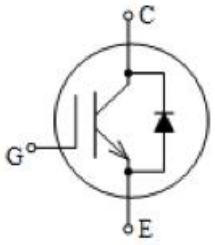
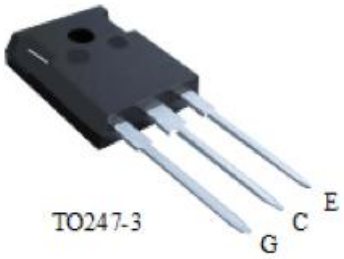
IGBT in advanced TrenchFS Technology with soft and fast recovery anti-parallel diode

具有先进 TrenchFS 技术的 IGBT 且反并联软快恢复二极管

Features

特性





- 650V TrenchFS technology
  650V沟槽栅场终止技术
- Low conduction and switching losses
  低导通和开关损耗
- Low gate charge
  低栅极电荷
- Maximum operating temperature of 175℃
  最高工作温度 175℃

Applications

应用

- UPS
  不间断电源
- Welding
  焊机
- Solar Inverter
  光伏逆变器

Type 型号	V_{CE}[V] 集电极-发射极电压	I_C[A] 集电极电流	V_{CEsat}[V] 饱和电压	T_{jmax}[℃] 最高结温	Marking 标记	Package 封装
BGN80V65HD	650	80	1.7	175	80V65HD	TO-247

Maximum Rated Values
最大额定参数

Parameter 参数	Symbol 符号	Value 值	Unit 单位
Collector-emitter voltage,T_j≥25℃ 集电极-发射极电压，T_j≥25℃	V_{CE}	650	V
Collector current,T_C=25℃ 集电极电流，T_C=25℃	I_C	160	A
Collector current,T_C=100℃ 集电极电流，T_C=100℃	I_C	80	A
Pulsed collector current，t_p limited by T_{jmax} 集电极脉冲电流，脉宽时间受 T_{jmax} 限制	I_{Cpuls}	320	A
Diode forward current,T_C=25℃ 二极管正向电流，T_C=25℃	I_F	160	A
Diode forward current,T_C=100℃ 二极管正向电流，T_C=100℃	I_F	80	A
Diode pulsed current 二极管脉冲电流	I_{Fpuls}	320	A
Gate-emitter voltage 栅极-发射极电压	V_{GE}	±20	V
Total power dissipation,T_C=25℃ 总耗散功率，T_C=25℃	P_{tot}	395	W
Operating junction temperature 最高结温	T_{jmax}	175	℃
Operating junction temperature 工作结温	T_{jop}	-40...+175	℃
Storage temperature 储存温度	T_{stg}	-55...+150	℃
Soldering temperature,1.6mm from case for 5s 焊接温度	T_{st}	260	℃

Thermal Resistance
热阻

Parameter 参数	Symbol 符号	Value 值	Unit 单位
IGBT Thermal resistance junction to case IGBT 结-管壳热阻	$R_{th(j-c)}$	0.38	℃/W
Diode Thermal resistance junction to case 二极管结-管壳热阻	$R_{th(j-c)}$	0.45	℃/W
Thermal resistance junction to ambient 结-环境热阻	$R_{th(j-a)}$	40	℃/W

Electrical Characteristic at Tj=25℃（unless otherwise specified）
Tj=25℃时电学特性（除非特别声明）

Parameter 参数	Symbol 符号	Conditions 条件		Value 值			Unit 单位
				Min. 最小值	Typ. 典型值	Max. 最大值	
Static Characteristic **静态特性**							
Collector-emitter breakdown voltage 集电极-发射极击穿电压	$V_{(BR)CES}$	V_{GE}=0V,I_C=100uA		650	-	-	V
Collector-emitter saturation voltage 集电极-发射极饱和电压	V_{CEsat}	V_{GE}=15V, I_C=80A	T_j=25℃	-	1.7	2.1	V
			T_j=150℃	-	2.0	-	V
Diode forward voltage 二极管正向电压	V_F	V_{GE}=0V, I_F=80A	T_j=25℃	-	1.7	2.1	V
			T_j=150℃	-	1.4	-	V
Gate-emitter threshold voltage 栅极-发射极阈值电压	$V_{GE(th)}$	I_C=1mA,V_{CE}=V_{GE}		2	2.8	4	V
Collector-emitter cut-off current 集电极-发射极截止电流	I_{CES}	V_{CE}=650V,V_{GE}=0V		-	-	100	μA
Gate-emitter leakage current 栅极-发射极漏电流	I_{GES}	V_{CE}=0V,V_{GE}=±20V		-200	-	200	nA
Dynamic Characteristic **动态特性**							
Input capacitance 输入电容	C_{ies}	V_{CE}=25V, V_{GE}=0V, f=1MHz		-	5777	-	pF
Output capacitance 输出电容	C_{oes}			-	271	-	pF
Reverse transfer capacitance 反向传输电容	C_{res}			-	10	-	pF
Gate charge 门极电量	Q_G	V_{CE}=400V,I_C=80A, V_{GE}=15V		-	240	-	nC

