

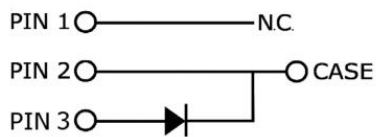
## S3D50065D1 650V SiC POWER SCHOTTKY RECTIFIER



### Description

S3D50065D1 is a SiC Schottky rectifier packaged in TO-247AD(TO-247-3) case. The device is a high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S3D50065D1 is ideal for energy sensitive, high frequency applications in challenging environments.

### Circuit Diagram



### Features

- 175°C T<sub>J</sub> operation
- Ultra-low switching loss
- Switching speeds independent of operating temperature
- Low total conduction losses
- High forward surge current capability
- High package isolation voltage
- Terminals finish: 100% Pure Tin
- “-A” is an AEC-Q101 qualified device
- Pb – Free Device
- All SMC parts are traceable to the wafer lot
- Additional electrical and life testing can be performed upon request

### Applications

- Alternative energy inverters
- Power Factor Correction (PFC)
- Free-Wheeling diodes
- Switching supply output rectification
- Reverse polarity protection

**Maximum Ratings:**

Characteristics	Symbol	Condition	Max.	Units
Peak Repetitive Reverse Voltage	$V_{RRM}$	-		
Working Peak Reverse Voltage	$V_{RWM}$		650	V
DC Blocking Voltage	$V_{DC}$			
Average Rectified Forward Current	$I_{F(AV)1}$	@ $T_c=25^{\circ}C$	112	A
	$I_{F(AV)2}$	$T_c=137^{\circ}C$	50	A
Repetitive Peak Forward Surge Current	$I_{FRM1}$	10ms, Half Sine pulse, $T_c=25^{\circ}C$	121	A
	$I_{FRM2}$	10ms, Half Sine pulse, $T_c=110^{\circ}C$	68	A
Peak One Cycle Non-Repetitive Surge Current	$I_{FSM1}$	10ms, Half Sine pulse, $T_c=25^{\circ}C$	300	A
	$I_{FSM2}$	10ms, Half Sine pulse, $T_c=110^{\circ}C$	209	A
Power Dissipation	$P_{tot1}$	$T_c=25^{\circ}C$	428.6	W
	$P_{tot2}$	$T_c=110^{\circ}C$	128.7	W

### Electrical Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	V <sub>F1</sub>	@ 50A, Pulse, T <sub>J</sub> = 25 °C	1.5	1.7	V
	V <sub>F2</sub>	@ 50A, Pulse, T <sub>J</sub> = 175 °C	2.0	2.4	V
Reverse Current at DC condition*	I <sub>R1</sub>	@V <sub>R</sub> = rated V <sub>R</sub> T <sub>J</sub> = 25 °C	1	40	uA
Reverse Current *	I <sub>R2</sub>	@V <sub>R</sub> = rated V <sub>R</sub> T <sub>J</sub> = 175 °C	10	60	uA
Junction Capacitance	C <sub>T</sub>	V <sub>R</sub> =0V, T <sub>J</sub> =25°C, f=100MHz	3520	-	nF
Reverse Recovery Charge	Q <sub>c</sub>	I <sub>F</sub> = 30A, di/dt = 200A/μs V <sub>R</sub> = 400 V, T <sub>J</sub> =25°C	193.4	-	nC
Capacitance Stored Energy	E <sub>c</sub>	V <sub>R</sub> = 400 V, T <sub>J</sub> =25°C	47.37	-	μJ

\* Pulse width < 300 μs, duty cycle < 2%

### Thermal-Mechanical Specifications:

Characteristics	Symbol	Condition	Specification	Units
Junction Temperature	T <sub>J</sub>	-	-55 to +175	°C
Storage Temperature	T <sub>stg</sub>	-	-55 to +175	°C
Typical Thermal Resistance Junction to Case	R <sub>θJC</sub>	DC operation	0.70(per leg) 0.35(both leg)	°C/W

