



TT075U065FQB

主要参数 MAIN CHARACTERISTICS

I_c	75A
V_{CE}	650V
$V_{CEsat-TYP}$	1.8V

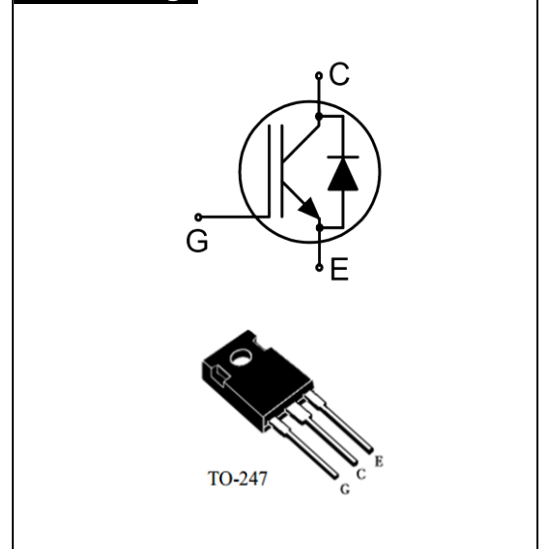
用途

- 充电桩
- UPS 电源
- 光伏

APPLICATIONS

- Charging pile
- UPS
- Solar converters

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		
TT075U065FQB-GE-BR	TT075U065FQB	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	150($T_C=25^\circ\text{C}$)	A
		75($T_C=100^\circ\text{C}$)	A
最大脉冲集电极极电流 (注 1) Collector current – pulse (note 1)	I_{CM}	300	A
二极管正向测试电流 Diode RMS forward current	I_F	150($T_C=25^\circ\text{C}$)	A
		75 ($T_C=100^\circ\text{C}$)	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}	300	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	-	300	A
耗散功率 Power dissipation	P_D	$T_C=25^\circ\text{C}$	428
		$T_C=100^\circ\text{C}$	214
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 (0.063in.) 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
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}	$V_{CE}=650V, V_{GE}=0V,$	-	-	80	μA
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
通态特性 On-Characteristics						
阈值电压 Gate threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C=1mA$	3.5	4.5	5.5	V
饱和压降 Collector-emitter saturation voltage	V_{CESAT}	$V_{GE}=15V, I_C=75A$ $T_C=25^\circ C$	-	1.8	2.4	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V,$ $V_{GE}=0V$ $f=1.0MHz$	-	3500	-	pF
输出电容 Output capacitance	C_{oes}		-	345	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	72	-	pF
栅极电荷总量 Total gate charge	Q_G	$V_{CC}=520V, I_C=75A, V_{GE}=15V$	-	146	-	nC
栅极-发射极电荷 Gate to emitter charge	Q_{GE}		-	23	-	
栅极-集电极电荷 Gate to collector charge	Q_{GC}		-	81	-	