Switching Characteristic at Tj=25℃（Inductive Load）
Tj=25℃时开关特性（感性负载）

Parameter 参数	Symbol 符号	Conditions 条件	Value 值			Unit 单位
			Min. 最小值	Typ. 典型值	Max. 最大值	
IGBT Characteristic **IGBT 特性**						
Turn-on delay time 开通延迟时间	$t_{d(on)}$	V_{CE}=400V, I_C=80A, V_{GE}=-7.5/15V, R_G=8Ω, T_j=25℃, Energy losses include "tail" and diode reverse recovery.	-	3.5	-	ns
Rise time 上升时间	t_r		-	95	-	ns
Turn-off delay time 关断延迟时间	$t_{d(off)}$		-	104	-	ns
Fall time 下降时间	t_f		-	79	-	ns
Turn-on energy 开通损耗	E_{on}		-	2.98	-	mJ
Turn-off energy 关断损耗	E_{off}		-	1.95	-	mJ
Total switching energy 总开关损耗	E_{ts}		-	4.93	-	mJ
Anti-Parallel Diode Characteristic **反并联二极管特性**						
Reverse recovery time 反向恢复时间	t_{rr}	V_R=400V, I_F=80A, di_F/dt=1000A/μs T_j=25℃,	-	123	-	ns
Reverse recovery charge 反向恢复电荷	Q_{rr}		-	1.8	-	μC
Peak reverse recovery current 反向恢复峰值电流	I_{rrm}		-	21.6	-	A
Reverse recovered energy 反向恢复损耗	E_{rec}		-	0.54	-	mJ

Switching Characteristic at Tj=150℃（Inductive Load）
Tj=150℃时开关特性（感性负载）

Parameter 参数	Symbol 符号	Conditions 条件	Value 值			Unit 单位
			Min. 最小值	Typ. 典型值	Max. 最大值	
IGBT Characteristic **IGBT 特性**						
Turn-on delay time 开通延迟时间	$t_{d(on)}$	V_{CE}=400V, I_C=80A, V_{GE}=-7.5/15V, R_G=8Ω, T_j=150℃, Energy losses include "tail" and diode reverse recovery.	-	4.0	-	ns
Rise time 上升时间	t_r		-	93	-	ns
Turn-off delay time 关断延迟时间	$t_{d(off)}$		-	122	-	ns
Fall time 下降时间	t_f		-	83	-	ns
Turn-on energy 开通损耗	E_{on}		-	4.72	-	mJ
Turn-off energy 关断损耗	E_{off}		-	2.35	-	mJ
Total switching energy 总开关损耗	E_{ts}		-	7.07	-	mJ
Anti-Parallel Diode Characteristic **反并联二极管特性**						
Reverse recovery time 反向恢复时间	t_{rr}	V_R=400V, I_F=80A, di_F/dt=1000A/μs T_j=150℃,	-	217	-	ns
Reverse recovery charge 反向恢复电荷	Q_{rr}		-	6.4	-	μC
Peak reverse recovery current 反向恢复峰值电流	I_{rrm}		-	47.6	-	A
Reverse recovered energy 反向恢复损耗	E_{rec}		-	1.75	-	mJ

Typical Characteristics Diagrams
特性曲线

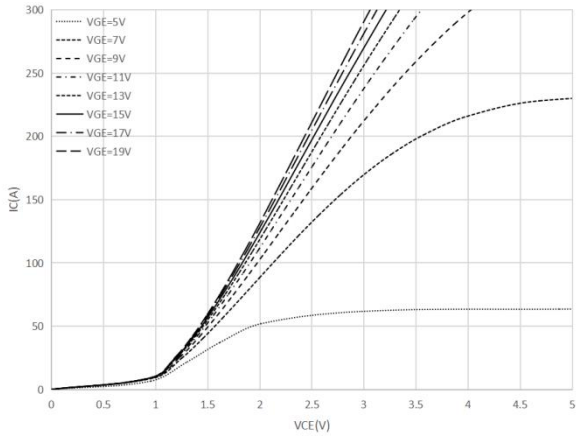


Figure 1.Typical output characteristic(T_j=25℃)

