

## Transient Voltage Suppressor



### Features

- 1680 Watts Peak Power ( $t_p = 8/20\mu s$ )
- Working Voltage: 22V
- Solid-state technology
- Low clamping voltage: 28V Maximum at IPP = 60A ( $t_p = 8/20\mu s$ )

### IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD)  $\pm 30kV$  (air),  $\pm 30kV$  (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 60A (8/20 $\mu s$ )

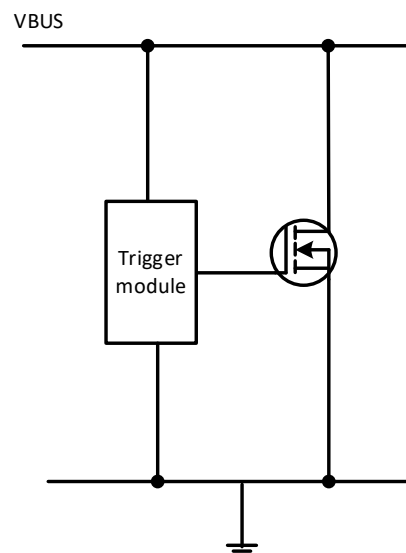
### Mechanical Characteristics

- DFN2020-6L package
- Marking : Making Code
- Packaging : Tape and Reel per EIA 481
- RoHS Compliant & HF
- Device meets MSL1 requirement

### Applications

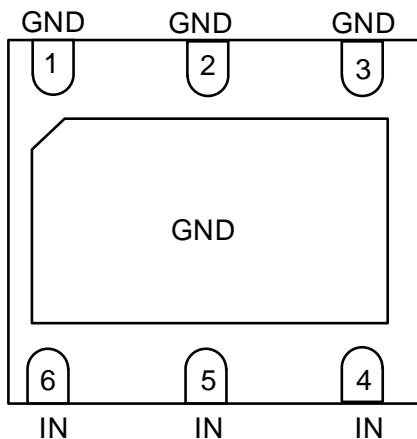
- USB Type-C
- VBUS Lines
- Industrial Sensors
- Notebooks and Tablets
- Storage Devices

### Functional Diagram



### Pin Configuration

WS8099RK6 is in a 2 x 2mm, 6-pin DFN package. The input or connection to the protected bus is made at pins 4, 5, and 6. Ground connection is made at pins 1, 2, and 3. The exposed center pad may optionally be connected to GND.



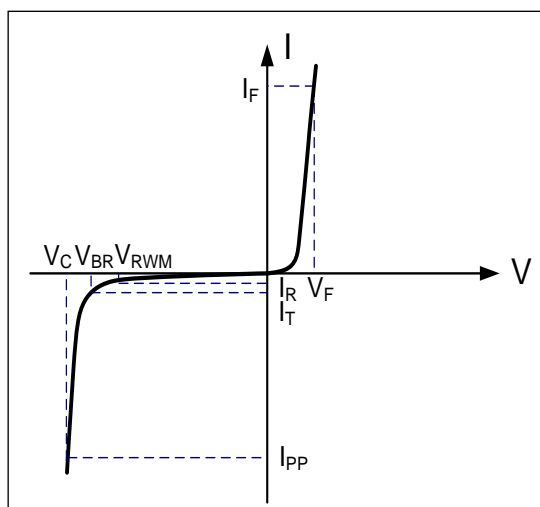
Pin Number	Pin Name	Description
1,2,3	GND	Ground
4,5,6	IN	EOS and ESD Protection Input
Center Pad	GND	Optional GND connection

### Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ( $t_p = 8/20\mu s$ )	$P_{PP}$	1680	Watts
Peak Pulse Current ( $t_p = 8/20\mu s$ )	$I_{PP}$	60	A
Human Body Model	HBM	8000	V
Operating Temperature	$T_J$	-55 to +125	°C
Storage Temperature	$T_{STG}$	-55 to +150	°C

### Electrical Parameters

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(T=25°C unless otherwise noted)

