



TT030U065GBA

主要参数 MAIN CHARACTERISTICS

I _C	30A
V _{CE}	650V
V _{CEsat-typ}	1.60V

用途

●PFC

APPLICATIONS

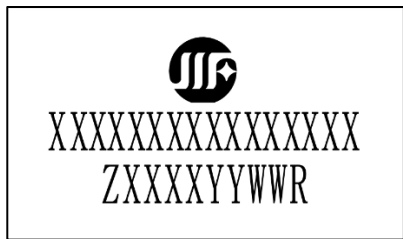
●Power factor corrector

产品特性

TT030U065GBA 是吉林华微第七代沟槽场截止工艺 IGBT 的 Boost 升压拓扑模块，具有较低的开关损耗，适用于白电 PFC。

印记定义

Mark definition



TO-247-5L 印章定义:

第一行: 商标 Logo

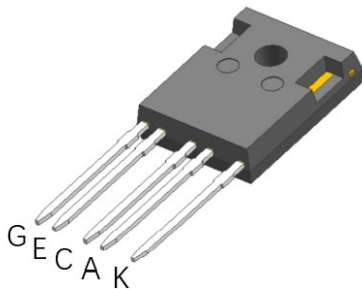
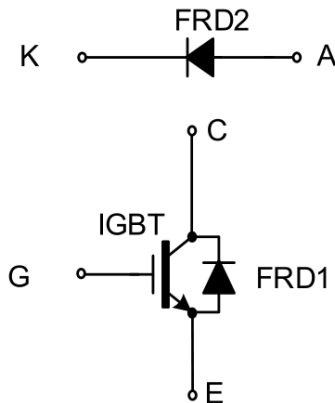
第二行: 产品型号说明

T T 030 U 065 G BA
↓ ↓ ↓ ↓ ↓ ↓ ↓
产品类型(IGBT) 工艺平台(Trench-FS) 电流(A) 频率(高频) 电压(V) 工艺版本(七代) 特殊特性
第三行: ZXXXXYYWWR (其中 Z:封装区别码; XXXX:系统识别码; YY:年份后两位; WW:周代码, 以印码日期计, 年份同; R: 无卤封装, 含卤塑封料封装则此字母缺省)

订货信息 ORDER MESSAGE

订 货 型 号 Order codes	印 记 Marking	封 装 Package
无卤-条管 Halogen-Free-Tube		
TT030U065GBA-GS-BR	TT030U065GBA	TO-247-5L

封装 Package



背面电极内绝缘
TO-247-5L

绝对最大额定值 ABSOLUTE RATINGS ($T_c=25^{\circ}\text{C}$)

项 目 Parameter	符 号 Symbol	数 值 Value	单 位 Unit
最高集电极-发射极直流电压 Collector-emitter voltage	V_{CE}	650	V
*连续集电极电流 Collector current-continuous	I_C	60($T_c=25^{\circ}\text{C}$)	A
		30($T_c=100^{\circ}\text{C}$)	A
最大脉冲集电极极电流 (注 1) Collector current – pulse (note 1)	I_{CM}	120	A
*二极管 FRD1 正向电流 Diode FRD1 RMS forward current	$I_{F(CE)}$	10 ($T_c=25^{\circ}\text{C}$)	A
		5 ($T_c=100^{\circ}\text{C}$)	A
二极管 FRD1 正向不重复峰值电流 (浪涌电流) Surge non repetitive forward current $t_p=10\text{ms}$ sinusoidal	$I_{FSM(CE)}$	20	A
二极管 FRD2 直流反向电压 Diode FRD2 DC reverse voltage	$V_{R(AK)}$	650	V
*二极管 FRD2 正向测试电流 Diode FRD2 RMS forward current	$I_{F(AK)}$	40 ($T_c=25^{\circ}\text{C}$)	A
		20 ($T_c=100^{\circ}\text{C}$)	A
二极管 FRD2 正向不重复峰值电流 (浪涌电流) Surge non repetitive forward current $t_p=8.3\text{ms}$ sinusoidal	$I_{FSM(AK)}$	210	A
最高栅极发射极电压 Gate-emitter voltage	V_{GE}	± 20	V
瞬态栅极发射极电压 Transient gate-emitter voltage($t_p \leq 10\mu\text{s}, D < 0.010$)	V_{GE}	± 30	V
安全工作区 Turn-off safe area $V_{CE} \leq 650\text{V}, T_{vj} \leq 175^{\circ}\text{C}, t_p=1\mu\text{s}$	-	120	A
耗散功率 Power dissipation	$T_c=25^{\circ}\text{C}$ P_D	94	W
	$T_c=100^{\circ}\text{C}$ P_D	47	
工作结温 (注 2) Operating junction temperature range	T_{vj}	$-40 \sim +175$	$^{\circ}\text{C}$
存储温度 Storage temperature	T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$
引线最高焊接温度 Maximum lead temperature for soldering purposes	T_L	260	$^{\circ}\text{C}$

*连续集电极电流由最高结温限制。

*Collector current limited by maximum junction temperature.

