

S3D20065D1

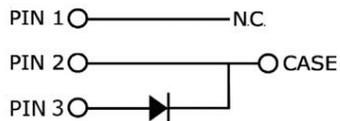
650V SIC POWER SCHOTTKY RECTIFIERS



Description

This 650V 20A diode is high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S3D20065D1 is ideal for energy sensitive, high frequency applications in challenging environments.

Circuit Diagram



Features

- 175°C TJ 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 Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_{DC}	-	650	V
Average Rectified Forward Current	$I_{F(AV)1}$	$T_C=25^{\circ}\text{C}$	68	A
	$I_{F(AV)2}$	$T_C=135^{\circ}\text{C}$	31	A
	$I_{F(AV)3}$	$T_C=155^{\circ}\text{C}$	20	A
Repetitive Peak Forward Surge Current	I_{FRM1}	10ms, Half Sine pulse, $T_C=25^{\circ}\text{C}$	105	A
	I_{FRM2}	10ms, Half Sine pulse, $T_C=110^{\circ}\text{C}$	70	A
Peak One Cycle Non-Repetitive Surge Current	I_{FSM1}	10ms, Half Sine pulse, $T_C=25^{\circ}\text{C}$	170	A
	I_{FSM2}	10ms, Half Sine pulse, $T_C=110^{\circ}\text{C}$	145	A
Non-Repetitive Peak Forward Surge Current	$I_{F,Max1}$	10 μs . Pulse, $T_C=25^{\circ}\text{C}$	1830	A
	$I_{F,Max2}$	10 μs . Pulse, $T_C=110^{\circ}\text{C}$	1260	A
Power Dissipation	P_{tot1}	$T_C=25^{\circ}\text{C}$	246	W
	P_{tot2}	$T_C=110^{\circ}\text{C}$	106	W

Electrical Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	V_{F1}	@ 20A, Pulse, $T_J = 25^{\circ}\text{C}$	1.45	1.7	V
	V_{F2}	@ 20A, Pulse, $T_J = 175^{\circ}\text{C}$	1.65	2.0	V
Reverse Current*	I_{R1}	@ $V_R = \text{rated } V_R$, $T_J = 25^{\circ}\text{C}$	1.5	50	μA
	I_{R2}	@ $V_R = \text{rated } V_R$, $T_J = 175^{\circ}\text{C}$	15	200	μA
Junction Capacitance	C_T	$V_R=0\text{V}$, $T_J=25^{\circ}\text{C}$, $f=1\text{MHz}$	1550	-	pF
Reverse Recovery Charge	Q_c	$I_F = 20\text{A}$, $di/dt=200\text{A}/\mu\text{s}$ $V_R = 400\text{V}$, $T_J = 25^{\circ}\text{C}$	96.7	-	nC
Capacitance Stored Energy	E_c	$V_R = 400\text{V}$, $T_J = 25^{\circ}\text{C}$	23.69	-	μJ

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

Thermal-Mechanical Specifications:

Characteristics	Symbol	Condition	Specification	Units
Junction Temperature	T_J	-	-55 to +175	°C
Storage Temperature	T_{stg}	-	-55 to +175	°C
Typical Thermal Resistance Junction to Case	$R_{\theta JC}$	DC operation	0.61	°C/W

Ordering Information

Device	Package	Plating	Shipping
S3D20065D1	TO-247AD(TO-247-3)	Pure Sn	25pcs / tube

