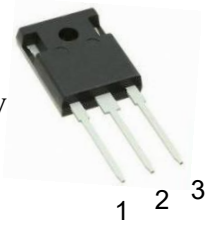
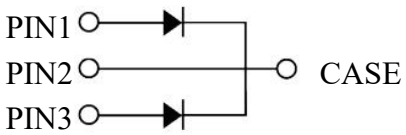
S1D040120D

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-247-3L

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 (per leg)

Type	V_{RRM}	I_F(T_C = 135℃)	Q_C	Marking	Package
S1D040120D	1200V	31A	110nC	S1D040120D	TO-247-3L

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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 (Per Leg/Device)	64/126 31/60 20/40	A	Tc = 25˚C Tc = 135˚C Tc = 154˚C	Fig.7
I_{FSM}	Non-Repetitive Peak Forward Surge Current(Per Leg)	180	A	T_C = 25˚C，tp = 10ms，Half Sine Pulse	
I_{FRM}	Repetitive Peak Forward Surge Current(Per Leg)	120	A	T_C = 25˚C，tp = 10ms，Half Sine Pulse	
P_{tot}	Power Dissipation (Per Leg/Device)	278/500 120/216	W	Tc = 25˚C Tc = 110˚C	Fig.6
$\int i^2dt$	$\int i^2dt$ (Per Leg)	160	A^2S	T_C = 25˚C，t_P = 10ms	
T_{stg} ,T_J	Operating Junction Range	-55 to +175	℃	-	

2、Thermal characteristics

Table 3 Thermal characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions	Note
$R_{th(j-c)}$	Thermal resistance from junction to case	0.30	°C/W	Per Device	
		0.54		Per Leg	Fig. 8

3、Electrical characteristics

Table 4 Electrical characteristics (Per Leg,Tc = 25°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 = 20A，T_J = 25°C I_F = 20A，T_J = 175°C	Fig.1
I_R	Reverse Current	1 10	100 200	μA	V_R = 1200V，T_J = 25°C V_R = 1200V，T_J = 175°C	Fig.2
Q_c	Total Capacitive Charge	110	-	nC	V_R = 800V，I_F = 20A di/dt = 200A/μs，T_J = 25°C	Fig.4
C	Total Capacitance	2120 104 76	-	pF	V_R = 0V，T_J = 25°C，f = 1MHz V_R = 400V，T_J = 25°C，f = 1MHz V_R = 800V，T_J = 25°C，f = 1MHz	Fig.3
E_C	Capacitance Stored Energy	60	-	μJ	V_R = 800V	Fig.5

