

## S3D20065A/S3D20065H/S3D20065G 650V SIC POWER SCHOTTKY RECTIFIERS

### Description



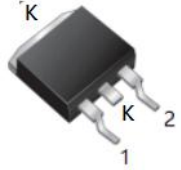
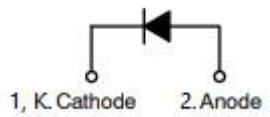
S3D20065A/S3D20065H/S3D20065G are SiC Schottky rectifiers packaged in TO-220AC(TO-220-2)/TO-247AC(TO-247-2)/D2PAK(TO-263-2) case. The devices are high voltage Schottky rectifiers that have very low total conduction losses and very stable switching characteristics over temperature extremes. The S3D20065A/S3D20065H/S3D20065G are ideal for energy sensitive, high frequency applications in challenging

### 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
- 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

S3D20065A	S3D20065H	S3D20065G
		
TO-220AC (TO-220-2)	TO-247AC (TO-247-2)	D2PAK (TO-263-2)
 <p>1, K. Cathode    2. Anode</p>		

**Technical Data**  
**Data Sheet N2347, REV.B**



**Maximum Ratings:**

Characteristics	Symbol	Condition	Max.	Units
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	-	650	V
Average Rectified Forward Current	$I_{F(AV)}$	50% duty cycle @ $T_c=150^{\circ}C$ , rectangular wave form	20	A
Peak One Cycle Non-Repetitive Surge Current	$I_{FSM}$	10ms, Half Sine pulse, $T_J=25^{\circ}C$	160	A
Repetitive Peak Forward Surge Current	$I_{FRM}$	10 ms, Half Sine pulse, $T_J=25^{\circ}C$	85	A

**Electrical Characteristics:**

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	$V_{F1}$	@ 20A, Pulse, $T_J = 25^{\circ}C$	1.5	1.7	V
	$V_{F2}$	@ 20A, Pulse, $T_J = 175^{\circ}C$	2.0	2.4	V
Reverse Current at DC condition*	$I_{R1}$	@ $V_R = \text{rated } V_R$ $T_J = 25^{\circ}C$	0.03	30	$\mu A$
Reverse Current *	$I_{R2}$	@ $V_R = \text{rated } V_R$ $T_J = 175^{\circ}C$	0.6	50	$\mu A$
Junction Capacitance	$C_T$	$V_R=0V, T_J=25^{\circ}C, f=1MHz$	1450	-	pF

\* Pulse width < 300  $\mu s$ , duty cycle < 2%

**Thermal-Mechanical Specifications:**

Characteristics	Symbol	S3D20065A	S3D20065H	S3D20065G	Units
Junction Temperature	$T_J$	-55 to +175			$^{\circ}C$
Storage Temperature	$T_{stg}$	-55 to +175			$^{\circ}C$
Typical Thermal Resistance Junction to Case	$R_{\theta JC}$	1.7	0.61	1.65	$^{\circ}C/W$

**Ordering Information**

Device	Package	Plating	Shipping
S3D20065A	TO-220AC(TO-220-2)	Pure Sn	50pcs / tube
S3D20065H	TO-247AC(TO-247-2)	Pure Sn	25pcs / tube
S3D20065G	D2PAK(TO-263-2)	Pure Sn	800pcs / reel

For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.

