



# JT050N065WED

主要参数 MAIN CHARACTERISTICS

|                     |       |
|---------------------|-------|
| Ic                  | 50 A  |
| VCES                | 650V  |
| Vcesat-typ(Vge=15V) | 1. 6V |

用途

- 逆变器
- UPS 电源
- 电机控制

APPLICATIONS

- General purpose inverters
- UPS
- Motor control

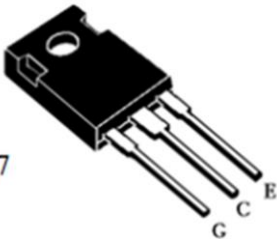
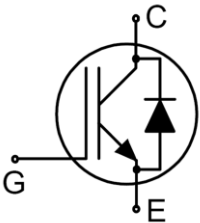
产品特性

- 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<br>Marking | 封 装<br>Package |
|-----------------------|----------------------------|-----------------------|----------------------------|----------------|----------------|
| 有卤-条管<br>Halogen-Tube | 无卤-条管<br>Halogen-Free-Tube | 有卤-编带<br>Halogen-Reel | 无卤-编带<br>Halogen-Free-Reel |                |                |
| JT050N065WED-GE-B     | JT050N065WED-GE-BR         | N/A                   | N/A                        | JT050N065WED   | TO-247         |



绝对最大额定值 ABSOLUTE RATINGS ( $T_c=25^{\circ}\text{C}$ )

| 项 目<br>Parameter                                            | 符 号<br>Symbol                  | 数 值 Value     | 单 位<br>Unit        |
|-------------------------------------------------------------|--------------------------------|---------------|--------------------|
| 最高集电极-发射极直流电压<br>Collector-Emmitter Voltage                 | $V_{ces}$                      | 650           | V                  |
| *连续集电极电流<br>Collector Current-continuous                    | $I_C$ $T=25^{\circ}\text{C}$   | 100           | A                  |
|                                                             | $I_C$ $T=100^{\circ}\text{C}$  | 50            | A                  |
| 最大脉冲集电极极电流 (注 1)<br>Collector Current – pulse (note 1)      | $I_{CM}$                       | 200           | A                  |
| 二极管正向电流<br>Diode forward current                            | $I_F$ $T=25^{\circ}\text{C}$   | 100           | A                  |
|                                                             | $I_F$ $T=100^{\circ}\text{C}$  | 50            | A                  |
| 二极管正向脉冲电流<br>Diode pulse current                            | $I_{FSM}$                      | 200           | A                  |
| 最高栅极发射极电压<br>Gate-Emmitter Voltage                          | $V_{GES}$                      | $\pm 20$      | V                  |
| 安全工作区<br>Turn-off safe area                                 | -                              | 200           | A                  |
| 耗散功率<br>Power Dissipation                                   | $P_D$ $T_c=25^{\circ}\text{C}$ | 437           | W                  |
| 最高结温及存储温度<br>Operating and Storage Temperature Range        | $T_J, T_{STG}$                 | $-55\sim+175$ | $^{\circ}\text{C}$ |
| 引线最高焊接温度<br>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<br>Parameter                                      | 符 号<br>Symbol                | 测试条件<br>Tests conditions                           | 最小<br>Min | 典型<br>Typ | 最大<br>Max | 单位<br>Units  |
|-------------------------------------------------------|------------------------------|----------------------------------------------------|-----------|-----------|-----------|--------------|
| <b>关态特性 Off –Characteristics</b>                      |                              |                                                    |           |           |           |              |
| 集电极—发射极击穿电压<br>Collector-Emmitter Voltage             | $BV_{CES}$                   | $I_C=250\mu A, V_{GE}=0V$                          | 650       | -         | -         | V            |
| 击穿电压温度特性<br>Breakdown Voltage Temperature Coefficient | $\Delta BV_{CES}/\Delta T_J$ | $I_C=0.5mA$ , referenced to $25^\circ C$           | -         | 0.6       | -         | $V/^\circ C$ |
| 零栅压下集电极漏电流<br>Zero Gate Voltage Collector Current     | $I_{CES}$                    | $V_{CE}=650V, V_{GE}=0V, T_C=25^\circ C$           | -         | -         | 40        | $\mu A$      |
| 正向栅极体漏电流<br>Gate-body leakage current, forward        | $I_{GESF}$                   | $V_{CE}=0V, V_{GE}=20V$                            | -         | -         | 200       | nA           |
| 反向栅极体漏电流<br>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<br>Gate Threshold Voltage                        | $V_{GE(th)}$                 | $V_{CE} = V_{GE}, I_C=250\mu A$                    | 4.5       | -         | 6.5       | V            |
| 饱和压降<br>Collector-Emmitter saturation Voltage         | $V_{CESAT}$                  | $V_{GE}=15V, I_C=50A, T_C=25^\circ C$              | -         | 1.6       | 2.2       | V            |
| <b>动态特性 Dynamic Characteristics</b>                   |                              |                                                    |           |           |           |              |
| 输入电容<br>Input capacitance                             | $C_{ies}$                    | $V_{CE}=25V, V_{GE}=0V, f=1.0MHz$                  | -         | 3435      | -         | pF           |
| 输出电容<br>Output capacitance                            | $C_{oes}$                    |                                                    | -         | 283       | -         | pF           |
| 反向传输电容<br>Reverse transfer capacitance                | $C_{res}$                    |                                                    | -         | 79.8      | -         | pF           |
| 栅极电荷总量 Total Gate Charge                              | $Q_g$                        | $V_{CC}=520V, I_C=50A, V_{GE}=15V, T_C=25^\circ C$ | -         | 121.0     | -         | nC           |
| 栅极-反射极 Gate to emitter charge                         | $Q_{ge}$                     |                                                    | -         | 31.6      | -         |              |
| 栅极-集电极 Gate to collector charge                       | $Q_{gc}$                     |                                                    | -         | 51.3      | -         |              |
| 栅极电阻-Gate resistance                                  | $R_g$                        | $f=1MHz$ , open collector                          | -         | 2.0       | -         | $\Omega$     |
| 短路电流-short current                                    | $I_{SC}$                     | $V_{GE}=15V, V_{CE}=300V, t_{sc} \leq 10\mu s$     | -         | 255       | -         | A            |





