



# TT075U065GQ

## 主要参数 MAIN CHARACTERISTICS

I <sub>c</sub>	75 A
V <sub>CE</sub>	650V
V <sub>CEsat-typ</sub> (V <sub>ge</sub> =15V)	1.7V

### 用途

- 充电桩

### APPLICATIONS

- EV-Charging

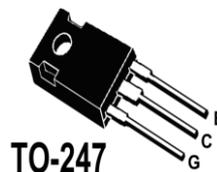
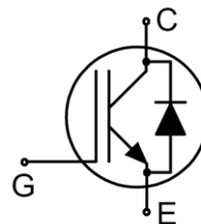
### 产品特性

- 第七代 Trench FS 技术
- 低栅极电荷
- 低开关损耗
- 快开关速度
- RoHS 产品

### FEATURES

- Gen 7 Trench FS technology
- Low gate charge
- Low switching losses
- Fast switching speed
- RoHS product

## 封装 Package



## 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		
TT075U065GQ-GE-BR	TT075U065GQ	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-emitter voltage	$V_{CE}$	650	V
*连续集电极电流 Collector current-continuous	$I_C$ $T_c=25^\circ\text{C}$	90	A
	$I_C$ $T_c=100^\circ\text{C}$	75	A
最大脉冲集电极极电流 (注1) Collector current – pulse (note 1)	$I_{CM}$	300	A
二极管正向测试电流 Diode RMS forward current	$I_F$ $T_c=25^\circ\text{C}$	90	A
	$I_F$ $T_c=100^\circ\text{C}$	75	A
二极管正向脉冲电流 Diode pulse current	$I_{FSM}$	300	A
最高栅极发射极电压 Gate-emitter voltage	$V_{GE}$	$\pm 20$	V
最高瞬态栅极发射极电压 Transient gate-emitter voltage( $t_p \leq 10\mu\text{s}$ )	$V_{GE}$	$\pm 30$	V
安全工作区 Turn-off safe area	-	300	A
耗散功率 Power dissipation	$P_D$ $T_c=25^\circ\text{C}$	428	W
工作结温 Operating junction temperature range	$T_{vj}$	$-40 \sim +175$	$^\circ\text{C}$
存储温度 Storage temperature	$T_{STG}$	$-55 \sim +150$	$^\circ\text{C}$
引线焊接温度 Soldering temperature, wave soldering 1.6mm from case for 10s	$T_L$	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

注释:

1: 脉冲宽度由最高结温限制

Notes:

1: Pulse width limited by maximum junction temperature



## 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
<b>关态特性 Off –Characteristics</b>						
集电极-发射极击穿电压 Collector-emitter voltage	$BV_{CES}$	$I_C=1mA, V_{GE}=0V, T_{vj}=25^{\circ}C$	650	-	-	V
零栅压下集电极漏电流 Zero gate voltage collector current	$I_{CES}$	$V_{CE}=650V, V_{GE}=0V, T_{vj}=25^{\circ}C$	-	-	75	$\mu A$
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
<b>通态特性 On-Characteristics</b>						
阈值电压 Gate threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C=0.75mA, T_{vj}=25^{\circ}C$	3.2	4.0	4.8	V
饱和压降 Collector-emitter saturation voltage	$V_{CESAT}$	$V_{GE}=15V, I_C=75A, T_{vj}=25^{\circ}C$	-	1.7	2.1	V
		$V_{GE}=15V, I_C=75A, T_{vj}=175^{\circ}C$	-	2.1	-	V
<b>动态特性 Dynamic Characteristics</b>						
输入电容 Input capacitance	$C_{ies}$	$V_{CE}=25V, V_{GE}=0V, f=1.0MHz$	-	2785	-	pF
输出电容 Output capacitance	$C_{oes}$		-	248	-	pF
反向传输电容 Reverse transfer capacitance	$C_{res}$		-	13	-	pF
栅极电荷总量 Total gate charge	$Q_G$	$V_{CC}=520V, I_C=75A, V_{GE}=15V$	-	97	-	nC
栅极-发射极 Gate to emitter charge	$Q_{GE}$		-	23	-	
栅极-集电极 Gate to collector charge	$Q_{GC}$		-	25	-	

