



TT075U065FQ

主要参数 MAIN CHARACTERISTICS

I_c	75A
V_{CES}	650V
$V_{cesat-typ}$	1.65V

用途

- 充电桩
- UPS 电源
- 光伏

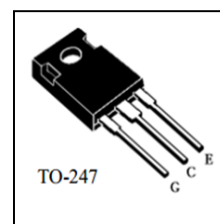
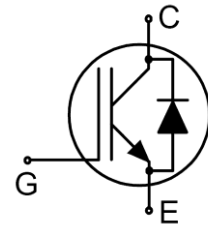
APPLICATIONS

- Charging pile
- UPS
- Solar converters

采用发射极载流子增强技术，优化 IGBT 导通饱和压降和关断损耗性能。

The emitter carrier enhancement technology is adopted to optimize the on saturation voltage drop and turn-off energy compromise performance of IGBT.

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
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		
TT075U065FQ-GE-B	TT075U065FQ-GE-BR	N/A	N/A	TT075U065FQ	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	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-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	-	300	A
耗散功率 Power Dissipation	P_D $T_C=25^\circ\text{C}$	625	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}	$-55 \sim +150$	$^\circ\text{C}$
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_L	300	$^\circ\text{C}$

*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-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}	$V_{CE}=650V, V_{GE}=0V,$	-	-	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	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C=250\mu A$	3.5	-	6.0	V
饱和压降 Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=75A$ $T_C=25^\circ C$	-	1.65	2.1	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V,$ $V_{GE}=0V,$ $f=1.0MHz$	-	2643	-	pF
输出电容 Output capacitance	C_{oes}		-	325	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	58	-	pF
栅极电荷总量 Total Gate Charge	Q_g	$V_{CC}=520V, I_C=75A, V_{GE}=15V$	-	141	-	nC
栅极-反射极 Gate to emitter charge	Q_{ge}		-	28	-	
栅极-集电极 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	$t_{d(on)}$	$V_{CC}=400V, I_c=75A, R_G=5\Omega$ $V_{GE}=15V$ $T_C=25^\circ C$	-	26	-	ns
上升时间 Turn-On rise time	t_r		-	120	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		-	94	-	ns
下降时间 Turn-Off Fall time	t_f		-	78	-	ns
开通损耗 Turn-On energy	Eon		-	2.7	-	mJ
关断损耗 Turn-off energy	Eoff		-	1.6	-	mJ
总开关损耗 Total switching energy	Etot		-	4.3	-	mJ
开启延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=75A, R_G=5\Omega$ $V_{GE}=15V$ $T_C=175^\circ C$	-	28	-	ns
上升时间 Turn-On rise time	t_r		-	132	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		-	118	-	ns
下降时间 Turn-Off Fall time	t_f		-	126	-	ns
开通损耗 Turn-On energy	Eon		-	3.1	-	mJ
关断损耗 Turn-off energy	Eoff		-	2.5	-	mJ
总开关损耗 Total switching energy	Etot		-	5.6	-	mJ
开启延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=37.5A, R_G=5\Omega$ $V_{GE}=15V$ $T_C=25^\circ C$	-	20	-	ns
上升时间 Turn-On rise time	t_r		-	52	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		-	110	-	ns
下降时间 Turn-Off Fall time	t_f		-	70	-	ns
开通损耗 Turn-On energy	Eon		-	0.70	-	mJ
关断损耗 Turn-off energy	Eoff		-	0.84	-	mJ
总开关损耗 Total switching energy	Etot		-	1.54	-	mJ
开启延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=37.5A, R_G=5\Omega$ $V_{GE}=15V$ $T_C=175^\circ C$	-	22	-	ns
上升时间 Turn-On rise time	t_r		-	50	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		-	142	-	ns
下降时间 Turn-Off Fall time	t_f		-	112	-	ns
开通损耗 Turn-On energy	Eon		-	0.8	-	mJ
关断损耗 Turn-off energy	Eoff		-	1.15	-	mJ
总开关损耗 Total switching energy	Etot		-	1.95	-	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	$V_{GE}=0V, I_F=75A$	-	2.0	2.6	V
反向恢复时间 Diode Reverse recovery time	t_{rr}	$V_{GE}=0V, V_R=200V, I_F=75A$	-	49	-	ns
反向恢复电荷 Diode Reverse recovery charge	Qrr	$dl_F/dt=200A/\mu s$ $T_C=25^\circ C$	-	121	-	nC





