



# ATT075N065EQ

## 主要参数 MAIN CHARACTERISTICS

I <sub>c</sub>	75A
V <sub>CE</sub>	650V
V <sub>cesat-typ</sub>	1.7V

### 用途

- 工业逆变器
- 车载充电机
- DC-DC 变换器
- 马达驱动

### 产品特性

- 低栅极电荷
- Trench FS 技术
- RoHS 产品
- AEC-Q101 认证

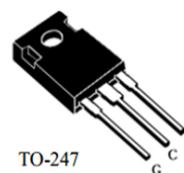
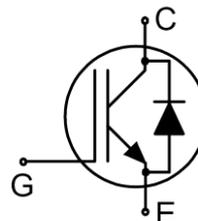
### APPLICATIONS

- Industrial Inverter
- On Board Chargers
- DC-DC Converters
- Motordrives

### FEATURES

- Low gate charge
- Trench FS Technology
- RoHS product
- AEC-Q101 qualified

## 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		
ATT075N065EQ-GE-BR	ATT075N065EQ	TO-247

绝对最大额定值 ABSOLUTE RATINGS (T<sub>C</sub>=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-emitter voltage	V <sub>CE</sub>	650	V
*连续集电极电流 Collector current-continuous	I <sub>C</sub>	150(T <sub>C</sub> =25°C)	A
		75(T <sub>C</sub> =100°C)	A
最大脉冲集电极极电流 (注1) Collector current – pulse (note 1)	I <sub>CM</sub>	300	A
二极管正向测试电流 Diode RMS forward current	I <sub>F</sub>	150(T <sub>C</sub> =25°C)	A
		75 (T <sub>C</sub> =100°C)	A
二极管正向不重复峰值电流 (浪涌电流) Surge non repetitive forward current tp= 10 ms sinusoidal	I <sub>FSM</sub>	300	A
最高栅极发射极电压 Gate-emitter voltage	V <sub>GE</sub>	±20	V
瞬态栅极发射极电压 Transient gate-emitter voltage(t <sub>p</sub> ≤10us, D< 0.010)	V <sub>GE</sub>	±30	V
安全工作区 Turn-off safe area	-	300	A
短路耐受时间 Short circuit withstand time V <sub>GE</sub> =15.0V, V <sub>CC</sub> ≤400V, T <sub>vj</sub> =150°C	T <sub>sc</sub>	6	us
耗散功率 Power dissipation	P <sub>D</sub> T <sub>C</sub> =25°C	625	W
工作结温 Operating junction temperature range	T <sub>VJ</sub>	-40~+175	°C
存储温度 Storage temperature	T <sub>STG</sub>	-55~+150	°C
引线最高焊接温度 Maximum lead temperature for soldering purposes	T <sub>L</sub>	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
<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	$I_{CES}$	$V_{CE}=650V, V_{GE}=0V, T_C=25^\circ C$	-	-	80	$\mu A$
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	$V_{CESAT}$	$V_{GE}=15V, I_C=75A, T_C=25^\circ C$	-	1.7	2.4	V
<b>动态特性 Dynamic Characteristics</b>						
输入电容 Input capacitance	$C_{ies}$	$V_{CE}=25V, V_{GE}=0V, f=1.0MHz$	-	5012	-	pF
输出电容 Output capacitance	$C_{oes}$		-	430	-	pF
反向传输电容 Reverse transfer capacitance	$C_{res}$		-	99.6	-	pF
栅极电荷总量 Total gate charge	$Q_g$	$V_{CC}=520V, I_C=75A, R_G=7.9\Omega, V_{GE}=15V, T_C=25^\circ C$	-	170	-	nC
栅极-反射极 Gate to emitter charge	$Q_{ge}$		-	43	-	
栅极-集电极 Gate to collector charge	$Q_{gc}$		-	78	-	





