

## S3D06065E

### 6A 650V SIC POWER SCHOTTKY RECTIFIERS



#### Description

This 650V 6A diode is a high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S3D06065E 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	$V_{RRM}$	-	650	V
Working Peak Reverse Voltage	$V_{RWM}$			
DC Blocking Voltage	$V_{DC}$			
Average Rectified Forward Current	$I_{F(AV)1}$	$T_C=25^{\circ}C$	24	A
	$I_{F(AV)2}$	$T_C=136^{\circ}C$	9	A
	$I_{F(AV)3}$	$T_C=157^{\circ}C$	6	A
Repetitive Peak Forward Surge Current	$I_{FRM1}$	10ms, Half Sine pulse, $T_C=25^{\circ}C$	42	A
	$I_{FRM2}$	10ms, Half Sine pulse, $T_C=110^{\circ}C$	29	A
Peak One Cycle Non-Repetitive Surge Current	$I_{FSM1}$	10ms, Half Sine pulse, $T_C=25^{\circ}C$	70	A
	$I_{FSM2}$	10ms, Half Sine pulse, $T_C=110^{\circ}C$	48	A
Non-Repetitive Peak Forward Surge Current	$I_{F,Max1}$	10 $\mu$ s. Pulse, $T_C=25^{\circ}C$	600	A
	$I_{F,Max2}$	10 $\mu$ s. Pulse, $T_C=110^{\circ}C$	500	A
Power Dissipation	$P_{tot1}$	$T_C=25^{\circ}C$	103	W
	$P_{tot2}$	$T_C=110^{\circ}C$	45	W

### Electrical Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	$V_{F1}$	@ 6A, Pulse, $T_J = 25^{\circ}C$	1.5	1.7	V
	$V_{F2}$	@ 6A, Pulse, $T_J = 175^{\circ}C$	1.75	2.2	V
Reverse Current*	$I_{R1}$	@ $V_R =$ rated $V_R$ $T_J = 25^{\circ}C$	0.03	3	$\mu$ A
	$I_{R2}$	@ $V_R =$ rated $V_R$ $T_J = 175^{\circ}C$	0.6	25	$\mu$ A
Junction Capacitance	$C_T$	$V_R=0V, T_J=25^{\circ}C, f=1MHz$	382	-	pF
Reverse Recovery Charge	$Q_C$	$I_F = 6A, di/dt = 200A/\mu s$ $V_R = 400V, T_J = 25^{\circ}C$	23.8	-	nC
Capacitance Stored Energy	$E_C$	$V_R = 400V, T_J = 25^{\circ}C$	5.88	-	$\mu$ J

\* Pulse width < 300  $\mu$ s, 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	1.45	°C/W

### Ordering Information

Device	Package	Shipping
S3D06065E	DPAK(TO-252-2)	2500pcs / reel
S3D06065ETR	DPAK(TO-252-2)	2500pcs / reel

