

QSD25HCS170U: 1700V 25A Homogeneous Current SiC Schottky Diode



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Description

Homogeneous-current 1700V/25A SiC Schottky diode with high surge current, low leakage, no reverse or forward recovery, and high-temperature operation.

$$V_{RRM} = 1700 \text{ V}$$

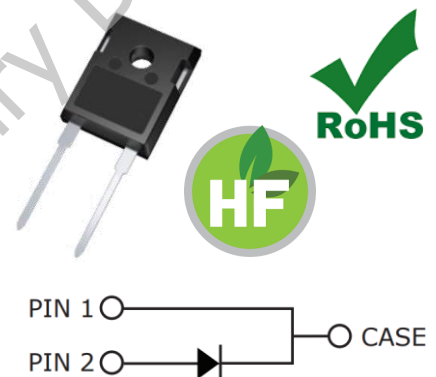
$$I_F (T_C = 135 \text{ }^\circ\text{C}) = 46 \text{ A}$$

$$Q_C = 271 \text{ nC}$$

Features

- Temperature-independent fast switching
- Low reverse leakage current
- Low V_F at high temperatures
- Easy paralleling (positive temperature coefficient of V_F)
- Essential no switching losses
- High repetitive surge current

Package



Applications

- Switch Mode Power Supplies (SMPS)
- Power Factor Correction
- Motor Drives
- Electric vehicles and battery chargers
- Solar inverters
- Free-wheeling diode

Part Number

QSD25HCS170U

Package

TO-247-2L

Marking

QS

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Maximum Rated Values ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	1700	V		
V_R	DC Peak Reverse Voltage	1700	V		
I_F	Continuous Forward Current	94	A	$T_c = 25^\circ\text{C}$	Fig. 3
		46		$T_c = 135^\circ\text{C}$	
		32		$T_c = 150^\circ\text{C}$	
I_{FRM}	Repetitive Peak Forward Surge Current	151	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Pulse}$	
		130		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Pulse}$	
I_{FSM}	Non-Repetitive Forward Surge Current	177	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Pulse}$	
		154		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Pulse}$	
$I_{F,MAX}$	Non-Repetitive Forward Surge Current	1150	A	$T_c = 25^\circ\text{C}, t_p = 10\mu\text{s}, \text{Square Wave Pulse}$	
		950		$T_c = 110^\circ\text{C}, t_p = 10\mu\text{s}, \text{Square Wave Pulse}$	
P_{tot}	Power Dissipation	556	W	$T_c = 25^\circ\text{C}$	Fig. 4
		241		$T_c = 110^\circ\text{C}$	
T_j	Operating Temperature	-55 to +175	$^\circ\text{C}$		
T_{stg}	Storage Temperature	-55 to +175	$^\circ\text{C}$		
	TO-247 Mounting Torque	1 8.8	Nm Ibf-in	M3 Screw 6-32 Screw	

Electrical Characteristics ($T_j = 25^\circ\text{C}$)

Symbol	Parameter	Value			Unit	Test Conditions	Note
		Min.	Typ.	Max.			
V_F	Forward Voltage		1.4	1.9	V	$I_F = 25\text{A}, T_j = 25^\circ\text{C}$	Fig. 1
			2.2	2.7		$I_F = 25\text{A}, T_j = 175^\circ\text{C}$	
I_R	Reverse Current		3	10	μA	$V_R = 1700\text{V}, T_j = 25^\circ\text{C}$	Fig. 2
			138	250		$V_R = 1700\text{V}, T_j = 175^\circ\text{C}$	
Q_C	Total Capacitive Charge		271		nC	$V_R = 1200\text{V}, I_F = 25\text{A}$ $di/dt = 200\text{A}/\mu\text{s}, T_j = 25^\circ\text{C}$	Fig. 5
C	Total Capacitance		2822		pF	$V_R = 0\text{V}, T_j = 25^\circ\text{C}, f = 1\text{MHz}$	Fig. 6
			120			$V_R = 800\text{V}, T_j = 25^\circ\text{C}, f = 1\text{MHz}$	
			117			$V_R = 1200\text{V}, T_j = 25^\circ\text{C}, f = 1\text{MHz}$	
E_C	Capacitance Stored Energy		107		μJ	$V_R = 0 \sim 1200\text{V}$	Fig. 7

