

# Silicon Carbide Schottky Diode

## QSD-HCS020X65

### Features

- 650v schottky rectifier
- Zero reverse recovery current
- High-frequency operation
- Temperature-independent switching behavior
- Extremely fast switching

V <sub>rrm</sub> =	650 V
I <sub>f</sub> (T <sub>c</sub> =150 °C)	20 A
Q <sub>c</sub> =	63 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-HCS020X65	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	650	V		
If	Continuous Forward Current	62	A	Tc=25°C	Fig.3
		27		Tc=135°C	
		20		Tc=150°C	
Ifrm	Repetitive Peak Forward Surge Current	104	A	Tc=25°C, Tp=10ms, Half Sine Pulse	
		91		Tc=110°C, Tp=10ms, Half Sine Pulse	
Ifsm	Non-Repetitive Forward Surge Current	130	A	Tc=25°C, Tp=10ms, Half Sine Pulse	
		113		Tc=110°C, Tp=10ms, Half Sine Pulse	
Ptot	Power Dissipation	192	W	Tc=25°C	Fig.4
		83		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		1.4	2.0	V	If=20A, Tj=25°C	Fig.1
			1.6	2.2		If=20A, Tj=175°C	
Ir	Reverse Current		2	100	µA	Vr=650V, Tj=25°C	Fig.2
			10			Vr=650V, Tj=175°C	
Qc	Total Capacitive Charge		63		nC	Vr=400V, Tj=25°C	Fig.5
C	Total Capacitance		1349		pF	Vr=0V, Tj=25°C, f=1MHz	Fig.6
			110			Vr=200V, Tj=25°C, f=1MHz	
			108			Vr=400V, Tj=25°C, f=1MHz	
Ec	Capacitance Stored Energy		17		µJ	Vr=400V	Fig.7

### Thermal Characteristics

Symbol	Parameter	Value	Unit	Note
Rejc	Thermal Resistance (Junction to Case) <sup>1</sup>	0.78	°C/W	Fig.8

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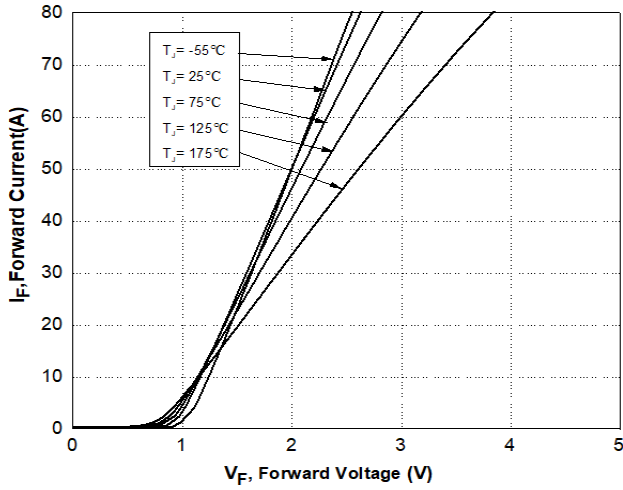


