

## Transient Voltage Suppressor

### Features

- 432 Watts Peak Pulse Power per Line ( $t_p = 8/20\mu s$ )
- Bidirectional Configuration
- Protects One Power or I/O Port
- Low Clamping Voltages
- Ultra Low Capacitance: 0.8 pF Typical

### 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(Surge): 24A (8/20 $\mu s$ )



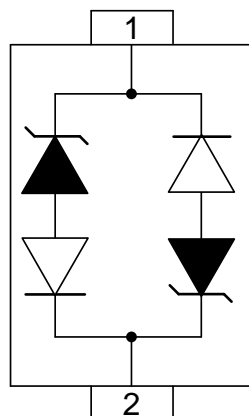
### Mechanical Characteristics

- Molded JEDEC SOD-323 package
- Weight 10 milligrams (Approximate)
- Flammability rating UL 94V-0
- 8mm Tape and Reel Per EIA Standard 481
- Device Marking: Marking Code
- RoHS Compliant & HF

### Applications

- Ethernet - 10/100/1000 Base T
- Cellular Phones
- Handheld - Wireless Systems
- Personal Digital Assistant (PDA)
- USB Interface

### PIN Configuration



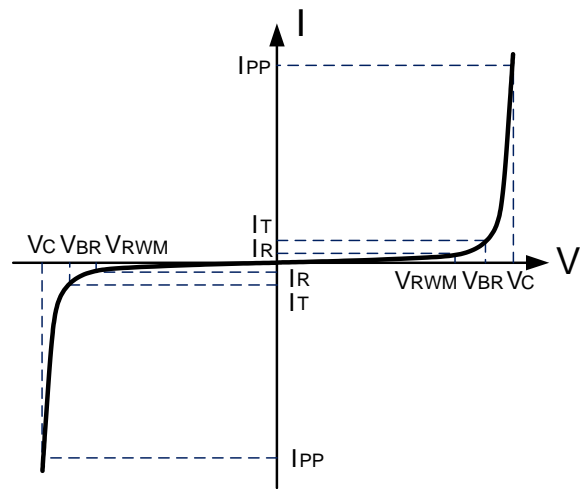
**BIDIRECTIONAL**

**Absolute Maximum Rating**

Rating	Symbol	Value	Units
Peak Pulse Power ( $t_p=8/20\mu s$ )	$P_{PP}$	432	W
Peak Pulse Current( $t_p=8/20\mu s$ )	$I_{PP}$	24	A
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



**Electrical characteristics(T=25°C unless otherwise noted)**

WS7195ED						
Parameter	Symbol	Conditions	Minimum	Typical	Maximum	Units
Reverse Stand-Off Voltage	$V_{RWM}$				3.3	V
Reverse Breakdown Voltage	$V_{BR}$	$I_T=1mA$	4.0		7.0	V
Reverse Leakage Current	$I_R$	$V_{RWM}=3.3V$			100	nA
Clamping Voltage	$V_C$	$I_{PP}=1A, t_p=8/20\mu s$			6	V
Clamping Voltage	$V_C$	$I_{PP}=24A, t_p=8/20\mu s$		15	18	V
ESD Clamping Voltage <sup>1</sup>	$V_C$	$I_{PP} = 4A$ $t_p = 0.2/100ns$		7.0		V
ESD Clamping Voltage <sup>1</sup>	$V_C$	$I_{PP} = 16A$ $t_p = 0.2/100ns$		10.6		V
Dynamic Resistance <sup>1,2</sup>	$R_{DYN}$	TLP=0.2/100ns		0.3		$\Omega$
Junction Capacitance	$C_j$	$V_R = 0V, f= 1MHz$		0.8	1.3	pF

**Note:** 1、 TLP Setting :  $t_p=100ns, t_r=0.2ns, I_{TLP}$  and  $V_{TLP}$  sample window: $t_1=70ns$  to  $t_2=90ns$ .  
 2、 Dynamic resistance calculated from  $I_{PP}=4A$  to  $I_{PP}=16A$  using "Best Fit".

