



TT030K065EQ

主要参数 MAIN CHARACTERISTICS

I_C	30 A
V_{CES}	650V
V_{CE(SAT)-TYP}	1.7V

用途

- PFC
- UPS 电源

APPLICATIONS

- Power factor corrector (PFC)
- UPS

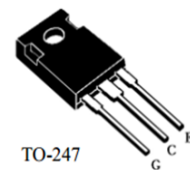
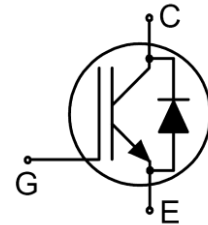
产品特性

- 低栅极电荷
- Trench FS 技术
- RoHS 产品

FEATURES

- Low gate charge
- Trench FS Technology
- RoHS product

封装 Package



订货信息 ORDER MESSAGE

订货型号 Order codes				印 记 Marking	封 装 Package
有卤-条管 Halogen-Tube	无卤-条管 Halogen-Free-Tube	有卤-编带 Halogen-Reel	无卤-编带 Halogen-Free-Reel		
TT030K065EQ-GE-B	TT030K065EQ-GE-BR	N/A	N/A	TT030K065EQ	TO-247





绝对最大额定值 ABSOLUTE RATINGS (Tc=25°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 T _C =25°C T _C =100°C	I_C	60 30	A
最大脉冲集电极极电流 (注 1) Collector Current – pulse (note 1)	I_{CM}	120	
二极管正向测试电流 Diode RMS forward current T _C =25°C T _C =100°C	I_F	60 30	
二极管正向脉冲电流 Diode pulse current	I_{FSM}	120	
最高栅极发射极电压 Gate-Emmitter Voltage	V_{GES}	±20	V
Turn-off safe area 安全工作区	-	120	A
耗散功率 Power Dissipation	P_D TC=25°C	234	W
存储温度 Storage Temperature Range	T_{STG}	-55~+150	°C
结温 Junction Temperature Range	T_J	-55~+175	°C
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_L	300	°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
关态特性 Off –Characteristics						
集电极-发射极击穿电压 Collector-Emmitter Voltage	BVCES	IC=250μA, VGE=0V	650	-	-	V
零栅压下集电极漏电流 Zero Gate Voltage Collector Current	ICES	VCE=650V, VGE=0V, TC=25°C	-	-	30	μA
正向栅极体漏电流 Gate-body leakage current,forward	IGESF	VCE=0V, VGE =20V	-	-	200	nA
反向栅极体漏电流 Gate-body leakage current,reverse	IGESR	VCE=0V, VGE =-20V	-	-	-200	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	VGE(th)	VCE = VGE , IC=250μA	4.0	-	6.0	V
饱和压降 Collector-Emmitter saturation Voltage	VCESAT	VGE=15V IC=30A Tc=25°C	-	1.7	2.1	V
		VGE=15V IC=30A Tc=125°C	-	1.9	-	V
		VGE=15V IC=30A Tc=175°C	-	2.1	-	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	Cies	VCE=25V, VGE=0V, f=1.0MHZ	-	1760	-	pF
输出电容 Output capacitance	Coes		-	139	-	pF
反向传输电容 Reverse transfer capacitance	Cres		-	42	-	pF
栅极电荷总量 Total Gate Charge	Qg	VCC=520V, Ic=30A, RG=10Ω, VGE=15	-	66	-	nC
栅极-反射极 Gate to emitter charge	Qge	V	-	18	-	
栅极-集电极 Gate to collector charge	Qgc	TC=25°C	-	26	-	
栅极电阻-Gate resistance	Rg	f=1 MHz, open collector	-	1.1	-	Ω

项 目 Parameter	符 号 Symbol	最大 MAX	单 位 Unit
结到管壳的热阻 Thermal Resistance Junction-Case IGBT	Rth(j-c)	0.64	°C/W
结到管壳的热阻 Thermal Resistance Junction-Case diode	Rth(j-c)	1.35	°C/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	40	°C/W





