



ATT030N065EQ

主要参数 MAIN CHARACTERISTICS

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

用途

- 逆变器
- UPS 电源
- 电机控制

产品特性

- 低栅极电荷
- Trench FS 技术
- RoHS 产品

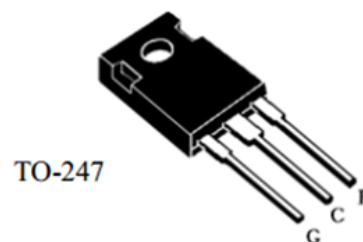
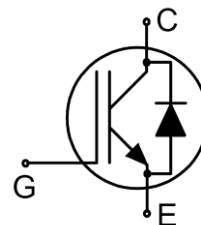
APPLICATIONS

- General purpose inverters
- UPS
- Motor Control

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 |
|----------------------------|--------------|------------|
| 无卤-条管 Halogen-Free-Tube | | |
| ATT030N065EQ-GE-BR | ATT030N065EQ | TO-247 |

绝对最大额定值 ABSOLUTE RATINGS (T_C=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 _{CE} | 650 | V |
| *连续集电极电流 Collector current-continuous T _C =25℃ T _C =100℃ | I _C | 60 30 | A |
| 最大脉冲集电极极电流 Collector current – pulse (pw<1ms, duty cycle ≤0.01) | I _{CM} | 120 | A |
| 二极管正向测试电流 Diode RMS forward current T _C =25℃ T _C =100℃ | I _F | 60 30 | A |
| 二极管正向脉冲电流 Diode pulse current (pw<1ms, duty cycle ≤0.01) | I _{FSM} | 120 | A |
| 栅极发射极电压 Gate-emitter voltage | V _{GE} | ±20 | V |
| 耗散功率 Power dissipation T _C =25℃ T _C =100℃ | P _D | 234 117 | W |
| 存储温度 Storage temperature range | T _{STG} | -55~+150 | ℃ |
| 结温 Junction temperature range | T _J | -40~+175 | ℃ |
| 最高焊接温度 Soldering temperature wave soldering 1.6 mm from case for 10 s | T _L | 260 | ℃ |

*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 |
|---|---------------|---|-----------|-----------|-----------|-------------|
| 关态特性 Off –Characteristics | | | | | | |
| 集电极-发射极击穿电压 Collector-emmitter voltage | BV_{CES} | $I_c=1mA, V_{GE}=0V, T_{vj}=25^{\circ}C$ | 650 | - | - | V |
| 零栅压下集电极漏电流 Zero gate voltage collector current | I_{CES} | $V_{CE}=650V, V_{GE}=0V, T_{vj}=25^{\circ}C$ | - | - | 30 | μA |
| 正向栅极体漏电流 Gate-body leakage current,forward | I_{GESF} | $V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$ | - | - | 200 | nA |
| 反向栅极体漏电流 Gate-body leakage current,reverse | I_{GESR} | $V_{CE}=0V, V_{GE}=-20V, T_{vj}=25^{\circ}C$ | - | - | -200 | nA |
| 通态特性 On-Characteristics | | | | | | |
| 阈值电压 Gate threshold voltage | $V_{GE(th)}$ | $V_{CE}=V_{GE}, I_c=1mA, T_{vj}=25^{\circ}C$ | 4.5 | - | 6.5 | V |
| 饱和压降 Collector-emmitter saturation voltage | V_{CESAT} | $V_{GE}=15V, I_c=30A, T_{vj}=25^{\circ}C$ | - | 1.7 | 2.1 | V |
| | | $V_{GE}=15V, I_c=30A, T_{vj}=125^{\circ}C$ | - | 1.9 | - | V |
| | | $V_{GE}=15V, I_c=30A, T_{vj}=175^{\circ}C$ | - | 2.1 | - | V |
| 动态特性 Dynamic Characteristics | | | | | | |
| 输入电容 Input capacitance | C_{ies} | $V_{CE}=25V, V_{GE}=0V, f=1.0MHz$ | - | 1830 | - | pF |
| 输出电容 Output capacitance | C_{oes} | | - | 160 | - | pF |
| 反向传输电容 Reverse transfer capacitance | C_{res} | | - | 50 | - | pF |
| 栅极电荷总量 Total gate charge | Q_g | $V_{CC}=520V, I_c=30A, R_g=7.9\Omega, V_{GE}=15V, T_{vj}=25^{\circ}C$ | - | 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 | $f=1MHz, open collector$ | - | 1.1 | - | Ω |
| 短路电流-short current | I_{sc} | $V_{GE}=15V, V_{CE}=360V, T_J \leq 150^{\circ}C, t \leq 10\mu s$ | - | 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 _{CC} =400V, I _C =30A, R _g =7.9Ω V _{GE} =15 V T _{vj} =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 | Eon | | - | 0.83 | - | mJ |
| 关断损耗 Turn-off energy | Eoff | | - | 0.36 | - | mJ |
| 总开关损耗 Total switching energy | Etot | | - | 1.19 | - | mJ |
| 开启延迟时间 Turn-on delay time | td(on) | V _{CC} =400V, I _C =30A, R _g =7.9Ω V _{GE} =15 V T _{vj} =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 | Eon | | | 1.09 | | mJ |
| 关断损耗 Turn-off energy | Eoff | | | 0.58 | | mJ |
| 总开关损耗 Total switching energy | Etot | | | 1.67 | | mJ |