项 目 Parameter	符 号 Symbol	Max	单 位 Unit
结到管壳的热阻 Thermal Resistance, Junction to case IGBT	$R_{th(j-c)}$	0.35	$^{\circ}C/W$
结到管壳的热阻 Thermal Resistance, Junction to case Diode	$R_{th(j-c)}$	0.42	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction to ambient	$R_{th(j-a)}$	40	$^{\circ}C/W$



## 电特性 ELECTRICAL CHARACTERISTICS

## 开关特性 Switching Characteristics

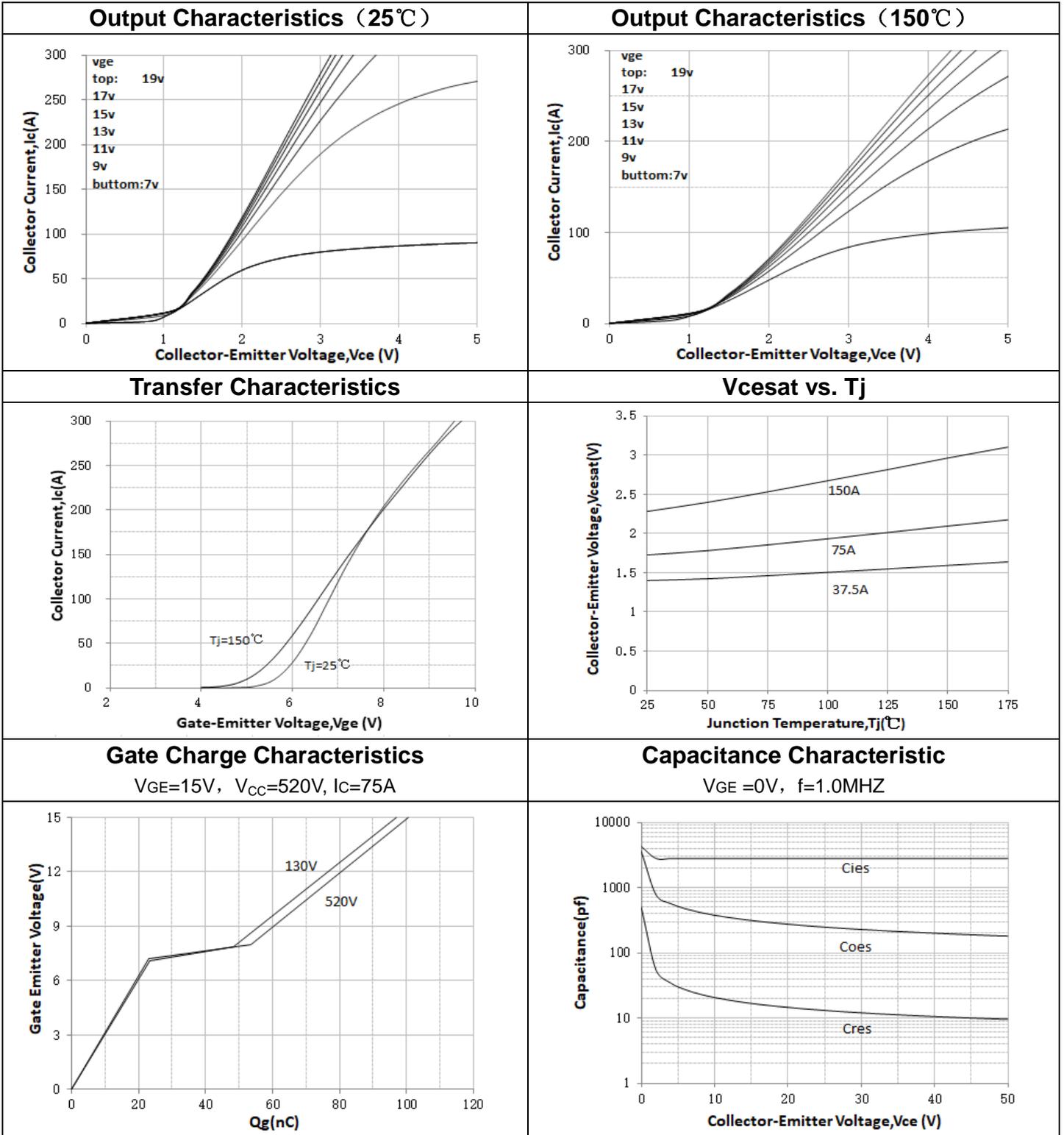
项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
开启延迟时间 Turn-on delay time	$t_d(\text{on})$	$V_{CC}=400V, I_c=75A, R_G=8\Omega$ $V_{GE}=15V, T_{vj}=25^\circ\text{C}$	-	26	-	ns
上升时间 Turn-on rise time	$t_r$		-	81	-	ns
关断延迟时间 Turn-off delay time	$t_d(\text{off})$		-	121	-	ns
下降时间 Turn-off fall time	$t_f$		-	111	-	ns
开通损耗 Turn-on energy	Eon		-	1.77	-	mJ
关断损耗 Turn-off energy	Eoff		-	1.37	-	mJ
总开关损耗 Total switching energy	Etot		-	3.14	-	mJ
开启延迟时间 Turn-on delay time	$t_d(\text{on})$	$V_{CC}=400V, I_c=75A, R_G=8\Omega$ $V_{GE}=15V, T_{vj}=150^\circ\text{C}$	-	24	-	ns
