

# Silicon Carbide Schottky Diode

## QSD-HCS006X120

### Features

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

V <sub>rrm</sub> =	1200 V
I <sub>f</sub> (T <sub>c</sub> =160°C)	6 A
Q <sub>c</sub> =	31 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-HCS006X120	Die Only	Q

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

Symbol	Parameter	Value	Unit	TestConditions	Note
Vrrm	Repetitive Peak Reverse Voltage	1200	V		
If	Continuous Forward Current	26	A	Tc=25°C	Fig.3
		13.5		Tc=135°C	
		6		Tc=160°C	
Ifrm	Repetitive Peak Forward Surge Current	39	A	Tc=25°C, Tp=10ms, Half Sine Pulse	
		35		Tc=110°C, Tp=10ms, Half Sine Pulse	
Ifsm	Non-Repetitive Forward Surge Current	45	A	Tc=25°C, Tp=10ms, Half Sine Pulse	
		41		Tc=110°C, Tp=10ms, Half Sine Pulse	
Ptot	Power Dissipation	176	W	Tc=25°C	Fig.4
		76		Tc=110°C	
Tj	Operating Temperature	-55to +175	°C		
Tstg	Storage Temperature	-55to +175	°C		

### Electrical Characteristics (Tj=25°C)

Symbol	Parameter	Value			Unit	Test Conditions	Note
		Min.	Typ.	Max.			
Vf	Forward Voltage		1.4	1.8	V	If=6A, Tj=25°C	Fig.1
			2.0	3		If=6A, Tj=175°C	
Ir	Reverse Current		1	50	µA	Vr=1200V, Tj=25°C	Fig.2
			7	150		Vr=1200V, Tj=175°C	
Qc	Total Capacitive Charge		31		nC	Vr=800V, Tj=25°C	Fig.5
C	Total Capacitance		431		pF	Vr=0V, Tj=25°C, f=1MHz	Fig.6
			28			Vr=400V, Tj=25°C, f=1MHz	
			27			Vr=800V, Tj=25°C, f=1MHz	
Ec	Capacitance Stored Energy		7.9		µJ	Vr=800V	Fig.7

### Thermal Characteristics

Symbol	Parameter	Value	Unit	Note
Rθjc	Thermal Resistance (Junction to Case) <sup>1</sup>	0.85	°C/W	Fig.8

