

关键参数 Key Parameters

V_{CES}		1700	V
$V_{CE(sat)}$	Typ.	1.85	V
I_c	Max.	3600	A
$I_{C(RM)}$	Max.	7200	A

典型应用 Typical Applications

● 牵引传动	Traction Drives
● 电机控制	Motor Controllers
● 智能电网	Smart Grid
● 高可靠性逆变器	High Reliability Inverter

特点 Features

● AISiC 基板	AISiC Baseplate
● AIN 衬板	AIN Substrates
● 高热循环能力	High Thermal Cycling Capability
● 10 μ s 短路承受能力	10 μ s Short Circuit Withstand

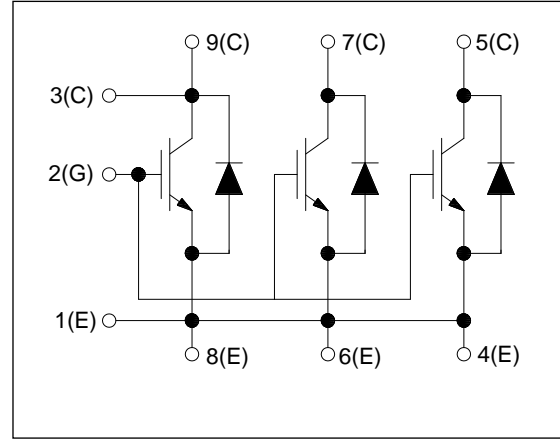
电路结构 Circuit Configuration


图 1. 电路结构

Fig. 1 Circuit configuration

模块外形 Module Appearance


图 2. 模块外形

Fig. 2 Module appearance

模块标签说明
Module Label Code Instruction

ab1234567890

数据位置 Data position	数据内容 Content of data
1--8	模块批次号 Module batch number
9--12	模块序列号 Module serial number

最大额定值
Absolute Maximum Ratings

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions	数值 Value	单位 Unit
V_{CES}	集电极-发射极电压 Collector-emitter voltage	$V_{GE} = 0V, T_C = 25^\circ C$	1700	V
V_{GES}	栅极-发射极电压 Gate-emitter voltage	$T_C = 25^\circ C$	± 20	V
I_C	集电极电流 Collector-emitter current	$T_C = 95^\circ C, T_{vj} \text{ max} = 175^\circ C$	3600	A
$I_{C(PK)}$	集电极峰值电流 Peak collector current	$t_p = 1ms$	7200	A
P_{max}	晶体管部分最大损耗 Max. transistor power dissipation	$T_{vj} = 175^\circ C, T_C = 25^\circ C$	20	kW
f_t	二极管 f_t 值 Diode f_t	$V_R = 0V, t_p = 10ms, T_{vj} = 150^\circ C$	TBD	kA^2s
V_{isol}	绝缘电压(模块) Isolation voltage – per module	短接所有端子, 端子与基板间施加电压 (Commoned terminals to base plate), AC RMS, 1 min, 50Hz, $T_C = 25^\circ C$	4.0	kV
Q_{PD}	局部放电电荷(模块) Partial discharge – per module	IEC1287. $V_1 = 1800V, V_2 = 1300V, 50Hz \text{ RMS}$	10	pC

热和机械数据
Thermal & Mechanical Data

参数 Symbol	说明 Explanation	值 Value	单位 Unit
爬电距离 Creepage distance	端子-散热器 Terminal to heatsink	33.0	mm
	端子-端子 Terminal to terminal	33.0	mm
绝缘间隙 Clearance	端子-散热器 Terminal to heatsink	20.0	mm
	端子-端子 Terminal to terminal	20.0	mm
相对漏电起痕指数 CTI (Comparative Tracking Index)		>600	

热和机械数据
Thermal & Mechanical Data

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
$R_{th(J-C) IGBT}$	IGBT 结壳热阻 Thermal resistance – IGBT				7.5	K / kW
$R_{th(J-C) Diode}$	二极管结壳热阻 Thermal resistance – Diode				9.5	K / kW
$R_{th(C-H) IGBT}$	接触热阻(IGBT) Thermal resistance – case to heatsink (IGBT)	安装力矩 5Nm, 导热脂 1W/m·°C Mounting torque 5Nm, with mounting grease 1W/m·°C		9.7		K / kW
$R_{th(C-H) Diode}$	接触热阻(Diode) Thermal resistance – case to heatsink (Diode)	安装力矩 5Nm, 导热脂 1W/m·°C Mounting torque 5Nm, with mounting grease 1W/m·°C		10.5		K / kW
$T_{vj op}$	工作结温 Operating junction temperature	IGBT 部分 (IGBT)	-40		150	°C
		二极管部分(Diode)	-40		150	°C
T_{stg}	存储温度 Storage temperature range		-40		150	°C
M	安装力矩 Screw torque	安装紧固用 – M6 Mounting – M6			5	Nm
		电路互连用 – M4 Electrical connections – M4			2	Nm
		电路互连用 - M8 Electrical connections – M8			10	Nm