**Ratings and Characteristics Curves**

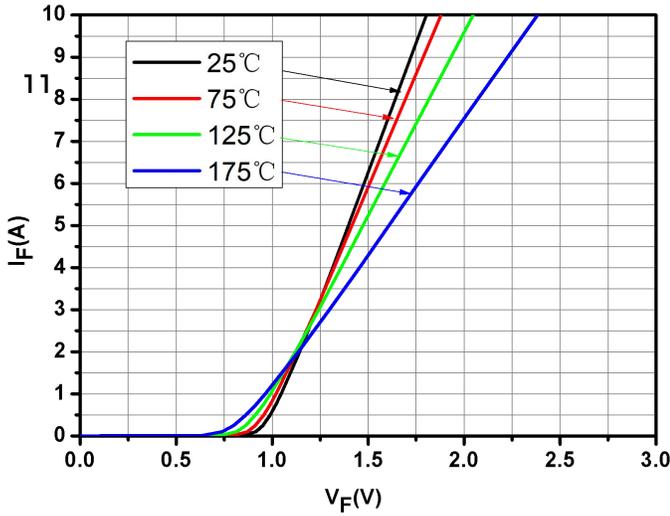


Fig.1-Typical Forward Voltage

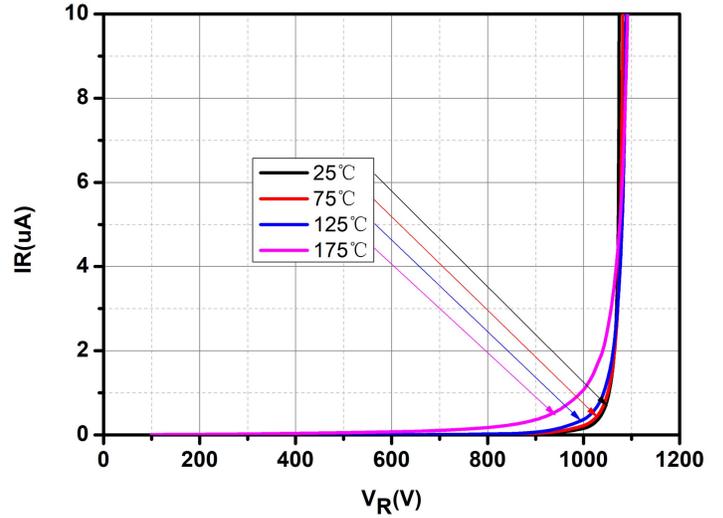


Fig.2-Typical Reverse Characteristics

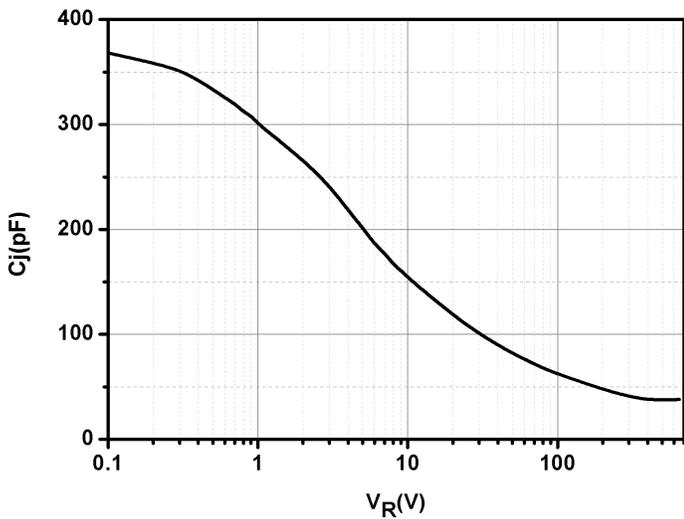


Fig.3-Capacitance vs. Reverse Voltage

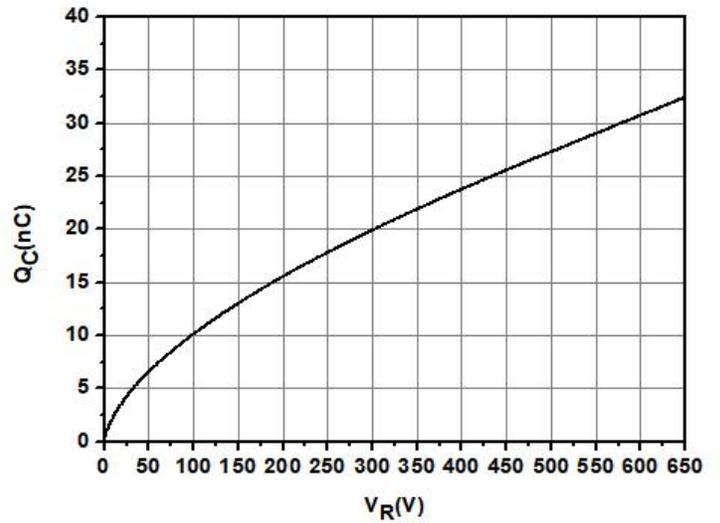


Fig.4-Total Capacitance Charge vs. Reverse Voltage

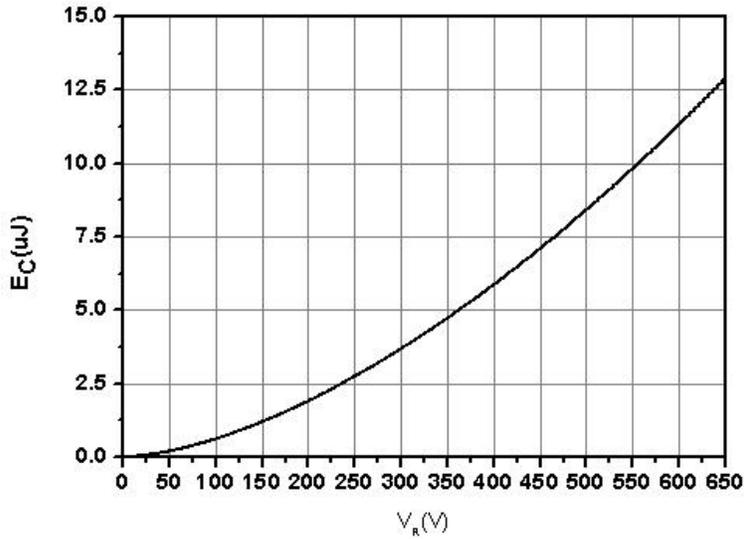


Fig.5-Capacitance Stored Energy

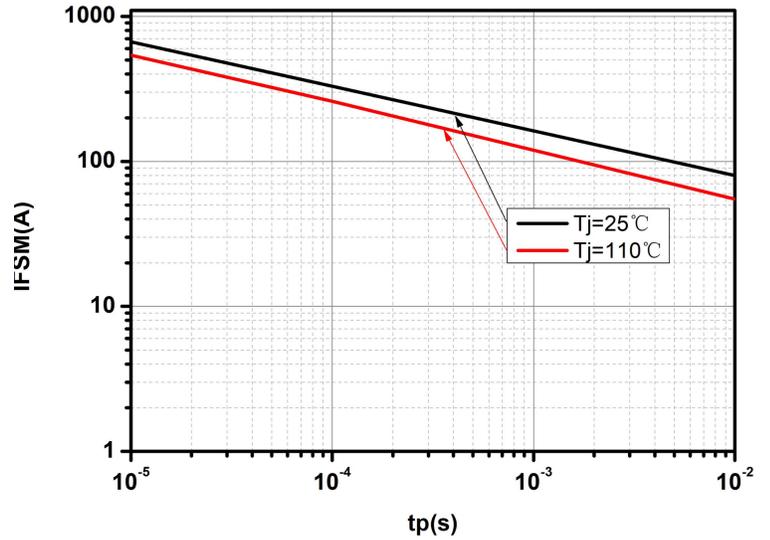


Fig.6-Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

