

# QSD20HCS65U - 650V 20A Homogeneous Current SiC Schottky Diode



VRRM	= 650	V
IF (TC=135 °C)	= 27	A
QC	= 90	nC

## General Features

- 650V Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching

## Package



## Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

## Typical Applications

- Switch Mode Power Supplies (SMPS)
- Power Factor Correction
- Motor Drives

Part Number	Package	Marking
QSD20HCS65U	TO247-2L	Q

# QSD20HCS65U - 650V 20A

## Homogeneous Current SiC

### Schottky Diode



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

Symbol	Parameter	Value	Unit	Test Conditions	Note
VRRM	Repetitive Peak Reverse Voltage	650	V		
VR	DC 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	79	A	TC=25°C, tP=10 ms, Half Sine Pulse	
		69		TC=110°C, tP=10 ms, Half Sine Pulse	
IFSM	Non-Repetitive Forward Surge Current	99	A	TC=25°C, tP=10 ms, Half Sine Pulse	
		86		TC=110°C, tP=10 ms, Half Sine Pulse	
IF,MAX	Non-Repetitive Forward Surge Current	557	A	TC=25°C, tP=10µs, Square Wave Pulse	
		422		TC=110°C, tP=10µs, Square Wave 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		
	TO-247 Mounting Torque	1 8.8	Nm Ibf-in	M3 Screw 6-32 Screw	

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## Electrical Characteristics (T<sub>J</sub>=25°C)

Symbol	Parameter	Value			Unit	Test Conditions	Note
		Min.	Typ.	Max.			
VF	Forward Voltage		1.4	2.0	V	IF=20A, T <sub>J</sub> =25°C	Fig. 1
			1.6	2.2		IF=20A, T <sub>J</sub> =175°C	
IR	Reverse Current		0.8	100	μA	VR=650V, T <sub>J</sub> =25°C	Fig. 2
			10			VR=650V, T <sub>J</sub> =175°C	
QC	Total Capacitive Charge		90		nC	VR=650V, T <sub>J</sub> =25°C	Fig. 5
C	Total Capacitance		1349		pF	VR=0V, T <sub>J</sub> =25°C, f=1MHz	Fig. 6
			110			VR=400V, T <sub>J</sub> =25°C, f=1MHz	
			108			VR=650V, T <sub>J</sub> =25°C, f=1MHz	
EC	Capacitance Stored Energy		17		μJ	VR=650 V	Fig. 7

## Thermal Characteristics

Symbol	Parameter	Value	Unit	Note
R <sub>θJC</sub>	Thermal Resistance(Junction to Case)	0.78	°C/W	Fig. 8