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	$t_{d(on)}$	$V_{CC}=400V, I_c=75A, R_G=5\Omega$ $V_{GE}=15V$ $T_C=25^\circ C$	-	12	-	ns
上升时间 Turn-on rise time	t_r		-	87	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	101	-	ns
下降时间 Turn-off fall time	t_f		-	75	-	ns
开通损耗 Turn-on energy	E_{on}		-	1.93	-	mJ
关断损耗 Turn-off energy	E_{off}		-	1.29	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	3.22	-	mJ
开启延迟时间 Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=75A, R_G=5\Omega$ $V_{GE}=15V$ $T_C=175^\circ C$	-	15	-	ns
上升时间 Turn-on rise time	t_r		-	83	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	115	-	ns
下降时间 Turn-off fall time	t_f		-	98	-	ns
开通损耗 Turn-on energy	E_{on}		-	2.05	-	mJ
关断损耗 Turn-off energy	E_{off}		-	1.97	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	4.02	-	mJ
开启延迟时间 Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=37.5A, R_G=5\Omega$ $V_{GE}=15V$ $T_C=25^\circ C$	-	8	-	ns
上升时间 Turn-on rise time	t_r		-	42	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	115	-	ns
下降时间 Turn-off fall time	t_f		-	56	-	ns
开通损耗 Turn-on energy	E_{on}		-	0.53	-	mJ
关断损耗 Turn-off energy	E_{off}		-	0.67	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	1.20	-	mJ
开启延迟时间 Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=37.5A, R_G=5\Omega$ $V_{GE}=15V$ $T_C=175^\circ C$	-	6	-	ns
上升时间 Turn-on rise time	t_r		-	42	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	146	-	ns
下降时间 Turn-off fall time	t_f		-	125	-	ns
开通损耗 Turn-On energy	E_{on}		-	0.54	-	mJ
关断损耗 Turn-off energy	E_{off}		-	0.79	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	1.33	-	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	$I_F=75A, T_C=25^\circ C$	-	1.45	1.85	V
		$I_F=75A, T_C=150^\circ C$	-	1.40	-	V
反向恢复时间 Diode reverse recovery time	t_{rr}	$V_R=200V, I_F=75A$	-	152	-	ns
反向恢复电荷 Diode reverse recovery charge	Q_{rr}	$di_F/dt=200A/\mu s$ $T_C=25^\circ C$	-	748	-	nC
反向恢复电流	I_{rrm}		-	9.2	-	A





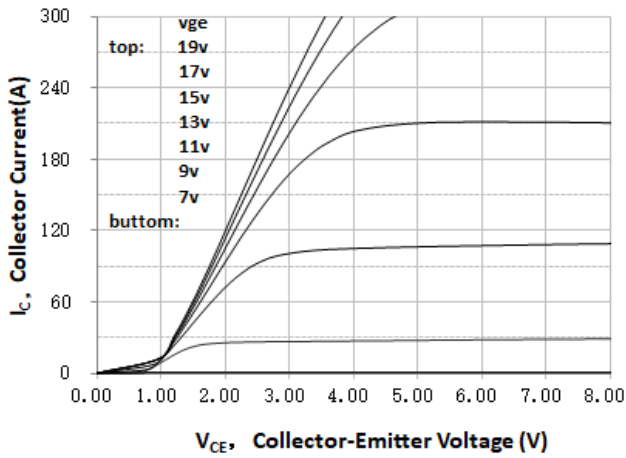
Diode reverse recovery current						
反向恢复时间 Diode reverse recovery time	t_{rr}	$V_{GE}=0V, V_R=200V I_F=75A$ $di_F/dt=200A/\mu s$ $T_C=175^\circ C$	-	270	-	ns
反向恢复电荷 Diode reverse recovery charge	Q_{rr}		-	3.3	-	μC
反向恢复电流 Diode reverse recovery current	I_{rrm}		-	21	-	A

项 目 Parameter	符 号 Symbol	典型值 TYP	最大值 MAX	单 位 Unit
结到管壳的热阻 Junction to case IGBT	$R_{th(j-c)}$	0.28	0.35	$^\circ C/W$
结到管壳的热阻 Junction to case diode	$R_{th(j-c)}$	0.34	0.42	$^\circ C/W$
结到环境的热阻 Junction to ambient	$R_{th(j-A)}$	-	40	$^\circ C/W$