## 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	$t_{d(on)}$	$V_{CC}=400V, I_c=75A, R_G=7.9\Omega$ $V_{GE}=15V$ $T_C=25^\circ C$	-	87	-	ns
上升时间 Turn-on rise time	$t_r$		-	156	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	168	-	ns
下降时间 Turn-off fall time	$t_f$		-	86	-	ns
开通损耗 Turn-on energy	Eon		-	3.4	-	mJ
关断损耗 Turn-off energy	Eoff		-	1.8	-	mJ
总开关损耗 Total switching energy	Etot		-	5.2	-	mJ
开启延迟时间 Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=75A, R_G=7.9\Omega$ $V_{GE}=15V$ $T_C=150^\circ C$	-	85	-	ns
上升时间 Turn-on rise time	$t_r$		-	154	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	190	-	ns
下降时间 Turn-off fall time	$t_f$		-	99	-	ns
开通损耗 Turn-on energy	Eon		-	4.2	-	mJ
关断损耗 Turn-off energy	Eoff		-	2.2	-	mJ
总开关损耗 Total switching energy	Etot		-	6.4	-	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	$V_F$	$I_F=75A$	-	2.0	2.5	V
反向恢复时间 Diode reverse recovery time	$t_{rr}$	$V_{GE}=0V, V_R=200V I_F=75A$ $di_F/dt=200A/\mu s$ $T_C=25^\circ C$	-	24.5	-	ns
反向恢复电荷 Diode reverse recovery charge	Qrr		-	20.6	-	nC
反向恢复电流 Diode reverse recovery current	$I_{rrm}$		-	1.64	-	A
反向恢复时间 Diode reverse recovery time	$t_{rr}$		$V_{GE}=0V, V_R=200V I_F=75A$ $di_F/dt=200A/\mu s$ $T_C=150^\circ C$	-	195	-
反向恢复电荷 Diode reverse recovery charge	Qrr	-		731	-	nC
反向恢复电流 Diode reverse recovery Current	$I_{rrm}$	-		8.3	-	A

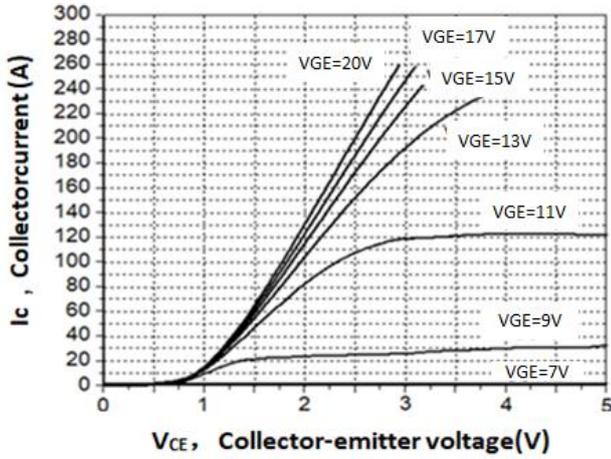
项 目 Parameter	符 号 Symbol	MAX	单 位 Unit
结到管壳的热阻 Junction to case IGBT	$R_{th(j-c)}$	0.24	$^\circ C/W$
结到管壳的热阻 Junction to case diode	$R_{th(j-c)}$	0.38	$^\circ C/W$
结到环境的热阻 Junction to ambient	$R_{th(j-A)}$	40	$^\circ C/W$