For optimum lifetime and reliability, JSMC recommends operating conditions that do not exceed 80% of the maximum ratings stated in this datasheet

注释:

1: 脉冲宽度由最高结温限制。

2: 过载工况时, 允许在最高结温 $T_{vjop}=175^{\circ}\text{C}$ 下运行, 最大占空比 $< 20\%$ (最多持续 60s)

Notes:

1: Pulse width limited by maximum junction temperature.

2: Under overload condition, it is allowed to operate at the maximum junction temperature $T_{vjop}=175^{\circ}\text{C}$, and the maximum duty ratio is less than 20% (lasting for 60 s at most)



电特性 ELECTRICAL CHARACTERISTICS

项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
关态特性 Off –Characteristics						
集电极—发射极击穿电压 Collector-emitter voltage	BV_{CES}	$I_C=250\mu A, V_{GE}=0V$	650	-	-	V
零栅压下集电极漏电流 Zero gate voltage collector current	I_{CES}	$V_{CE}=650V, V_{GE}=0V, T_{vj}=25^{\circ}C$	-	-	30	μA
正向栅极体漏电流 Gate-body leakage current,forward	I_{GESF}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$	-	-	200	nA
反向栅极体漏电流 Gate-body leakage current,reverse	I_{GESR}	$V_{CE}=0V, V_{GE}=-20V, T_{vj}=25^{\circ}C$	-	-	-200	nA
通态特性 On-Characteristics						
阈值电压 Gate threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C=0.3mA$	3.5	4.2	5.0	V
饱和压降 Collector-emitter saturation voltage	V_{CESAT}	$V_{GE}=15V, I_C=30A$ $T_{vj}=25^{\circ}C$ $T_{vj}=150^{\circ}C$	- -	1.6 2.1	2.1 -	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V$ $V_{GE}=0V$ $f=1.0MHz$	-	1980	-	pF
输出电容 Output capacitance	C_{oes}		-	60	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	9.8	-	pF
栅极电荷总量 Total gate charge	Q_g	$V_{CC}=520V, I_C=30A, V_{GE}=15V$	-	63	-	nC
栅极-发射极 Gate to emitter charge	Q_{ge}		-	16.5	-	
栅极-集电极 Gate to collector charge	Q_{gc}		-	17	-	





电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics

项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
开启延迟时间 Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=30A, R_G=10\Omega$ $V_{GE}=15V$ $T_{vj}=25^\circ C$	-	10	-	ns
上升时间 Turn-on rise time	t_r		-	44	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	90	-	ns
下降时间 Turn-off fall time	t_f		-	60	-	ns
开通损耗 Turn-on energy	E_{on}		-	0.45	-	mJ
关断损耗 Turn-off energy	E_{off}		-	0.30	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	0.75	-	mJ
开启延迟时间 Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=30A, R_G=10\Omega$ $V_{GE}=15V$ $T_{vj}=150^\circ C$	-	10	-	ns
上升时间 Turn-on rise time	t_r		-	44	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	114	-	ns
下降时间 Turn-off fall time	t_f		-	80	-	ns
开通损耗 Turn-on energy	E_{on}		-	0.52	-	mJ
关断损耗 Turn-off energy	E_{off}		-	0.39	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	0.91	-	mJ

反并联二极管 FRD1 特性及最大额定值 Anti-Parallel Diode FRD1 Characteristics and Maximum Ratings

正向压降 Diode forward voltage	V_F	$I_F=5A, T_{vj}=25^\circ C$ $T_{vj}=150^\circ C$	-	1.4 1.2	1.8 -	V
反向恢复时间 Reverse recovery time	t_{rr}	$V_R=400V, I_F=5A$ $dI_F/dt=200A/\mu s$ $T_{vj}=25^\circ C$	-	43	-	ns
反向恢复电荷 Diode reverse recovery charge	Q_{rr}		-	40	-	nC
反向恢复电流 Diode reverse recovery current	I_{rrm}		-	1.7	-	A
反向恢复时间 Diode reverse recovery time	t_{rr}	$V_R=400V, I_F=5A$ $dI_F/dt=200A/\mu s$ $T_{vj}=150^\circ C$	-	68	-	ns
反向恢复电荷 Diode reverse recovery charge	Q_{rr}		-	98	-	nC
反向恢复电流 Diode reverse recovery current	I_{rrm}		-	4.6	-	A