Typical Characteristics

Figure 1: Peak Pulse Power vs. Pulse Time

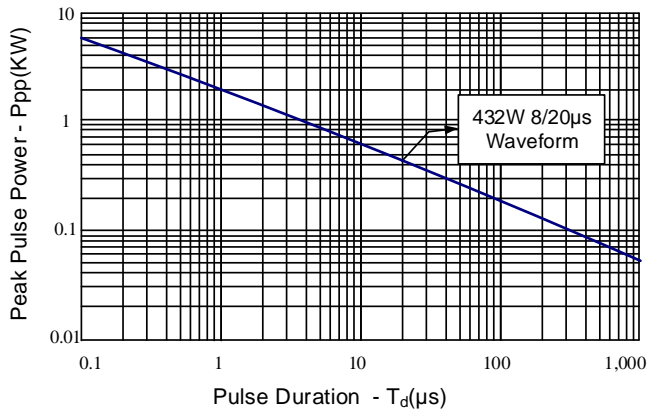


Figure 2: Power Derating Curve

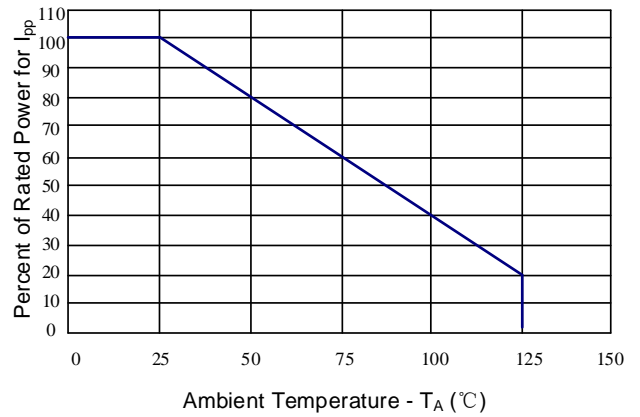


Figure 3: Clamping Voltage vs. Peak Pulse Current

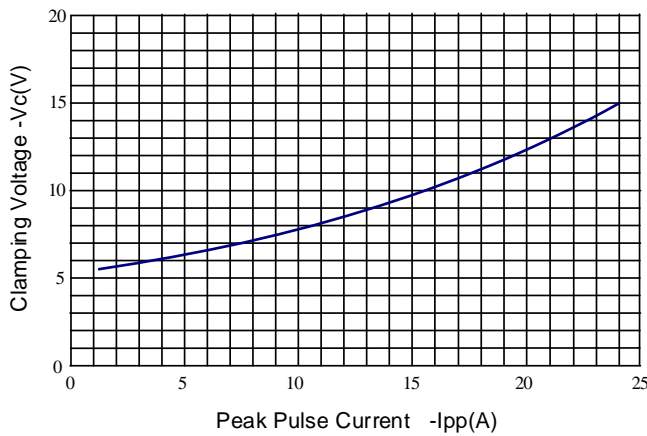


