

18V Transient Voltage Suppressor

Features

- Excellent Clamping Voltage
- Working Voltage: 18V
- Low Leakage Current
- Low profile package

IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (air), $\pm 30\text{kV}$ (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 200A (PIN1&2 to PIN3), 150A(PIN3 to PIN1&2) (8/20 μs)

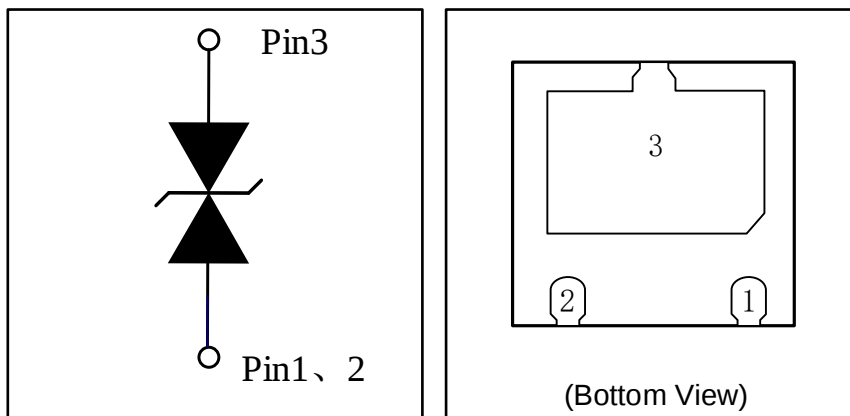
Mechanical Characteristics

- DFN2020-3L package
- Marking : Marking Code
- Packaging : Tape and Reel per EIA 481
- RoHS Compliant & HF
- Device meets MSL1 requirement

Applications

- Power lines
- Industrial Electronics
- Microcontroller Input Protections
- Personal Digital Assistants (PDAs)

Schematic & PIN Configuration



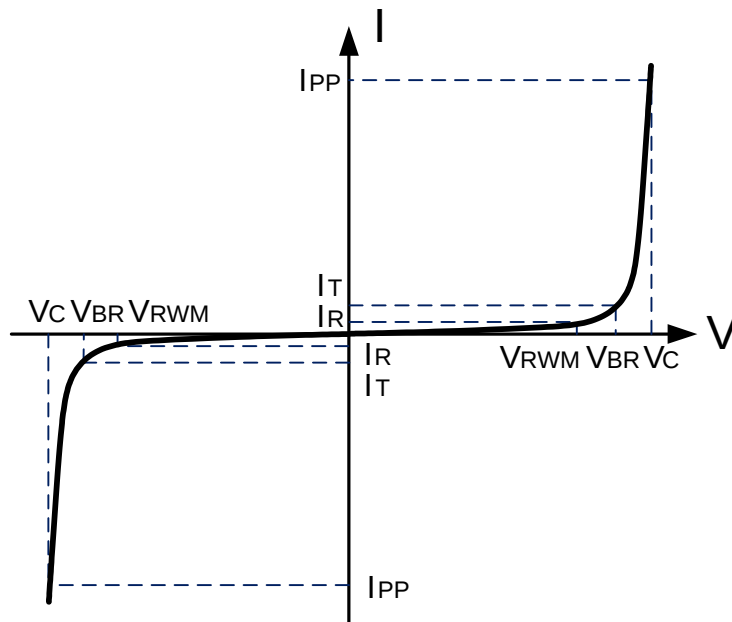
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Absolute Maximum Rating

Parameter	Symbol	Pin1&2 to Pin3	Pin3 to Pin1&2	Unit
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{PP}	2400	4950	Watts
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{PP}	200	150	A
Operating Temperature	T_J	-55 to +125	-55 to +125	°C
Storage Temperature	T_{STG}	-55 to +150	-55 to +150	°C

Electrical Parameters (T=25°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