**Note:**

<sup>1</sup>Tested in TO-220 Package  
Typical Performance

### Typical Performance

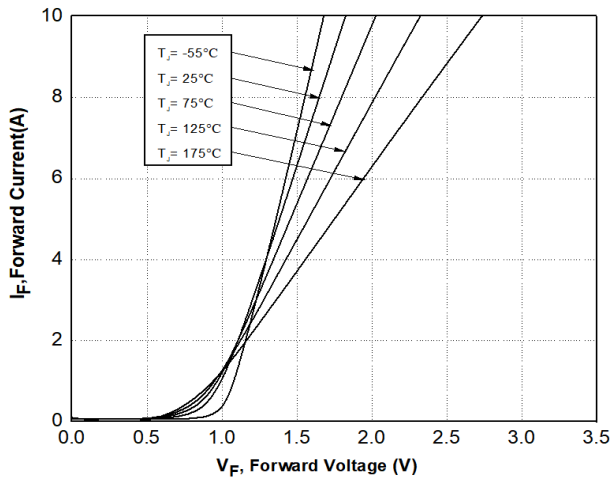


Figure 1. Forward Characteristics

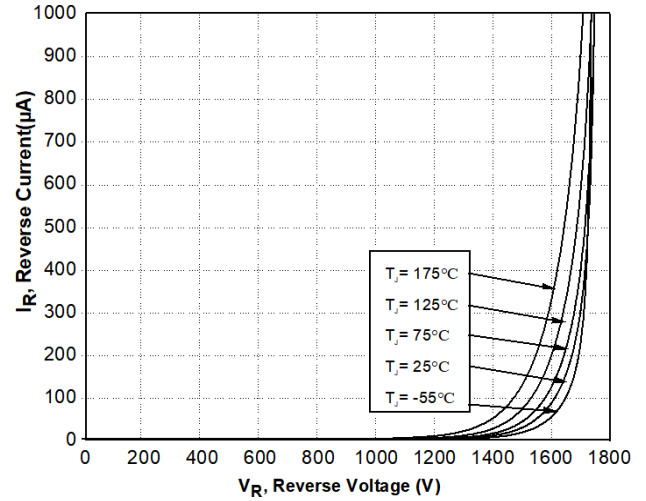


Figure 2. Reverse Characteristics

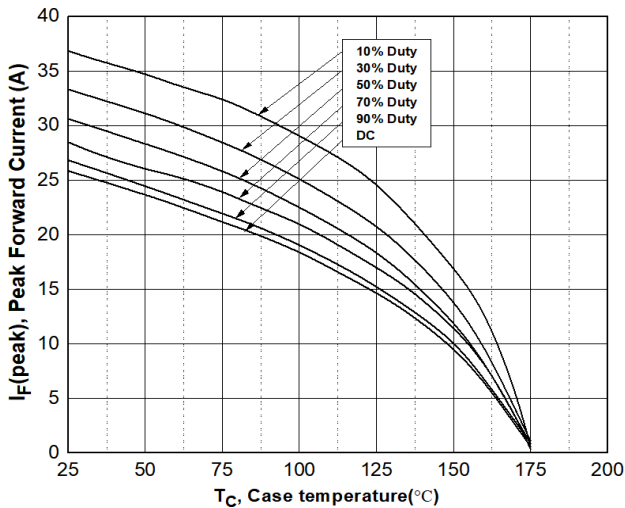


Figure 3. Current Derating

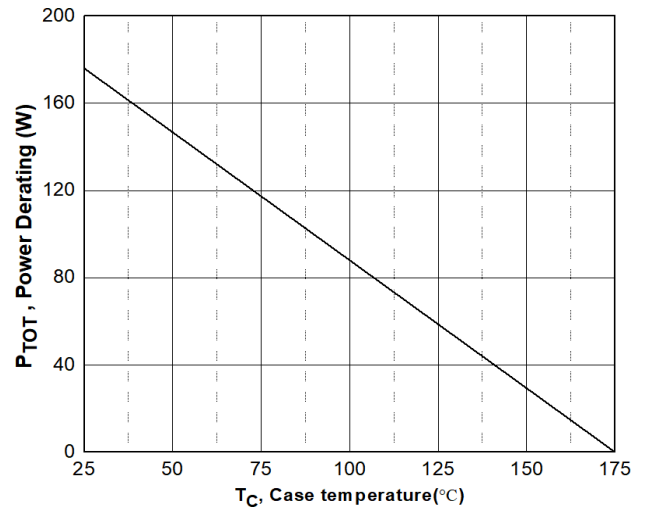


Figure 4. Power Derating

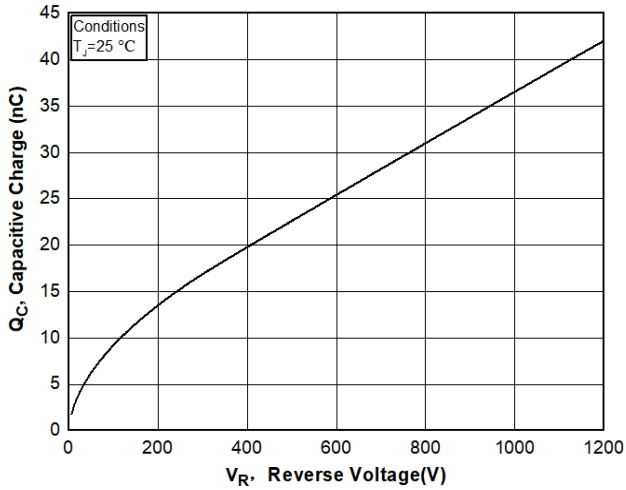


Figure 5. Capacitance Charge Vs. Reverse Voltage

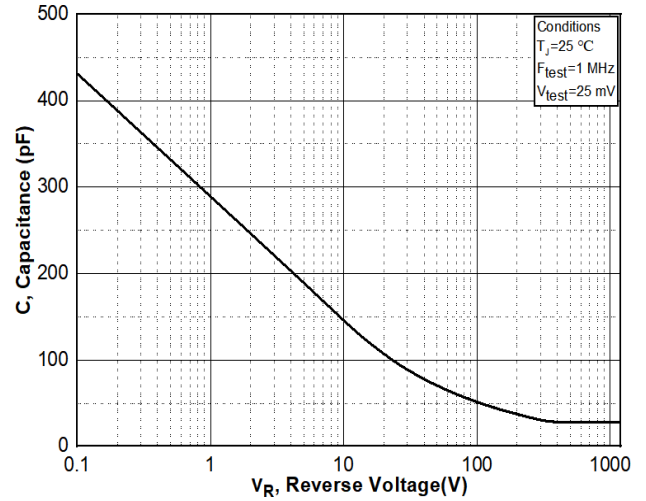


