

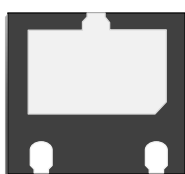
Description

The WPE1291ZP4 is an uni-directional TVS diode, 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 data and power line. The WPE1291ZP4 complies with the IEC 61000-4-2 (ESD) standard with $\pm 30\text{kV}$ air and $\pm 30\text{kV}$ contact discharge. It is assembled into an ultra-small 2.0x2.0x0.5mm lead-free DFN package. The small size and high ESD surge protection make WPE1291ZP4 an ideal choice to protect cell phone, digital cameras, audio players and many other portable applications.

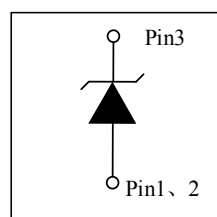
Features

- 6000 Watts Peak Power ($t_p = 8/20\mu\text{s}$)
- Fast Response time: Typically, $<1\text{ns}$
- Excellent Clamping Capability
- Low Inductance
- Low profile package
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 30\text{kV}$
 - Contact discharge: $\pm 30\text{kV}$
 - IEC61000-4-4 (EFT) 40A (5/50ns)
 - IEC61000-4-5 (Lightning) 200A (8/20 μs)
- RoHS Compliant

Dimensions & Symbol (Unit: mm Max)



DFN2020-3L



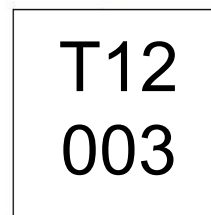
Mechanical Characteristics

- Package: DFN2020-3L
- Case Material: "Green" Molding Compound
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

Applications

- I/O interface
- Power lines
- Automotive and Telecommunication
- Computer & Consumer Electronics
- Industrial Electronics
- Microcontroller input protection

Marking Information



Ordering Information

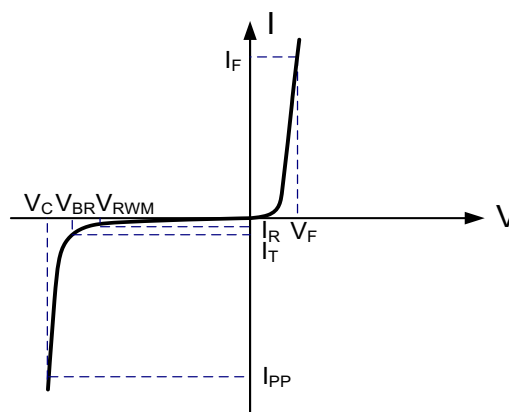
Part Number	Packaging	Reel Size
WPE1291ZP4	3000/Tape&Reel	7inch

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power ($t_p=8/20 \mu\text{s}$ waveform)	P_{pp}	6000	W
Peak Pulse Current (8/20 μs)	I_{pp}	200	A
ESD per IEC 61000-4-2(Air)	V_{ESD}	± 30	kV
ESD per IEC 61000-4-2(Contact)		± 30	
Operating Temperature Range	T_J	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics($T_A=25^{\circ}\text{C}$)

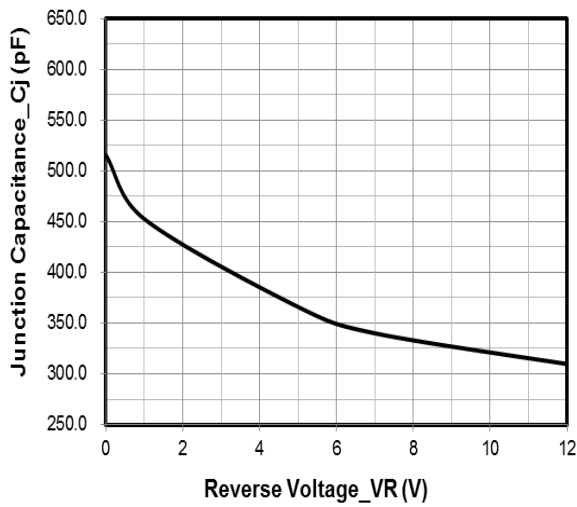
Symbol	Parameter
I_{PP}	Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Reverse Stand-Off Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_F	Forward Current
V_F	Forward Voltage @ I_F