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Electrical Characteristics(T=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Pin1&2 to Pin3			Pin3 to Pin1&2			Unit
			Min	Typ	Max	Min	Typ	Max	
Reverse Stand-Off Voltage	V_{RWM}				5			18	V
Reverse Breakdown Voltage	V_{BR}	$I_T=1mA$	5.6			20			V
Reverse Leakage Current	I_R	V_{RWM}			200			200	nA
Clamping Voltage ⁽¹⁾	V_C	$I_{PP}=150A$, $t_p=8/20\mu s$			12		31	33	V
		$I_{PP}=200A$, $t_p=8/20\mu s$		10	13				V
ESD Clamping Voltage ⁽²⁾	V_C	$I_{PP} = 4A$ $t_p = 0.2/100ns$		7.48			22.3		V
ESD Clamping Voltage ⁽²⁾	V_C	$I_{PP} = 16A$ $t_p = 0.2/100ns$		8.3			22.9		V
Dynamic Resistance ^{(2) (3)}	R_{DYN}	TLP=0.2/100ns		0.07			0.06		Ω
Junction Capacitance	C_j	$V_R = 0V$, $f = 1MHz$		852	1000		852	1000	pF

Note1. Measured from pin 3 to pin 1&2, and pin 1& pin 2 to pin 3;

Note2. TLP Setting: $t_p=100ns$, $t_r=0.2ns$, I_{TLP} and V_{TLP} sample window: $t_1=70ns$ to $t_2=90ns$.

Note3. Dynamic resistance calculated from $I_{PP}=4A$ to $I_{PP}=16A$ using “Best Fit”.

