

Silicon Carbide Schottky Diode

QSD-HCS040X120

Features

- 1200v schottky rectifier
- Zero reverse recovery current
- High-frequency operation
- Temperature-independent switching behavior
- Extremely fast switching

V _{rrm} =	1200 V
I _f (T _c =150 °C)	40 A
Q _c =	194 nC

Benefits

- Replace bipolar with unipolar rectifiers
- Essentially no switching losses
- Higher efficiency
- Reduction of heat sink requirements
- Parallel devices without thermal runaway

Package



Applications

- Switch mode power supplies (SMPS)
- Power factor correction
- Motor drives

Part Number	Package	Marking
QSD-HCS040X120	Die Only	Q

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Maximum Rated Values (Tc=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
Vrrm	Repetitive Peak Reverse Voltage	1200	V		
If	Continuous Forward Current	89	A	Tc=25°C	Fig.3
		48		Tc=135°C	
		40		Tc=150°C	
Ifrm	Repetitive Peak Forward Surge Current	168	A	Tc=25°C, Tp=10ms, Half Sine Pulse	
		142		Tc=110°C, Tp=10ms, Half Sine Pulse	
Ifsm	Non-Repetitive Forward Surge Current	240	A	Tc=25°C, Tp=10ms, Half Sine Pulse	
		178		Tc=110°C, Tp=10ms, Half Sine Pulse	
Ptot	Power Dissipation	470	W	Tc=25°C	Fig.4
		203		Tc=110°C	
Tj	Operating Temperature	-55 to +175	°C		
Tstg	Storage Temperature	-55 to +175	°C		

Electrical Characteristics (Tj=25°C)

Symbol	Parameter	Value			Unit	Test Conditions	Note
		Min.	Typ.	Max.			
VF	Forward Voltage		1.5	1.8	V	If=40A, Tj=25°C	Fig.1
			2.1	3		If=40A, Tj=175°C	
Ir	Reverse Current		20	300	µA	Vr=1200V, Tj=25°C	Fig.2
			159	500		Vr=1200V, Tj=175°C	
QC	Total Capacitive Charge		194		nC	Vr=800V, Tj=25°C	Fig.5
C	Total Capacitance		2890		pF	Vr=0V, Tj=25°C, f=1MHz	Fig.6
			174			Vr=400V, Tj=25°C, f=1MHz	
			171			Vr=800V, Tj=25°C, f=1MHz	
EC	Capacitance Stored Energy		48		µJ	Vr=800V	Fig.7

Thermal Characteristics

Symbol	Parameter	Value	Unit	Note
Rejc	Thermal Resistance (Junction to Case) ¹	0.32	°C/W	Fig.8