### Ordering Information

Device	Package	Shipping
S3D50065D1	TO-247AD(TO-247-3)	25pcs /tube

**Ratings and Characteristics Curves**

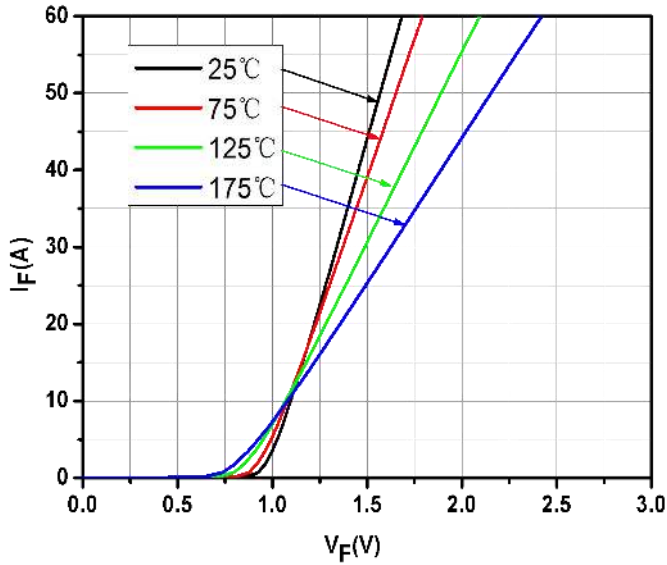


Fig.1-Typical Forward Voltage Characteristics

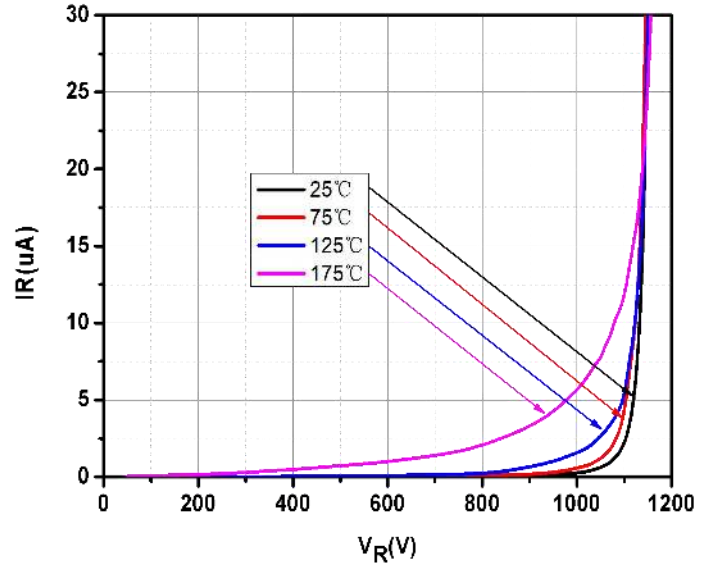


Fig.2-Typical Reverse Characteristics

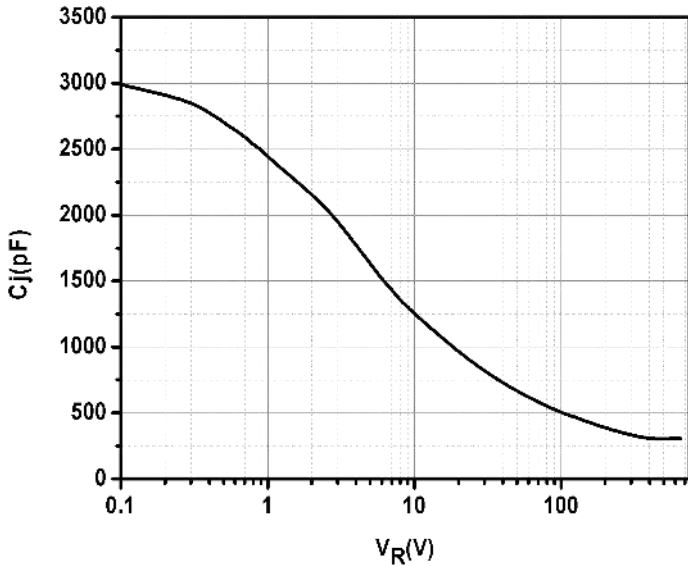


Fig.3-Capacitance vs. Reverse Voltage

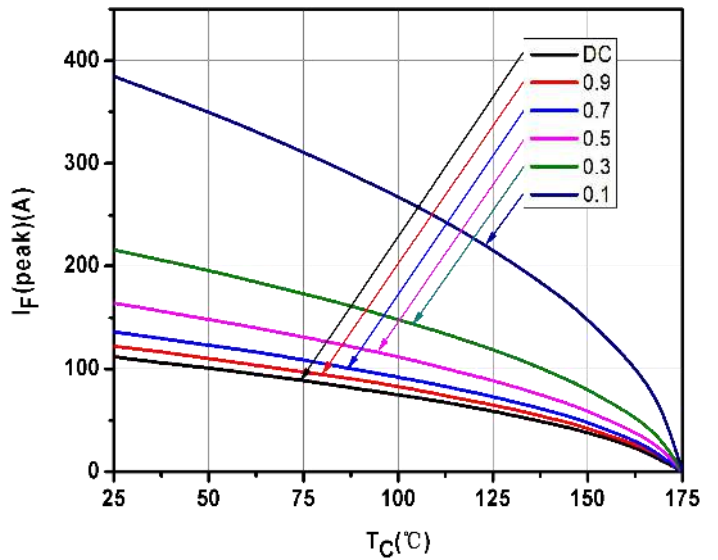


Fig.4-Current Derating

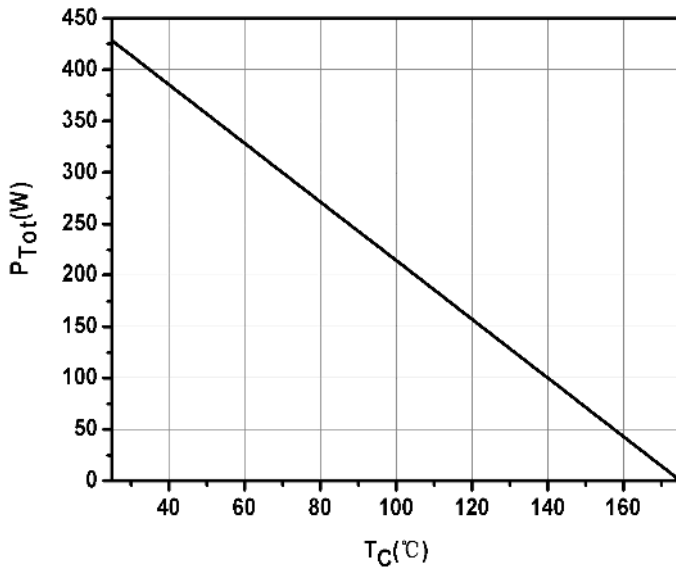


