

HE20R065H6ZFS

High Performance Field Stop IGBT Power Transistor with SiC SBD

Product features/产品特点

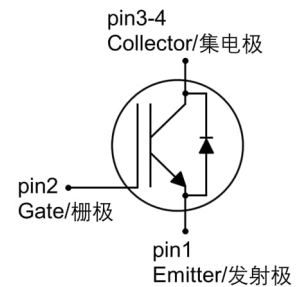
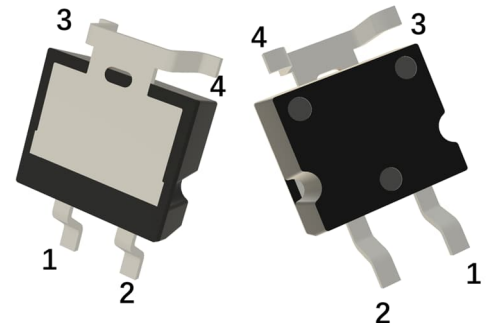
- Top side cooling technology
顶部散热技术
- Advanced Trench+FS IGBT technology
先进的沟槽栅+场截止技术
- SiC Schottky Barrier Diode (SBD)
SiC 肖特基势垒二极管 (SBD)
- Low conduction loss
低传导损耗
- Short circuit rated, $t_{sc} \leq 5\mu s$
额定短路能力, $t_{sc} \leq 5\mu s$
- Fast switching
快速开关
- Halogen free, RoHS compliant
无卤, 符合RoHS

Applications/应用领域

- UPS (Uninterruptible Power Supplies)
不间断电源 (UPS)
- Inverter
变频器
- Motor Drives
电机驱动

Key performance parameters/关键性能参数

Parameter/参数	Value/值	Unit/单位
V_{CE}	650	V
I_C	20	A
$V_{CEsat,typ}$	1.55	V



Package parameters/封装信息

Type/型号	Package/封装	Marking/标识	Packaging method/包装方式
HE20R065H6ZFS	TSC263-4L	HE20R065ZFS	800pcs-Tape&Reel/卷带包装(单卷800颗)

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1. Maximum ratings at $T_{vj}=25^{\circ}\text{C}$, unless otherwise specified.

最大额定值 默认 $T_{vj}=25^{\circ}\text{C}$ 除非另有说明

Table 1 Characteristic values/特征值

Parameter 参数	Symbol 符号	Test condition 测试条件	Value 值	Unit 单位
Collector-to-emitter voltage 集电极-发射极电压	V_{CE}	$T_{vj}\geq 25^{\circ}\text{C}$	650	V
DC Collector current 集电极连续直流电流	I_C^1	$T_C=25^{\circ}\text{C}$	40	A
		$T_C=100^{\circ}\text{C}$	20	
Pulsed Collector current 集电极脉冲电流	I_{Cpuls}^2		60	A
Turn off safe operating area 关断安全工作区	— ²	$V_{CE}\leq 650\text{V}, T_{vj}\leq 175^{\circ}\text{C}$	60	A
Diode continuous forward current 二极管连续直流电流	I_F^1	$T_C=25^{\circ}\text{C}$	40	A
		$T_C=100^{\circ}\text{C}$	20	
Diode pulsed current 二极管脉冲电流	I_{Fpuls}^2		60	A
Gate-emitter voltage 栅极-发射极峰值电压	V_{GE}		± 20	V
Transient gate-emitter voltage 瞬态栅极-发射极电压	V_{GE}	$t_p\leq 10\mu\text{s}, D<0.01$	± 30	V
Short circuit withstand time 短路耐量	t_{sc}	$V_{GE}=15\text{V}, V_{CC}\leq 400\text{V}$	5	μs
Power dissipation 总耗散功率	P_{tot}	$T_C=25^{\circ}\text{C}$	217	W
		$T_C=100^{\circ}\text{C}$	109	

