



## SSCTXXX21D2 Series

### 1-Line Uni-directional Capacitance TVS Diode

#### ● Description

The SSCTXXX21D2 is a bi-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 high-speed data lines. The SSCTXXX21D2 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 a leadfree SOD-323 package. The small size, low capacitance and high ESD surge protection make SSCTXXX21D2 an ideal choice to protect cell phone, wireless systems, and communication equipment.

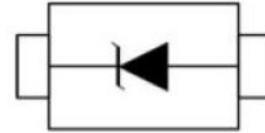
#### ● Feature

- ◇ 350W peak pulse power ( $t_P = 8/20\mu\text{s}$ )
- ◇ SOD-323 Package
- ◇ Working voltage: 3.3V, 5V, 12V, 15V, 24V, 36V
- ◇ Low clamping voltage
- ◇ Low capacitance
- ◇ 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)

#### ● Electronic Parameter

Symbol	Parameter
$V_{RWM}$	Peak Reverse Working Voltage
$I_R$	Reverse Leakage Current @ $V_{RWM}$
$V_{BR}$	Breakdown Voltage @ $I_T$
$I_T$	Test Current
$I_{PP}$	Maximum Reverse Peak Pulse Current
$V_C$	Clamping Voltage @ $I_{PP}$
$P_{PP}$	Peak Pulse Power
C	Junction Capacitance

#### ● PIN configuration



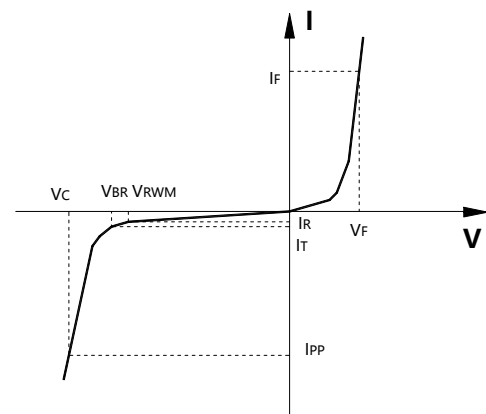
Top view

#### ● Applications

- ◇ Cell Phone Handsets and Accessories
- ◇ Microprocessor based equipment
- ◇ Personal Digital Assistants (PDAs)
- ◇ Notebooks, Desktops, and Servers
- ◇ Portable Instrumentation
- ◇ Digital Cameras
- ◇ Laptop Computers
- ◇ Peripherals

#### ● Mechanical data

- ◇ Case Material: “Green” Molding Compound.
- ◇ UL Flammability Classification Rating 94V-0
- ◇ Qualified max reflow temperature: 260°C
- ◇ Device meets MSL 1 requirements
- ◇ Moisture Sensitivity: Level 3 per J-STD-020





# SSCTXXX21D2

## ● Absolute maximum rating @TA=25°C

SSCT3V321D2			
Parameter	Symbol	Value	Unit
Peak Pulse Power (tp=8/20μs waveform)	P <sub>PPP</sub>	350	W
Peak Pulse Current (tp=8/20μs waveform)	I <sub>PP</sub>	20	A
ESD Rating per IEC61000-4-2:	Contact	30	KV
	Air	30	
Operating Temperature Range	T <sub>J</sub>	-55 ~ 125	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ 150	°C
SSCT5V021D2			
Parameter	Symbol	Value	Unit
Peak Pulse Power (tp=8/20μs waveform)	P <sub>PPP</sub>	350	W
Peak Pulse Current (tp=8/20μs waveform)	I <sub>PP</sub>	17	A
ESD Rating per IEC61000-4-2:	Contact	30	KV
	Air	30	
Operating Temperature Range	T <sub>J</sub>	-55 ~ 125	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ 150	°C
SSCT12V21D2			
Parameter	Symbol	Value	Unit
Peak Pulse Power (tp=8/20μs waveform)	P <sub>PPP</sub>	350	W
Peak Pulse Current (tp=8/20μs waveform)	I <sub>PP</sub>	11	A
ESD Rating per IEC61000-4-2:	Contact	30	KV
	Air	30	
Operating Temperature Range	T <sub>J</sub>	-55 ~ 125	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ 150	°C
SSCT15V21D2			
Parameter	Symbol	Value	Unit
Peak Pulse Power (tp=8/20μs waveform)	P <sub>PPP</sub>	350	W
Peak Pulse Current (tp=8/20μs waveform)	I <sub>PP</sub>	10	A
ESD Rating per IEC61000-4-2:	Contact	30	KV
	Air	30	
Operating Temperature Range	T <sub>J</sub>	-55 ~ 125	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ 150	°C
SSCT24V21D2			
Parameter	Symbol	Value	Unit
Peak Pulse Power (tp=8/20μs waveform)	P <sub>PPP</sub>	350	W
Peak Pulse Current (tp=8/20μs waveform)	I <sub>PP</sub>	7	A
ESD Rating per IEC61000-4-2:	Contact	30	KV
	Air	30	
Operating Temperature Range	T <sub>J</sub>	-55 ~ 125	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ 150	°C



