

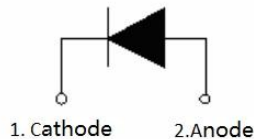
## S4D40120H 1200V SiC POWER SCHOTTKY RECTIFIER



### Description

S4D40120H is a SiC Schottky rectifier packaged in TO-247AC(TO-247-2) case. The device is high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S4D40120H 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
- 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 <sub>RRM</sub>	-	1200	V
Working Peak Reverse Voltage	V <sub>RWM</sub>			
DC Blocking Voltage	V <sub>R</sub>			
Average Rectified Forward Current	I <sub>F(AV)1</sub>	T <sub>C</sub> = 25°C	128	A
	I <sub>F(AV)2</sub>	T <sub>C</sub> = 155°C	41	A
Peak One Cycle Non-Repetitive Surge Current	I <sub>FSM1</sub>	10ms, Half Sine pulse, T <sub>C</sub> = 25°C	340	A
	I <sub>FSM2</sub>	10ms, Half Sine pulse, T <sub>C</sub> = 110°C	245	A
Repetitive Peak Forward Surge Current	I <sub>FRM1</sub>	10ms, Half Sine pulse, T <sub>C</sub> = 25°C	161	A
	I <sub>FRM2</sub>	10ms, Half Sine pulse, T <sub>C</sub> = 110°C	91	A
Power Dissipation	P <sub>tot1</sub>	T <sub>C</sub> = 25°C	667	W
	P <sub>tot2</sub>	T <sub>C</sub> = 110°C	289	W
I <sup>2</sup> t Value	∫i <sup>2</sup> t1	10ms, T <sub>C</sub> = 25°C	305	A <sup>2</sup> s
	∫i <sup>2</sup> t2	10ms, T <sub>C</sub> = 25°C	300	A <sup>2</sup> s

### Electrical Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	V <sub>F1</sub>	@ 40A, Pulse, T <sub>J</sub> = 25 °C	1.5	1.8	V
	V <sub>F2</sub>	@ 40A, Pulse, T <sub>J</sub> = 175 °C	2.2	3.0	V
Reverse Current*	I <sub>R1</sub>	@V <sub>R</sub> = rated V <sub>R</sub> , T <sub>J</sub> = 25 °C	2	30	uA
	I <sub>R2</sub>	@V <sub>R</sub> = rated V <sub>R</sub> , T <sub>J</sub> = 175 °C	10	300	uA
Junction Capacitance	C <sub>T</sub>	V <sub>R</sub> =0V, f=1MHz, T <sub>J</sub> =25°C,	3227	-	pF
Reverse Recovery Charge	Q <sub>c</sub>	V <sub>R</sub> = 800 V, T <sub>J</sub> =25°C	167	-	nC
Capacitance Stored Energy	E <sub>c</sub>	V <sub>R</sub> = 800 V, T <sub>J</sub> =25°C	36	-	μJ

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

### Thermal-Mechanical Specifications:

Characteristics	Symbol	Condition	Specification	Units
Junction Temperature	T <sub>J</sub>	-	-55 to +175	°C
Storage Temperature	T <sub>stg</sub>	-	-55 to +175	°C
Typical Thermal Resistance Junction to Case	R <sub>θJC</sub>	DC operation, T <sub>J</sub> =25°C	0.225	°C/W

### Electrostatic Discharge (ESD) Classifications:

Parameter	Symbol	Value
Human Body Model	HBM	Class 3B (≥ 8000 V)
Charge Device Model	CDM	Class C3 (≥ 1000 V)

