



# TT030N065EI

## 主要参数 MAIN CHARACTERISTICS

$I_c$	30A
$V_{CES}$	650V
$V_{CE(sat)}$ -TYP	1.7V

### 用途

- 白电领域

### APPLICATIONS

- White electricity field

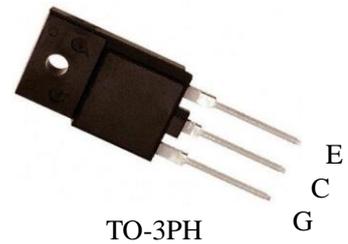
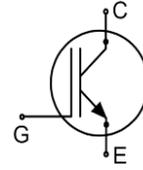
### 产品特性

- 低栅极电荷
- Trench FS 技术
- RoHS 产品
- 低  $V_{CEsat}$

### FEATURES

- Low gate charge
- Trench FS Technology
- RoHS product
- Low  $V_{CEsat}$

## 封装 Package



TO-3PH

## 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		
TT030N065EI-GA-BR	TT030N065EI	TO-3PH

绝对最大额定值 ABSOLUTE RATINGS (T<sub>C</sub>=25℃)

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 <sub>CE</sub>	650	V
*连续集电极电流 Collector current-continuous T <sub>C</sub> =25℃ T <sub>C</sub> =100℃	I <sub>C</sub>	60 30	A
最大脉冲集电极极电流 Collector current – pulse (pw<1ms, duty cycle ≤0.01)	I <sub>CM</sub>	120	A
栅极发射极电压 Gate-emitter voltage 瞬态栅极发射极电压 Transient gate-emitter voltage (pw≤10us, duty cycle <0.01)	V <sub>GE</sub>	±20 ±30	V
安全工作区 Turn-off safe area	-	120	A
耗散功率 Power dissipation T <sub>C</sub> =25℃ T <sub>C</sub> =100℃	P <sub>D</sub>	71 35	W
存储温度 Storage temperature range	T <sub>STG</sub>	-55~+150	℃
结温 Junction temperature range	T <sub>VJ</sub>	-40~+175	℃
引线最高焊接温度 Maximum lead temperature for soldering Purposes	T <sub>L</sub>	300	℃
绝缘耐压 Isolation voltage	V <sub>ISO</sub>	1500	V

\*连续集电极电流由最高结温限制

\*Collector current 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	$BV_{CES}$	$I_C=250\mu A, V_{GE}=0V$	650	-	-	V
零栅压下集电极漏电流 Zero gate voltage collector current	$I_{CES}$	$V_{CE}=650V, V_{GE}=0V, T_C=25^\circ C$	-	-	100	$\mu A$
		$V_{CE}=650V, V_{GE}=0V, T_C=175^\circ C$	-	1.0	-	mA
正向栅极体漏电流 Gate-body leakage current,forward	$I_{GESF}$	$V_{CE}=0V, V_{GE}=20V$	-	-	200	nA
反向栅极体漏电流 Gate-body leakage current,reverse	$I_{GESR}$	$V_{CE}=0V, V_{GE}=-20V$	-	-	-200	nA
<b>通态特性 On-Characteristics</b>						
阈值电压 Gate threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=250\mu A$	4.5	-	6.5	V
饱和压降 Collector-emitter saturation voltage	$V_{CESAT}$	$V_{GE}=15V, I_C=30A, T_C=25^\circ C$	-	1.7	2.1	V
		$V_{GE}=15V, I_C=30A, T_C=125^\circ C$	-	1.8	-	V
		$V_{GE}=15V, I_C=30A, T_C=175^\circ C$	-	2.0	-	V
<b>动态特性 Dynamic Characteristics</b>						
输入电容 Input capacitance	$C_{ies}$	$V_{CE}=25V, V_{GE}=0V, f=1.0MHz$	-	1830	-	pF
输出电容 Output capacitance	$C_{oes}$		-	160	-	pF
反向传输电容 Reverse transfer capacitance	$C_{res}$		-	50.3	-	pF
栅极电荷总量 Total gate charge	$Q_g$	$V_{CC}=520V, I_C=30A, R_g=7.9\Omega, V_{GE}=15V, T_C=25^\circ C$	-	64.5	-	nC
栅极-发射极 Gate to emitter charge	$Q_{ge}$		-	18.1	-	
栅极-集电极 Gate to collector charge	$Q_{gc}$		-	23.7	-	
栅极电阻 Gate resistance	$R_g$	$f=1MHz, \text{open collector}$	-	1.1	-	$\Omega$
短路电流 Short current	$I_{sc}$	$V_{GE}=15V, V_{CE}=300V, t\leq 10\mu s$	-	150	-	A