二极管 FRD2 特性及最大额定值 Diode FRD2 Characteristics and Maximum Ratings

正向压降 Diode forward voltage	V_F	$I_F=20A, T_{vj}=25^\circ C$ $T_{vj}=150^\circ C$	-	2.6 1.75	3.4 -	V
反向漏电流	I_R	$V_R=650V, T_{vj}=25^\circ C$			5.0	μA
		$V_R=650V, T_{vj}=125^\circ C$			400	μA
反向恢复时间 Reverse recovery time	t_{rr}	$V_R=400V, I_F=20A$	-	20	-	ns
反向恢复电荷 Diode reverse recovery charge	Q_{rr}	$dI_F/dt=200A/\mu s$ $T_{vj}=25^\circ C$	-	108	-	nC





反向恢复电流 Diode reverse recovery current	Irrm		-	4.6	-	A
反向恢复时间 Diode reverse recovery time	trr	VR=400V, IF=20A dIF/dt=200A/μs Tvj =150℃	-	43	-	ns
反向恢复电荷 Diode reverse recovery charge	Qrr		-	340	-	nC
反向恢复电流 Diode reverse recovery current	Irrm		-	7.9	-	A

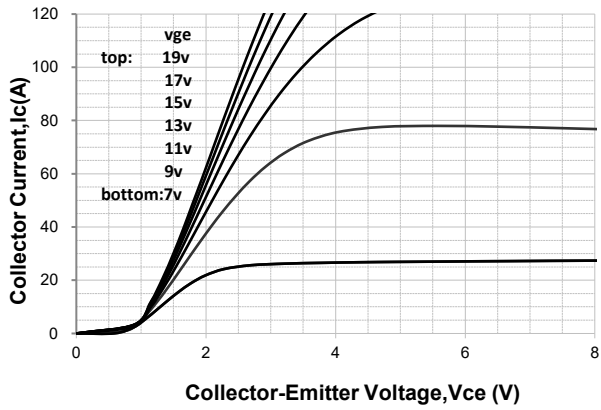
项 目 Parameter	符 号 Symbol	MAX	单 位 Unit
结到管壳的热阻 Junction to case IGBT	R _{th(j-c)}	1.6	℃/W
结到管壳的热阻 Junction to case Diode1	R _{th(j-c)}	4.3	℃/W
结到管壳的热阻 Junction to case Diode2	R _{th(j-c)}	1.8	℃/W
结到环境的热阻 Junction to ambient	R _{th(j-a)}	40	℃/W



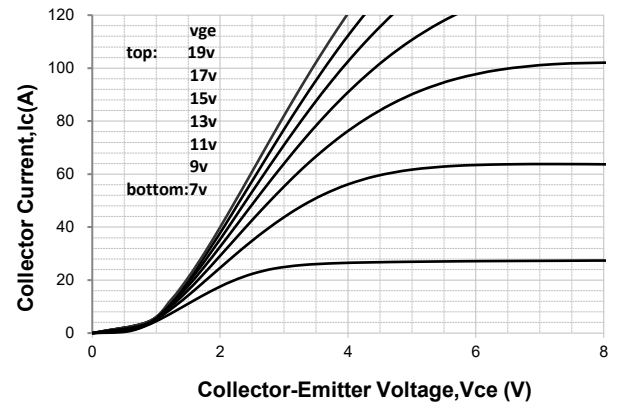


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

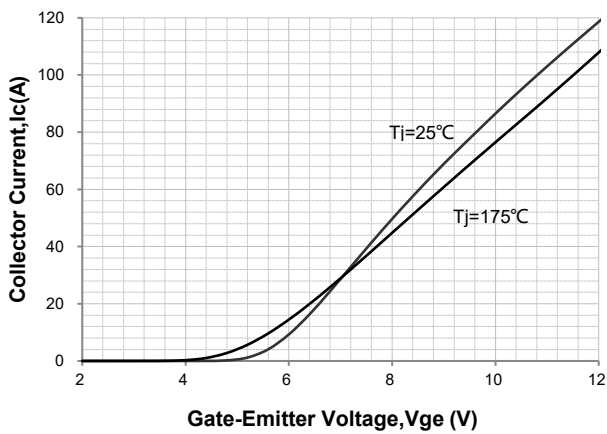
Output Characteristics (25°C)



