# S1D030120D

## Silicon Carbide Schottky Diode

| | | |
|---|---|---|
| $V_{RRM}$ | = | 1200 V |
| $I_{F\ (TC=135°C)}$ | = | 22 A (per leg) |
| $Q_C$ | = | 86 nC |

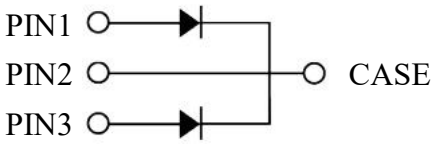
## Feature

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

## Package

Halogen-Free

RoHS




## 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
- Free Wheeling Diodes in Inverter stages
- AC/DC converters

| Part Number | Packge | Marking |
|---|---|---|
| S1D030120D | TO-247-3L | S1D030120D |

## Maximum Ratings （Tc = 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 | 47/94<br>21/42<br>15/30 | A | Tc = 25°C<br>Tc = 135°C<br>Tc = 152°C | Fig.7 |
| $I_{FRM}$ | Repetitive Peak Forward Surge Current （Per Leg） | 70<br>50 | A | $T_C$ = 25°C， tp = 10 ms，Half Sine Pulse<br>$T_C$ = 110°C，tp = 10 ms，Half Sine Pulse | |
| $I_{FSM}$ | Non-Repetitive Peak Forward Surge Current | 140<br>95 | A | $T_C$ = 25°C， tp = 10 ms，Half Sine Pulse<br>$T_C$ = 110°C，tp = 10 ms，Half Sine Pulse | |
| $P_{tot}$ | Power Dissipation (Device/Per Leg) | 455/197<br>192/83 | W | Tc = 25°C<br>Tc = 110°C | |
| dV/dt | Diode dV/dt ruggedness | 200 | V/ns | $V_R$ = 0~960V | |
| $\int i^2dt$ | $\int i^2dt$ | 88 | $A^2S$ | $T_C$ = 25°C， $t_P$ = 10 ms，(Per Leg) | |
| $T_{stg}$ ,$T_J$ | Operating Junction Range | -55 to +175 | °C | | |

## Electrical Characteristics

| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions | Note |
|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | 1.4<br>1.9 | 1.8<br>3 | V | $I_F$ = 15 A，$T_J$ = 25℃<br>$I_F$ = 15 A，$T_J$ = 175℃ | Fig.1 |
| $I_R$ | Reverse Current | 1<br>7 | 100<br>200 | μA | $V_R$ = 1200V，$T_J$ = 25℃<br>$V_R$ = 1200V，$T_J$ = 175℃ | Fig.2 |
| $Q_c$ | Total Capacitive Charge | 86 | | nC | $V_R$ = 800V，$I_F$ = 15A<br>di/dt = 200A/μs，$T_J$ = 25℃ | Fig.4 |
| C | Total Capacitance | 1500<br>80<br>60 | | pF | $V_R$ = 0V，$T_J$ = 25℃，f = 1MHz<br>$V_R$ = 400V，$T_J$ = 25℃，f = 1MHz<br>$V_R$ = 800V，$T_J$ = 25℃，f = 1MHz | Fig.3 |
| $E_C$ | Capacitance Stored Energy | 43 | | μJ | $V_R$ = 800V | Fig.5 |

## Thermal Characteristics

| symbol | parameter | Typ | Unit | Note |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance from Junction to Case | 0.39<br>0.78 | °C/W | Fig. 8 |