# SSCTXXX21D2

SSCT36V21D2			
Parameter	Symbol	Value	Unit
Peak Pulse Power (tp=8/20μs waveform)	P <sub>PPP</sub>	350	W
Peak Pulse Current (tp=8/20μs waveform)	I <sub>PP</sub>	5	A
ESD Rating per IEC61000-4-2:	Contact	30	KV
	Air	30	
Operating Temperature Range	T <sub>J</sub>	-55 ~ 125	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ 150	°C

## ● Electrical Characteristics @TA=25°C

SSCT3V321D2						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			3.3	V	
Breakdown Voltage	VBR	4.0			V	IT = 1mA
Reverse Leakage Current	IR			40	uA	VRWM = 3.3V
Clamping Voltage	IPP		6.5		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	IPP			10.5	V	IPP = 20A (8 x 20uS pulse)
Junction Capacitance	CJ		450		pF	VR = 0V, f = 1MHz
SSCT5V021D2						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			5	V	
Breakdown Voltage	VBR	6.2			V	IT = 1mA
Reverse Leakage Current	IR			10	uA	VRWM = 5V
Clamping Voltage	IPP		9.8		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	IPP			18.6	V	IPP = 17A (8 x 20uS pulse)
Junction Capacitance	CJ		300		pF	VR = 0V, f = 1MHz
SSCT12V21D2						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			12	V	
Breakdown Voltage	VBR	13.3			V	IT = 1mA
Reverse Leakage Current	IR			1	uA	VRWM = 12V
Clamping Voltage	IPP		19		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	IPP			32	V	IPP = 11A (8 x 20uS pulse)
Junction Capacitance	CJ		130		pF	VR = 0V, f = 1MHz