反向恢复电流 Diode Reverse recovery Current	I_{RRM}		-	4.3	-	A
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}		-	2.56	-	μC
反向恢复电流 Diode Reverse recovery Current	I_{RRM}		-	16.7	-	A

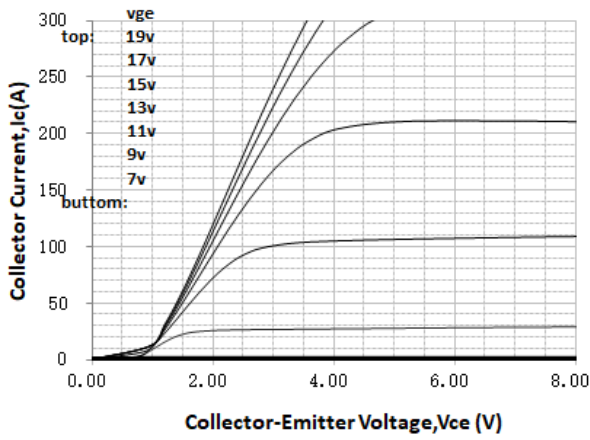
项 目 Parameter	符 号 Symbol	MAX	单 位 Unit
结到管壳的热阻 Junction to Case IGBT	$R_{th(j-c)}$	0.24	$^\circ C/W$
结到管壳的热阻 Junction to Case diode	$R_{th(j-c)}$	0.34	$^\circ C/W$
结到环境的热阻 Junction to Ambient	$R_{th(j-A)}$	40	$^\circ C/W$



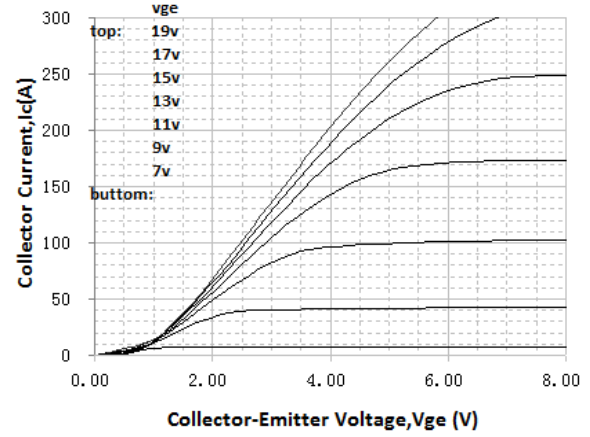


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

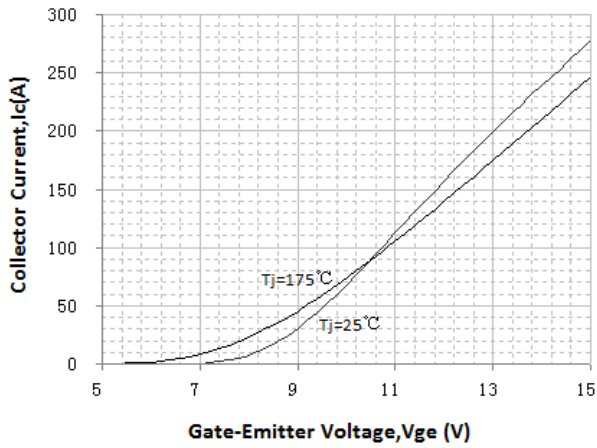
Output Characteristics (25°C)