Figure 6. Capacitance Vs. Reverse Voltage

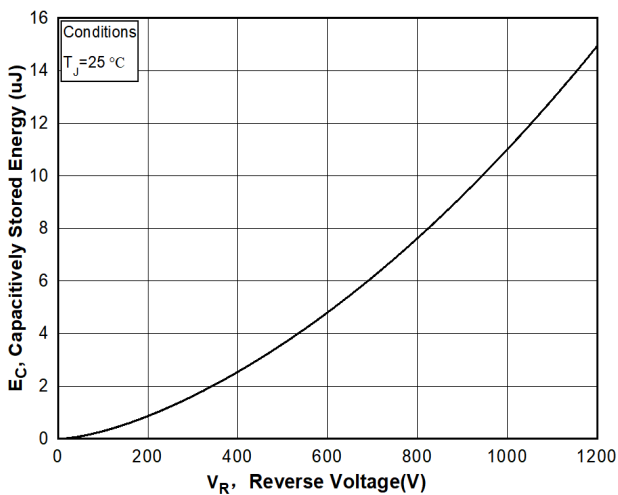


Figure 7. Capacitance Stored Energy

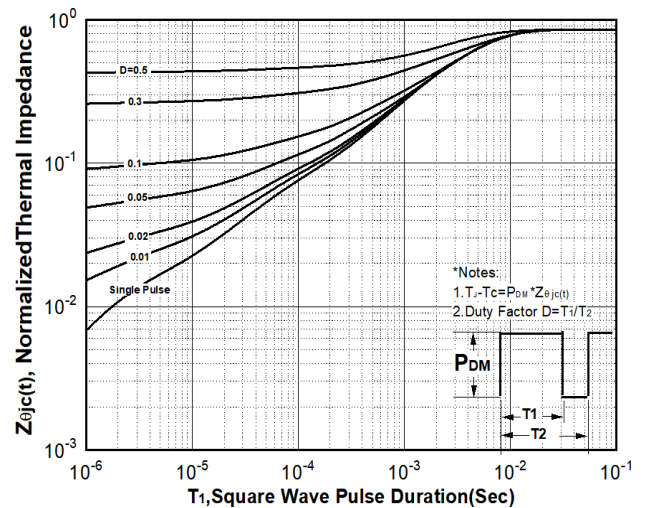
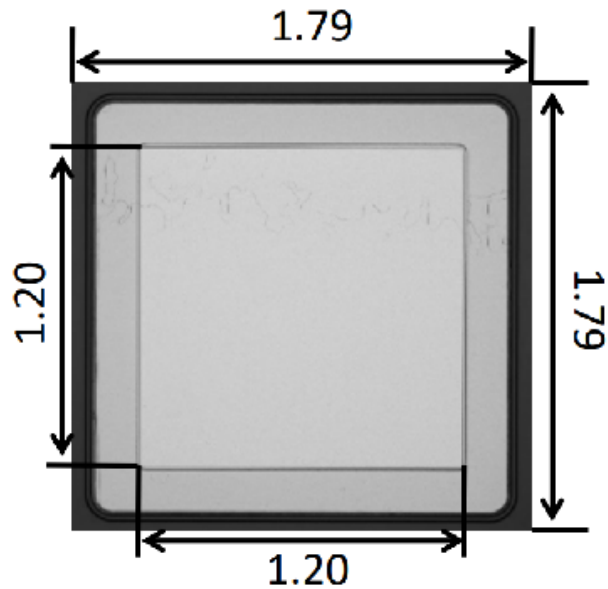


Figure 8. Transient Thermal Response Curve(Junction-to-Case)

### Package Dimensions



### Product Dimensions

Parameter	Typical	Units
DieSize(LxW)	1.79x1.79	mm
Anode Pad Opening	1.20x1.20	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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