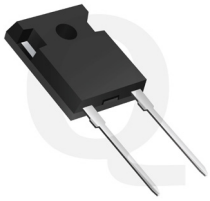
QSD6HCS65U 650V 6A Silicon Carbide Schottky Diode

VRRM	= 650 V
IF (TC=135 °C)	= 8.8 A
QC	= 30 nC

Description

Homogeneous-current SiC Schottky diode with low VF, high repetitive surge current, low leakage, no reverse or forward recovery, and high-temperature operation.

Package



RoHS

Features

- Temperature-independent fast switching
- Low reverse leakage current
- Low VF at high temperatures
- Easy paralleling (positive temperature coefficient of VF)
- Essentially no switching losses
- Subject to AEC-Q101 qualification
- High repetitive surge current

Typical Applications

- High-frequency power converters
- Industrial motor drives
- Switch-mode power supplies
- Electric vehicles and battery chargers
- Solar inverters
- Power factor correction
- Free-wheeling diode

Part Number	Package	Marking
QSD6HCS65U	TO220	Q

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	21		TC=25°C	Fig. 3
		8.8	A	TC=135°C	
		7.0		Tc=150°C	
IFRM	Repetitive Peak Forward Surge Current	26	A	TC=25°C, tP=10 ms, Half Sine Pulse	
		22		TC=110°C, tP=10 ms, Half Sine Pulse	
IFSM	Non-Repetitive Forward Surge Current	34	A	TC=25°C, tP=10 ms, Half Sine Pulse	
		27		TC=110°C, tP=10 ms, Half Sine Pulse	
IF,MAX	Non-Repetitive Forward Surge Current	424	A	TC=25°C, tP=10µs, Square Wave Pulse	
		400		TC=110°C, tP=10µs, Square Wave Pulse	
Ptot	Power Dissipation	65	W	TC=25°C	Fig. 4
		28		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 (TJ=25°C)

Symbol	Parameter	Value Min.	Typ.	Max.	Unit	Test Conditions	Note
VF	Forward Voltage		1.4	1.6	V	IF=6A, TJ=25°C	Fig. 1
			1.5	2.0		IF=6A, TJ=175°C	
IR	Reverse Current		0.5	15	μA	VR=650V, TJ=25°C	Fig. 2
			6			VR=650V, TJ=175°C	
QC	Total Capacitive Charge		30		nC	VR=650V,TJ=25°C	Fig. 5
C	Total Capacitance		421		pF	VR=0V, TJ=25°C, f=1MHz	Fig. 6
			38			VR=400V, TJ=25°C, f=1MHz	
			37			VR=650V, TJ=25°C, f=1MHz	
EC	Capacitance Stored Energy		5.6		μJ	VR=650 V	Fig. 7

Thermal Characteristics

Symbol	Parameter	Value	Unit	Note
RΘJC	Thermal Resistance(Junction to Case)	2.3	°C/W	Fig. 8