4、Electrical characteristic diagrams

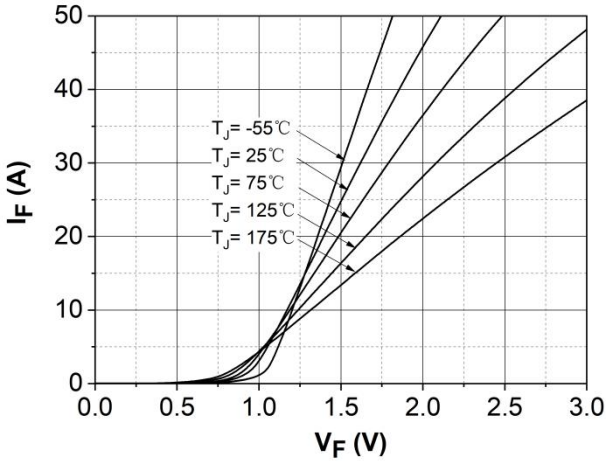


Figure 1. Forward Characteristics

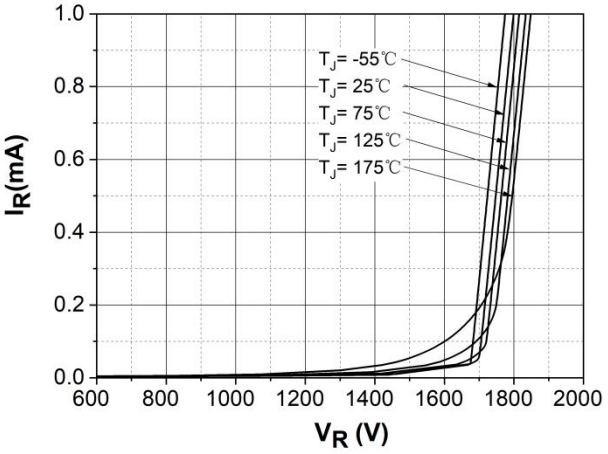


Figure 2. Reverse Characteristics

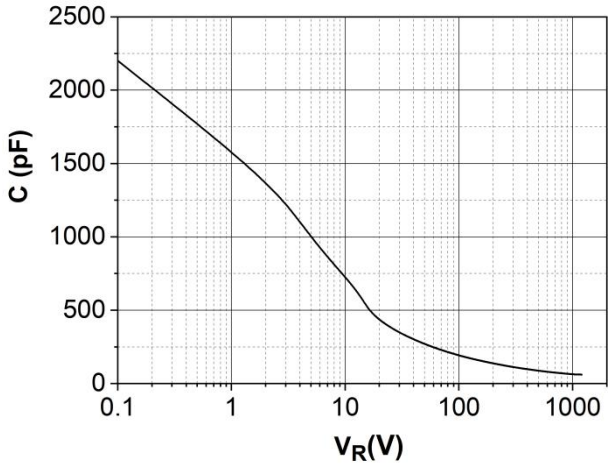


Figure 3. Capacitance vs. Reverse Voltage

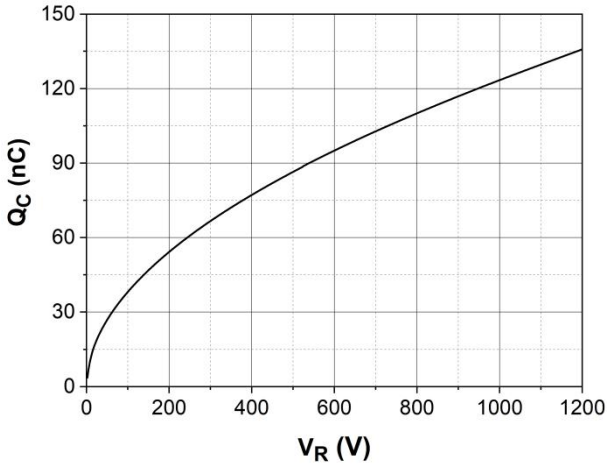


Figure 4. Recovery Charge vs. Reverse Voltage

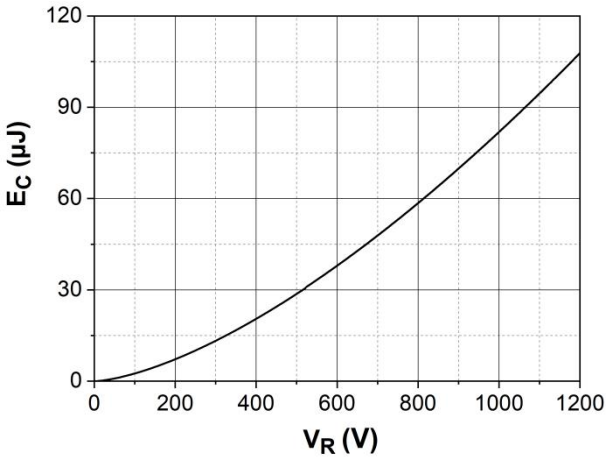


Figure 5. Typical Capacitance Stored Energy

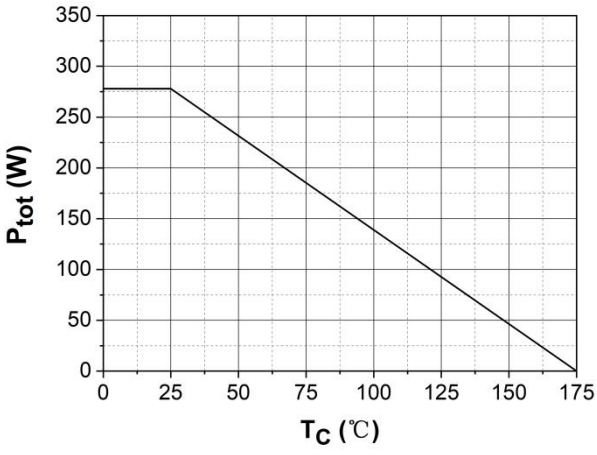


Figure 6. Power Derating

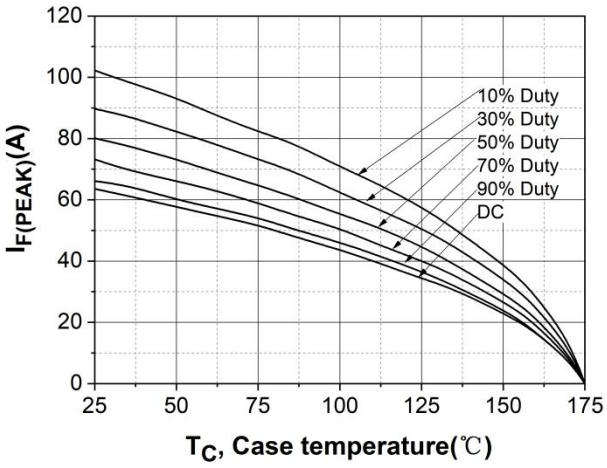


Figure 7. Current Derating

