



TT030U065FBA

主要参数 MAIN CHARACTERISTICS

I _c	30A
V _{CEs}	650V
V _{cesat-typ}	1.7V

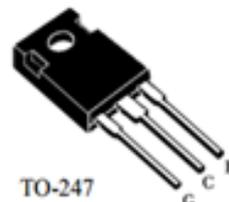
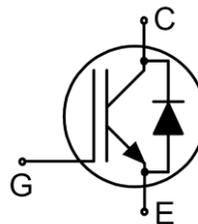
用途

- PFC

APPLICATIONS

- Power factor corrector

封装 Package



产品特性

- 低栅极电荷
- Trench FS 技术,
- RoHS 产品
- 快开关速度
- 低开关损耗
- V_{CE(sat)} 正温度系数

FEATURES

- Low gate charge
- Trench FS Technology,
- RoHS product
- Fast switching speed
- Low switching losses
- V_{CE(sat)} with positive temperature coefficient

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		
TT030U065FBA-GE-BR	TT030U065FBA	TO-247

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-Emmitter Voltage	V_{CES}	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
*二极管正向测试电流 Diode RMS forward current	I_F	30 ($T_C=25^\circ\text{C}$)	A
		15 ($T_C=100^\circ\text{C}$)	A
二极管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}	60	A
最高栅极发射极电压 Gate-Emmitter Voltage	V_{GES}	± 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_{GES}	± 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	P_D $T_C=25^\circ\text{C}$	319	W
	P_D $T_C=100^\circ\text{C}$	159	
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-Emmitter 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}	$V_{CE}=650V, V_{GE}=0V, T_{vj}=25^\circ C$	-	-	50	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	4.5	5.5	V
饱和压降 Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=30A$ $T_{vj}=25^\circ C$ $T_{vj}=150^\circ C$	- -	1.7 2.1	2.1 -	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V$ $V_{GE}=0V$ $f=1.0MHz$	-	955	-	pF
输出电容 Output capacitance	C_{oes}		-	107	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	33	-	pF
栅极电荷总量 Total Gate Charge	Q_g	$V_{CC}=520V, I_C=30A, V_{GE}=15V$	-	62	-	nC
栅极-反射极 Gate to emitter charge	Q_{ge}		-	9.5	-	
栅极-集电极 Gate to collector charge	Q_{gc}		-	33	-	



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		-	70	-	ns
开通损耗 Turn-On energy	E_{on}		-	0.45	-	mJ
关断损耗 Turn-off energy	E_{off}		-	0.55	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	1.0	-	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		-	130	-	ns
开通损耗 Turn-On energy	E_{on}		-	0.52	-	mJ
关断损耗 Turn-off energy	E_{off}		-	0.79	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	1.31	-	mJ