**Ratings and Characteristics Curves**

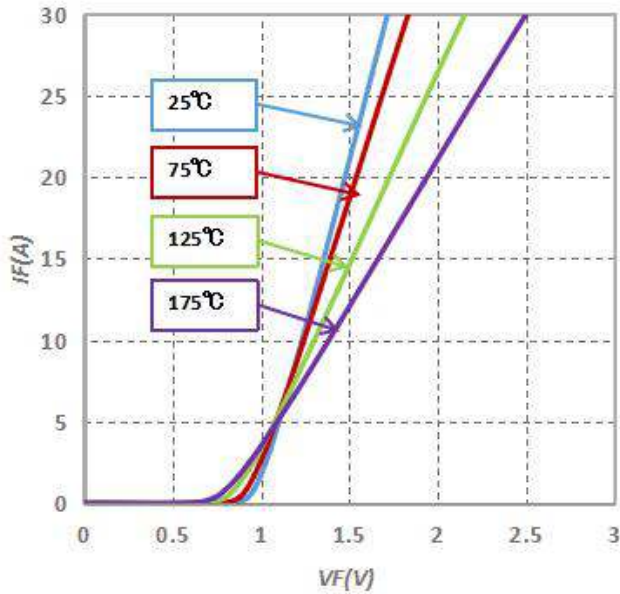


Fig.1-Typical Forward Voltage Characteristics

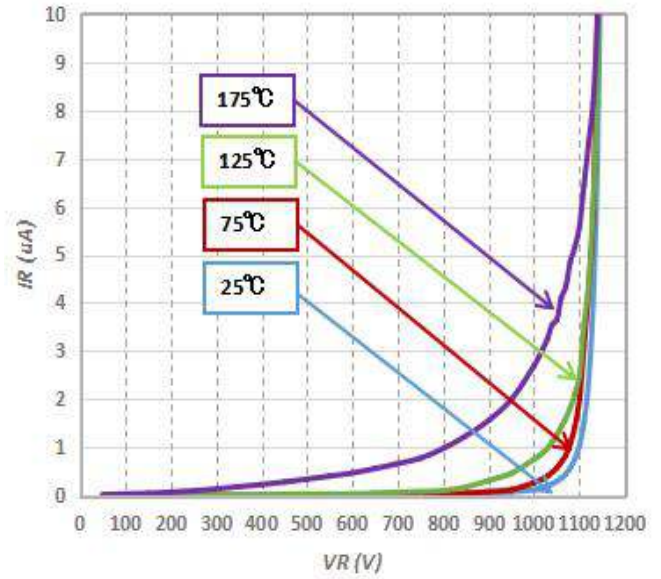


Fig.2-Typical Reverse Characteristics

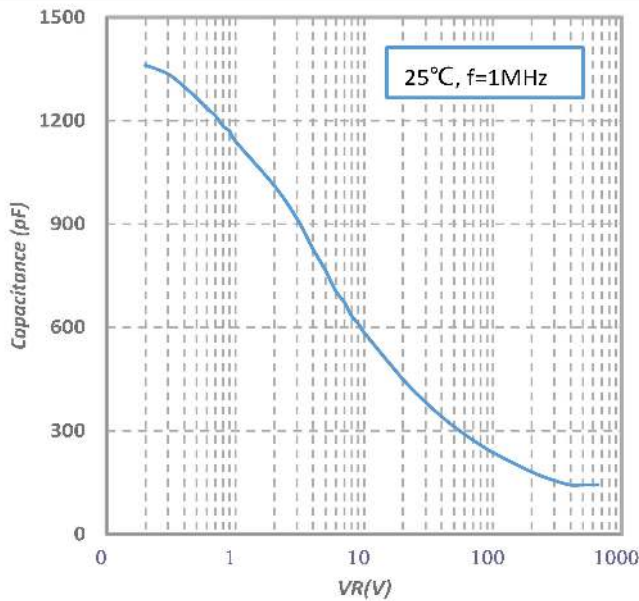
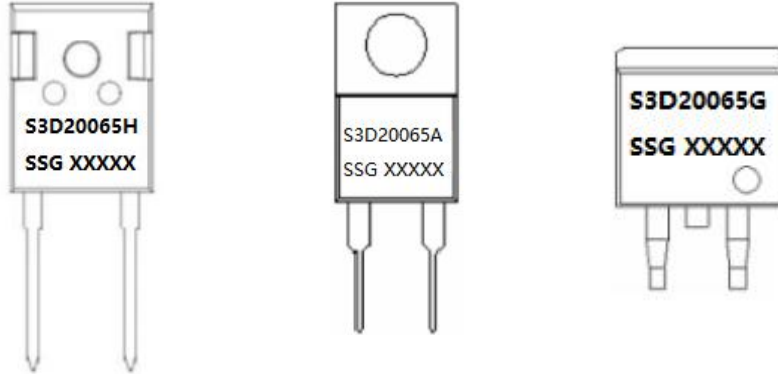


Fig.3-Capacitance vs. Reverse Voltage

## Marking Diagram

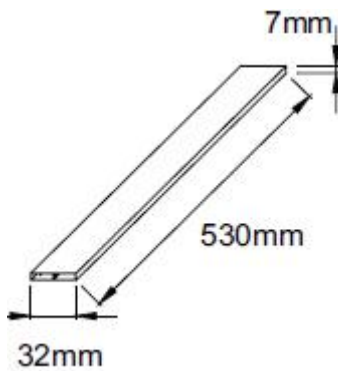


Where XXXXX is YYWWL

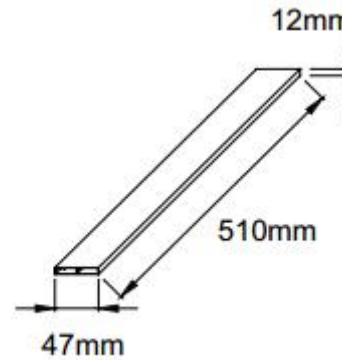
S3D = Device Type  
A/H/G = Package type  
20 = Forward Current (20A)  
065 = Reverse Voltage (650V)  
SSG = SSG  
YY = Year  
WW = Week  
L = Lot Number