**电特性 ELECTRICAL CHARACTERISTICS****开关特性 Switching Characteristics**

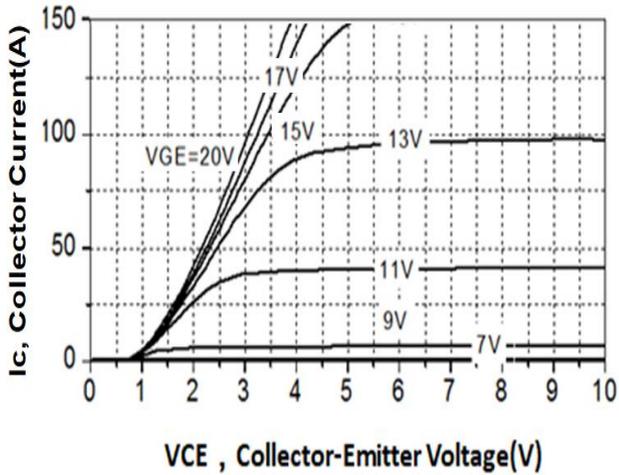
项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units	
开启延迟时间 Turn-on delay time	td(on)	V <sub>CC</sub> =400V, I <sub>C</sub> =30A, R <sub>g</sub> =7.9Ω V <sub>GE</sub> =15 V T <sub>C</sub> =25°C	-	27.0	-	ns	
上升时间 Turn-on rise time	tr		-	67.0	-	ns	
关断延迟时间 Turn-off delay time	td(off)		-	67.0	-	ns	
下降时间 Turn-off fall time	tf		-	44.0	-	ns	
开通损耗 Turn-on energy	E <sub>on</sub>		-	0.83	-	mJ	
关断损耗 Turn-off energy	E <sub>off</sub>		-	0.36	-	mJ	
总开关损耗 Total switching energy	E <sub>tot</sub>		-	1.19	-	mJ	
开启延迟时间 Turn-on delay time	td(on)		V <sub>CC</sub> =400V, I <sub>C</sub> =30A, R <sub>g</sub> =7.9Ω V <sub>GE</sub> =15 V T <sub>C</sub> =175°C	-	27.0	-	ns
上升时间 Turn-on rise time	tr			-	68.0	-	ns
关断延迟时间 Turn-off delay time	td(off)			-	90.0	-	ns
下降时间 Turn-off fall time	tf	-		59.0	-	ns	
开通损耗 Turn-on energy	E <sub>on</sub>			1.09		mJ	
关断损耗 Turn-off energy	E <sub>off</sub>			0.58		mJ	
总开关损耗 Total switching energy	E <sub>tot</sub>			1.67		mJ	
关断电压变化率 Turn-off dv/dt	dv/dt	V <sub>CC</sub> =400V, I <sub>C</sub> =30A, R <sub>g</sub> =10Ω V <sub>GE</sub> =15 V, T <sub>C</sub> =25°C		6140		V/us	

项 目 Parameter	符 号 Symbol	Typ	Max	单 位 Unit
IGBT 结到管壳的热阻 IGBT thermal resistance, Junction -case	R <sub>th(j-c)</sub>	1.86	2.1	°C/W