Typical Performance

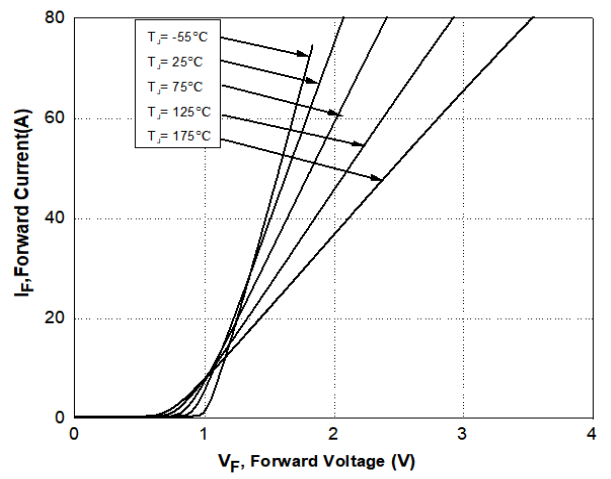


Figure 1. Forward Characteristics

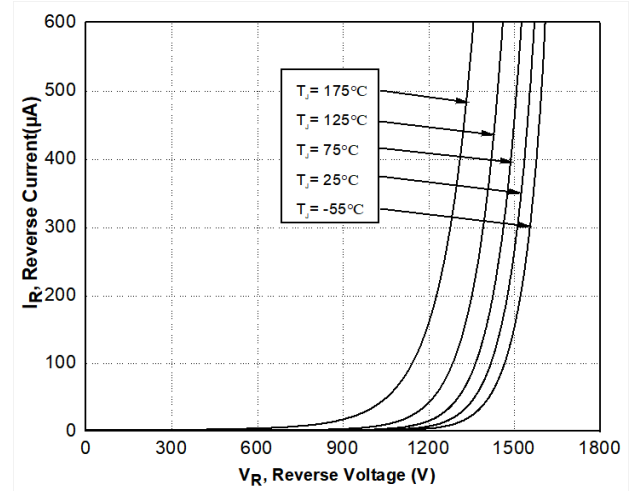


Figure 2. Reverse Characteristics

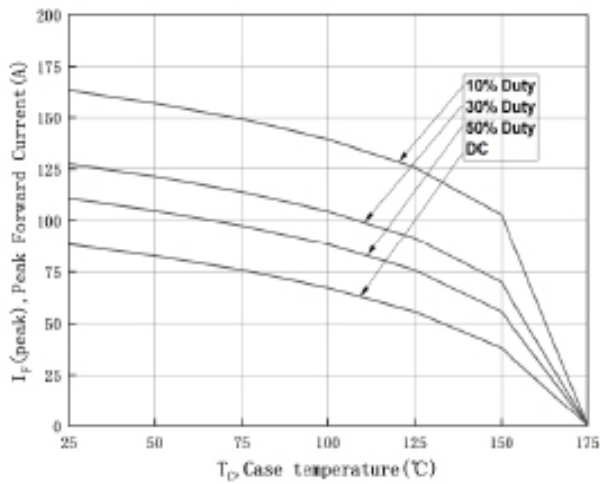


Figure 3. Current Derating

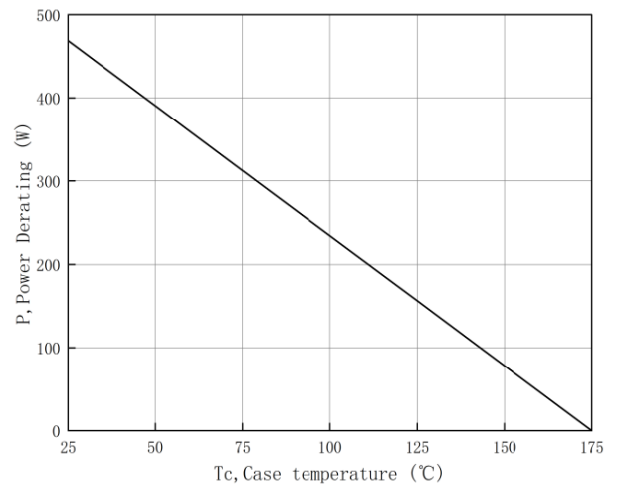


Figure 4. Power Derating

Typical Performance

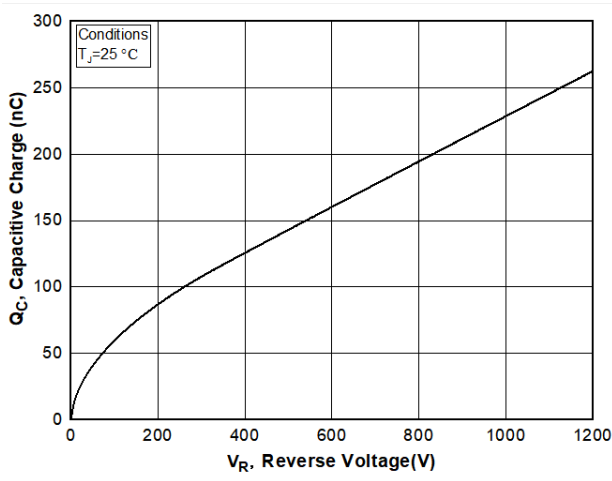


Figure 5. Capacitance Charge Vs. Reverse Voltage

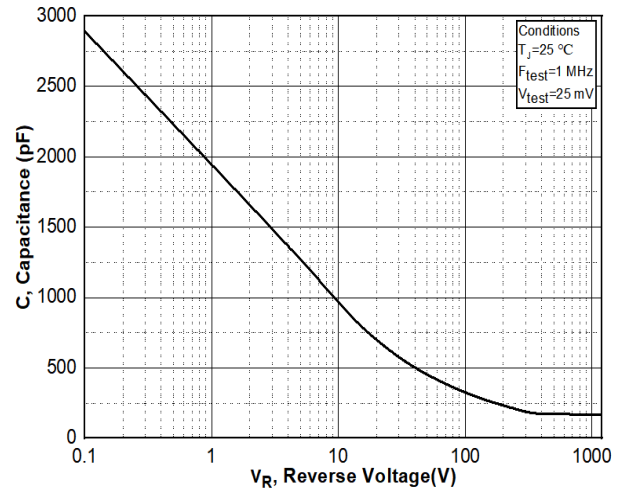


Figure 6. Capacitance Vs. Reverse Voltage

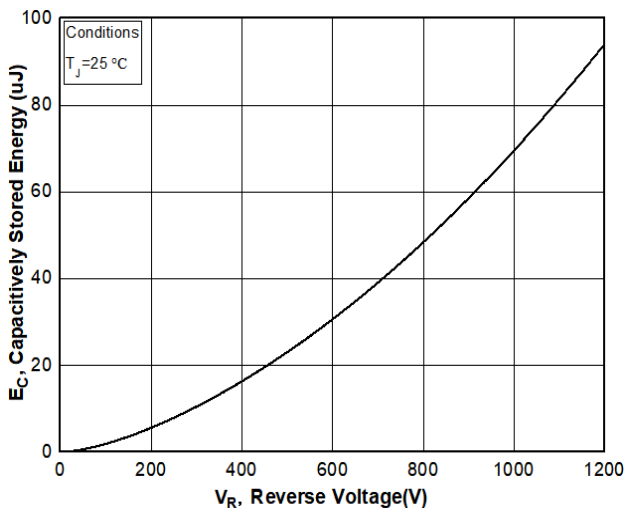


Figure 7. Capacitance Stored Energy