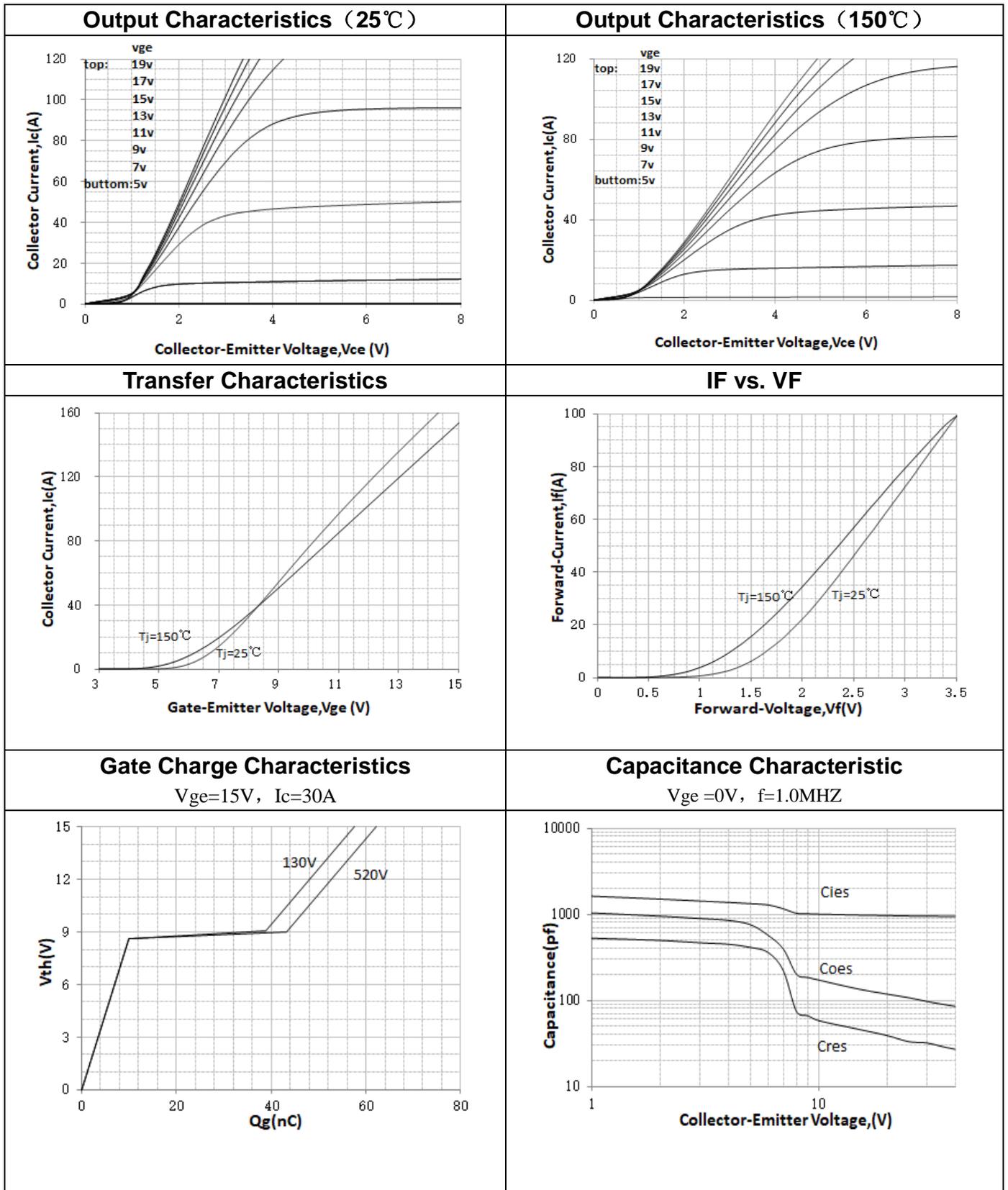
反并联二极管特性及最大额定值 Anti-Parallel Diode Characteristics and Maximum Ratings

正向压降 Diode Forward Voltage	V_F	$I_F=15A, T_{vj}=25^\circ C$	-	1.8	2.2	V
反向恢复时间 Reverse recovery time	t_{rr}	$V_{GE}=0V, V_R=400V, I_F=15A$ $dI_F/dt=200A/\mu s$ $T_{vj}=25^\circ C$	-	213	-	ns
反向恢复电荷 Diode Reverse recovery charge	Q_{rr}		-	312	-	nC
反向恢复电流 Diode Reverse recovery Current	I_{rrm}		-	2.5	-	A
反向恢复时间 Diode Reverse recovery time	t_{rr}	$V_{GE}=0V, V_R=400V, I_F=15A$ $dI_F/dt=200A/\mu s$ $T_{vj}=150^\circ C$	-	285	-	ns
反向恢复电荷 Diode Reverse recovery charge	Q_{rr}		-	1090	-	nC
反向恢复电流 Diode Reverse recovery Current	I_{rrm}		-	5.4	-	A