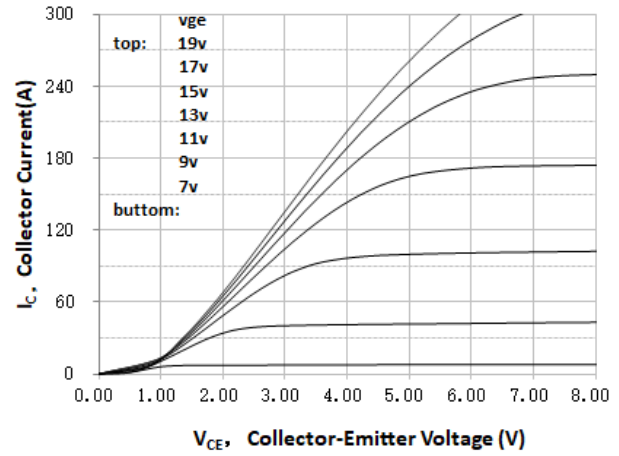


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

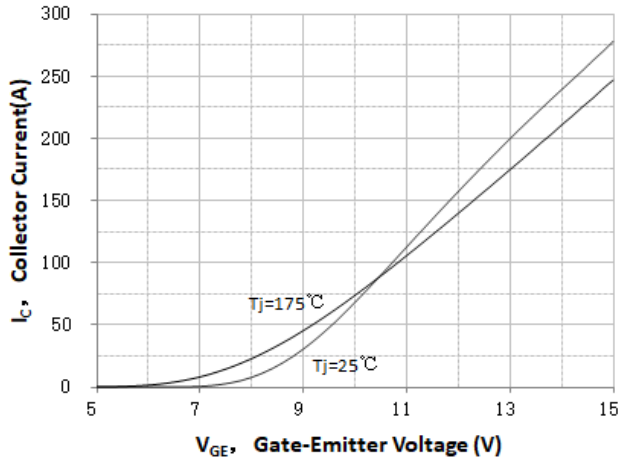
Output Characteristics (25°C)



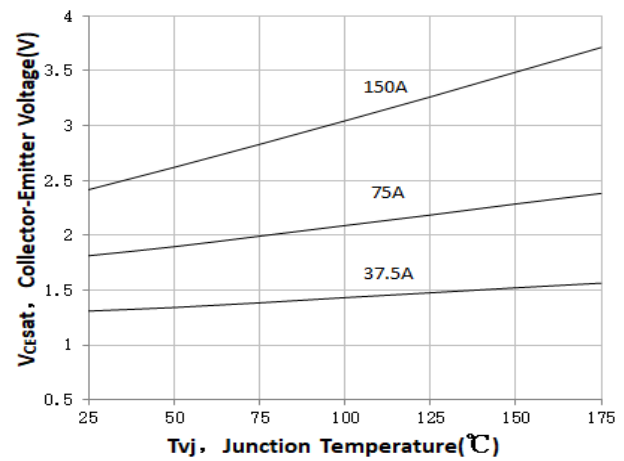
Output Characteristics (175°C)



