Technical Data
Data Sheet N2369, REV. C

S4D02120A S4D02120E
1200V SIC POWER SCHOTTKY RECTIFIERS

TO-220AC(TO-220-2) DPAK(TO-252-2)

Description

S4D02120A/S4D02120E are SiC Schottky rectifiers packaged in TO-220AC(TO-220-2)/DPAK(TO-252-2) case. The devices are high voltage Schottky rectifiers that have very low total conduction losses and very stable switching characteristics over temperature extremes. The S4D02120A/S4D02120E are ideal for energy sensitive, high frequency applications in challenging environments.

Circuit Diagram

Features

- 175°C T_J 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

Technical Data
Data Sheet N2369, REV. C

Maximum Ratings

Characteristics	Symbol	Condition	Max.	Units
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	-	1200	V
Average Rectified Forward Current	$I_{F\ (AV)1}$	Tc=25°C	9	A
	$I_{F\ (AV)2}$	Tc=160°C	2	A
Peak One Cycle Non-Repetitive Surge Current	I_{FSM1}	10ms, Half Sine pulse, Tc =25°C	44	A
	I_{FSM2}	10ms, Half Sine pulse, Tc =110°C	33	A
Repetitive Peak Forward Surge Current	I_{FRM1}	10 ms, Half Sine pulse , Tc =25°C	13	A
	I_{FRM2}	10 ms, Half Sine pulse , Tc =110°C	8.4	A
Non-Repetitive Peak Forward Surge Current	$I_{F,Max1}$	10μs. Pulse, Tc =25℃	200	A
	$I_{F,Max2}$	10μs. Pulse, Tc =110℃	160	A
Power Dissipation	P_{tot1}	Tc =25℃	60	W
	P_{tot2}	Tc =110℃	26	W

Technical Data
Data Sheet N2369, REV. C

RoHS

Electrical Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	V_{F1}	@ 2A, Pulse, T_J = 25 °C	1.5	1.8	V
	V_{F2}	@ 2A, Pulse, T_J = 175 °C	1.9	2.5	V
Reverse Current*	I_{R1}	@V_R = rated V_R T_J = 25 °C	1	25	uA
	I_{R2}	@V_R = rated V_R T_J = 175 °C	20	35	uA
Junction Capacitance	C_T	VR=0V, Tj=25℃,f=1MHz	160	-	pF
Reverse Recovery Charge	Q_c	I_F = 2A, di/dt = 200A/μs VR = 800 V, T_J =25°C	12.33	-	nC
Capacitance Stored Energy	E_C	V_R = 800 V, T_J =25°C	6.33	-	μJ

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

Thermal-Mechanical Specifications:

Characteristics	Symbol	S4D02120A	S4D02120E	Units
Junction Temperature	T_J	-55 to +175		°C
Storage Temperature	T_{stg}	-55 to +175		°C
Typical Thermal Resistance Junction to Case	R_{qJC}	2.4	2.5	°C/W

Ordering Information

Device	Package	Shipping
S4D02120A	TO-220AC(TO-220-2)	50pcs / tube
S4D02120E	DPAK(TO-252-2)	2500pcs / reel
S4D02120ETR	DPAK(TO-252-2)	2500pcs / 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