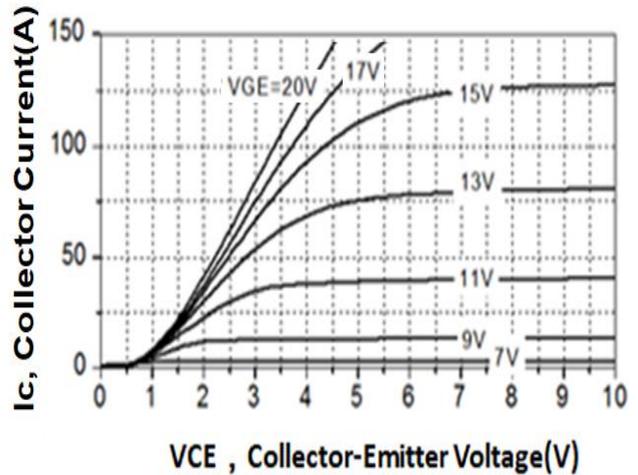


## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

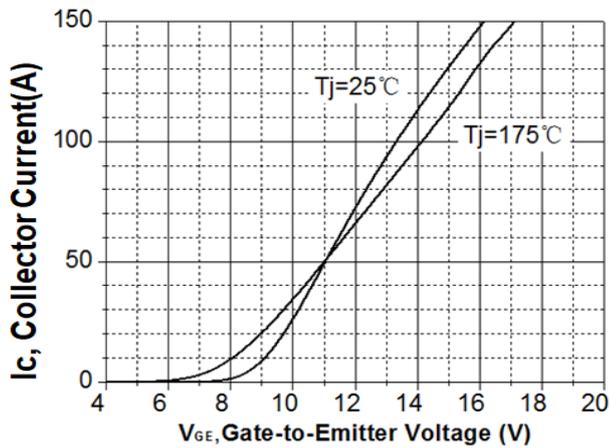
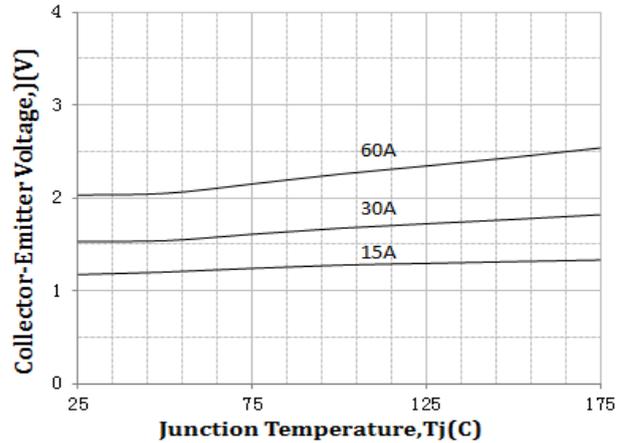
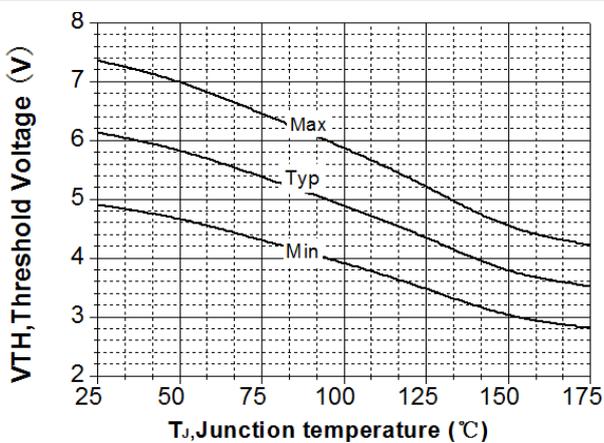
Output Characteristics (25°C)



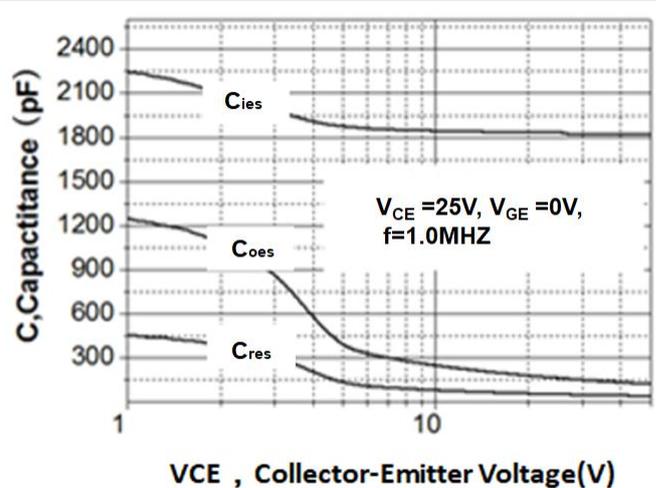
Output Characteristics (175°C)