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## Typical Performance

Figure 1. Forward Characteristics

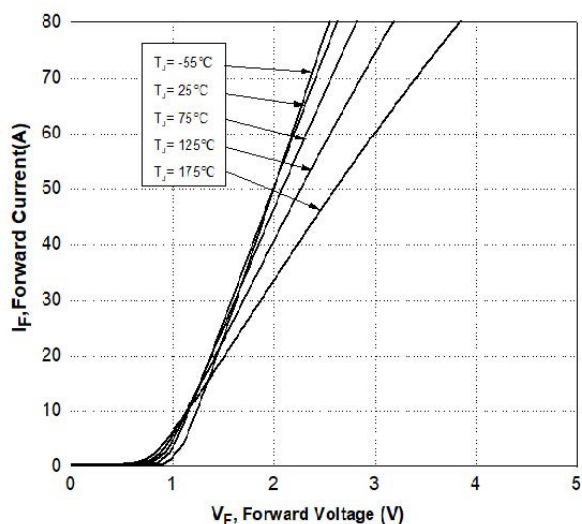


Figure 2. Reverse Characteristics

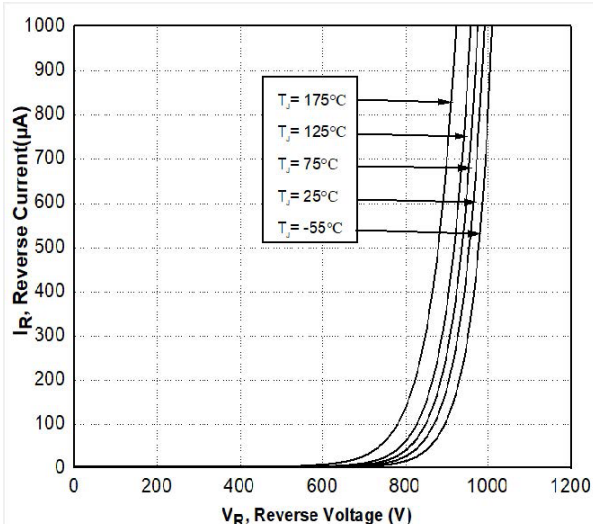


Figure 3. Current Derating

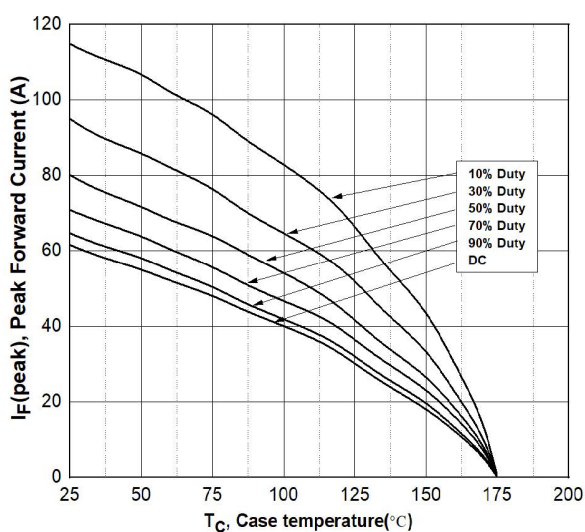
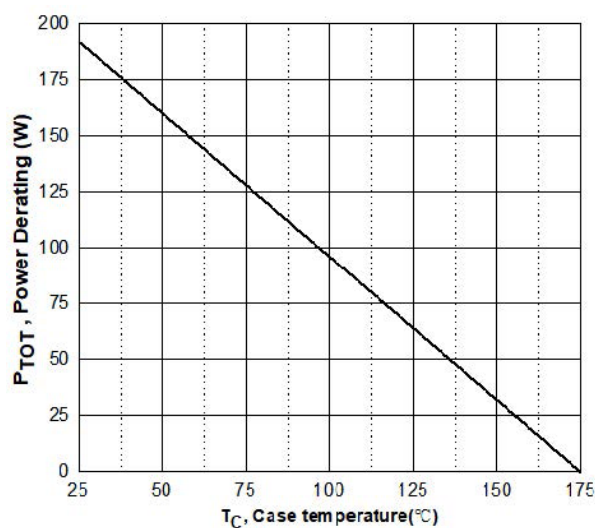


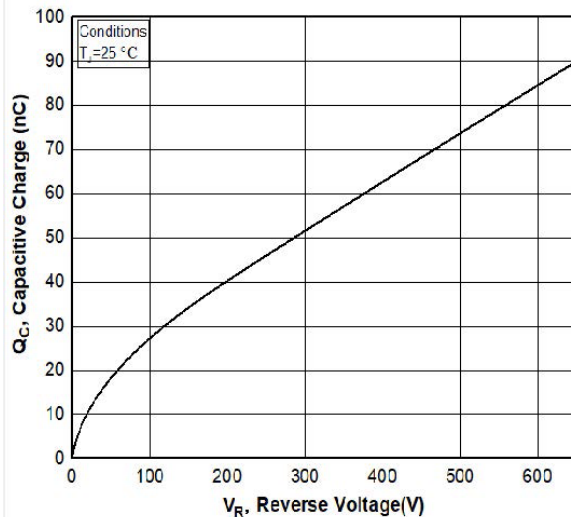
Figure 4. Power Derating



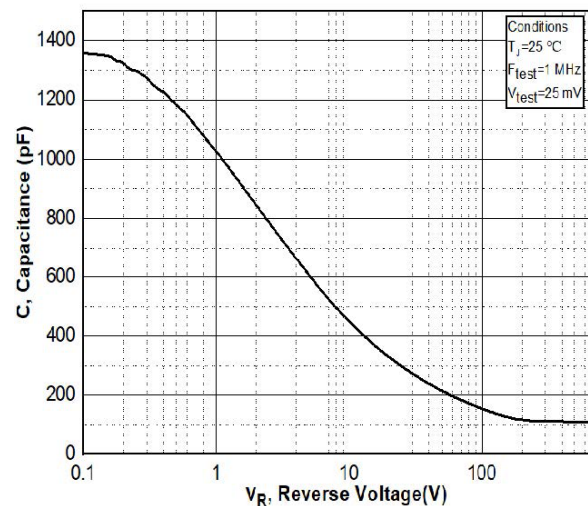
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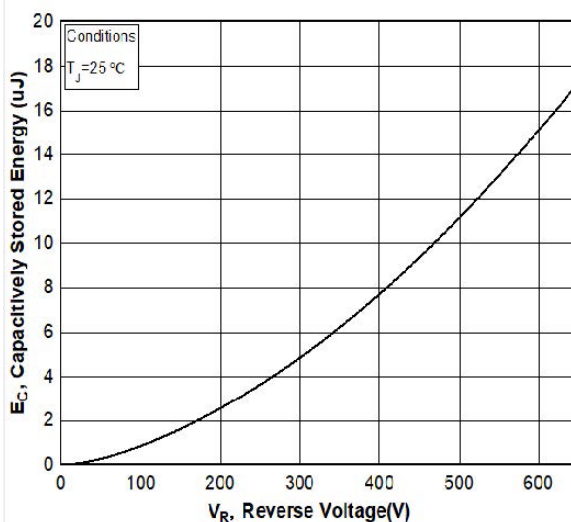
**Figure 5. Capacitance Charge Vs. Reverse Voltage**



