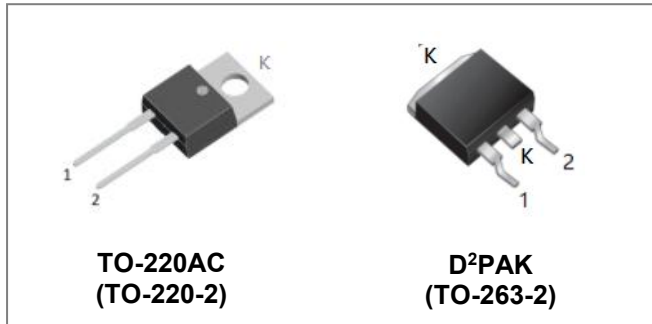


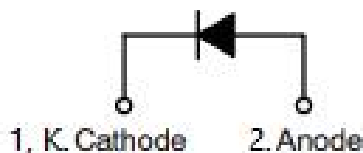
## S6D20065A S6D20065G 650V SIC POWER SCHOTTKY RECTIFIER



### Description

This 650V 20A device is high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S6D20065A/S6D20065G 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
- “-A” is an AEC-Q101 qualified device
- 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

**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	$I_{F(AV)1}$	$T_C=25^{\circ}C$	61	A
	$I_{F(AV)2}$	$T_C=135^{\circ}C$	23	A
	$I_{F(AV)3}$	$T_C=140^{\circ}C$	20	A
Repetitive Peak Forward Surge Current	$I_{FRM1}$	10ms, Half Sine pulse, $T_C=25^{\circ}C$	80	A
	$I_{FRM2}$	10ms, Half Sine pulse, $T_C=110^{\circ}C$	72	A
Peak One Cycle Non-Repetitive Surge Current	$I_{FSM1}$	10ms, Half Sine pulse, $T_C=25^{\circ}C$	135	A
	$I_{FSM2}$	10ms, Half Sine pulse, $T_C=110^{\circ}C$	120	A
Non-Repetitive Peak Forward Surge Current	$I_{F,Max1}$	10 $\mu$ s. Pulse, $T_C=25^{\circ}C$	1830	A
	$I_{F,Max2}$	10 $\mu$ s. Pulse, $T_C=110^{\circ}C$	1260	A
Power Dissipation	$P_{tot1}$	$T_C=25^{\circ}C$	136	W
	$P_{tot2}$	$T_C=110^{\circ}C$	59	W

**Electrical Characteristics:**

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	$V_{F1}$	@ 20A, Pulse, $T_J = 25^{\circ}C$	1.36	1.6	V
	$V_{F2}$	@ 20A, Pulse, $T_J = 175^{\circ}C$	1.55	1.8	V
Reverse Current*	$I_{R1}$	@ $V_R =$ rated $V_R$ , $T_J = 25^{\circ}C$	1	50	$\mu$ A
	$I_{R2}$	@ $V_R =$ rated $V_R$ , $T_J = 175^{\circ}C$	15	200	$\mu$ A
Junction Capacitance	$C_T$	$V_R=0V$ , $T_J=25^{\circ}C$ , $f=1MHz$	1650	-	pF
Reverse Recovery Charge	$Q_c$	$I_F = 20A$ , $di/dt=200A/\mu s$ $V_R = 400 V$ , $T_J = 25^{\circ}C$	102.9	-	nC
Capacitance Stored Energy	$E_c$	$V_R = 400 V$ , $T_J = 25^{\circ}C$	25.2	-	$\mu$ J

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

**Thermal-Mechanical Specifications:**

Characteristics	Symbol	S6D20065A	S6D20065G	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	$R_{\theta JC}$	1.1	1.65	$^{\circ}C/W$