项 目 Parameter	符 号 Symbol	MAX	单 位 Unit
结到管壳的热阻 Junction to Case IGBT	$R_{th(j-c)}$	0.47	$^\circ C/W$
结到管壳的热阻 Junction to Case Diode	$R_{th(j-c)}$	2.0	$^\circ C/W$
结到环境的热阻 Junction to Ambient	$R_{th(j-A)}$	40	$^\circ C/W$



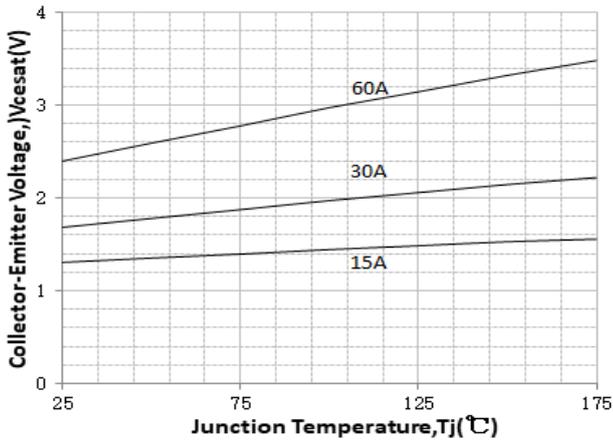
特征曲线 ELECTRICAL CHARACTERISTICS (curves)





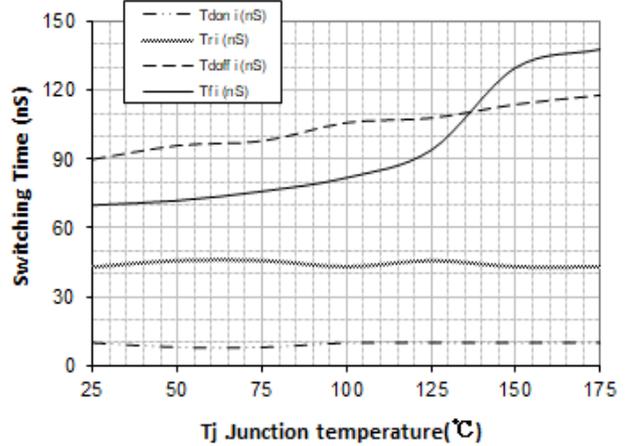
Vcesat vs. Tj

Vge=15V, Ic=15A, 30A, 60A



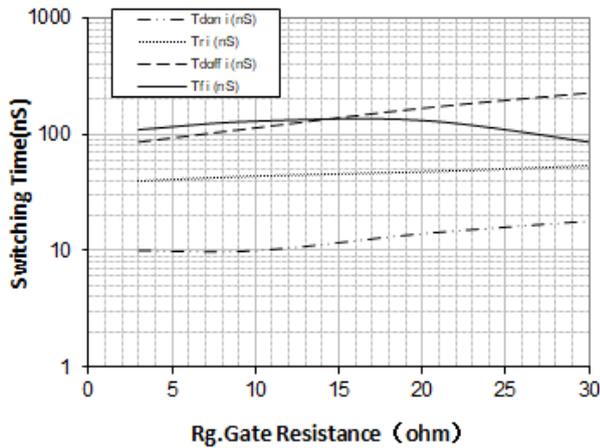
Switching Time vs. Tj

Vge=15V, Vce=400V, Ic=30A, Rg=10Ω



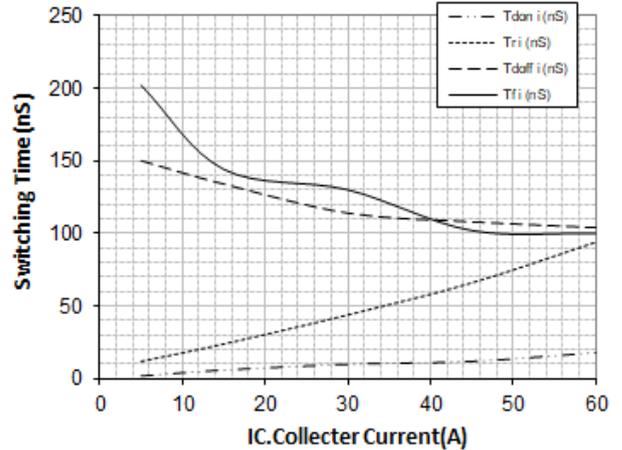
Switching Time vs. Rg(150°C)