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

## Tube Specification

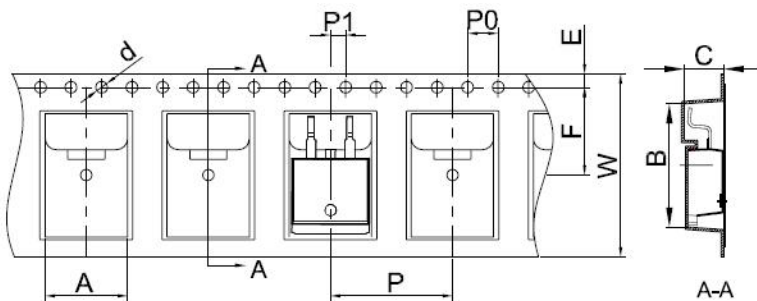


TO-220AC(TO-220-2)



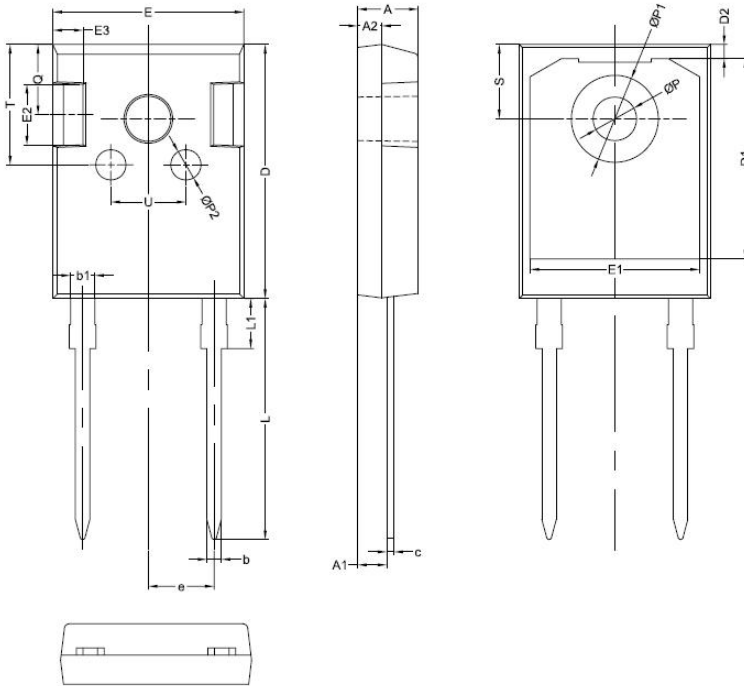
TO-247AC(TO-247-2)

## Carrier Tape & Reel Specification D2PAK(TO-263-2)



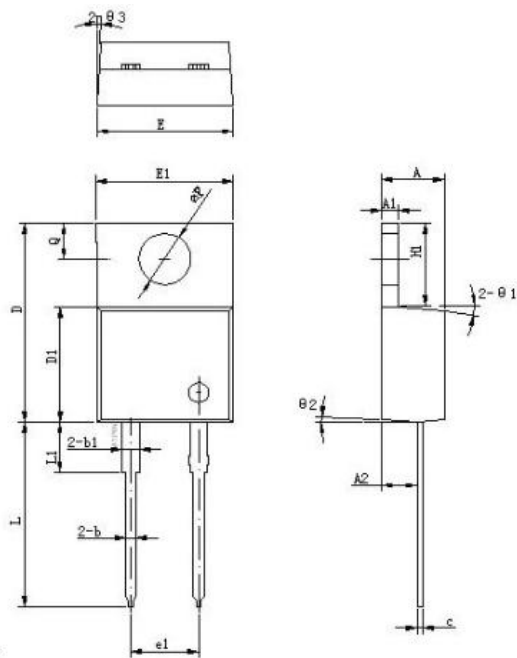
SYMBOL	Millimeters	
	Min.	Max.
A	10.70	10.90
B	16.03	16.23
C	5.11	5.31
d	1.45	1.65
E	1.65	1.85
F	11.40	11.60
P0	3.90	4.10
P	15.90	16.10
P1	1.90	2.10
W	23.90	24.30

