

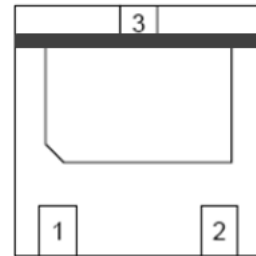
### ➤ General Description

The PAE1501P4 is a high power TVS, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive lines. The PAE1501P4 complies with the IEC 61000-4-2 (ESD) with  $\pm 30\text{kV}$  air and  $\pm 30\text{kV}$  contact discharge. It is assembled into a 3-pin DFN2020-3 lead-free package. Each device will protect one line. The combination of small size, and high surge capability makes them ideal for use in applications such as cellular phones, LCD displays, USB, and multi media card interfaces.

### ➤ Feature

- 6500W peak pulse power (8/20 $\mu\text{s}$ )
- Low leakage: nA level
- Operating voltage: 15V
- Ultra low clamping voltage
- One power line protects
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
    - Air discharge:  $\pm 30\text{kV}$
    - Contact discharge:  $\pm 30\text{kV}$  (8/20 $\mu\text{s}$ )
  - IEC61000-4-5 (Lightning) 180A
- RoHS Compliant

### ➤ DFN2020-3



Pin Schematic  
Bar denotes cathode

### ➤ Mechanical Characteristics

- Package: DFN2020-3
- Case Material: “Green” Molding Compound
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below



Circuit Diagram

### ➤ Application

- Power Management
- Industrial Application
- Power Supply Protection

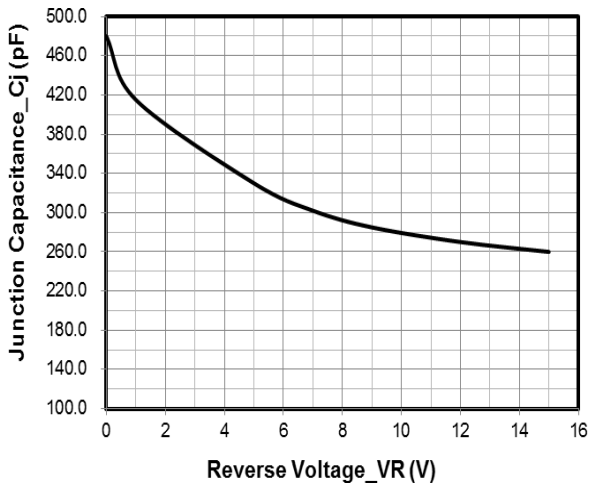
➤ **Maximum Ratings (T<sub>A</sub>=25°C Unless otherwise specified)**

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	Ppk	6500	W
Peak Pulse Current (8/20μs)	I <sub>PP</sub>	180	A
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	±30	kV
ESD per IEC 61000-4-2 (Contact)		±30	
Operating Temperature Range	T <sub>J</sub>	-55 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-55 to +150	°C

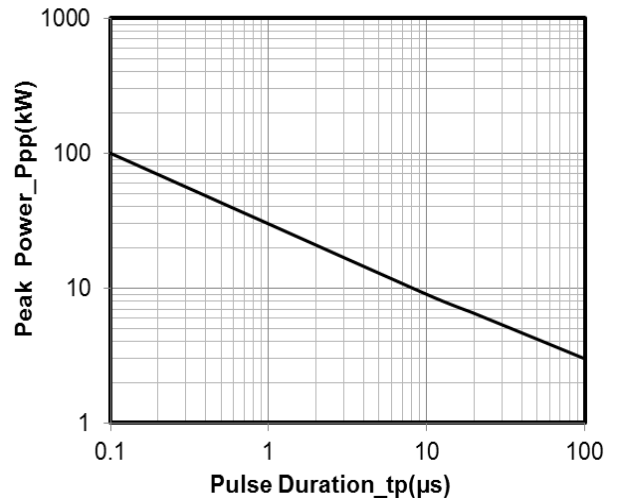
➤ **Electrical Characteristics (T<sub>A</sub>=25°C Unless otherwise specified)**