**Ratings and Characteristics Curves**

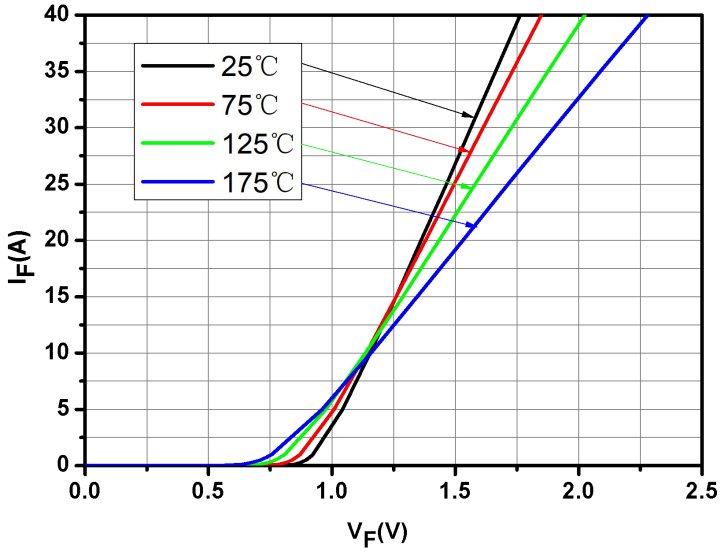


Fig.1-Typical Forward Voltage Characteristics

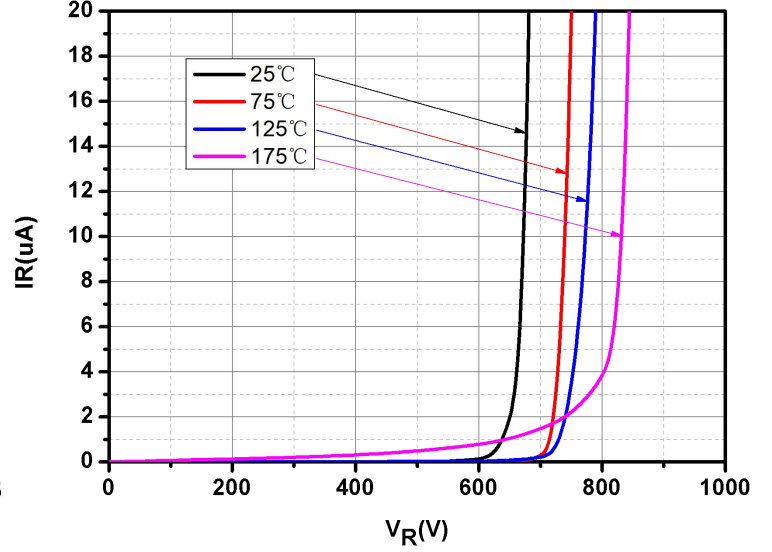


Fig.2-Typical Reverse Characteristics

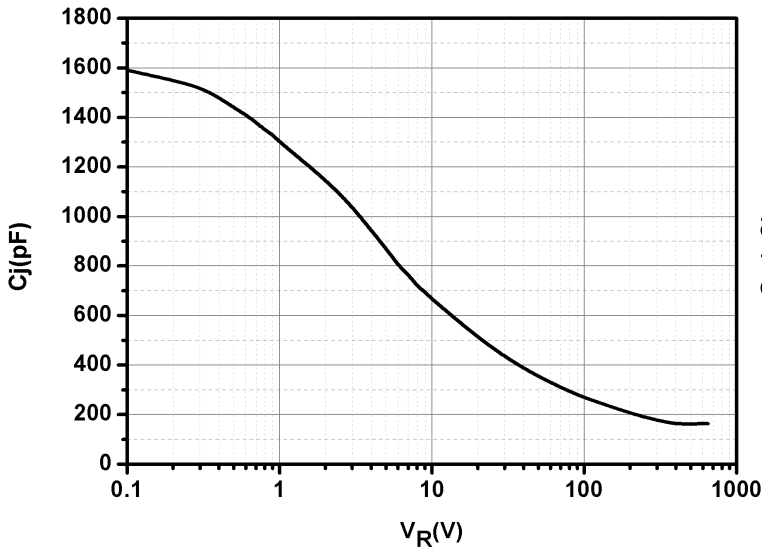


Fig.3-Capacitance vs. Reverse Voltage

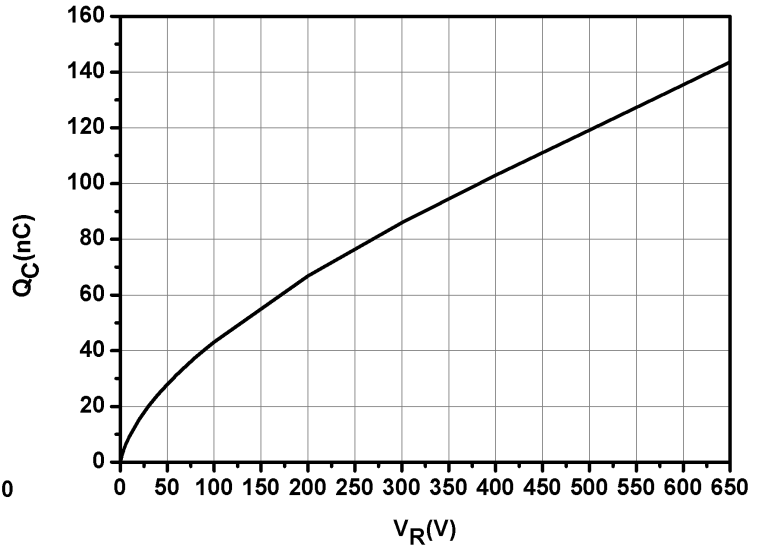


