Silicon Carbide (SiC)
3300V 13.5mohm
Half-Bridge MOSFET Module
62mm

HCS100FH330A2C1

The HCS100FH330A2C1 is a power module containing 13.5mΩ/ 3300V SiC MOSFET half-bridge and a thermistor with Si_3N_4 AMB in a 62mm package.

Features

- 13.5mΩ / 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

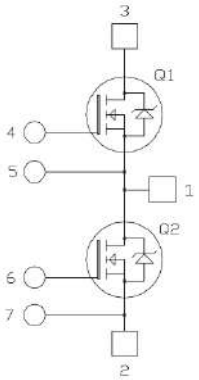
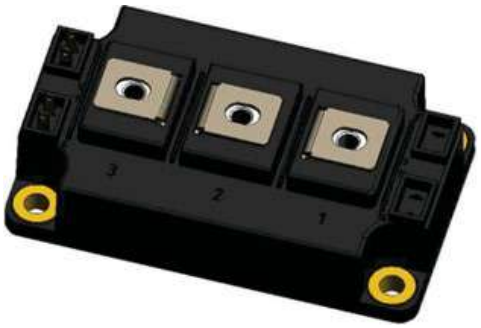


Figure 1. Schematic



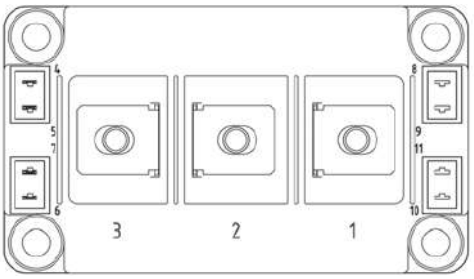
108 × 62.00 × 30.9

MARKING DIAGRAM



HCS100FH330A2C1= Device Code
XXXXXXX = Year, week and batch Code
XXXXX = Flow code

PIN ASSIGNMENTS



ORDERING INFORMATION

Device	Package
HCS100FH330A2C1	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	100	A
	T_C = 80 °C		69	
Pulsed drain current		I_{DM}	300	
Gate-source voltage		V_{GS}	–10/23	V
Drain-source ON resistance		$R_{DS(on)}$	15.5	mΩ
Power dissipation	T_C = 25 °C	P_D	1013	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}	—	—	200	μA
Drain–source ON resistance	V_{GS} = 20V I_D = 100A	T_j = 25 °C	$R_{DS(on)}$	—	13.5	15.5	mΩ
		T_j = 150 °C		—	32.4	—	
		T_j = 175 °C		—	38.5	—	
Gate threshold voltage	V_{GS} = V_{DS}; I_D = 14 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}	—	17.5	—	nF
Output capacitance			C_{oss}	—	0.39	—	
Reverse transfer capacitance			C_{rss}	—	0.02	—	
Total gate charge	V_{GS}=–5/20V V_{Bus}=2640V I_D =100A		Q_g	—	820	—	nC
Gate-source charge			Q_{gs}	—	276	—	
Gate-drain charge			Q_{gd}	—	266	—	
Turn-on delay time	V_{GS} = –5/20V V_{Bus} = 1800V I_D = 100A R_{Gon} = 8.2Ω R_{Goff} = 3.3Ω	T_j = 25 °C	$t_{d(on)}$	—	82	—	ns
		T_j = 150 °C		—	93	—	
Rise time		T_j = 25 °C	t_r	—	42	—	
		T_j = 150 °C		—	51	—	
Turn-off delay time		T_j = 25 °C	$t_{d(off)}$	—	179	—	
		T_j = 150 °C		—	321	—	
Fall time		T_j = 25 °C	t_f	—	61	—	
		T_j = 150 °C		—	81	—	
Turn-on energy	V_{GS}=–5/20V V_{Bus}=1800V I_D =100A R_{Gon} = 8.2Ω R_{Goff} = 3.3Ω di/dt=3.3kA/μs dv/dt=30kV/μs	T_j = 25 °C	E_{on}	—	20.2	—	mJ
		T_j = 150 °C		—	37.7	—	
Turn-off energy		T_j = 25 °C	E_{off}	—	7.1	—	
		T_j = 150 °C		—	12	—	
Internal gate resistance			R_{Gint}	—	2.7	—	Ω
Junction-to-case thermal resistance			R_{thJC}	—	—	0.148	°C/W

Body Diode ELECTRICAL CHARACTERISTICS

Characteristic	Test Conditions		Symbol	Min.	Typ.	Max.	Unit
Body diode forward voltage	V_{GS} = –5V I_{SD} = 100A	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} = 100A R_{Gon} = 8.2Ω di/dt = 3.3 kA/μs	T_j = 25 °C	I_{rrm}	—	40	—	A
		T_j = 150 °C		—	130	—	
Reverse recovery charge		T_j = 25 °C	Q_{rr}	—	3.2	—	μC
		T_j = 150 °C		—	13.3	—	
Reverse recovery energy		T_j = 25 °C	E_{rr}	—	2.7	—	mJ
		T_j = 150 °C		—	12.5	—	

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

