

## S4D04120E

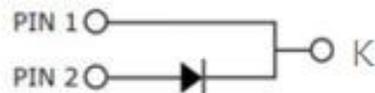
### 1200V SiC POWER SCHOTTKY RECTIFIERS



#### Description

S4D04120E is SiC Schottky rectifiers packaged in 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 S4D04120E 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	$V_{RRM}$ $V_{RWM}$ $V_{DC}$	-	1200	V
Average Rectified Forward Current	$I_{F(AV)1}$	$T_C=25^{\circ}C$	17	A
	$I_{F(AV)2}$	$T_C=160^{\circ}C$	4	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	$P_{tot1}$	$T_C=25^{\circ}C$	100	W
	$P_{tot2}$	$T_C=110^{\circ}C$	43	W

## Electrical Characteristics:

Characteristics	Symbol	Condition	Typ.	Max.	Units
Forward Voltage Drop*	$V_{F1}$	@ 4A, Pulse, $T_J = 25^{\circ}C$	1.5	1.8	V
	$V_{F2}$	@ 4A, Pulse, $T_J = 175^{\circ}C$	2.0	3.0	V
Reverse Current*	$I_{R1}$	@ $V_R = \text{rated } V_R$ $T_J = 25^{\circ}C$	4	50	$\mu$ A
	$I_{R2}$	@ $V_R = \text{rated } V_R$ $T_J = 175^{\circ}C$	10	100	$\mu$ A
Junction Capacitance	$C_T$	$V_R=0V, T_J=25^{\circ}C, f=1MHz$	296	-	pF
Reverse Recovery Charge	$Q_c$	$I_F = 5A, di/dt = 200A/\mu s$ $V_R = 800V, T_J = 25^{\circ}C$	22.80	-	nC
Capacitance Stored Energy	EC	$V_R = 800V, T_J = 25^{\circ}C$	11.71	-	$\mu$ J

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

## Thermal-Mechanical Specifications:

Characteristics	Symbol	Condition	Specification	Units
Junction Temperature	$T_J$	-	-55 to +175	$^{\circ}C$
Storage Temperature	$T_{stg}$	-	-55 to +175	$^{\circ}C$
Typical Thermal Resistance Junction to Case	$R_{\theta JC}$	DC operation	1.5	$^{\circ}C/W$