反并联二极管特性及最大额定值 Anti-Parallel Diode Characteristics and Maximum Ratings

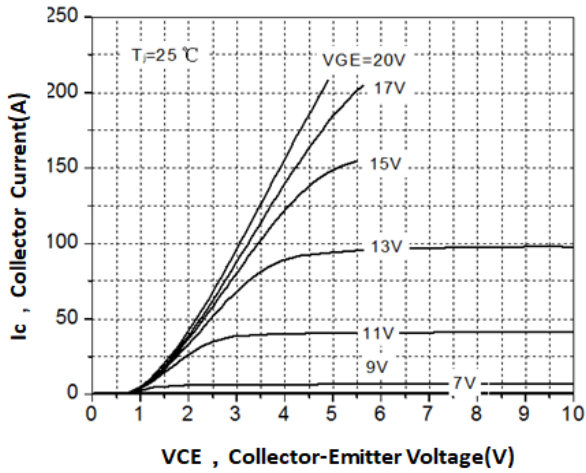
| | | | | | | |
|--|------------------|--|---|------|-----|----|
| 正向压降 Diode forward voltage | V _F | I _F =30A, T _{vj} =25°C | - | 1.7 | 2.2 | V |
| 反向恢复时间 Reverse recovery time | t _{rr} | V _{GE} =0V, V _R =400V, I _F =30A dI _F /dt=100A/μs | - | 155 | - | ns |
| 反向恢复电荷 Reverse recovery charge | Q _{rr} | | - | 85.0 | - | nC |
| 反向恢复电流 Diode reverse recovery current | I _{rrm} | T _{vj} =25°C | - | 1.14 | - | A |
| 反向恢复时间 Diode reverse recovery time | t _{rr} | V _{GE} =0V, V _R =400V I _F =30A dI _F /dt=100A/μs T _{vj} =175°C | - | 307 | - | ns |
| 反向恢复电荷 Diode reverse recovery charge | Q _{rr} | | - | 685 | - | nC |
| 反向恢复电流 Diode reverse recovery current | I _{rrm} | | - | 3.98 | - | A |

| 项 目 Parameter | 符 号 Symbol | Max | 单 位 Unit |
|---|----------------------|------|-------------|
| IGBT 结到管壳的热阻 IGBT thermal resistance, Junction -Case | R _{th(j-c)} | 0.64 | °C/W |
| Diode 结到管壳的热阻 Diode thermal resistance, Junction -Case | R _{th(j-c)} | 40 | °C/W |

