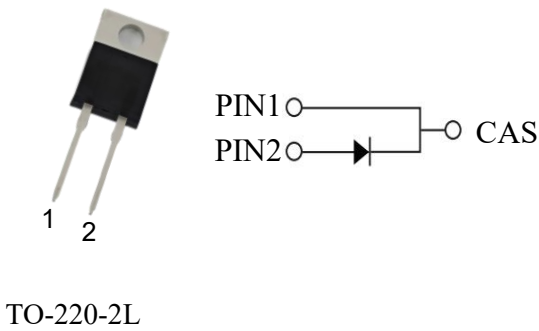


S1D004065A

TriQSiC™ 650V Silicon Carbide Schottky Diode G1

Features

- 650V schottky Rectifier
- Zero Reverse Recovery Current / Zero forward recovery
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Low forward voltage
- Positive Temperature Coefficient on V_F
- Increased Creepage/Clearance Distance



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

Table 1 Key performance and package parameters

Type	V_{RRM}	$I_F(T_C = 135^{\circ}C)$	Q_C	Marking	Package
S1D004065A	650V	7A	9.5nC	S1D004065A	TO-220-2L

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1、Maximum ratings

Table 2 Maximum rating (Tc = 25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	650	V	-	
V_{RSM}	Surge Peak Reverse Voltage	700	V	-	
V_R	DC Peak Reverse Voltage	650	V	-	
I_F	Continuous Forward Current	14 7 4	A	Tc = 25°C Tc = 135°C Tc = 155°C	Fig.7
I_{FSM}	Non-Repetitive Peak Forward Surge Current	30	A	Tc = 25°C, tp = 10ms, Half Sine Pulse	
P_{tot}	Power Dissipation	50 21	W	Tc = 25°C Tc = 110°C	Fig.6
$\int i^2 dt$	$\int i^2 dt$	4.5	A ² S	Tc = 25°C, tp = 10ms	
T_{stg}, T_J	Operating Junction Range	-55 to +175	°C	-	

2、Thermal characteristics

Table 3 Thermal characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions	Note
$R_{th(j-c)}$	Thermal resistance from junction to case	3	°C/W	-	Fig.8

3、Electrical characteristics

Table 4 Electrical characteristics ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.35 1.55	1.6 1.9	V	$I_F = 4\text{A}$, $T_J = 25^\circ\text{C}$ $I_F = 4\text{A}$, $T_J = 175^\circ\text{C}$	Fig.1
I_R	Reverse Current	0.4 4.3	100 200	μA	$V_R = 650\text{V}$, $T_J = 25^\circ\text{C}$ $V_R = 650\text{V}$, $T_J = 175^\circ\text{C}$	Fig.2
Q_c	Total Capacitive Charge	9.5	-	nC	$V_R = 400\text{V}$, $I_F = 4\text{A}$ $di/dt = 200\text{A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$	Fig.4
C	Total Capacitance	222 17.5 13.5	-	pF	$V_R = 0\text{V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$ $V_R = 200\text{V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$ $V_R = 400\text{V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$	Fig.3
E_C	Capacitance Stored Energy	2.5	-	μJ	$V_R = 400\text{V}$	Fig.5