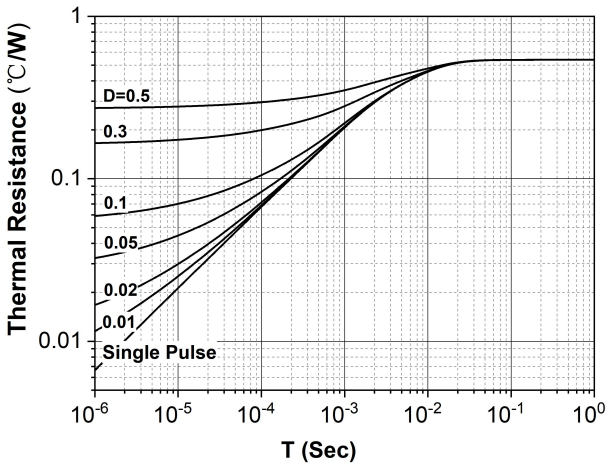
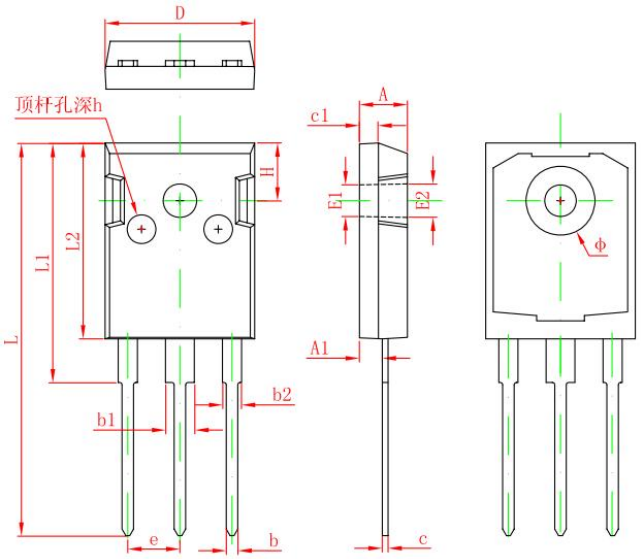


Figure 8. Transient Thermal Impedance

5、Package drawing (TO-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

Revision history

Document version	Date of release	Description of changes
V02_00	2024-08-05	——
V02_01	2024-08-07	——
V02_02	2024-10-28	——
V02_03	2024-12-02	——

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.

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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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