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

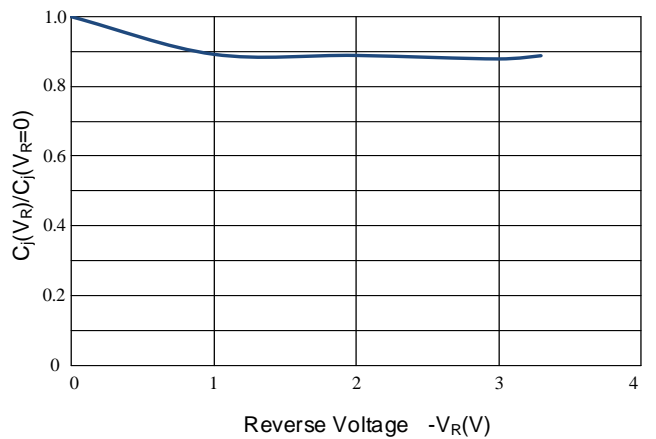


Figure 5: TLP Positive I-V Curve

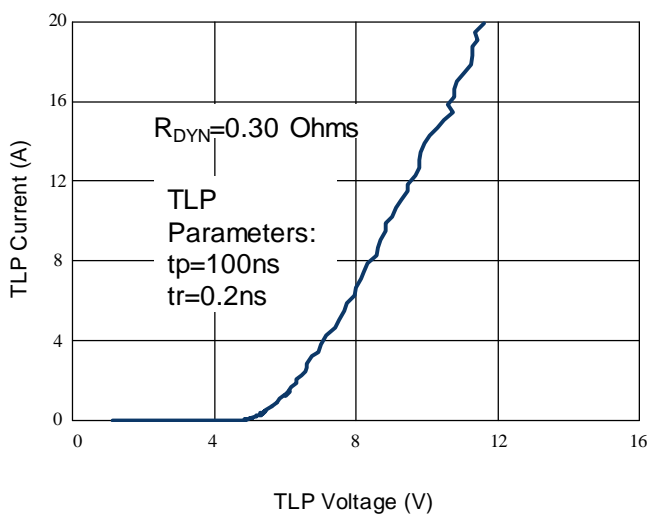
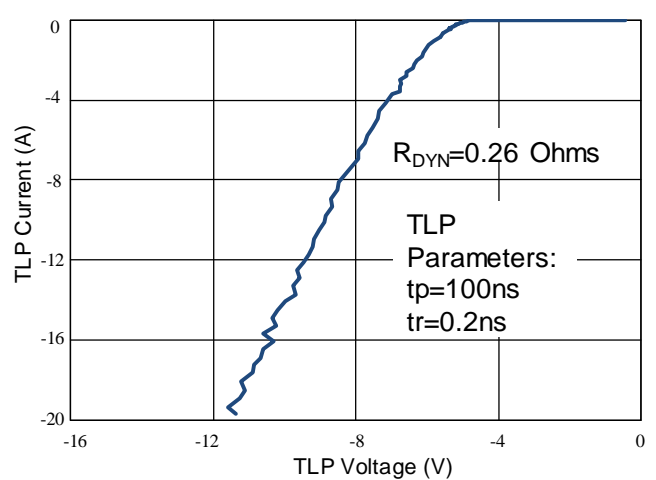
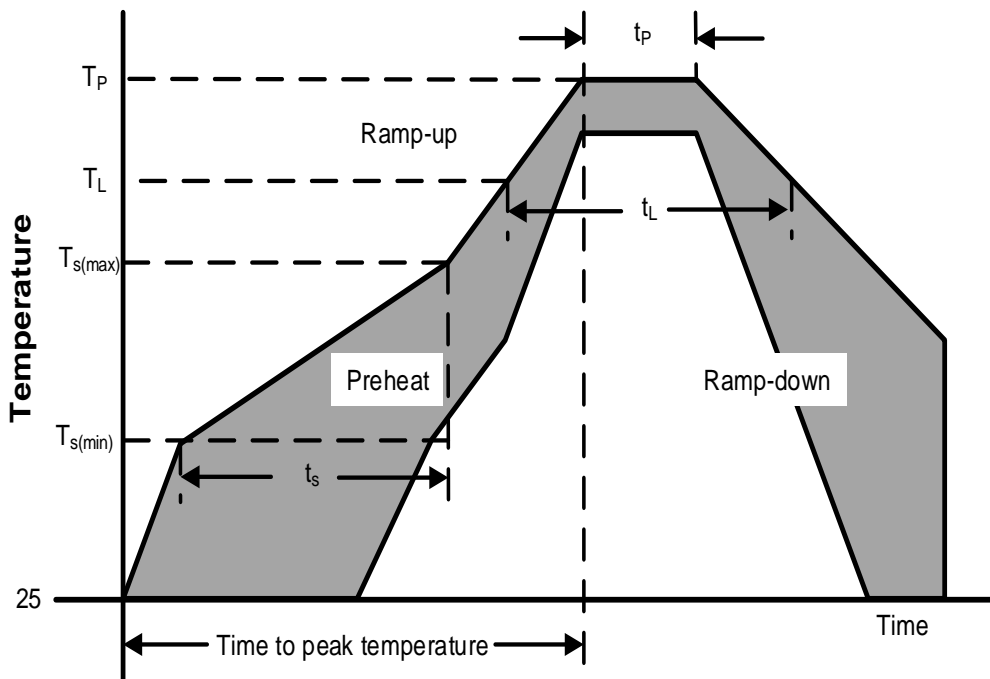