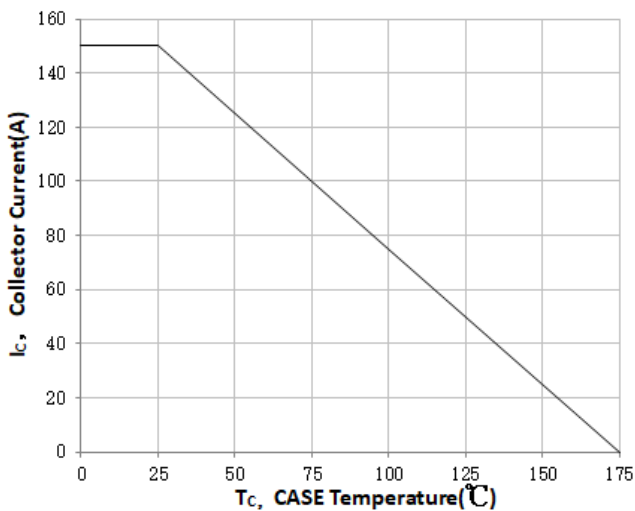
Transfer Characteristics



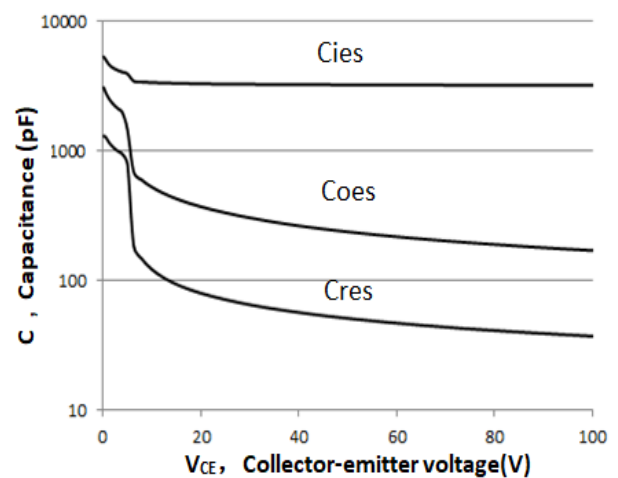
VCEsat vs. Tvj



Collector current vs. case temperature

 $V_{GE} \geq 15\text{V}$, $T_{vj} \leq 175^\circ\text{C}$ 

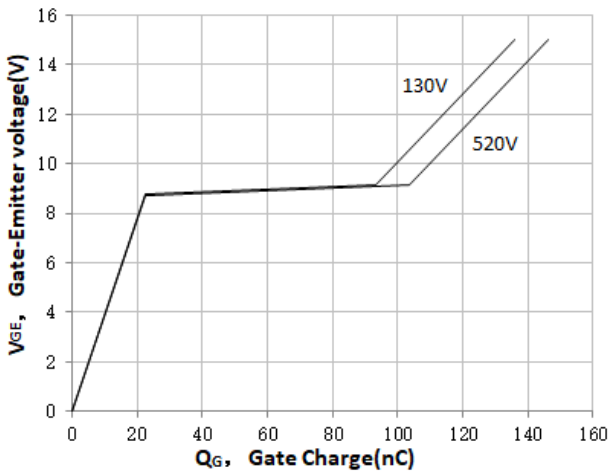
Capacitance Characteristic

 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$ 



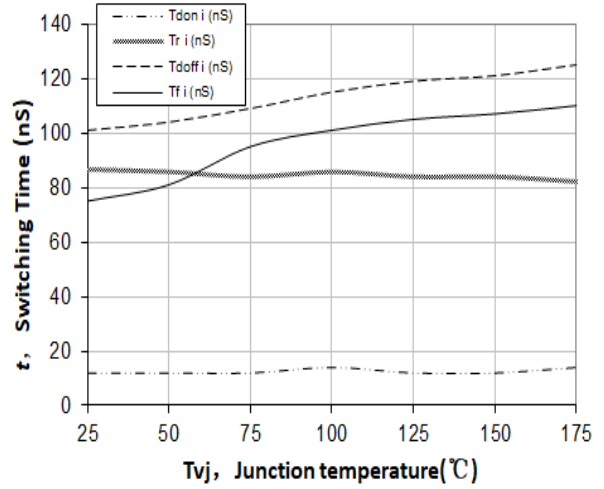
Gate Charge Characteristics

$V_{GE}=15V, I_C=75A$



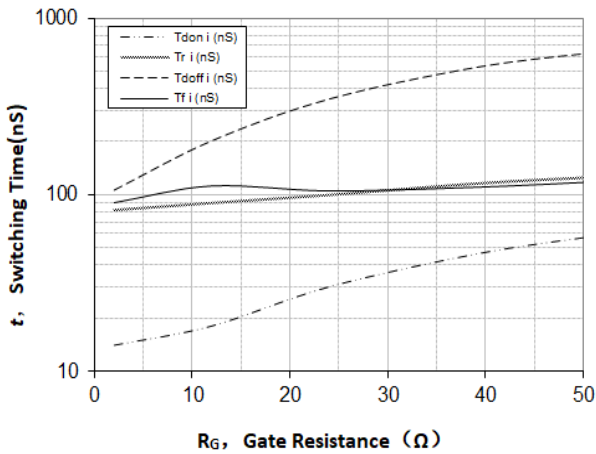
