

S1D040120D

Silicon Carbide Schottky Diode

V_{RRM}	=	1200 V
$I_F (T_C=135^\circ\text{C})$	=	58 A (Device)
Q_C	=	118 nC

Feature

- 1.2kv schottky Rectifier
- Zero Reverse Recovery Current / Zero forward recovery
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Low forward voltage

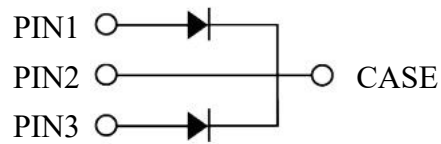
Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- High Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives
- AC/DC converters

Package



Part Number	Package	Marking
S1D040120D	TO-247-3L	S1D040120D

Maximum Ratings (T_c = 25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V		
V_{RSM}	Surge Peak Reverse Voltage	1300	V		
V_R	DC Peak Reverse Voltage	1200	V		
I_F	Continuous Forward Current (Per Leg/Device)	62.8/125.6 29/58 20/40	A	T _c = 25°C T _c = 135°C T _c = 153°C	Fig.7
I_{FSM}	Non-Repetitive Peak Forward Surge Current (Per Leg)	152	A	T _c = 25°C, t _p = 10 ms, Half Sine Pulse	
P_{tot}	Power Dissipation (Per Leg/Device)	278/500 111/200	W	T _c = 25°C T _c = 110°C	Fig.6
dV/dt	Diode dV/dt ruggedness	200	V/ns	V _R = 0-960V	
$\int i^2 dt$	$\int i^2 dt$	115	A ² S	T _c = 25°C, t _p = 10ms	
T _{stg} , T _J	Operating Junction Range	-55 to +175	°C		

Electrical Characteristics (Per Leg, $T_J=25^\circ\text{C}$)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.4 1.9	1.8 2.5	V	$I_F = 20\text{A}$, $T_J = 25^\circ\text{C}$ $I_F = 20\text{A}$, $T_J = 175^\circ\text{C}$	Fig.1
I_R	Reverse Current	1 10	100 250	μA	$V_R = 1200\text{V}$, $T_J = 25^\circ\text{C}$ $V_R = 1200\text{V}$, $T_J = 175^\circ\text{C}$	Fig.2
Q_c	Total Capacitive Charge	114		nC	$V_R = 800\text{V}$, $I_F = 20\text{A}$ $di/dt = 200\text{A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$	Fig.4
C	Total Capacitance	2120		pF	$V_R = 0\text{V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$	Fig.3
		104			$V_R = 400\text{V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$	
		76			$V_R = 800\text{V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$	
E_c	Capacitance Stored Energy	60		μJ	$V_R = 800\text{V}$	Fig.5

Thermal Characteristics

symbol	parameter	Typ	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.3	$^\circ\text{C}/\text{W}$	Per Device
		0.54		Per Leg Fig. 8

Typical Performance (Per Leg)