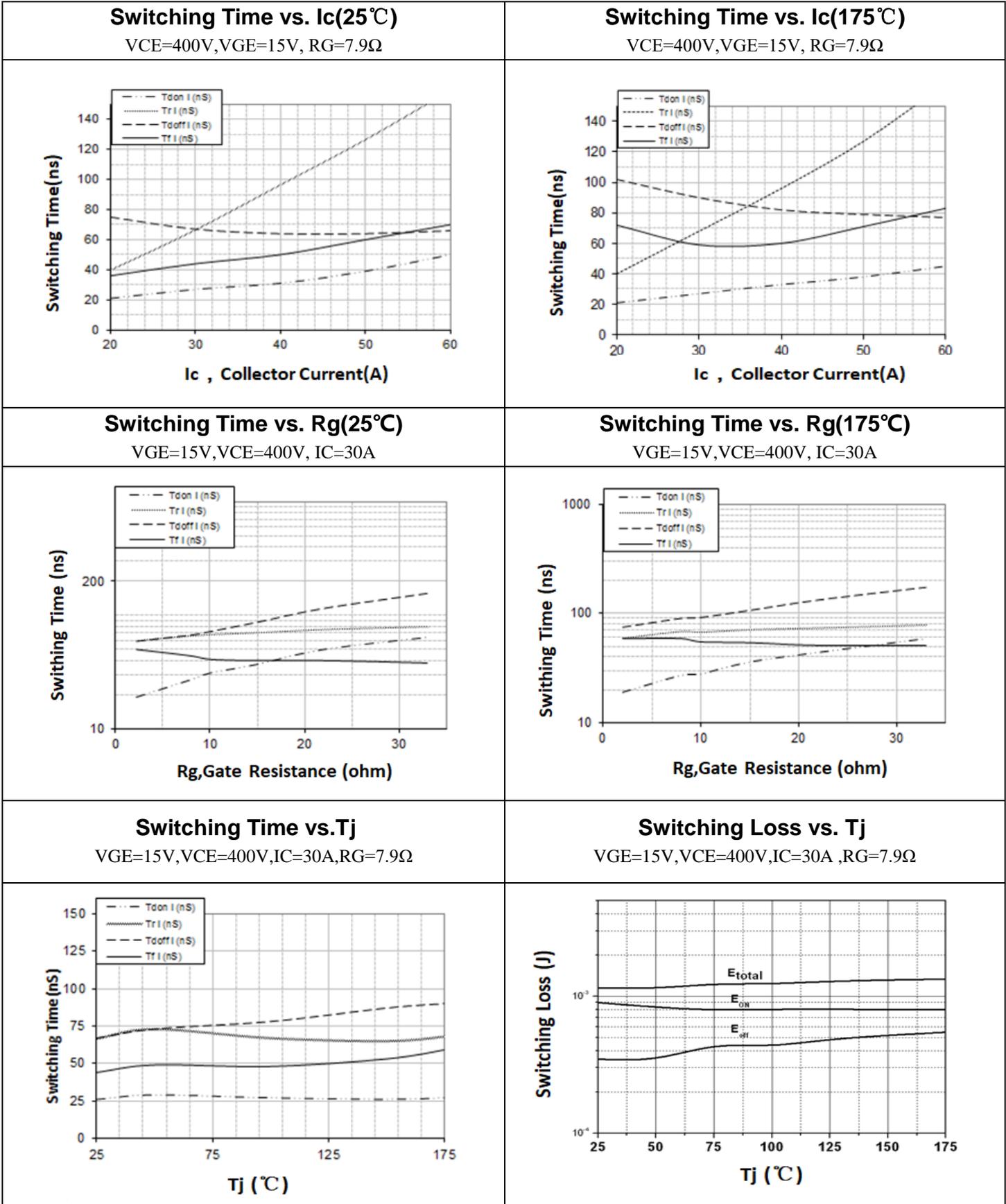


Transfer Characteristics

 $V_{ce} = 20\text{V}$  $V_{cesat}$  vs.  $T_j$  $V_{ge} = 15\text{V}, I_c = 15\text{A}, 30\text{A}, 60\text{A}$  $V_{th}$  vs.  $T_j$  $I_c = 250\mu\text{A}$ 