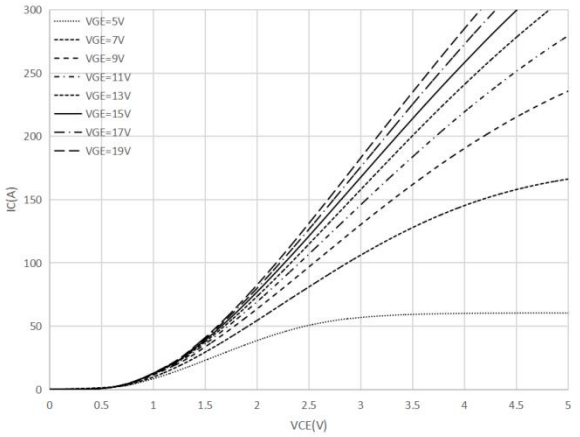


Figure 2.Typical output characteristic(T_j=150℃)

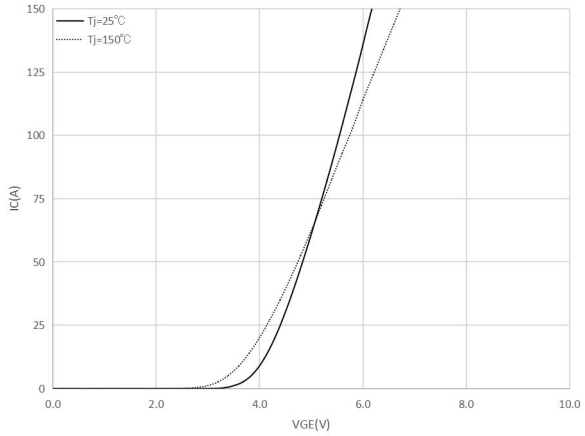


Figure 3.Typical transfer characteristic(V_{CE}=20V)

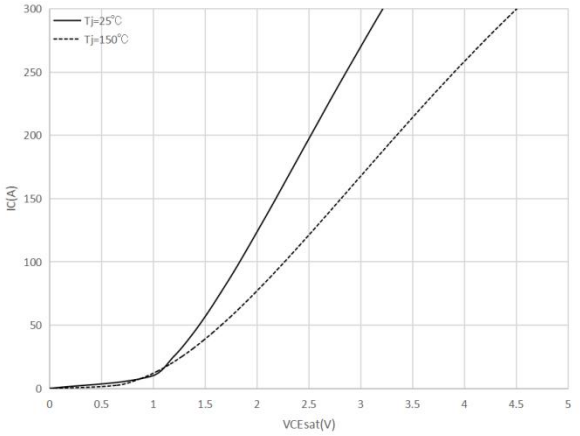


Figure 4.Typical collector current as a function of collector-emitter saturation voltage(V_{GE}=15V)

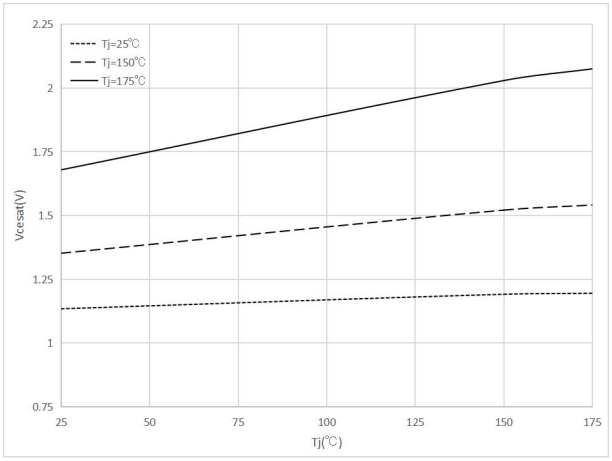


Figure 5.Typical collector-emitter saturation voltage as a function of junction temperature(V_{GE}=15V)

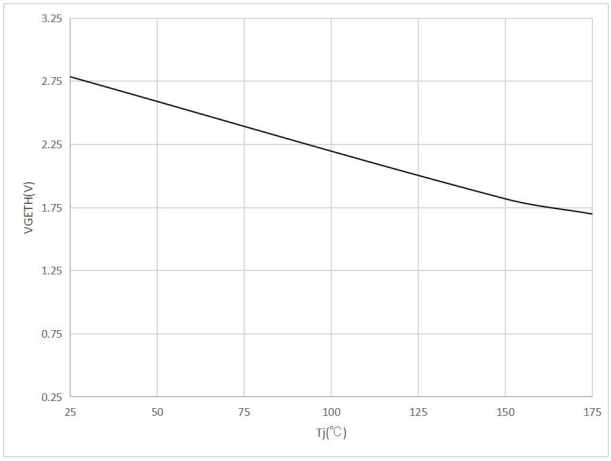


Figure 6.Gate-emitter threshold voltage as a function of junction temperature(I_C=1mA)