4、Electrical characteristic diagrams

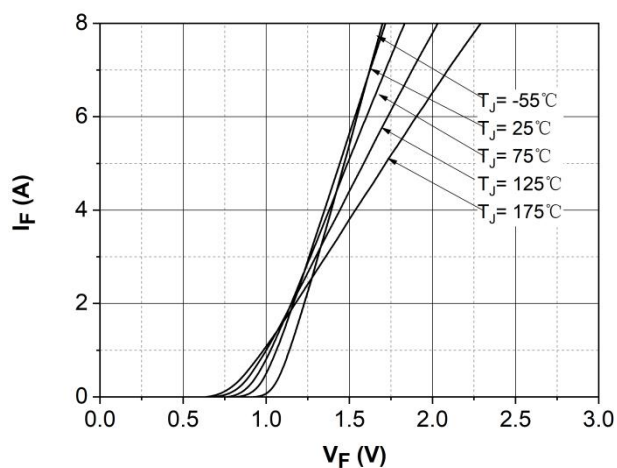


Figure 1. Forward Characteristics

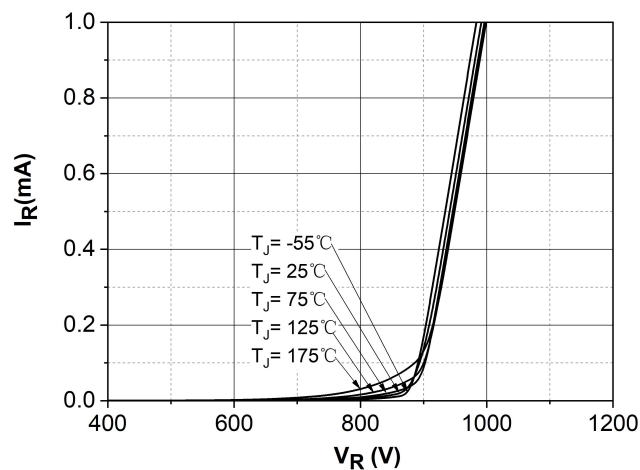


Figure 2. Reverse Characteristics

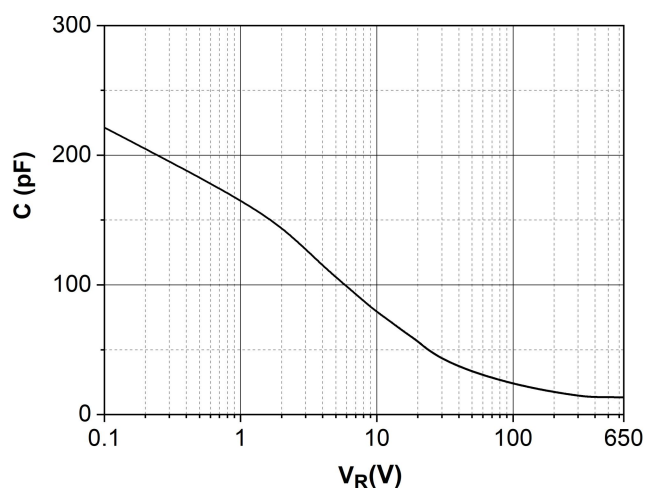


Figure 3. Capacitance vs. Reverse Voltage

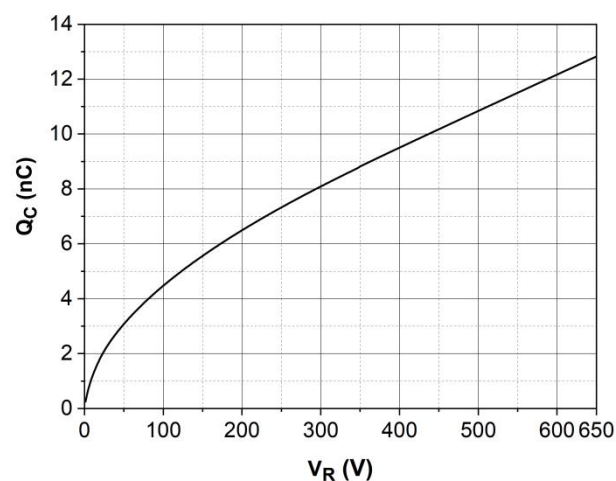


Figure 4. Recovery Charge vs. Reverse Voltage

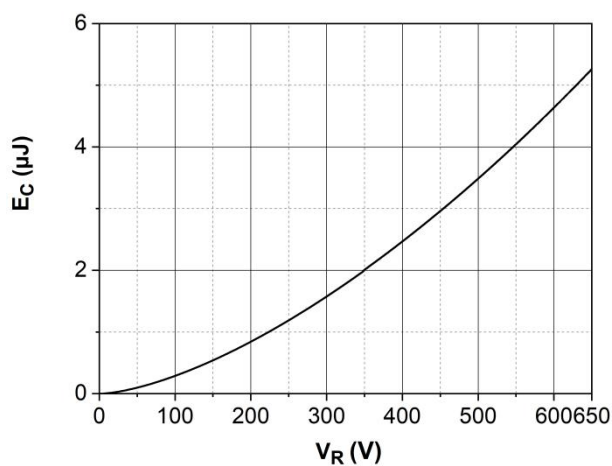


Figure 5. Typical Capacitance Stored Energy

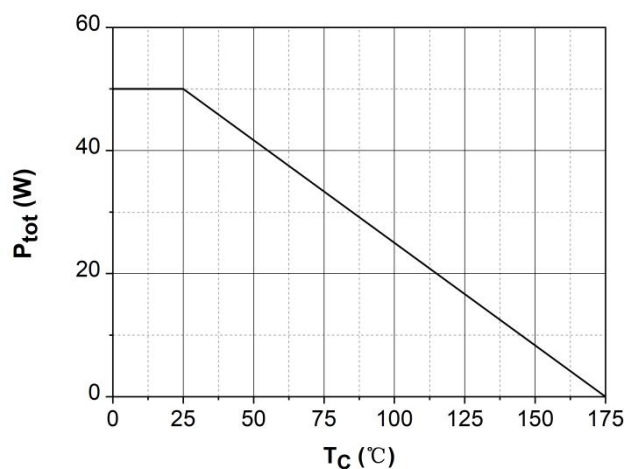


Figure 6. Power Derating

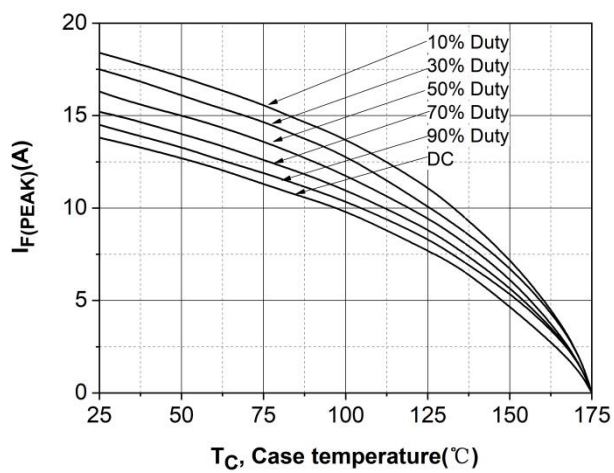


Figure 7. Current Derating

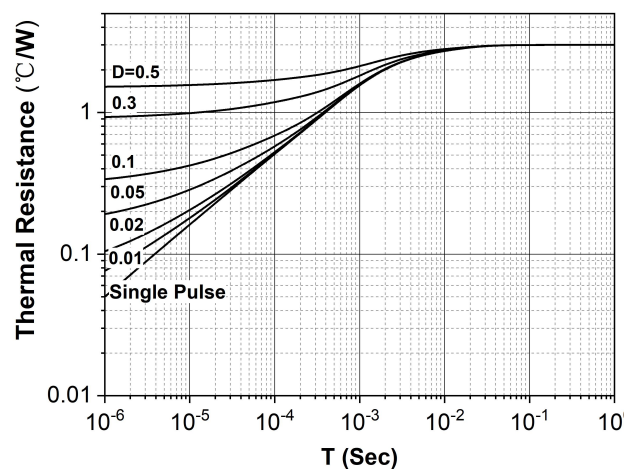
