

## 500 WATT LOW CAPACITANCE STEERING DIODE/TVS ARRAY



**SOT-143 PACKAGE**

### DESCRIPTION

The PAM15ST4305 is a low capacitance steering diode TVS array, designed to protect two I/O lines from the effects of Electrostatic Discharge (ESD) and Electrical Fast Transients (EFT). The PAM15ST4305 exceeds Level 4 IEC 61000-4-2, with a peak pulse power rating of 500 Watts for an 8/20 $\mu$ s waveshape.

The low capacitance of the steering diode allows the designer to protect automotive applications. The small SOT-143 package, with four leads reduces the internal lead inductance for low overshoot voltage during fast front time transient events, such as ESD and EFT. The PAM15ST4305 meet the IEC 61000-4-2, IEC 61000-4-4 and IEC 61000-4-5 requirements.

### FEATURES

- **AEC-Q101 Qualified**
- 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): 24A, 8/20 $\mu$ s - Level 2 (Line-Gnd) & Level 3 (Line-Line)
- 500 Watts Peak Pulse Power per Line ( $t_p = 8/20\mu s$ )
- Protects Two I/O Ports & Power Supply
- Low Capacitance: 10pF
- RoHS Compliant
- REACH Compliant

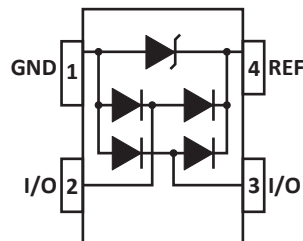
### APPLICATIONS

- Automotive Applications

### MECHANICAL CHARACTERISTICS

- Molded JEDEC SOT-143 Package
- Approximate Weight: 9 milligrams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature:  
Pure-Tin - Sn, 100: 260-270°C
- 8mm Tape and Reel Per EIA Standard 481
- Flammability Rating UL 94V-0

### PIN CONFIGURATION



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

PARAMETER	SYMBOL	VALUE	UNITS
Operating Temperature	$T_L$	-55 to 150	°C
Storage Temperature	$T_{STG}$	-55 to 150	°C
Peak Pulse Power (tp = 8/20µs) - See Figure 1	$P_{PP}$	500	Watts
Peak Forward Voltage - $I_F = 1A$ , 8/20µs	$V_F$	1.5	Volts

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

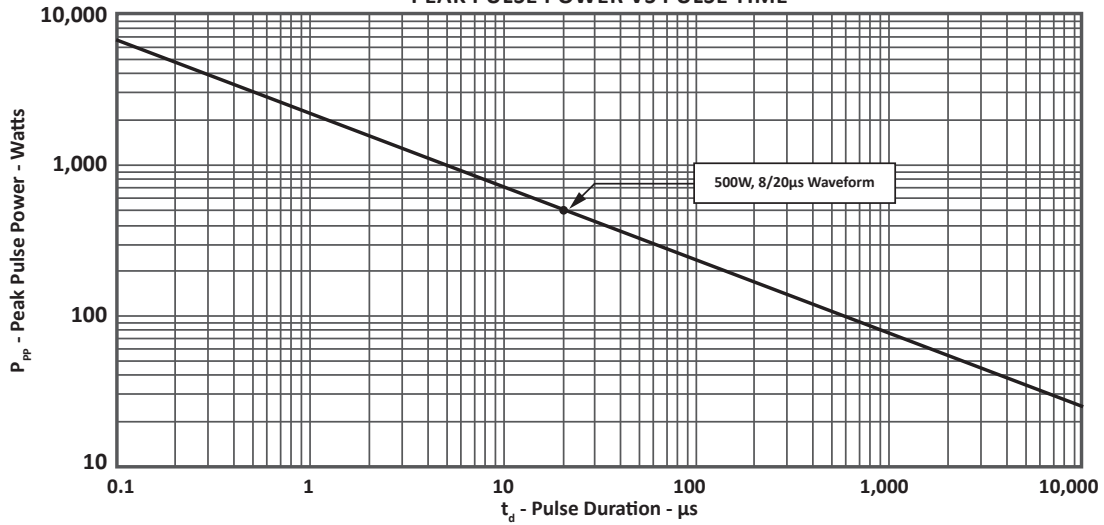
PART NUMBER	DEVICE MARKING	RATED STAND-OFF VOLTAGE  $V_{WM}$ VOLTS	MINIMUM BREAKDOWN VOLTAGE  @ 1mA $V_{(BR)}$ VOLTS	MAXIMUM CLAMPING VOLTAGE (Fig. 2)  @ $I_P = 1A$ $V_C$ VOLTS	MAXIMUM CLAMPING VOLTAGE (Fig. 2)  @ 8/20µs $V_C @ I_{PP}$ VOLTS	MAXIMUM LEAKAGE CURRENT  @ $V_{WM}$ $I_D$ µA	MAXIMUM CAPACITANCE PER LINE (Note 1) (Fig. 5) 0V, 1MHz $C_{J(SD)}$ pF
PAM15ST4305	5A	5.0	6.0	9.8	20.0V @ 28.0A	5	10