**Mechanical Dimensions TO-247AC(TO-247-2)**



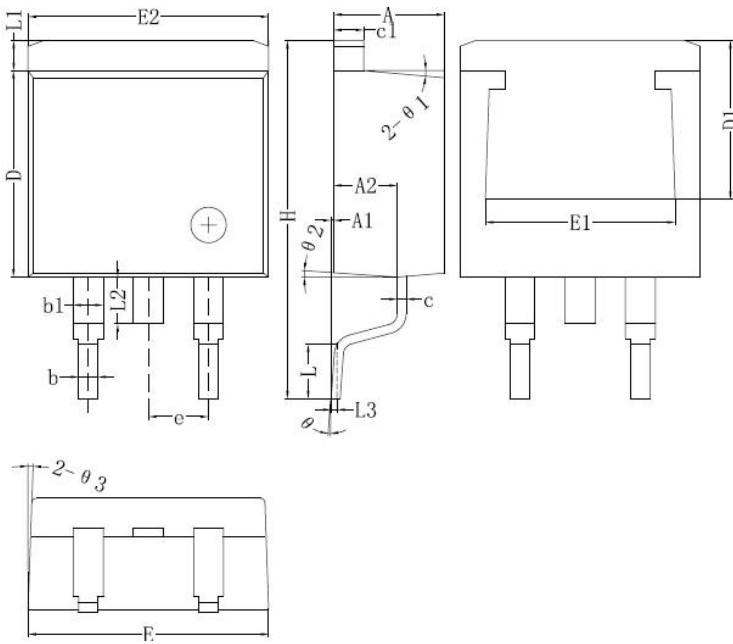
SYMBOL	Millimeters		
	MIN.	TYP.	MAX.
A	4.80	5.00	5.20
A1	2.20	2.41	2.61
A2	1.90	2.00	2.10
b	1.10	1.20	1.35
b1	1.80	2.00	2.20
c	0.50	0.60	0.75
D	20.30	21.00	21.20
D1		16.58	
D2		1.17	
E	15.60	15.80	16.00
E1		14.02	
E2		5.00	
E3		2.50	
e		5.44	
L	19.42	19.92	20.42
L1		4.13	
P	3.50	3.60	3.70
P1	7.1	7.19	7.40
P2		2.50	
Q		5.80	
S	6.05	6.15	6.25
T		10.00	
U		6.20	

**Mechanical Dimensions TO-220AC(TO-220-2)**



Symbol	Dimensions in millimeters		
	Min.	Typical	Max.
A	4.55	4.70	4.85
A1	1.17	1.27	1.37
A2	2.59	2.69	2.89
b	0.71	0.81	0.96
b1		1.27	
c	0.36	0.38	0.61
D	14.64	14.94	15.24
D1	8.55	8.70	8.90
E	10.01	10.16	10.31
E1	9.98	10.18	10.38
e1		5.08	
H1	6.04	6.24	6.44
L	13.00	13.86	14.08
L1		3.80	
ΦP	3.74	3.84	4.04
Q	2.54	2.74	2.94
Ø1		5°	
Ø2		4°	
Ø3		4°	

**Mechanical Dimensions D<sup>2</sup>PAK(TO-263-2)**



Symbol	Dimensions in millimeters		
	Min.	Typical	Max.
A	4.55	4.70	4.85
A1	0	0.10	0.25
A2	2.59	2.69	2.89
b	0.71	0.81	0.96
b1		1.27	
c	0.36	0.38	0.61
c1	1.17	1.27	1.37
D	8.55	8.70	8.85
D1	6.40		
E	10.01	10.16	10.31
E1	7.6		
E2	9.98	10.08	10.18
e		2.54	
H	14.6	15.1	15.6
L	2.00	2.30	2.70
L1	1.17	1.27	1.40
L2			2.20
L3		0.25BSC	
θ	0	-	8°
θ1		5°	
θ2		4°	
θ3		4°	

**Technical Data**  
**Data Sheet N2347, REV.B**



**DISCLAIMER:**

1- The information given herein, including the specifications and dimensions, is subject to change without prior notice to improve product characteristics. Before ordering, purchasers are advised to contact the SMC Diode Solutions sales department for the latest version of the datasheet(s).

2- In cases where extremely high reliability is required (such as use in nuclear power control, aerospace and aviation, traffic equipment, medical equipment, and safety equipment), safety should be ensured by using semiconductor devices that feature assured safety or by means of users' fail-safe precautions or other arrangement.

3- In no event shall SMC Diode Solutions be liable for any damages that may result from an accident or any other cause during operation of the user's units according to the datasheet(s). SMC Diode Solution assumes no responsibility for any intellectual property claims or any other problems that may result from applications of information, products or circuits described in the datasheets.

4- In no event shall SMC Diode Solutions be liable for any failure in a semiconductor device or any secondary damage resulting from use at a value exceeding the absolute maximum rating.

5- No license is granted by the datasheet(s) under any patents or other rights of any third party or SMC Diode Solutions.

6- The datasheet(s) may not be reproduced or duplicated, in any form, in whole or part, without the expressed written permission of SMC Diode Solutions.

7- The products (technologies) described in the datasheet(s) are not to be provided to any party whose purpose in their application will hinder maintenance of international peace and safety nor are they to be applied to that purpose by their direct purchasers or any third party. When exporting these products (technologies), the necessary procedures are to be taken in accordance with related laws and regulations.