WS8099RK6						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	$V_{RWM}$				22	V
Reverse Breakdown Voltage	$V_{BR}$	$I_T=1mA$	24			V
Reverse Leakage Current	$I_R$	$V_{RWM}=22V$			500	nA
Forward Voltage	$V_F$	$I_F=1mA$	0.25	0.39	0.65	V
Clamping Voltage <sup>1</sup>	$V_C$	$I_{PP}=40A, t_p=8/20\mu s$		27.6	28	V
Clamping Voltage <sup>1</sup>	$V_C$	$I_{PP}=60A, t_p=8/20\mu s$		27.6	28	V
Junction Capacitance	$C_j$	$V_R=0V, f=1MHz$		626	800	pF

Note: 1.Measured from pin 4 & pin 5 & pin6 to pin 1& pin 2& pin3;

### Typical Characteristics

Figure 1: Peak Pulse Power vs. Pulse Time

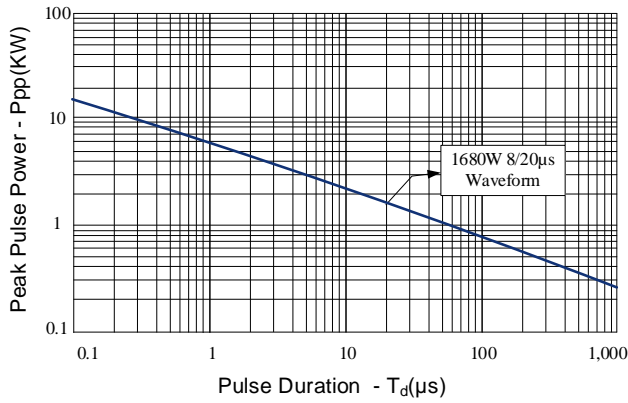


Figure 2: Power Derating Curve

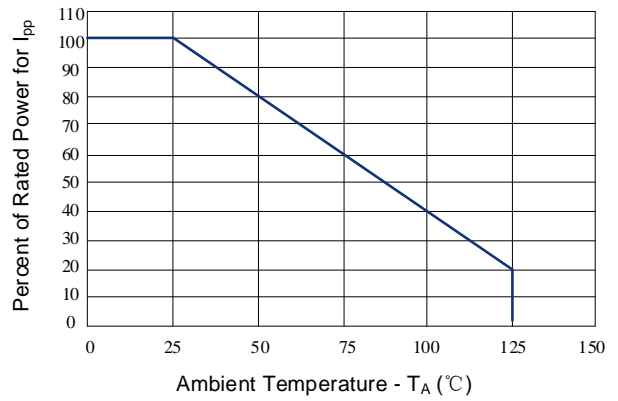


Figure 3: Clamping Voltage vs. Peak Pulse Current

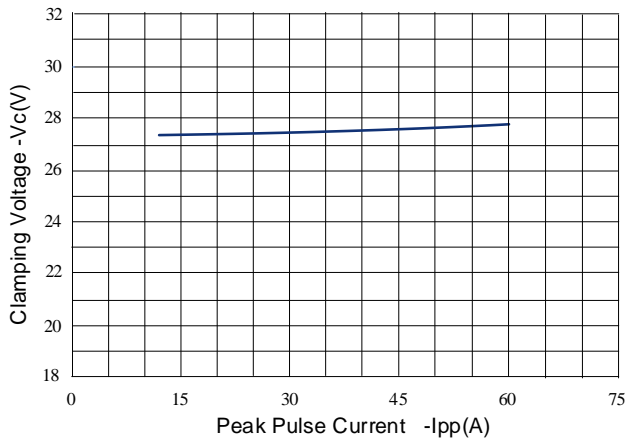


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

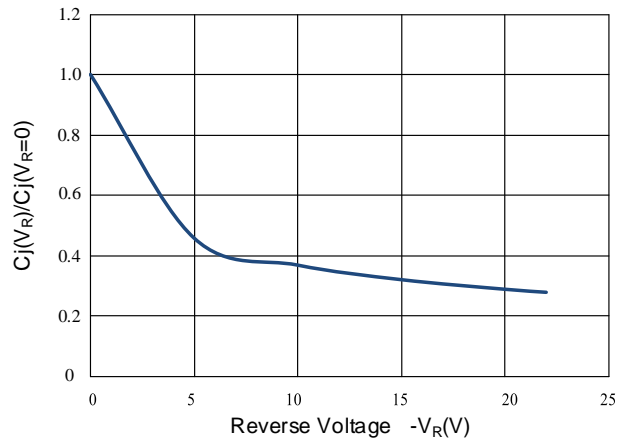


Figure 5: Clamping Voltage ( $t_p=8/20, I_{pp}=40A$ )