1. Limited by $T_{vj}(\text{max})$ /受限于最高结温

2. Pulse width t_p limited by $T_{vj}(\text{max})$ /脉宽受限于最大结温



2. Package 封装

Table 2 Characteristic values/特征值

Parameter 参数	Symbol 符号	Test condition 测试条件	Value/值			Unit 单位
			Min.	Typ.	Max.	
Operating Junction Temperature 可工作结温	T_{vj}		-55		175	°C
Storage Temperature Range 储存温度	T_{stg}		-55		175	°C
Soldering temperature, reflow solderin 焊接温度, 回流焊	T_{sold}	Reflow MSL1			260	°C
IGBT thermal resistance, junction-to-case IGBT 芯片到壳热阻	$R_{th(j-C)}$				0.69	°C/W
Diode thermal resistance, junction-to-case 二极管芯片到壳热阻	$R_{th(j-C)}$				1.0	°C/W
Thermal resistance, junction-to-ambient 结到环境热阻	$R_{th(j-A)}$			30		°C/W



3. Static electrical characteristic at $T_{vj}=25^{\circ}\text{C}$, unless otherwise specified.

静态电气特性 默认 $T_{vj}=25^{\circ}\text{C}$ 除非另有说明

Table 3 Characteristic values/特征值

Parameter 参数	Symbol 符号	Test condition 测试条件	Value/值			Units 单位
			Min.	Typ.	Max.	
Collector - Emitter breakdown voltage 集电极-发射极击穿电压	$V_{(BR)CES}$	$V_{GE}=0V, I_C=0.25mA$	650			V
Collector-Emitter Saturation voltage 集电极-发射极饱和压降	V_{CEsat}	$V_{GE}=15V, I_C=20A$		1.55	1.66	V
		$T_{vj}=175^{\circ}\text{C}$		2.0		
Gate threshold voltage 门极开启阈值电压	V_{GEth}	$V_{GE}=V_{CE}, I_C=1mA$	5.0	6.1	7.0	V
Diode Forward Voltage 二极管正向导通压降	V_F	$V_{GE}=0V, I_F=20A$		1.6		V
Gate to Emitter Leakage current 门极-发射极漏电流	I_{GES}	$V_{GE}=30V, V_{CE}=0V$			200	nA
		$V_{GE}=-30V, V_{CE}=0V$			-200	
Zero gate voltage collector current 集电极-发射极漏电流	I_{CES}	$V_{CE}=650V, V_{GE}=0V$			100	μA

4. Dynamic electrical characteristic at $T_{vj}=25^{\circ}\text{C}$, unless otherwise specified.

动态电气特性 默认 $T_{vj}=25^{\circ}\text{C}$ 除非另有说明

Table 4 Characteristic values/特征值

Parameter 参数	Symbol 符号	Test condition 测试条件	Value/值			Units 单位
			Min.	Typ.	Max.	
Input capacitance 输入电容	C_{ies}	$V_{GE}=0V, V_{CE}=25V,$ $f=1MHz$		1130		pF
Output capacitance 输出电容	C_{oes}			44		
Reverse transfer capacitance 反向传输电容	C_{res}			9		
Total gate charge 门极电荷	Q_g	$V_{GE}=15V,$ $I_C=20A, V_{CC}=520V$		54		nC



