

## S4D40120A/S4D40120F 1200V SIC POWER SCHOTTKY RECTIFIERS

### Description




This 1200V 40A diode is a high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S4D40120A/S4D40120F is ideal for energy sensitive high frequency applications in challenging environments.

### 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

<p>S4D40120A</p> 	<p>S4D40120F</p> 
<p>TO-220AC (TO-220-2)</p>	<p>ITO-220AC (TO-220MF-2L)</p>
	

### Maximum Ratings:

Characteristics	Symbol	Condition	Max.	Units
Peak Repetitive Reverse Voltage	$V_{RRM}$	-	1200	V
Working Peak Reverse Voltage	$V_{RWM}$			
DC Blocking Voltage	$V_R$			
Average Rectified Forward Current	$I_{F(AV)1}$	$T_C = 25^\circ\text{C}$	94	A
	$I_{F(AV)2}$	$T_C = 155^\circ\text{C}$	30	A
Peak One Cycle Non-Repetitive Surge Current	$I_{FSM1}$	10ms, Half Sine pulse, $T_C = 25^\circ\text{C}$	280	A
	$I_{FSM2}$	10ms, Half Sine pulse, $T_C = 110^\circ\text{C}$	200	A
Repetitive Peak Forward Surge Current	$I_{FRM1}$	10ms, Half Sine pulse, $T_C = 25^\circ\text{C}$	134	A
	$I_{FRM2}$	10ms, Half Sine pulse, $T_C = 110^\circ\text{C}$	96	A
Power Dissipation	$P_{tot1}$	$T_C = 25^\circ\text{C}$	441	W
	$P_{tot2}$	$T_C = 110^\circ\text{C}$	191	W

### Electrical Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	$V_{F1}$	@ 40A, Pulse, $T_J = 25^\circ\text{C}$	1.6	1.8	V
	$V_{F2}$	@ 40A, Pulse, $T_J = 175^\circ\text{C}$	2.3	3.0	V
Reverse Current*	$I_{R1}$	@ $V_R = \text{rated } V_R, T_J = 25^\circ\text{C}$	1	20	$\mu\text{A}$
	$I_{R2}$	@ $V_R = \text{rated } V_R, T_J = 175^\circ\text{C}$	5	200	$\mu\text{A}$
Junction Capacitance	$C_T$	$V_R = 0\text{V}, f = 1\text{MHz}, T_J = 25^\circ\text{C}$ ,	2581	-	pF
Reverse Recovery Charge	$Q_c$	$V_R = 800\text{V}, T_J = 25^\circ\text{C}$	152	-	nC
Capacitance Stored Energy	$E_c$	$V_R = 800\text{V}, T_J = 25^\circ\text{C}$	44	-	$\mu\text{J}$

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

Technical Data  
Data Sheet N2647, REV.-



### Thermal-Mechanical Specifications:

Characteristics	Symbol	S4D40120A	S4D40120F	Units
Junction Temperature	$T_J$	-55 to +175		°C
Storage Temperature	$T_{stg}$	-55 to +175		°C
Typical Thermal Resistance Junction to Case	$R_{\theta JC}$	0.3	2	°C/W

### Ordering Information

Device	Package	Shipping
S4D40120A	TO-220AC(TO-220-2)	50pcs / tube
S4D40120F	ITO-220AC(TO-220MF-2L)	50pcs / tube