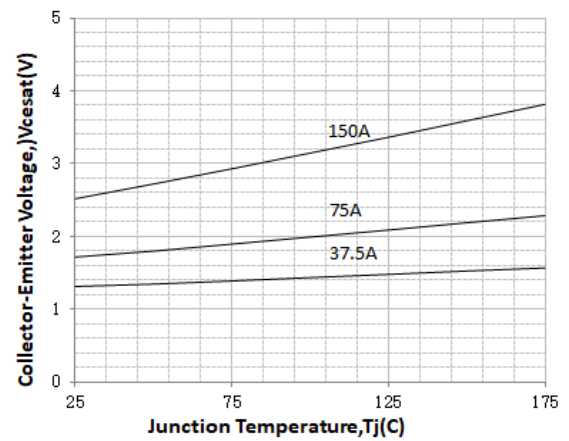
Output Characteristics (175°C)



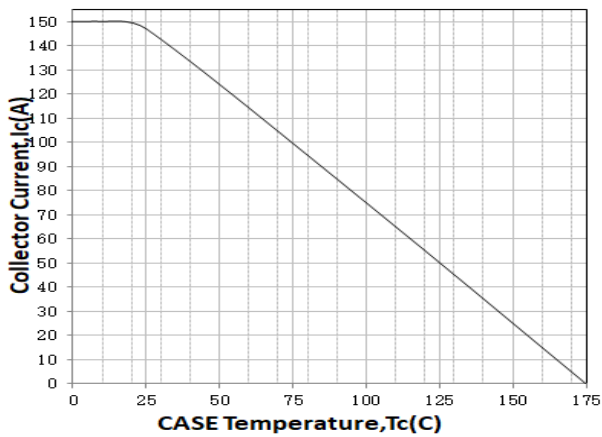
Transfer Characteristics



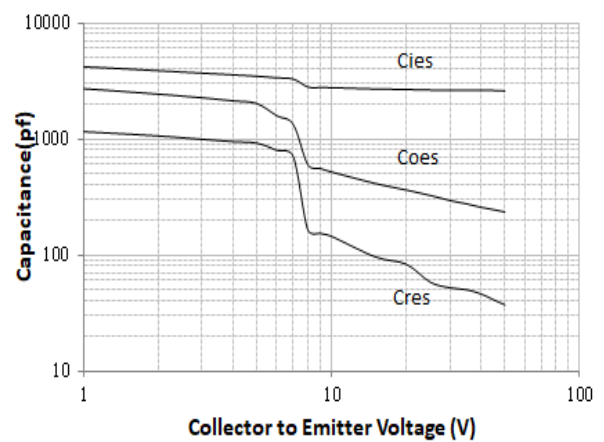
VCESAT vs. Tj



Collector current vs. case temperature

 $V_{ge} \geq 15\text{V}$, $T_j \leq 175^\circ\text{C}$ 

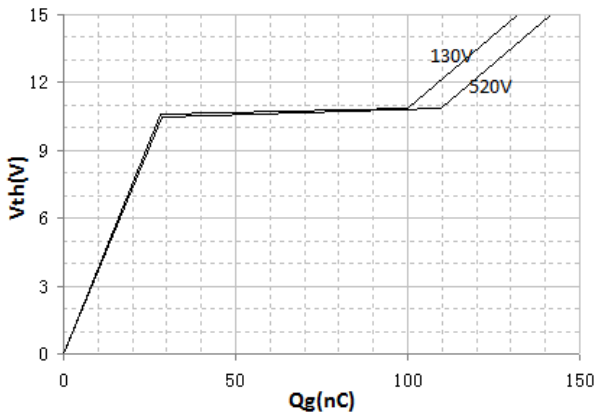
Capacitance Characteristic

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