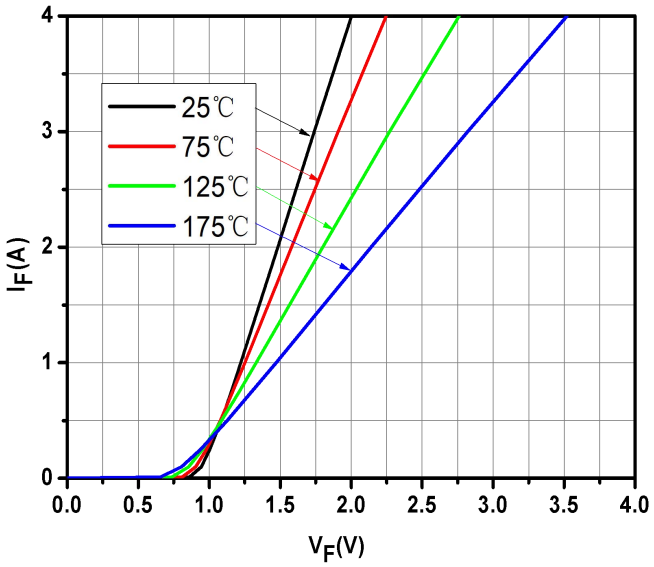


Fig.1-Typical Forward Voltage Characteristics

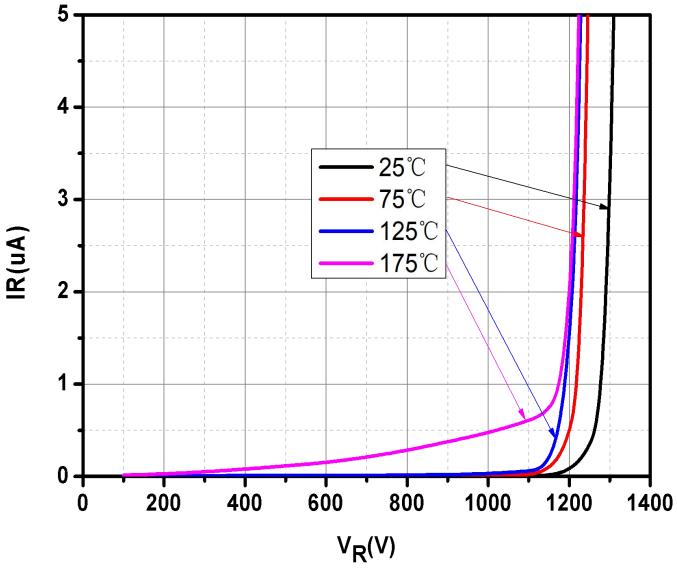


Fig.2-Typical Reverse Characteristics

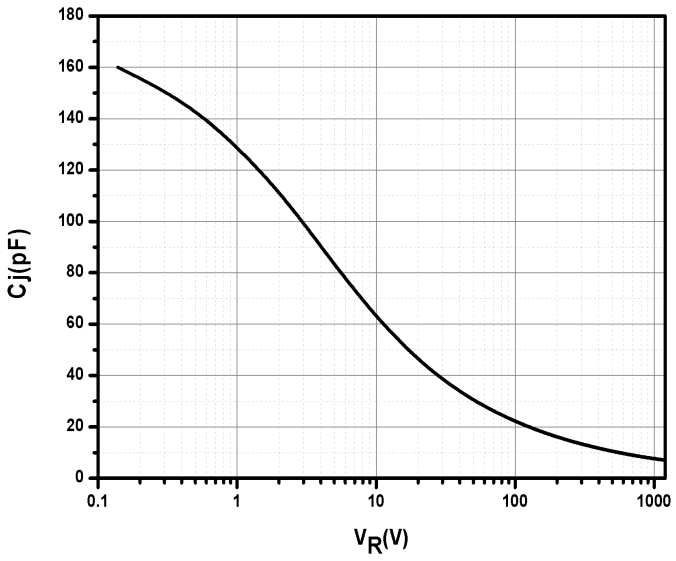


Fig.3-Capacitance vs. Reverse Voltage

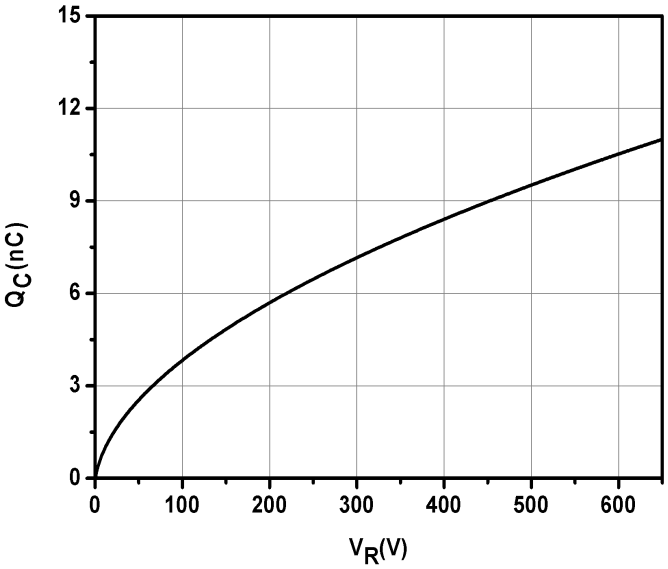


Fig.4-Total Capacitance Charge vs. Reverse Voltage