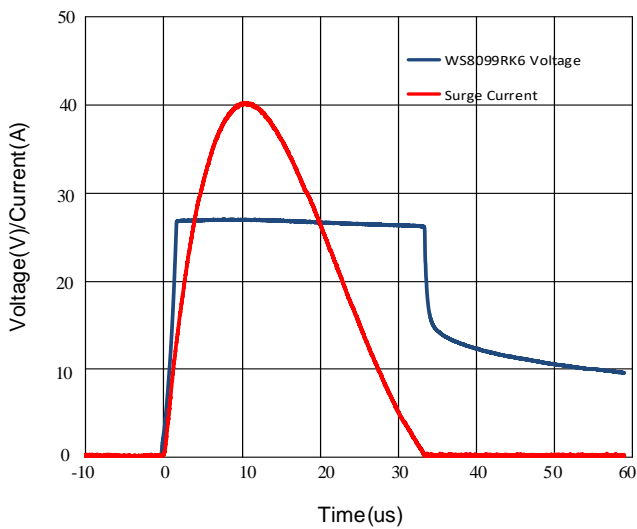
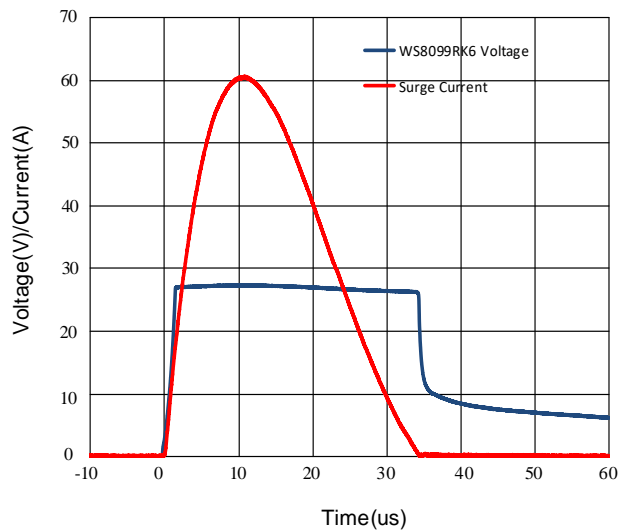
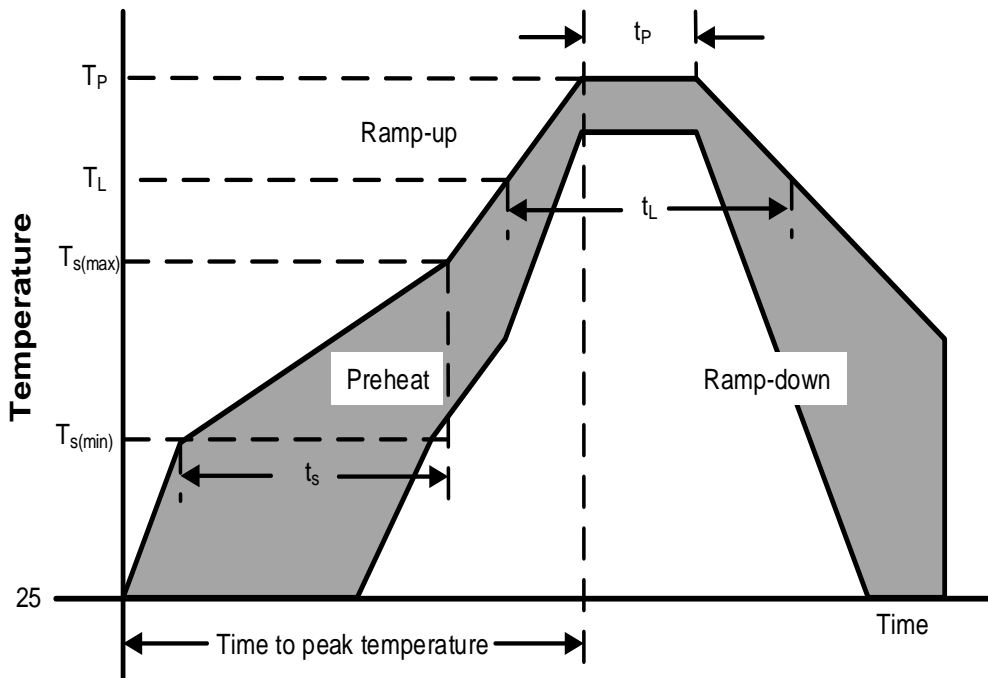