上升时间 Turn-on rise time	$t_r$		-	81	-	ns
关断延迟时间 Turn-off delay time	$t_d(\text{off})$		-	139	-	ns
下降时间 Turn-off fall time	$t_f$		-	124	-	ns
开通损耗 Turn-on energy	Eon		-	1.91	-	mJ
关断损耗 Turn-off energy	Eoff		-	1.45	-	mJ
总开关损耗 Total switching energy	Etot		-	3.36	-	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	$V_F$	$V_{GE}=0V, I_F=75A, T_{vj}=25^\circ\text{C}$	-	1.5	1.9	V
		$V_{GE}=0V, I_F=75A, T_{vj}=150^\circ\text{C}$	-	1.3	-	V
反向恢复时间 Diode reverse recovery time	$t_{rr}$	$V_R=400V, I_F=75A$ $dl_F/dt=200A/\mu s$ $T_{vj}=25^\circ\text{C}$	-	227	-	ns
反向恢复电荷 Diode reverse recovery charge	$Q_{rr}$		-	810	-	nC
反向恢复电流 Diode reverse recovery current	$I_{rrm}$		-	7.3	-	A
反向恢复时间 Diode reverse recovery time	$t_{rr}$	$V_{GE}=0V, V_R=400V, I_F=30A$ $dl_F/dt=200A/\mu s$ $T_{vj}=150^\circ\text{C}$	-	295	-	ns
反向恢复电荷 Diode reverse recovery charge	$Q_{rr}$		-	3.67	-	uC
反向恢复电流 Diode reverse recovery current	$I_{rrm}$		-	19	-	A