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Typical Characteristics

Figure 1: Peak Pulse Power Vs Pulse Time

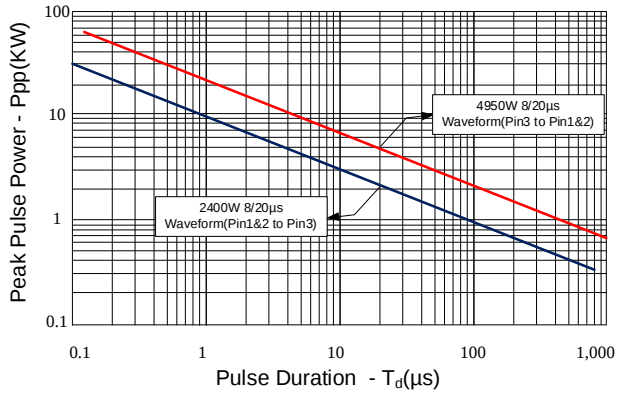


Figure 2: Power Derating Curve

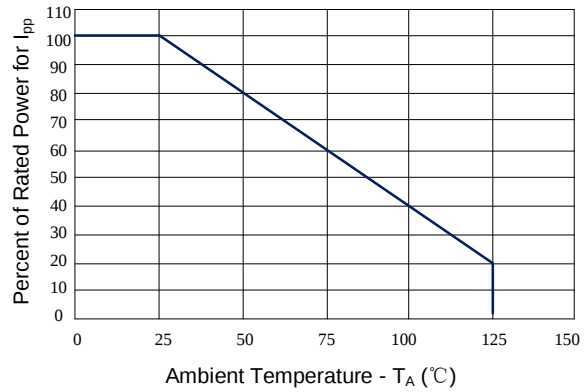


Figure 3: Clamping Voltage vs. Peak Pulse Current

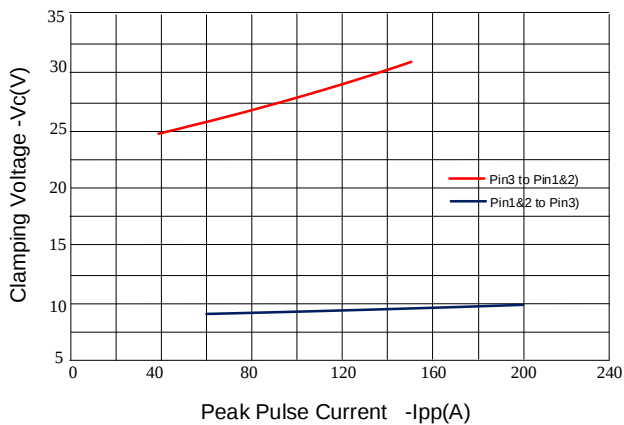


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

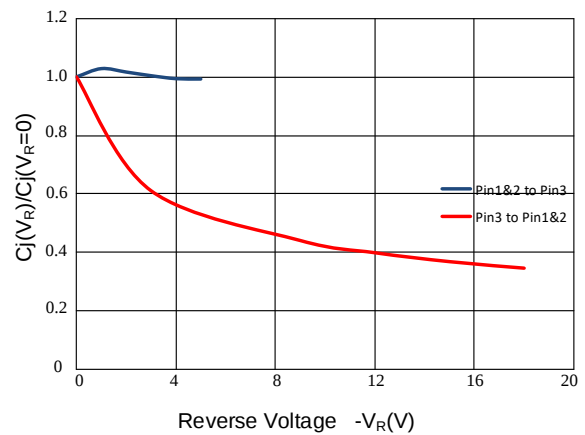


Figure 5: TLP Positive I-V Curve

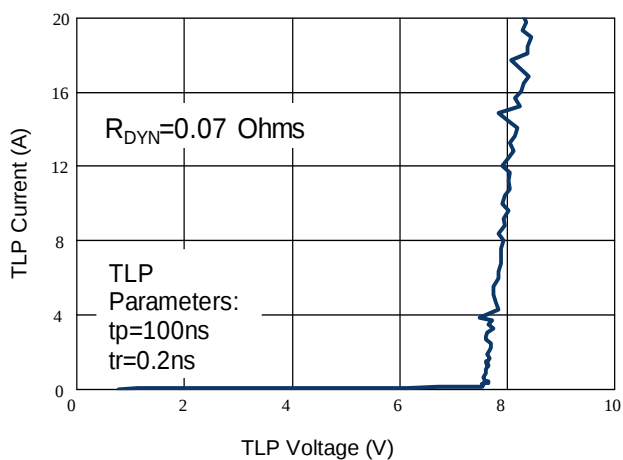
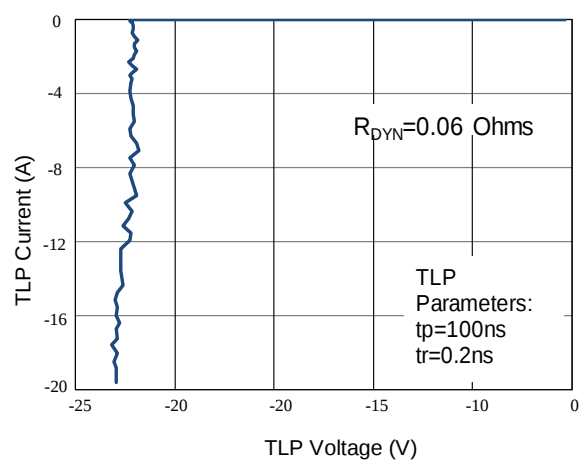