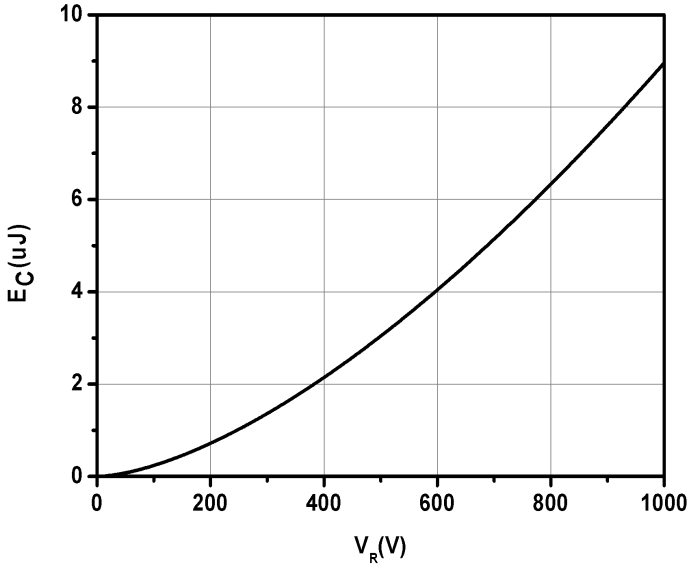


Fig.5-Capacitance Stored Energy

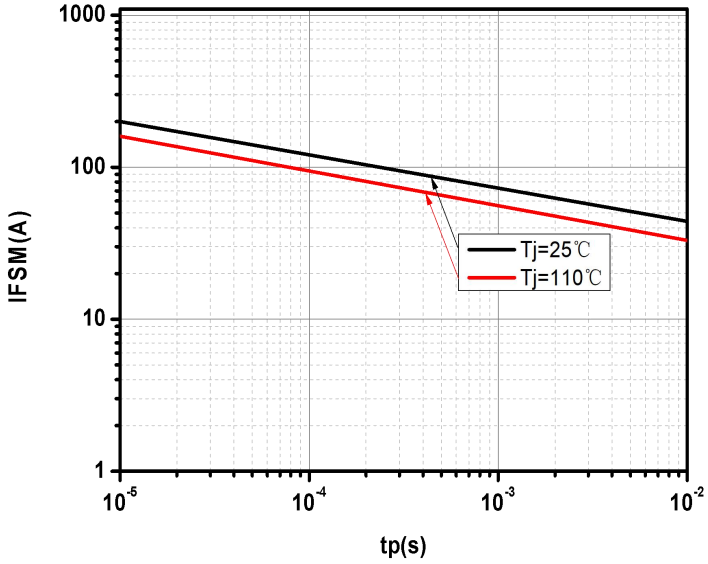


Fig.6-Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

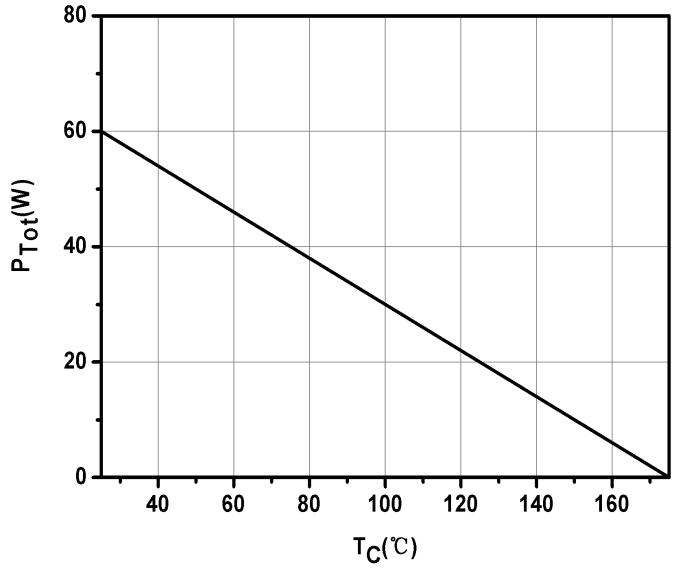


Fig.7-Power Derating

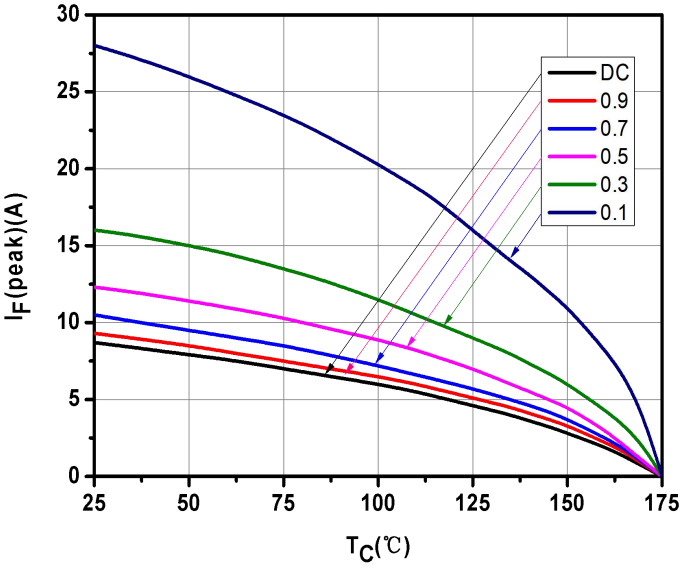
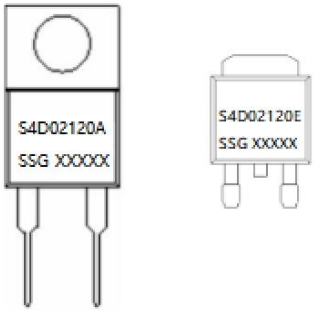