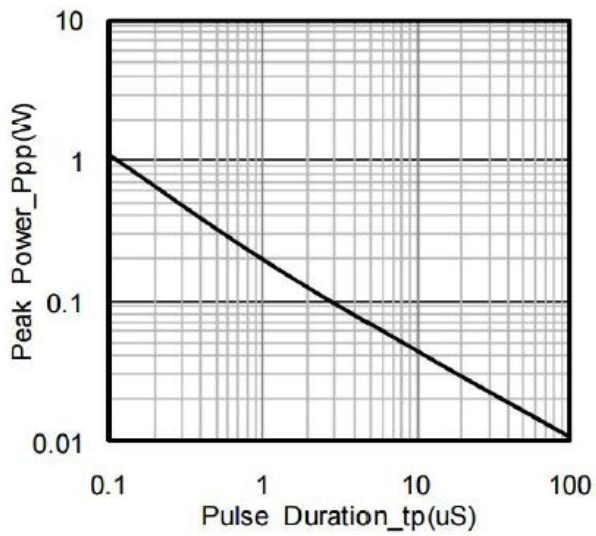


# SSCTXXX21D2

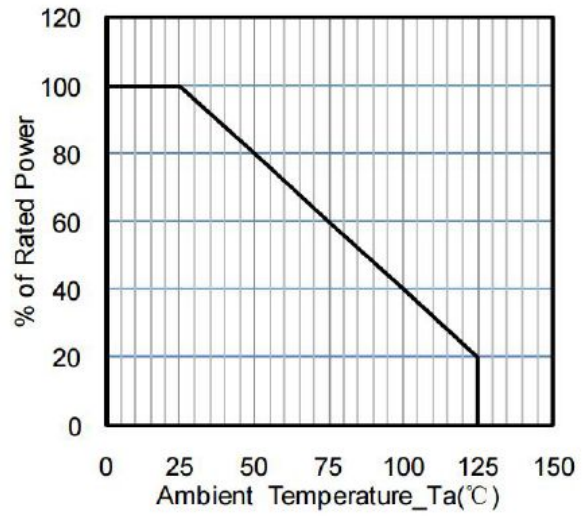
SSCT15V21D2						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			15	V	
Breakdown Voltage	VBR	16.7			V	IT = 1mA
Reverse Leakage Current	IR			1	uA	VRWM = 15V
Clamping Voltage	IPP		17.6		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	IPP			38	V	IPP = 10A (8 x 20uS pulse)
Junction Capacitance	CJ		120		pF	VR = 0V, f = 1MHz
SSCT24V21D2						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			24	V	
Breakdown Voltage	VBR	26.7			V	IT = 1mA
Reverse Leakage Current	IR			1	uA	VRWM = 24V
Clamping Voltage	IPP		43		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	IPP			52	V	IPP = 7A (8 x 20uS pulse)
Junction Capacitance	CJ		80		pF	VR = 0V, f = 1MHz
SSCT36V21D2						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	VRWM			36	V	
Breakdown Voltage	VBR	40			V	IT = 1mA
Reverse Leakage Current	IR			1	uA	VRWM = 36V
Clamping Voltage	IPP		60		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	IPP			52	V	IPP = 5A (8 x 20uS pulse)
Junction Capacitance	CJ		60		pF	VR = 0V, f = 1MHz