**Ratings and Characteristics Curves**

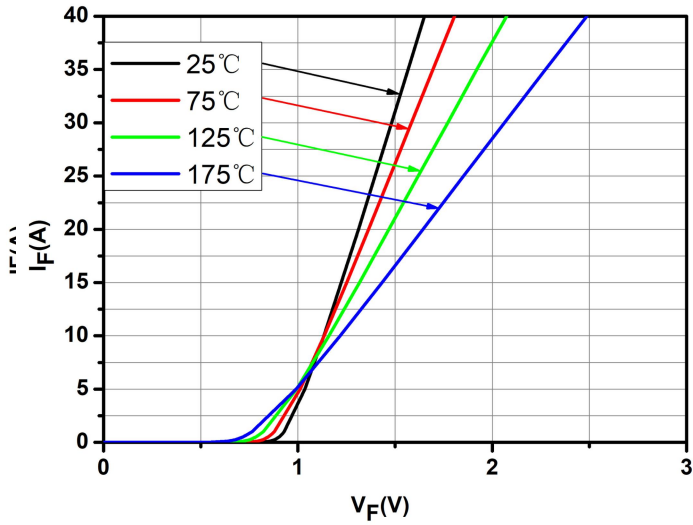


Fig.1-Typical Forward Voltage Characteristics

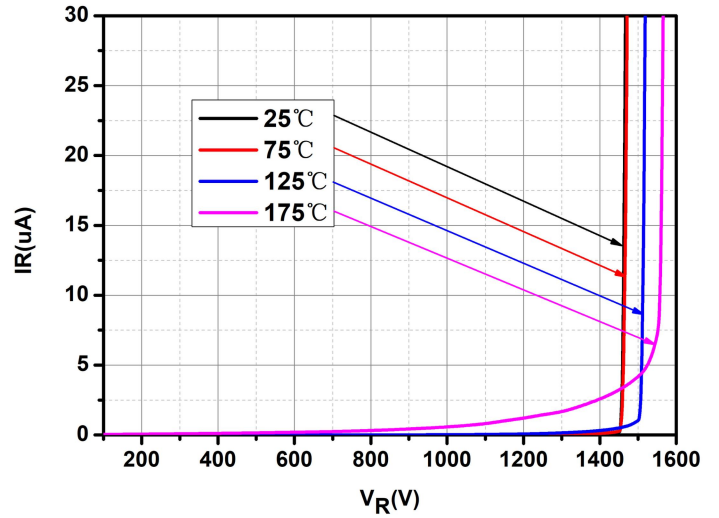


Fig.2-Typical Reverse Characteristics

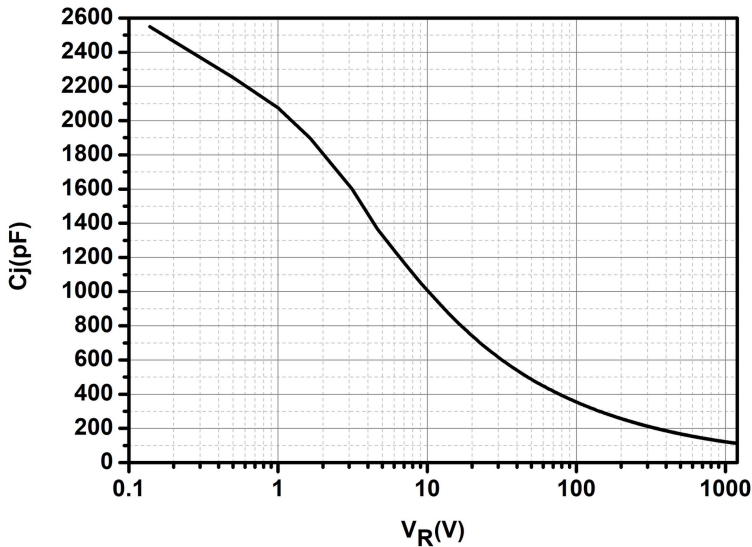


Fig.3-Capacitance vs. Reverse Voltage