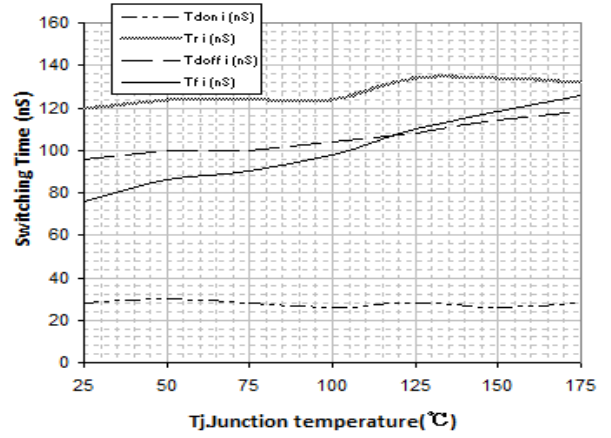
Gate Charge Characteristics

$V_{ge}=15V, I_c=75A$



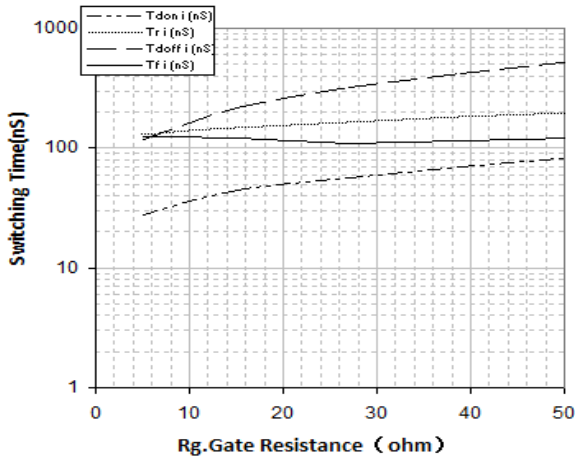
Switching Time vs. Tj

$V_{ge}=15V, V_{ce}=400V, I_c=75A, R_g=5\Omega$



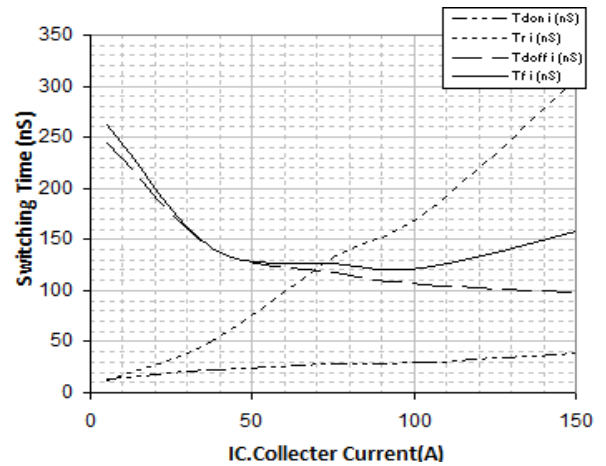
Switching Time vs. Rg(175°C)

$V_{ge}=15V, V_{ce}=400V, I_c=75A$



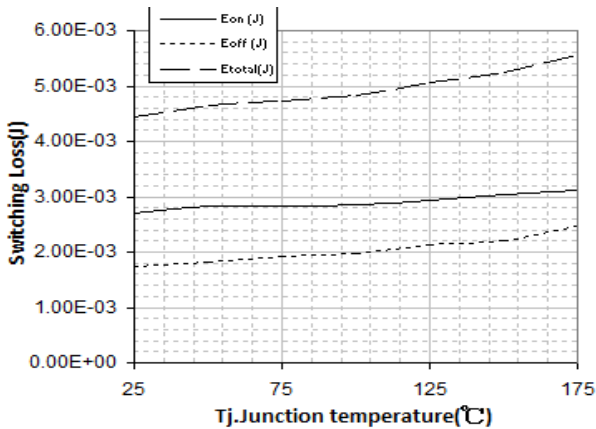
Switching Time vs. IC(175°C)