Ratings and Characteristics Curves

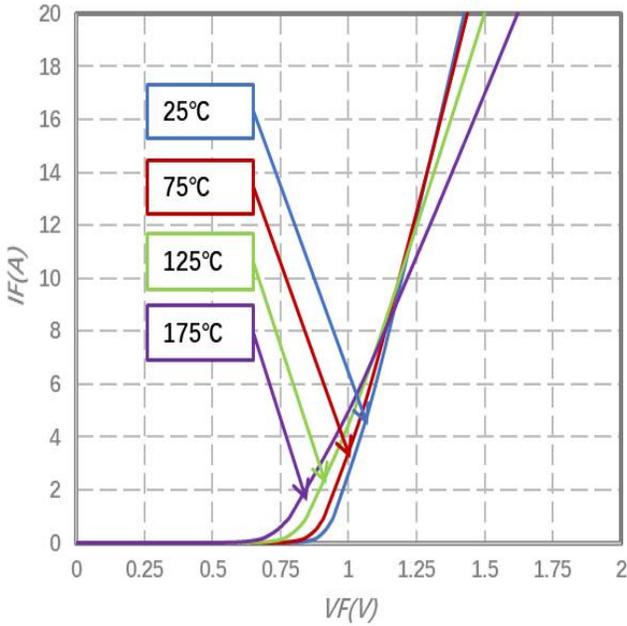


Fig.1-Typical Forward Voltage Characteristics

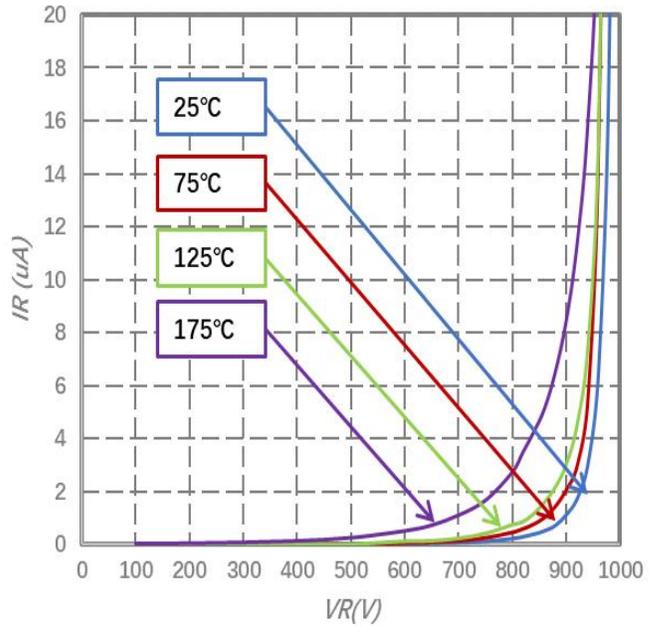


Fig.2-Typical Reverse Characteristics

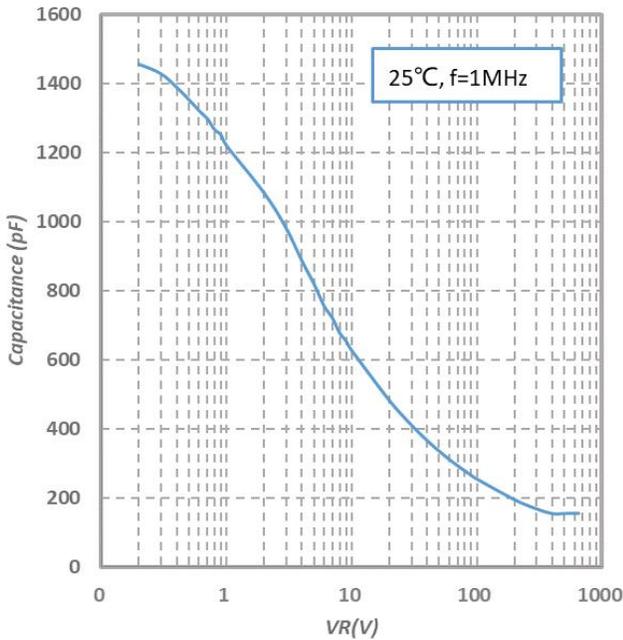


Fig.3-Capacitance vs. Reverse Voltage

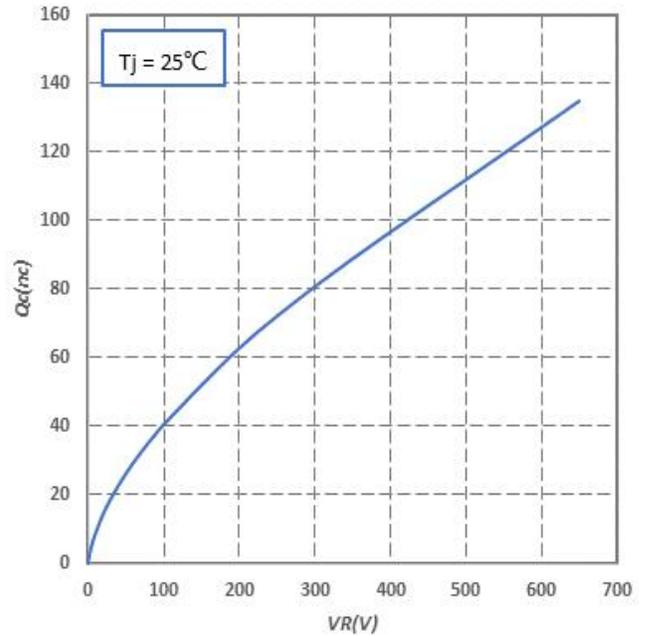


Fig.4-Total Capacitance Charge vs. Reverse Voltage

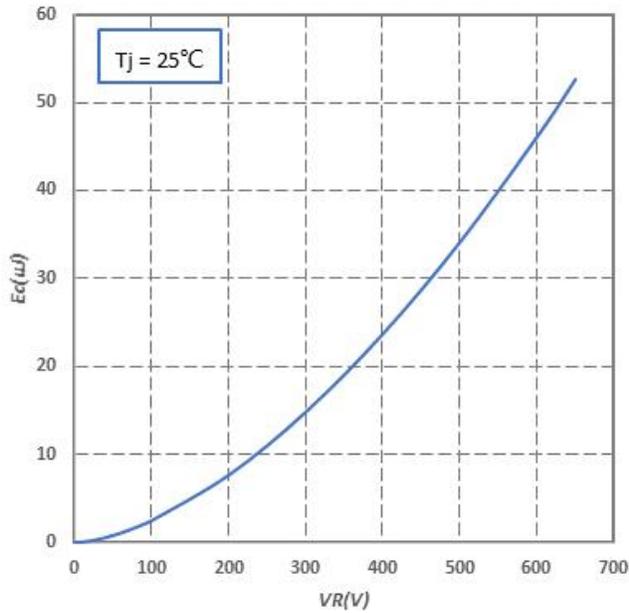


Fig.5-Capacitance Stored Energy

