

## S4D05120A S4D05120E S4D05120G 1200V SIC POWER SCHOTTKY RECTIFIERS

### Description

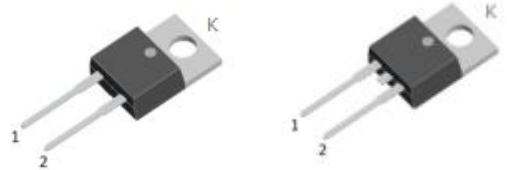
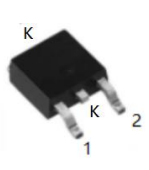
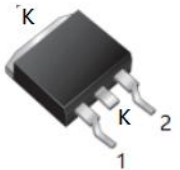

The 1200V 5A diodes are high voltage Schottky rectifiers that have very low total conduction losses and very stable switching characteristics over temperature extremes. The S4D05120A/S4D05120E/S4D05120G are ideal for energy sensitive, high frequency applications in challenging environments.

### 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

S4D05120A	S4D05120E	S4D05120G
		
TO-220AC (TO-220-2)	DPAK (TO-252-2)	D <sup>2</sup> PAK (TO-263-2)
		

## Maximum Ratings

Characteristics	Symbol	Condition	Max.	Units
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_{DC}$	-	1200	V
Average Rectified Forward Current	$I_{F(AV)1}$	$T_C=25^{\circ}C$	16	A
	$I_{F(AV)2}$	$T_C=151^{\circ}C$	5	A
Repetitive Peak Forward Surge Current	$I_{FRM1}$	10ms, Half Sine pulse, $T_C=25^{\circ}C$	30	A
	$I_{FRM2}$	10ms, Half Sine pulse, $T_C=110^{\circ}C$	20	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	$P_{tot1}$	$T_C=25^{\circ}C$	90.6	W
	$P_{tot2}$	$T_C=110^{\circ}C$	39.4	W

### Electrical Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	V <sub>F1</sub>	@ 5A, Pulse, T <sub>J</sub> = 25 °C	1.65	1.8	V
	V <sub>F2</sub>	@ 5A, 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	4	50	uA
	I <sub>R2</sub>	@V <sub>R</sub> = rated V <sub>R</sub> T <sub>J</sub> = 175 °C	10	100	uA
Junction Capacitance	C <sub>T</sub>	V <sub>R</sub> =0V, T <sub>J</sub> =25°C, f=1MHz	296	-	pF
Reverse Recovery Charge	Q <sub>c</sub>	I <sub>F</sub> = 5A, di/dt = 200A/μs V <sub>R</sub> = 800 V, T <sub>J</sub> =25°C	22.80	-	nC
Capacitance Stored Energy	E <sub>c</sub>	V <sub>R</sub> = 800 V, T <sub>J</sub> =25°C	11.71	-	μJ

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

### Thermal-Mechanical Specifications:

Characteristics	Symbol	S4D05120A	S4D05120E	S4D05120G	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	R <sub>qJC</sub>	1.7	1.5	1.65	°C/W

### Ordering Information

Device	Package	Shipping
S4D05120A	TO-220AC(TO-220-2)	50pcs / tube
S4D05120E	DPAK(TO-252-2)	2500pcs / reel
S4D05120ETR	DPAK(TO-252-2)	2500pcs / reel
S4D05120G	D2PAK(TO-263-2)	800 pcs / reel
S4D05120GTR	D2PAK(TO-263-2)	800 pcs / reel

For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.