5. Switching characteristic inductive load at $T_{vj}=25^{\circ}\text{C}$, unless otherwise specified.

开关特性感性负载 默认 $T_{vj}=25^{\circ}\text{C}$ 除非另有说明

Table 5 IGBT Characteristic values/IGBT特征值

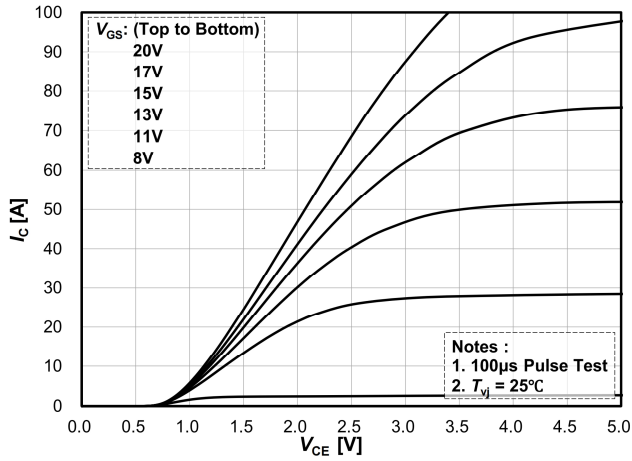
Parameter 参数	Symbol 符号	Test condition 测试条件		Value/值			Units 单位
				Min.	Typ.	Max.	
Turn-on delay time 开启延迟时间	t _{d(on)}	V _{GE} =0/15V V _{CC} =400V I _C =20A R _{G(on)} =10Ω R _{G(off)} =10Ω	T _{vj} =25°C		25		ns
			T _{vj} =175°C		24		
Rise time 上升时间	t _r		T _{vj} =25°C		12		ns
			T _{vj} =175°C		11		
Turn-off delay time 关闭延迟时间	t _{d(off)}		T _{vj} =25°C		117		ns
			T _{vj} =175°C		152		
Fall time 下降时间	t _f		T _{vj} =25°C		34		ns
			T _{vj} =175°C		67		
Turn-on switch loss 单次开启损耗	E _{on}		T _{vj} =25°C		0.12		mJ
			T _{vj} =175°C		0.17		
Turn-off switch loss 单次关闭损耗	E _{off}		T _{vj} =25°C		0.40		mJ
			T _{vj} =175°C		0.59		
Total switching energy 总开关损耗	E _{ts}		T _{vj} =25°C		0.52		mJ
			T _{vj} =175°C		0.76		



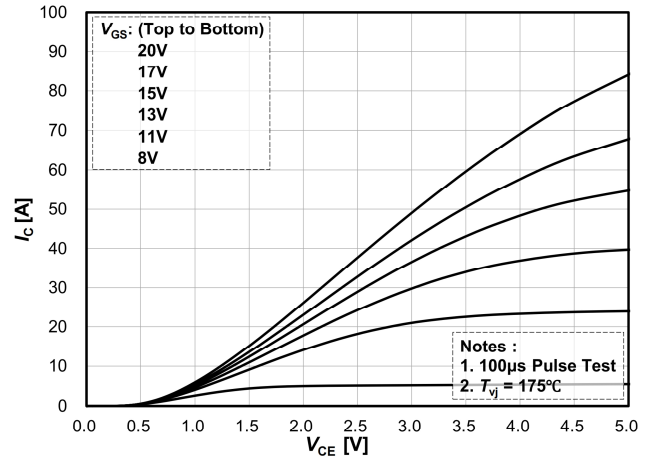
6. Characteristics diagrams

特性曲线

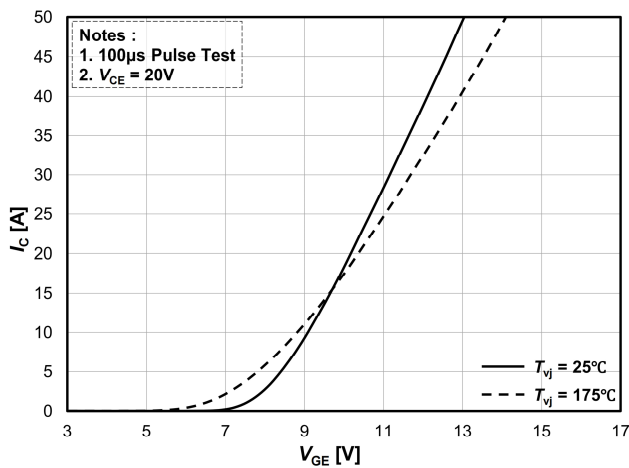
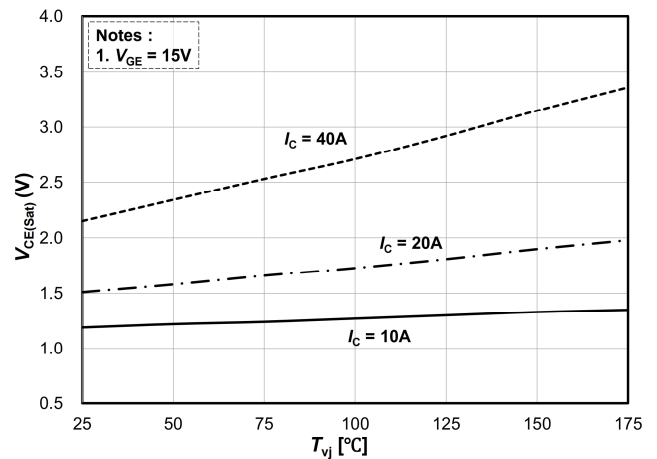
Typ. Output characteristic/输出特性