Vge=15V, Vce=400V, Ic=30A



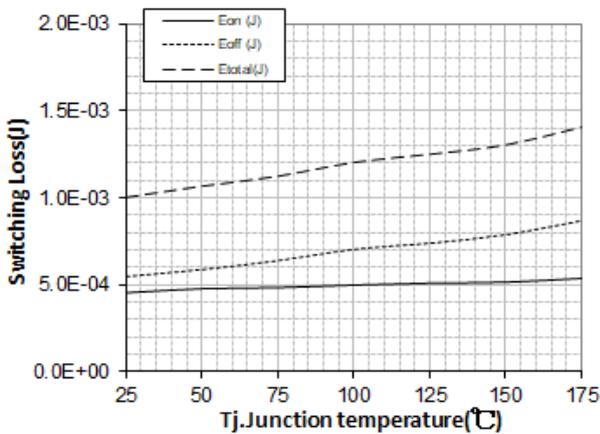
Switching Time vs. Ic(150°C)

Vce=400V, Vge=15V, Rg=10Ω



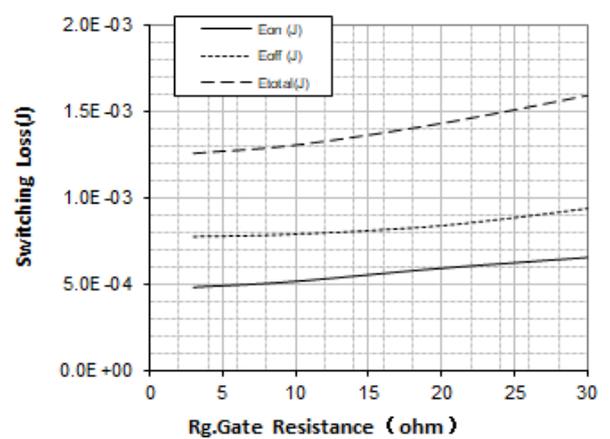
Switching Loss vs. Tj

Vge=15V, Vce=400V, Ic=30A, Rg=10Ω



Switching Loss vs. Rg(150°C)