Figure 1. Forward Characteristics

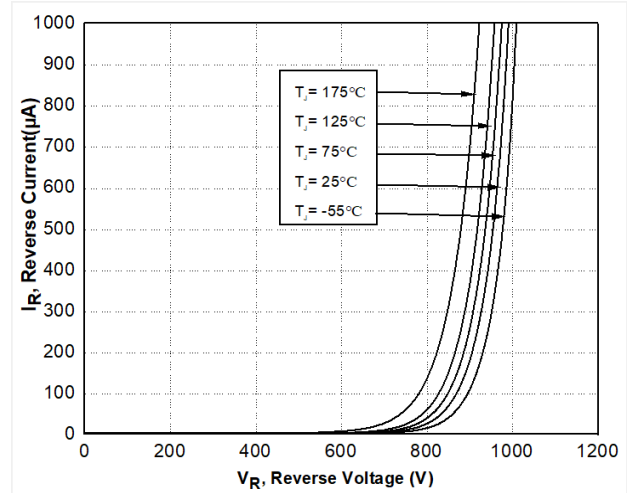


Figure 2. Reverse Characteristics

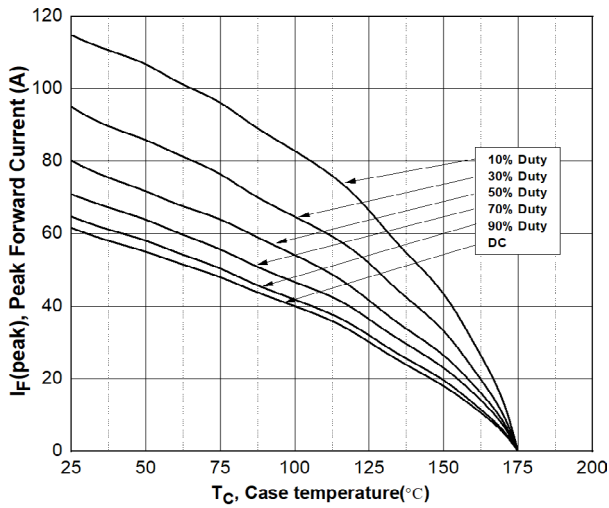


Figure 3. Current Derating

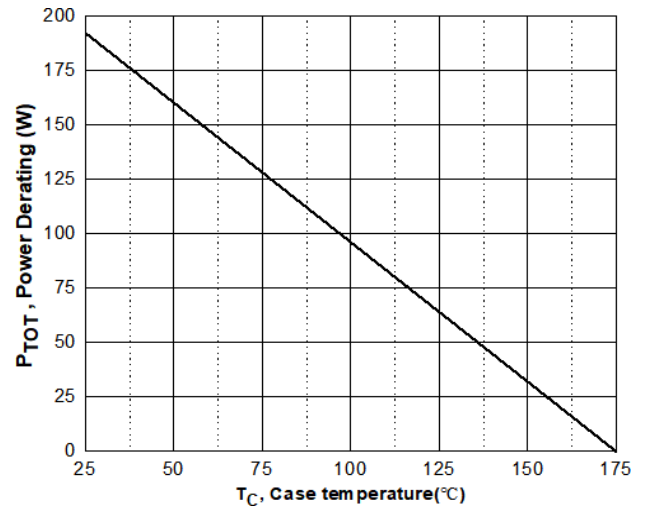


Figure 4. Power Derating

### Typical Performance

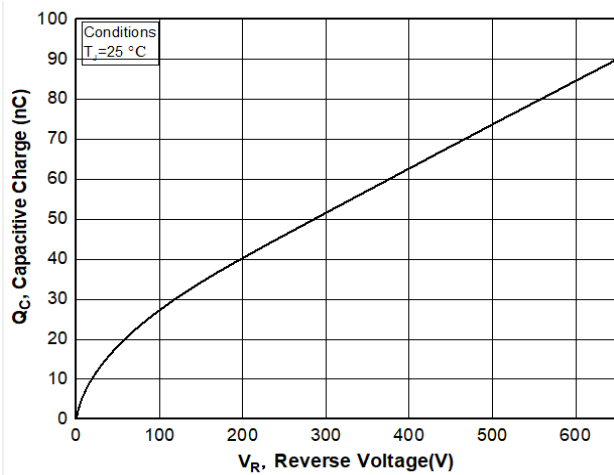


Figure 5. Capacitance Charge Vs. Reverse Voltage

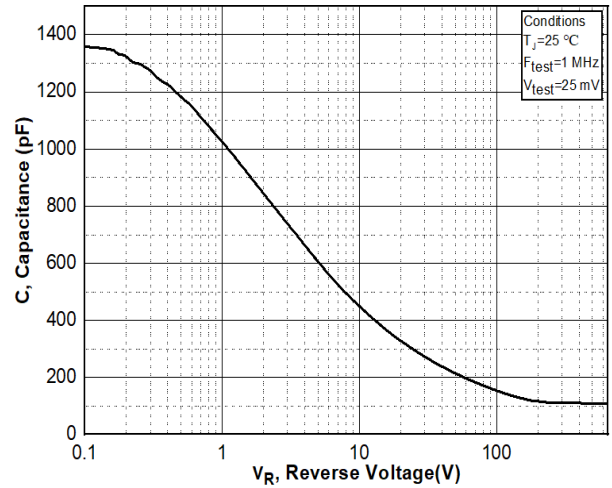


Figure 6. Capacitance Vs. Reverse Voltage

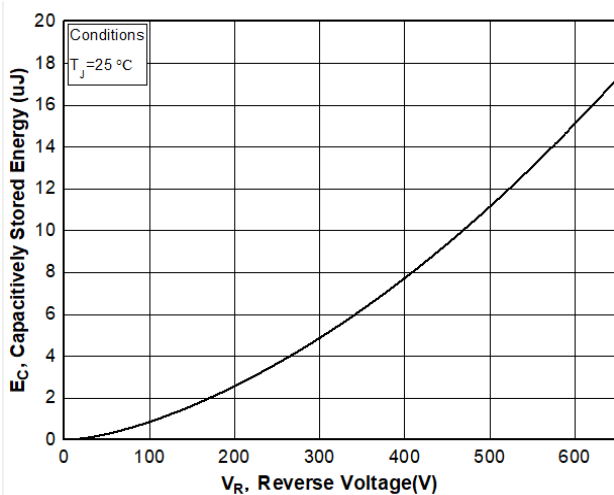


Figure 7. Capacitance Stored Energy