Capacitance Characteristic

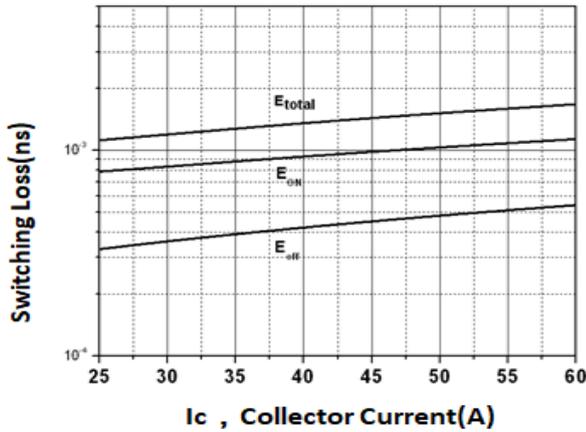
 $V_{ge} = 0\text{V}, f = 1.0\text{MHz}$ 





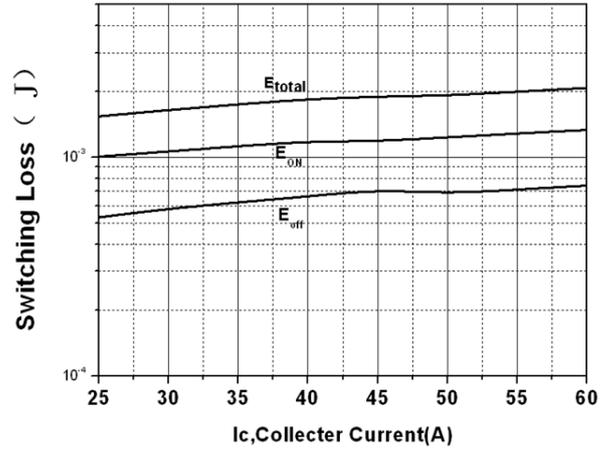
**Switching Loss vs. Ic(25°C)**

VGE=15V, VCE=400V, RG=7.9Ω



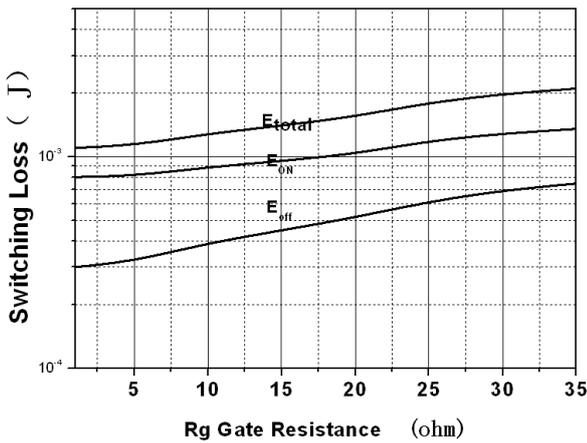
**Switching Loss vs. Ic(175°C)**

VGE=15V, VCE=400V, RG=7.9Ω



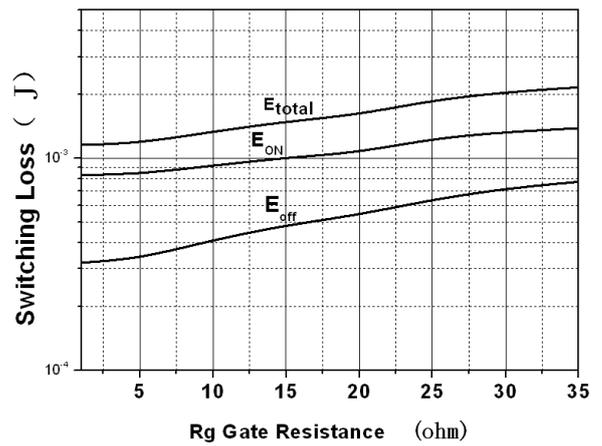
**Switching Loss vs. Rg(25°C)**

VGE=15V, VCE=400V, IC=30A