Switching Time vs. T_{vj}

$V_{GE}=15V, V_{CE}=400V, I_C=75A, R_G=5\Omega$



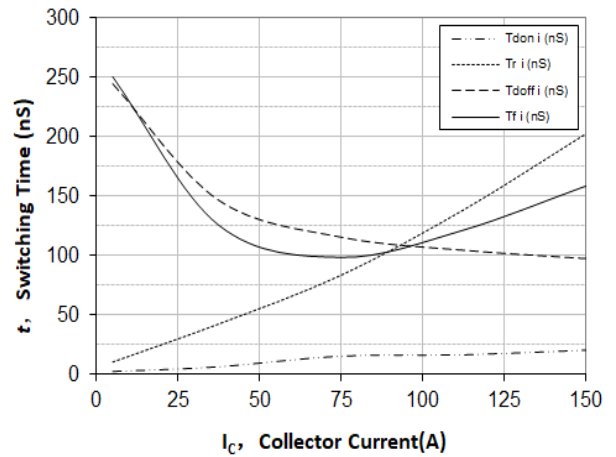
Switching Time vs. $R_G(175^\circ C)$

$V_{GE}=15V, V_{CE}=400V, I_C=75A$



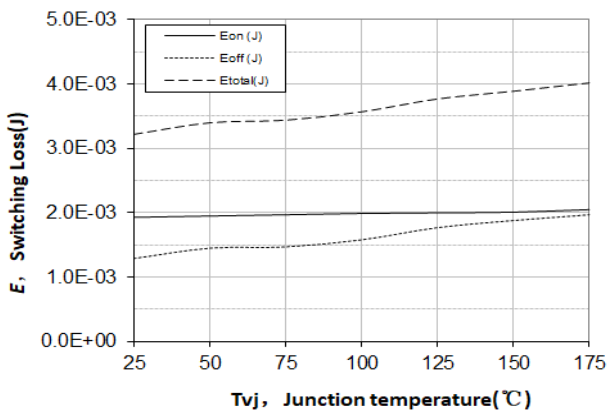
Switching Time vs. $I_C(175^\circ C)$

$V_{CE}=400V, V_{GE}=15V, R_G=5\Omega$



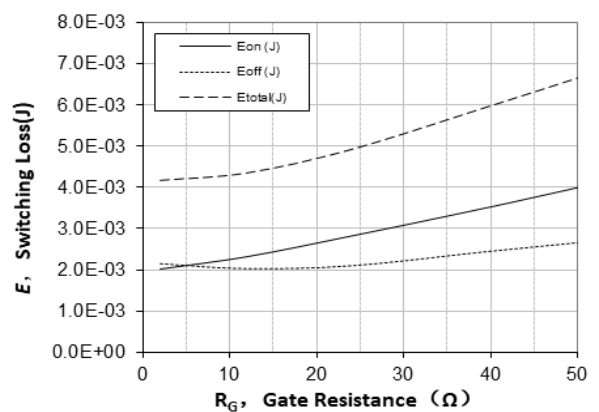
Switching Loss vs. T_{vj}

$V_{GE}=15V, V_{CE}=400V, I_C=75A, R_G=5\Omega$



Switching Loss vs. $R_G(175^\circ C)$

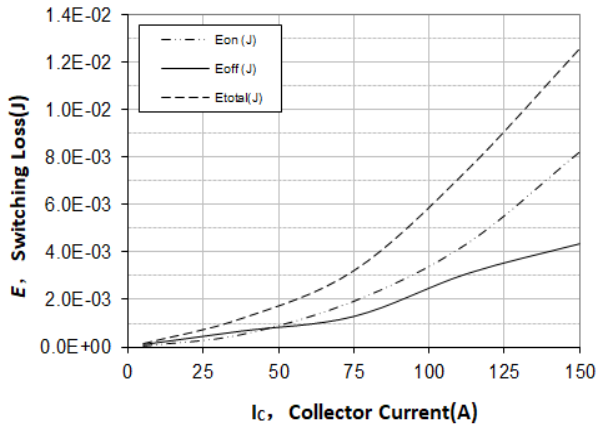