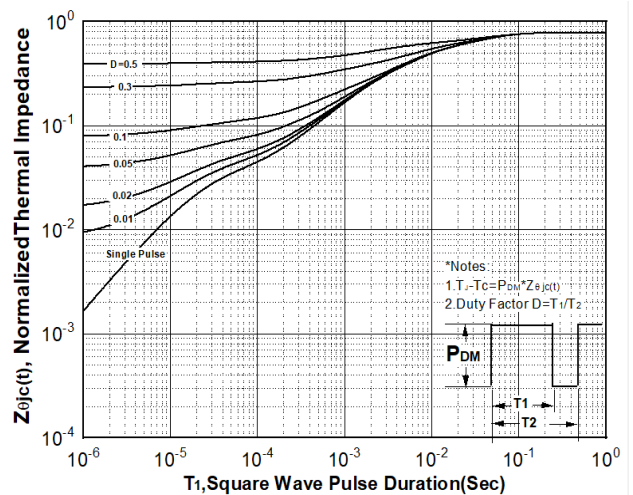
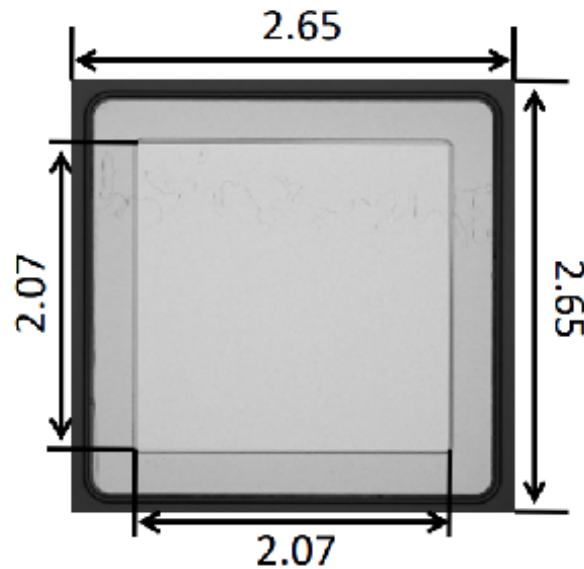


Figure 8. Transient Thermal Response Curve(Junction-to-Case)

### Package Dimensions



### Product Dimensions

Parameter	Typical	Units
DieSize(LxW)	2.65x2.65	mm
Anode Pad Opening	2.07x2.07	mm
DieThickness <sup>1</sup>	364±10%	μm
Top side Anode Metalization (Al)	4	μm
Back side Cathode Metalization (Ni/Ti/Ag)	2.05	μm
Front side Passivation (polymide)	SiO <sub>2</sub> 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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