Silicon Carbide (SiC)
3300V 6.8mohm
Half-Bridge MOSFET Module
62mm

HCS200FH330A2C1

The HCS200FH330A2C1 is a power module containing 6.8mΩ/ 3300V SiC MOSFET half-bridge and a thermistor with Si_3N_4 AMB in a 62mm package.

Features

- 6.8mΩ / 3300V SiC MOSFET Half−Bridge
- Si_3N_4 AMB
- Outstanding performance at high temperature
- High reliability
- Direct mounting to heatsink (isolated package)
- Low junction-to-case thermal resistance
- RoHS Compliant

Typical Applications

- Switched mode power supplies
- Rail converters
- Traction drive
- Pulsed power
- Solid state transformers

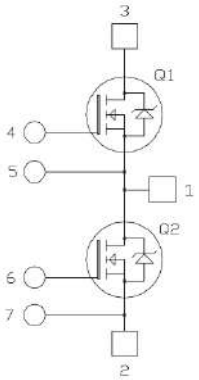
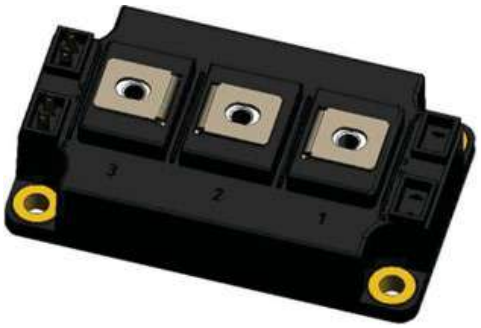
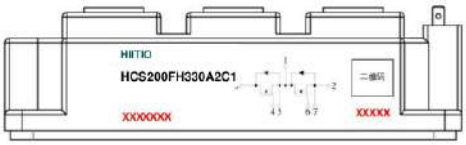


Figure 1. Schematic



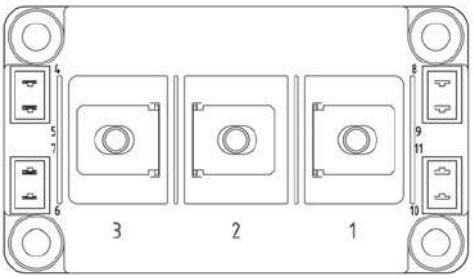
108 × 62.00 × 30.9

MARKING DIAGRAM



HCS200FH330A2C1= Device Code
XXXXXXX = Year, week and batch Code
XXXXX = Flow code

PIN ASSIGNMENTS



ORDERING INFORMATION

Device	Package
HCS200FH330A2C1	62mm

PIN DESCRIPTION

Pin	Name	Description
1	OUT	Center Point of Half Bridge
2	DC-	DC Negative Bus Connection
3	DC+	DC Positive Bus Connection
4	G1	T1 Gate
5	S1	T1 Source
6	G2	T2 Gate
7	S2	T2 Source

ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Parameter		Symbol	Maximum Ratings	Unit
Drain-source voltage		V_{DSS}	3300	V
Continuous drain current	T_C = 25 °C	I_D	200	A
	T_C = 80 °C		139	
Pulsed drain current		I_{DM}	600	
Gate-source voltage		V_{GS}	–10/23	V
Drain-source ON resistance		$R_{DS(on)}$	7.8	mΩ
Power dissipation	T_C = 25 °C	P_D	1918	W