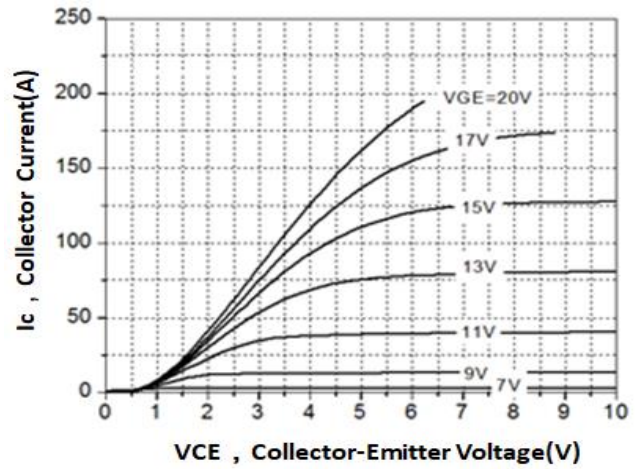


ELECTRICAL CHARACTERISTICS (curves)

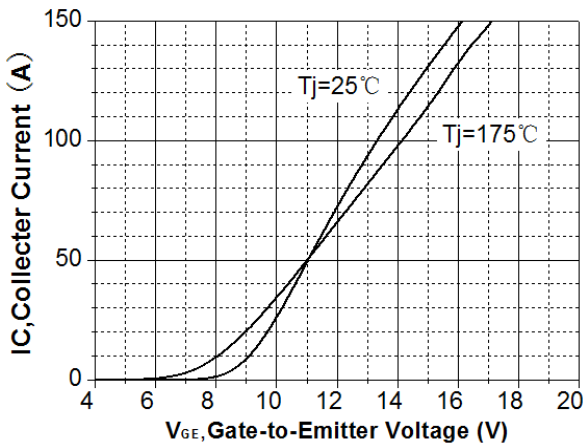
Output Characteristics (25°C)



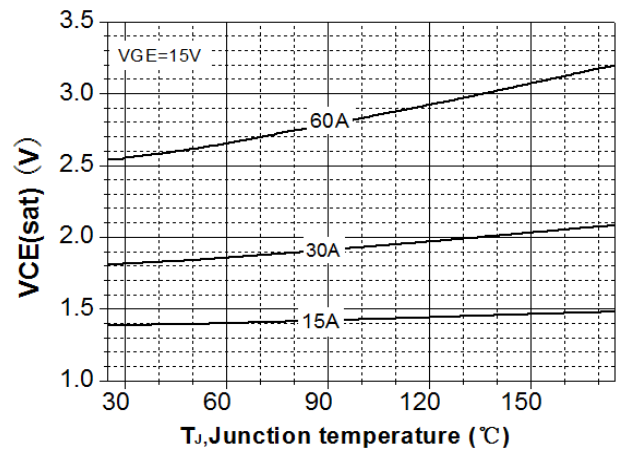
Output Characteristics (175°C)



