 25 kilovolts
- Very Low Clamping Voltage
- Protection for 2 Differential Pairs
- Ultra Low Capacitance I/O - I/O: 1.0pF Typical
- RoHS Compliant
- REACH Compliant

**APPLICATIONS**

- Gigabit Ethernet
- 2.5GbE
- RJ-45 Connectors
- LVDS Interface

**MECHANICAL CHARACTERISTICS**

- Molded JEDEC DFN-10 Package
- Approximate Weight: 7 milligrams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature 260°C for 10 seconds
- Flammability Rating UL 94V-0
- 8mm Tape and Reel per EIA Standard 481

**CIRCUIT DIAGRAM**


## TYPICAL DEVICE CHARACTERISTICS

## MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power (tp = 8/20μs) - See Figure 1	$P_{PP}$	500	Watts
Operating Temperature	$T_L$	-55 to 150	°C
Storage Temperature	$T_{STG}$	-55 to 150	°C
Forward Voltage (pw ≤ 300μs, $I_F = 10mA$ ) - Note 1	$V_F$	1.2	Volts
Peak Pulse Current (tp = 8/20μs) - Note 2	$I_{PP}$	30	Amps

## NOTES

1. Measure from pad 1 and/or pad 3 to any I/O and from any I/O to pad 2.
2. Measured with I/O pins tied together, as shown on circuit diagram.

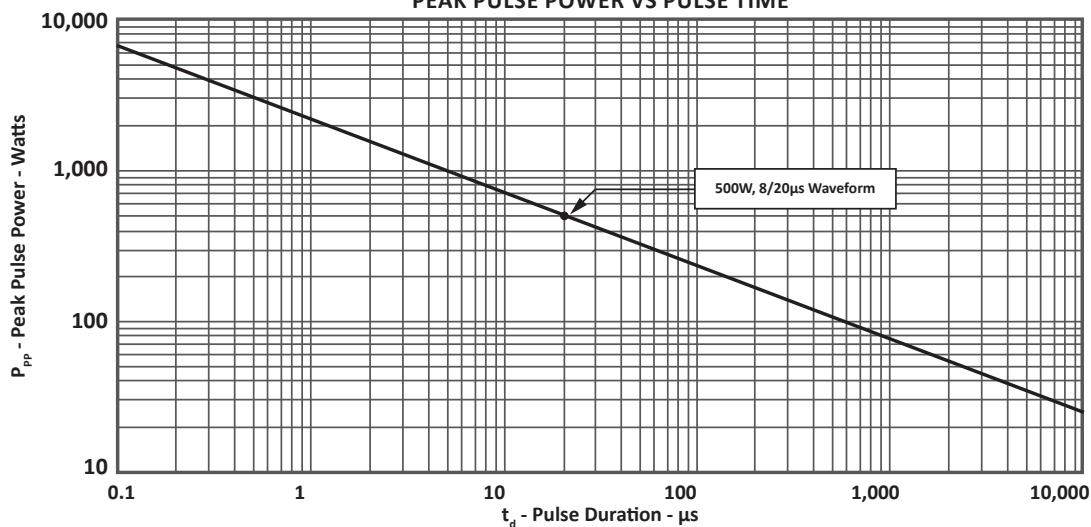
## ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER	DEVICE MARKING	RATED STAND-OFF VOLTAGE (Note 1)  $V_{WM}$ VOLTS	MINIMUM BREAKDOWN VOLTAGE (Note 1)  @ 1mA $V_{(BR)}$ VOLTS	MAXIMUM CLAMPING VOLTAGE (Fig. 2 & 4) (Note 1) @ $I_P = 5A$ $V_C$ VOLTS	MAXIMUM CLAMPING VOLTAGE (Fig. 2 & 4) (Note 1) @ $I_P = 30A$ $V_C$ VOLTS	MAXIMUM LEAKAGE CURRENT (Note 1)  @ $V_{WM}$ $I_D$ μA	TYPICAL CAPACITANCE (Note 1)
							@ 0V, 1MHz $C_{J(SD)}$ pF
PGBT2504	2594	2.5	3.0	6.0	18.0	0.1	1.0
PGBT3304	3304	3.3	5.0	6.0	18.0	0.1	1.0