电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics

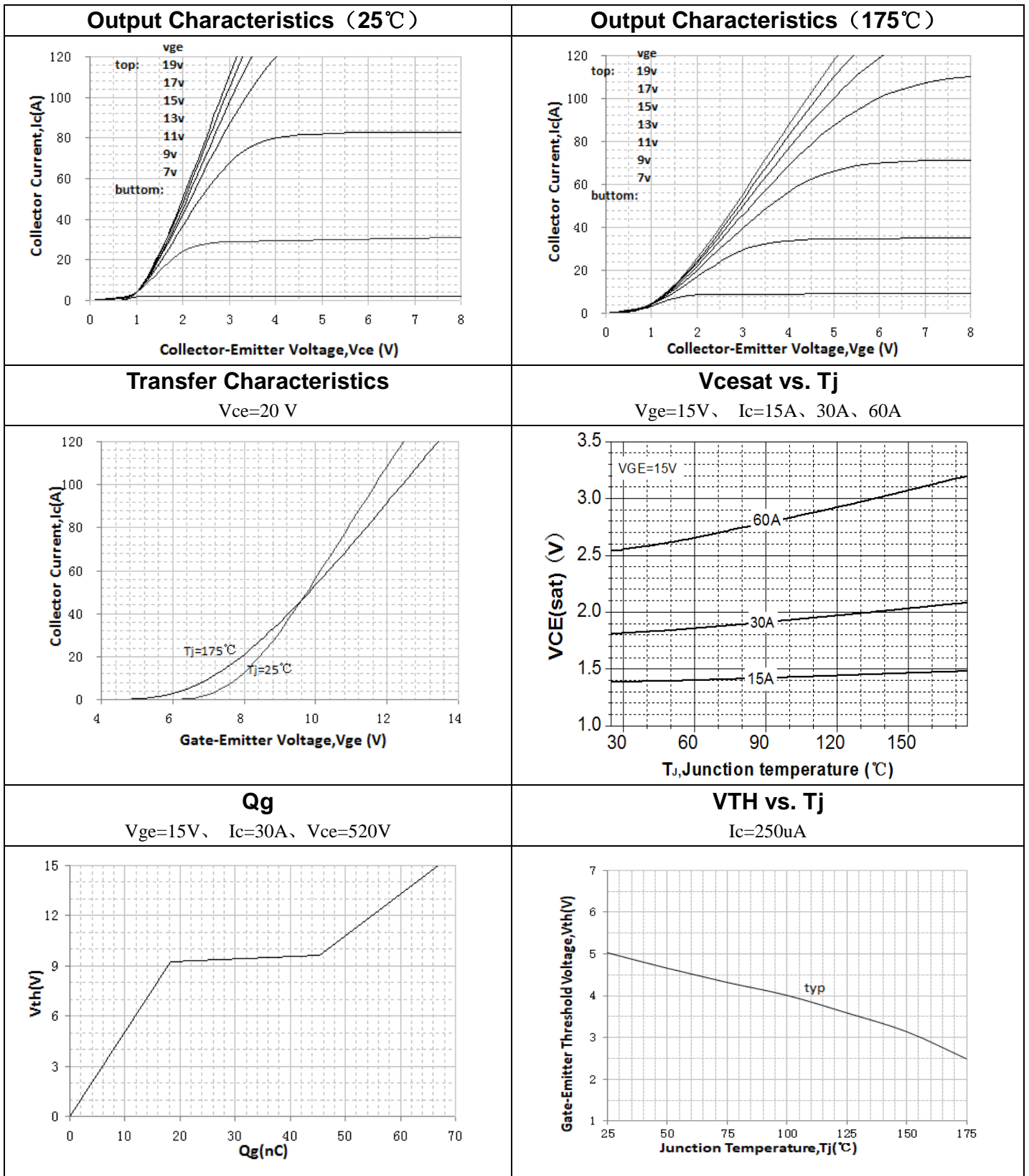
项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
开启延迟时间 Turn-On delay time	td(on)	VCC=400V,Ic=30A,RG=10Ω VGE=15 V TC=25°C	-	10	-	ns
上升时间 Turn-On rise time	tr		-	52	-	ns
关断延迟时间 Turn-Off delay time	td(off)		-	66	-	ns
下降时间 Turn-Off Fall time	tf		-	72	-	ns
开通损耗 Turn-On energy	Eon		-	0.51	-	mJ
关断损耗 Turn-off energy	Eoff		-	0.59	-	mJ
总开关损耗 Total switching energy	Etot		-	1.10	-	mJ
开启延迟时间 Turn-On delay time	td(on)	VCC=400V,Ic=30A,RG=10Ω VGE=15 V TC=175°C	-	12	-	ns
上升时间 Turn-On rise time	tr		-	50	-	ns
关断延迟时间 Turn-Off delay time	td(off)		-	78	-	ns
下降时间 Turn-Off Fall time	tf		-	146	-	ns
开通损耗 Turn-On energy	Eon			0.53		mJ
关断损耗 Turn-off energy	Eoff			0.89		mJ
总开关损耗 Total switching energy	Etot			1.42		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 Drain-Source Diode Forward Voltage	V _F	V _{GE} =0V, I _F =20A	-	1.5	1.8	V
反向恢复时间 Diode Reverse recovery time	t _{rr}	V _{GE} =0V, V _R =400V I _F =20A dI _F /dt=200A/μs TC=25°C	-	150	-	ns
反向恢复电荷 Diode Reverse recovery charge	Q _{rr}		-	546	-	nC
反向恢复电流 Diode Reverse recovery Current	I _{RRM}		-	5.8	-	A
反向恢复时间 Diode Reverse recovery time	t _{rr}	V _{GE} =0V, V _R =400V I _F =20A dI _F /dt=200A/μs TC=175°C	-	239	-	ns
反向恢复电荷 Diode Reverse recovery charge	Q _{rr}		-	1716	-	nC
反向恢复电流 Diode Reverse recovery Current	I _{RRM}		-	12.5	-	A