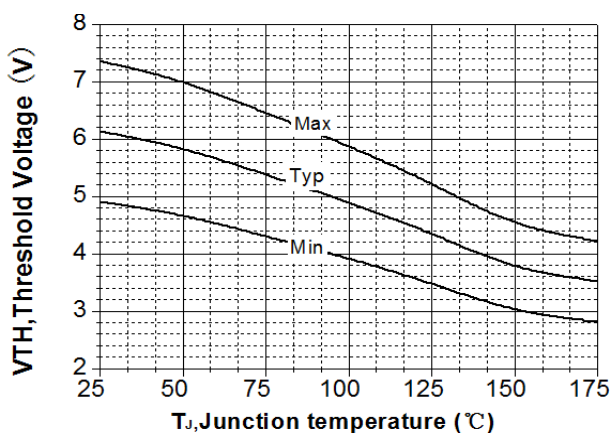
Transfer Characteristics

 $V_{CE} = 20\text{V}$ 

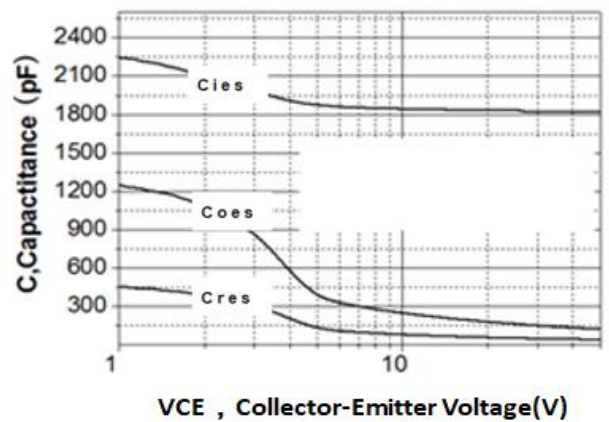
VCESat vs. Tj

 $V_{GE} = 15\text{V}, I_c = 15\text{A}, 30\text{A}, 60\text{A}$ 

Vth vs. Tj

 $I_c = 1\text{mA}$ 

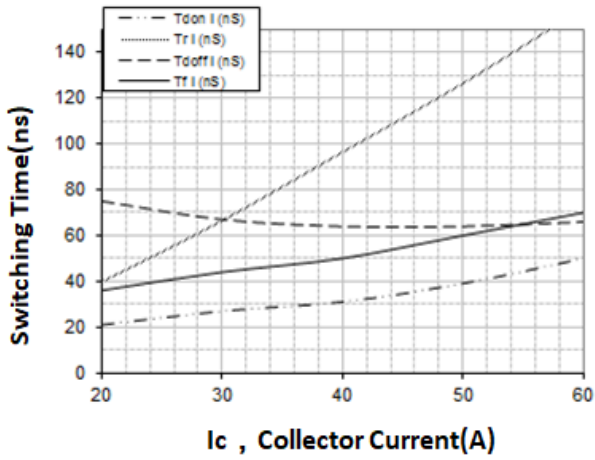
Capacitance Characteristic

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



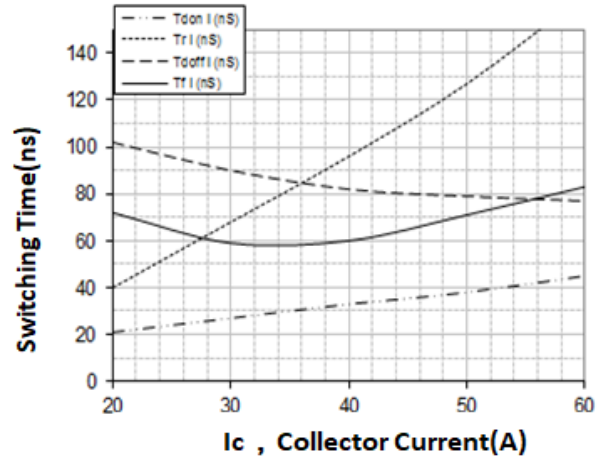
Switching Time vs. Ic(25°C)

$V_{CE}=400V, V_{GE}=15V, R_G=7.9\Omega$



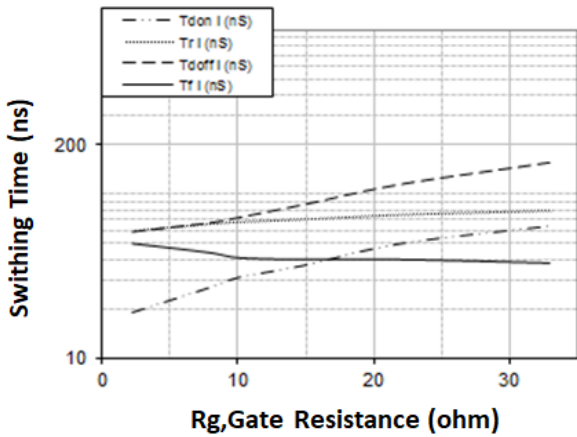
Switching Time vs. Ic(175°C)

$V_{CE}=400V, V_{GE}=15V, R_G=7.9\Omega$



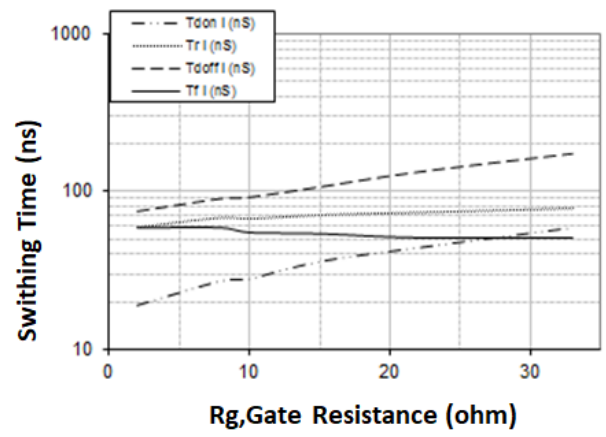
Switching Time vs. Rg(25°C)