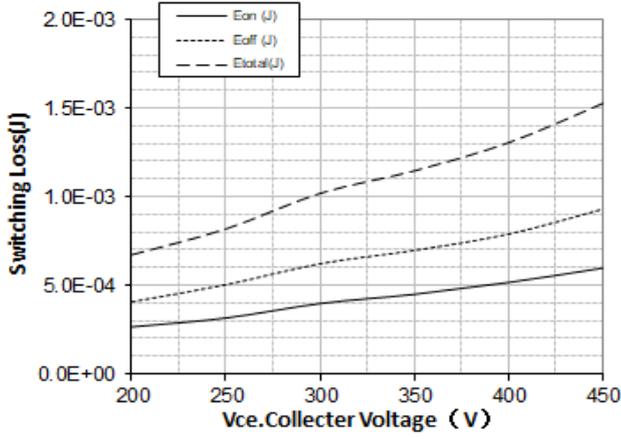
Vge=15V, Vce=400V, Ic=30A



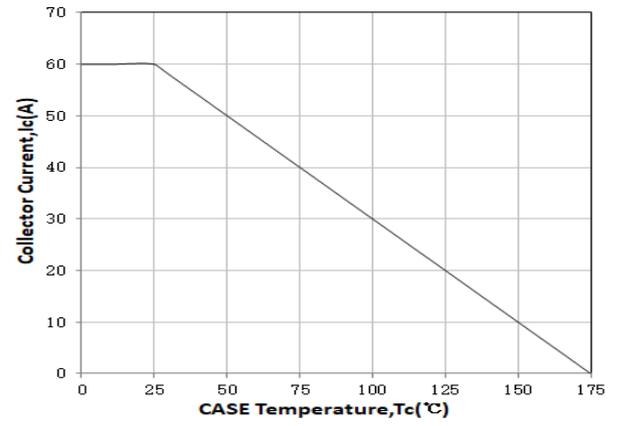


Switching Loss vs. VCE(150°C)

