

## S3D04065A

### 4A 650V SIC POWER SCHOTTKY RECTIFIERS



#### Description

This 650V 4A diode is high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S3D04065A 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	$I_{F(AV)1}$	$T_c=25^{\circ}\text{C}$	17	A
	$I_{F(AV)2}$	$T_c=110^{\circ}\text{C}$	8	A
	$I_{F(AV)3}$	$T_c=150^{\circ}\text{C}$	4	A
Repetitive Peak Forward Surge Current	$I_{FRM1}$	10ms, Half Sine pulse, $T_c=25^{\circ}\text{C}$	23	A
	$I_{FRM2}$	10ms, Half Sine pulse, $T_c=110^{\circ}\text{C}$	15	A
Peak One Cycle Non-Repetitive Surge Current	$I_{FSM1}$	10ms, Half Sine pulse, $T_c=25^{\circ}\text{C}$	32	A
	$I_{FSM2}$	10ms, Half Sine pulse, $T_c=110^{\circ}\text{C}$	30	A
Non-Repetitive Peak Forward Surge Current	$I_{F,Max}$	10 $\mu\text{s}$ . Pulse, $T_c=25^{\circ}\text{C}$	390	A
	$I_{F,Max}$	10 $\mu\text{s}$ . Pulse, $T_c=110^{\circ}\text{C}$	265	A
Power Dissipation	$P_{tot1}$	$T_c=25^{\circ}\text{C}$	89	W
	$P_{tot1}$	$T_c=110^{\circ}\text{C}$	39	W

## Electrical Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	$V_{F1}$	@ 4A, Pulse, $T_J = 25^{\circ}\text{C}$	1.5	1.7	V
	$V_{F2}$	@ 4A, Pulse, $T_J = 175^{\circ}\text{C}$	1.75	2.2	V
Reverse Current*	$I_{R1}$	@ $V_R = \text{rated } V_R$ $T_J = 25^{\circ}\text{C}$	0.03	2	$\mu\text{A}$
	$I_{R2}$	@ $V_R = \text{rated } V_R$ $T_J = 175^{\circ}\text{C}$	0.3	20	$\mu\text{A}$
Junction Capacitance	$C_T$	$V_R=0\text{V}$ , $T_J=25^{\circ}\text{C}$ , $f=1\text{MHz}$	230	-	pF
Reverse Recovery Charge	$Q_c$	$I_F = 4\text{A}$ , $di/dt = 200\text{A}/\mu\text{s}$ $V_R = 400\text{V}$ , $T_J = 25^{\circ}\text{C}$	14.35	-	nC
Capacitance Stored Energy	EC	$V_R = 400\text{V}$	3.51	-	$\mu\text{J}$

\* Pulse width < 300  $\mu\text{s}$ . duty cycle < 2%

## Thermal-Mechanical Specifications:

Characteristics	Symbol	Condition	Specification	Units
Junction Temperature	$T_J$	-	-55 to +175	$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-	-55 to +175	$^{\circ}\text{C}$
Typical Thermal Resistance Junction to Case	$R_{\theta JC}$	DC operation	1.7	$^{\circ}\text{C}/\text{W}$