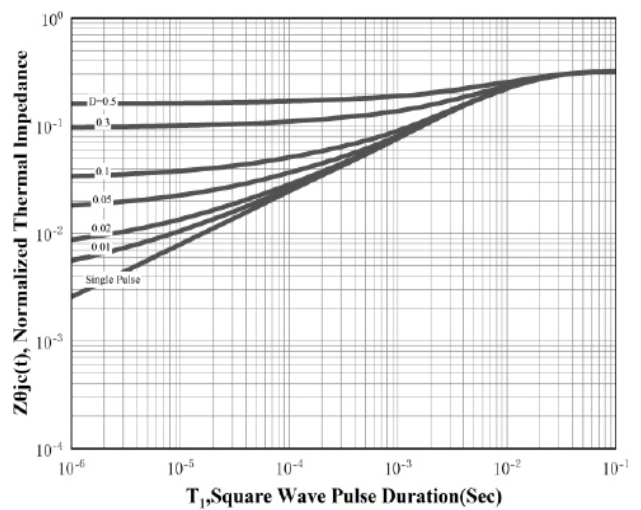
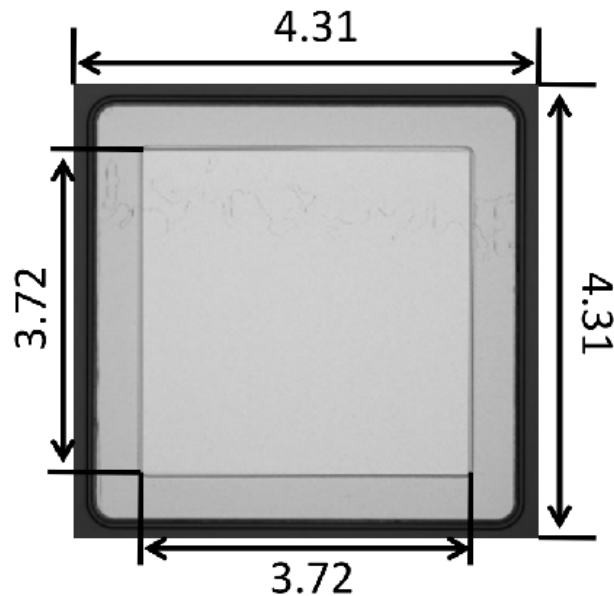


Figure 8. Transient Thermal Response Curve(Junction-to-Case)

Package Dimensions



Product Dimensions

Parameter	Typical	Units
Die Size (LxW)	4.31x4.31	mm
Anode Pad Opening	3.72x3.72	mm
Die Thickness ¹	364±10%	μm
Top side Anode Metalization (Al)	4	μm
Back side Cathode Metalization (Ti/Ni/Ag)	2.05	μm
Front side Passivation (polymide)	SiO ₂ Polyimide	

Attention

- 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. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
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