Fig.8-Current Derating

Technical Data
Data Sheet N2369, REV. C

RoHS

Marking Diagram

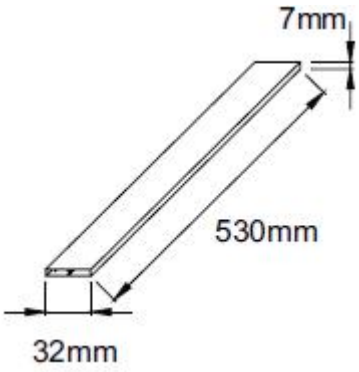


Where XXXXX is YYWWL

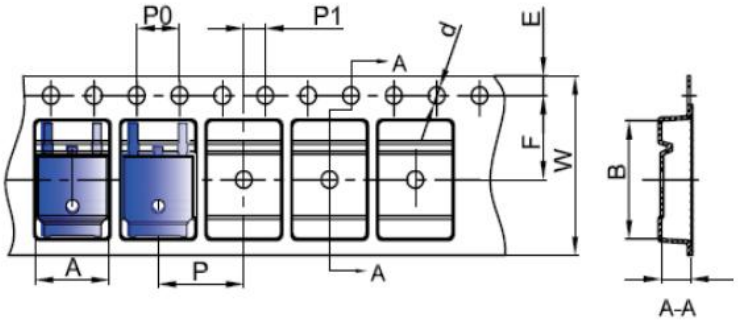
S4D	= Device Type
A/E	= Package type
02	= Forward Current (2A)
120	= Reverse Voltage (1200V)
SSG	= SSG
YY	= Year
WW	= Week
L	= Lot Number

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

Tube Specification(TO-220-2)



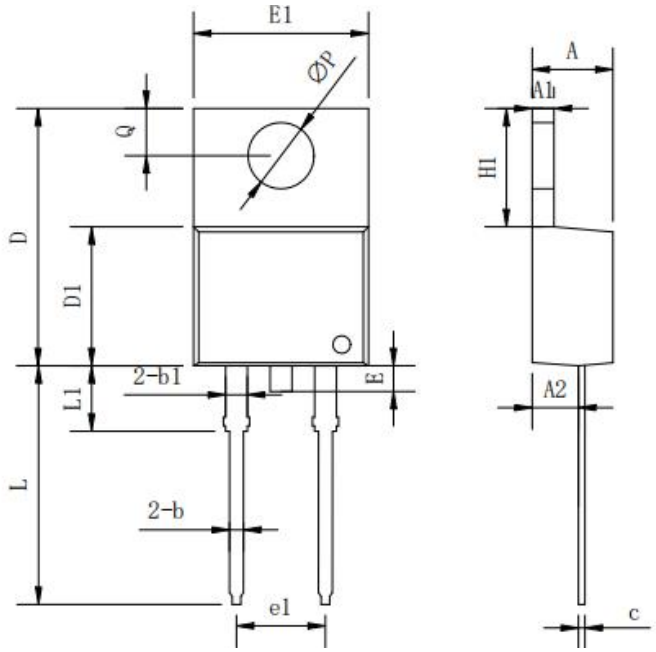
Carrier Tape & Reel Specification DPAK(TO-252-2)



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

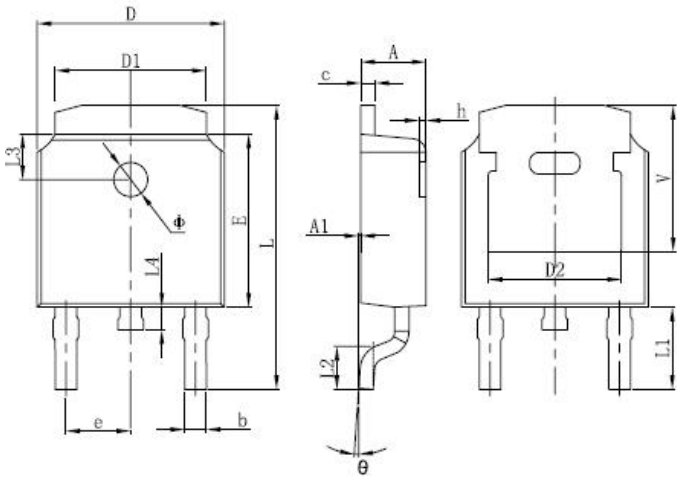
Technical Data
Data Sheet N2369, REV. C

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	-	-

Technical Data
Data Sheet N2369, REV. C

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