## NOTES

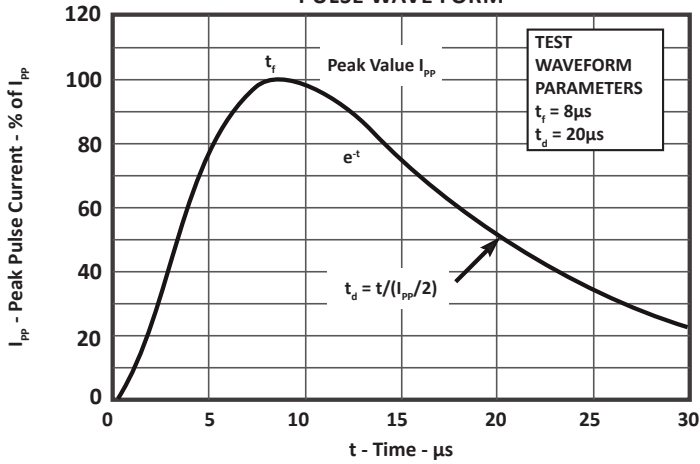
1. Measured with I/O pins tied together, as shown on circuit diagram.

FIGURE 1  
PEAK PULSE POWER VS PULSE TIME

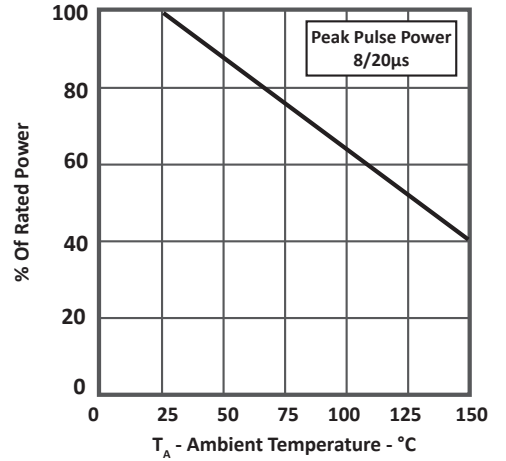


**TYPICAL DEVICE CHARACTERISTICS**

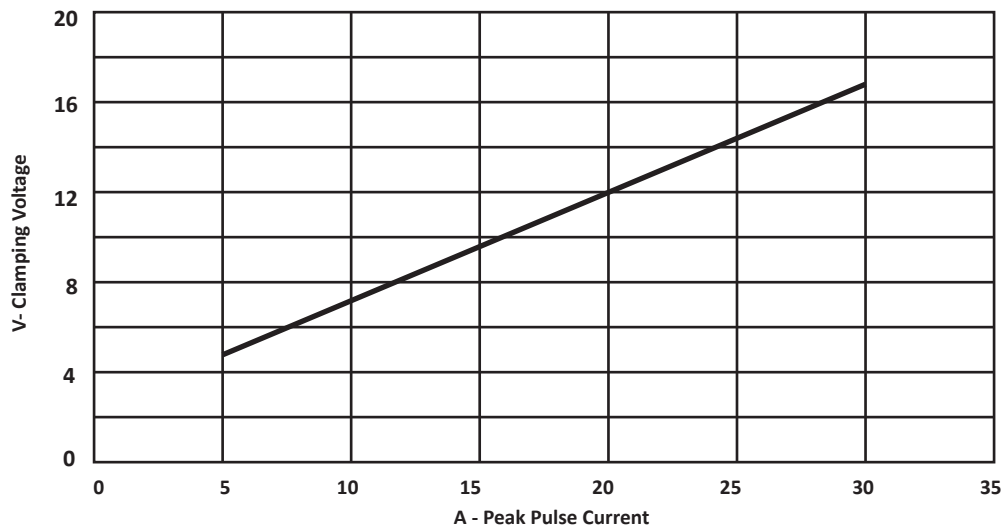
**FIGURE 2  
PULSE WAVE FORM**

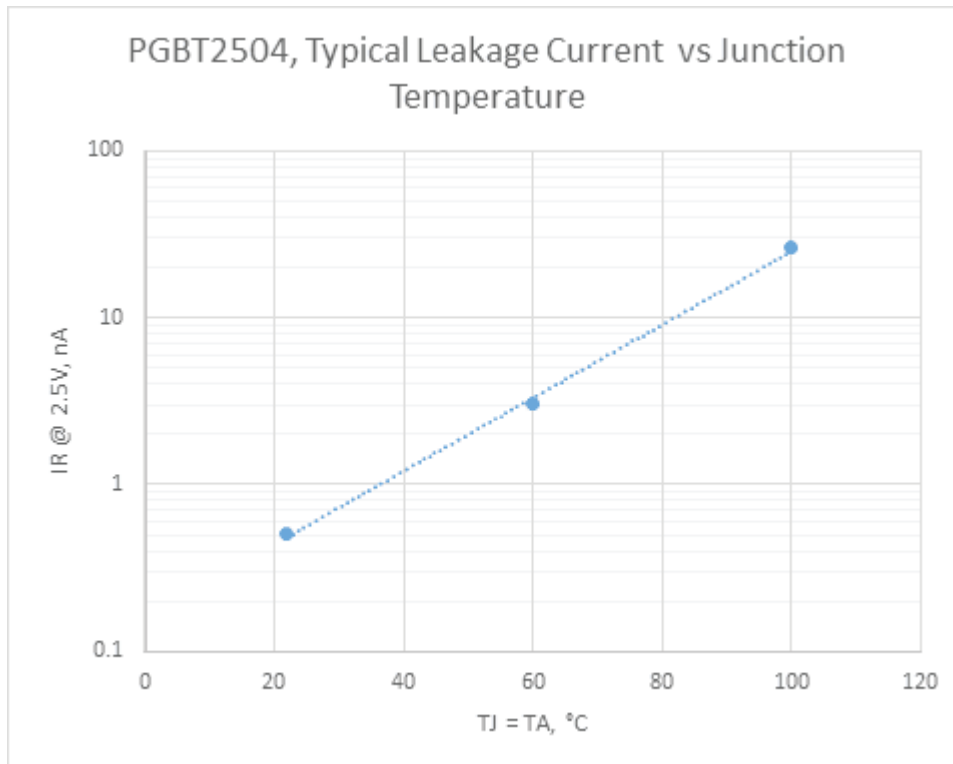


**FIGURE 3  
POWER DERATING CURVE**