### Ordering Information

Device	Package	Shipping
S4D40120H	TO-247AC(TO-247-2)	25pcs / tube

**Ratings and Characteristics Curves**

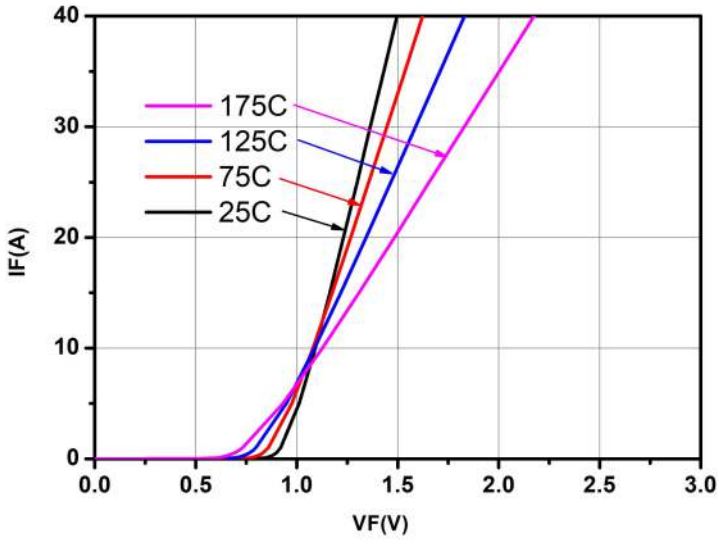


Fig.1-Typical Forward Voltage Characteristics

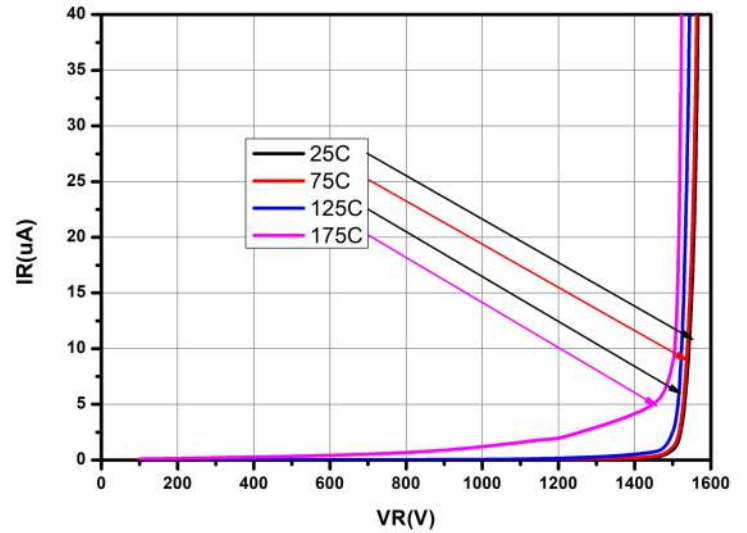


Fig.2-Typical Reverse Characteristics

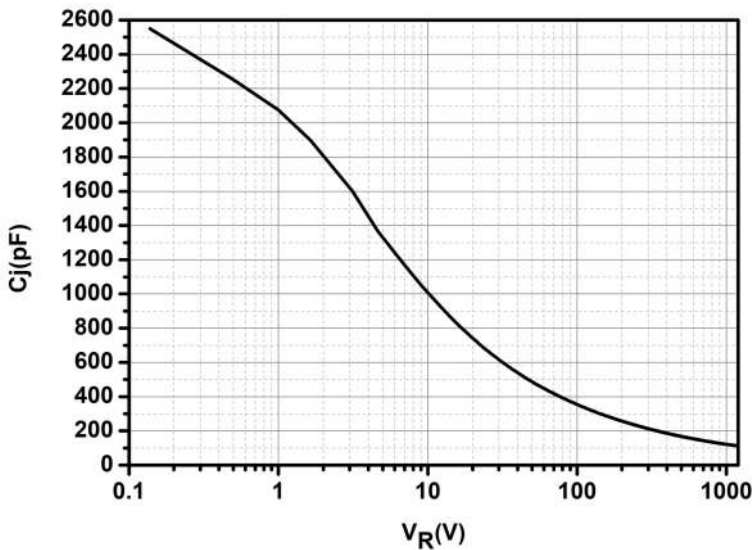


Fig.3-Capacitance vs. Reverse Voltage

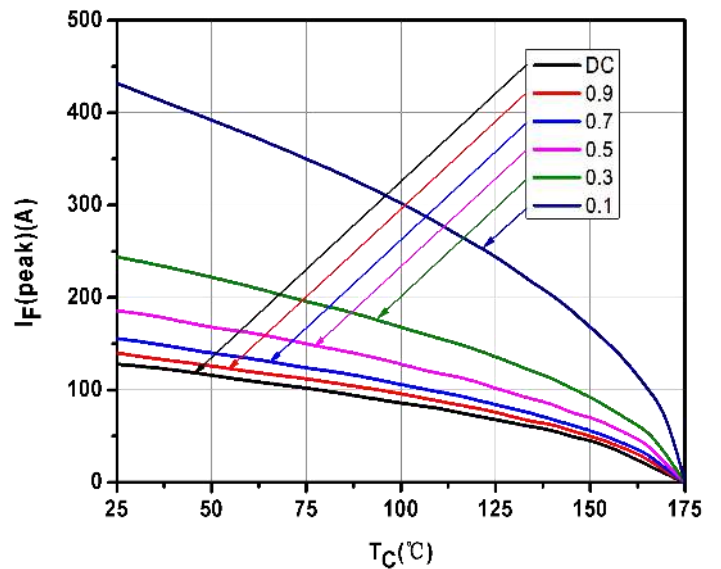