$V_{GE}=15V, V_{CE}=400V, I_c=30A$



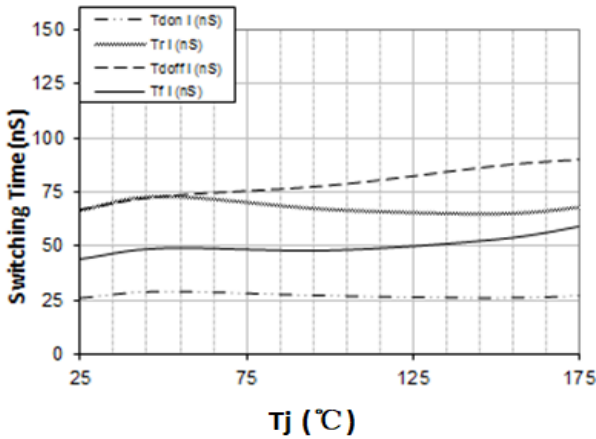
Switching Time vs. Rg(175°C)

$V_{GE}=15V, V_{CE}=400V, I_c=30A$



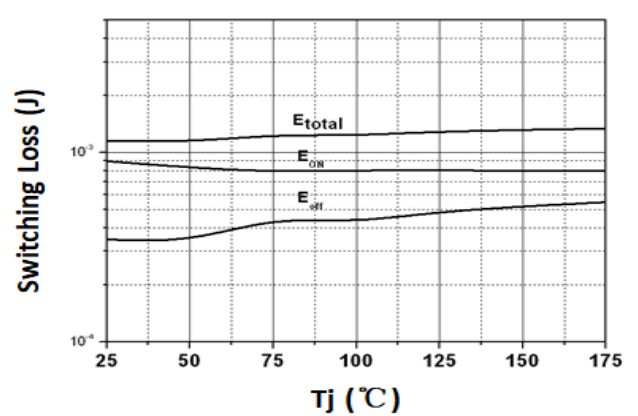
Switching Time vs. Tj

$V_{GE}=15V, V_{CE}=400V, I_c=30A, R_G=7.9\Omega$



Switching Loss vs. Tj

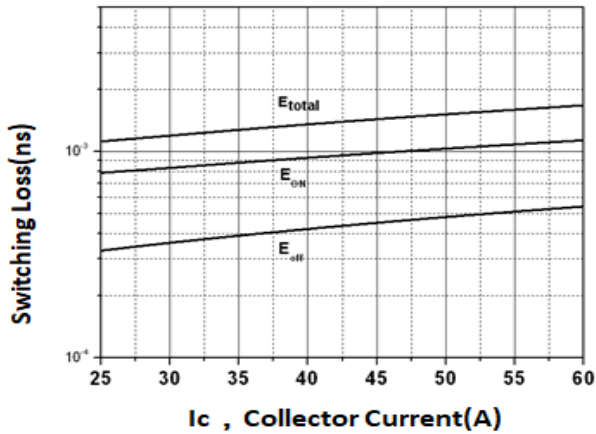
$V_{GE}=15V, V_{CE}=400V, I_c=30A, R_G=7.9\Omega$





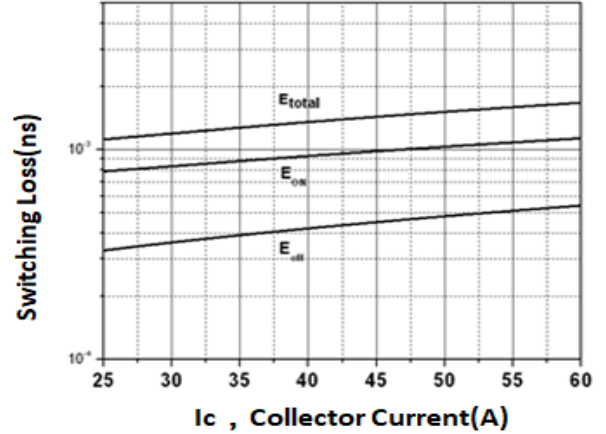
Switching Loss vs. Ic(25°C)