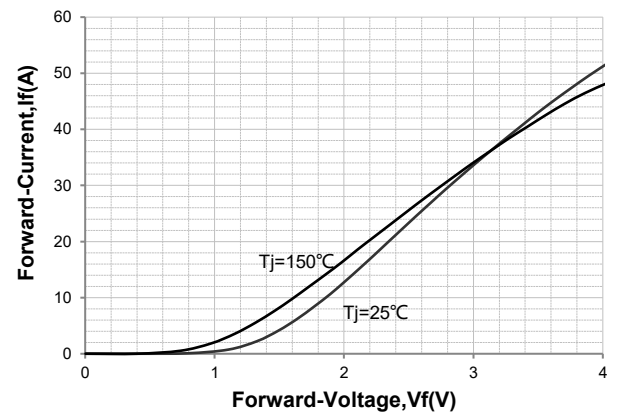
Output Characteristics (150°C)



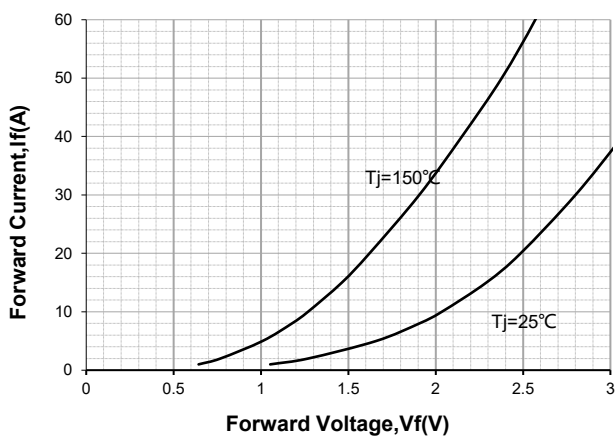
Transfer Characteristics



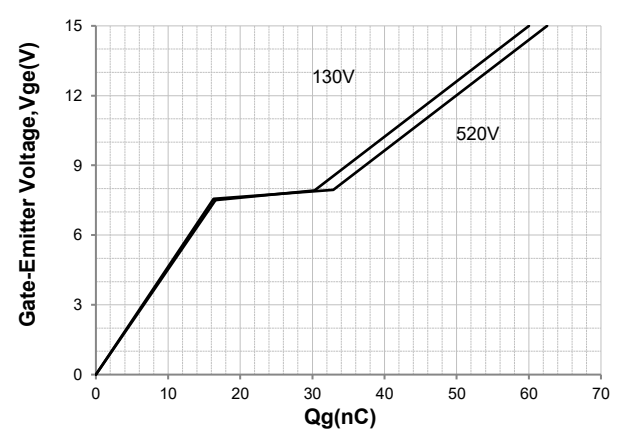
IF vs. VF(FRD1)