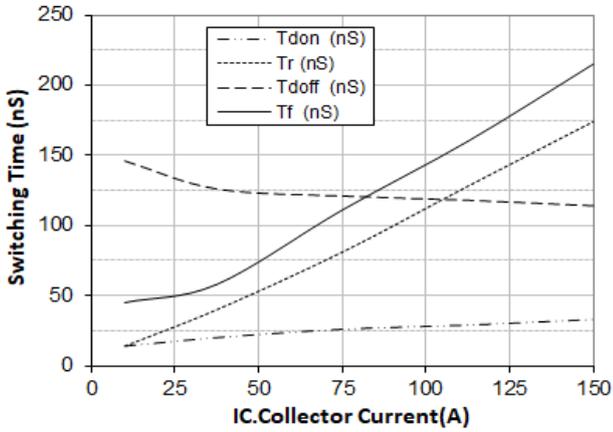
特征曲线 ELECTRICAL CHARACTERISTICS (curves)





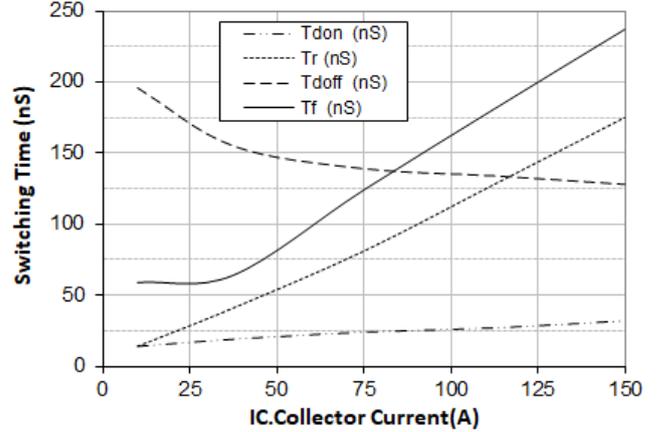
**Switching Time vs. Ic(25°C)**

VCE=400V, VGE=15V, RG=8Ω



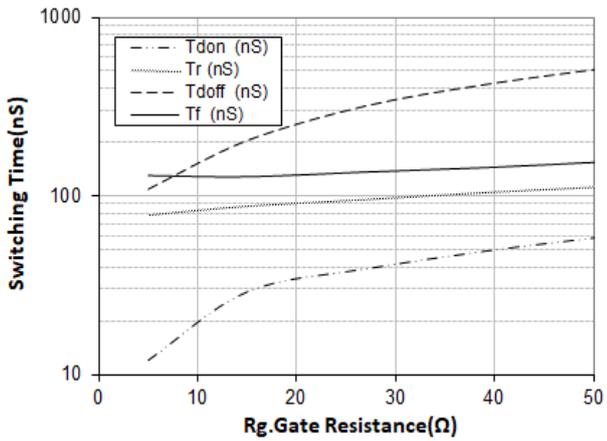
**Switching Time vs. Ic(175°C)**

VCE=400V, VGE=15V, RG=8Ω



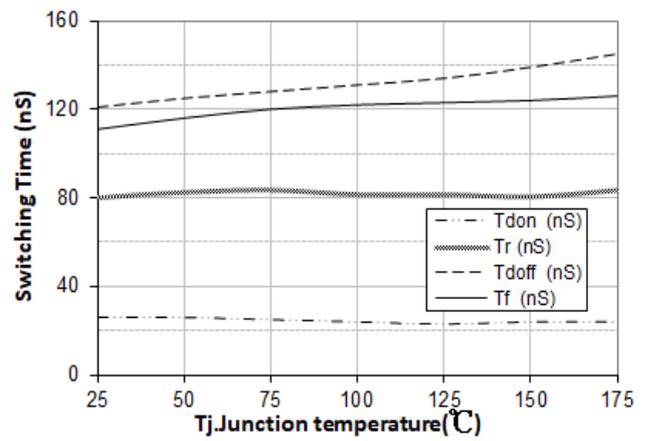
**Switching Time vs. Rg(150°C)**

VGE=15V, VCE=400V, Ic=75A



