HCG300FH170D3K4

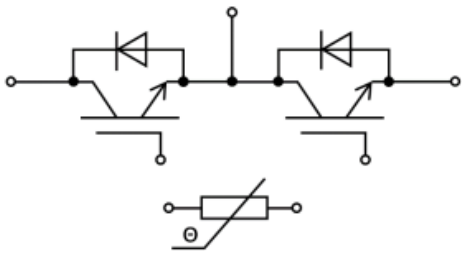
1700V 300A IGBT 模块, E6封装, 内置续流二极管
1700V 300A IGBT Module, E6 Package, with FWD

特点 Features

- 1700V 沟槽栅及场截止结构
  1700V Trench Gate & Field Stop Structure
- 高短路耐量
  High Short Circuit Capability
- 低VCEsat
  Low VCEsat
- 高可靠性
  High Reliability
- 正温度系数
  Positive Temperature Coefficient

应用 Applications

- 电机传动
  Motor Drives
- 伺服驱动器
  Servo Drives
- UPS系统
  UPS Systems
- 风力发电机
  Wind Turbines



最大额定值 Maximum Rated Values

参数 Parameter	符号 Symbol	条件 Condition	数□ Value	□位 Unit
集□极-□射极□□ Collector-Emitter Voltage	V_{CES}	V_{GE}=0V, T_{vj}=25°C	1700	V
集□极□流 DC Collector Current	I_C	T_C=100°C, $T_{vj,max}$=175°C	300	A
集□极峰□□流 Peak Collector Current	I_{CM}	t_p=1ms	600	A
□极-□射极□□ Gate-Emitter Voltage	V_{GES}		±20	V
IGBT最大功耗 IGBT Maximum Power Dissipation	P_D	T_C=25°C, $T_{vj,max}$=175°C	1765	W
反向重复峰□□□ Repetitive Peak Reverse Voltage	V_{RRM}	T_{vj}=25°C	1700	V
□□正向直流□流 Continuous DC Forward Current	I_F		300	A
正向重复峰□□流 Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	600	A
IGBT短路耐量 IGBT Short Circuit Withstand Time	t_{psc}		10	μs
最高□温 Maximum Junction Temperature	$T_{vj(max)}$		175	°C
工作□温 Operating Junction Temperature	$T_{vj(op)}$		-40~150	°C
存□温度 Storage temperature	T_{stg}		-40~125	°C

IGBT特征值 IGBT Characteristics Values*1 (T_{vj}=25℃ unless otherwise noted)

参数 Parameter	符号 Symbol	条件 Condition		数□ Value Min.	Typ.	Max.	□位 Unit
集□极-□射极□和□□ Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=300A, V_{GE}=15V	T_{vj}=25°C		1.65	2.05	V
			T_{vj}=125°C		1.95		
			T_{vj}=150°C		2.00		
□极-□射极开启□□ Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C=12mA, V_{CE}=V_{GE}		5.4	5.9	6.4	V
集□极-□射极截止□流 Collector-Emitter Cut-off Current	I_{CES}	V_{CE}=1700V, V_{GE}=0V				1	mA
□极-□射极漏□流 Gate-Emitter Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}=±20V		-100		100	nA
内置□极□阻 InterTBDI Gate Resistance	R_{Gint}				2.43		Ω
□入□容 Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1MHz			37.7		nF
反向□□□ 容 Reverse Transfer Capacitance	C_{res}				0.43		nF
开通延□□□ Turn-on Delay Time	$t_{d(on)}$	I_C=300A, V_{CE}=900V, V_{GE}=±15V, R_{Gon}=3.3Ω, R_{Goff}=4.7Ω, 开通di/dt=1700A/us (T_{vj}=150°C) 关断dv/dt=4100V/us (T_{vj}=150°C) Inductive Load	T_{vj}=25°C		250		ns
			T_{vj}=125°C		250		
			T_{vj}=150°C		255		
上升□□ Rise Time	t_r		T_{vj}=25°C		100		ns
			T_{vj}=125°C		130		
			T_{vj}=150°C		140		
关断延□□□ Turn-off Delay Time	$t_{d(off)}$		T_{vj}=25°C		705		ns
			T_{vj}=125°C		800		
			T_{vj}=150°C		825		
下降□□ Fall Time	t_f		T_{vj}=25°C		295		ns
			T_{vj}=125°C		465		
			T_{vj}=150°C		555		
开通□耗 Turn-on Energy Loss	E_{on}		T_{vj}=25°C		60		mJ
			T_{vj}=125°C		85		
			T_{vj}=150°C		90		
关断□耗 Turn-off Energy Loss	E_{off}		T_{vj}=25°C		70		mJ
			T_{vj}=125°C		100		
			T_{vj}=150°C		110		
短路□流 Short Circuit Current	I_{SC}	V_{GE}≤15V, t_{psc}≤10us, V_{CC}=1000V, T_{vj}=150°C $V_{CE,max}$=V_{CES}-$L_{s(CE)}$ x di/dt			1670		A