电特性值
Electrical Characteristics

 除非特别声明，否则 $T_C = 25\text{ }^\circ\text{C}$
 $T_C = 25\text{ }^\circ\text{C}$ unless otherwise stated

符号 Symbol	参数名称 Parameter	条件 Test Conditions	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
I_{CES}	集电极截止电流 Collector cut-off current	$V_{GE} = 0V, V_{CE} = V_{CES}$			1	mA
		$V_{GE} = 0V, V_{CE} = V_{CES}, T_C = 125\text{ }^\circ\text{C}$			60	mA
		$V_{GE} = 0V, V_{CE} = V_{CES}, T_C = 150\text{ }^\circ\text{C}$			100	mA
I_{GES}	栅极漏电流 Gate leakage current	$V_{GE} = \pm 20V, V_{CE} = 0V$			1	μA
$V_{GE(TH)}$	栅极-发射极阈值电压 Gate threshold voltage	$I_C = 120\text{mA}, V_{GE} = V_{CE}$	5.5	6.3	7.0	V
$V_{CE(sat)}^{(*1)}$	集电极-发射极饱和电压 Collector-emitter saturation voltage	$V_{GE} = 15V, I_C = 3600A$		1.85		V
		$V_{GE} = 15V, I_C = 3600A, T_{vj} = 125\text{ }^\circ\text{C}$		2.25		V
		$V_{GE} = 15V, I_C = 3600A, T_{vj} = 150\text{ }^\circ\text{C}$		2.35		V
I_F	二极管正向直流电流 Diode forward current	DC		3600		A
I_{FRM}	二极管正向重复峰值电流 Diode peak forward current	$t_p = 1\text{ms}$		7200		A
$V_F^{(*1)}$	二极管正向电压 Diode forward voltage	$I_F = 3600A, V_{GE} = 0$		1.80		V
		$I_F = 3600A, V_{GE} = 0, T_{vj} = 125\text{ }^\circ\text{C}$		1.85		V
		$I_F = 3600A, V_{GE} = 0, T_{vj} = 150\text{ }^\circ\text{C}$		1.85		V
I_{SC}	短路电流 Short circuit current	$T_{vj} = 150\text{ }^\circ\text{C}, V_{CC} = 1000V,$ $V_{GE} \leq 15V, t_p \leq 10\mu\text{s},$ $V_{CE(max)} = V_{CES} - L^{(*2)} \times di/dt,$ IEC 6074-9		14400		A

注意: 1.(*1) 表示该参数的测试点为辅助母排端子 (*1 indicates it is measured at the auxiliary busbar terminal),

Note: 2.(*2) 表示 L 是电路杂散电感加上 L_M (*2 indicates L is the circuit stray inductance plus L_M).