Typical Performance

Figure 1. Forward Characteristics

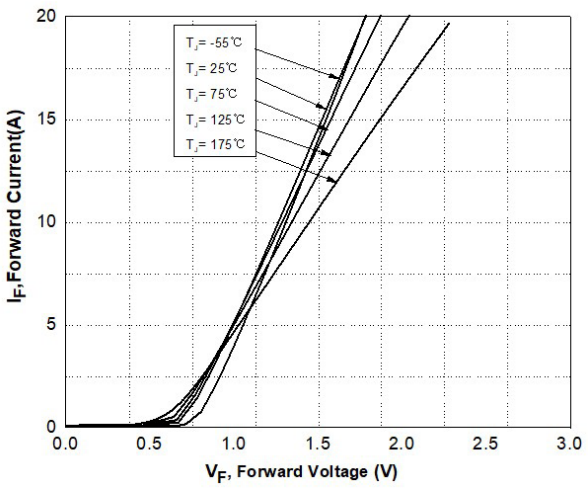


Figure 2. Reverse Characteristics

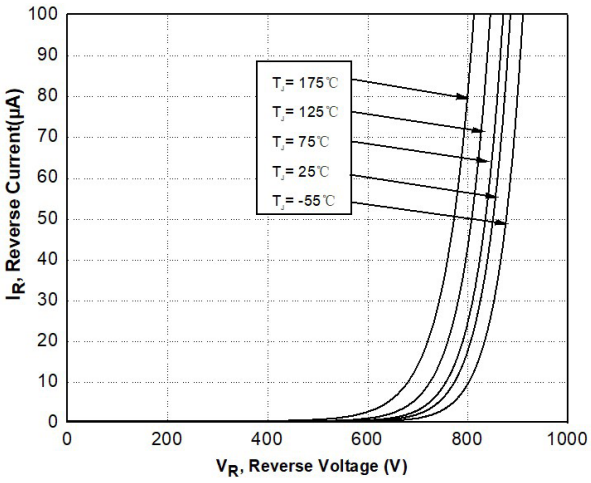


Figure 3. Current Derating

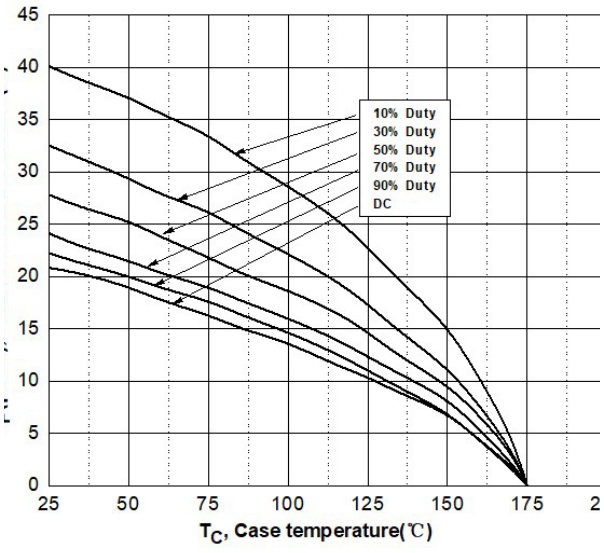


Figure 4. Power Derating

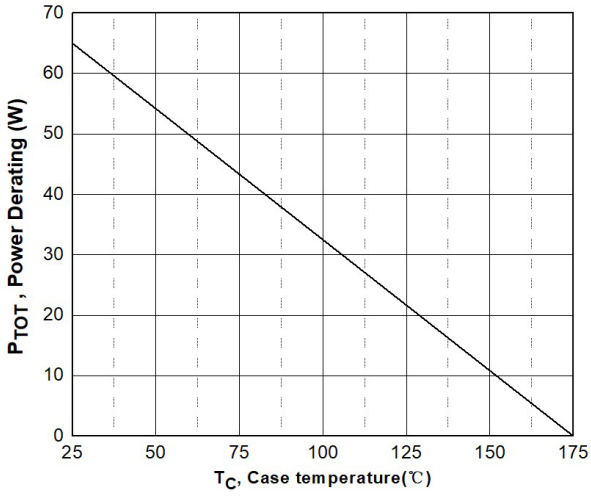


Figure 5. Capacitance Charge Vs. Reverse Voltage

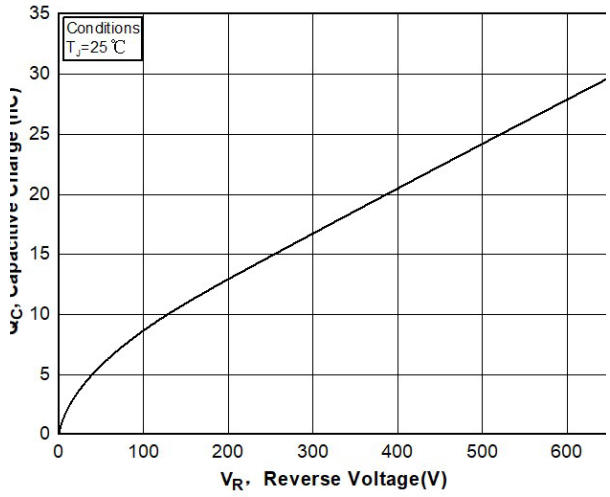


Figure 6. Capacitance Vs. Reverse Voltage

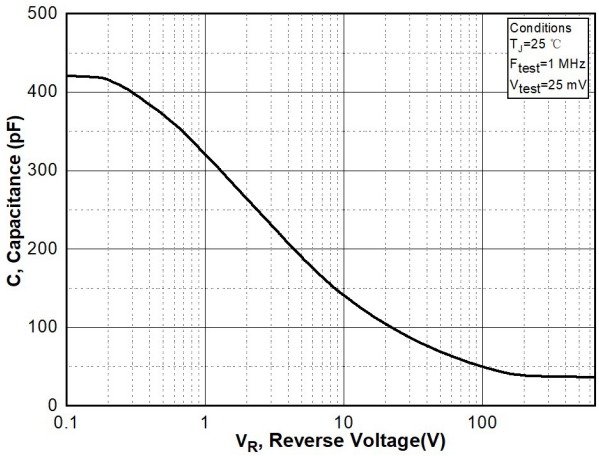


Figure 7. Capacitance Stored Energy