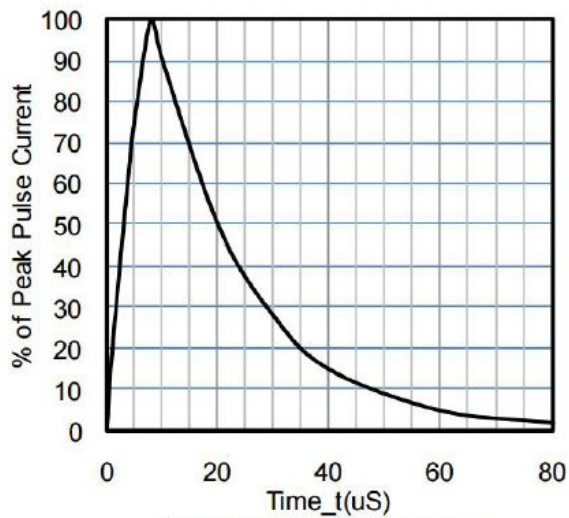
- Typical Performance Characteristics



Peak Pulse Power vs. Pulse Time



Power Derating Curve

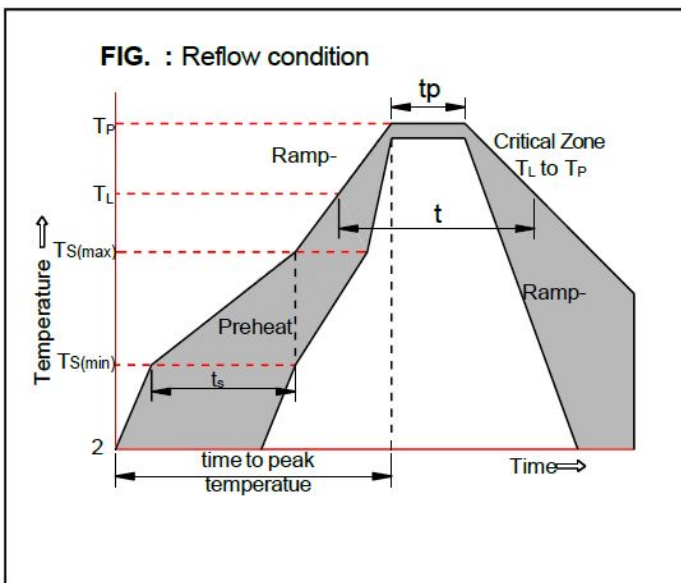


8 X 20uS Pulse Waveform



- Soldering Parameters

Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min (Ts(min))	+150°C
	-Temperature Max(Ts(max))	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (TL) to peak)		3°C/sec. Max
Ts(max) to TL - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(TL)(Liquid us)	+217°C
	-Temperature(tL)	60-150 secs.
Peak Temp (Tp)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (tp)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (TP)		8 min. Max
Do not exceed		+260°C





# SSCTXXX21D2

## ● Package Information

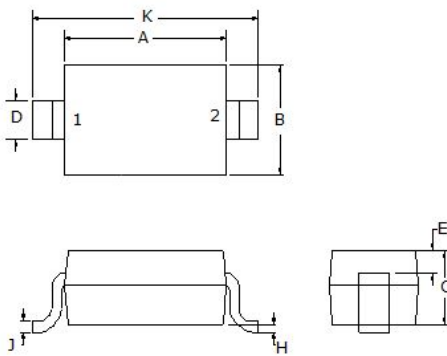
### Ordering Information

Device	Package	Qty per Reel	Reel Size
SSCT3V321D2	SOD-323	3000	7 Inch
SSCT5V021D2	SOD-323	3000	7 Inch
SSCT12V21D2	SOD-323	3000	7 Inch
SSCT15V21D2	SOD-323	3000	7 Inch
SSCT24V21D2	SOD-323	3000	7 Inch
SSCT36V21D2	SOD-323	3000	7 Inch

## Mechanical Data

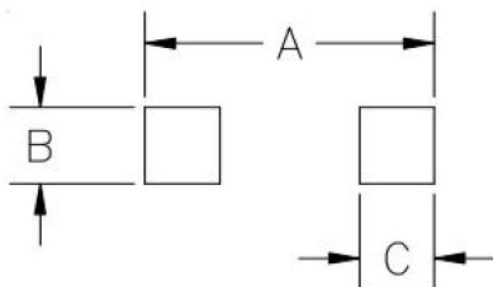
Case: SOD-323

Case Material: Molded Plastic. UL Flammability



Dim	Dimensions			
	Millimeters		Inches	
	Min	Max	Min	Max
A	1.50	1.80	0.060	0.071
B	1.2	1.40	0.045	0.054
C	-	1.10	-	0.043
D	0.30	0.40	0.012	0.016
H	-	0.10	-	0.004
J	0.10	0.25	0.004	0.010
K	2.30	2.70	0.090	0.107

## Recommended Pad outline



Dim	Dimensions	
	Millimeters	Inches
A	3.15	0.120
B	0.80	0.031
C	0.80	0.031



## DISCLAIMER

AFSEMI RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. AFSEMI DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENCE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

THE GRAPHS PROVIDED IN THIS DOCUMENT ARE STATISTICAL SUMMARIES BASED ON A LIMITED NUMBER OF SAMPLES AND ARE PROVIDED FOR INFORMATIONAL PURPOSE ONLY. THE PERFORMANCE CHARACTERISTICS LISTED IN THEM ARE NOT TESTED OR GUARANTEED. IN SOME GRAPHS, THE DATA PRESENTED MAY BE OUTSIDE THE SPECIFIED OPERATING RANGE (E.G., OUTSIDE SPECIFIED POWER SUPPLY RANGE ) AND THEREFORE OUTSIDE THE WARRANTED RANGE.