**Ratings and Characteristics Curves**

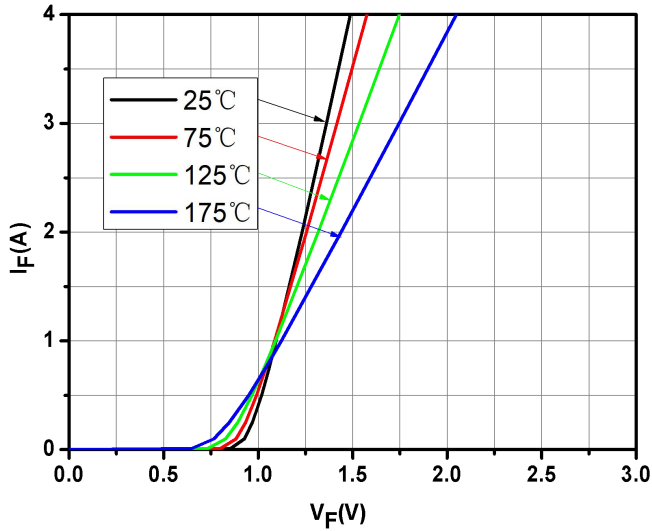


Fig.1-Typical Forward Voltage Characteristics

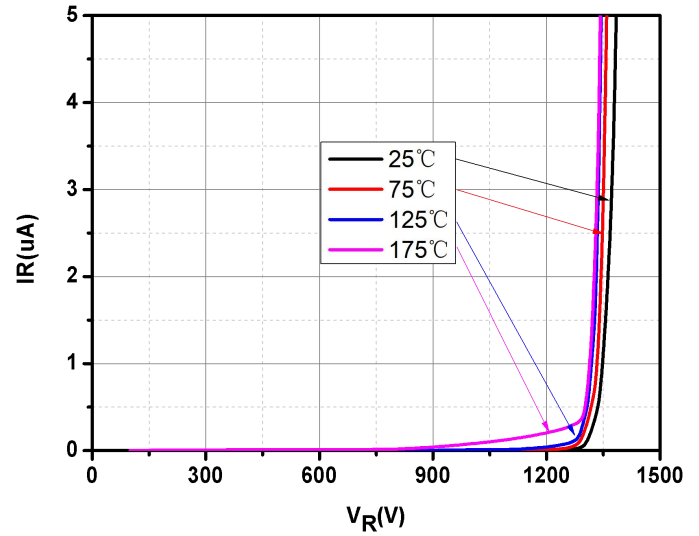


Fig.2-Typical Reverse Characteristics

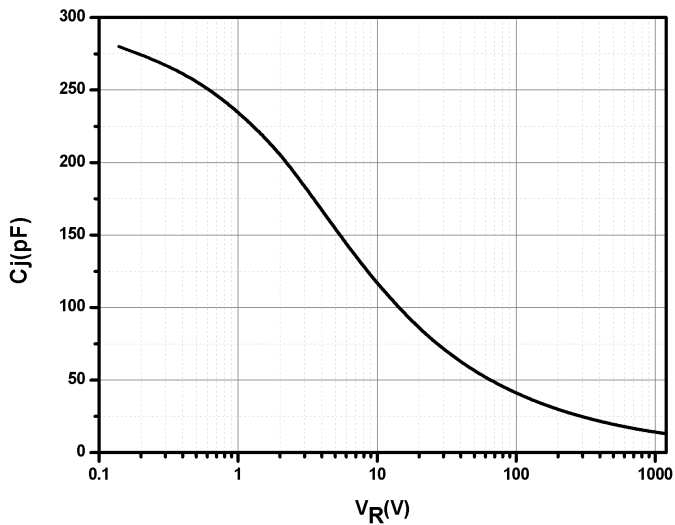


Fig.3-Capacitance vs. Reverse Voltage