$V_{GE}=15V, V_{CE}=400V, I_C=75A$





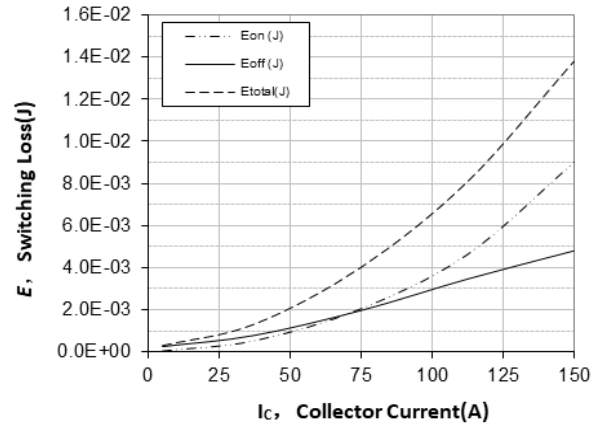
Switching Loss vs. $I_c(25^\circ\text{C})$

$V_{CE}=400\text{V}, V_{GE}=15\text{V}, R_G=5\Omega$



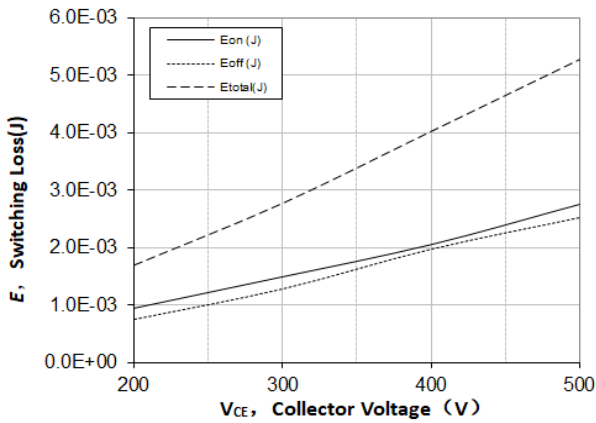
Switching Loss vs. $I_c(175^\circ\text{C})$

$V_{CE}=400\text{V}, V_{GE}=15\text{V}, R_G=5\Omega$

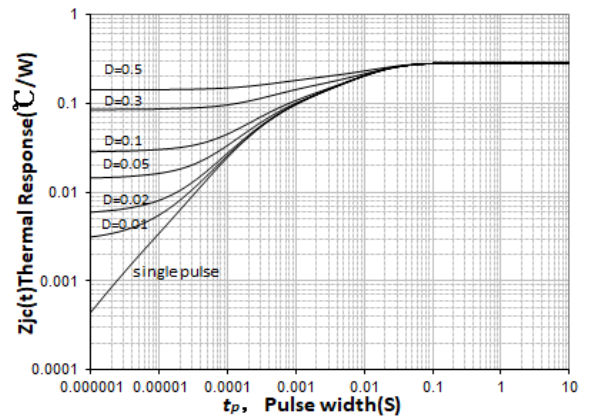


Switching Loss vs. $V_{CE}(175^\circ\text{C})$

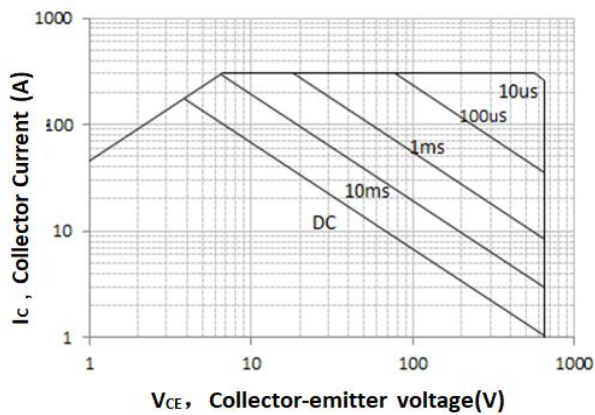
$V_{GE}=15\text{V}, I_c=75\text{A}, R_G=5\Omega$



