

S1D020120C



TriQSiC™ 1200V Silicon Carbide Schottky Diode

Features

- 1.2kv 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



TO-247-2L



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
S1D020120C	1200V	29A	110nC	S1D020120C	TO-247-2L

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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	1200	V	-	
V_{RSM}	Surge Peak Reverse Voltage	1300	V	-	
V_R	DC Peak Reverse Voltage	1200	V	-	
I_F	Continuous Forward Current	61 29 20	A	Tc = 25°C Tc = 135°C Tc = 153°C	Fig.7
I_{FSM}	Non-Repetitive Peak Forward Surge Current	180	A	Tc = 25°C, tp = 10ms, Half Sine Pulse	
P_{tot}	Power Dissipation	268 116	W	Tc = 25°C Tc = 110°C	Fig.6
$\int i^2 dt$	$\int i^2 dt$	160	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	0.56	°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	1.38 1.85	1.6 2.2	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	100 200	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	110	-	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 104 76	-	pF	$V_R = 0\text{V}$, $T_J = 25^{\circ}\text{C}$, $f = 1\text{MHz}$ $V_R = 400\text{V}$, $T_J = 25^{\circ}\text{C}$, $f = 1\text{MHz}$ $V_R = 800\text{V}$, $T_J = 25^{\circ}\text{C}$, $f = 1\text{MHz}$	Fig.3
E_C	Capacitance Stored Energy	60	-	μJ	$V_R = 800\text{V}$	Fig.5