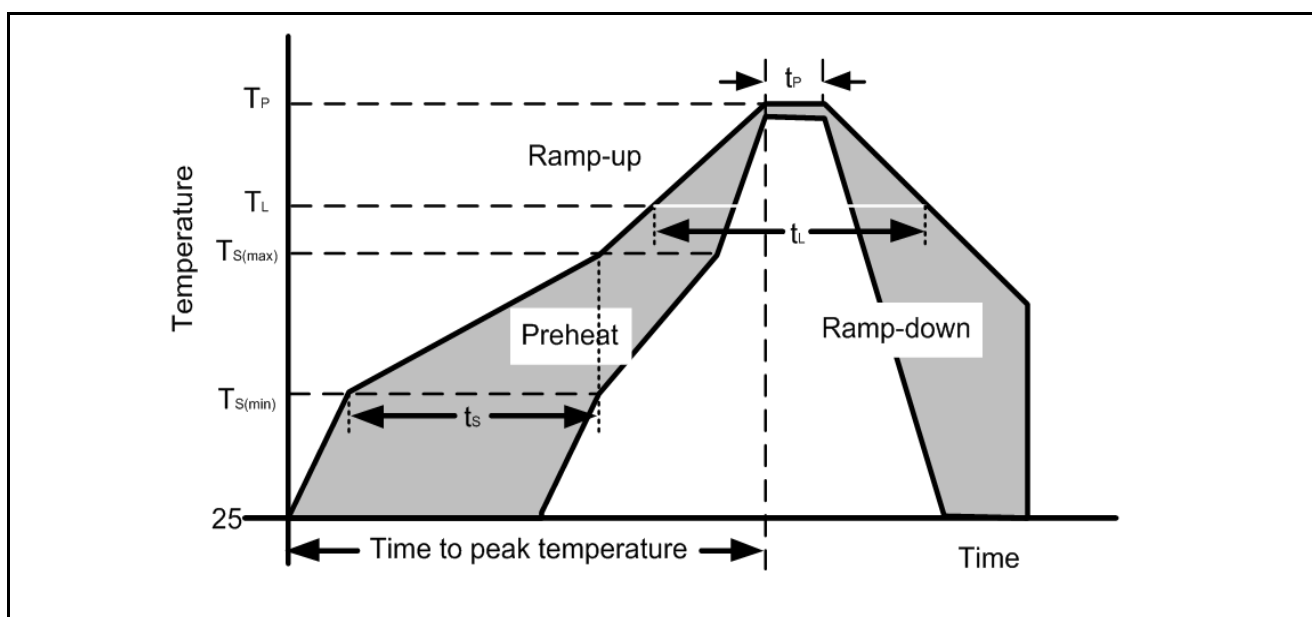
Figure 6: TLP Negative I-V Curve



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Soldering Parameters

Reflow Condition		Pb – Free assembly
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 (Liquidus 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) (Liquidus)	217°C
	Temperature (t_L)	60 – 150 seconds
Peak Temperature (T_P)		260+0/-5 °C
Time within actual peak Temperature (t_P)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C



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Package Dimension

PACKAGE OUTLINE

Technical drawings of the DFN2020-3L package showing top, bottom, and side views with dimension labels.

TOP VIEW: Shows the package footprint with dimensions D (total width), 3 (width of the central pad), and E (total length). A laser mark is indicated near PIN1. The package is divided into three sections labeled 1, 2, and 3.

BOTTOM VIEW: Shows the underside of the package with dimensions L1, E2, D2, h, L, E3, L, b1, e, b, and K. It also shows the locations of the three solder pads.

SIDE VIEW: Shows the package height with dimensions A and A1.

DFN2020-3L

SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	0.45	0.55	0.60
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

MOUNTING PAD

Technical drawing of the mounting pad showing dimensions: 1.8 (width), 1.2 (height), 1.3 (width of the central pad), 0.5 (width of the side pads), 0.5 (width of the side pads), 0.5 (width of the side pads), and 0.3 (height of the side pads).

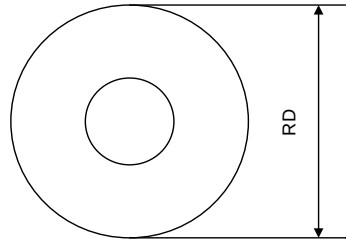
Notes:

Controlling Dimension: Millimeter.

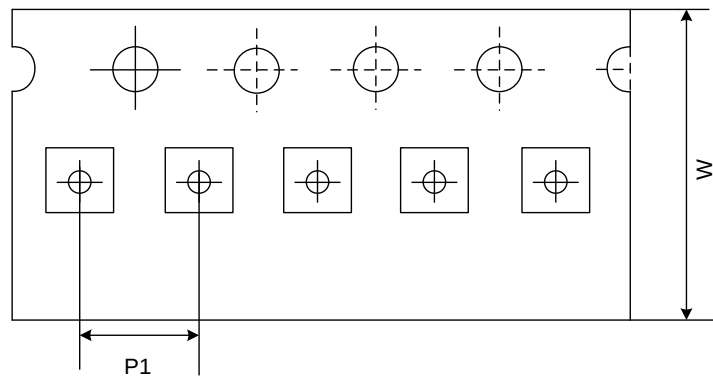
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Tape And Reel Information

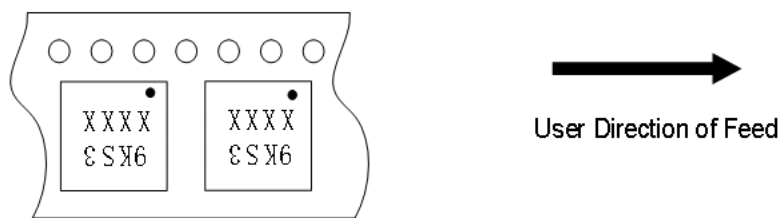
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimensions	7 inch
W	Overall width of the carrier tape	8 mm
P1	Pitch between successive cavity centers	4mm

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Ordering Information

Part	Package	Marking	Packing Information
ES1805P4N3	DFN2020-3L	3 9KS3 XXXX 12 9KS3=Specific Device Code XXXX=Lot Code	3k/Reel

Revision History and Checking Table

No.	Version	Date	Revision Item	Request	Function & Spec Checking	Package Checking	Tape Checking
1	1.0	2025-01-12	Released Version	Qi Shu Kun	Yin Peng	Liu Jia Ying	Liu Jia Ying