



# ESDHLC3V301D3 THRU ESDHLC3601D3

Uni-directional TVS Diode for ESD Protection

## 1. Features

- 350 Watts peak pulse power per line ( $t_p=8/20\mu s$ )
- Protects one uni-directional I/O line
- Low clamping voltage
- Working voltage: 3.3V 12V 24V 36V
- Low leakage current
- RoHS compliant
- IEC61000-4-2 (ESD)  $\pm 30kV$  (air),  $\pm 30kV$  (contact)

SOD323



## 2. Mechanical Data

- Case: Molded Plastic, SOD323.
- Epoxy: UL 94V-0 rate flame retardant.
- Mounting Position : Any.



## Maximum Ratings and Electrical Characteristics

ESDHLC3V301D3			
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu s$ )	$P_{pp}$	350	W
Peak Pulse Current (8/20 $\mu s$ )	$I_{pp}$	20	A
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	$\pm 30$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 30$	
Operating Temperature Range	$T_J$	-55 to +125	$^{\circ}C$
Storage Temperature Range	$T_{stg}$	-55 to +150	$^{\circ}C$
ESDHLC1201D3			
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu s$ )	$P_{pp}$	350	W
Peak Pulse Current (8/20 $\mu s$ )	$I_{pp}$	11	A
ESD per IEC 61000-4-2 (Air)	V <sub>ESD</sub>	$\pm 30$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 30$	
Operating Temperature Range	$T_J$	-55 to +125	$^{\circ}C$
Storage Temperature Range	$T_{stg}$	-55 to +150	$^{\circ}C$



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## Maximum Ratings and Electrical Characteristics

<b>ESDHLC2401D3</b>			
<b>Parameter</b>	<b>Symbol</b>	<b>Value</b>	<b>Unit</b>
Peak Pulse Power (8/20μs)	P <sub>pp</sub>	350	W
Peak Pulse Current (8/20μs)	I <sub>pp</sub>	7	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
<b>ESDHLC3601D3</b>			
<b>Parameter</b>	<b>Symbol</b>	<b>Value</b>	<b>Unit</b>
Peak Pulse Power (8/20μs)	P <sub>pp</sub>	350	W
Peak Pulse Current (8/20μs)	I <sub>pp</sub>	5	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 (TA=25°C unless otherwise noted)

<b>ESDHLC3V301D3</b>						
<b>Parameter</b>	<b>Symbol</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Unit</b>	<b>Test Condition</b>
Reverse Working Voltage	V <sub>RWM</sub>			3.3	V	
Breakdown Voltage	V <sub>BR</sub>	4.0			V	I <sub>T</sub> = 1mA
Reverse Leakage Current	I <sub>R</sub>			40	uA	V <sub>RWM</sub> = 3.3V
Clamping Voltage	V <sub>C</sub>		6.5		V	I <sub>PP</sub> = 1A (8 x 20uS pulse)
Clamping Voltage	V <sub>C</sub>			10.5	V	I <sub>PP</sub> = 20A (8 x 20uS pulse)
Junction Capacitance	C <sub>J</sub>		450		pF	V <sub>R</sub> = 0V, f = 1MHz



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## Electrical Characteristics (TA=25°C unless otherwise noted)