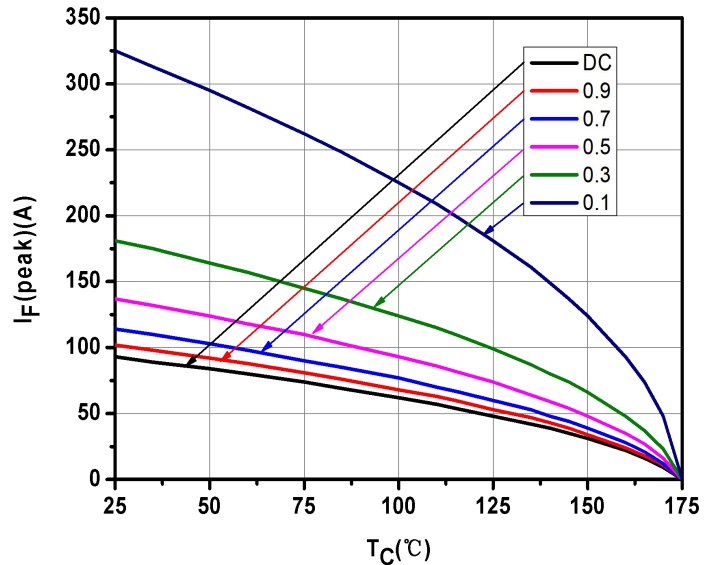


Fig.4-Current Derating

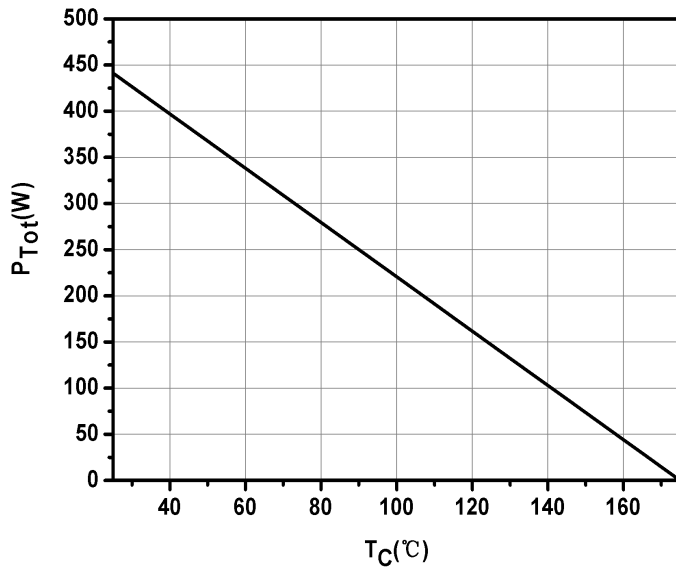


Fig.5-Power Derating

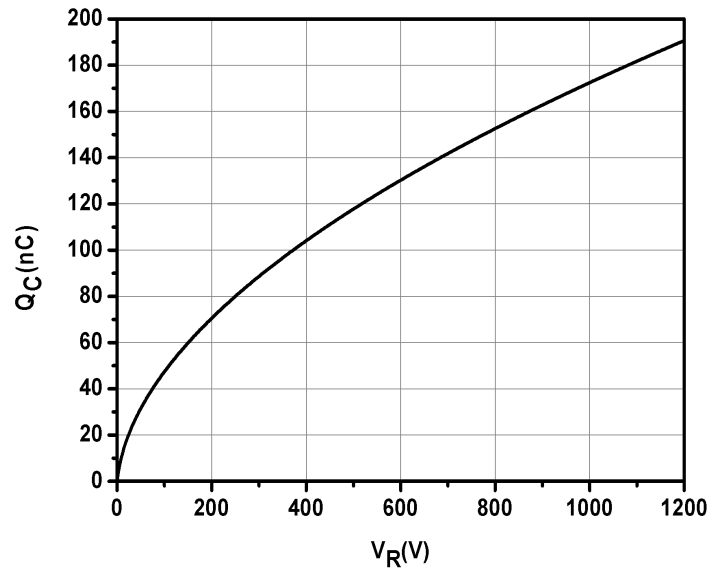


Fig.6-Total Capacitance Charge vs. Reverse Voltage

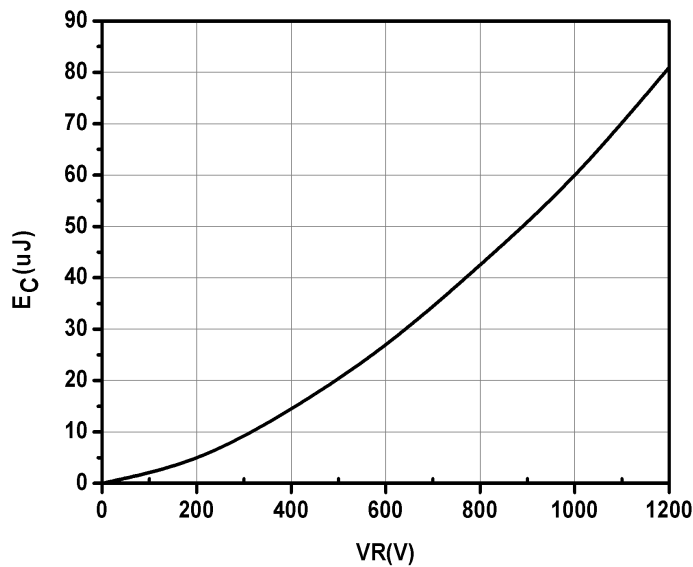
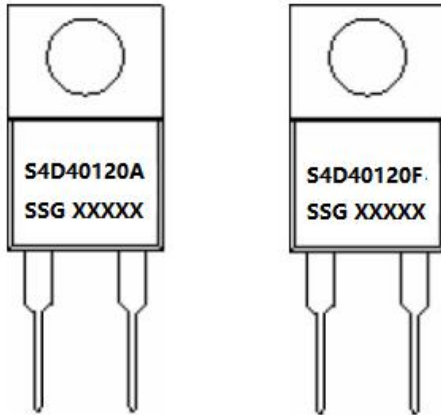