4、Electrical characteristic diagrams

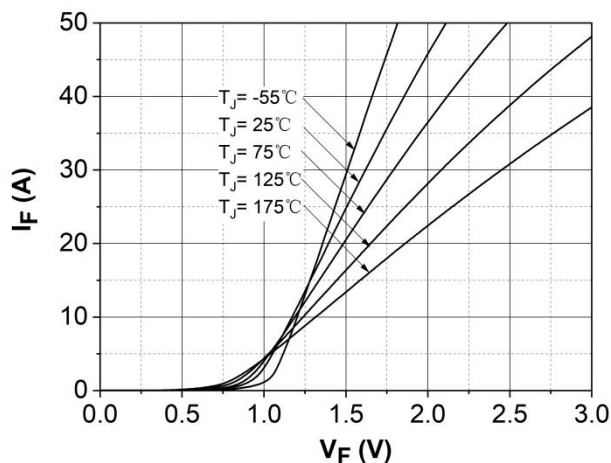


Figure 1. Forward Characteristics

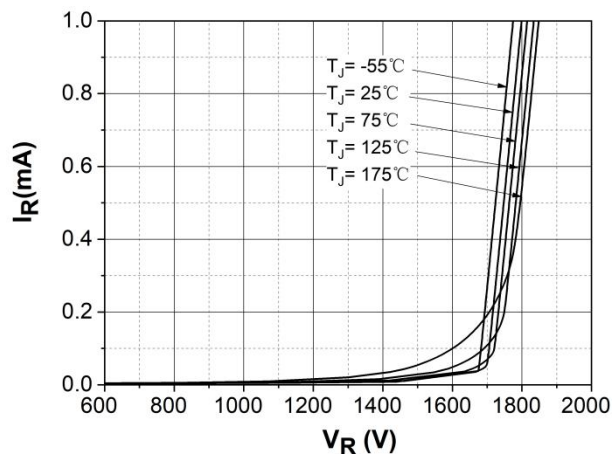


Figure 2. Reverse Characteristics

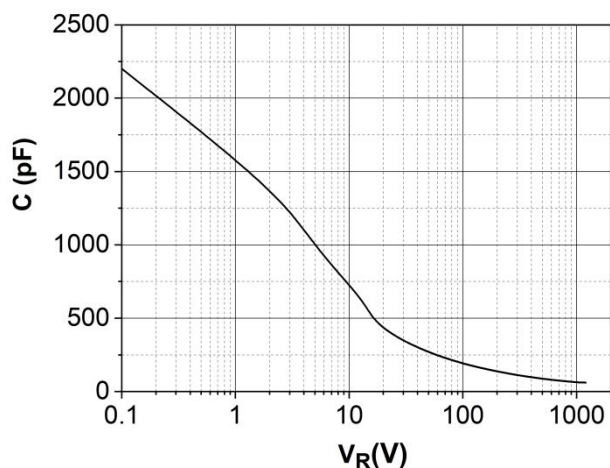


Figure 3. Capacitance vs. Reverse Voltage

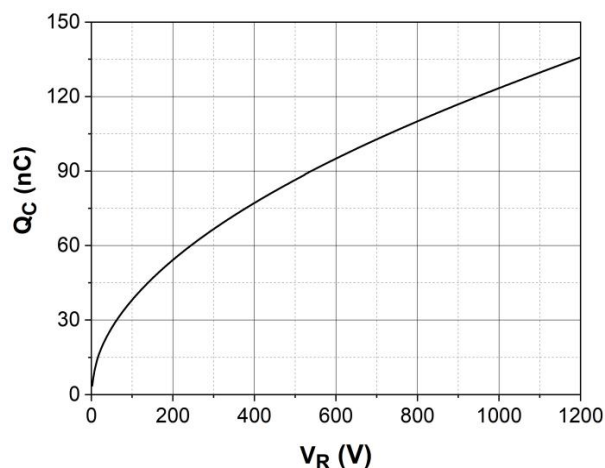


Figure 4. Recovery Charge vs. Reverse Voltage

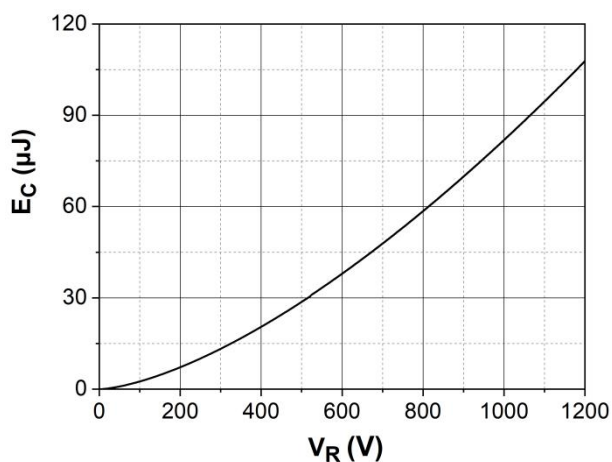


Figure 5. Typical Capacitance Stored Energy

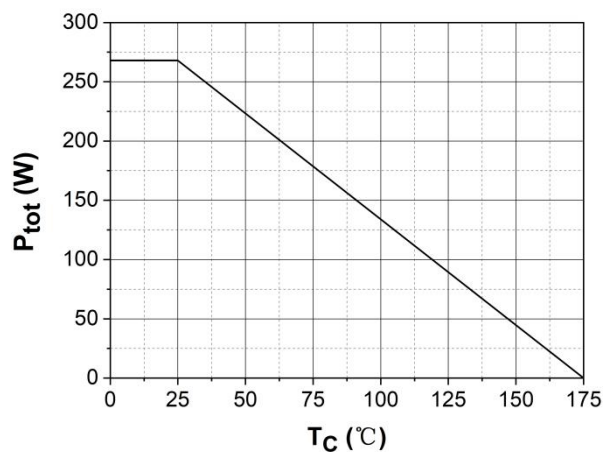


Figure 6. Power Derating

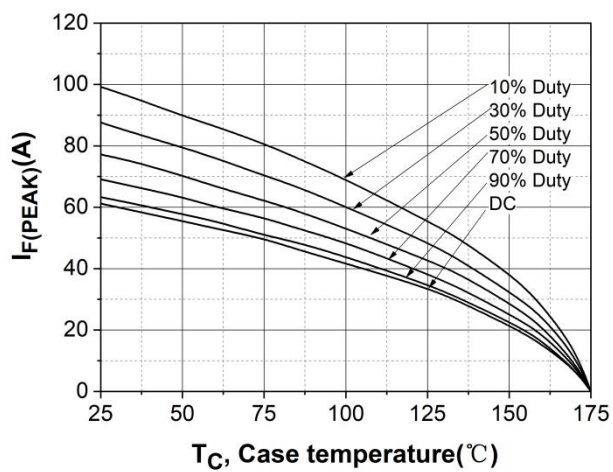


Figure 7. Current Derating

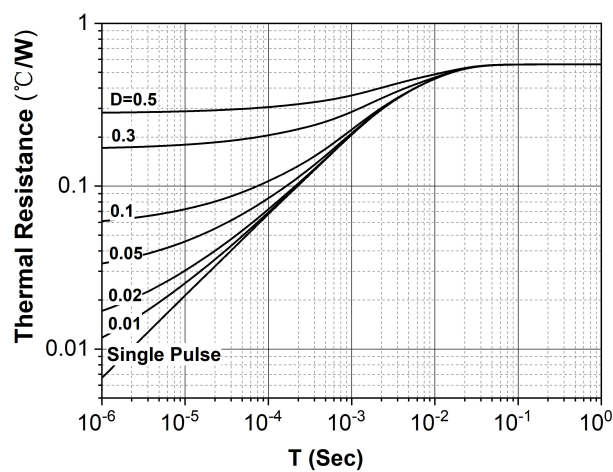


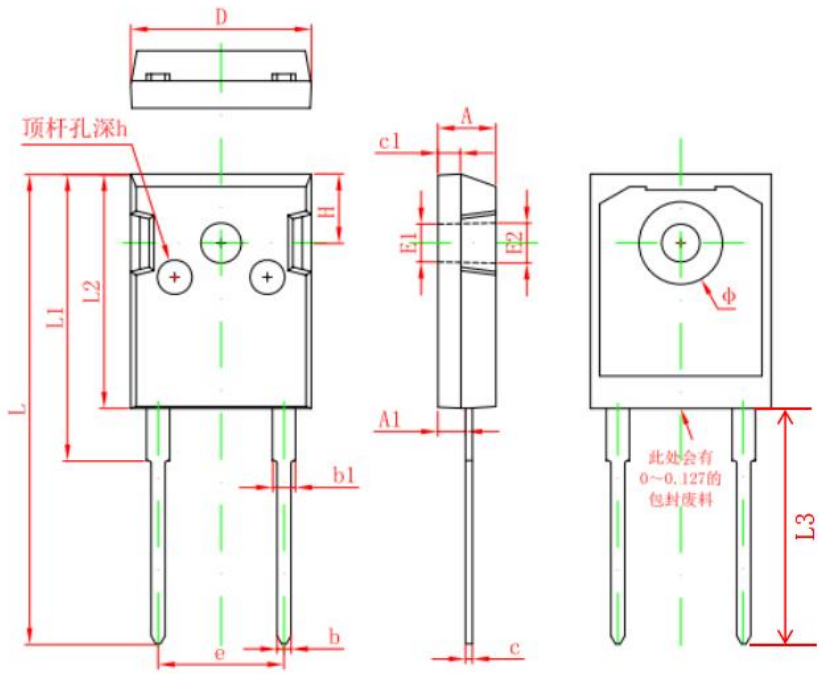
Figure 8. Transient Thermal Impedance

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1200V SiC Schottky Diode

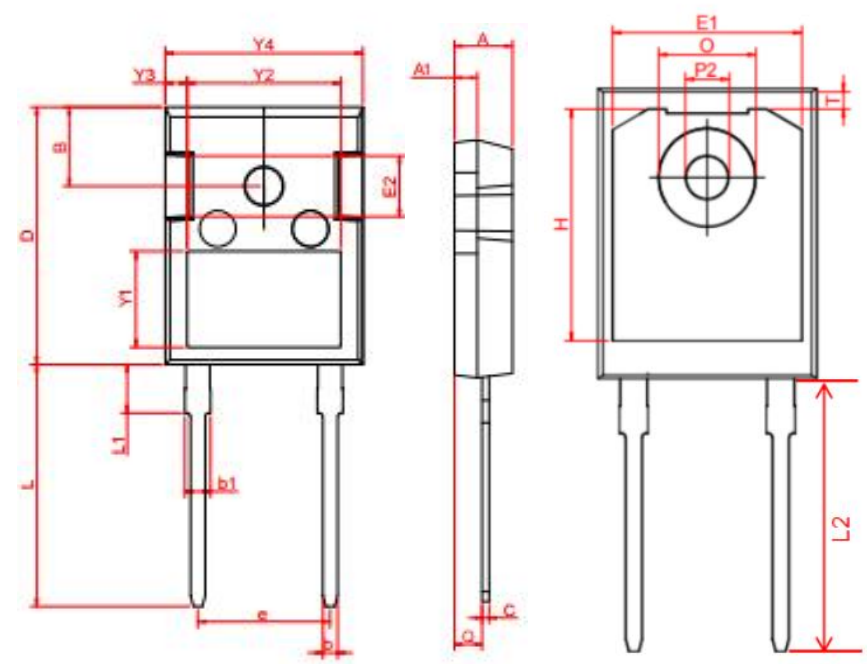


5、 Package drawing (TO-247-2L-A&TO-247-2L-B)



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	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
L3	20.300	21.000	0.799	0.827
φ	7.100	7.300	0.280	0.287
e	10.900 TYP		0.429 TYP	
H	5.980 REF		0.235 REF	