**FIGURE 4  
8/20 μs CLAMPING VOLTAGE VS PEAK PULSE CURRENT**



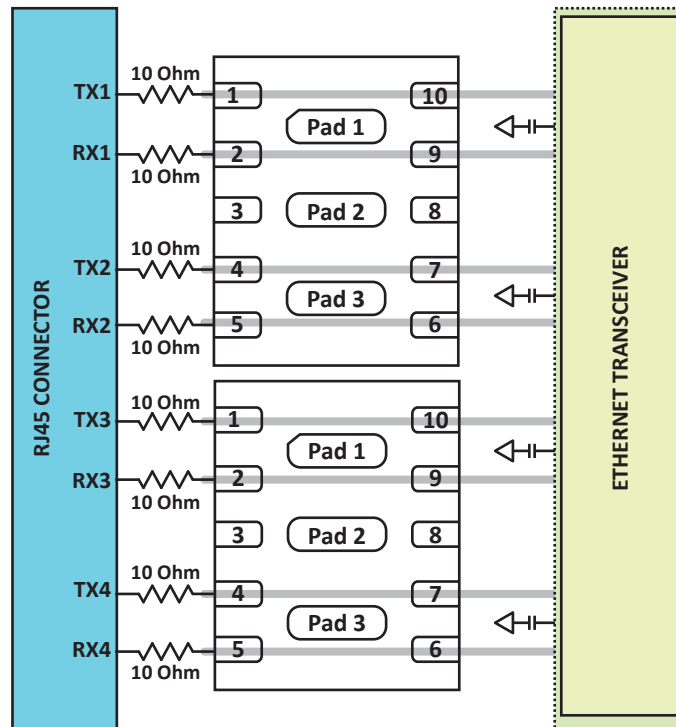
**TYPICAL DEVICE CHARACTERISTICS****FIGURE 5**

Note: Max IR of 500nA @ 2.5V, T<sub>j</sub> = 100°C - Guaranteed by Design

## APPLICATION INFORMATION

### APPLICATION

Typical application for 4 differential signal pairs using a rail to rail PCB configuration. Pins 3, 8 and pads 1-3 open or floating.