Figure 6: TLP Negative I-V Curve

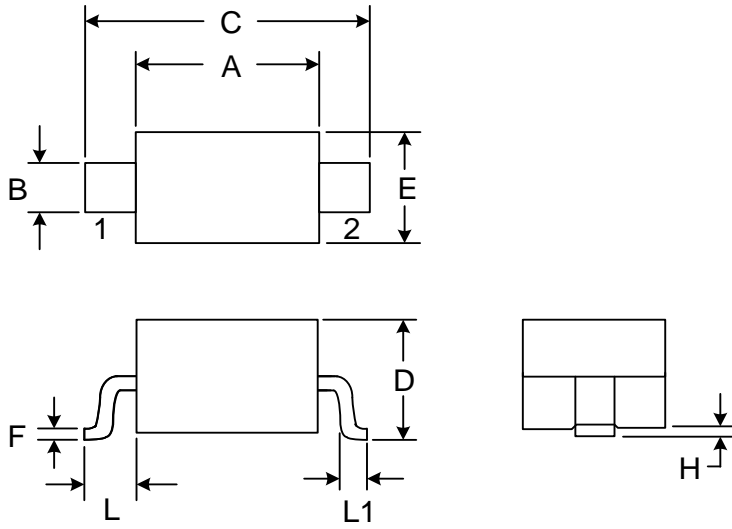
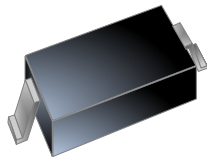
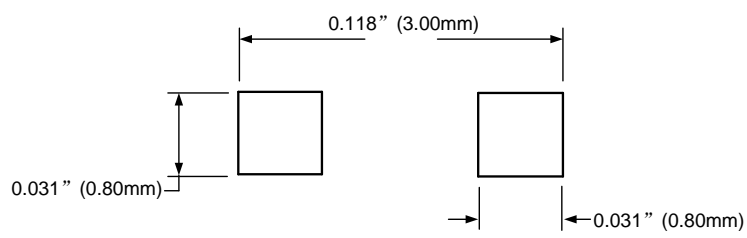


Soldering Parameters

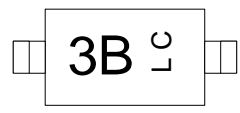
Reflow Condition		Pb – Free assembly
Pre Heat	Temperature Min ( $T_{s(min)}$ )	150°C
	Temperature Max ( $T_{s(max)}$ )	200°C
	Time (min to max) ( $t_s$ )	60 – 190 secs
Average ramp up rate (Liquidus Temp) ( $T_L$ ) to peak		5°C/second max
$T_{s(max)}$ to $T_L$ —Ramp-up Rate		5°C/second max
Reflow	Temperature ( $T_L$ ) (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



Outline Drawing – SOD-323

<p style="text-align: center;"><b>PACKAGE OUTLINE</b></p> 	<div style="text-align: center;">  <p><b>SOD-323</b></p> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2">SYMBOL</th> <th colspan="2">MILLIMETERS</th> </tr> <tr> <th>MIN</th> <th>MAX</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>1.52</td> <td>1.80</td> </tr> <tr> <td>B</td> <td>0.25</td> <td>0.40</td> </tr> <tr> <td>C</td> <td>2.46</td> <td>2.71</td> </tr> <tr> <td>D</td> <td>0.80</td> <td>1.16</td> </tr> <tr> <td>E</td> <td>1.11</td> <td>1.40</td> </tr> <tr> <td>F</td> <td>0.08</td> <td>0.20</td> </tr> <tr> <td>L</td> <td colspan="2" style="text-align: center;">0.475 REF</td> </tr> <tr> <td>L1</td> <td>0.25</td> <td>0.40</td> </tr> <tr> <td>H</td> <td>0.00</td> <td>0.10</td> </tr> </tbody> </table>	SYMBOL	MILLIMETERS		MIN	MAX	A	1.52	1.80	B	0.25	0.40	C	2.46	2.71	D	0.80	1.16	E	1.11	1.40	F	0.08	0.20	L	0.475 REF		L1	0.25	0.40	H	0.00	0.10
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<p style="text-align: center;"><b>MOUNTING PAD</b></p> 	<p><b>Notes:</b> Controlling Dimension: Millimeter.</p>																																

**Marking Codes**

Part Number	WS7195ED
Marking Code	

**Package Information**

Qty: 3k/Reel

**CONTACT INFORMATION**

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Specifications are subject to change without notice.  
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.  
Users should verify actual device performance in their specific applications.