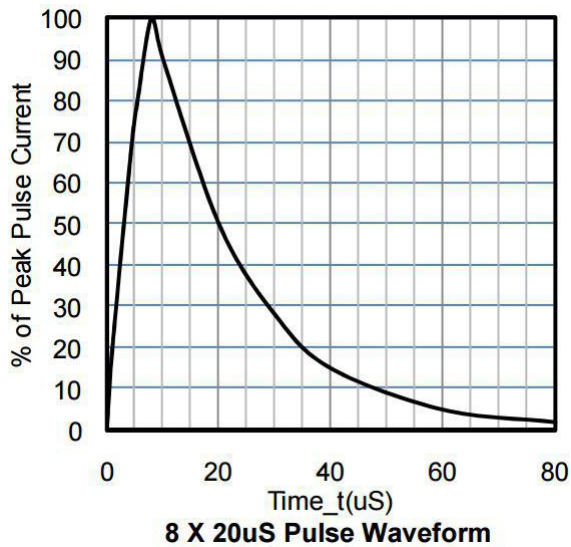
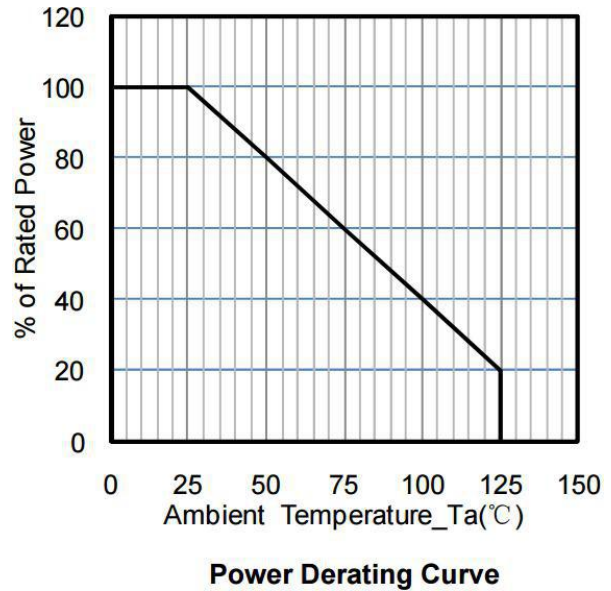
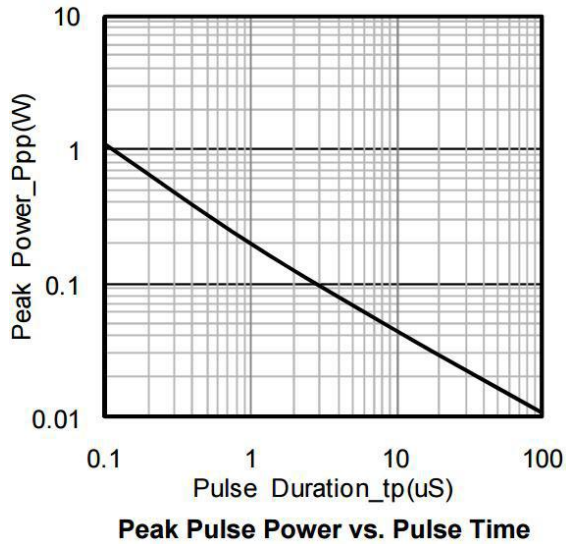
ESDHLC1201D3						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V <sub>RWM</sub>			12	V	
Breakdown Voltage	V <sub>BR</sub>	13.3			V	IT = 1mA
Reverse Leakage Current	I <sub>R</sub>			1	uA	VRWM = 12V
Clamping Voltage	V <sub>C</sub>		19		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	V <sub>C</sub>			32	V	IPP = 11A (8 x 20uS pulse)
Junction Capacitance	C <sub>J</sub>		130		pF	VR = 0V, f = 1MHz
ESDHLC2401D3						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V <sub>RWM</sub>			24	V	
Breakdown Voltage	V <sub>BR</sub>	26.7			V	IT = 1mA
Reverse Leakage Current	I <sub>R</sub>			1	uA	VRWM = 24V
Clamping Voltage	V <sub>C</sub>		43		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	V <sub>C</sub>			52	V	IPP = 7A (8 x 20uS pulse)
Junction Capacitance	C <sub>J</sub>		80		pF	VR = 0V, f = 1MHz
ESDHLC3601D3						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	V <sub>RWM</sub>			36	V	
Breakdown Voltage	V <sub>BR</sub>	40			V	IT = 1mA
Reverse Leakage Current	I <sub>R</sub>			1	uA	VRWM = 40V
Clamping Voltage	V <sub>C</sub>		60		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	V <sub>C</sub>			52	V	IPP = 5A (8 x 20uS pulse)
Junction Capacitance	C <sub>J</sub>		60		pF	VR = 0V, f = 1MHz