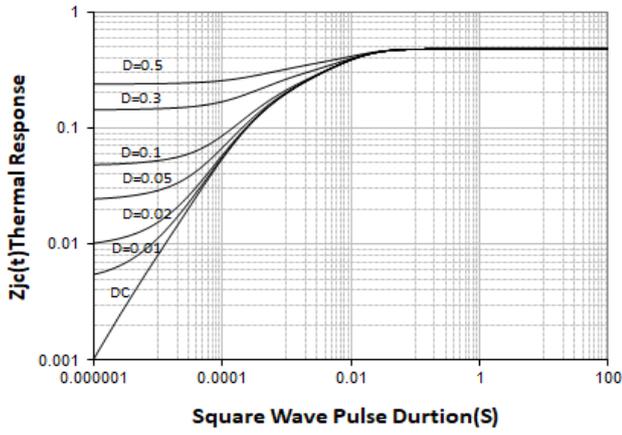
Vge=15V, Ic=30A, Rg=10Ω



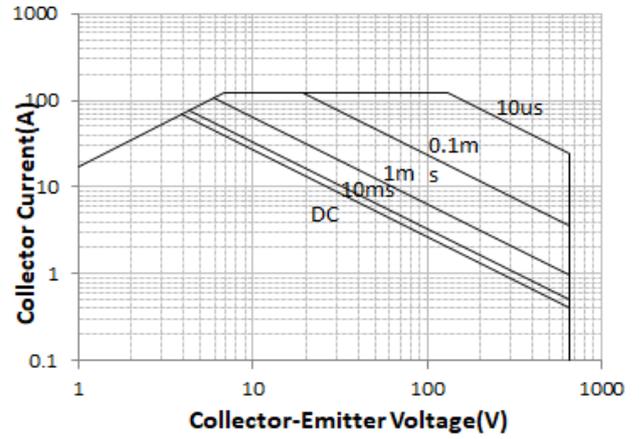
Collector current vs. case temperature



Transient Thermal Impedance for IGBT



Forward Bias Safe Operating Area

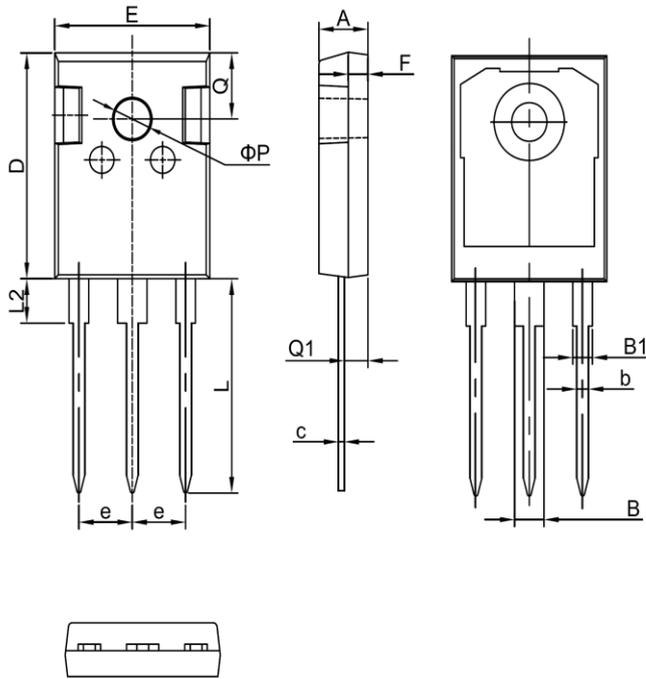




外形尺寸 PACKAGE MECHANICAL DATA

TO-247

单位 Unit: mm



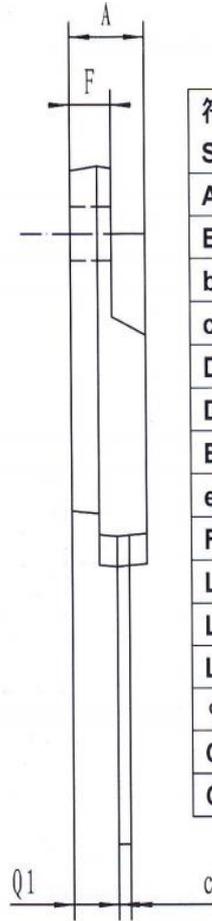
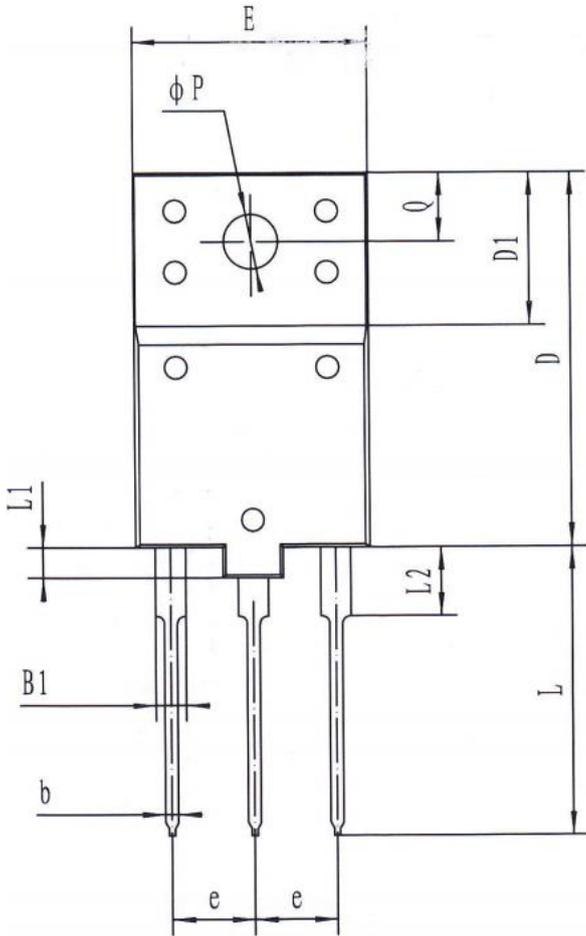
符号 symbol	MIN	MAX
A	4.90	5.10
B	2.95	3.35
B1	1.95	2.35
b	1.15	1.35
c	0.50	0.70
D	20.90	21.10
E	15.70	15.90
e	5.34	5.54
F	1.90	2.10
L	19.40	20.40
L2	4.03	4.23
Q	6.00	6.40
Q1	2.30	2.50
P	3.50	3.70





TO-3PH

单位 Unit: mm



符号 Symbol	Min	Max
A	5.2	5.8
B1	1.8	2.2
b	0.75	1.05
c	0.8	1.1
D	24.0	25.0
D1	9.8	10.2
E	15.0	16.0
e	5.45 (typ)	
F	2.7	3.3
L	18.5	19.5
L1	1.8	2.2
L2	4.3	4.7
ϕP	3.4	3.8
Q	4.3	4.7
Q1	3.1	3.5



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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