Thermal Characteristics

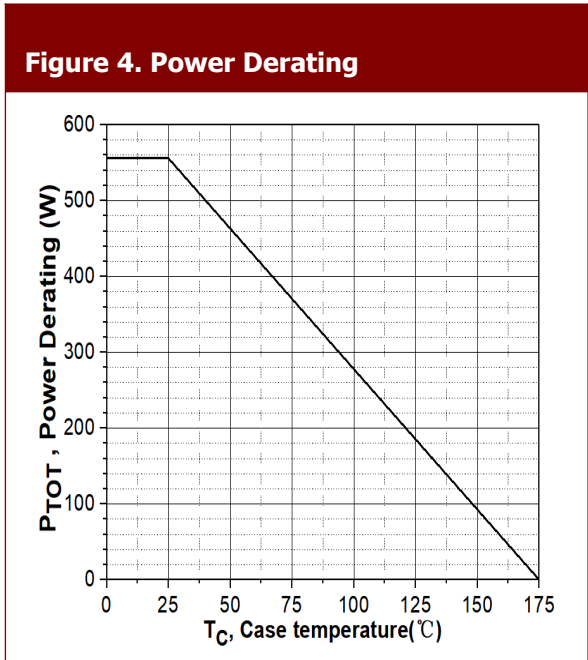
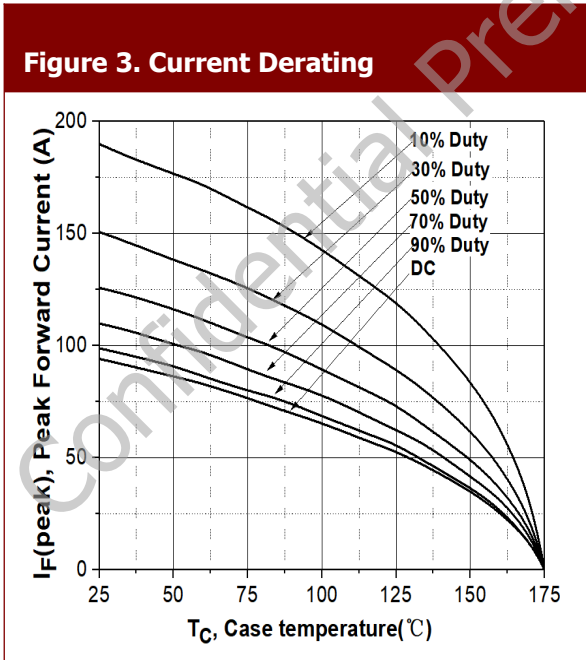
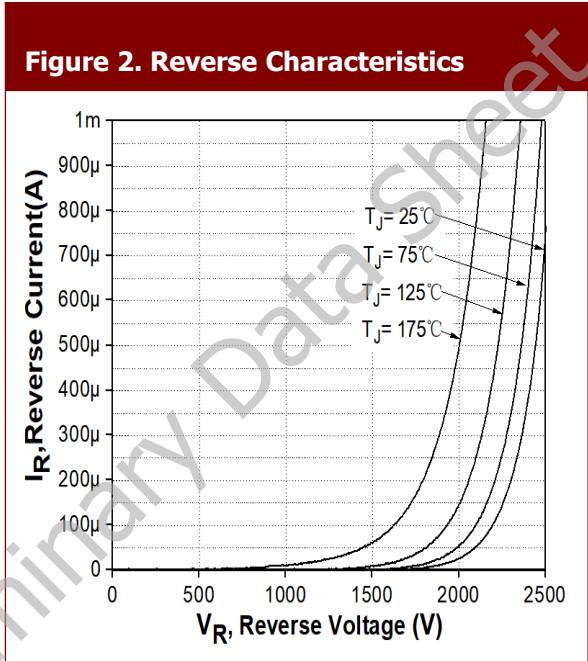
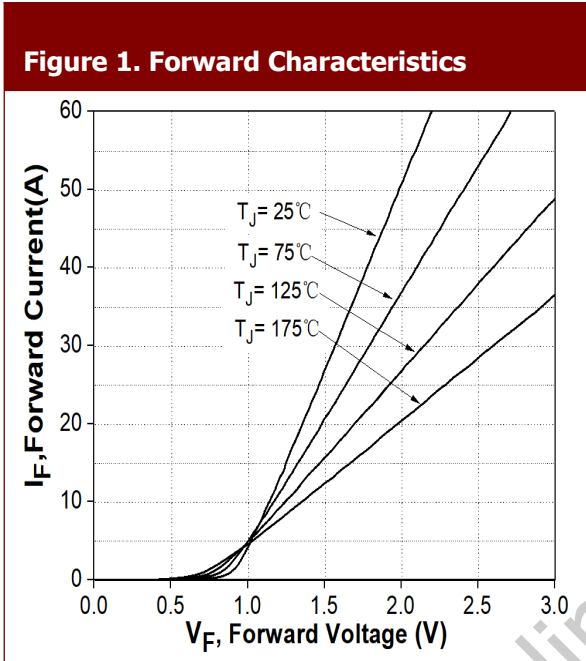
Symbol	Parameter	Value	Unit	Note
$R_{\theta JC}$	Thermal Resistance (Junction to Case)	0.27	$^\circ\text{C}/\text{W}$	Fig. 8