SiC MOSFET ELECTRICAL CHARACTERISTICS

Characteristic	Test Conditions		Symbol	Min.	Typ.	Max.	Unit
Zero gate voltage drain current	V_{GS} = 0V; V_{DS} = 3300V		I_{DSS}	—	—	400	μA
Drain–source ON resistance	V_{GS} = 20V I_D = 200A	T_j = 25 °C	$R_{DS(on)}$	—	6.8	7.8	mΩ
		T_j = 150 °C		—	16.3	—	
		T_j = 175 °C		—	19.4	—	
Gate threshold voltage	V_{GS} = V_{DS}; I_D = 28 mA		$V_{GS(th)}$	—	3	—	V
Gate–source leakage current	V_{GS} = 20V; V_{DS} = 0V		I_{GSS}	—	—	200	nA
Input capacitance	V_{GS} = 0V V_{DS}=2640V f=200kHz		C_{iss}	—	35	—	nF
Output capacitance			C_{oss}	—	0.78	—	
Reverse transfer capacitance			C_{rss}	—	0.04	—	
Total gate charge	V_{GS}=–5/20V V_{Bus}=2640V I_D =280A		Q_g	—	1640	—	nC
Gate-source charge			Q_{gs}	—	552	—	
Gate-drain charge			Q_{gd}	—	532	—	
Turn-on delay time	V_{GS} = –5/20V V_{Bus} = 1800V I_D = 200A R_{Gon} = 8.2Ω R_{Goff} = 2.7Ω	T_j = 25 °C	$t_{d(on)}$	—	122	—	ns
		T_j = 150 °C		—	132	—	
Rise time		T_j = 25 °C	t_r	—	63	—	
		T_j = 150 °C		—	68	—	
Turn-off delay time		T_j = 25 °C	$t_{d(off)}$	—	254	—	
		T_j = 150 °C		—	426	—	
Fall time		T_j = 25 °C	t_f	—	70	—	
		T_j = 150 °C		—	86	—	
Turn-on energy	V_{GS}=–5/20V V_{Bus}=1800V I_D = 200A R_{Gon} = 8.2Ω R_{Goff} = 2.7Ω di/dt=4kA/μs dv/dt=26kV/μs	T_j = 25 °C	E_{on}	—	47.8	—	mJ
		T_j = 150 °C		—	80	—	
Turn-off energy		T_j = 25 °C	E_{off}	—	21.8	—	
		T_j = 150 °C		—	33.4	—	
Internal gate resistance			R_{Gint}	—	1.4	—	Ω
Junction-to-case thermal resistance			R_{thJC}	—	—	0.078	°C/W

Body Diode ELECTRICAL CHARACTERISTICS

Characteristic	Test Conditions		Symbol	Min.	Typ.	Max.	Unit
Body diode forward voltage	V_{GS} = –5V I_{SD} = 200A	T_j = 25 °C	V_{SD}	—	4.3	—	V
		T_j = 175 °C		—	3.7	—	
Reverse recovery current	V_{GS} = –5V V_{Bus} = 1800V I_{SD} = 200A R_{Gon} = 8.2Ω di/dt = 4 kA/μs	T_j = 25 °C	I_{rrm}	—	86	—	A
		T_j = 150 °C		—	274	—	
Reverse recovery charge		T_j = 25 °C	Q_{rr}	—	7.6	—	μC
		T_j = 150 °C		—	31.7	—	
Reverse recovery energy		T_j = 25 °C	E_{rr}	—	5.2	—	mJ
		T_j = 150 °C		—	26.1	—	

Thermal and Package Characteristics

Characteristic			Symbol	Min.	Typ.	Max.	Unit
RMS isolation voltage, any terminal-to-case t=1min, 50/60Hz			V_{ISOL}	6	—	—	kV
Partial discharge extinction voltage, RMS 50/60 Hz, Q_{PD} < 10 pC			PDT	2.6	—	—	
Comparative tracking index			CTI	600	—	—	—
Module stray inductance between V_{Bus} and 0/V_{Bus}			L_{stray}	—	16	—	nH
Creepage distance terminal-to-terminal			d_{creep}	—	23	—	mm
Creepage distance terminal-to-baseplate				—	28.3	—	
Clearance distance terminal-to-terminal			d_{clear}	—	8.1	—	
Clearance distance terminal-to-baseplate				—	23.4	—	
Lead resistance terminal-to-chip	T_C = 25 °C, per switch		R_{DS}	—	0.5	—	mΩ
Operating junction temperature range			T_J	–40	—	175	°C
Recommended junction temperature under switching conditions			T_{JOP}	–40	—	150	
Storage temperature range			T_{STG}	–40	—	125	
Operating case temperature			T_C	–40	—	125	
Mounting torque	To heatsink	M6	τM	3	—	5	N.m
	For terminals	M6		3	—	5	
Package weight			Wt	—	350	—	g

Package Outline

