Technical Data
Data Sheet N2343, REV.E

S3D20065D S3D20065C
650V SIC POWER SCHOTTKY RECTIFIER

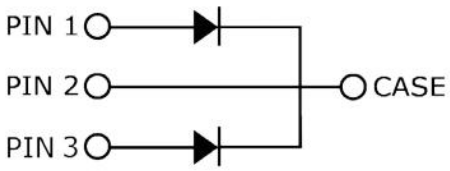
TO-247AD(TO-247-3)

TO-220AB(TO-220-3)

Description

S3D20065D/S3D20065C are SiC Schottky rectifiers packaged in TO-247AD(TO-247-3)/TO-220AB(TO-220-3) case. The devices are high voltage Schottky rectifiers that have very low total conduction losses and very stable switching characteristics over temperature extremes. The S3D20065D/S3D20065C are ideal for energy sensitive, high frequency applications in challenging environments.

Circuit Diagram



Features

- 175°C T_J 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

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Maximum Ratings(per leg)

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	$I_{F\ (AV)1}$	Tc=25°C	31	A
	$I_{F\ (AV)2}$	Tc=135°C	14	A
	$I_{F\ (AV)3}$	Tc=150°C	10	A
Repetitive Peak Forward Surge Current	I_{FRM1}	10ms, Half Sine pulse, T_C =25°C	55	A
	I_{FRM2}	10ms, Half Sine pulse, T_C =110°C	40	A
Peak One Cycle Non-Repetitive Surge Current	I_{FSM1}	10ms, Half Sine pulse, T_C =25°C	115	A
	I_{FSM2}	10ms, Half Sine pulse, T_C =110°C	80	A
Non-Repetitive Peak Forward Surge Current	$I_{F,Max1}$	10μs. Pulse, T_C =25℃	995	A
	$I_{F,Max2}$	10μs. Pulse, T_C =110℃	685	A
Power Dissipation	P_{tot1}	T_C =25℃	103	W
	P_{tot2}	T_C =110℃	45	W
TO-247 Mounting Torque		M3 Screw	1	Nm
		6-32 Screw	8.8	bf-in

Electrical Characteristics(per leg)

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	V_{F1}	@ 10A, Pulse, T_J = 25 °C	1.45	1.7	V
	V_{F2}	@ 10A, Pulse, T_J = 175 °C	1.65	2.0	V
Reverse Current*	I_{R1}	@V_R = rated V_R, T_J = 25 °C	0.7	40	uA
	I_{R2}	@V_R = rated V_R, T_J = 175 °C	7	160	uA
Junction Capacitance	C_T	V_R=0V, T_J=25℃, f=1MHz	787	-	pF
Reverse Recovery Charge	Q_c	I_F = 10A, di/dt = 200A/μs VR = 400 V, T_J =25°C	49.1	-	nC
Capacitance Stored Energy	E_C	V_R = 400 V, T_J =25°C	12.03	-	μJ

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

Thermal-Mechanical Specifications:

Characteristics	Symbol	S3D20065D	S3D20065C	Units
Junction Temperature	T_J	-55 to +175		°C
Storage Temperature	T_{stg}	-55 to +175		°C
Typical Thermal Resistance Junction to Case	$R_{\theta JC}$	0.84(per leg) 0.42(both leg)	2.4(per leg) 1.2(both leg)	°C/W

Ratings and Characteristics Curves (per leg)