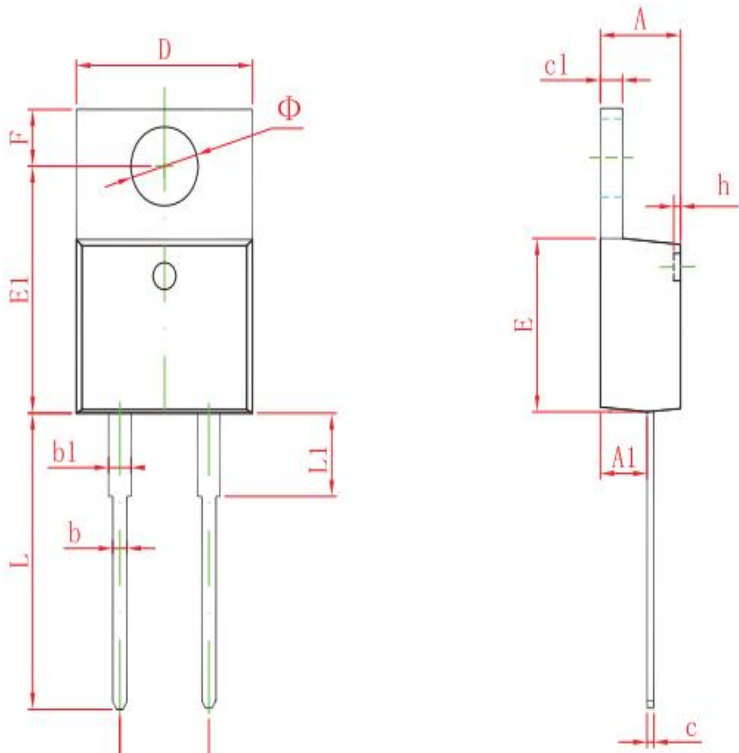


Figure 8. Transient Thermal Impedance

5、 Package drawing (TO-220-2L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.450	4.750	0.175	0.187
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.300	0.500	0.012	0.020
c1	1.170	1.370	0.046	0.054
D	9.830	10.330	0.387	0.407
E	8.500	8.900	0.335	0.350
E1	12.050	12.650	0.474	0.498
e	5.080 TYP		0.200 TYP	
F	2.540	2.940	0.100	0.116
h	0.100 TYP		0.004 TYP	
L	13.300	13.800	0.523	0.543
L1	3.540	3.940	0.139	0.155
Φ	3.735	3.935	0.147	0.155

Revision history

Document version	Date of release	Description of changes
V01_00	2025-04-30	—

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.