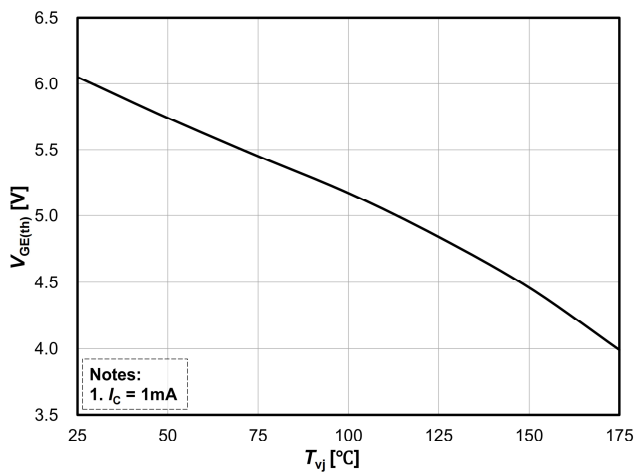
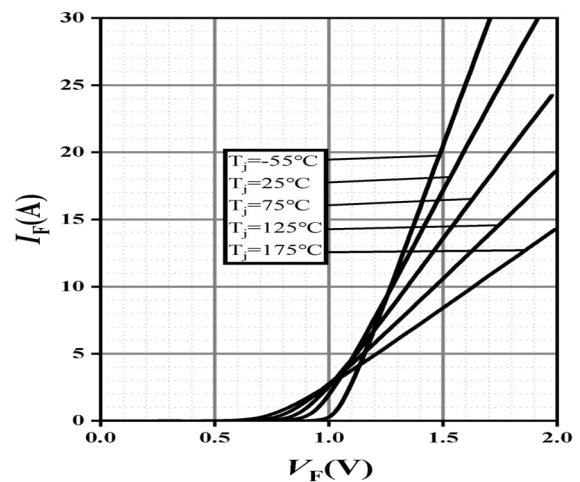
Typ. Output characteristic/输出特性



Typ. Transfer characteristic/典型传输特性

Typ. Temperature dependence of $V_{CE(sat)}$ /饱和压降与结温特性

Typ. Gate threshold voltage/门级阈值电压结温特性

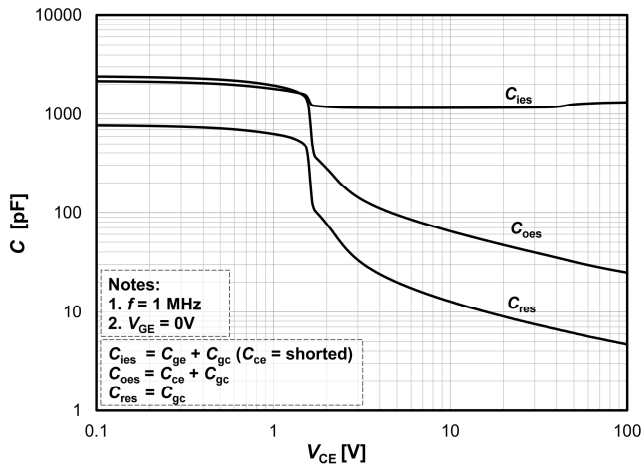
Typ. Temperature dependence of V_F /二极管压降与结温特性