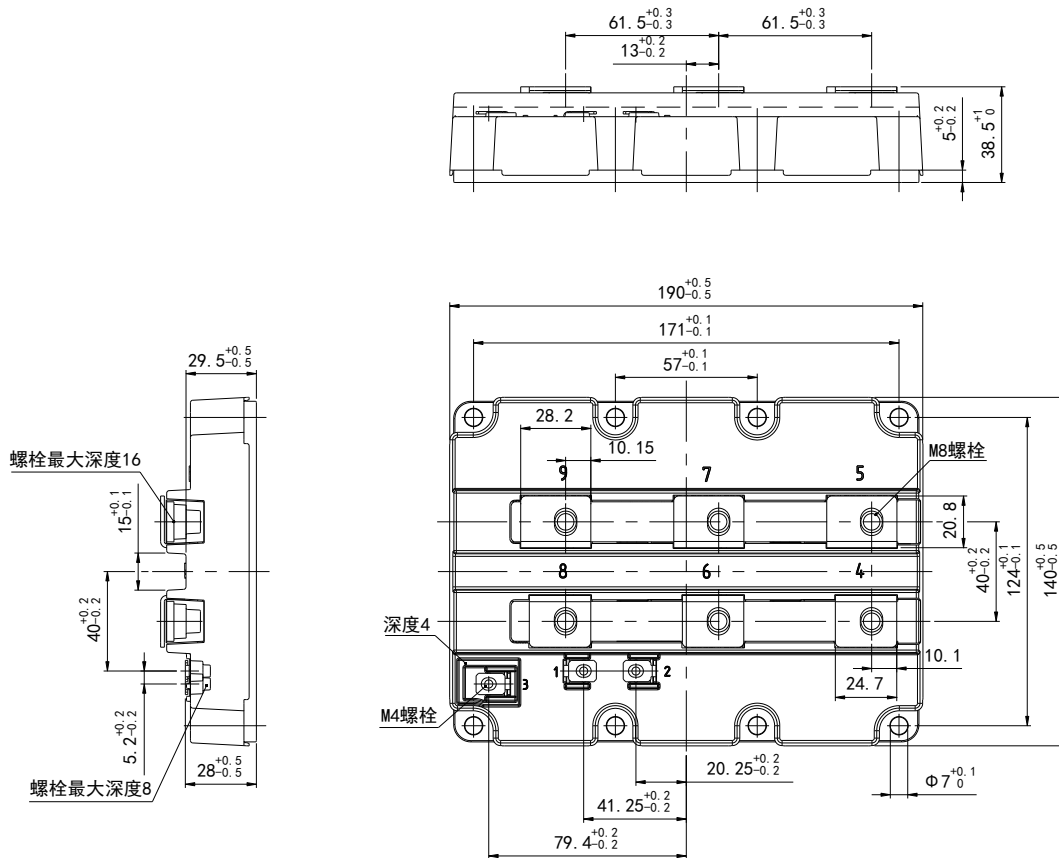
电特性值
Electrical Characteristics

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 $T_C = 25\text{ }^\circ\text{C}$ unless otherwise stated

符号 Symbol	参数名称 Parameter	条件 Test Conditions	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
C_{ies}	输入电容 Input capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 100kHz$		TBD		nF
Q_g	栅极电荷 Gate charge	$\pm 15V$		TBD		μC
C_{res}	反向传输电容 Reverse transfer capacitance	$V_{CE} = 25V, V_{GE} = 0V, f = 100kHz$		TBD		nF
L_M	模块电感 Module inductance			6		nH
R_{INT}	内阻 Internal transistor resistance			85		$\mu\Omega$

电特性值
Electrical Characteristics

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
$t_{d(off)}$	关断延迟时间 Turn-off delay time	$I_C = 3600A,$ $V_{CE} = 900V,$ $V_{GE} = \pm 15V,$ $R_{G(OFF)} = 0.5\Omega,$ $L_S = 60H$	$T_{vj} = 25\text{ }^\circ\text{C}$		2110	ns
			$T_{vj} = 125\text{ }^\circ\text{C}$		2260	
			$T_{vj} = 150\text{ }^\circ\text{C}$		2290	
t_f	下降时间 Fall time		$T_{vj} = 25\text{ }^\circ\text{C}$		240	ns
			$T_{vj} = 125\text{ }^\circ\text{C}$		280	
			$T_{vj} = 150\text{ }^\circ\text{C}$		300	
E_{OFF}	关断损耗 Turn-off energy loss		$T_{vj} = 25\text{ }^\circ\text{C}$		1610	mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$		1730	
			$T_{vj} = 150\text{ }^\circ\text{C}$		1800	
$t_{d(on)}$	开通延迟时间 Turn-on delay time	$I_C = 3600A$ $V_{CE} = 900V,$ $V_{GE} = \pm 15V,$ $R_{G(ON)} = 0.5\Omega,$ $L_S = 60nH,$ $di/dt = 11000A/us$ ($T_{vj} = 150\text{ }^\circ\text{C}$)	$T_{vj} = 25\text{ }^\circ\text{C}$		940	ns
			$T_{vj} = 125\text{ }^\circ\text{C}$		960	
			$T_{vj} = 150\text{ }^\circ\text{C}$		990	
t_r	上升时间 Rise time		$T_{vj} = 25\text{ }^\circ\text{C}$		310	ns
			$T_{vj} = 125\text{ }^\circ\text{C}$		320	
			$T_{vj} = 150\text{ }^\circ\text{C}$		330	
E_{ON}	开通损耗 Turn-on energy loss		$T_{vj} = 25\text{ }^\circ\text{C}$		460	mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$		600	
			$T_{vj} = 150\text{ }^\circ\text{C}$		660	
Q_{rr}	二极管反向恢复电荷 Diode reverse recovery charge	$T_{vj} = 25\text{ }^\circ\text{C}$		1020	μC	
		$T_{vj} = 125\text{ }^\circ\text{C}$		1560		
		$T_{vj} = 150\text{ }^\circ\text{C}$		1790		
I_{rr}	二极管反向恢复电流 Diode reverse recovery current	$T_{vj} = 25\text{ }^\circ\text{C}$		2070	A	
		$T_{vj} = 125\text{ }^\circ\text{C}$		2440		
		$T_{vj} = 150\text{ }^\circ\text{C}$		2600		
E_{rec}	二极管反向恢复损耗 Diode reverse recovery energy	$T_{vj} = 25\text{ }^\circ\text{C}$		760	mJ	
		$T_{vj} = 125\text{ }^\circ\text{C}$		1180		
		$T_{vj} = 150\text{ }^\circ\text{C}$		1350		



重量 Weight: 1100g 模块外观类型 Module outline code: E2

图 3. 模块外观尺寸

Fig. 3 Module outlines

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