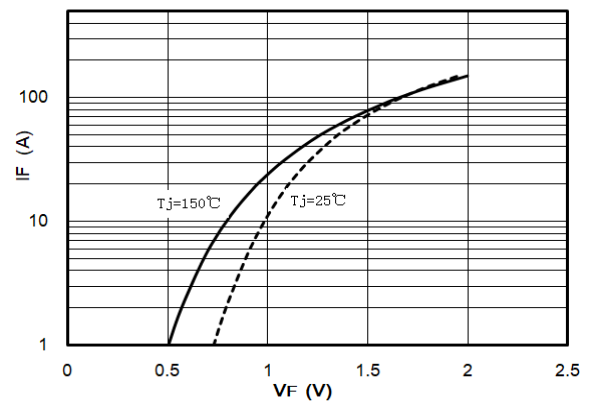
Transient Thermal Impedance IGBT $R_{th(j-c)}$



Safe Operating Area For TO-247

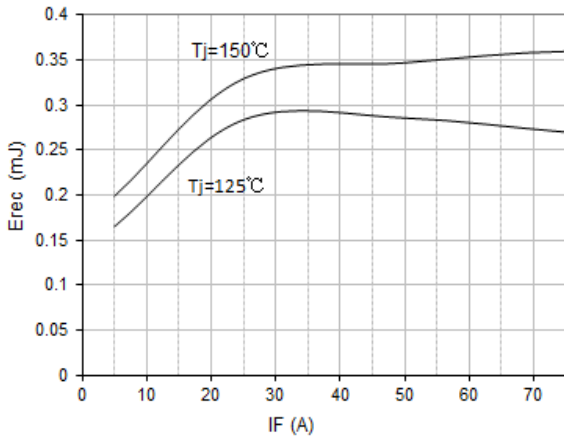


IF vs. VF

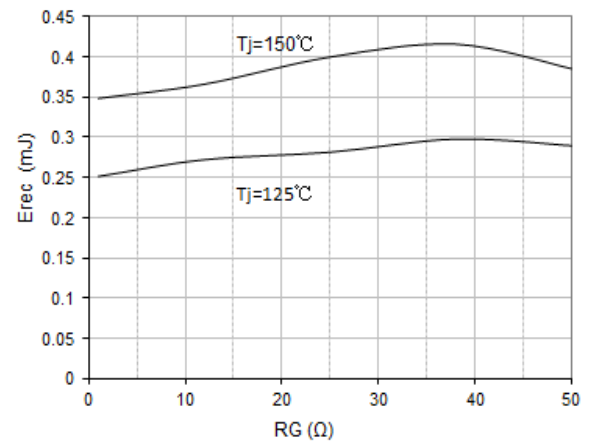




Erec vs. IF



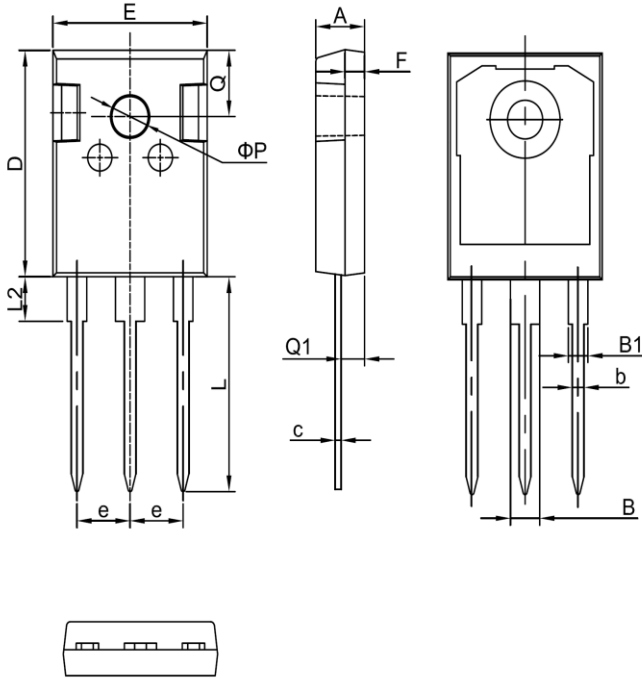
Erec vs. RG





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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