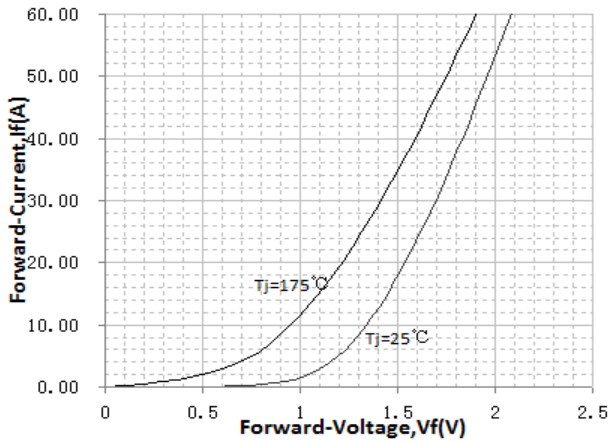
特征曲线 ELECTRICAL CHARACTERISTICS (curves)





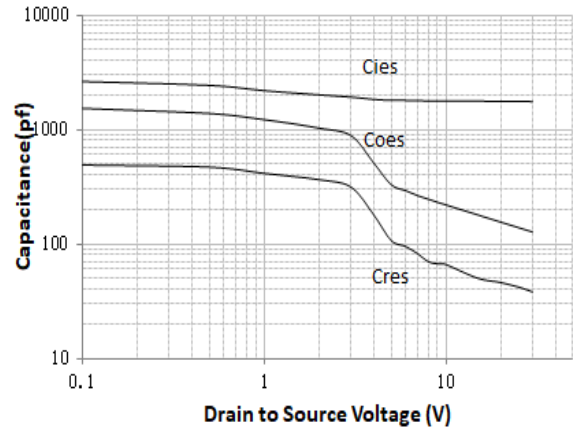
Diode Characteristic

T_j=25°C、175°C



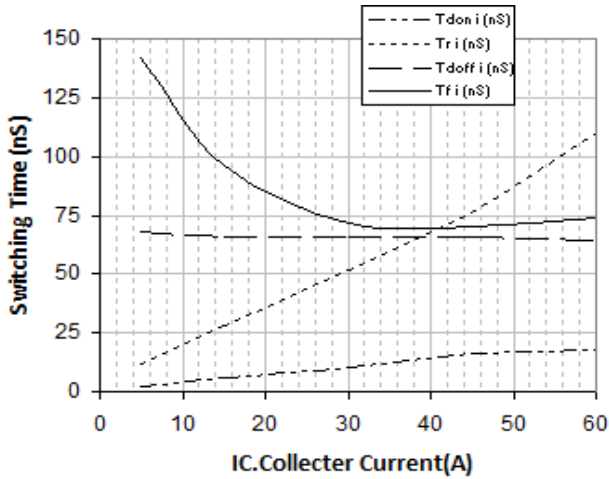
Capacitance Characteristic

V_{GE}=0V、f=1.0MHZ



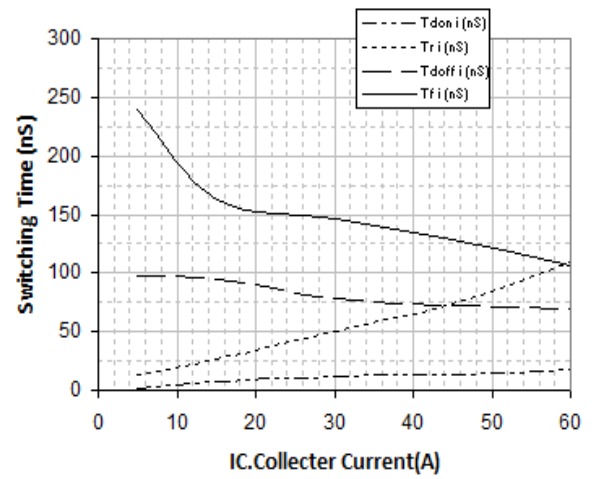