**Ratings and Characteristics Curves**

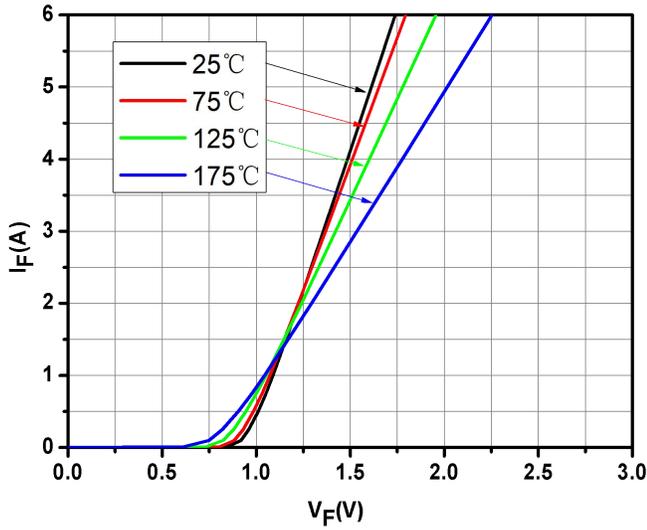


Fig.1-Typical Forward Voltage Characteristics

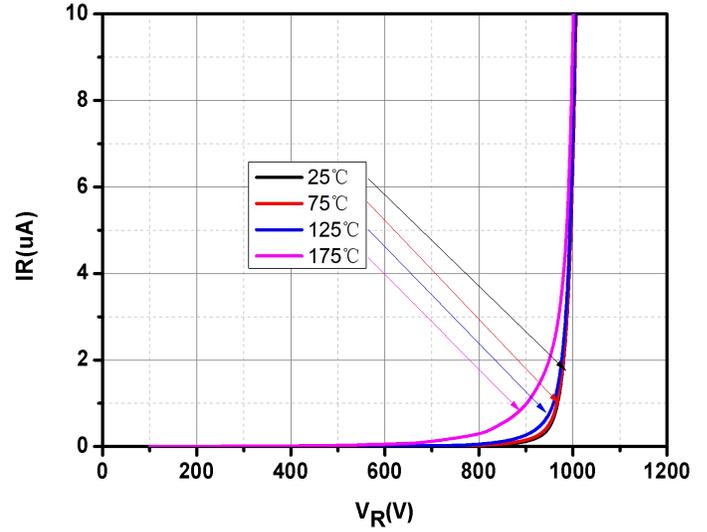


Fig.2-Typical Reverse Characteristics

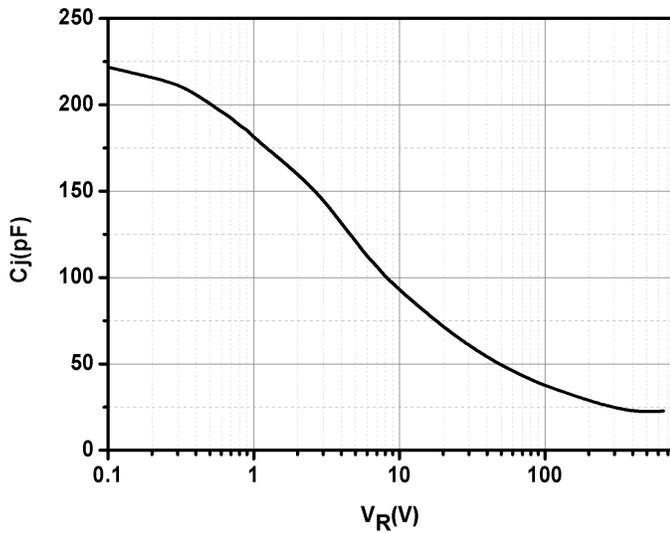


Fig.3-Capacitance vs. Reverse Voltage

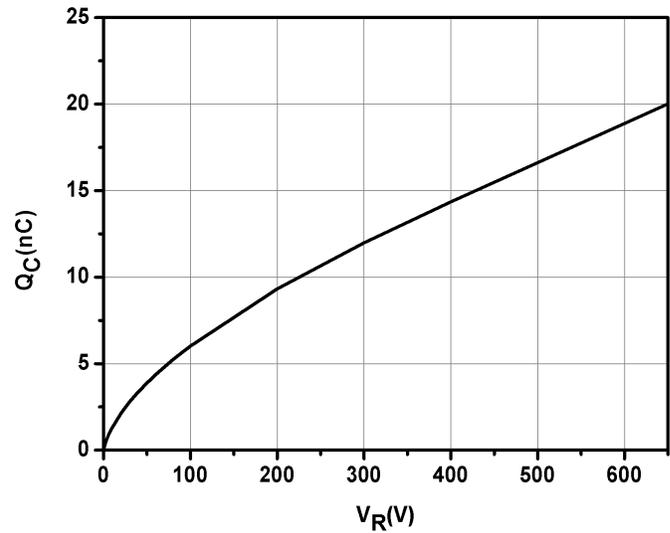


Fig.4-Total Capacitance Charge vs. Reverse Voltage

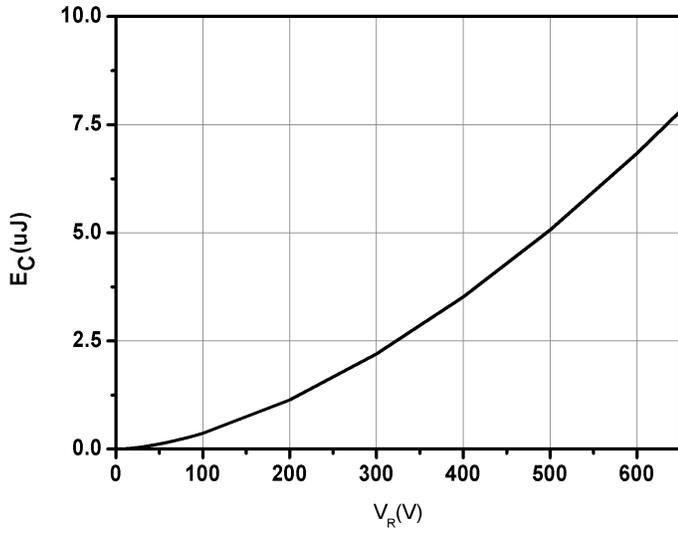


Fig.5-Capacitance Stored Energy

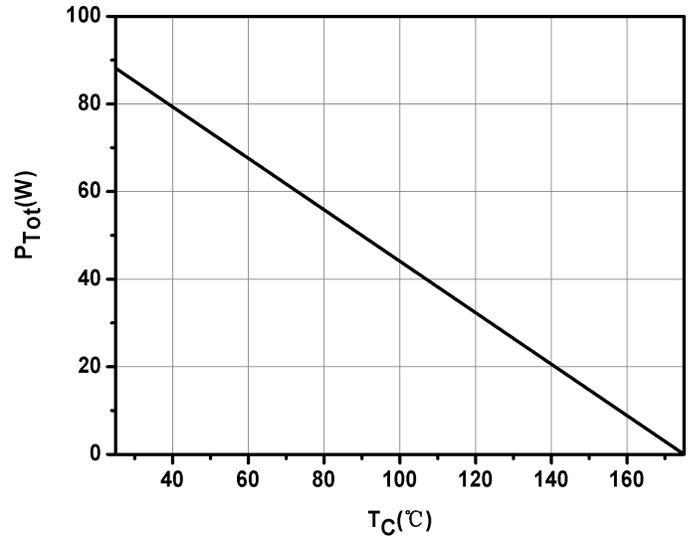


Fig.6-Power Derating

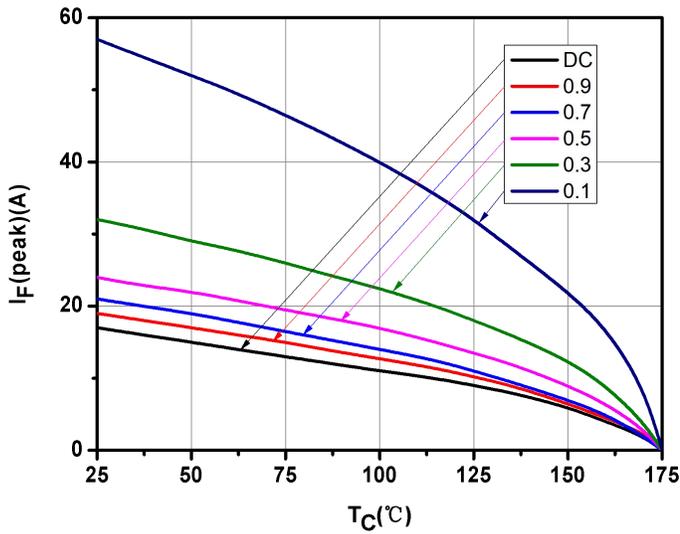


Fig.7-Current Derating