$V_{ce}=400V, V_{ge}=15V, R_g=5\Omega$



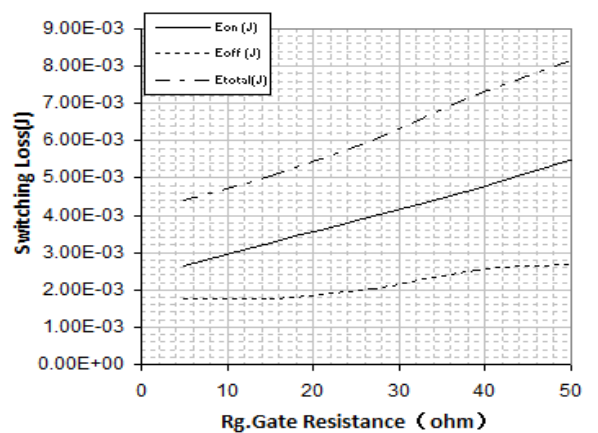
Switching Loss vs. Tj

$V_{ge}=15V, V_{ce}=400V, I_c=75A, R_g=5\Omega$



Switching Loss vs. Rg(175°C)

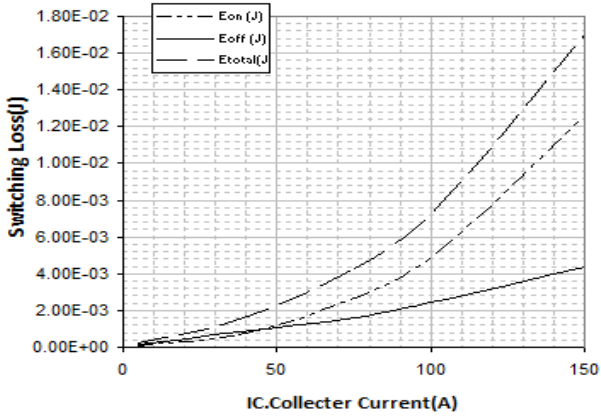
$V_{ge}=15V, V_{ce}=400V, I_c=75A$





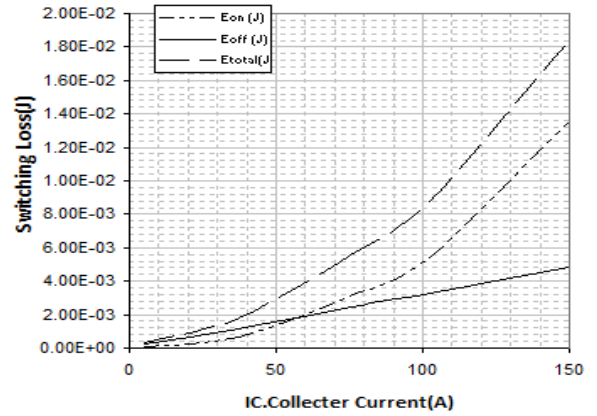
Switching Loss vs. IC(25°C)

Vce=400V, Vge=15V, Rg=5Ω



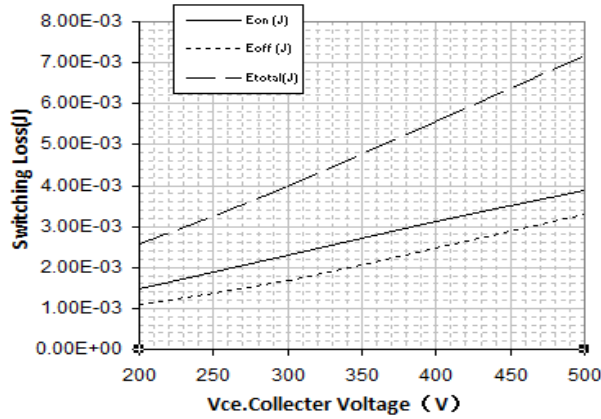
Switching Loss vs. IC(175°C)