Switching Time vs. IC(25°C)

V_{CE}=400V、V_{GE}=15V、R_G=10Ω



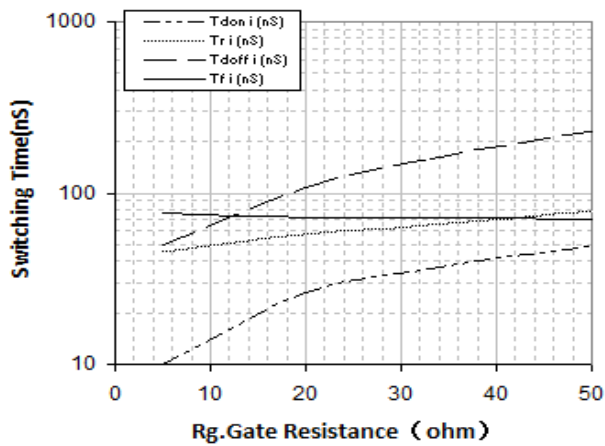
Switching Time vs. IC(175°C)

V_{CE}=400V、V_{GE}=15V、R_G=10Ω



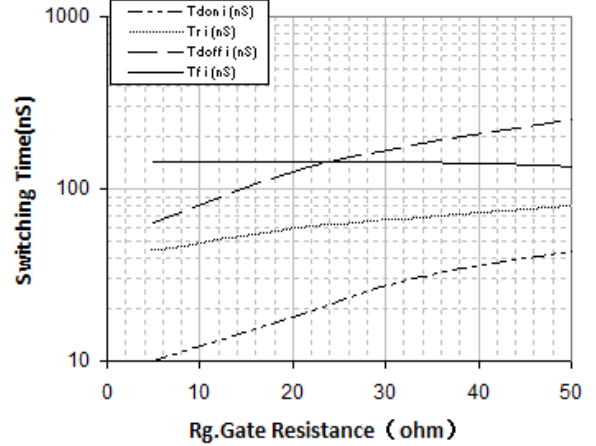
Switching Time vs. Rg(25°C)

V_{GE}=15V、V_{CE}=400V、IC=30A



Switching Time vs. Rg(175°C)