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V <sub>RWM</sub>			15	V	
Breakdown Voltage	V <sub>BR</sub>	16.5			V	I <sub>T</sub> = 1mA
Reverse Leakage Current	I <sub>R</sub>			1.0	μA	V <sub>RWM</sub> = 15V
Clamping Voltage	V <sub>C</sub>			21	V	I <sub>PP</sub> = 20A (8 x 20μs pulse)
Clamping Voltage	V <sub>C</sub>			36	V	I <sub>PP</sub> = 180A (8 x 20μs pulse)
Junction Capacitance	C <sub>J</sub>		480		pF	V <sub>R</sub> = 0V, f = 1MHz

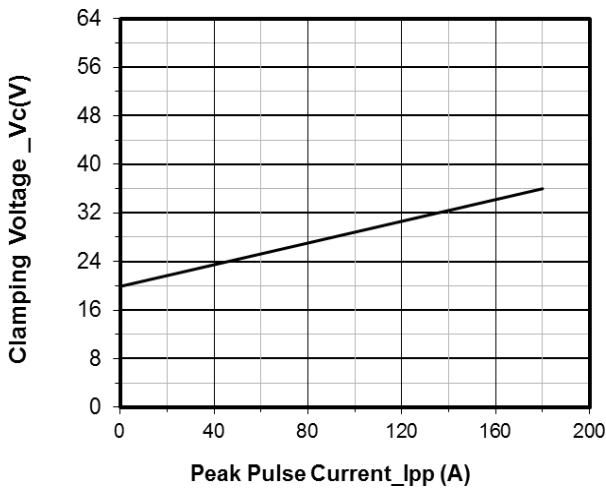
### ➤ Typical Characteristics



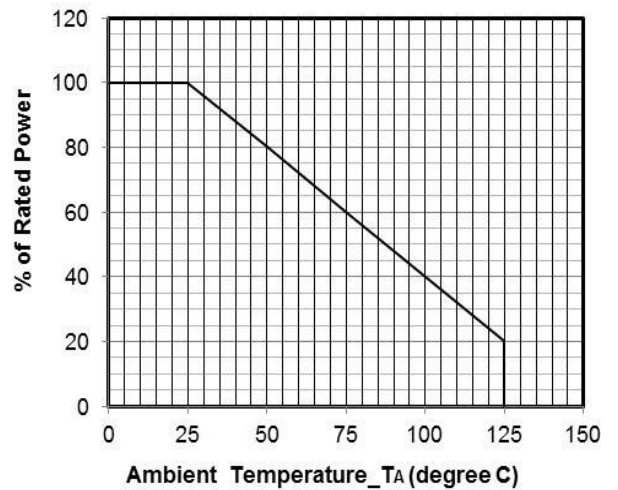
Novction Capacitance vs. Reverse Voltage