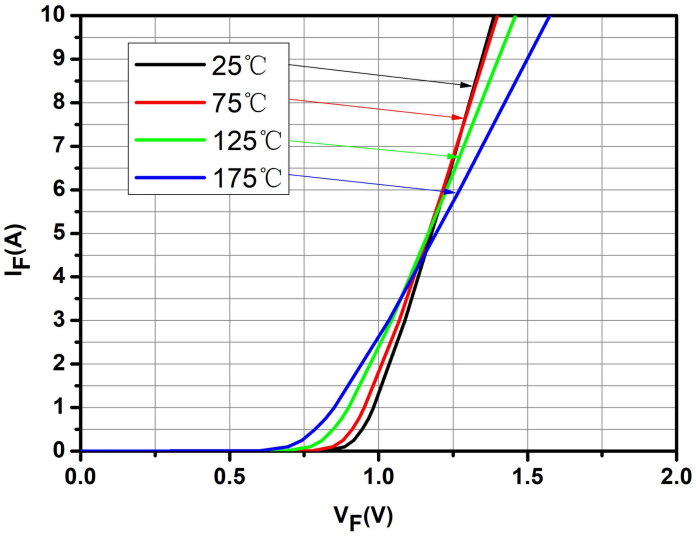

Fig.1-Typical Forward Voltage Characteristics

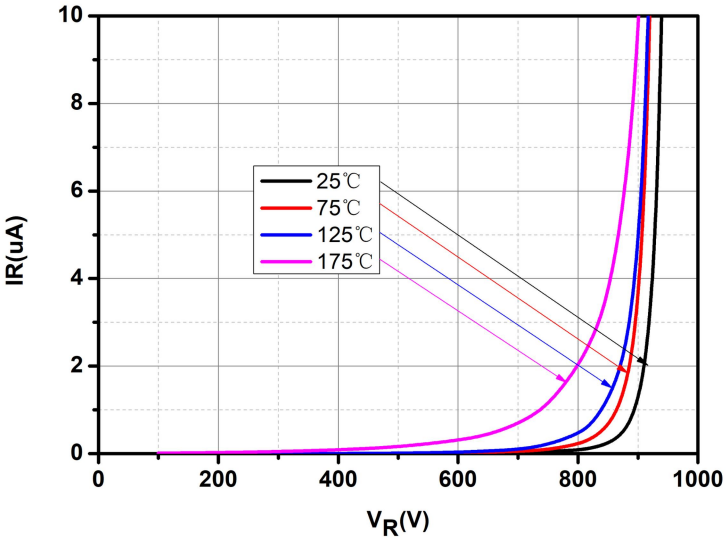

Fig.2-Typical Reverse Characteristics

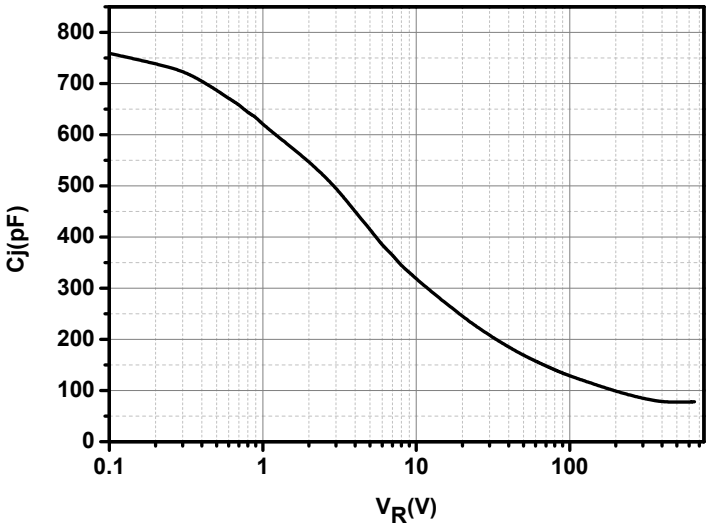

Fig.3-Capacitance vs. Reverse Voltage

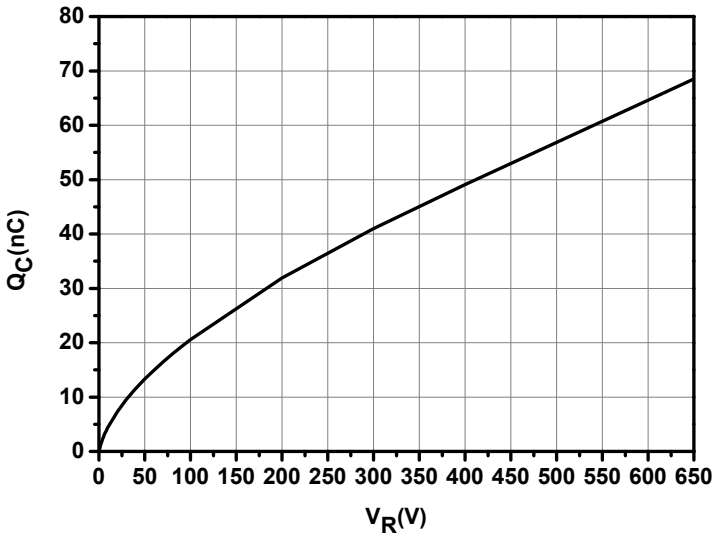

Fig.4-Total Capacitance Charge vs. Reverse Voltage

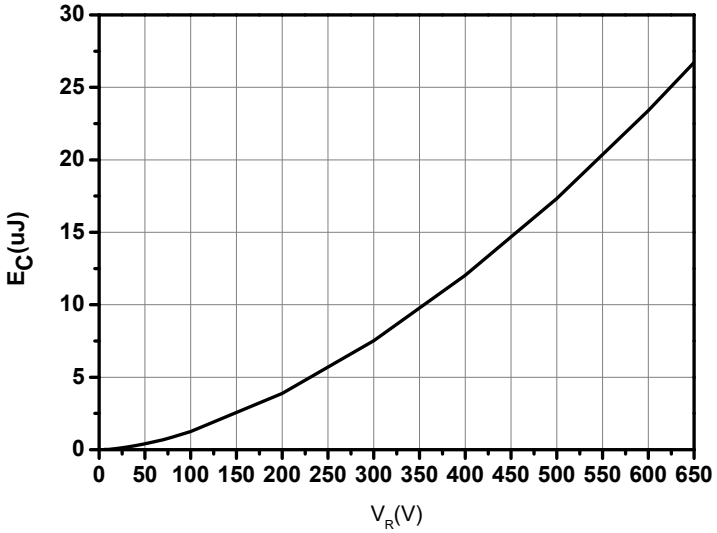

Fig.5-Capacitance Stored Energy