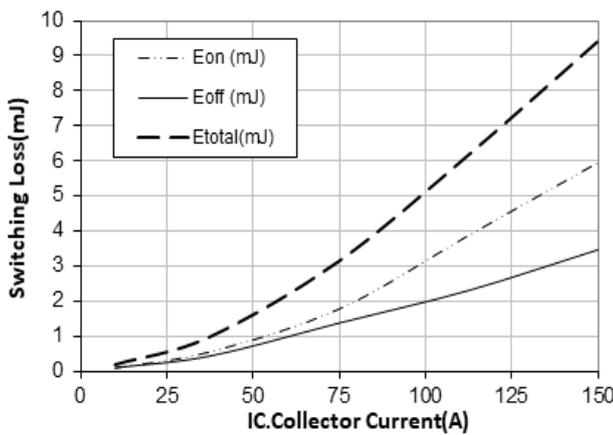
**Switching Time vs. Tj**

VGE=15V, VCE=400V, Ic=75A, RG=8Ω



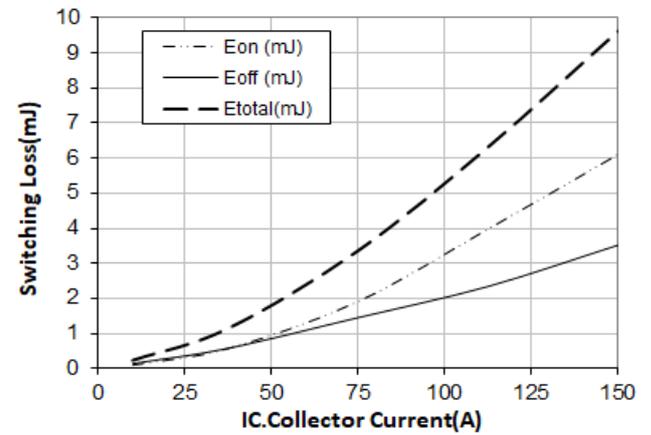
**Switching Loss vs. Ic(25°C)**

VGE=15V, VCE=400V, RG=8Ω



**Switching Loss vs. Ic(150°C)**

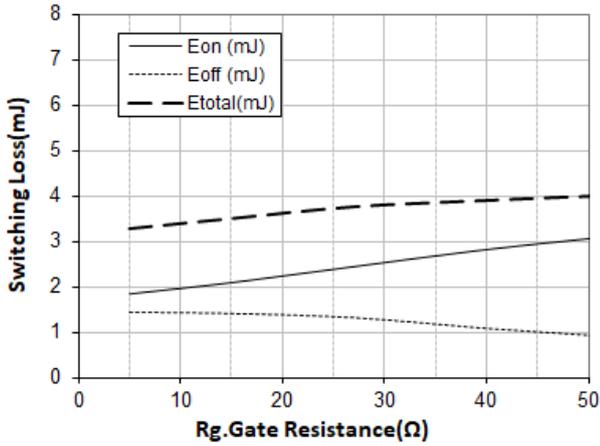
VGE=15V, VCE=400V, RG=8Ω





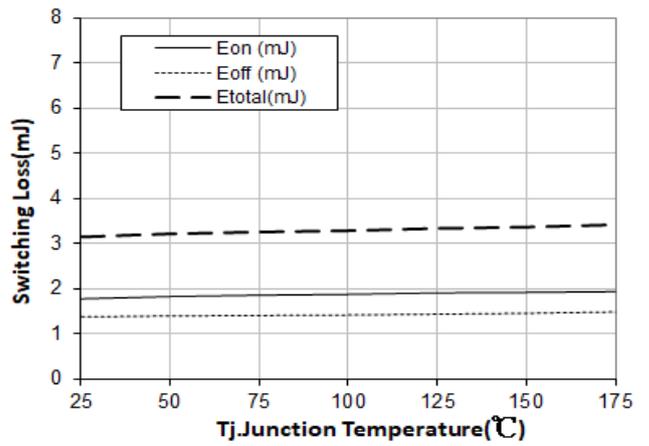
Switching Loss vs. Rg(150°C)