## 电特性 ELECTRICAL CHARACTERISTICS

| 开关特性 Switching Characteristics                                         |                      |                                                                                                                                         |           |           |           |             |
|------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-------------|
| 项 目<br>Parameter                                                       | 符 号<br>Symbol        | 测试条件<br>Tests conditions                                                                                                                | 最小<br>Min | 典型<br>Typ | 最大<br>Max | 单位<br>Units |
| 开启延迟时间 Turn-On delay time                                              | t <sub>d</sub> (on)  | V <sub>CC</sub> =400V,I <sub>c</sub> =50A,R <sub>G</sub> =10Ω<br>V <sub>GE</sub> =15 V, Parasitic ductance=75nH<br>T <sub>C</sub> =25℃  | -         | 35        | -         | ns          |
| 上升时间 Turn-On rise time                                                 | t <sub>r</sub>       |                                                                                                                                         | -         | 100       | -         | ns          |
| 关断延迟时间 Turn-Off delay time                                             | t <sub>d</sub> (off) |                                                                                                                                         | -         | 134       | -         | ns          |
| 下降时间 Turn-Off Fall time                                                | t <sub>f</sub>       |                                                                                                                                         | -         | 75        | -         | ns          |
| 开通损耗 Turn-On energy                                                    | Eon                  |                                                                                                                                         | -         | 1.55      | -         | mJ          |
| 关断损耗 Turn-off energy                                                   | Eoff                 |                                                                                                                                         | -         | 1.15      | -         | mJ          |
| 总开关损耗 Total switching energy                                           | Etot                 |                                                                                                                                         | -         | 2.7       | -         | mJ          |
| 开启延迟时间 Turn-On delay time                                              | t <sub>d</sub> (on)  | V <sub>CC</sub> =400V,I <sub>c</sub> =50A,R <sub>G</sub> =10Ω<br>V <sub>GE</sub> =15 V, Parasitic ductance=75nH<br>T <sub>C</sub> =175℃ | -         | 32        | -         | ns          |
| 上升时间 Turn-On rise time                                                 | t <sub>r</sub>       |                                                                                                                                         | -         | 93        | -         | ns          |
| 关断延迟时间 Turn-Off delay time                                             | t <sub>d</sub> (off) |                                                                                                                                         | -         | 161       | -         | ns          |
| 下降时间 Turn-Off Fall time                                                | t <sub>f</sub>       |                                                                                                                                         | -         | 159       | -         | ns          |
| 开通损耗 Turn-On energy                                                    | Eon                  |                                                                                                                                         | -         | 1.58      | -         | mJ          |
| 关断损耗 Turn-off energy                                                   | Eoff                 |                                                                                                                                         | -         | 1.8       | -         | mJ          |
| 总开关损耗 Total switching energy                                           | Etot                 |                                                                                                                                         | -         | 3.38      | -         | 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                                                                   | V <sub>F</sub>       | V <sub>GE</sub> =0V, I <sub>F</sub> =50A,T <sub>C</sub> =25℃                                                                            | -         | 1.95      | 2.4       | V           |
| Drain-Source Diode Forward Voltage                                     |                      | V <sub>GE</sub> =0V, I <sub>F</sub> =50A,T <sub>C</sub> =175℃                                                                           | -         | 1.75      | -         | V           |
| 反向恢复时间                                                                 | t <sub>rr</sub>      | V <sub>GE</sub> =0V, V <sub>R</sub> =400V, I <sub>F</sub> =50A<br>dI <sub>F</sub> /dt=200A/μs<br>T <sub>C</sub> =25℃                    | -         | 20.2      | -         | ns          |
| 反向恢复电荷                                                                 | Q <sub>rr</sub>      |                                                                                                                                         | -         | 13.9      | -         | nC          |
| 反向恢复电流                                                                 | I <sub>RRM</sub>     |                                                                                                                                         | -         | 1.26      | -         | A           |
| 反向恢复时间                                                                 | t <sub>rr</sub>      | V <sub>GE</sub> =0V, V <sub>R</sub> =400V, I <sub>F</sub> =50A<br>dI <sub>F</sub> /dt=200A/μs<br>T <sub>C</sub> =175℃                   | -         | 128       | -         | ns          |
| 反向恢复电荷                                                                 | Q <sub>rr</sub>      |                                                                                                                                         | -         | 380       | -         | nC          |
| 反向恢复电流                                                                 | I <sub>RRM</sub>     |                                                                                                                                         | -         | 5.94      | -         | A           |