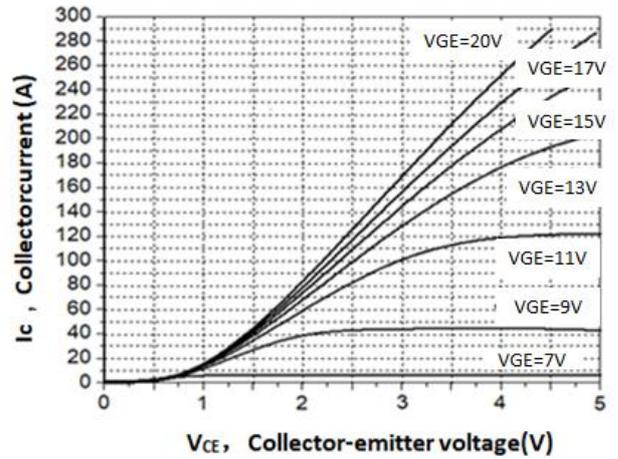


## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

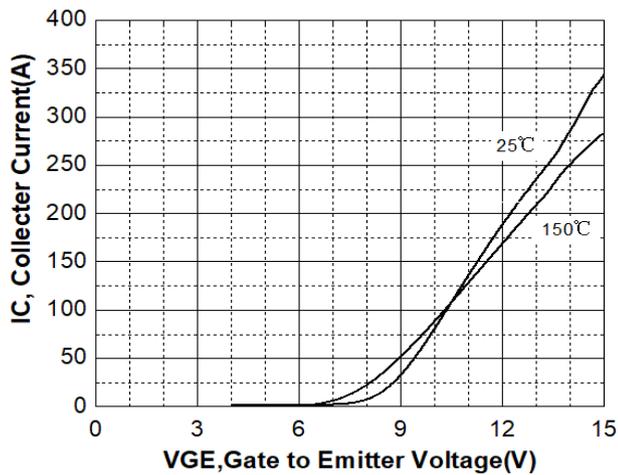
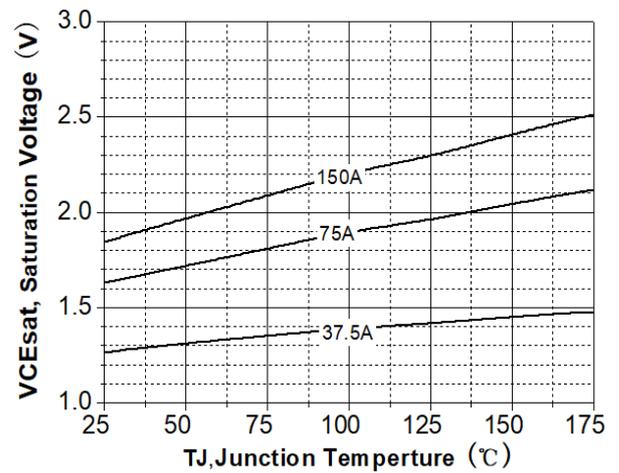
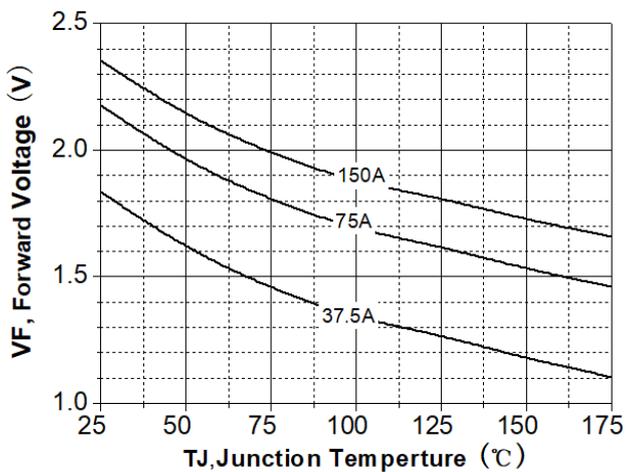
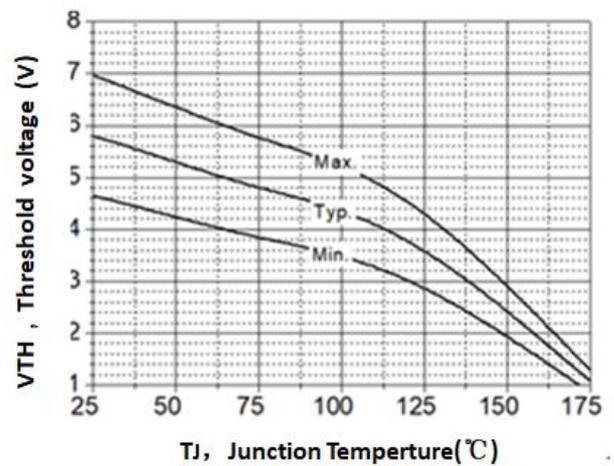
Output Characteristics (25°C)



Output Characteristics (150°C)



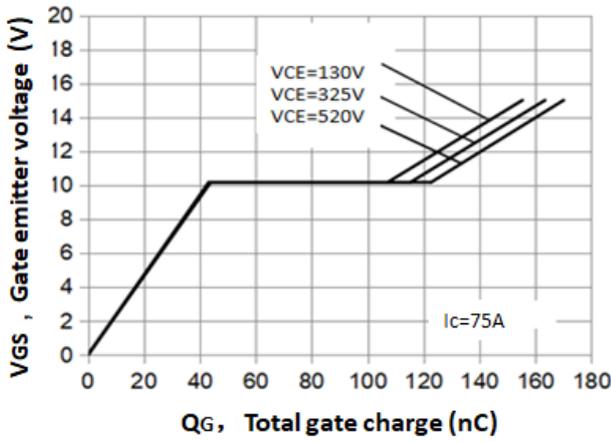
Transfer Characteristics

 $V_{CESat}$  vs.  $T_j$  $V_{ge}=15V, I_c=37.5A, 75A, 150A$  $V_F$  vs.  $T_j$  $I_F=37.5A, 75A, 150A$  $V_{TH}$  vs.  $T_j$  $I_c=250\mu A$ 