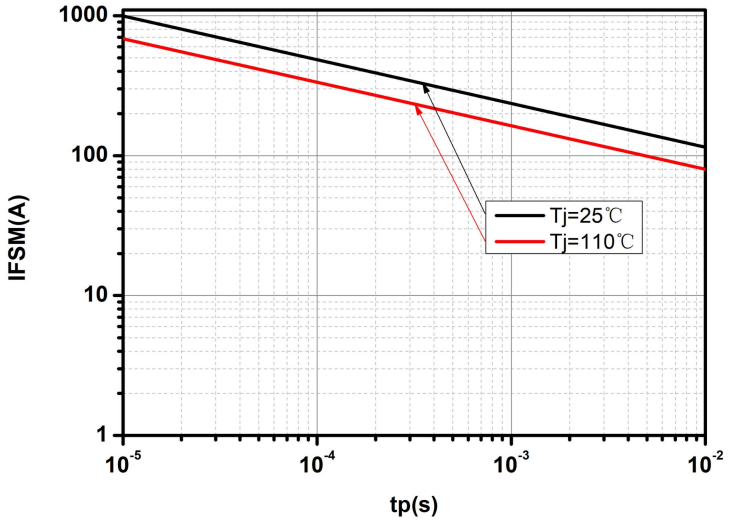

Fig.6-Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

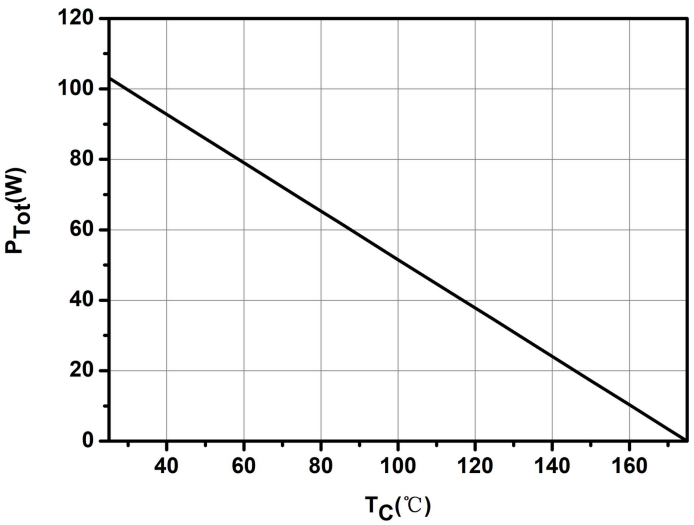

Fig.7-Power Derating

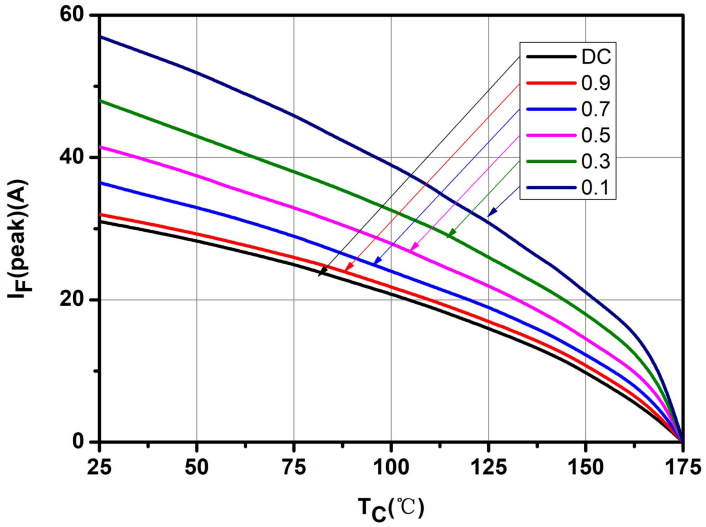

Fig.8-Current Derating

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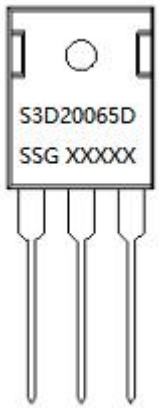
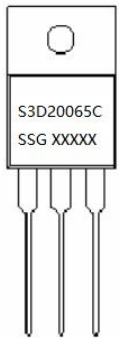
Ordering Information

Device	Package	Shipping