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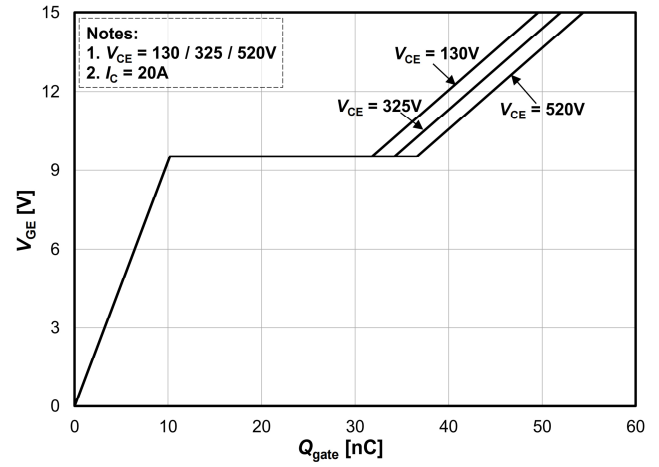
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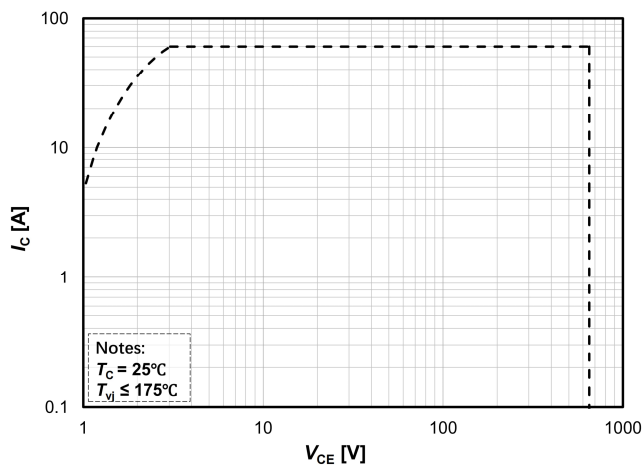
Typ.Capacitances/电容特性