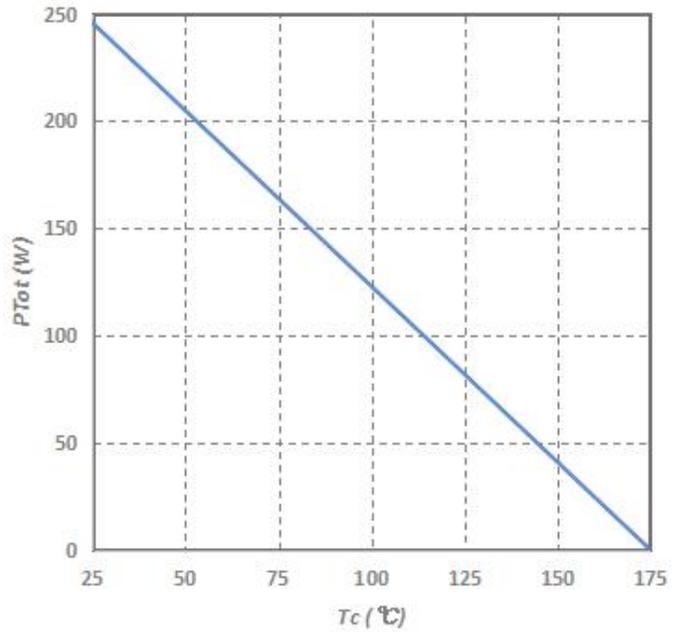


Fig.6-Power Derating

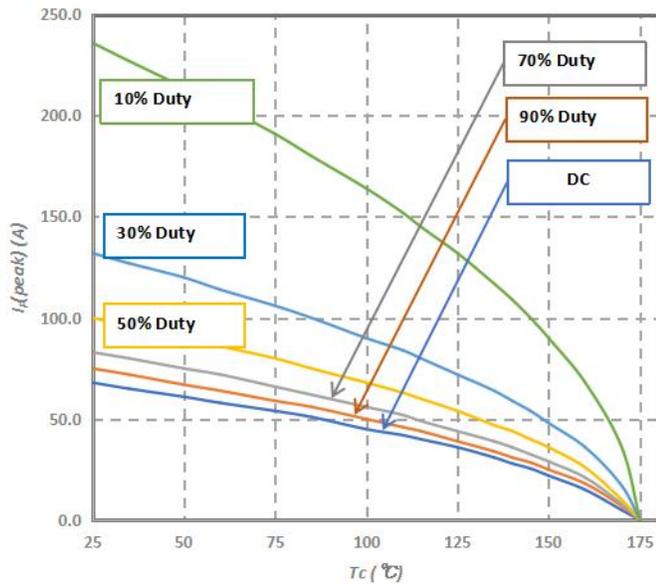
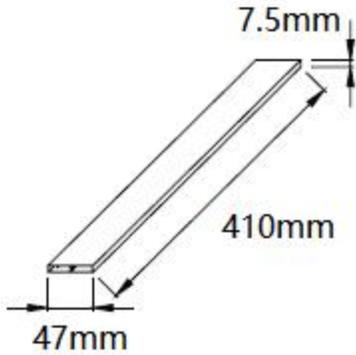
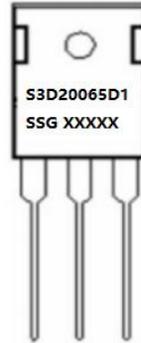


Fig.7-Current Derating

Tube Specification



Marking Diagram

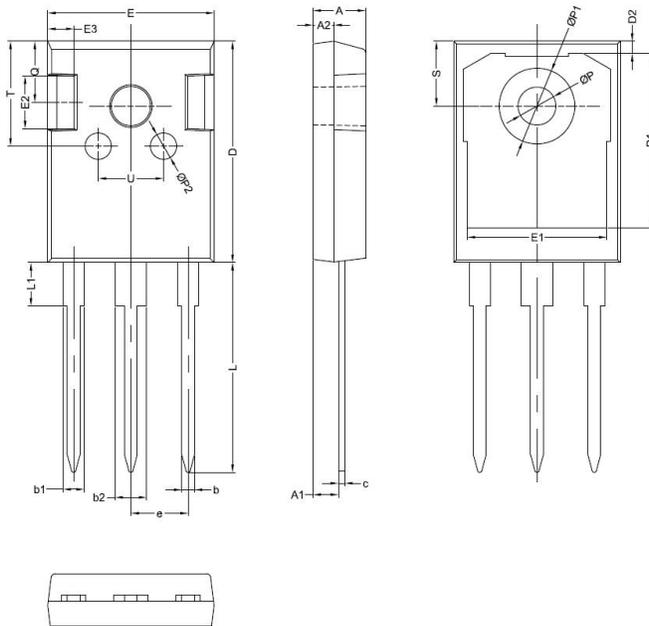


Where XXXXX is YYWWL

- S3D = Device Type
- D1 = Package type
- 20 = Forward Current (20A)
- 065 = Reverse Voltage (650V)
- SSG = SSG
- YY = Year
- WW = Week
- L = Lot Number

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

Mechanical Dimensions



SYMBOL	Millimeters		
	MIN.	TYP.	MAX.
A	4.80	5.00	5.20
A1	2.20	2.41	2.61
A2	1.90	2.00	2.10
b	1.10	1.20	1.40
b1	1.80	2.00	2.20
b2	2.80	3.00	3.20
c	0.50	0.60	0.75
D	20.30	21.00	21.20
D1		16.55	
D2		1.20	
E	15.45	15.80	16.00
E1		13.30	
E2		5.00	
E3		2.50	
e		5.44	
L	19.42	19.92	20.70
L1		4.13	
P	3.50	3.60	3.70
P1	7.1		7.40
P2		2.50	
Q		5.80	
S	6.05	6.15	6.25
T		10.00	
U		6.20	

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