**NOTES**

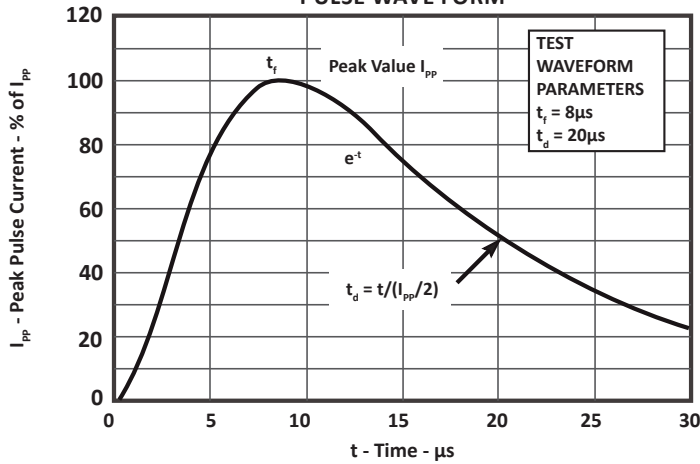
- As shown in Figure 5, REF 1 is connected to ground, REF 2 is connected to + $V_{CC}$  and input applies to  $V_{CC} = 5V$ ,  $V_{SIGN} = 30mV$ ,  $F = 1MHz$ .

**TYPICAL DEVICE CHARACTERISTICS**

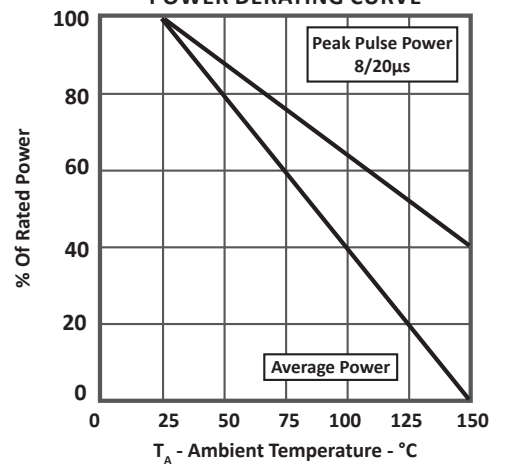
**FIGURE 1**  
**PEAK PULSE POWER VS PULSE TIME**