*1 IGBT特征值遵从IEC 60747-9。

二极管特征值 Diode Characteristics Values*2

参数 Parameter	符号 Symbol	条件 Condition		数□ Value			□位 Unit
				Min.	Typ.	Max.	
正向□□ Forward Voltage	V_F	I_F=300A	T_{vj}=25°C		1.90	2.40	V
			T_{vj}=125°C		2.10		
			T_{vj}=150°C		2.15		
反向峰□□ 流 Peak Reverse Recovery Current	I_{RM}	I_F=300A, V_R=600V, V_{GE}=-15V, $-di_F/dt$=1690A/us (T_{vj}=150°C)	T_{vj}=25°C		240		A
			T_{vj}=125°C		240		
			T_{vj}=150°C		240		
反向□荷 Reverse Charge	Q_{rr}		T_{vj}=25°C		65		uC
			T_{vj}=125°C		90		
			T_{vj}=150°C		100		
反向恢复□耗 Reverse Recovery Energy Loss	E_{rec}		T_{vj}=25°C		30		mJ
			T_{vj}=125°C		45		
			T_{vj}=150°C		50		

*2 二极管特征值遵从IEC 60747-2。

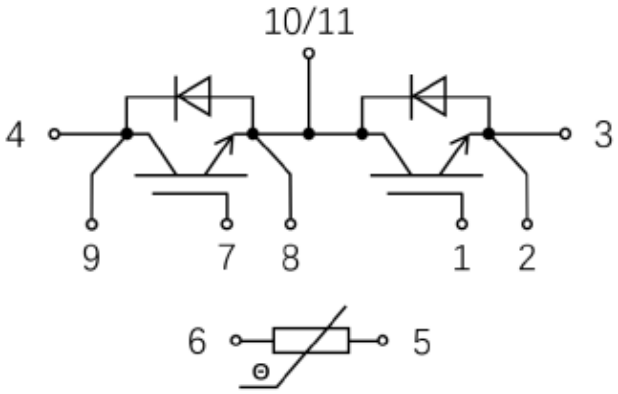
负温度系数热敏电阻 NTC-Thermistor

参数 Parameter	符号 Symbol	条件 Condition	数□ Value			□位 Unit
			Min.	Typ.	Max.	
□定□阻 Rated Resistance	R_{25}	T_{NTC}=25°C		5		KΩ
功耗 Power Dissipation	P_{25}	T_{NTC}=25°C			10	mW
B-□ B-Value	$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298,15K))]$		3375		K