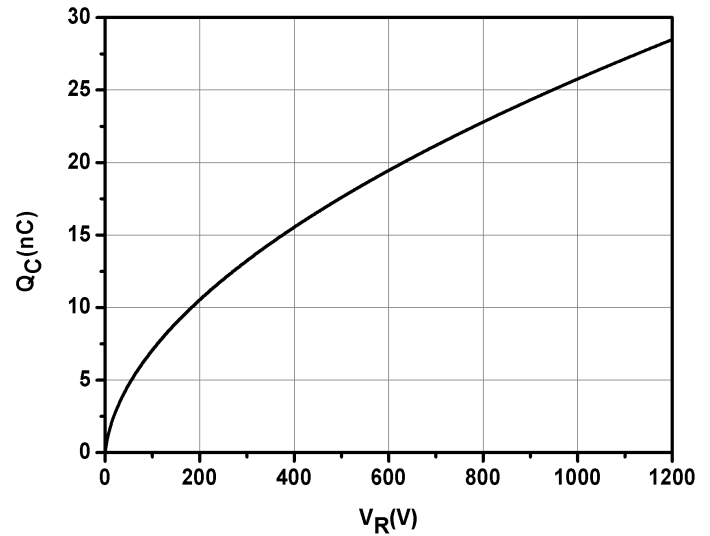


Fig.4-Total Capacitance Charge vs. Reverse Voltage

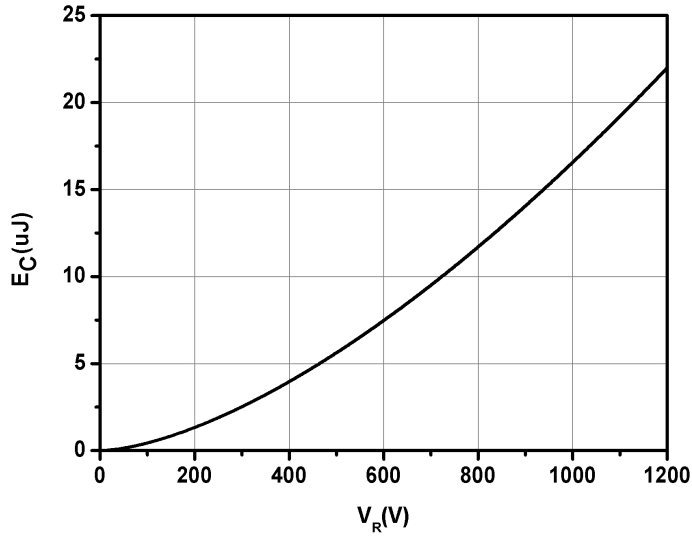


Fig.5-Capacitance Stored Energy

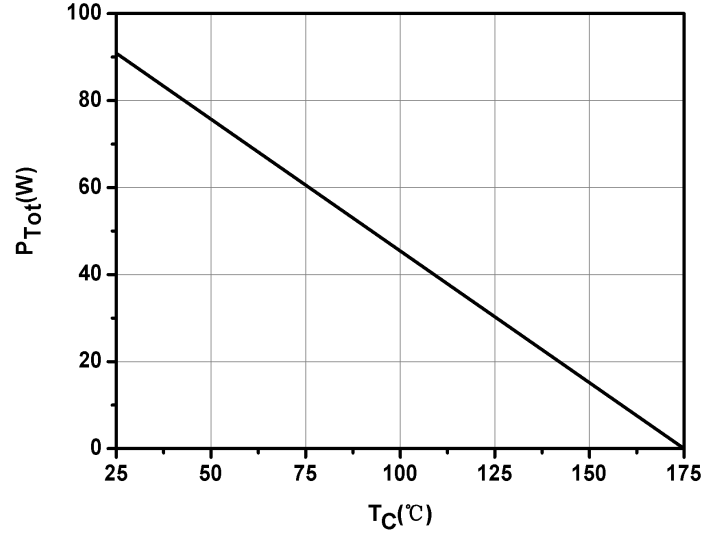


Fig.6-Power Derating

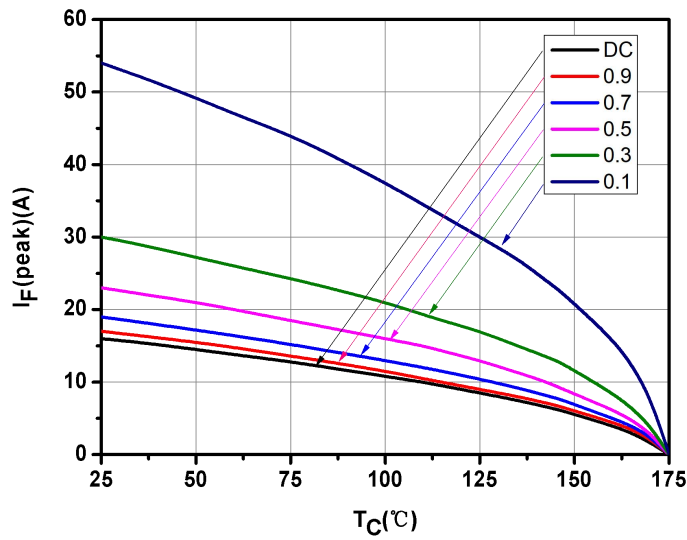
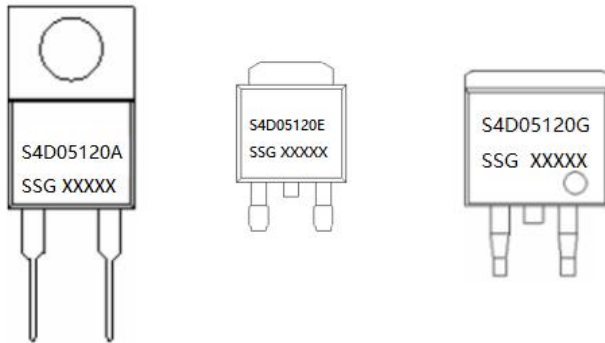