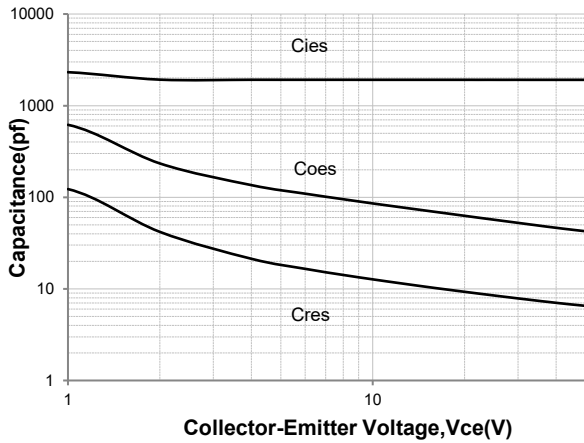
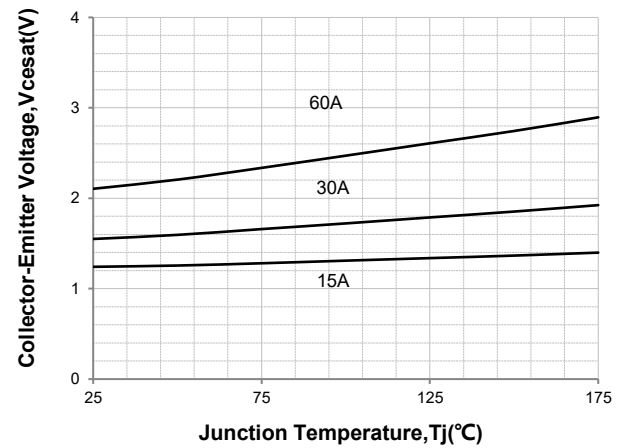
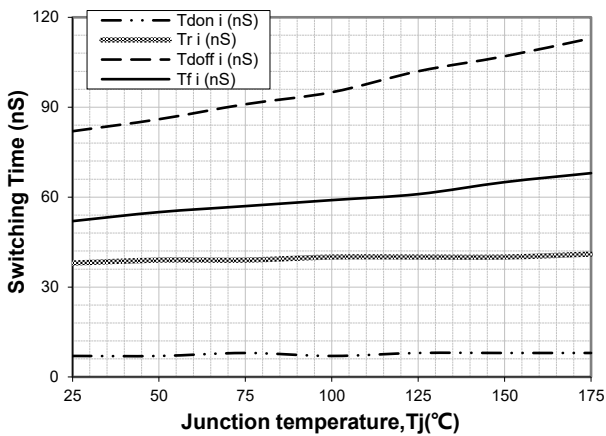
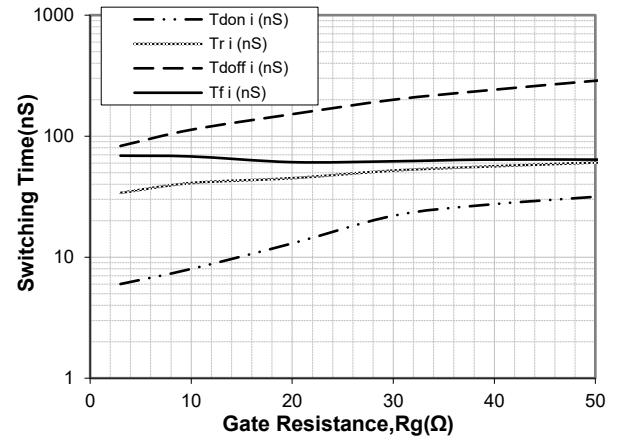
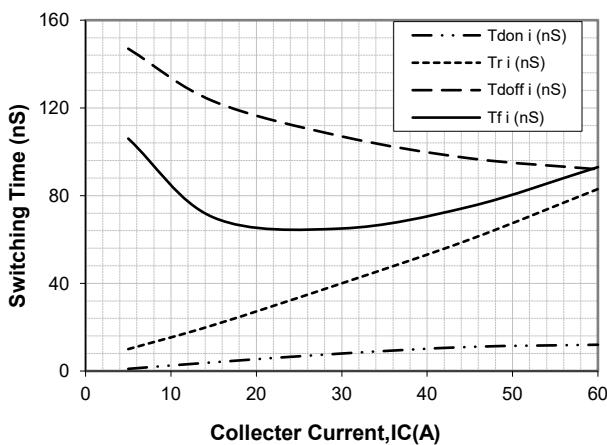
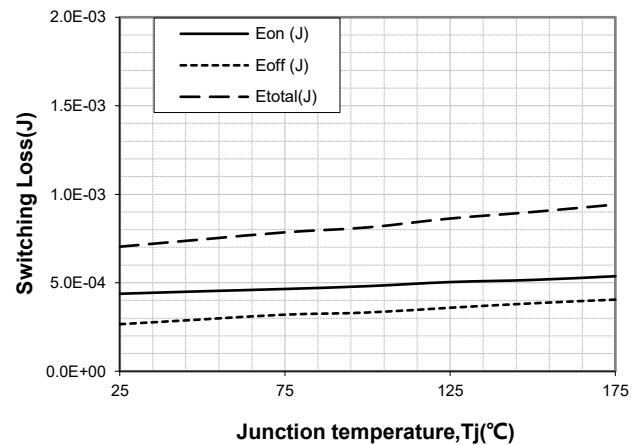