# ESDHLC3V301D3 THRU ESDHLC3601D3

Uni-directional TVS Diode for ESD Protection

## Rating And Characteristic Curves



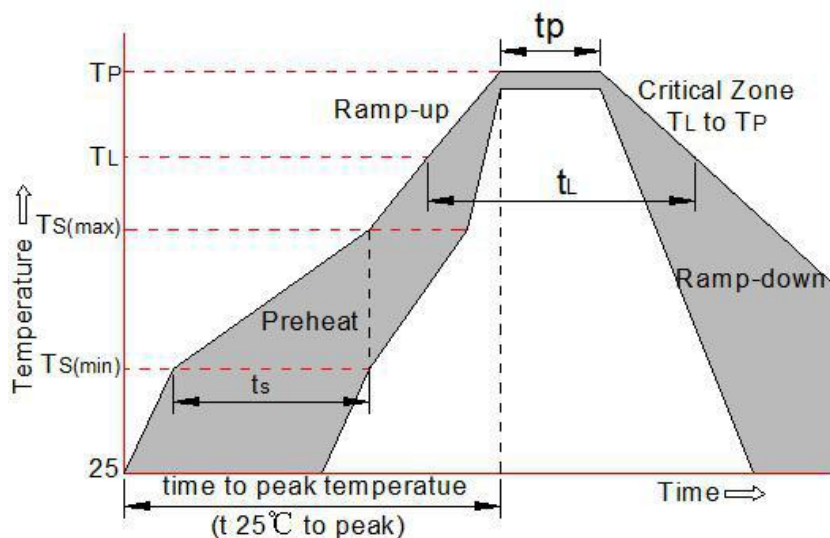


# ESDHLC3V301D3 THRU ESDHLC3601D3

Uni-directional TVS Diode for ESD Protection

## Soldering Parameters

Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) ( $t_s$ )	60-180 secs.
Average ramp up rate (Liquid us Temp ( $T_L$ ) to peak)		3°C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature( $T_L$ ) (Liquid us)	+217°C
	-Temperature( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_p$ )		8 min. Max
Do not exceed		+260°C

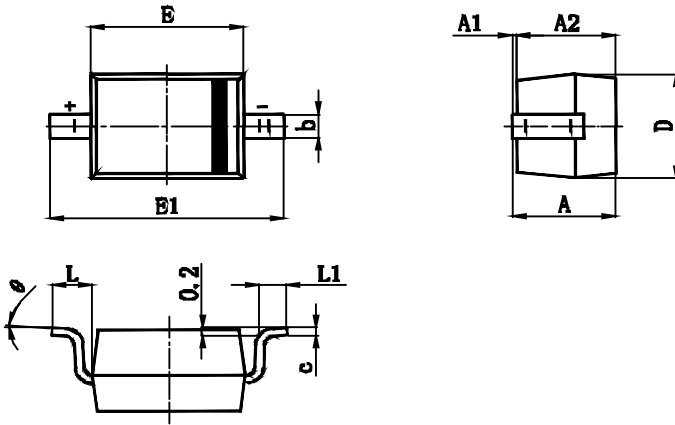




# ESDHLC3V301D3 THRU ESDHLC3601D3

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## Package Mechanical Data



Symbol	Min.(mm)	Max.(mm)
A		1.000
A1	0.000	0.100
A2	0.800	0.900
b	0.250	0.350
c	0.080	0.150
D	1.200	1.400
E	1.600	1.800
E1	2.500	2.700
L	0.475REF	
L1	0.250	0.400
$\theta$	0°	8°



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