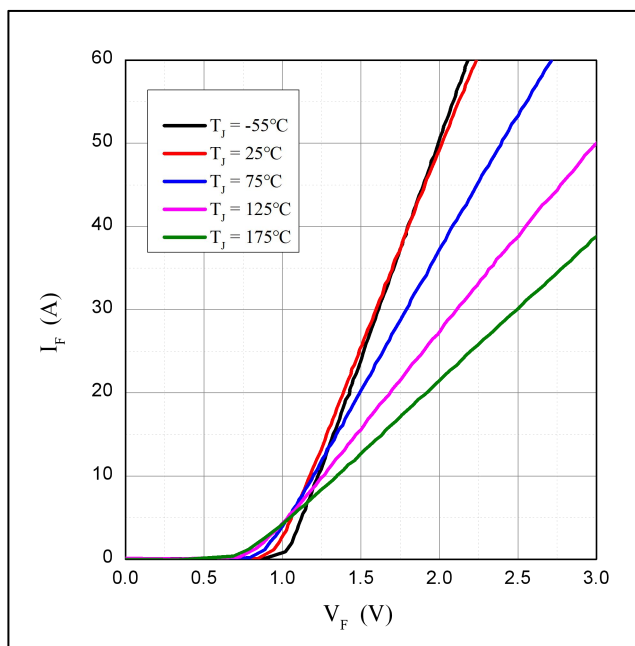


Figure 1: Forward Characteristics

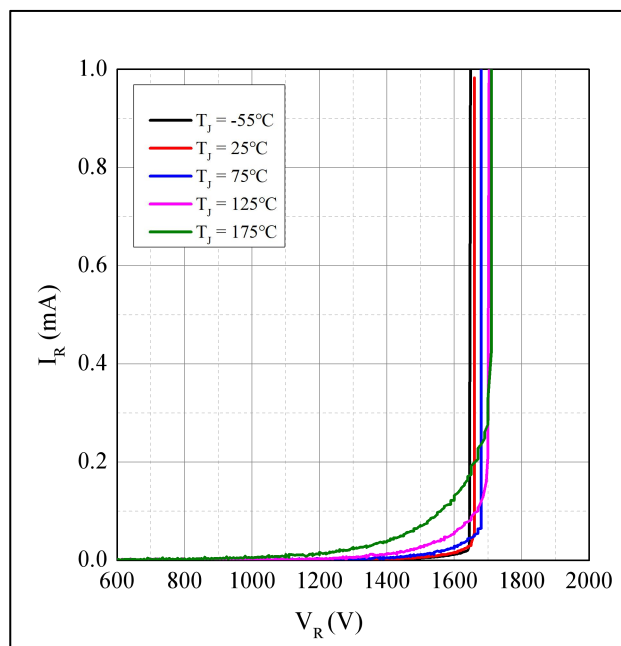


Figure 2: Reverse Characteristics

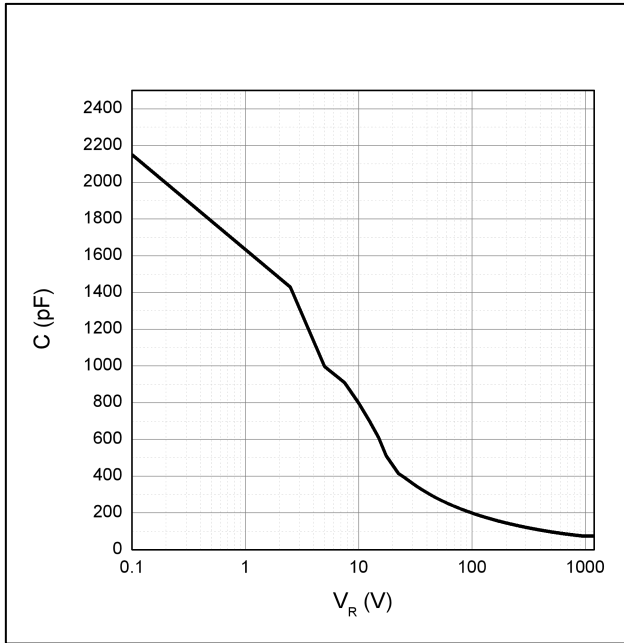


Figure 3: Capacitance vs. Reverse Voltage

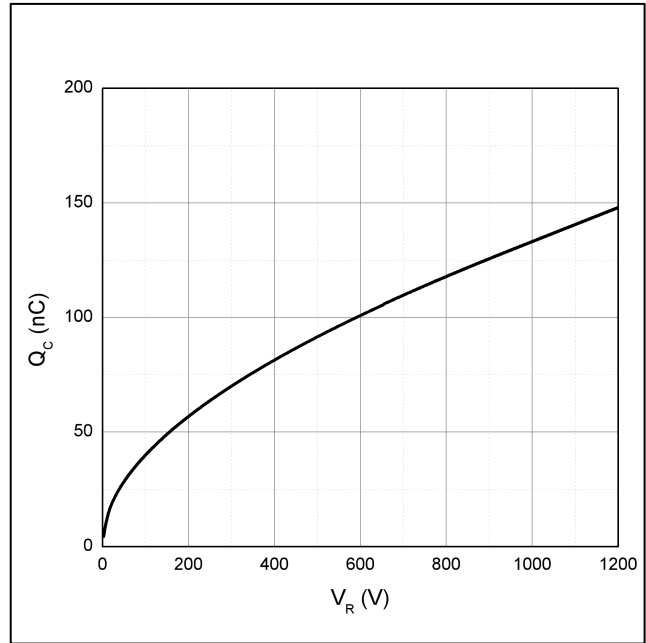


Figure 4: Recovery Charge vs. Reverse Voltage

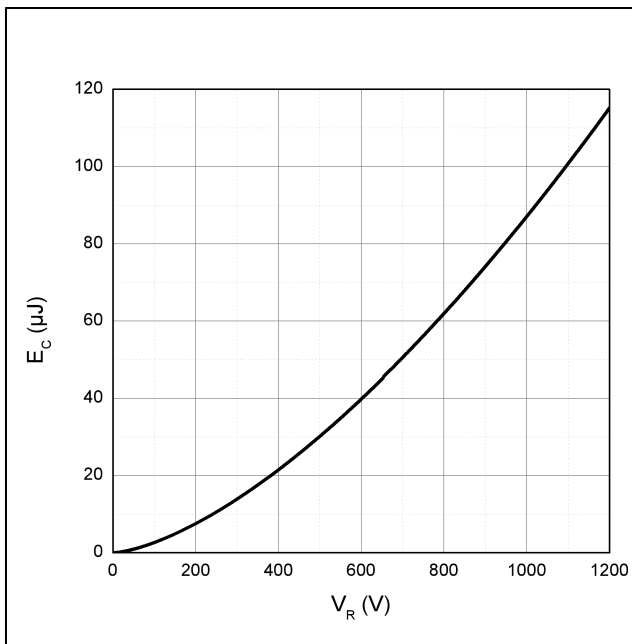


Figure 5: Typical Capacitance Stored Energy

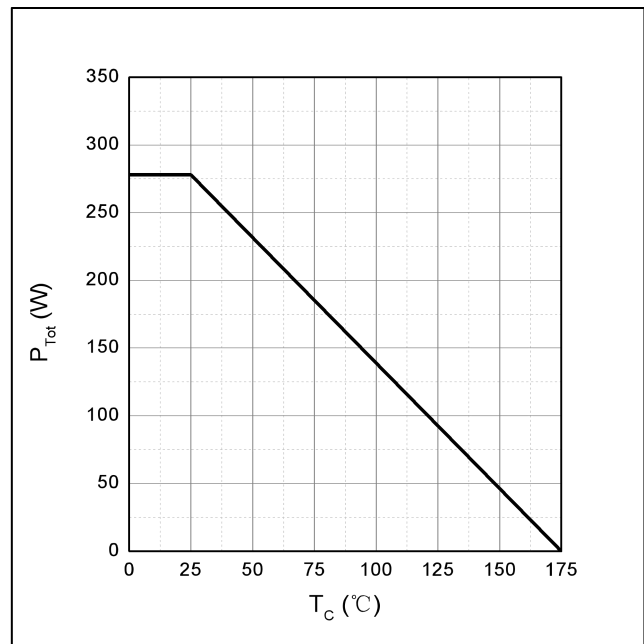


Figure 6: Power Derating

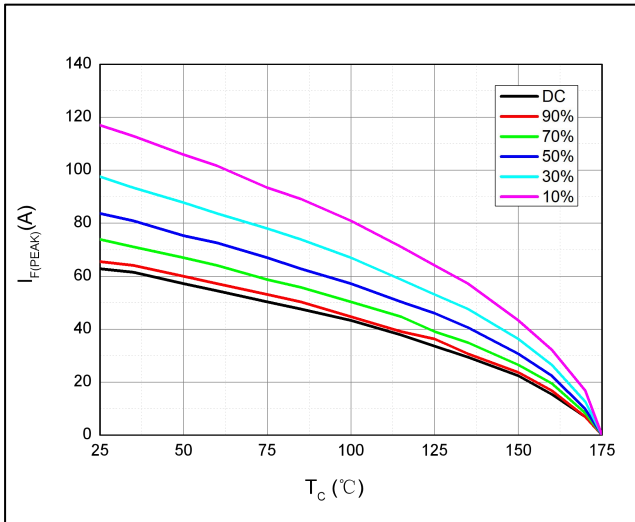


Figure 7: Current Derating

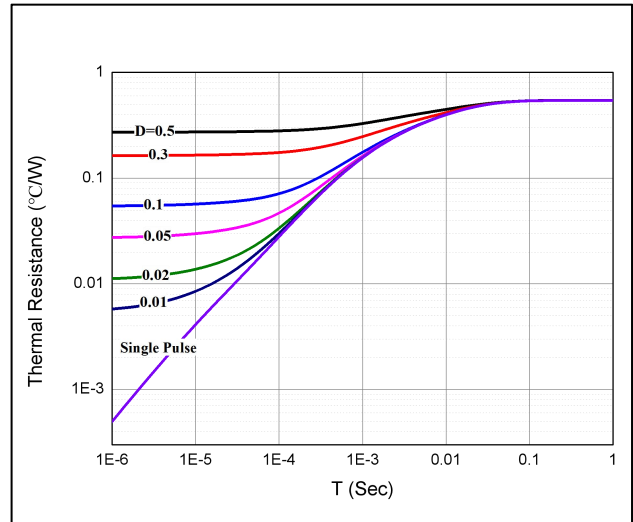
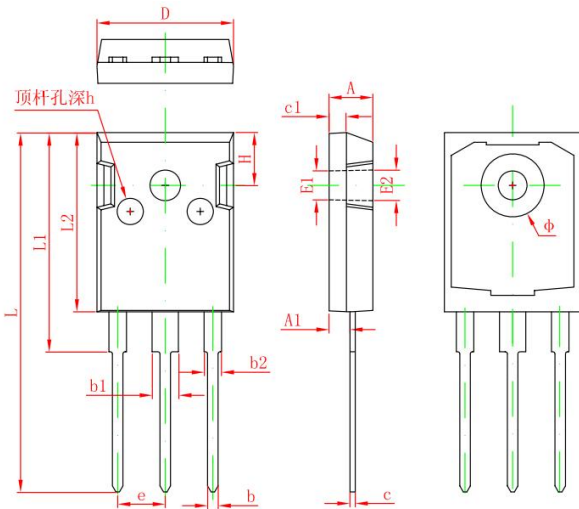


Figure 8: Transient Thermal Impedance

Package Dimensions

Package TO-247-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		0.138 REF	
E2	3.600 REF		0.142 REF	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
phi	7.100	7.300	0.280	0.287
e	5.450 TYP		0.215 TYP	
H	5.980 REF		0.235 REF	
h	0.000	0.300	0.000	0.012

Attention

1. Rohs compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/ EC (RoHS2), as implemented January 2, 2013.

2. REACH compliance

REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Sichain representative to insure you get the most up-to-date REACH SVHC Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

3. With respect to information regarding the application of the product, Sichain hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

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6. Due to technical requirements products may contain dangerous substances. For information on the types in question please contact Sichain office.

7. Except as otherwise explicitly approved by Sichain in a written document signed by authorized representatives of Sichain, Sichain' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

8. For use of our products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a Sichain representatives, for example but not limited to: transportation equipment, primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, and power transmission systems.