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Typical Performance



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Figure 5. Capacitance Charge vs. Reverse Voltage

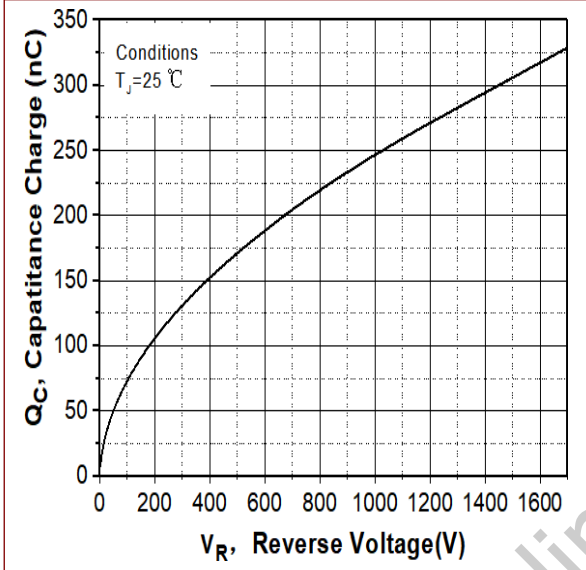


Figure 6. Capacitance vs. Reverse Voltage

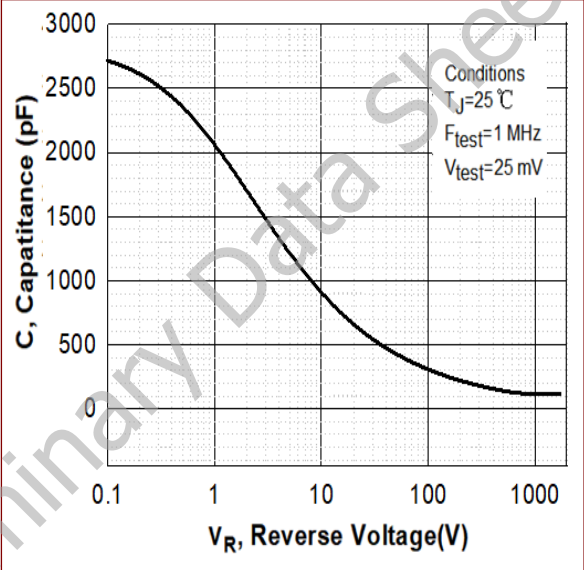


Figure 7. Capacitance Stored Energy

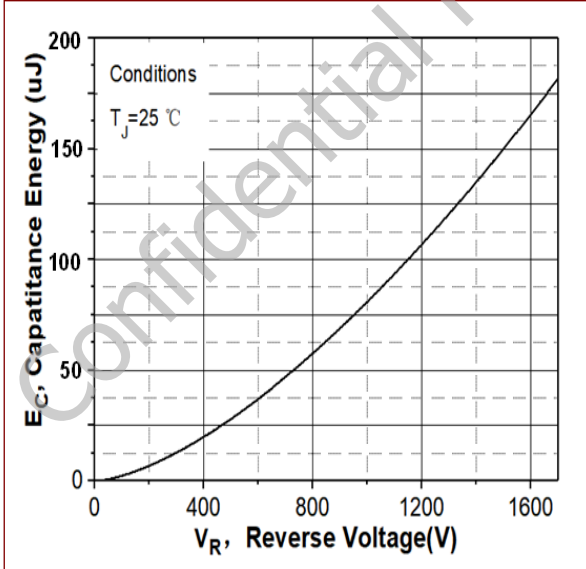