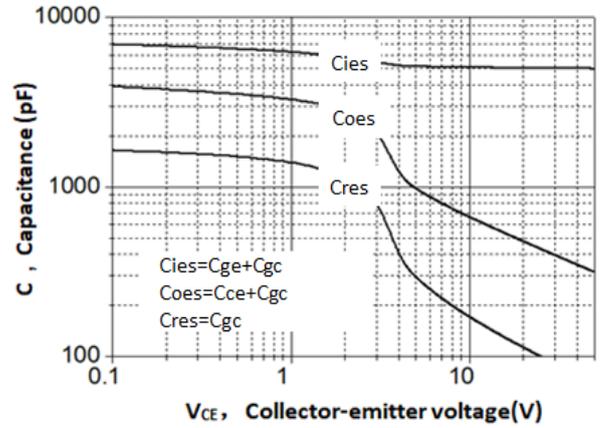
**Gate Charge Characteristics**

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



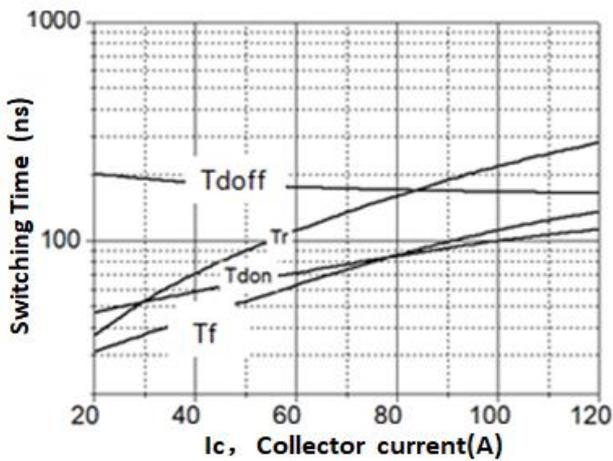
**Capacitance Characteristic**

$f=1.0MHz$



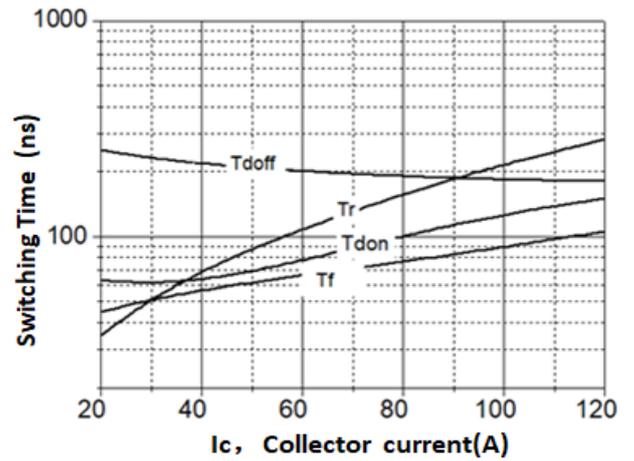
**Switching Time vs.  $I_C(25^\circ C)$**

$V_{ce}=400V, V_{ge}=15V, R_g=7.9\Omega$



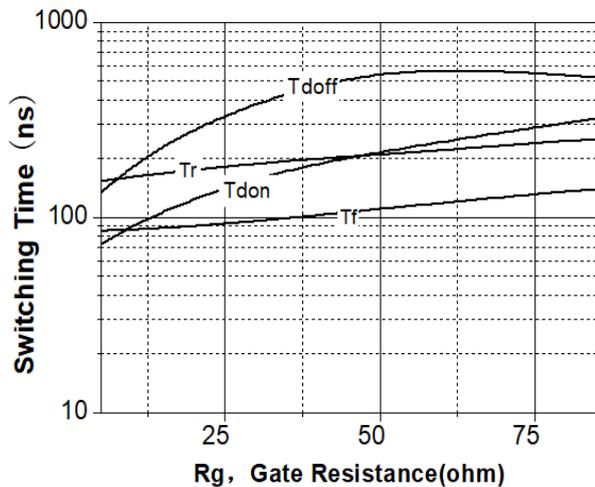
**Switching Time vs.  $I_C(150^\circ C)$**