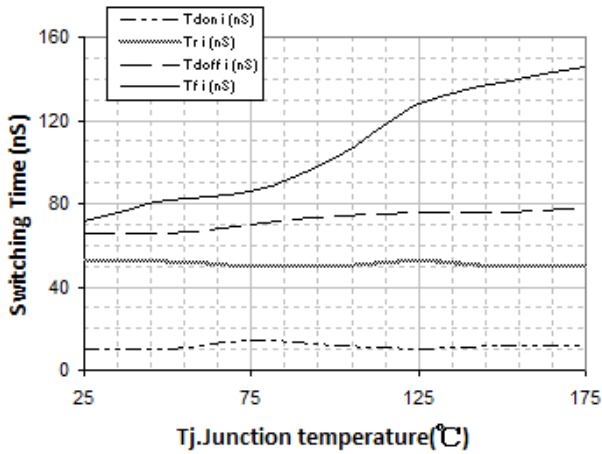
V_{GE}=15V、V_{CE}=400V、IC=30A





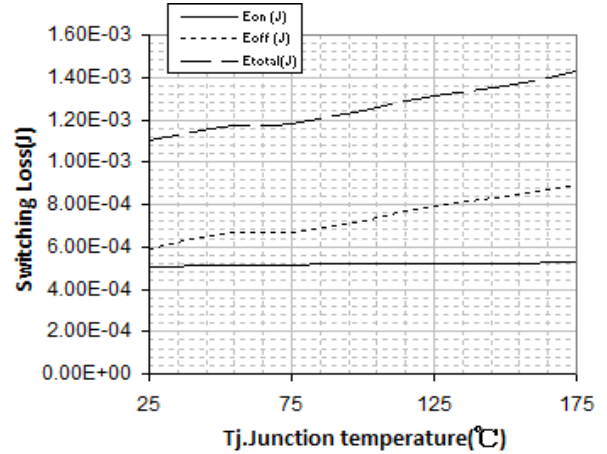
Switching Time vs.Tj

VGE=15V、VCE=400V、IC=30A、Rg=10Ω



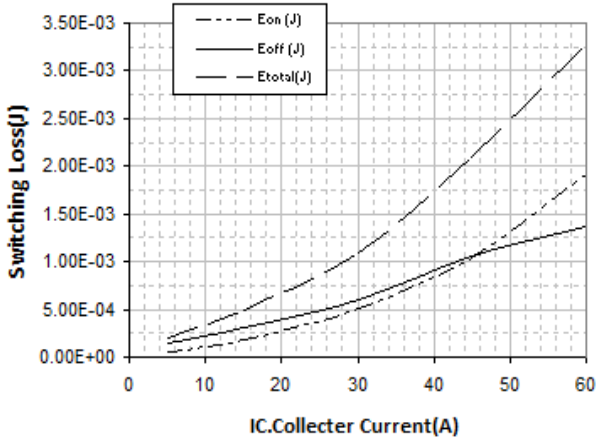
Switching Loss vs. Tj

VGE=15V、VCE=400V、IC=30A、Rg=10Ω



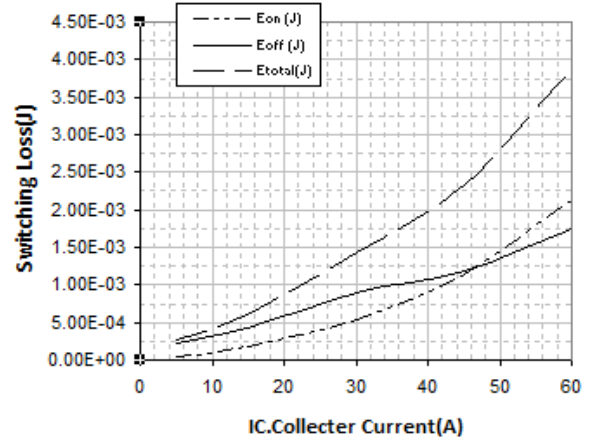
Switching Loss vs. IC(25°C)

VGE=15V、VCE=400V、Rg=10Ω



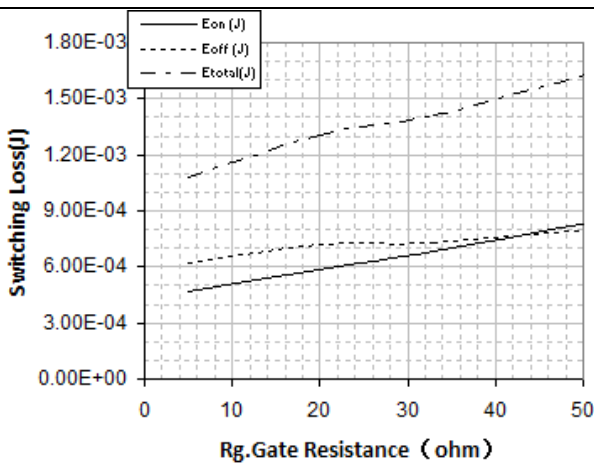
Switching Loss vs. IC(175°C)