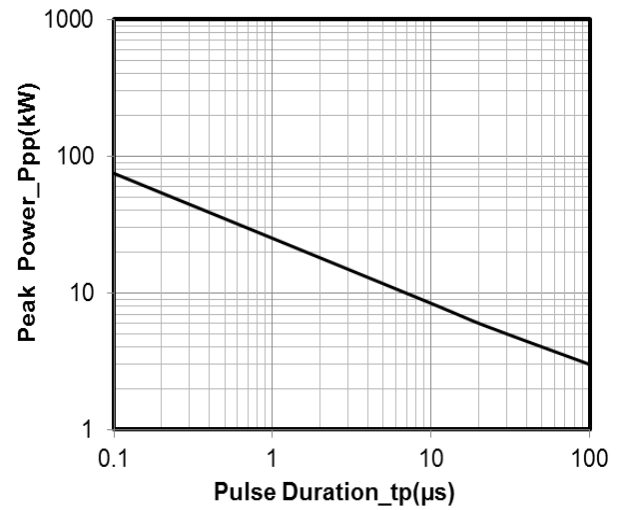
Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V_{RWM}			12	V	
Breakdown Voltage	V_{BR}	13.4	14		V	$I_T=1\text{mA}$
Reverse Leakage Current	I_R			0.5	μA	$V_{RWM}=12\text{V}$ $T=25^{\circ}\text{C}$
Clamping Voltage	V_C			15	V	$I_{PP}=20\text{A}$ (8 x 20 μs pulse)
Clamping Voltage	V_C		17	19	V	$I_{PP}=40\text{A}$ (8 x 20 μs pulse)
Clamping Voltage	V_C		19	22	V	$I_{PP}=90\text{A}$ (8 x 20 μs pulse)
Clamping Voltage	V_C		22	25	V	$I_{PP}=140\text{A}$ (8 x 20 μs pulse)
Clamping Voltage	V_C		25	30	V	$I_{PP}=200\text{A}$ (8 x 20 μs pulse)
Junction Capacitance	C_J			550	pF	$V_R=0\text{V}$, $f=1\text{MHz}$

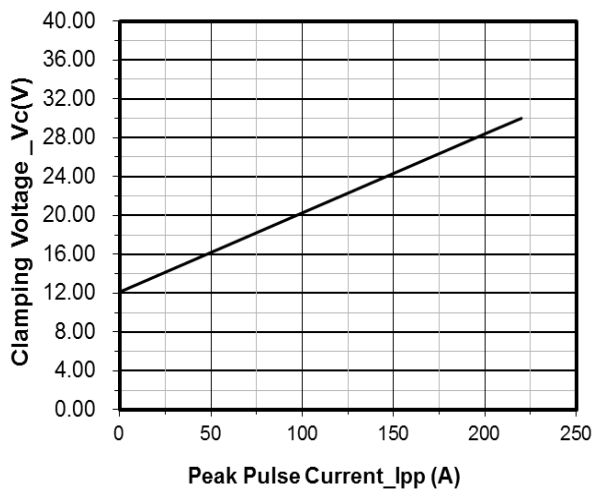
Typical Performance Characteristics ($T_A=25^\circ\text{C}$ unless other wise specified)