S3D20065D	TO-247AD(TO-247-3)	25pcs /tube
S3D20065C	TO-220AB(TO-220-3)	50pcs /tube

Marking Diagram



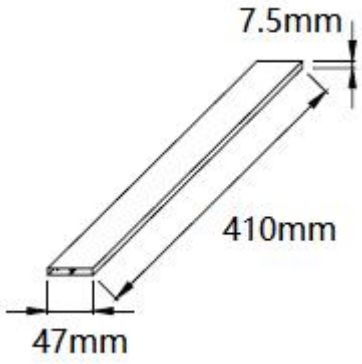


Where XXXXX is YYWWL

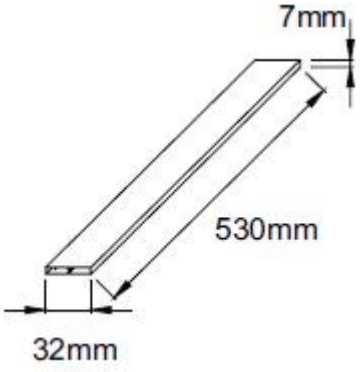
S3D	= Device Type
D/C	= Package type
20	= Forward Current (20A)
065	= Reverse Voltage (650V)
SSG	= SSG
YY	= Year
WW	= Week
L	= Lot Number

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

Tube Specification



TO-247AD(TO-247-3)