## Marking Diagram



Where XXXXX is YYWWL

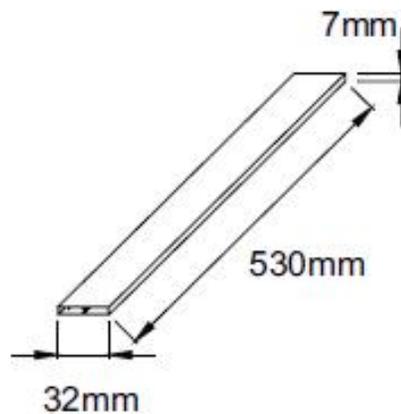
S3D = Device Type  
A = Package type  
04 = Forward Current (4A)  
065 = Reverse Voltage (650V)  
SSG = SSG  
YY = Year  
WW = Week  
L = Lot Number

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

## Ordering Information

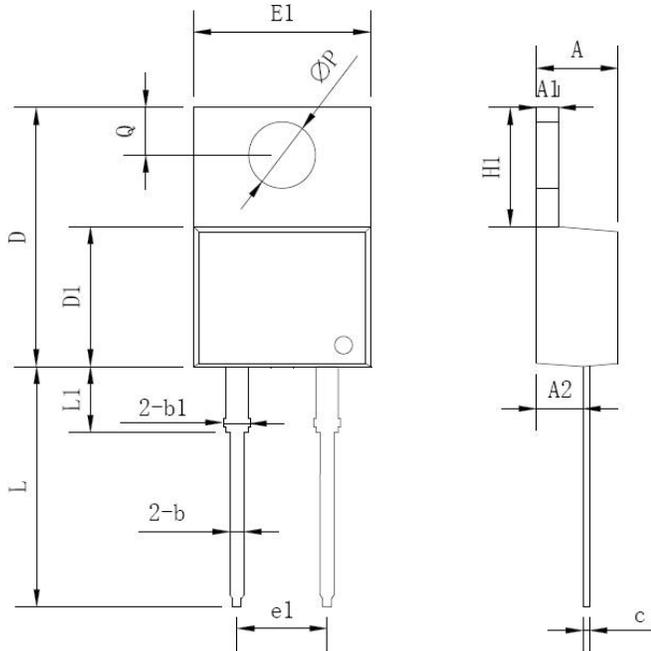
Device	Package	Shipping
S3D04065A	TO-220AC(TO-220-2)	50pcs / tube

## Tube Specification



TO-220AC(TO-220-2)

**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
$\phi P$	-	3.56	-
Q	2.54	-	3.43

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