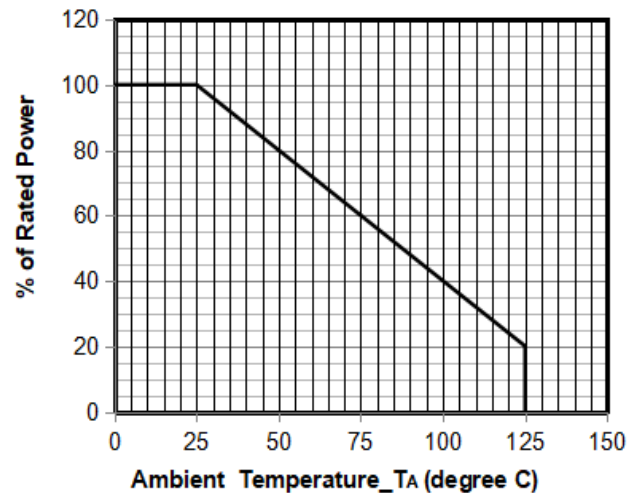
Junction Capacitance vs. Reverse Voltage



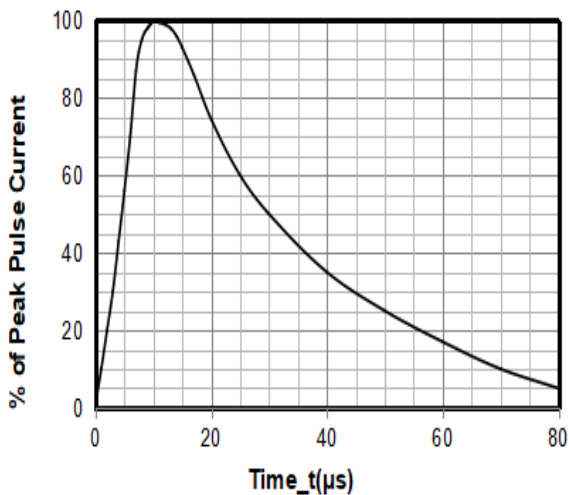
Peak Pulse Power vs. Pulse Time



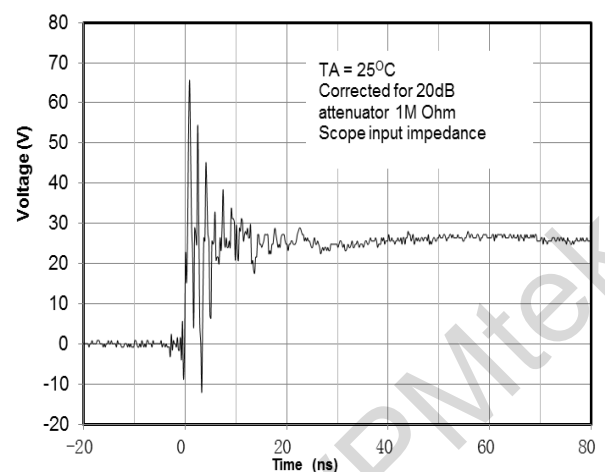
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