$V_{ce}=400V, V_{ge}=15V, R_g=7.9\Omega$



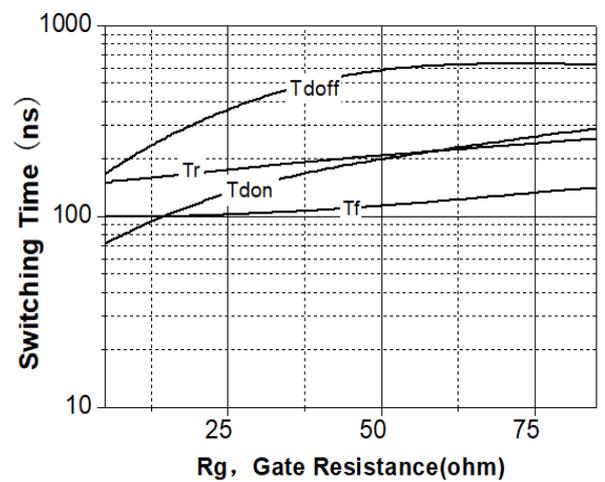
**Switching Time vs.  $R_g(25^\circ C)$**

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



**Switching Time vs.  $R_g(150^\circ C)$**

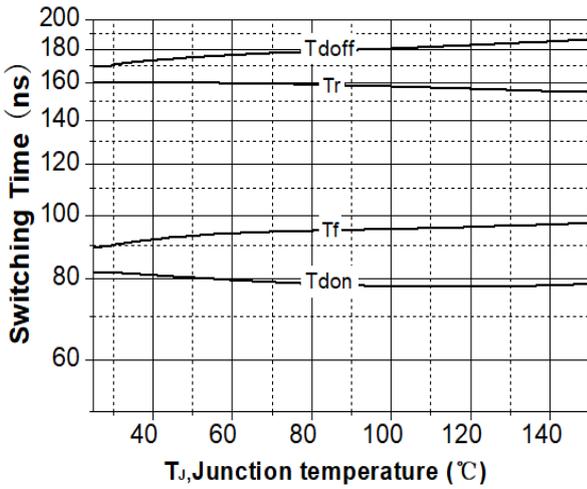
$V_{ge}=15V, V_{ce}=400V, I_c=75A$





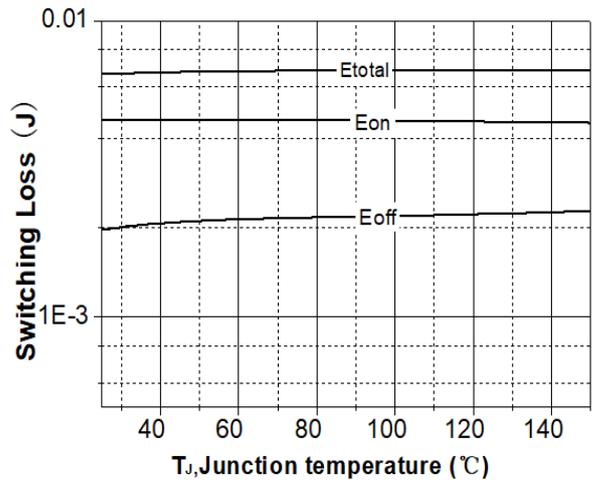
### Switching Time vs. Tj

Vge=15V, Vce=400V, Ic=75A, Rg=7.9Ω