VGE=15V、VCE=400V、Rg=10Ω



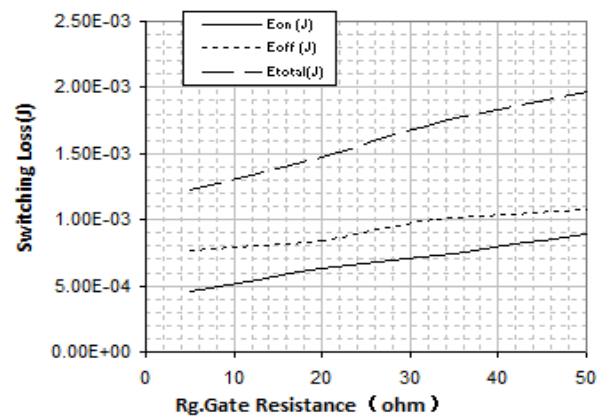
Switching Loss vs. Rg(25°C)

VGE=15V、VCE=400V、IC=30A



Switching Loss vs. Rg(175°C)

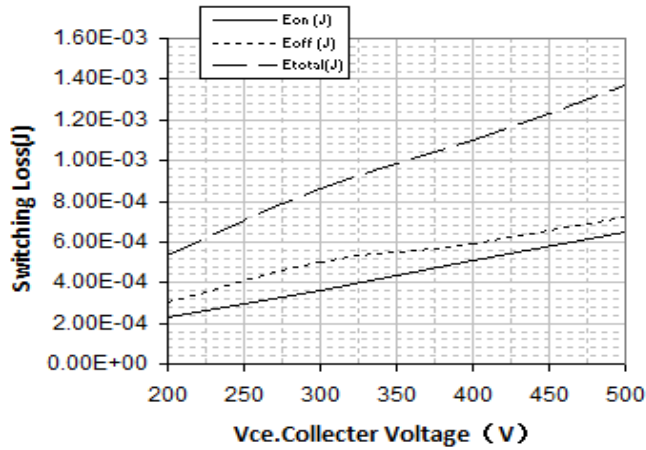
VGE=15V、VCE=400V、IC=30A





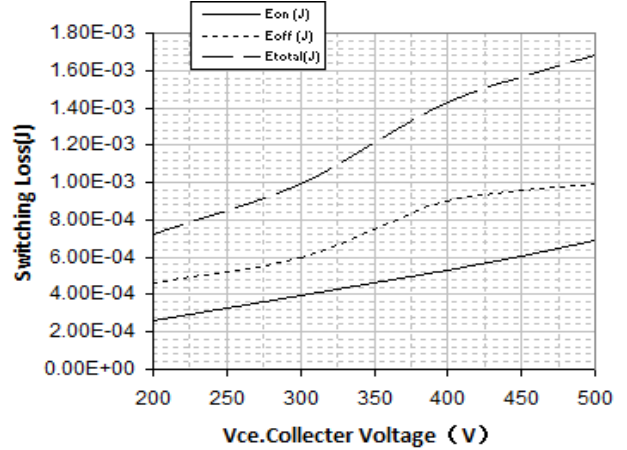
Switching Loss vs. VCE(25°C)

VGE=15V、IC=30A、Rg=10Ω

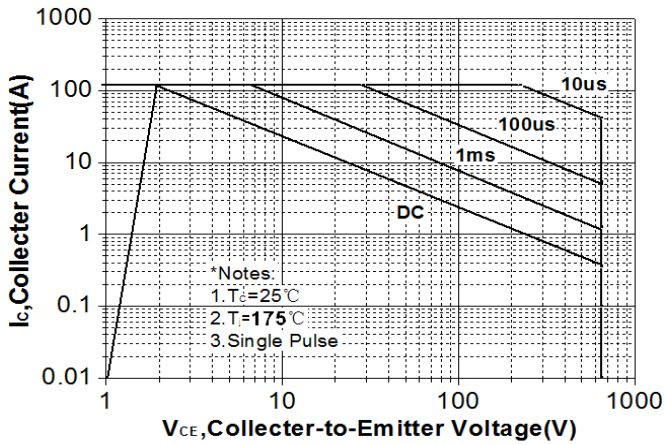


Switching Loss vs. VCE(175°C)