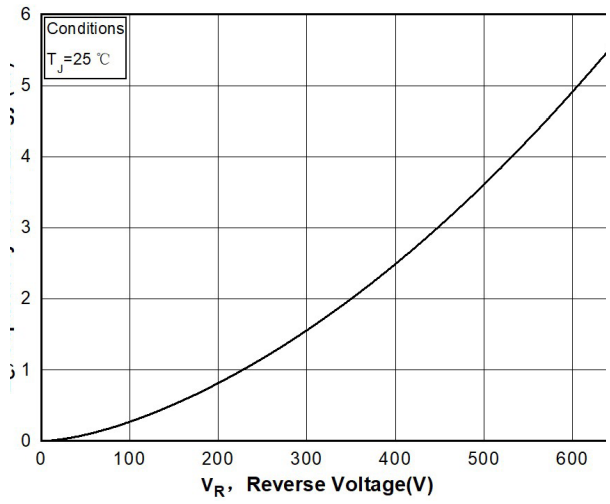
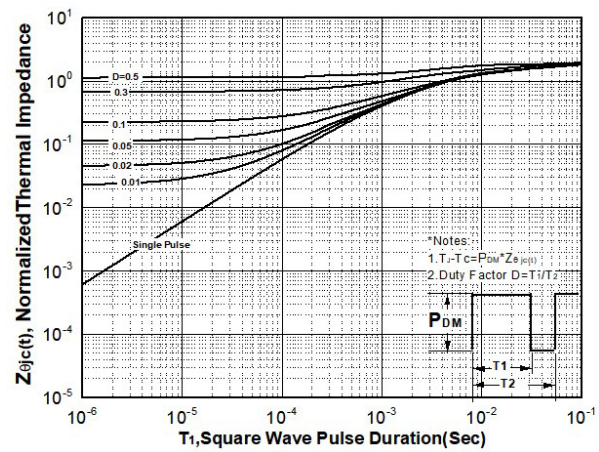


Figure 8. Transient Thermal Response Curve(Junction-to-Case)



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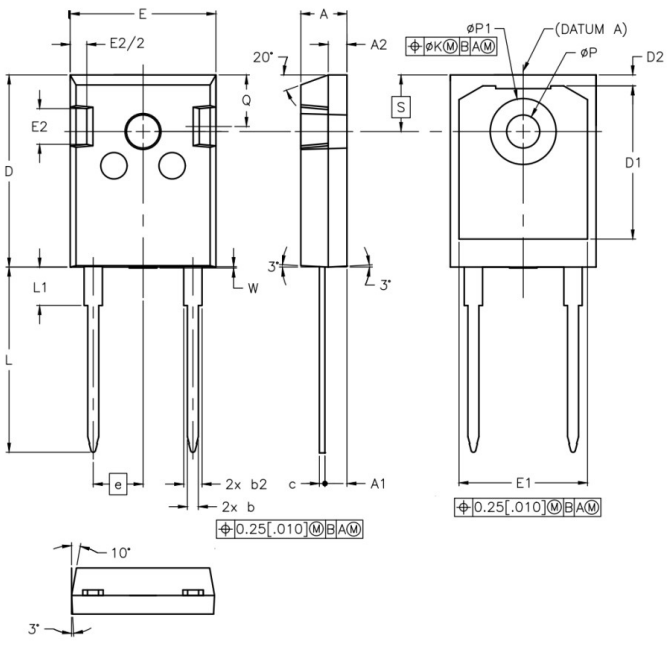
Package Dimensions

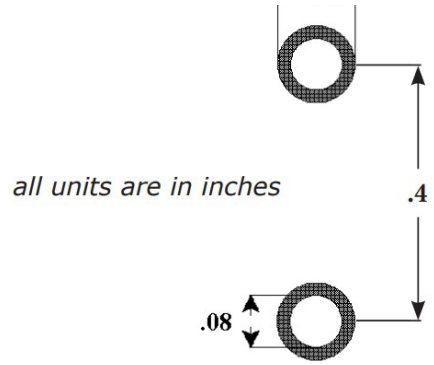
Figure 1



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

SOT-23 Suggested Pad Layout



Part Number	Package	Marking
QSD6HCS65U	TO220	Q

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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