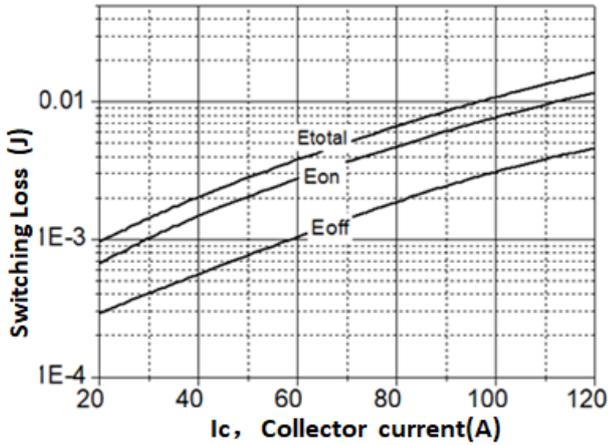
### Switching Loss vs. Tj

Vge=15V, Vce=400V, Ic=75A, Rg=7.9Ω



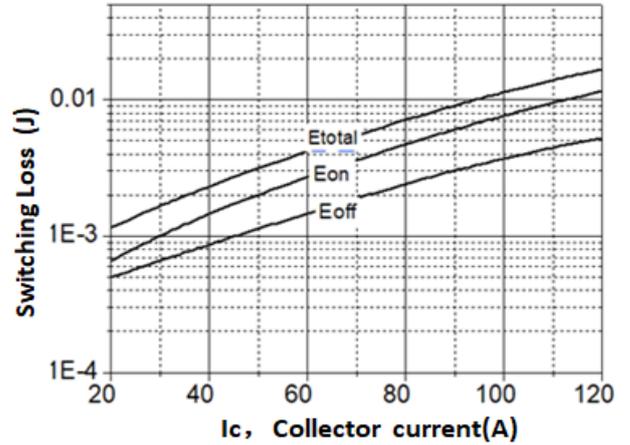
### Switching Loss vs. Ic(25°C)

Vge=15V, Vce=400V, Rg=7.9Ω



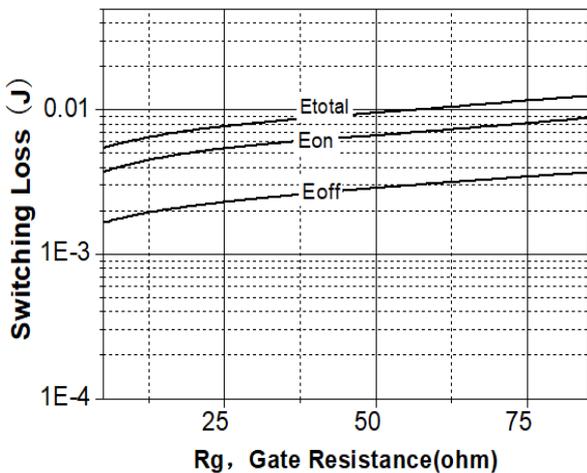
### Switching Loss vs. Ic(150°C)

Vge=15V, Vce=400V, Rg=7.9Ω



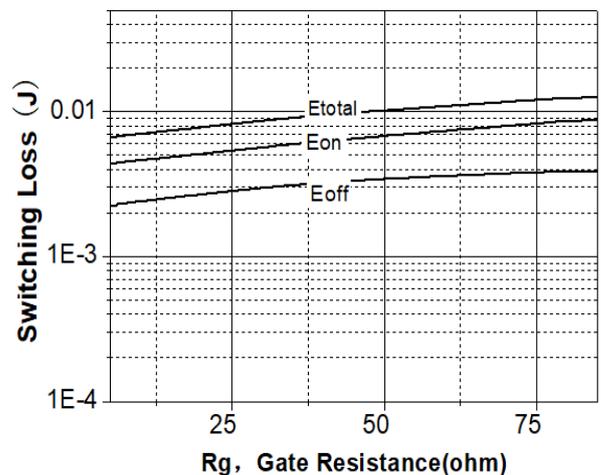
### Switching Loss vs. Rg(25°C)