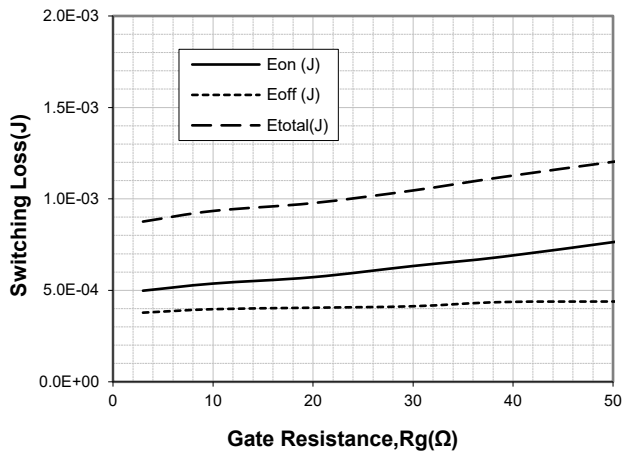
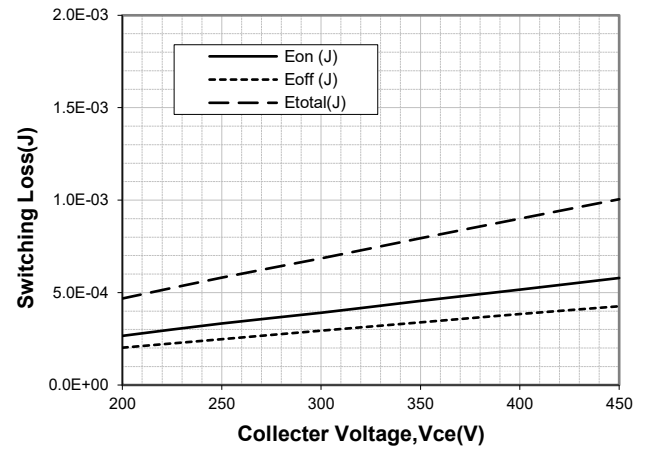
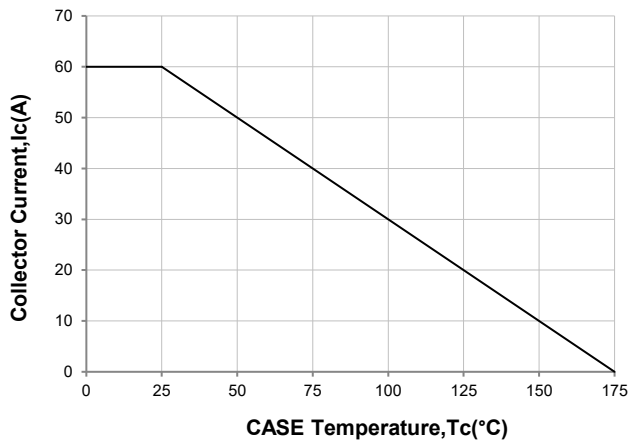
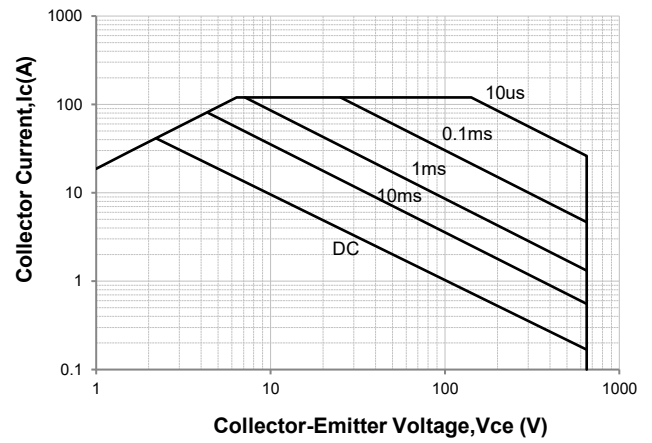
IF vs. VF(FRD2)