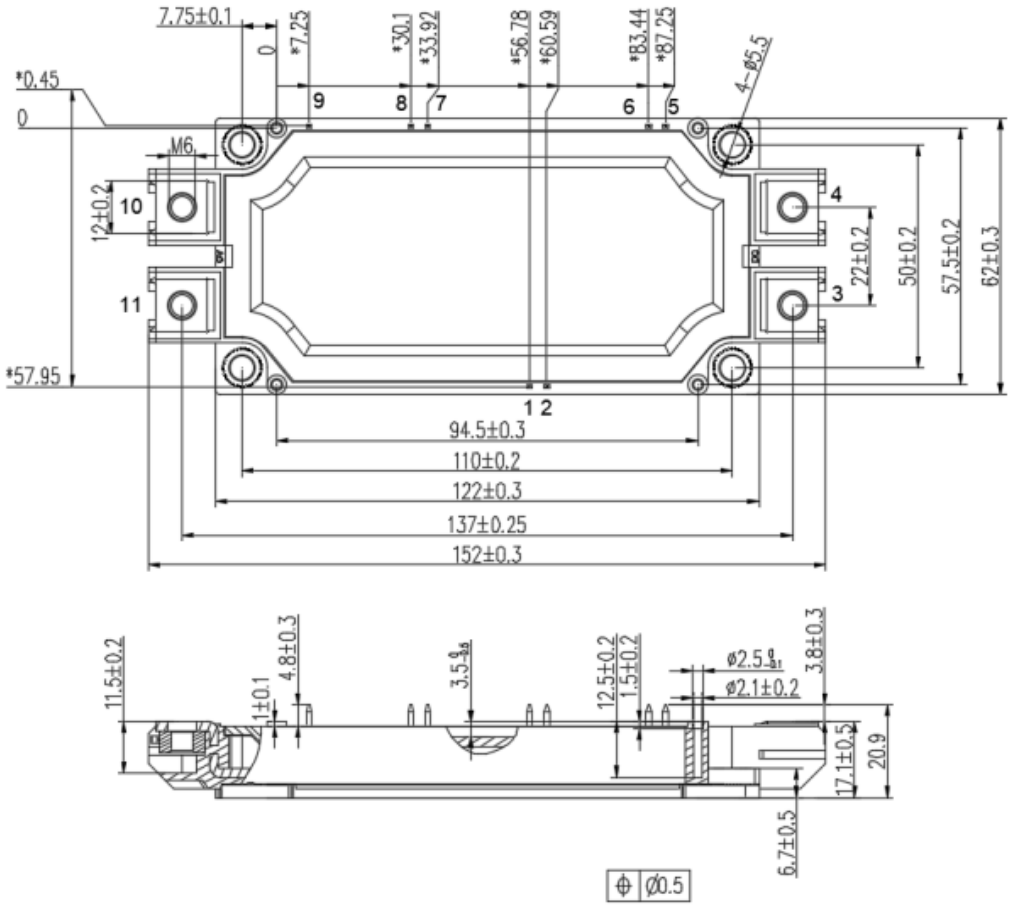
封装特性 Package Properties*3

参数 Parameter	符号 Symbol	条件 Condition	数□ Value			□位 Unit
			Min.	Typ.	Max.	
IGBT □-壳□阻 IGBT Thermal Resistance: Junction to Case	$R_{th(J-C)}$	每个IGBT/per IGBT		0.085		K/W
二极管 □-壳□阻 Diode Thermal Resistance: Junction to Case	$R_{th(J-C)}$	每个二极管/per Diode		0.150		K/W
IGBT接触□阻 IGBT Thermal Resistance: Case to Heatsink	$R_{th(C-H)}$	每个IGBT/per IGBT 硅脂□□ 系数λ_{grease}=1W/(m•K)		0.033		K/W
二极管接触□阻 Diode Thermal Resistance: Case to Heatsink	$R_{th(C-H)}$	每个二极管/per Diode 硅脂□□ 系数λ_{grease}=1W/(m•K)		0.037		K/W
□□ 耐□ Isolation Voltage	V_{isol}	RMS, f=50Hz, t=60s		3.4		kV
爬□距离 Creepage Distance	d_{cr}	端子到散□器 TermiTBDl to Heatsink		14		mm
		端子到端子 TermiTBDl to TermiTBDl		13.5		mm
□气□隙 Clearance Distance	d_{cl}	端子到散□器 TermiTBDl to Heatsink		12.5		mm
		端子到端子 TermiTBDl to TermiTBDl		10		mm
相□漏□起痕指数 Comparative Tracking Index	CTI			>200		
模□寄生□感 Module Stray Inductance	$L_{s,\ CE}$	每个□臂/per Switch		20		nH
模□引□内阻 Module Lead Resistance, TermiTBDl to Chip	$R_{CC`+EE`}$	每个□臂/per Switch, T_C=25°C		1.1		mΩ
安装扭矩 Mounting Torques	M	基板至散□器, Baseplate to Heatsink, M5	3.0		6.0	Nm
*3 封装特性遵从IEC 60747-15		功率端子安装, Power TermiTBDl, M6	3.0		6.0	Nm
模□重量 Module Weight	G			345		g

电路图 Circuit Diagram



外形尺寸 Outline Drawing



修订记录Revision History

版本Version	日期Date	描述Description
A0	2024-03-13	初版

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