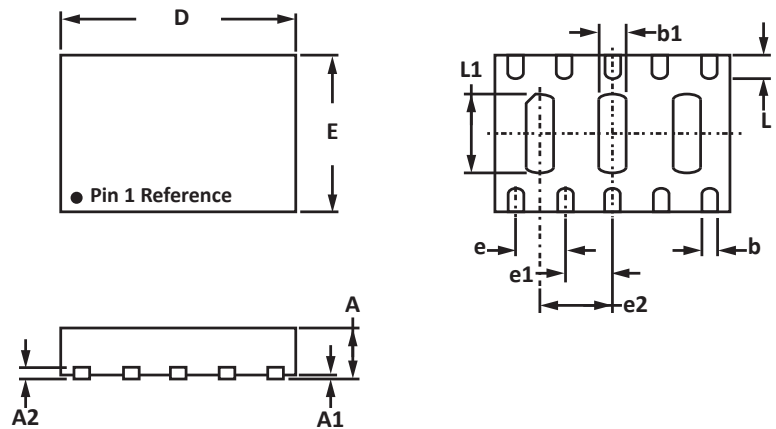
## PACKAGE INFORMATION

## OUTLINE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.50	0.65	0.020	0.026
A1	0.00	0.05	0.00	0.002
A2	0.15		0.006	
b	0.15	0.25	0.006	0.010
b1	0.25	0.45	0.010	0.018
D	2.90	3.10	0.114	0.122
E	1.90	2.10	0.075	0.083
e	0.60 BSC		0.024 BSC	
e1	0.65 BSC		0.026 BSC	
e2	0.95 BSC		0.037 BSC	
L	0.25	0.35	0.010	0.014
L1	0.95	1.05	0.037	0.041

## NOTES

- Controlling dimension: millimeters.
- Dimensioning and tolerances per ANSI Y14.M, 1985.

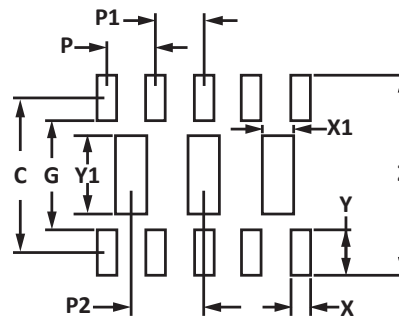


## PAD LAYOUT DIMENSIONS

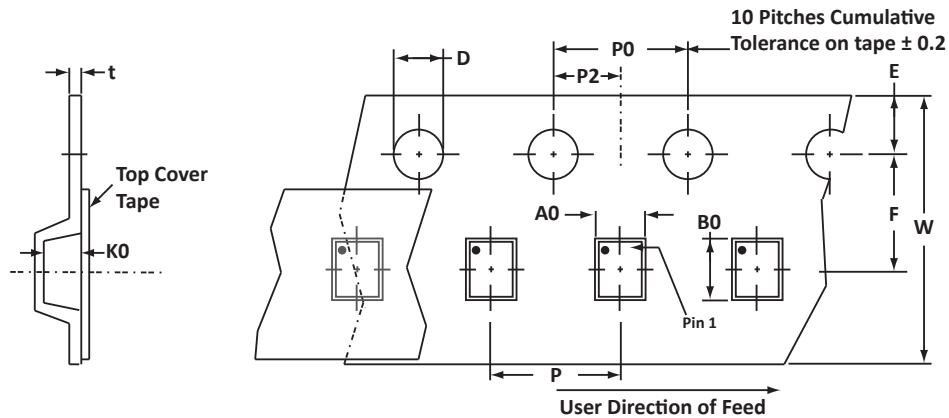
DIM	MILLIMETERS	INCHES
	NOMINAL	NOMINAL
C	1.98	0.078
G	1.40	0.056
P	0.60	0.024
P1	0.65	0.026
P2	0.95	0.037
X	0.25	0.010
X1	0.40	0.016
Y	0.58	0.023
Y1	1.00	0.039
Z	2.56	0.101

## NOTES

- Controlling dimension: millimeters.



## TAPE AND REEL



## SPECIFICATIONS

REEL DIA.	TAPE WIDTH	A0	B0	K0	D	E	F	W	P0	P2	P	tmax
178mm (7")	8mm	2.24 ± 0.05	3.23 ± 0.05	0.93 ± 0.05	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

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).

## ORDERING INFORMATION

BASE PART NUMBER	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY
PGBT2504	N/A	-T73	3,000	7"	n/a
PGBT3304	N/A	-T73	3,000	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 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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