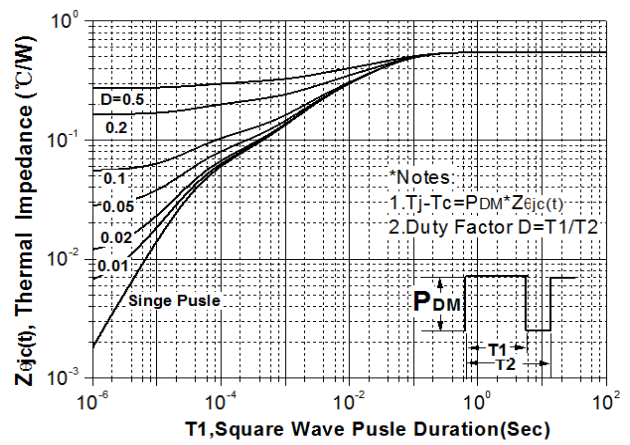
VGE=15V、IC=30A、Rg=10Ω



Safe Operating Area For TO-247

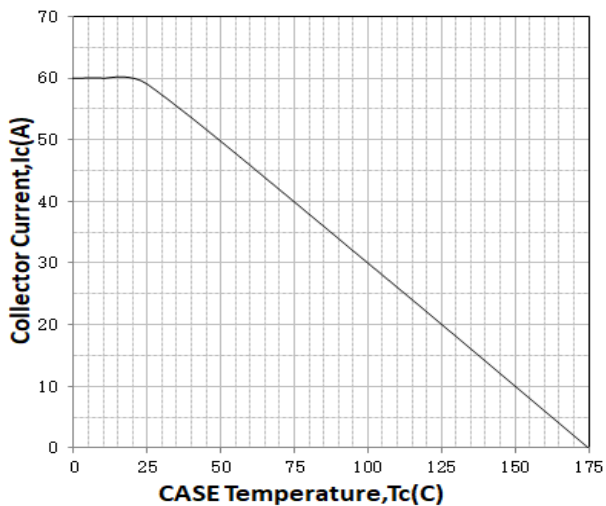


Transient Thermal Impedance for TO-247



Collector current vs. case temperature

VGE≥15V、Tj≤175°C

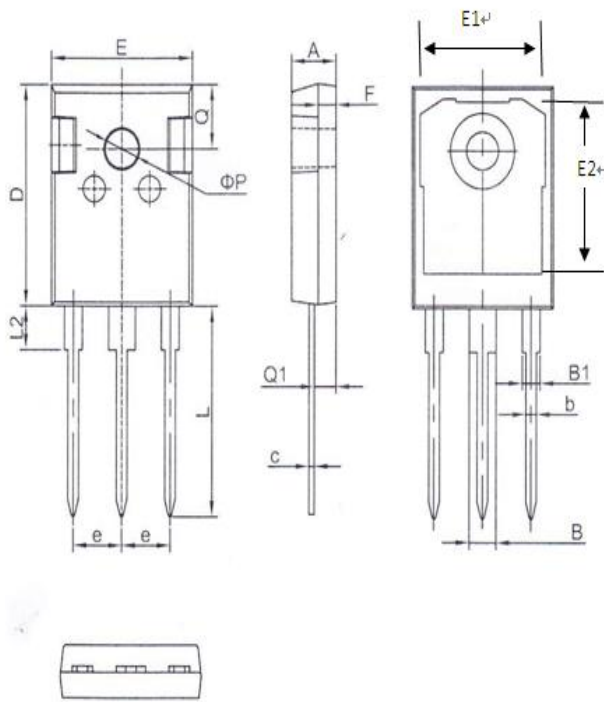




外形尺寸 PACKAGE MECHANICAL DATA

TO-247

单位 Unit : mm



符号 SYMBOL	mm		
	MIN	TYP	MAX
A	4.90	5.00	5.10
B	2.95	3.10	3.35
B1	1.95	2.10	2.35
b	1.15	1.20	1.35
c	0.50	0.60	0.70
D	20.90	21.00	21.10
E	15.70	15.80	15.90
e	5.34	5.44	5.54
F	1.90	2.00	2.10
L	19.40	19.90	20.40
L2	4.03	4.13	4.23
Q	6.00	6.20	6.40
Q1	2.30	2.40	2.50
P	3.50	3.60	3.70
E1	13.82	14.02	14.22
E2	16.35	16.55	16.75



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