## Typical Performance

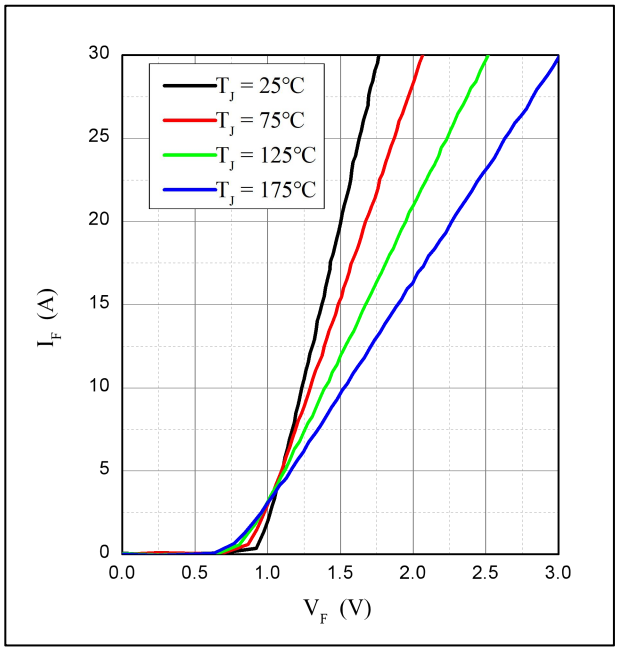



Figure 1: Forward Characteristics

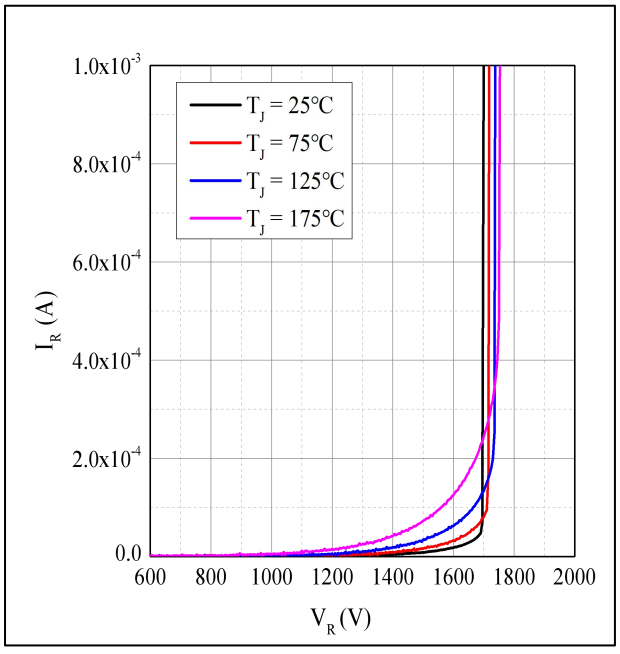



Figure 2: Reverse Characteristics

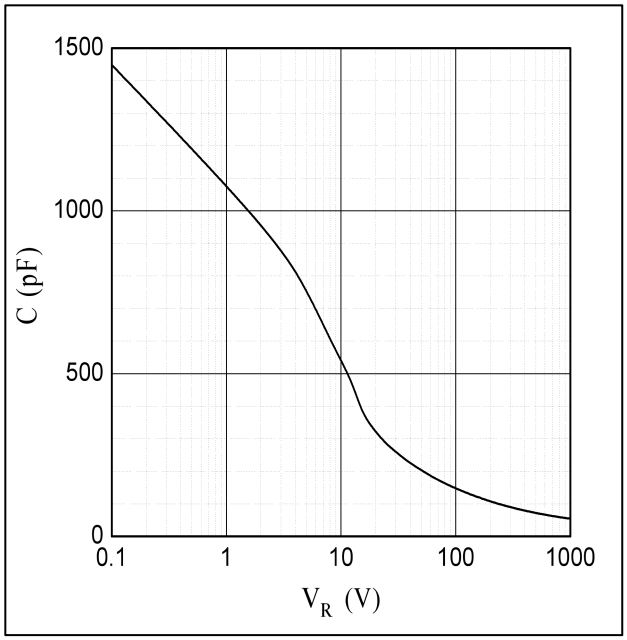



Figure 3: Capacitance vs. Reverse Voltage

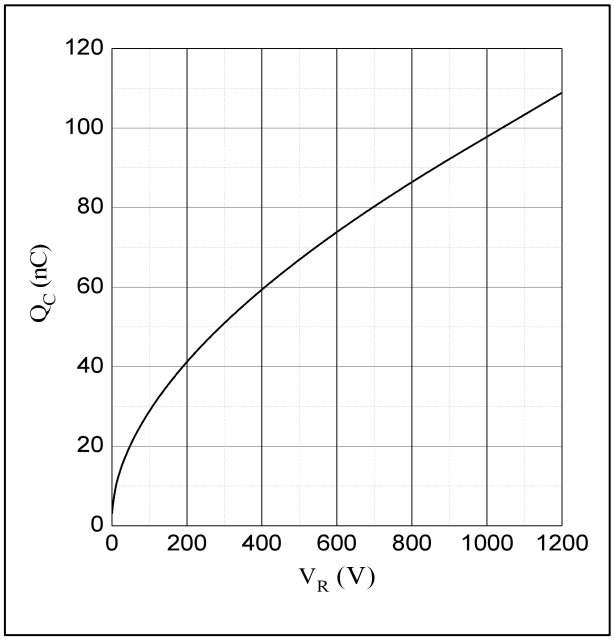



Figure 4: Recovery Charge vs. Reverse Voltage

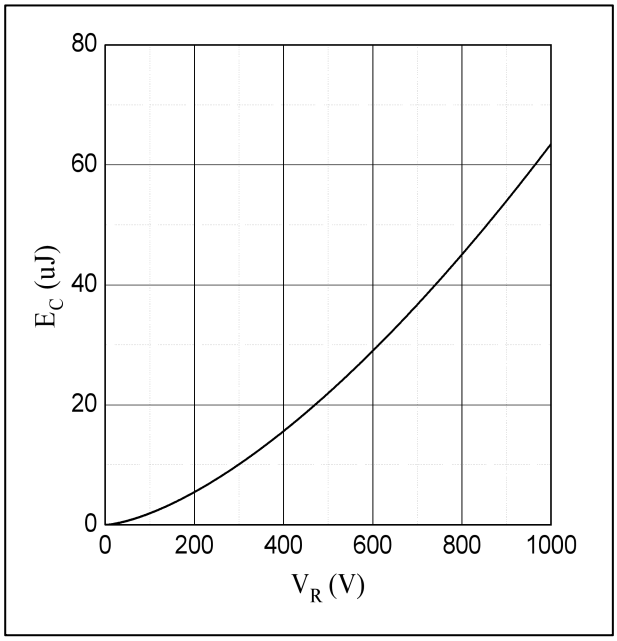



Figure 5: Typical Capacitance Stored Energy

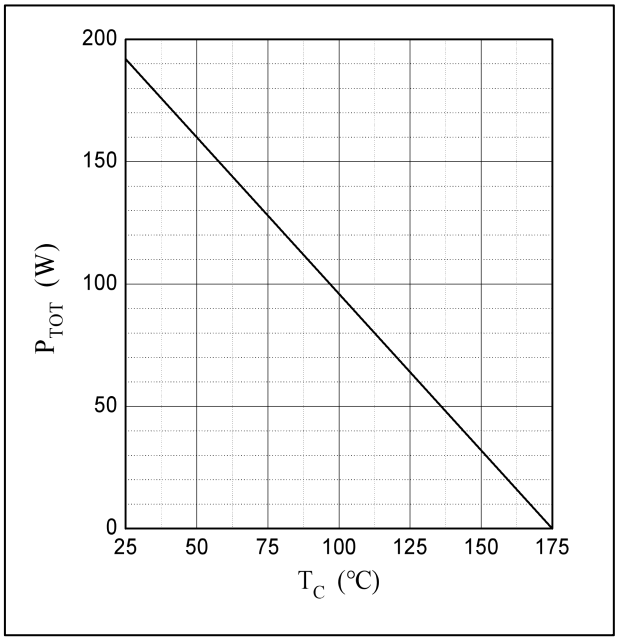



Figure 6: Power Derating

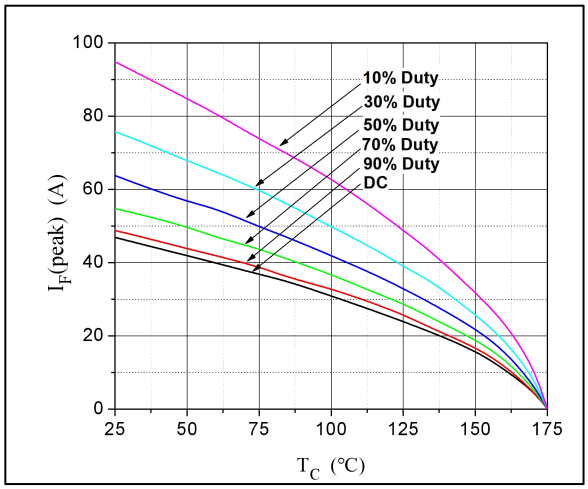



Figure 7: Current Derating

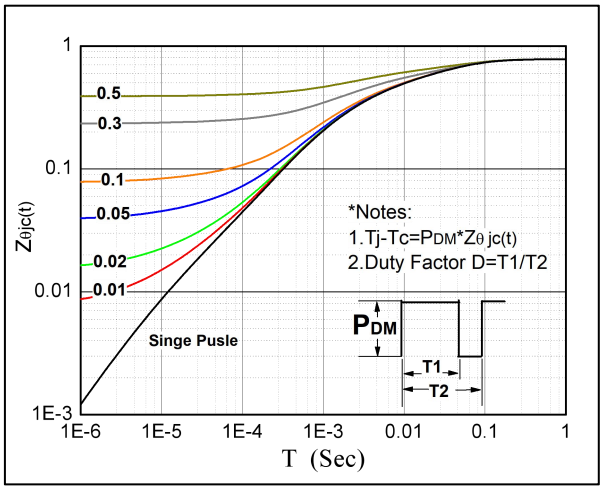
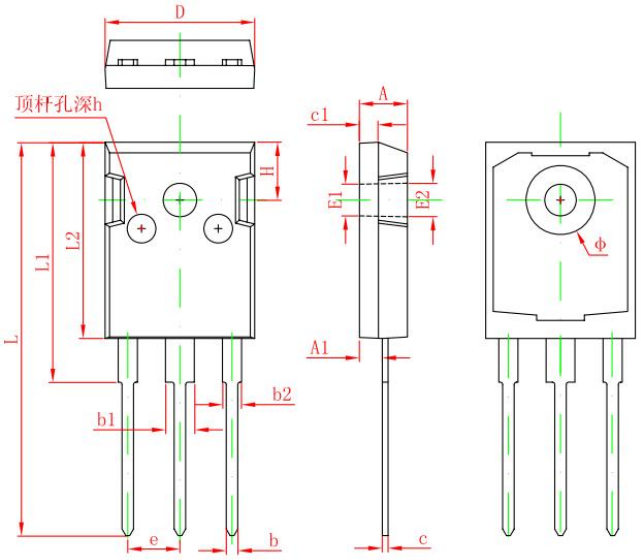



Figure 8: Transient Thermal Impedance

## 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 |
| Φ | 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.

4. Any information given in this documents subject to customer's compliance with its obligations and any applicable legal requirements, norms and standards concerning any use of the product of Sichain in any customer's applications.

5. Specifications of any and all products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance,characteristics,and functions of the described products as mounted in the customer's products or equipment.

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.