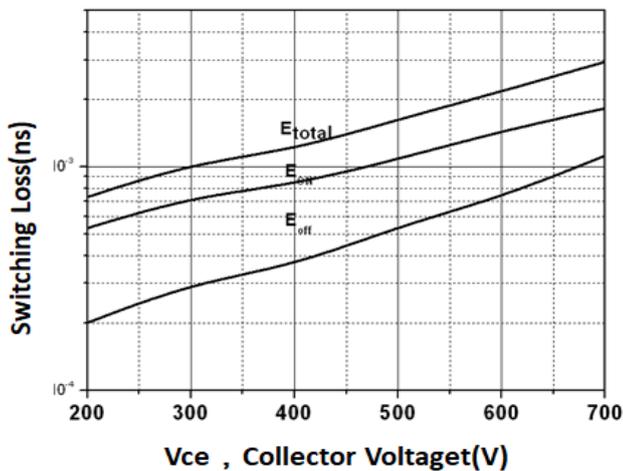
**Switching Loss vs. Rg(175°C)**

VGE=15V, VCE=400V, IC=30A



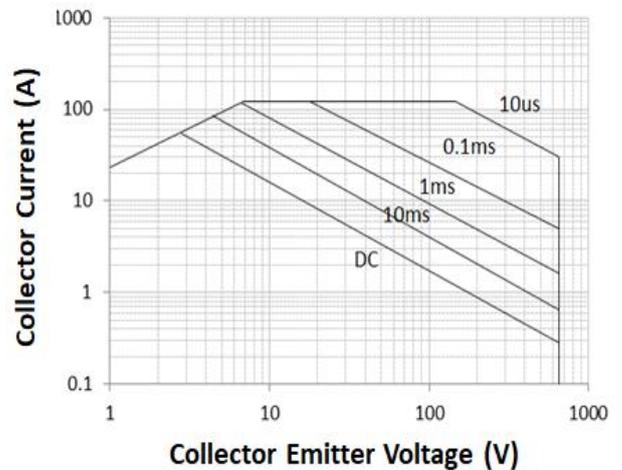
**Switching Loss vs. VCE(175°C)**

VGE=15V, IC=30A, RG=7.9Ω



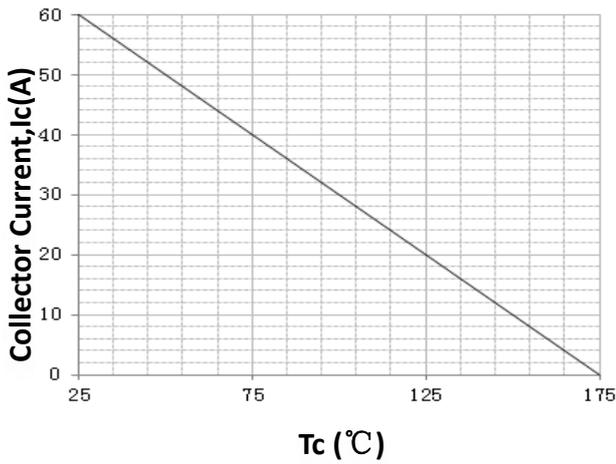
**Forward Bias Safe Operating Area**

Tc=25 °C, VGE=15V, Tvj ≤ 150 °C

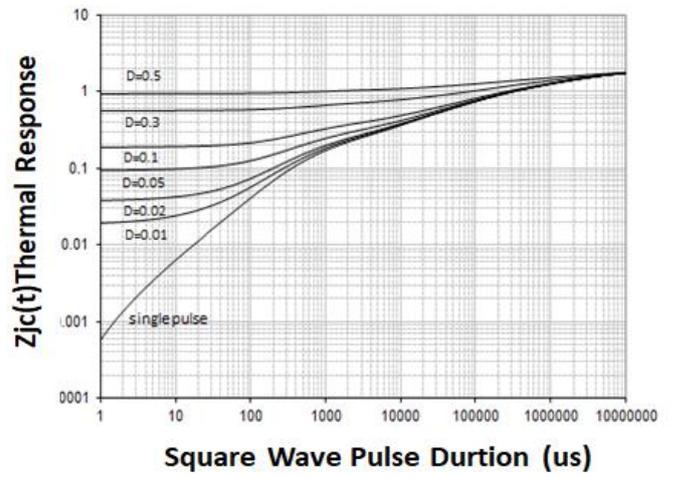




Ic vs.Tc

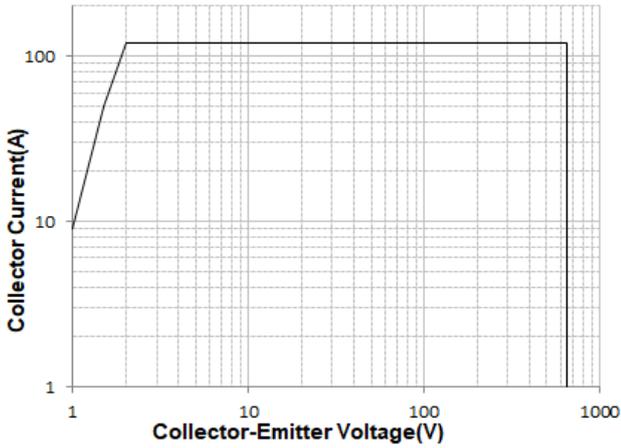