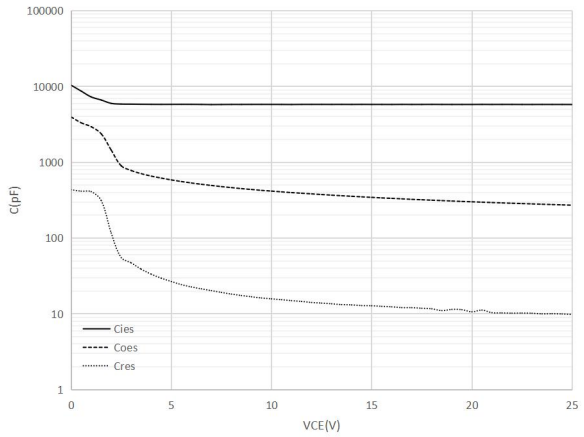


Figure 7.Typical capacitance as a function of collector-emitter voltage(f=1MHz,V_{GE}=0V)

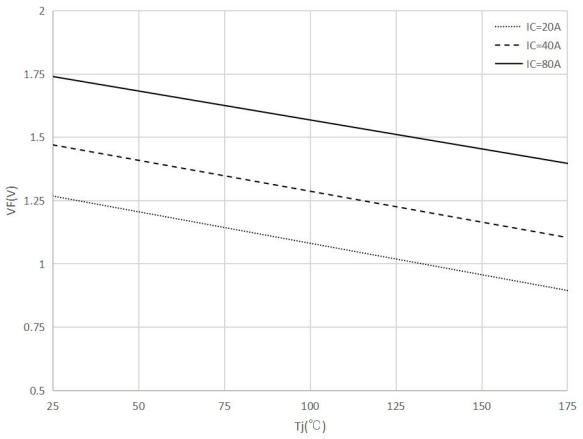


Figure 8.Typical diode forward voltage as a function of junction temperature

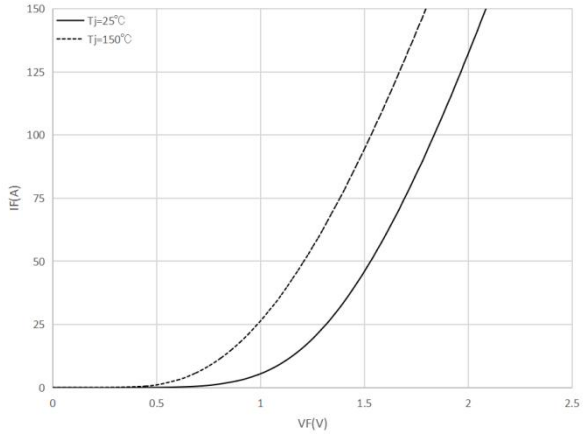
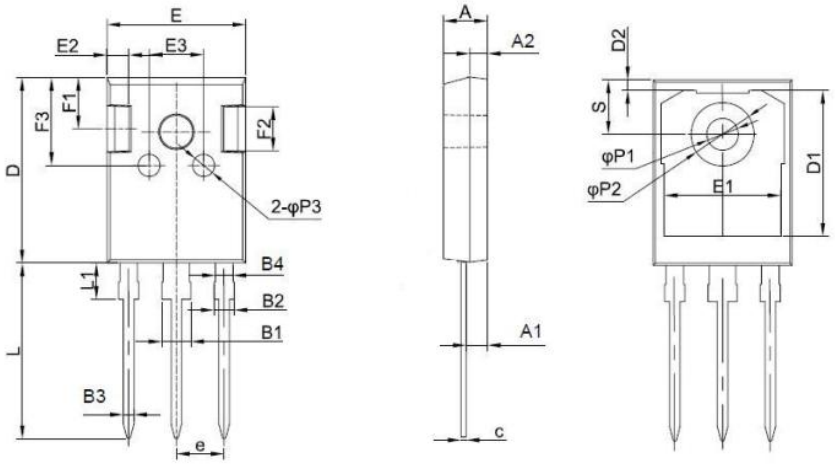


Figure 9.Typical diode forward current as a function of forward voltage

Outline Dimensions
外形尺寸



Dimensions	Millimeter	
	Min.	Max.
A	4.90	5.10
A1	2.31	2.51
A2	1.90	2.10
B1	3.00	3.20
B2	2.00	2.20
B3	1.16	1.26
B4	1.95	2.15
C	0.55	0.65
D	20.90	21.10
D1	16.25	16.85
D2	1.07	1.27
E	15.70	15.96
E1	13.10	13.50
E2	2.40	2.60
E3	6.10	6.30
F1	5.75	5.90
F2	4.9	5.10
F3	9.80	10.20
e	5.44BSC	
L	19.72	20.12
L1	4.05	4.25
ϕP1	3.50	3.70
ϕP2	7.10	7.30
ϕP3	2.40	2.60
S	6.05	6.25

Packing
包装

Packing 包装	pcs/tube 个/料管	tube/inner box 料管/内盒	inner box/carton 内盒/箱	pcs/carton 个/箱
Tube	30	12	6	2160

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