Fig.4-Total Capacitance Charge vs. Reverse Voltage

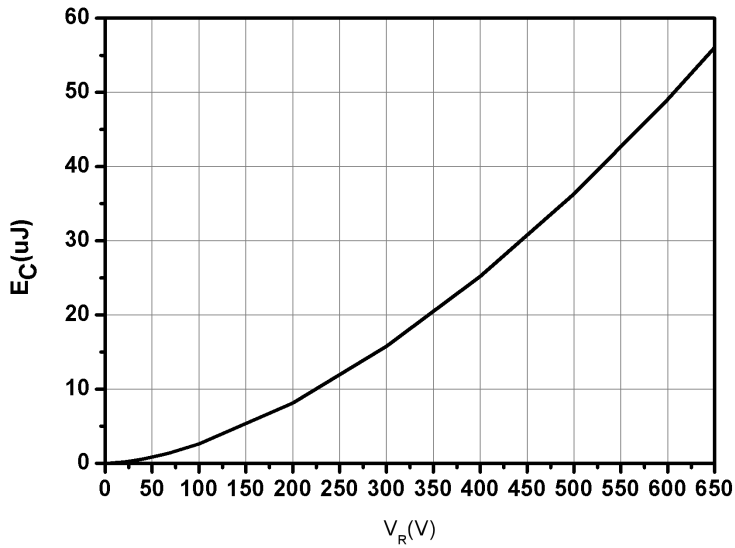


Fig.5-Capacitance Stored Energy

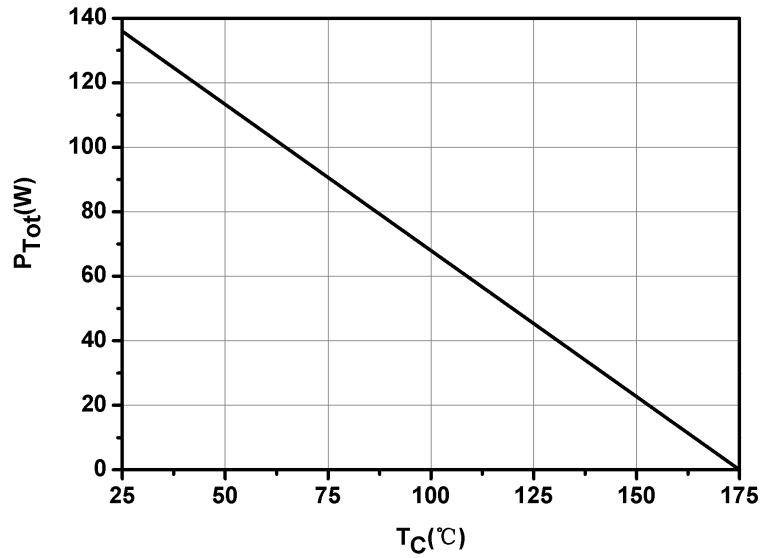


Fig.6-Power Derating

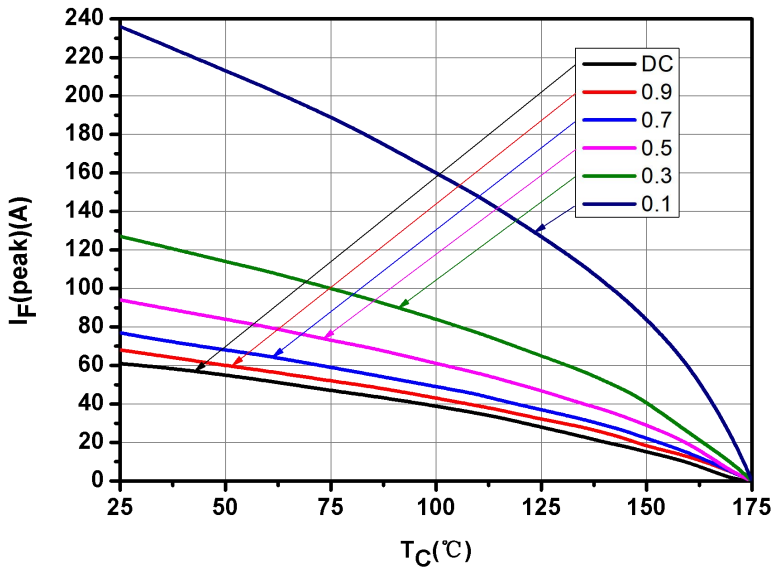


Fig.7-Current Derating

## Ordering Information

Device	Package	Shipping
S6D20065A	TO-220AC(TO-220-2)	50pcs / tube