8 X 20 μs Pulse Waveform

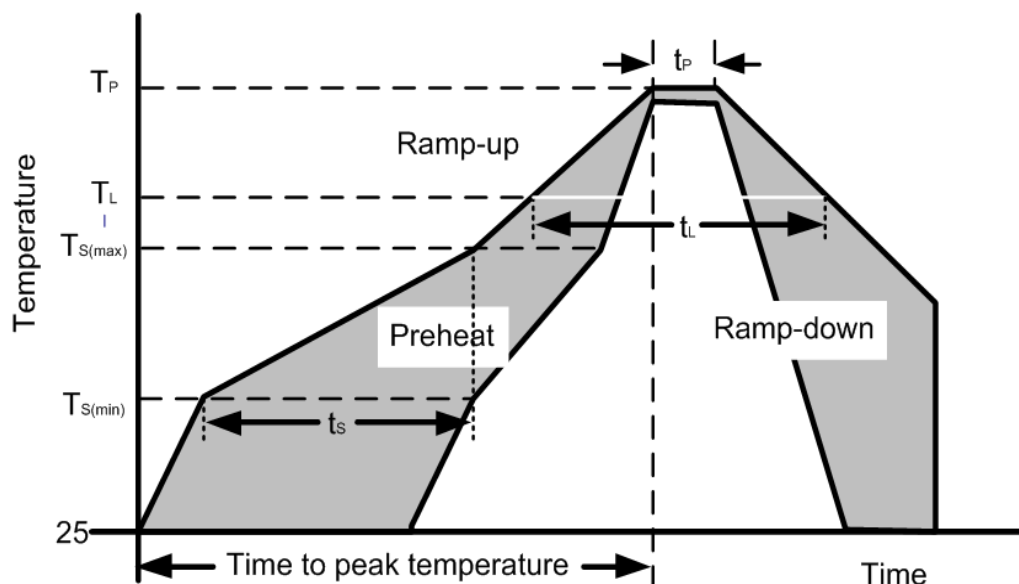


ESD Clamping Voltage

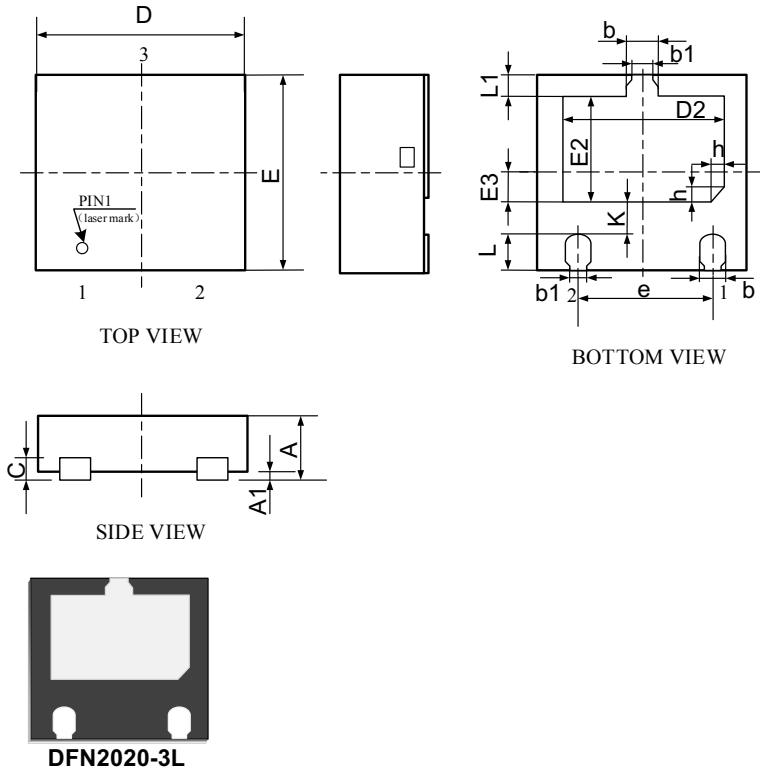
8 kV Contact per IEC61000-4-2

Soldering Parameters

Reflow Condition		Pb-Free assembly (see FIG.2)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (t_s)	60-190 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		5°C/second. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		5°C/ second. Max
Reflow	-Temperature(T_L) (Liquid us)	+217°C
	-Temperature(t_L)	60-150 seconds.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_P)		20-40 seconds. Max
Ramp-down Rate		5°C/ second. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+280°C



Package Mechanical Data



SYMBOL	DIMENSIONS		
	MILLIMETERS		
	MIN	NOM	MAX
A	0.55	0.60	0.65
A1	0.00	0.02	0.05
b	0.25	0.30	0.35
b1	0.20REF		
c	0.152REF		
D	1.90	2.00	2.10
D2	1.40	1.50	1.60
e	1.30BSC		
E	1.90	2.00	2.10
E2	0.95	1.05	1.15
E3	0.20	0.30	0.40
L	0.35	0.40	0.45
L1	0.20	0.25	0.30
h	0.20REF		
K	0.20	0.30	0.40

Suggested Land Pattern