Fig.7-Capacitance Stored Energy

## Marking Diagram

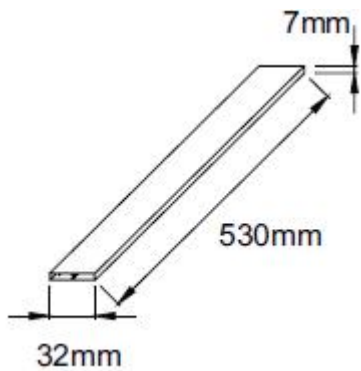


Where XXXXX is YYWWL

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

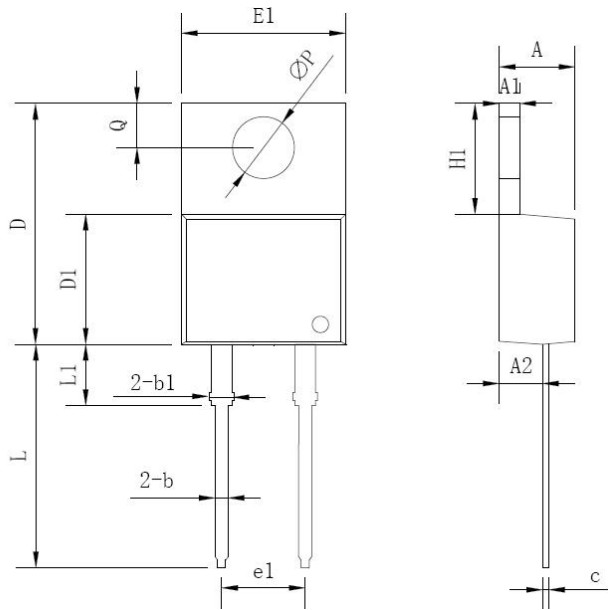
**Cautions:** Molding resin  
Epoxy resin UL:94V-0

## Tube Specification(TO-220-2)



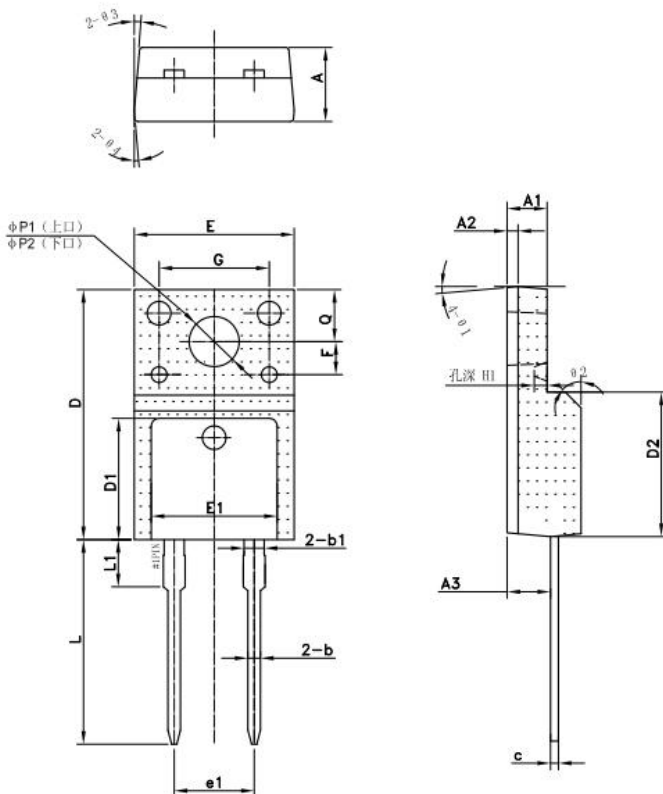
(TO-220-2/TO-220-F2)

**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 ITO-220AC(TO-220MF-2L)**



Symbol	Dimensions in millimeters		
	Min.	Typical	Max.
A	4.50	4.70	4.90
A1	2.34	2.54	2.74
A2		0.70	
A3	2.56	2.76	2.96
b	0.70	0.80	0.95
b1		1.28	
c	0.45	0.50	0.65
D	15.67	15.87	16.07
D1		7.70	
D2		9.12	
E	9.96	10.16	10.36
E1		8.00	
e1		5.08	
F		2.1	
G		7	
H1		0.81	
L	12.48	12.98	13.20
L1		2.93	
4>P1 (上口)	2.98	3.18	3.38
4>P2 (下口)	3.20	3.40	3.60
Q	3.10	3.30	3.50
e 1		5°	
02		45°	
03		5°	
e 4		5°	



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