S6D20065G	D2PAK (TO-263-2)	800pcs / Reel

## Marking Diagram

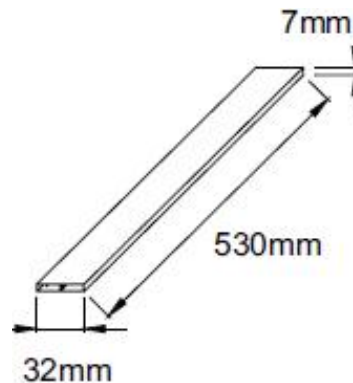


Where XXXXX is YYWWL

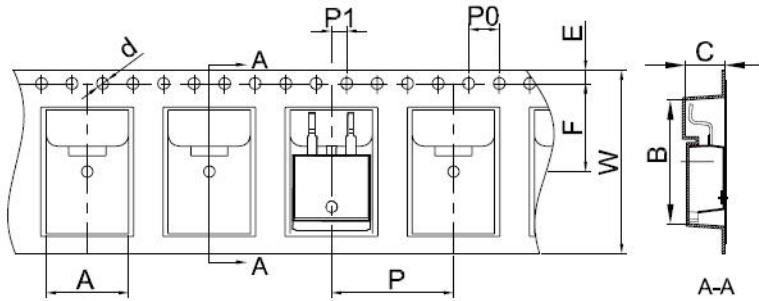
S6D = Device Type  
A/G = Package type  
20 = Forward Current (20A)  
065 = Reverse Voltage (650V)  
SSG = SSG  
YY = Year  
WW = Week  
L = Lot Number