VGE=15V, VCE=400V, IC=75A



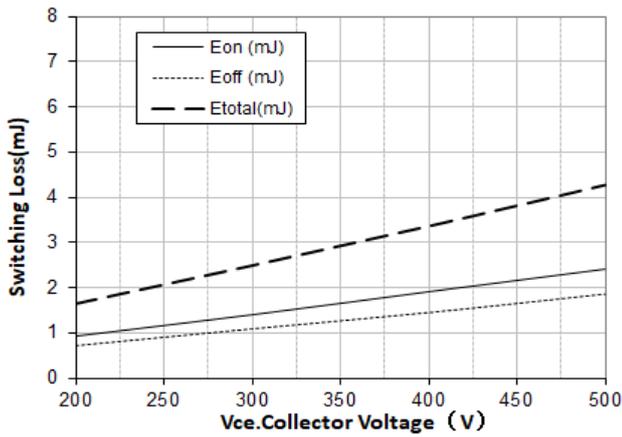
Switching Loss vs. Tj

VGE=15V, VCE=400V, IC=75A, RG=8Ω



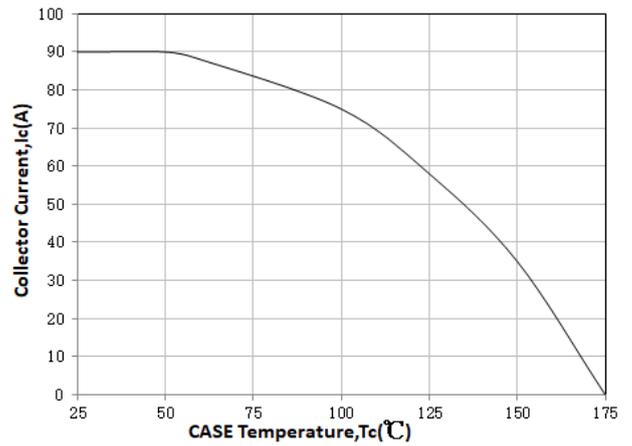
Switching Loss vs. Vce(150°C)

VGE=15V, VCE=400V, RG=8Ω

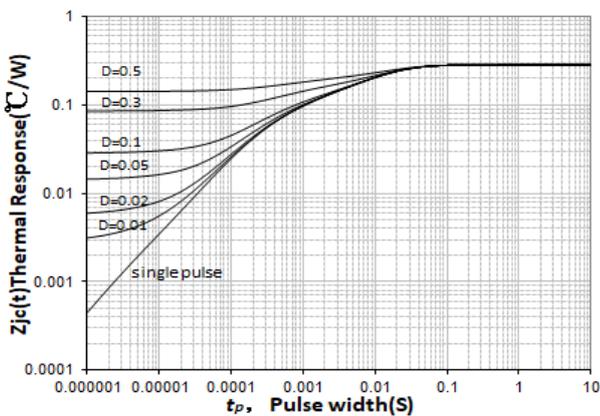


Collector current vs. case temperature

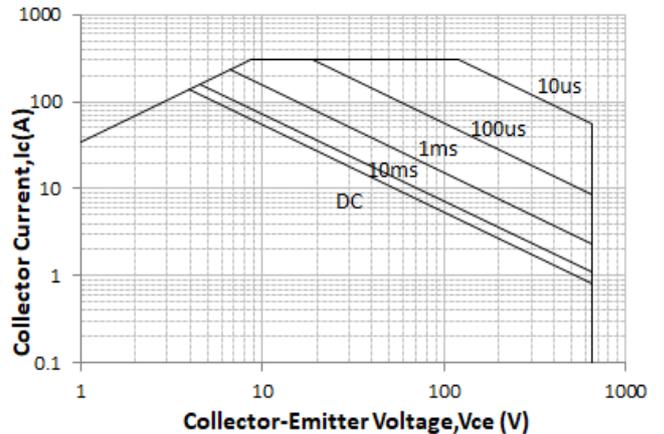
VGE≥15V, Tvj≤175°C



IGBT Transient Thermal Impedance



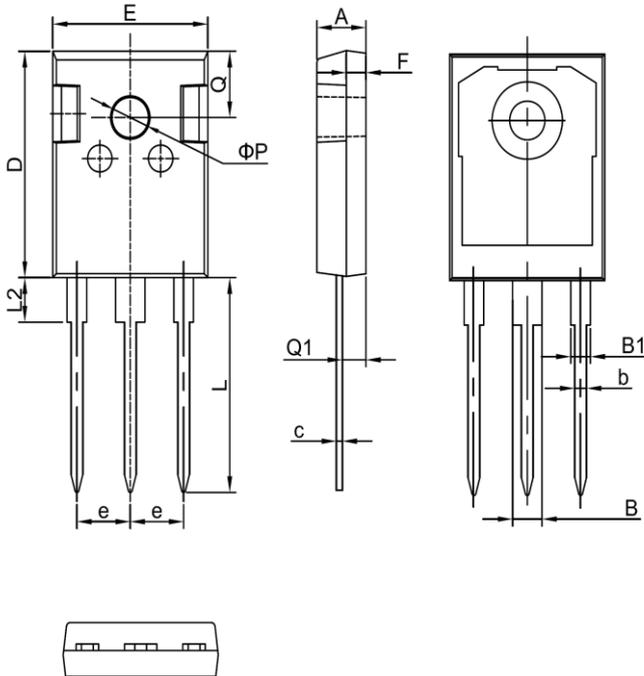
Forward Bias SOA





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



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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](http://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](http://www.hwdz.com.cn)