Figure 6: Clamping Voltage ( $t_p=8/20, I_{pp}=60A$ )



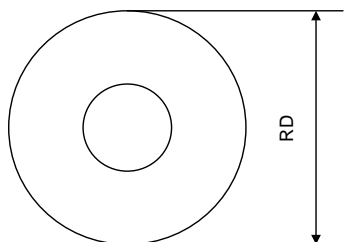
Soldering Parameters

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

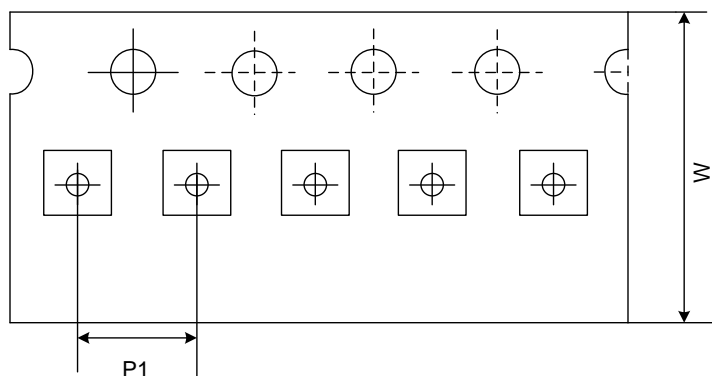


### Tape And Reel Information

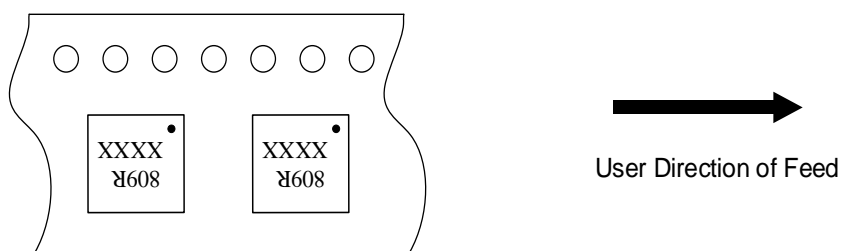
Reel Dimensions



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

Outline Drawing –DFN2020-6L

**PACKAGE OUTLINE**

TOP VIEW

BOTTOM VIEW

SIDE VIEW

**DFN2020-6L**

SYMBOL	MILLIMETERS	
	MIN	MAX
A	0.70	0.80
A1	0.000	0.050
b	0.25	0.35
c	0.18	0.25
D	1.90	2.10
D2	1.5	1.7
e	0.65BSC	
Nd	1.30BSC	
E	1.9	2.1
E2	0.9	1.1
K	0.20	-
L	0.20	0.30
h	0.15	0.25

DIMENSIONS		
DIM	INCHES	MILLIMETERS
Z	0.083	2.10
G	0.055	1.4
P	0.026TYP	0.65 TYP
X	0.016	0.4
Y	0.014	0.35

**Notes**

1. Dimensioning and tolerances per ANSI Y14.5M, 1985.
2. Controlling Dimension: Inches
3. Dimensions are exclusive of mold flash and metal burrs.

Marking Codes

Part Number	Marking Code
WS8099RK6	<p style="font-size: small;">809R=Specific Device Code XXXX=Lot Code</p>

Package Information

Qty: 3k/Reel

CONTACT INFORMATION

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For additional information, please contact your local Sales Representative.

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**Product Specification Statement**

1. The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.
2. The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.
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