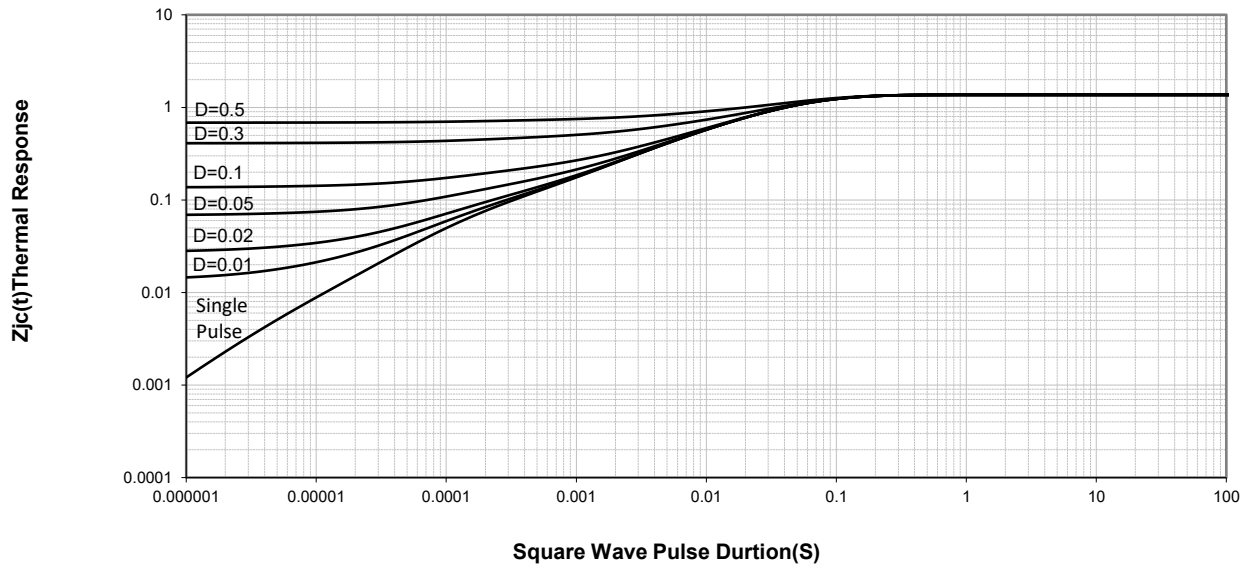
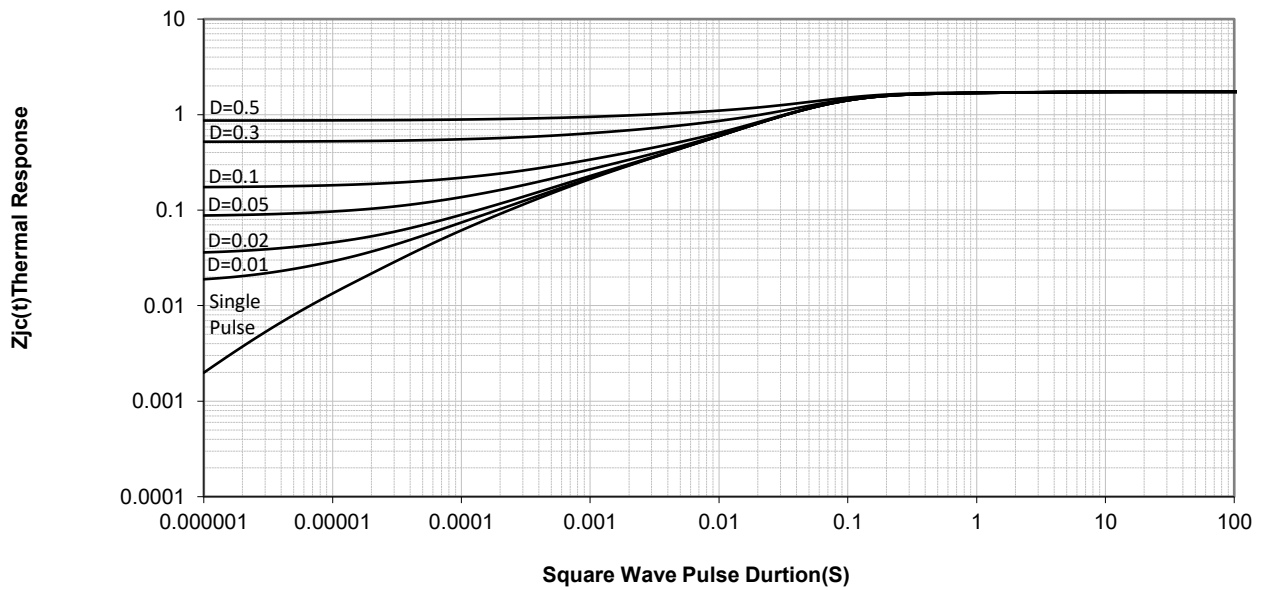


Gate Charge Characteristics

 $V_{GE} = 15\text{V}$, $I_c = 30\text{A}$ 

**Capacitance Characteristic** $V_{GE}=0V$, $f=1.0MHz$ **Vcesat vs. Tj** $V_{GE}=15V$, $I_c=15A$, $30A$, $60A$ **Switching Time vs. Tj** $V_{GE}=15V$, $V_{CE}=400V$, $I_c=30A$, $R_G=10\Omega$ **Switching Time vs. Rg(150°C)** $V_{GE}=15V$, $V_{CE}=400V$, $I_c=30A$ **Switching Time vs. Ic(150°C)** $V_{CE}=400V$, $V_{GE}=15V$, $R_G=10\Omega$ **Switching Loss vs. Tj** $V_{GE}=15V$, $V_{CE}=400V$, $I_c=30A$, $R_G=10\Omega$ 

**Switching Loss vs. $R_g(150^{\circ}\text{C})$** $V_{GE}=15\text{V}$, $V_{CE}=400\text{V}$, $I_c=30\text{A}$ **Switching Loss vs. $V_{CE}(150^{\circ}\text{C})$** $V_{GE}=15\text{V}$, $I_c=30\text{A}$, $R_g=10\Omega$ **Collector Current vs. Case temperature****Safe Operating Area** $V_{GE}=15\text{V}$ 