Vge=15V, Vce=400V, Ic=75A



### Switching Loss vs. Rg(150°C)

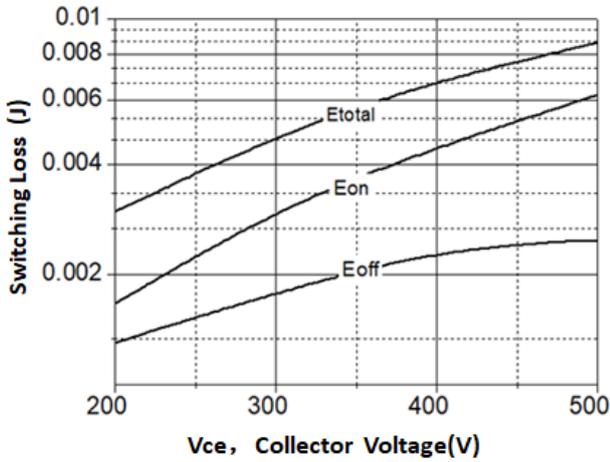
Vge=15V, Vce=400V, Ic=75A





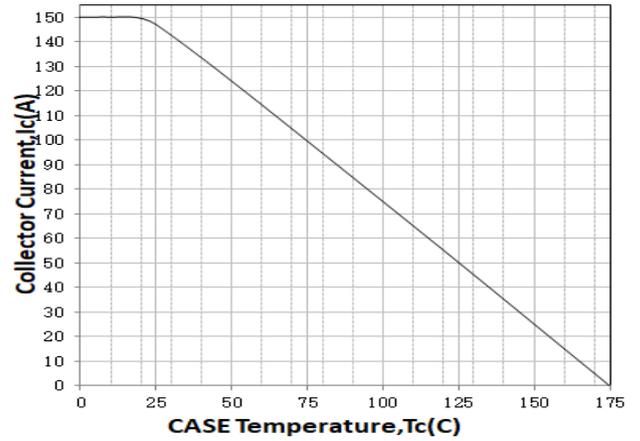
**Switching Loss vs. VCE(150°C)**

$V_{ge}=15V, I_c=75A, R_g=7.9\Omega$

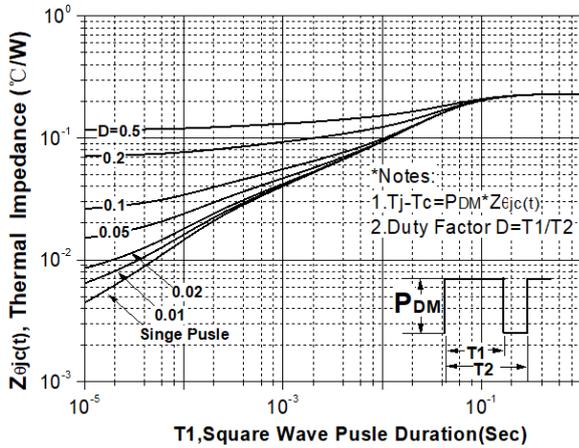


**Collector current vs. case temperature**

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

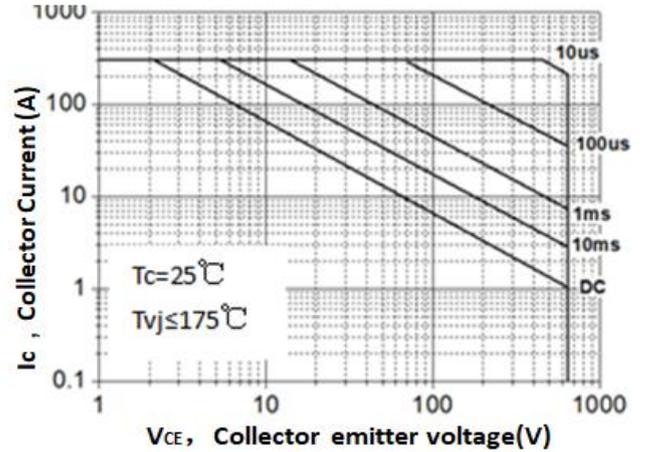


**Transient Thermal Impedance for IGBT**



**Safe Operating Area For TO-247**

$T_c=25^\circ C, V_{ge}=15V, T_j\leq 175^\circ C$

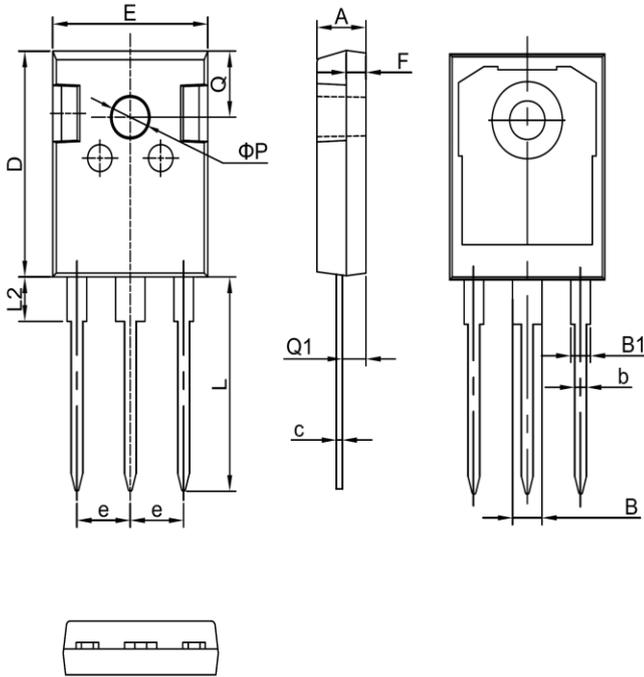




## 外形尺寸 PACKAGE MECHANICAL DATA

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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