TO-220AB(TO-220-3)

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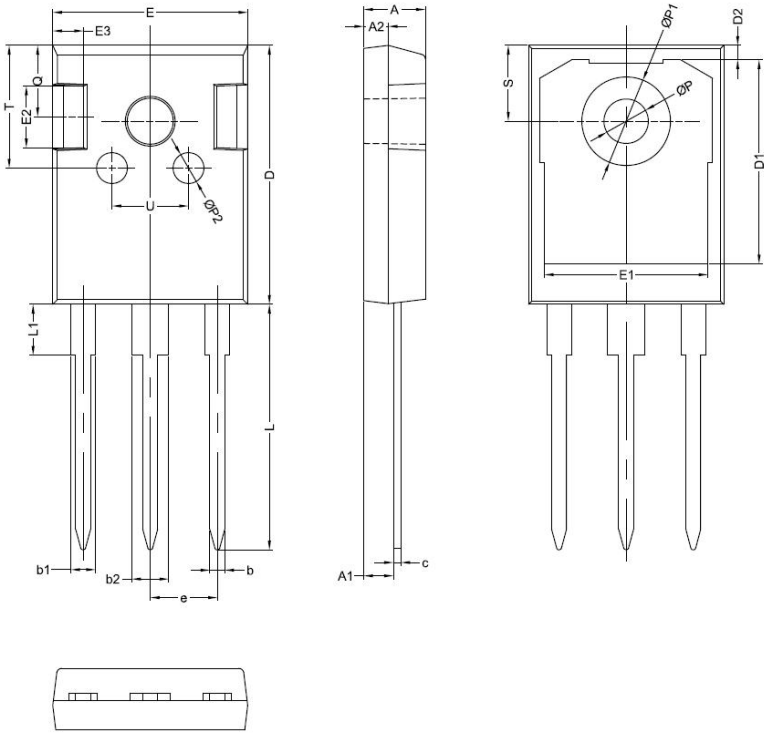
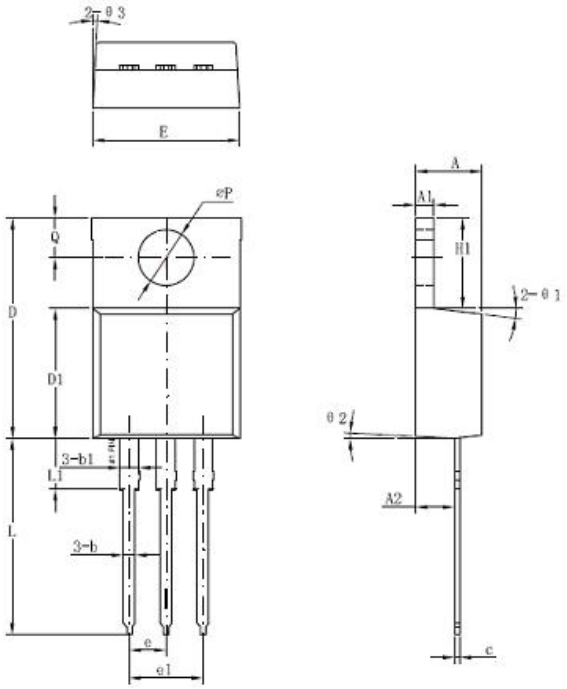
Mechanical Dimensions TO-247AD



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	

Mechanical Dimensions TO-220AB



Symbol	Dimensions in millimeters		
	Min	Typical	Max
A	3.56	-	4.83
A1	0.51	-	1.40
A2	2.03	-	2.92
b	0.38	-	1.02
b1	1.14	-	1.78
c	0.31	-	0.61
D	14.22	-	16.51
D1	8.38	-	9.42
E	9.65	-	10.67
e	-	2.54	-
e1	-	5.08	-
H1	5.84	-	6.86
L	12.70	-	14.73
L1	-	-	6.35
ΦP	-	3.56	-
Q	2.54	-	3.43

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