**FIGURE 2**  
**PULSE WAVE FORM**

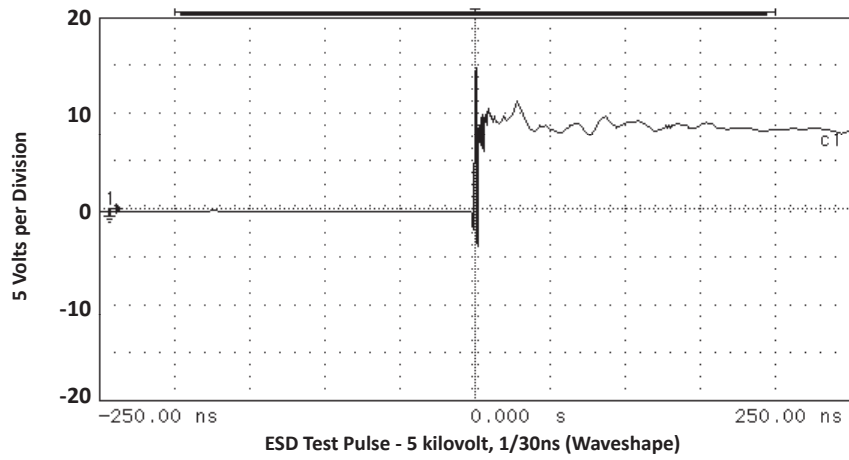


**FIGURE 3**  
**POWER DERATING CURVE**

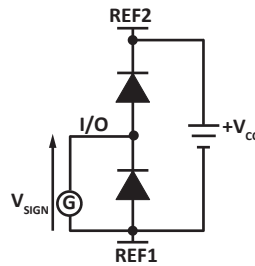


**TYPICAL DEVICE CHARACTERISTICS**

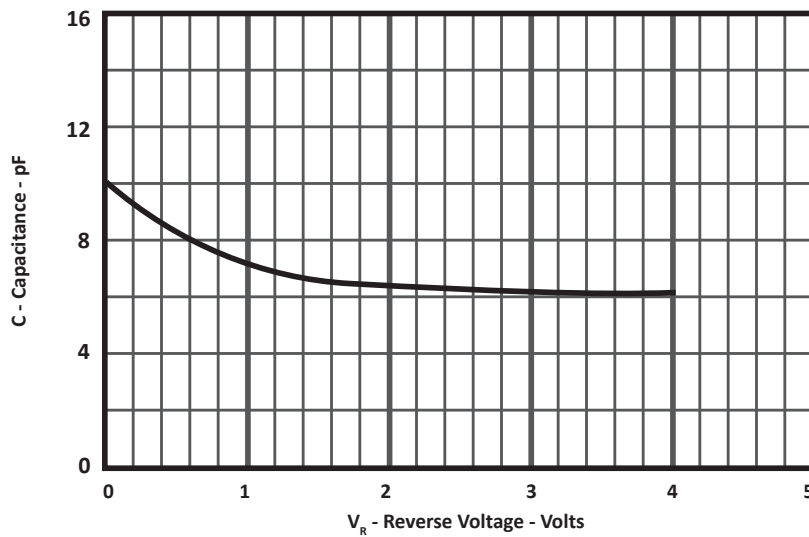
**FIGURE 4  
OVERSHOOT & CLAMPING VOLTAGE**



**FIGURE 5  
INPUT CAPACITANCE CIRCUIT**

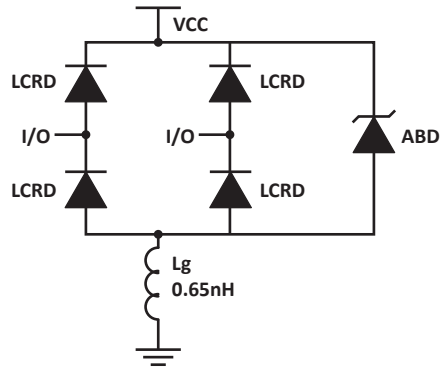


**FIGURE 6  
TYPICAL REVERSE VOLTAGE VS CAPACITANCE**



## SPICE MODEL

FIGURE 1  
SPICE MODEL



ABD - Avalanche Breakdown Diode (TVS)  
 LCRD: Low Capacitance Rectifier Diode  
 Lg - Lead Inductance

TABLE 1 - SPICE PARAMETERS			
PARAMETER	UNIT	ABD(TVS)	LCRD
BV	V	6.0	200
IBV	$\mu\text{A}$	1	0.01
$C_{jo}$	pF	230	6
$I_s$	A	1E-11	1E-11
Vj	V	0.6	0.6
M	-	0.33	0.33
N	-	1	1
$R_s$	Ohms	0.014	0.75
TT	s	1E-8	1E-9
EG	eV	1.11	1.11