h	0.000	0.300	0.000	0.012

TO-247-2L-A



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	MAX	Min	MAX
A	4.70	5.30	0.185	0.209
A1	1.70	2.30	0.067	0.091
C	0.45	0.75	0.018	0.030
Q	2.20	2.60	0.087	0.102
O	7.10	7.40	0.280	0.291
P2	3.45	3.75	0.136	0.148
L	19.00	21.00	0.748	0.827
L1	4.20	4.50	0.165	0.177
L2	20.30	21.00	0.799	0.827
b	1.00	1.40	0.039	0.055
b1	1.80	2.25	0.071	0.089
e	10.65	10.95	0.419	0.431
D	20.95	21.35	0.825	0.841
Y1	7.60	8.10	0.299	0.319
Y2	11.00	13.00	0.433	0.512
Y3	1.75	2.25	0.069	0.089
Y4	16.00	16.40	0.630	0.646
E2	4.60	4.90	0.181	0.193
T	1.35 REF		0.053 REF	
H	16.25 REF		0.640 REF	
E1	14.00 REF		0.551 REF	
B	6.55 REF		0.258 REF	

TO-247-2L-B

Revision history

Document version	Date of release	Document stage	Description of changes
V02_00	2024-08-05	---	---
V02_01	2024-08-07	---	---
V02_02	2024-10-28	---	---
V02_03	2025-04-30	---	---
V02_04	2025-05-23	---	---
V03_00	2026-05-12	Final	---

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.

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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.