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

## Tube Specification TO-220AC(TO-220-2)

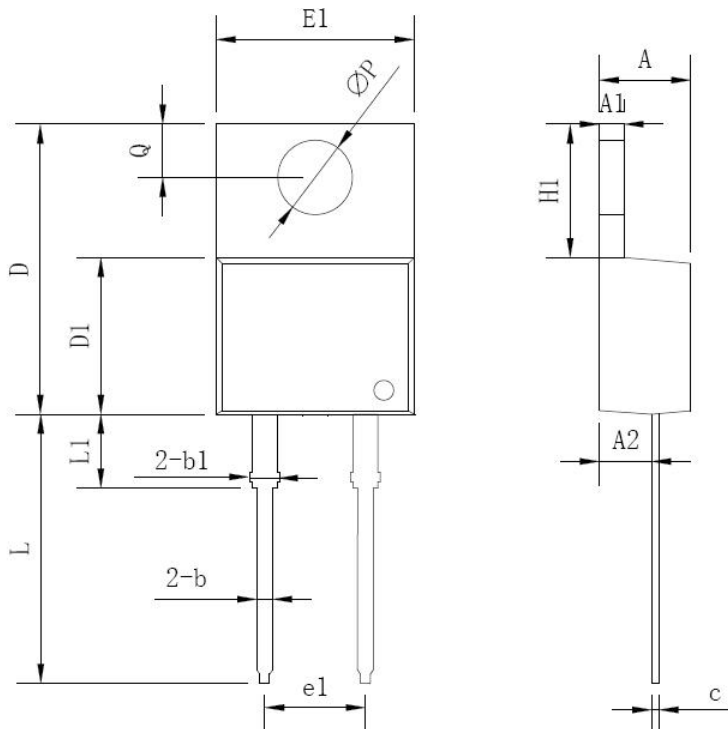


**Carrier Tape & Reel Specification D2PAK(TO-263-2)**



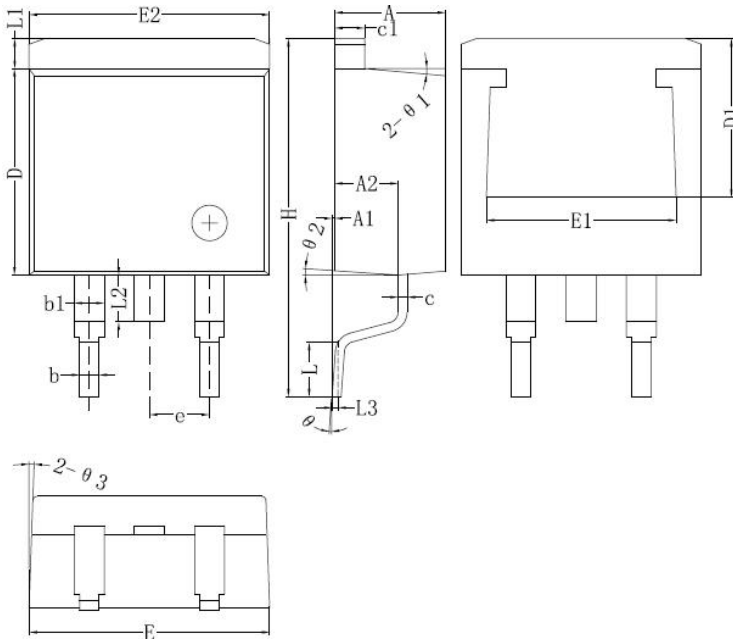
SYMBOL	Millimeters	
	Min.	Max.
A	10.70	10.90
B	16.03	16.23
C	5.11	5.31
d	1.45	1.65
E	1.65	1.85
F	11.40	11.60
P0	3.90	4.10
P	15.90	16.10
P1	1.90	2.10
W	23.90	24.30

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



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
E1	9.65	10.16	10.67
e1	-	5.08	-
H1	5.84	-	6.86
L	12.70	-	14.73
L1	-	-	6.35
ΦP	-	3.56	-
Q	2.54	-	3.43

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



Symbol	Dimensions in millimeters	
	Min.	Max.
A	4.06	4.83
A1	0	0.26
b	0.51	0.99
b1	1.14	1.78
c	0.31	0.74
c1	1.14	1.65
D	8.38	9.65
D1	6.4	
E1	6.22	
E2	9.65	10.67
e	2.54BSC	
H	14.6	15.88
L	1.78	2.8
L1	-	1.68
L2	-	2.2
L3	0.255BSC	
Θ	0	8°

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