Vce=400V, Vge=15V, Rg=5Ω

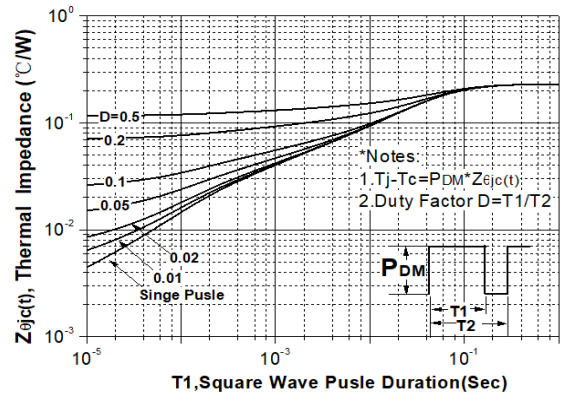


Switching Loss vs. VCE(175°C)

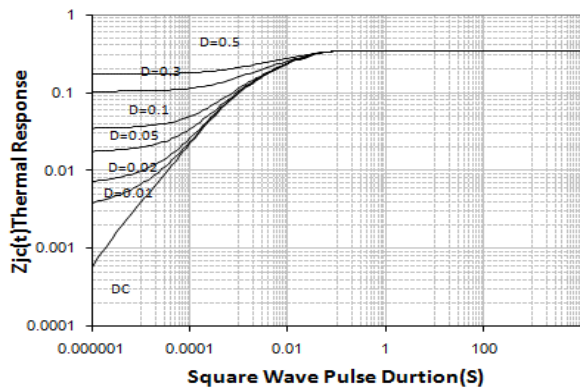
Vge=15V, Ic=75A, Rg=5Ω



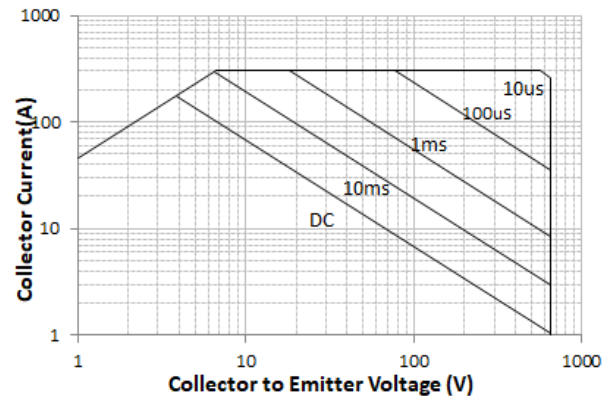
Transient Thermal Impedance for IGBT



Transient Thermal Impedance for FRD



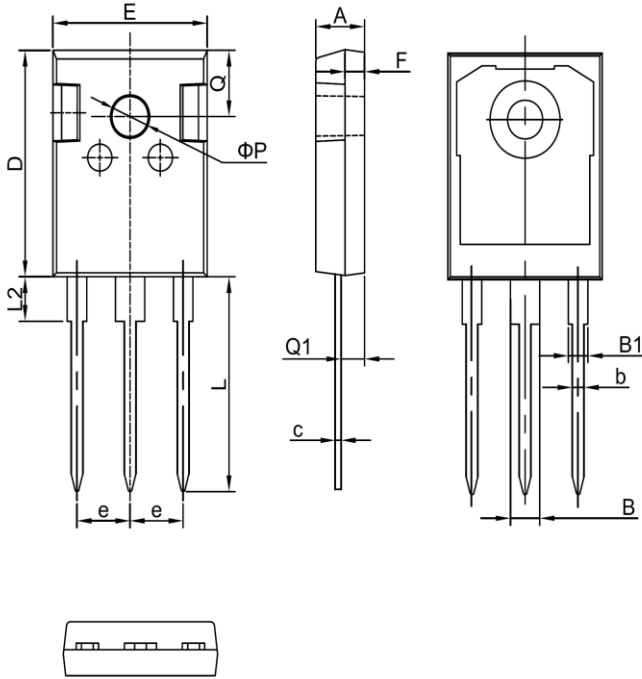
Safe Operating Area For TO-247





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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