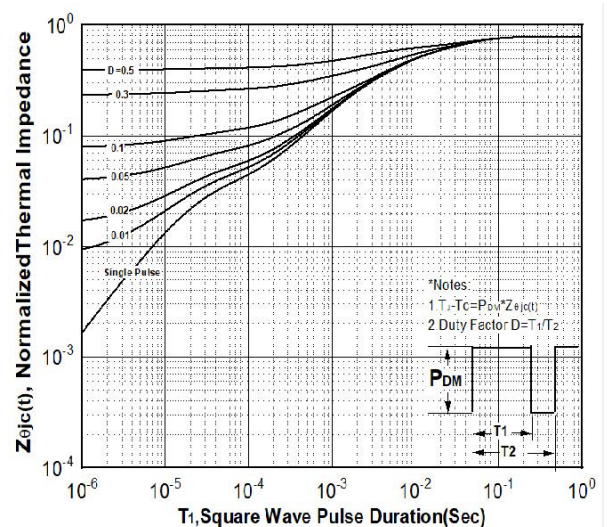
**Figure 6. Capacitance Vs. Reverse Voltage**



**Figure 7. Capacitance Stored Energy**



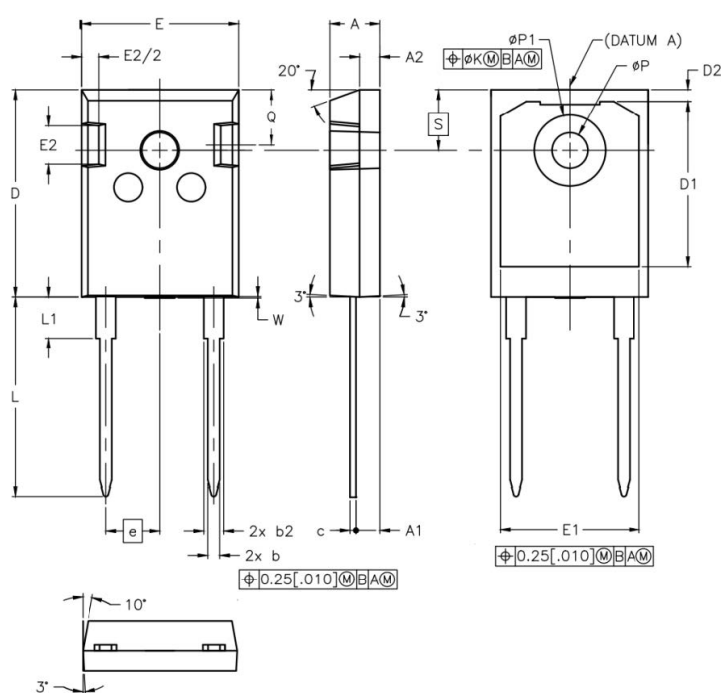
**Figure 8. Transient Thermal Response Curve (Junction-to-Case)**



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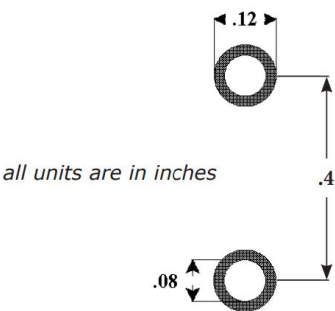


Package Dimensions



POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.70	5.31
A1	.087	.102	2.21	2.59
A2	.059	.098	1.50	2.49
b	.039	.055	0.99	1.40
b2	.065	.094	1.65	2.39
c	.015	.035	0.38	0.89
D	.819	.845	20.80	21.46
D1	.515	-	13.08	-
D2	.020	.053	0.51	1.35
E	.620	.640	15.49	16.26
E1	.530	-	13.46	-
E2	.135	.157	3.43	3.99
e	.214		5.44	
ØK	.010		0.25	
L	.780	.800	19.81	20.32
L1	-	.177	-	4.50
ØP	.140	.144	3.56	3.66
ØP1	.278	.291	7.06	7.39
Q	.212	.244	5.38	6.20
S	.243		6.17	
W	-	.006	-	0.15

Recommended Solder Pad Layout



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## **Attention**

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