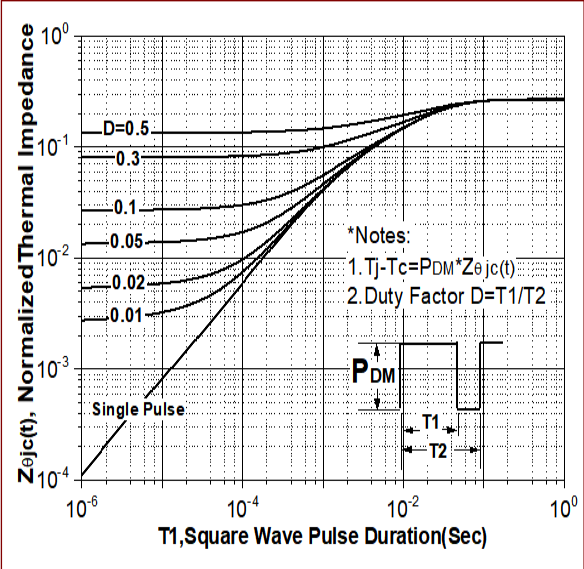


Figure 8. Transient Thermal Response Curve (Junction-to-Case)



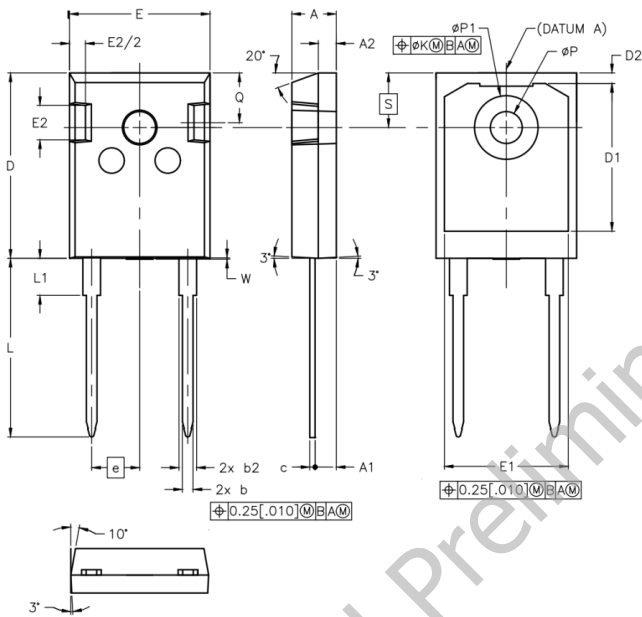
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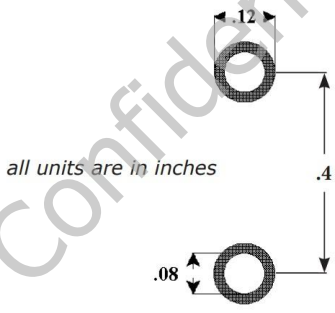
Package Dimensions

Package TO-247-2L



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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