V_{GE}=15V, V_{CE}=400V, R_G=7.9Ω



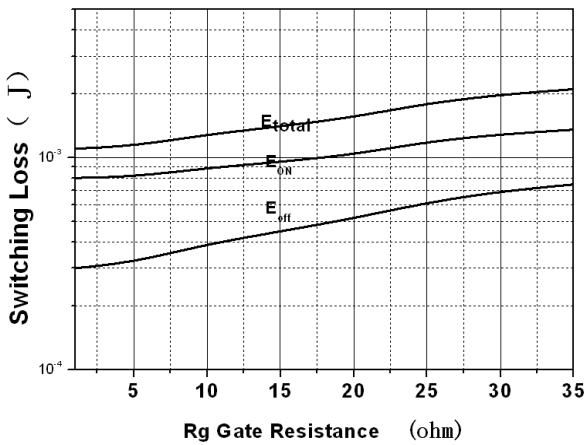
Switching Loss vs. Ic(175°C)

V_{GE}=15V, V_{CE}=400V, R_G=7.9Ω



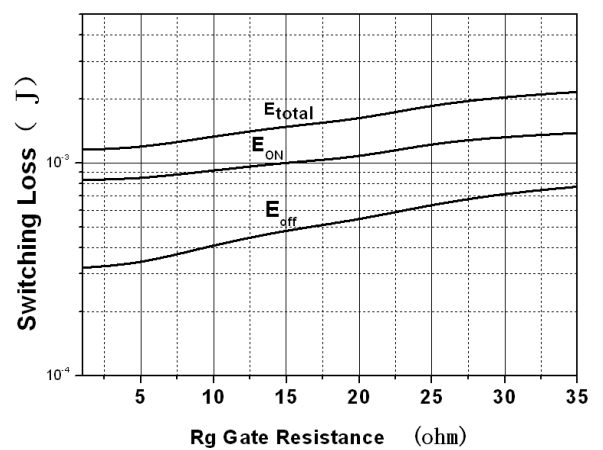
Switching Loss vs. Rg(25°C)

V_{GE}=15V, V_{CE}=400V, I_c=30A



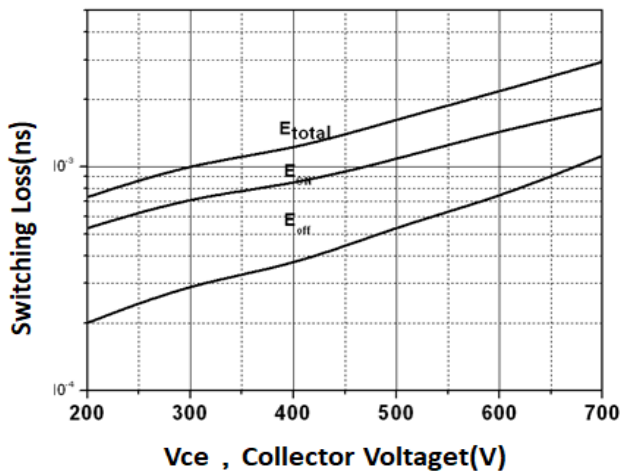
Switching Loss vs. Rg(175°C)

V_{GE}=15V, V_{CE}=400V, I_c=30A

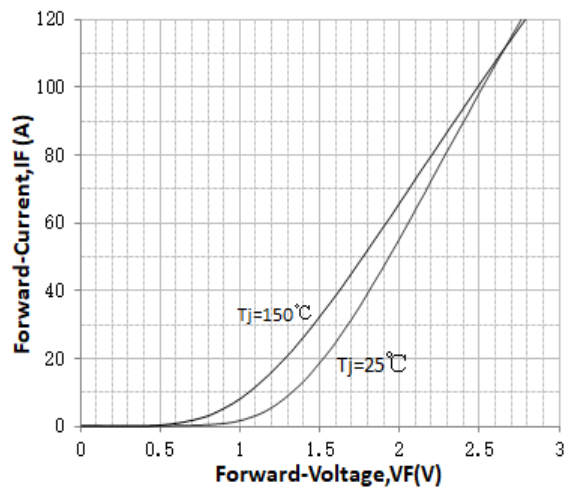


Switching Loss vs. VCE(175°C)