**Ratings and Characteristics Curves**

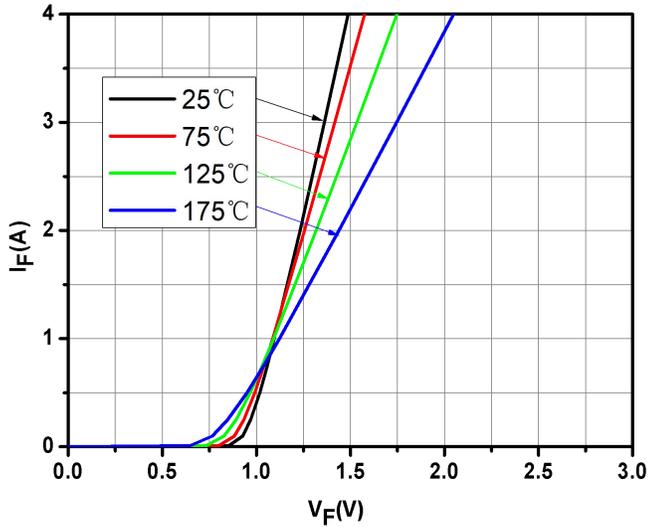


Fig.1-Typical Forward Voltage Characteristics

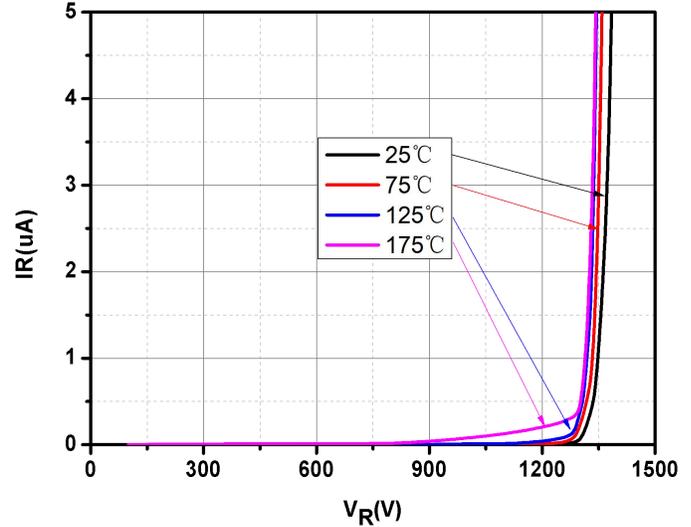


Fig.2-Typical Reverse Characteristics

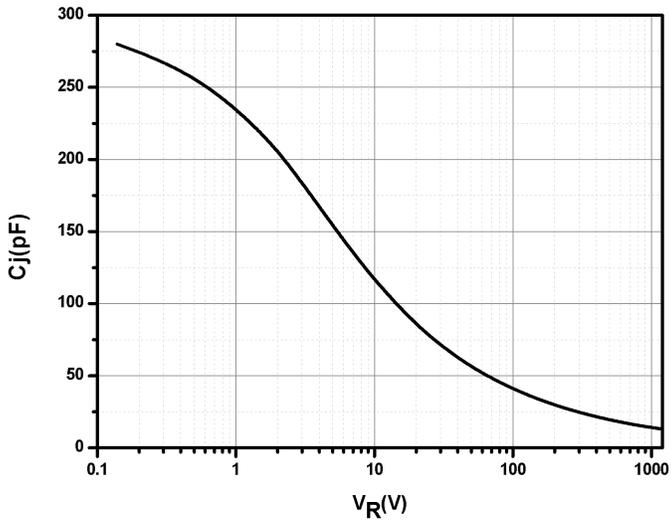


Fig.3-Capacitance vs. Reverse Voltage

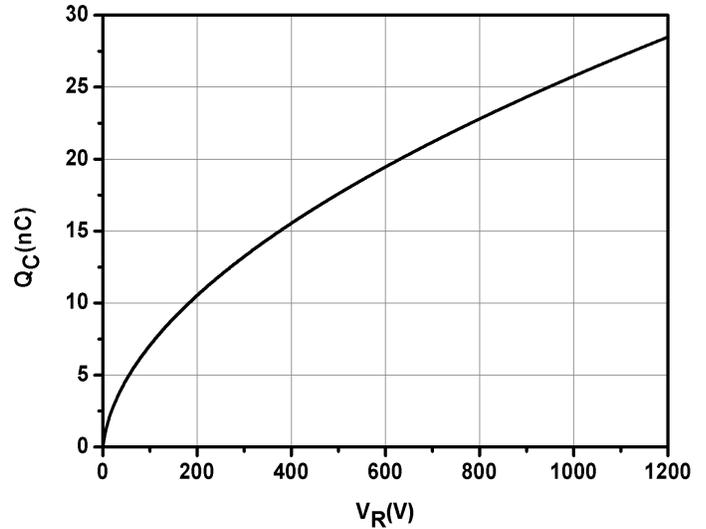


Fig.4-Total Capacitance Charge vs. Reverse Voltage

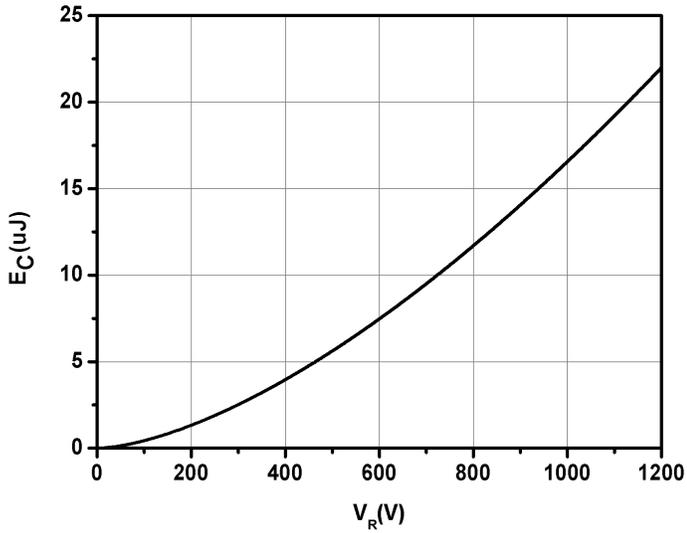


Fig.5-Capacitance Stored Energy

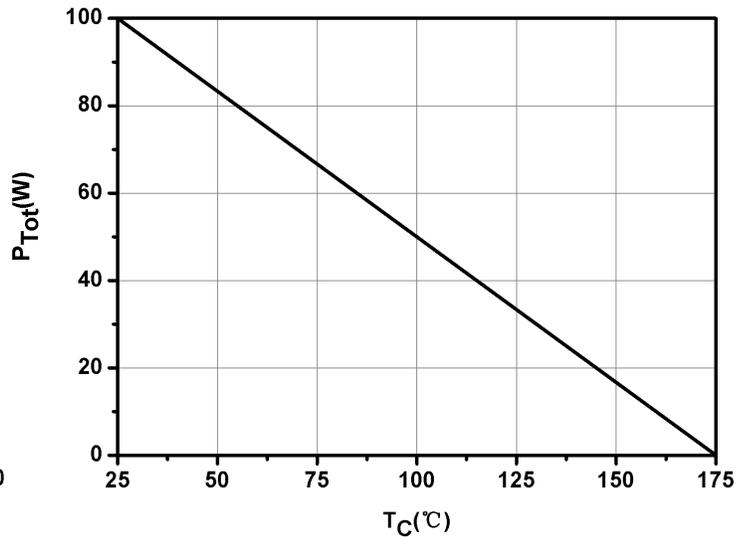


Fig.6-Power Derating

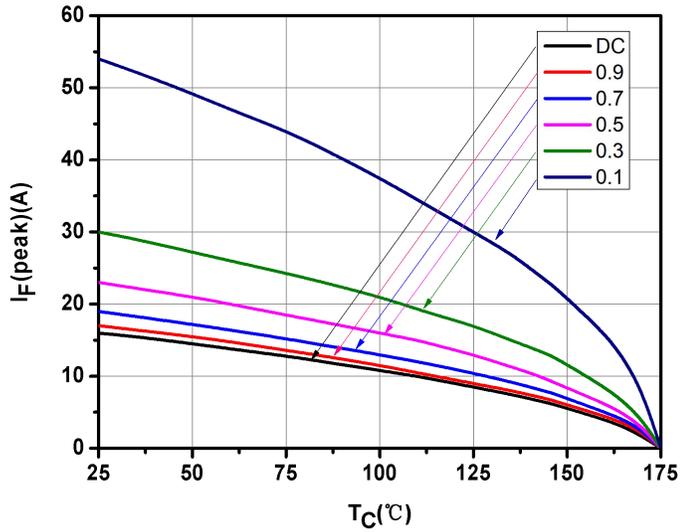


Fig.7-Current Derating



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