Fig.4-Current Derating

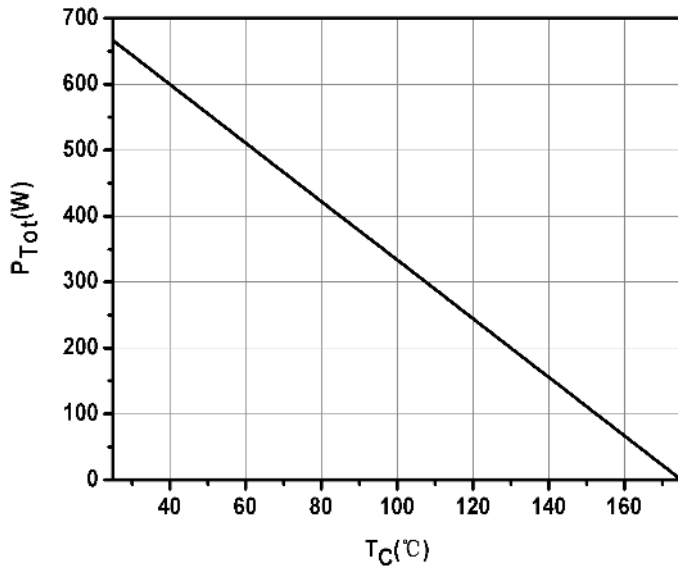


Fig.5-Power Derating

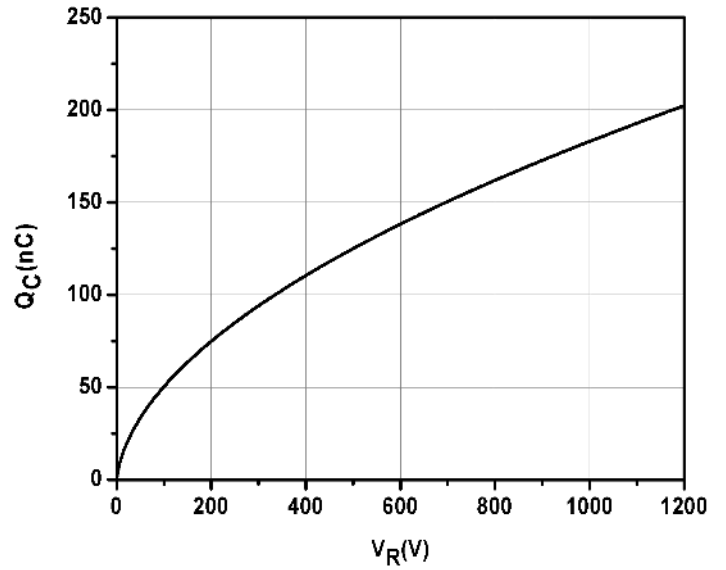


Fig.6-Total Capacitance Charge vs. Reverse Voltage

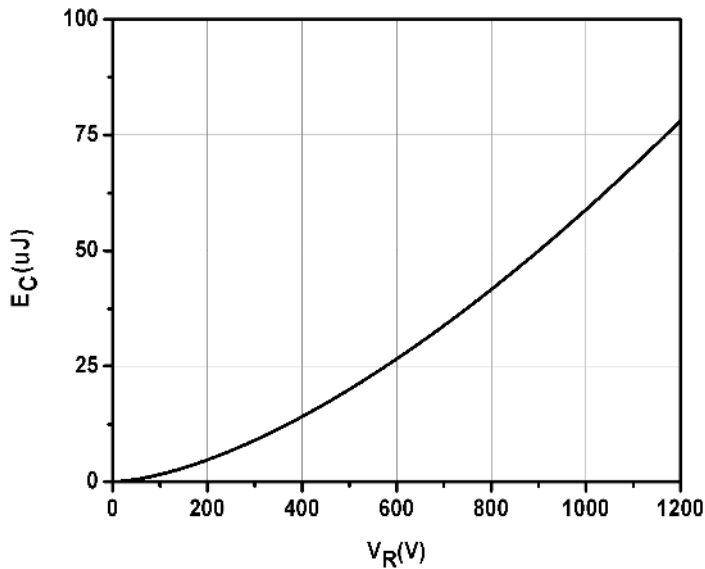


Fig.7-Capacitance Stored Energy

**Marking Diagram**

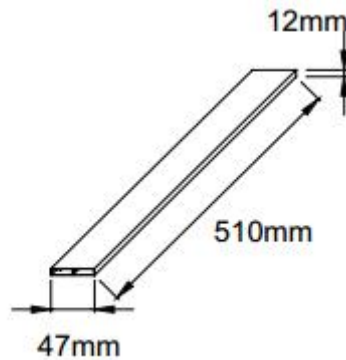


Where XXXXX is YYWWL

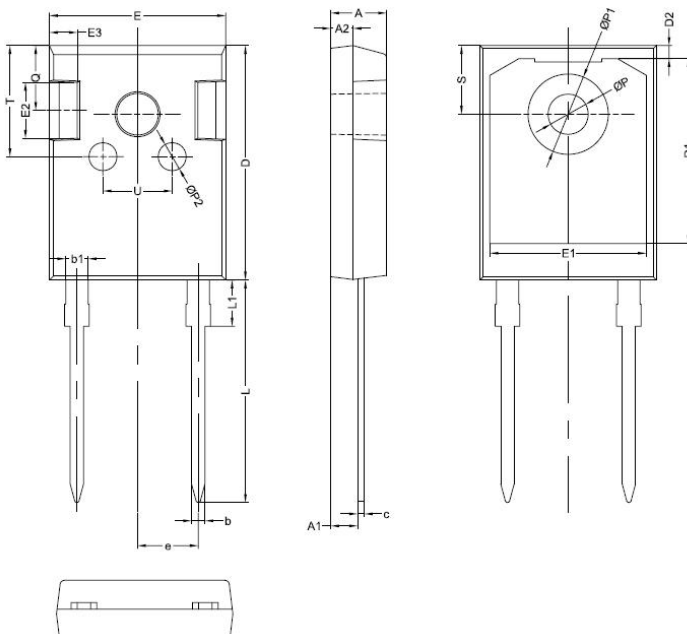
- S4D = Device Type
- H = Package type
- 40 = Forward Current (40A)
- 120 = Reverse Voltage (1200V)
- SSG = SSG
- YY = Year
- WW = Week
- L = Lot Number

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

**Tube Specification(TO-247AC(TO-247-2))**



**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	

**Technical Data**  
**Data Sheet N2409, REV.D**



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