Fig.7-Current Derating

## Marking Diagram

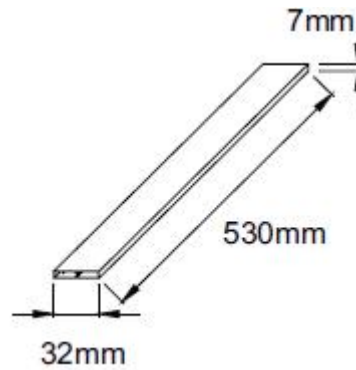


Where XXXXX is YYWWL

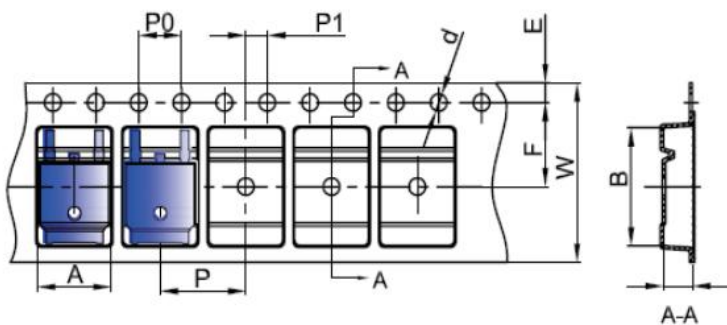
S4D = Device Type  
A/E/G = Package type  
05 = Forward Current (5A)  
120 = Reverse Voltage (1200V)  
SSG = SSG  
YY = Year  
WW = Week  
L = Lot Number

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

## Tube Specification(TO-220-2)

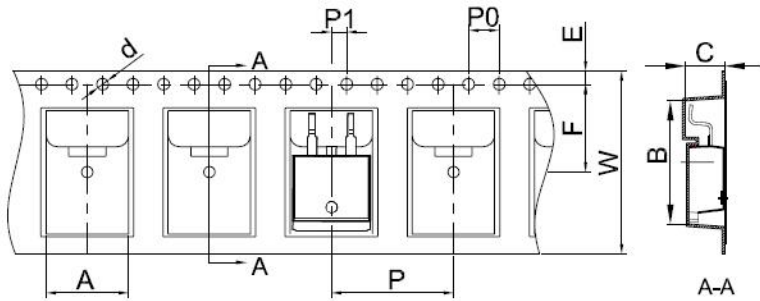


## Carrier Tape & Reel Specification DPAK(TO-252-2)



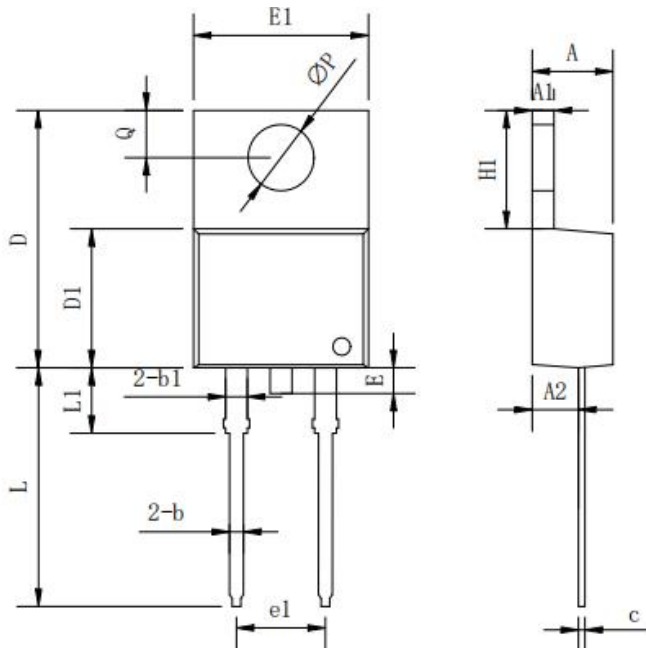
SYMBOL	Millimeters	
	Min.	Max.
A	6.80	7.00
B	10.40	10.60
C	2.60	2.80
d	Φ1.45	Φ1.65
E	1.65	1.85
F	7.40	7.60
P0	3.90	4.10
P	7.90	8.10
P1	1.90	2.10
W	15.90	16.30