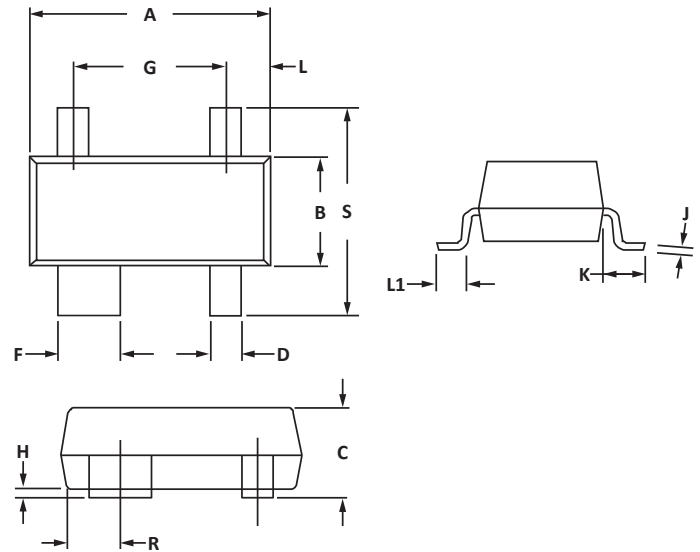
## SOT-143 PACKAGE INFORMATION

## OUTLINE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.80	3.04	0.110	0.120
B	1.20	1.39	0.047	0.055
C	0.84	1.14	0.033	0.045
D	0.39	0.50	0.015	0.020
F	0.79	0.93	0.031	0.037
G	1.78	2.03	0.070	0.080
J	0.08	0.15	0.003	0.006
K	0.46	0.60	0.018	0.024
L	0.445	0.60	0.0175	0.024
L1	0.40	0.60	0.016	0.024
R	0.72	0.83	0.028	0.033
S	2.11	2.48	0.083	0.098

## NOTES

1. Dimensioning and tolerances per ANSI Y14.M, 1985.
2. Controlling dimension: inches.
3. Dimensions are exclusive of mold flash and metal burrs.

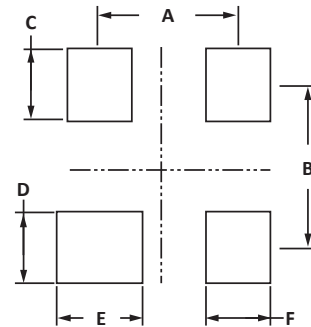


## PAD LAYOUT DIMENSIONS

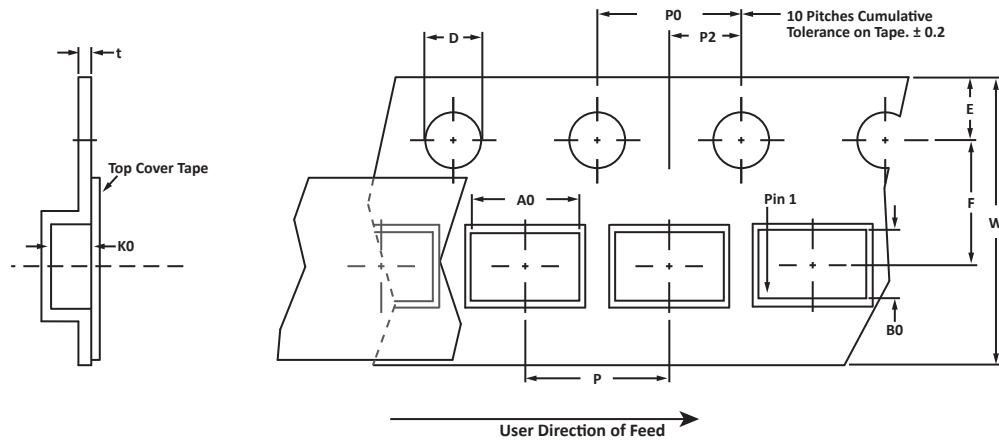
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.88	2.13	0.074	0.084
B	1.80	2.06	0.071	0.081
C	0.71	0.97	0.028	0.038
D	0.76	1.02	0.030	0.040
E	1.07	1.32	0.042	0.052
F	0.71	0.97	0.028	0.038

## NOTES

1. Controlling dimension: inches.



## TAPE AND REEL



## SPECIFICATIONS

REEL DIA.	TAPE WIDTH	A0	B0	K0	D	E	F	W	P0	P2	P	tmax
178mm (7")	8mm	3.10 ± 0.10	2.70 ± 0.10	1.35 ± 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

1. Dimensions are in millimeters.
2. Surface mount product is taped and reeled in accordance with EIA-481.
3. Suffix - T7 = 7" Reel - 3,000 pieces per 8mm tape.
4. Suffix - T13 = 13" Reel - 10,000 pieces per 8mm tape.
5. Marking on Part - marking code (see page 2).

Package outline, pad layout and tape specifications per document number 06011.R4 8/10.

## ORDERING INFORMATION

BASE PART NUMBER	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY
PAM15ST4305	n/a	-T7	3000	7"	n/a
PAM15ST4305	n/a	-T13	10,000	13"	n/a

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

## COMPANY INFORMATION

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### COMPANY PROFILE

In business more than 25 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. ProTek Devices is ISO 9001:2015 certified.

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