V_{GE}=15V, I_c=30A, R_G=7.9Ω

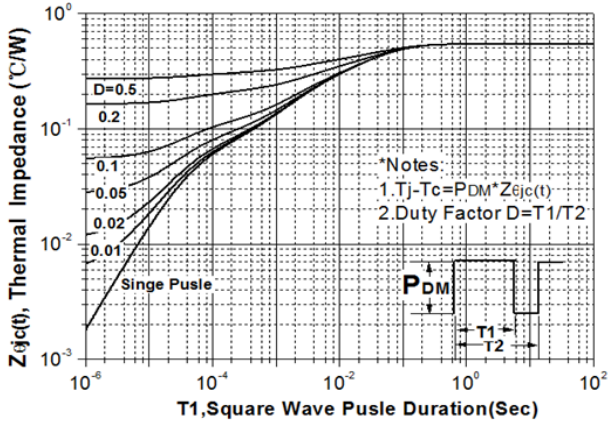


Diode Characteristic



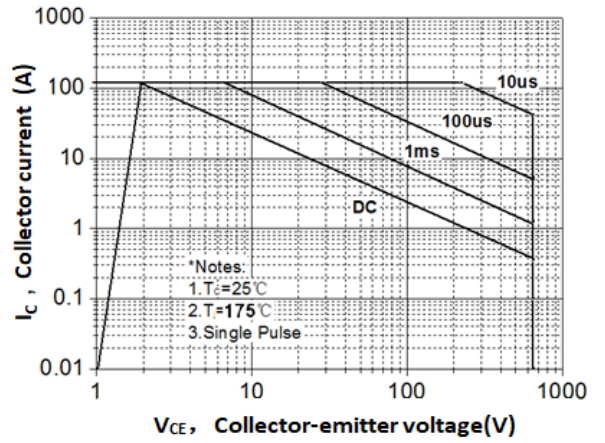


Transient Thermal Impedance IGBT



Forward Bias Safe Operating Area

$T_c = 25^\circ\text{C}$, $V_{GE} = 15\text{V}$, $T_{vj} \leq 175^\circ\text{C}$

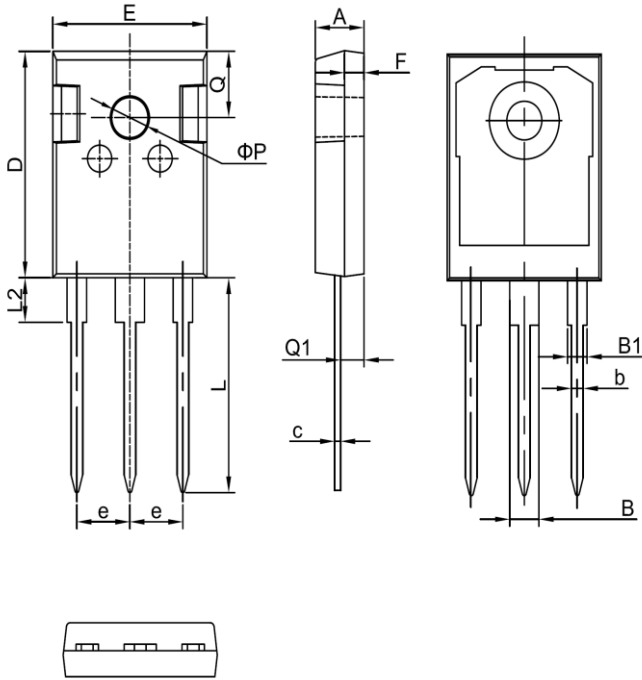




外形尺寸 PACKAGE MECHANICAL DATA

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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