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



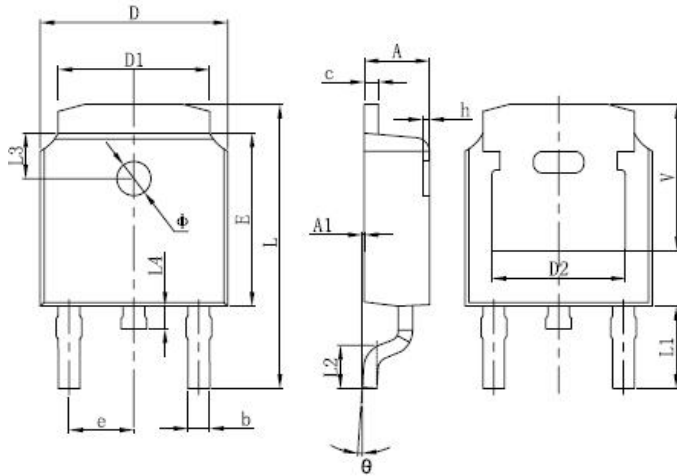
SYMBOL	Millimeters	
	Min.	Max.
A	10.70	10.90
B	16.03	16.23
C	5.11	5.31
d	1.45	1.65
E	1.65	1.85
F	11.40	11.60
P0	3.90	4.10
P	15.90	16.10
P1	1.90	2.10
W	23.90	24.30

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



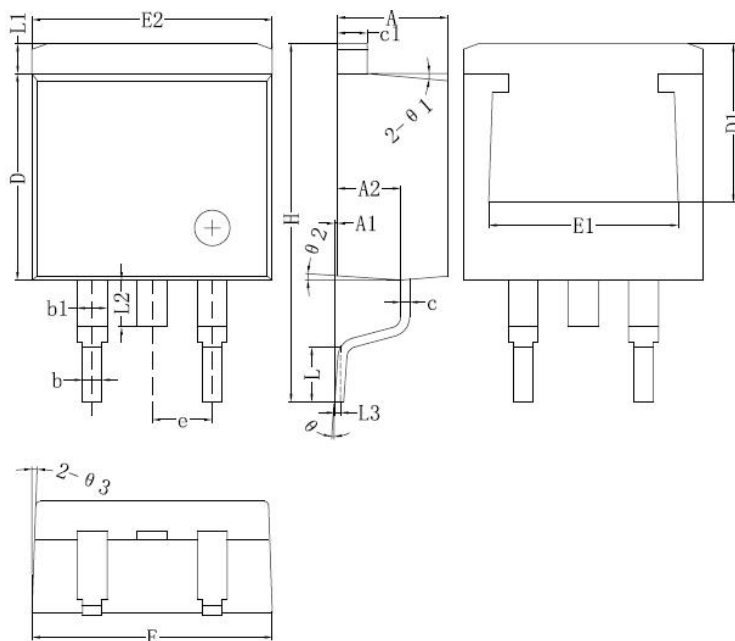
Symbol	Dimensions in millimeters		
	Min.	Typical	Max.
A	3.56	-	4.83
A1	0.51	-	1.40
A2	2.03	-	2.92
b	0.38	-	1.02
b1	1.14	-	1.78
c	0.31	-	0.61
D	14.22	-	16.51
D1	8.38	-	9.42
E	-	-	1.78
E1	9.65	10.16	10.67
e1	-	5.08	-
H1	5.84	-	6.86
L	12.70	-	14.73
L1	-	-	6.35
ΦP	-	3.56	-

### Mechanical Dimensions DPAK(TO-252-2)



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	-	-

### 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°



**Technical Data**  
**Data Sheet N2365, REV. D**



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