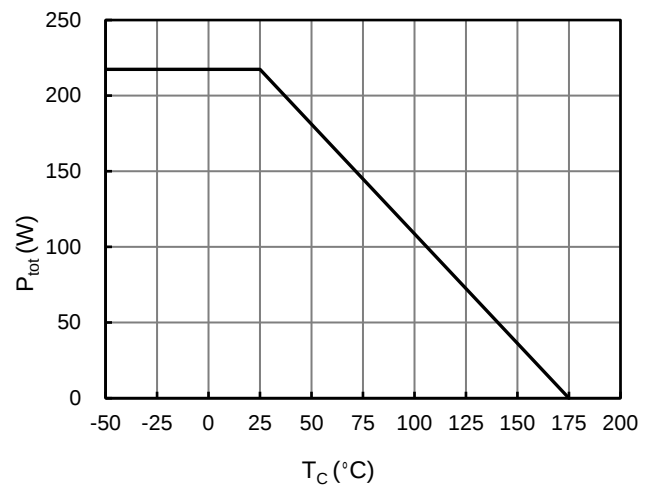
Typ.Gate charge/门级电荷



Reverse bias safe operating area/反偏安全工作区



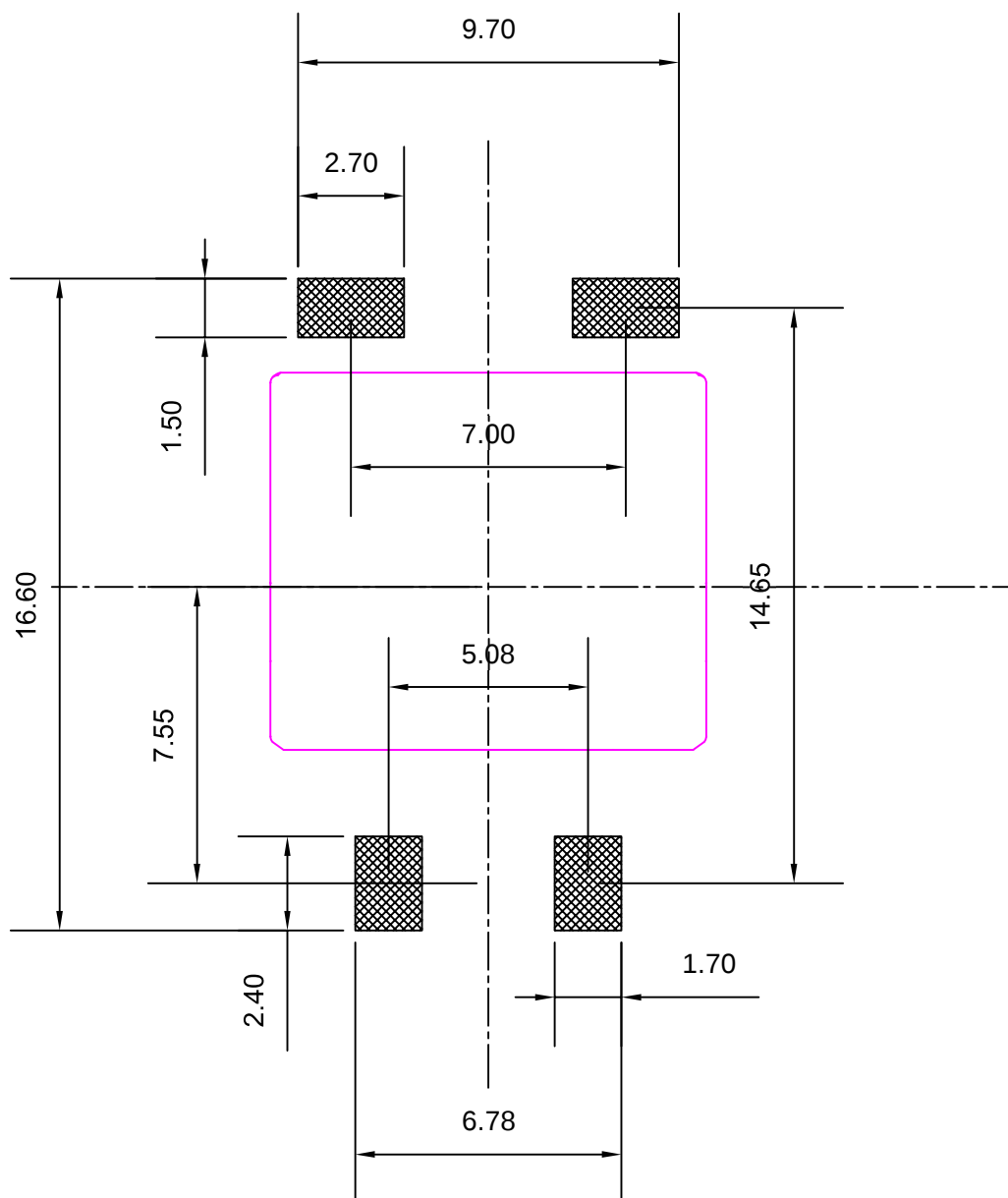
Power dissipation/耗散功率



8. Recommended Land Pattern

推荐焊盘尺寸

Figure 2. TSC263-4L Effective Solderable Area for Reflow Soldering/ TSC263-4L 回流焊接有效可焊面积



solder land/焊盘区域

----- Package Reference Centerline/封装参考中心线

dimensions in mm/单位为毫米

注:

注：
所示焊盘尺寸仅供参考。为确保最佳散热性能及焊接质量，建议根据实际应用中的 PCB 板材、层数及散热设计对焊盘进行优化调整
The land pattern dimensions provided are for reference only. To achieve optimal thermal performance, actual design adjustments should be considered based on the specific PCB materials, layer stack-up, and thermal dissipation requirements.



9. Revision history

修订历史

Table 6 Date and version number/日期与版本号

Date日期	Revision版本	Changes更改内容
2026年8月20日	Rev.G 1.0	Target Datasheet（目标规格书）

10. Matters needing attention

注意事项

Table 7 Important Technical Guidance, Application Policy, and Copyright Notice/重要技术指南、应用规范与版权声明

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