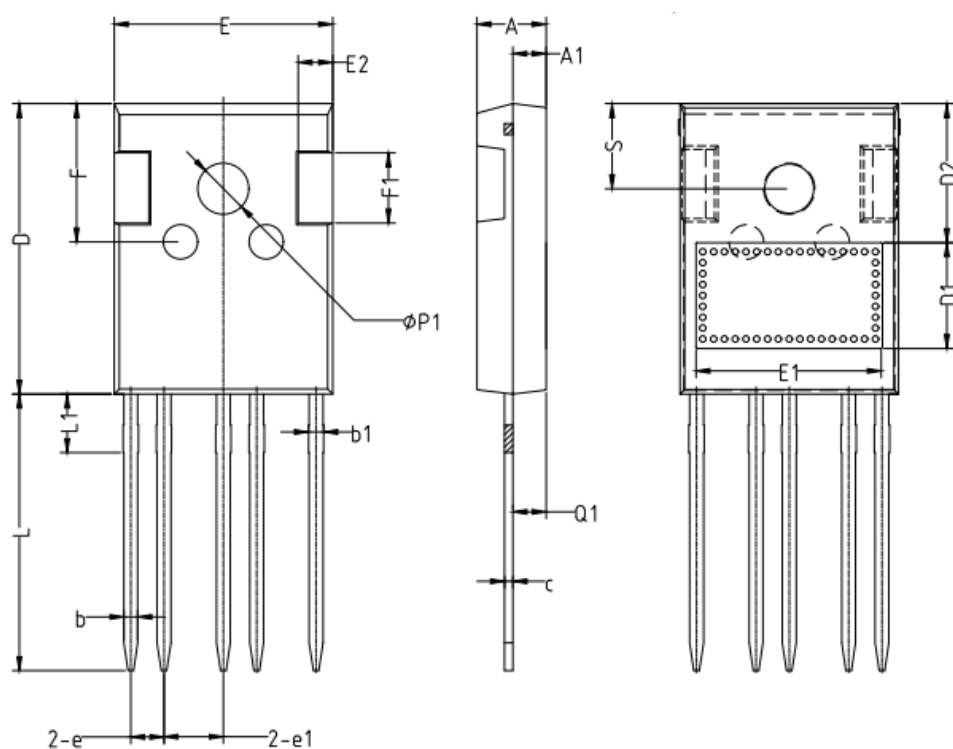
**Transient Thermal Impedance for IGBT****Transient Thermal Impedance for FRD2**



外形尺寸 PACKAGE MECHANICAL DATA

TO-247-5L

单位 Unit: mm



SYMBOL	MM		
	MIN	NOM	MAX
A	4.85	5.00	5.15
A1	2.25	2.40	2.55
b	0.90	1.00	1.10
b1	0.90	1.10	1.30
c	0.50	0.60	0.70
D	20.85	21.00	21.15
D1	7.45	7.65	7.85
D2	9.85	10.05	10.25
E	15.65	15.80	15.95
E1	13.20	13.40	13.60
E2	2.35	2.5	2.65
F	9.80	10.00	10.20
F1	4.85	5.00	5.15
e	2.30	2.40	2.50
e1	4.20	4.30	4.40
L	19.50	20.00	20.50
L1	4.10	4.25	4.40
Q1	2.25	2.40	2.55
S	6.05	6.15	6.25





注意事项

1. 吉林华微电子股份有限公司的产品销售分为直销和销售代理，无论哪种方式，订货时请与公司核实。
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3. 在电路设计时请不要超过器件的绝对最大额定值，否则会影响整机的可靠性。
4. 本说明书如有版本变更不另外告知。
5. 本产品背面部分为裸铜，需注意产品保存条件。

NOTE

1. Jilin Sino-microelectronics co., Ltd sales its product either through direct sales or sales agent , thus, for customers, when ordering , please check with our company.
2. We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.
3. Please do not exceed the absolute maximum ratings of the device when circuit designing.
4. Jilin Sino-microelectronics co., Ltd reserves the right to make changes in this. specification sheet and is subject to change without prior notice.
5. Required storage conditions must be observed due to the presence of bare copper on the back side of the product.

联系方式

吉林华微电子股份有限公司

公司地址：吉林省吉林市深圳街 99 号

邮编：132013

总机：86-432-64678411

传真：86-432-64665812

网址：www.hwdz.com.cn

CONTACT

JILIN SINO-MICROELECTRONICS CO., LTD.

ADD: No.99 Shenzhen Street, Jilin City, Jilin Province, China.

Post Code: 132013

Tel: 86-432-64678411

Fax: 86-432-64665812

Web Site: www.hwdz.com.cn