Fig.5-Power Derating

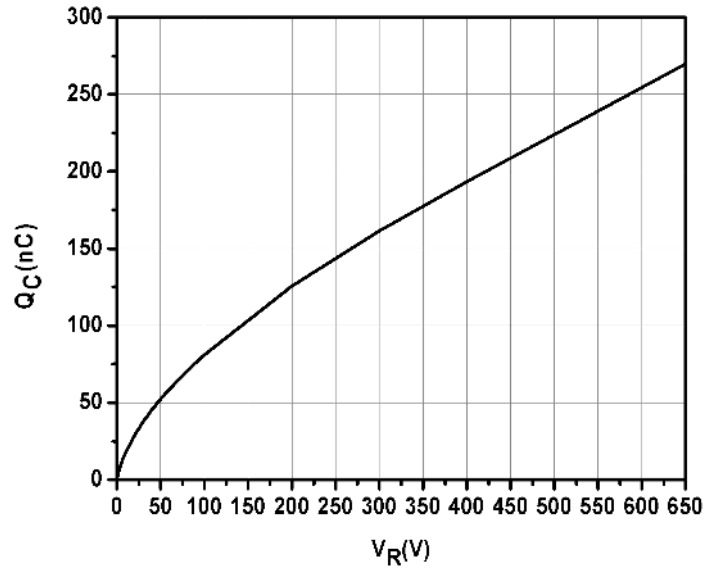


Fig.6-Total Capacitance Charge vs. Reverse Voltage

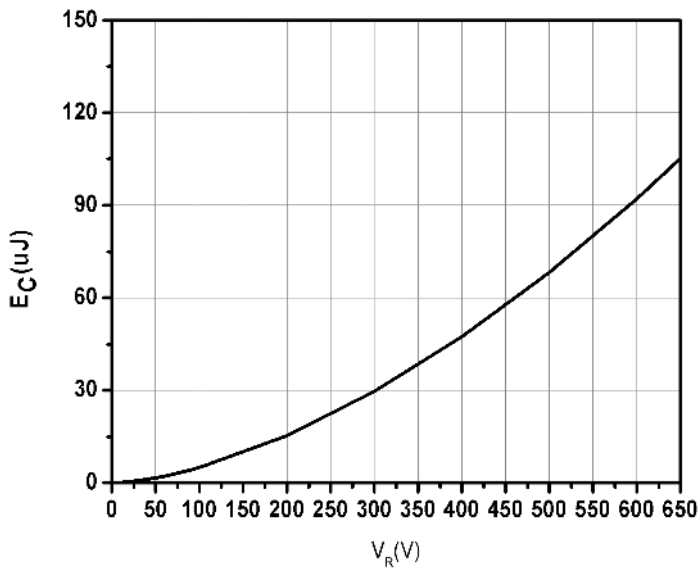
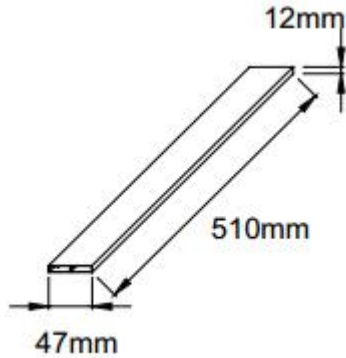
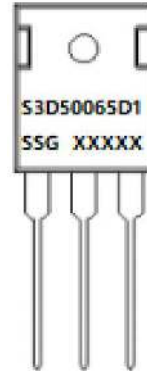


Fig.7-Capacitance Stored Energy

**Tube Specification**



**Marking Diagram**

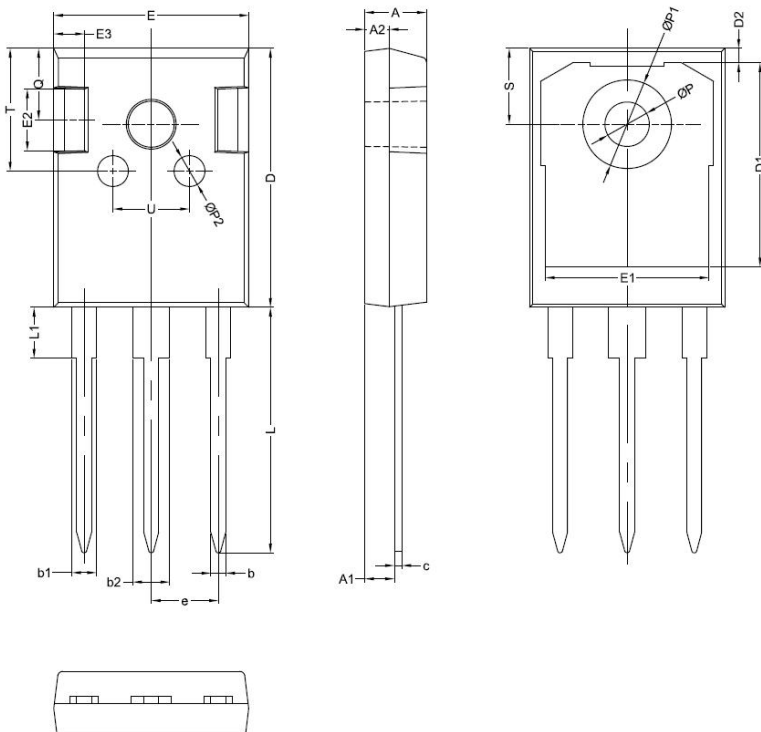


Where XXXXX is YYWWL

S3D = Device Type  
D1 = Package type  
50 = Forward Current (35A)  
065 = Reverse Voltage (650V)  
SSG = SSG  
YY = Year  
WW = Week  
L = Lot Number

**Cautions:** Molding resin  
Epoxy resin UL:94V-0

**Mechanical Dimensions TO-247AD**



SYMBOL	Millimeters		
	MIN.	TYP.	MAX.
A	4.80		5.20
A1	2.00		2.75
A2	1.90		2.10
b	1.00		1.40
b1	1.80		2.40
b2	2.80		3.40
c	0.40		0.75
D	19.80		21.20
D1		16.55	
D2		1.20	
E	15.20		16.00
E1		13.30	
E2		5.00	
E3		2.50	
e	5.20		5.70
L	13.90		20.70
L1	3.70		4.30
P	3.50		3.70
P1	7.1		7.40
P2		2.50	
Q		5.80	
S	6.05		6.25
T		10.00	
U		6.20	



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