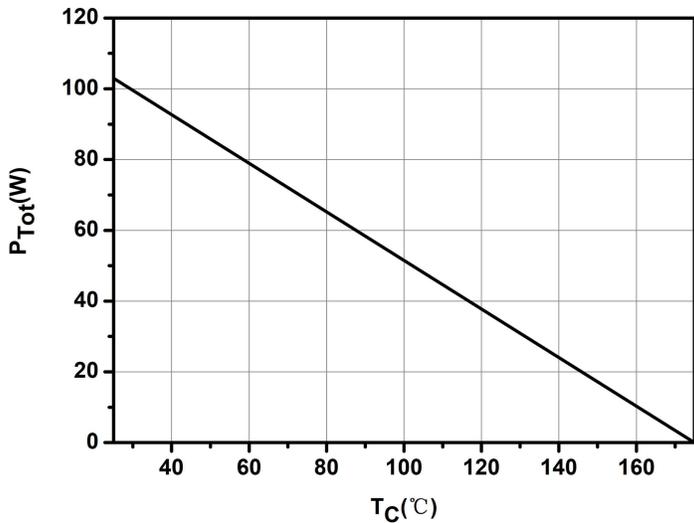


Fig.7-Power Derating

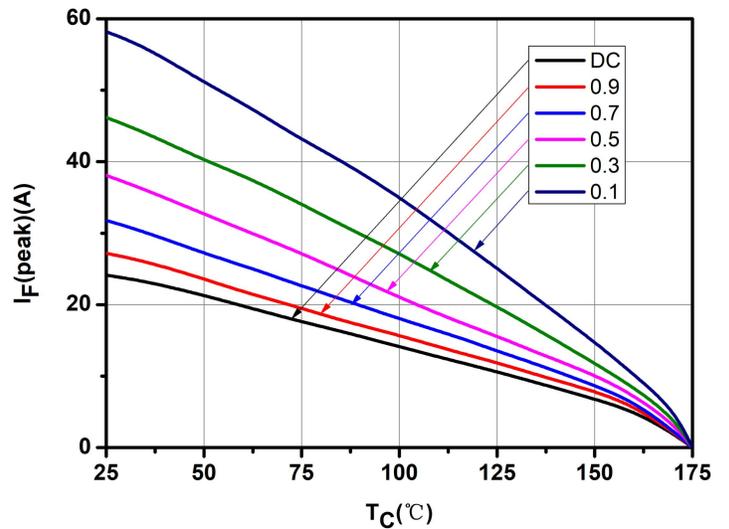
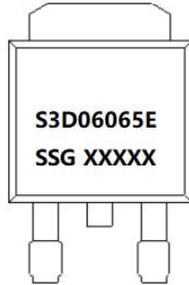


Fig.8-Current Derating

**Marking Diagram**

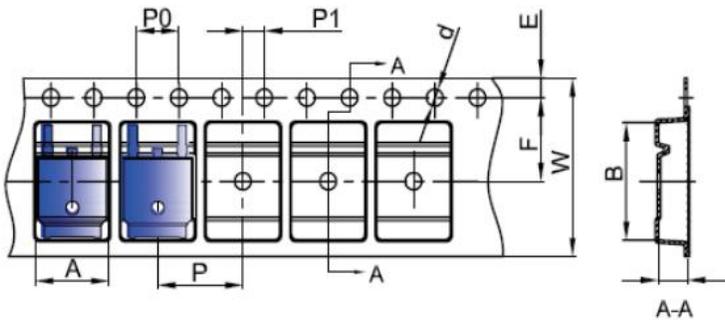


Where XXXXX is YYWWL

- S3D = Device Type
- E = Package type
- 06 = Forward Current (6A)
- 065 = Reverse Voltage (650V)
- SSG = SSG
- YY = Year
- WW = Week
- L = Lot Number

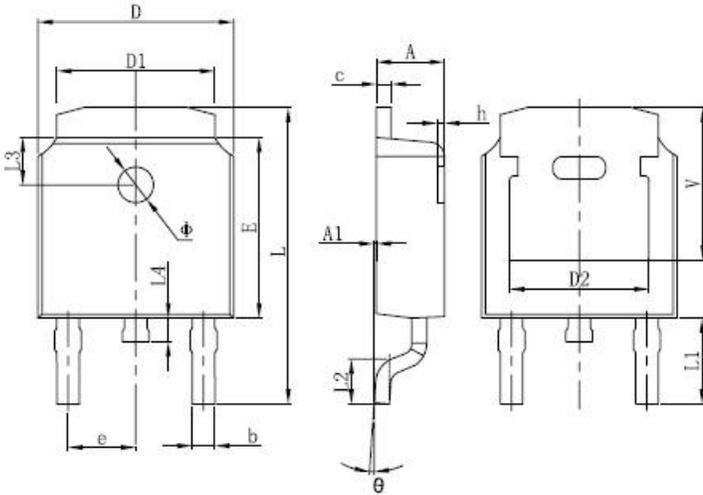
**Cautions:** Molding resin  
Epoxy resin UL94V-0

**Carrier Tape & Reel Specification DPAK(TO-252-2)**



SYMBOL	Millimeters	
	Min.	Max.
A	6.80	7.00
B	10.40	10.60
C	2.60	2.80
d	φ1.45	φ1.65
E	1.65	1.85
F	7.40	7.60
P0	3.90	4.10
P	7.90	8.10
P1	1.90	2.10
W	15.90	16.30

**Mechanical Dimensions**



SYMBOL	Dimensions in millimeters		
	Min.	Typ.	Max.
A	2.18	-	2.39
A1	-	-	0.13
b	0.64	-	0.89
c	0.46	-	0.89
D	6.35	-	6.73
D1	4.95	-	5.46
D2	4.32	-	-
E	5.97	6.1	6.22
e	2.29BSC		
L	9.4	-	10.41
L1	2.90 REF.		
L2	1.4	1.52	1.78
L3	1.60 REF.		
L4	-	-	1.02
φ	1.1	-	1.3
θ	0°	-	10°
V	5.21	-	-

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