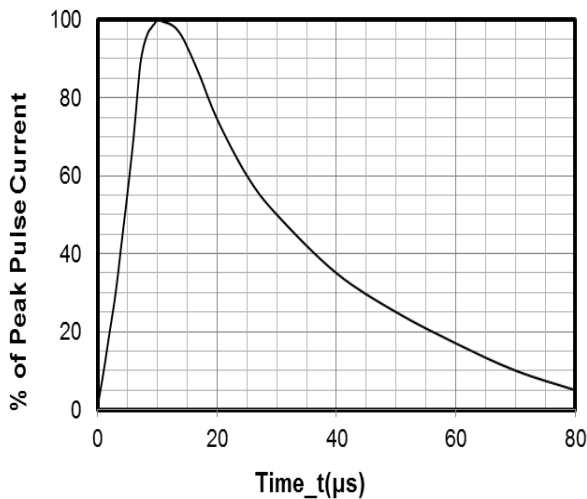
Peak Pulse Power vs. Pulse Time



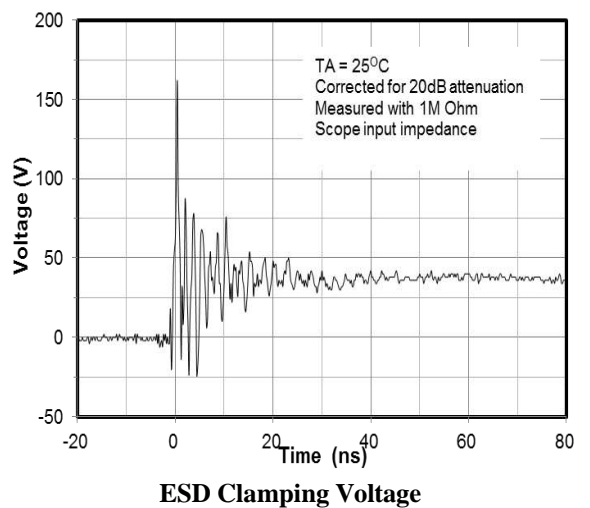
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve

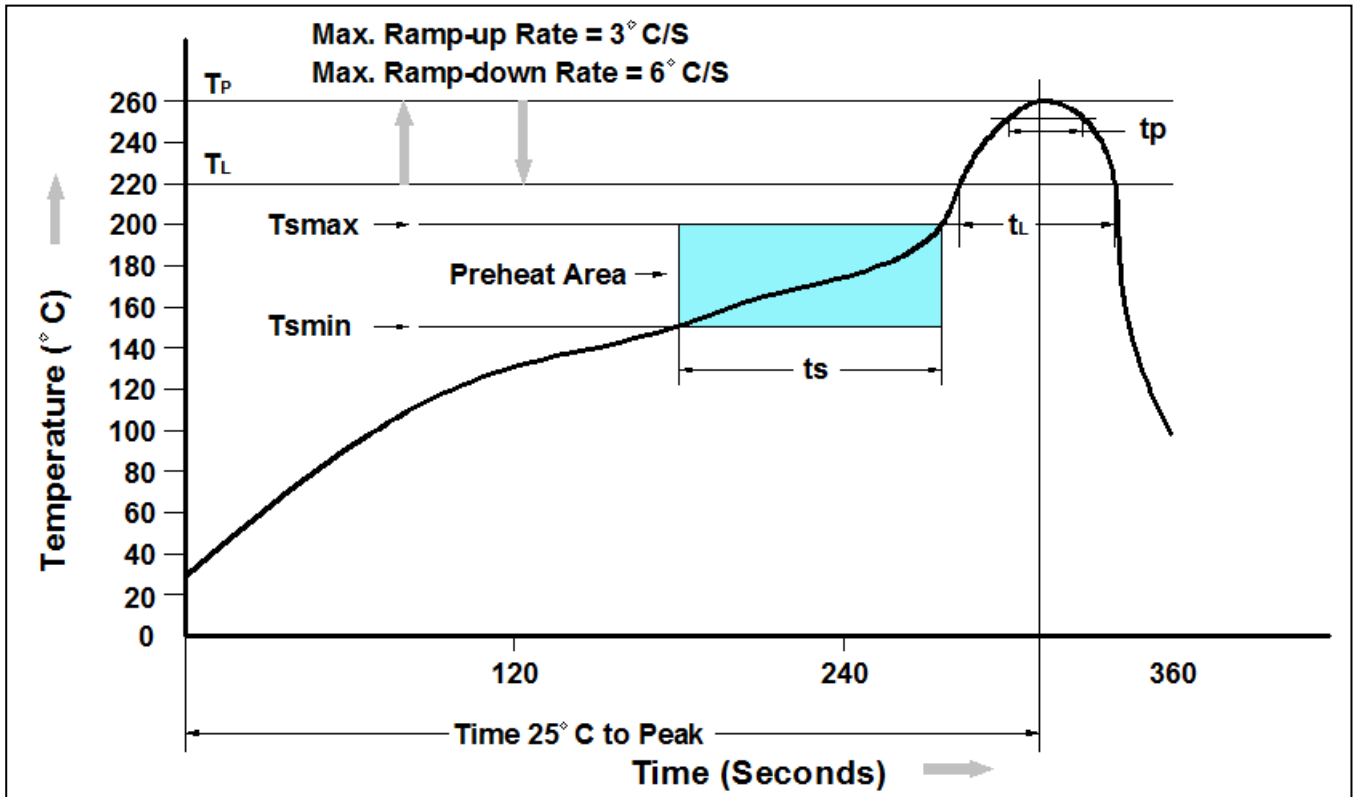


8 X 20μs Pulse Waveform



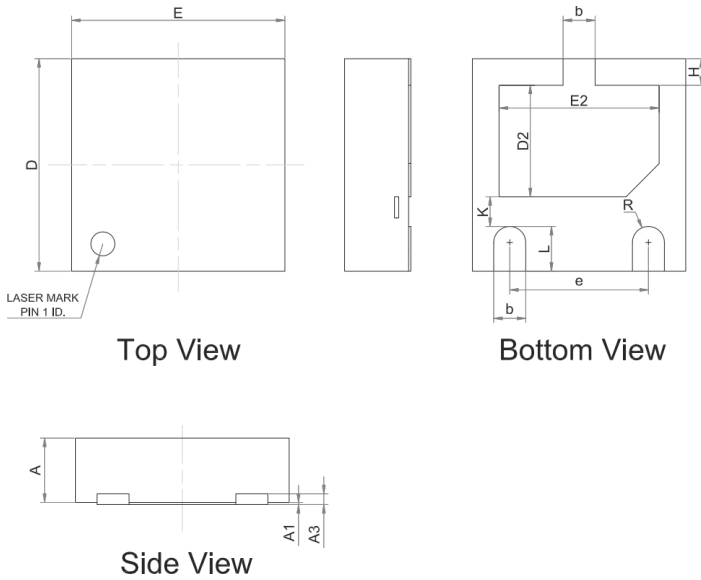
8 kV Contact per IEC61000-4-2

➤ Recommmend IR Reflow Soldering Thermal Profile



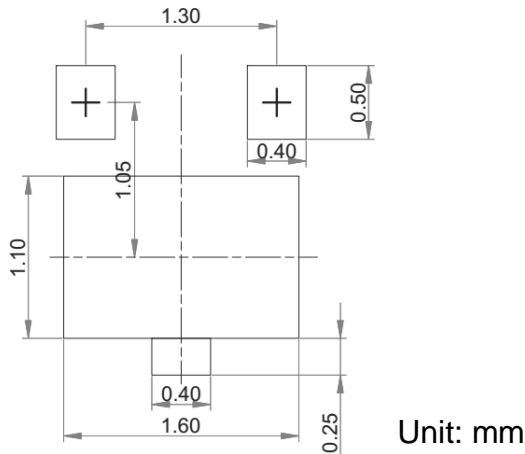
Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	150°C
Temperature Max. (T <sub>smax</sub> )	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds
Average Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60 – 150 seconds
Peak Temperature	260°C +0°C / -5°C
Time (t <sub>P</sub> ) within 5°C of actual Peak Temperature	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

### ➤ DFN2020-3 Package Outline Drawing



	MILLIMETERS		
	MIN	NOM	MAX
A	0.55	0.60	0.65
A1	0.00	0.02	0.05
A3	0.10REF.		
b	0.25	--	0.35
D	1.90	--	2.10
E	1.90	--	2.10
D2	0.95	--	1.15
E2	1.40	--	1.60
e	1.20		1.40
H	0.20	--	0.30
K	0.20		0.40
L	0.35	--	0.45
R	0.13	--	--

### Suggested Land Pattern



### ➤ Ordering Information

Part Number	Description	Quantity
PAE1501P4	DFN2020-3 / Reel	3000 pcs

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