Transient Thermal Impedance

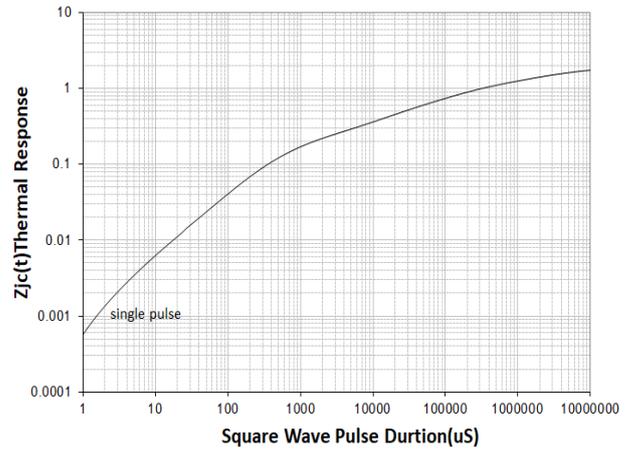


Reverse Bias Safe Operating Area

Tc=25 °C, VGE=±15V, Rg=10 Ω, Tvj≤150°C



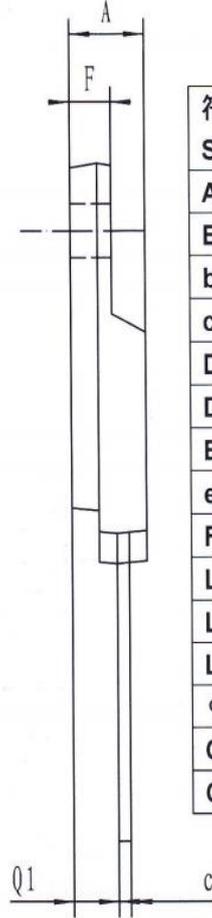
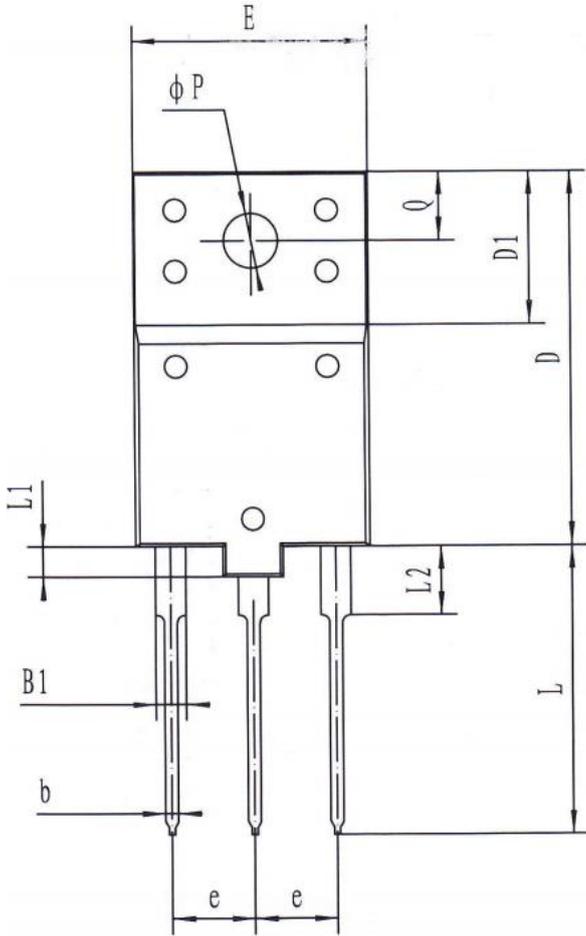
Transient Thermal Impedance





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
$\phi P$	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](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)