## 电特性 ELECTRICAL CHARACTERISTICS

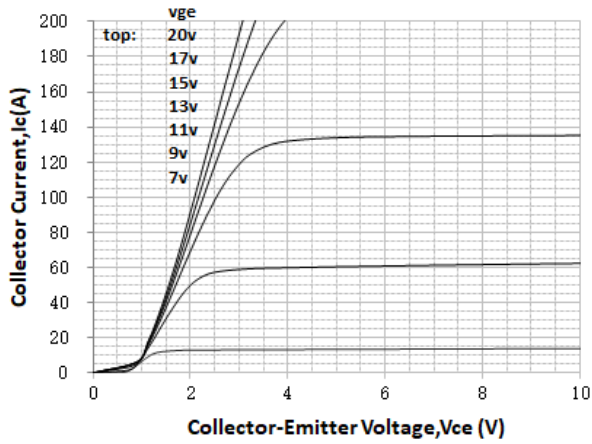
| 项 目 Parameter                  | 符 号 Symbol    | MAX   | 单 位 Unit     |
|--------------------------------|---------------|-------|--------------|
| 结到管壳的热阻 Junction to Case IGBT  | $R_{th(j-c)}$ | 0.343 | $^\circ C/W$ |
| 结到管壳的热阻 Junction to Case diode | $R_{th(j-c)}$ | 0.47  | $^\circ C/W$ |
| 结到环境的热阻 Junction to Ambient    | $R_{th(j-A)}$ | 40    | $^\circ C/W$ |



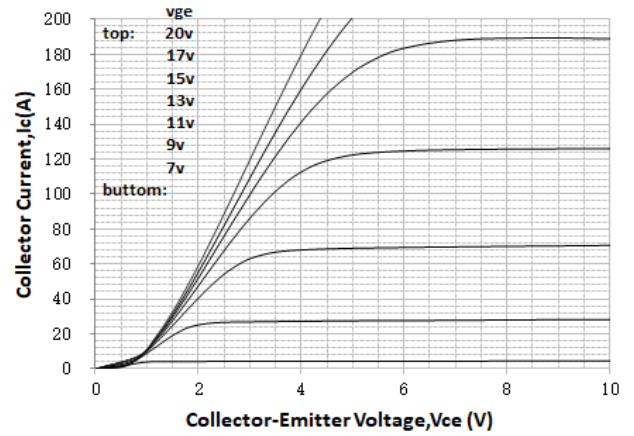


## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

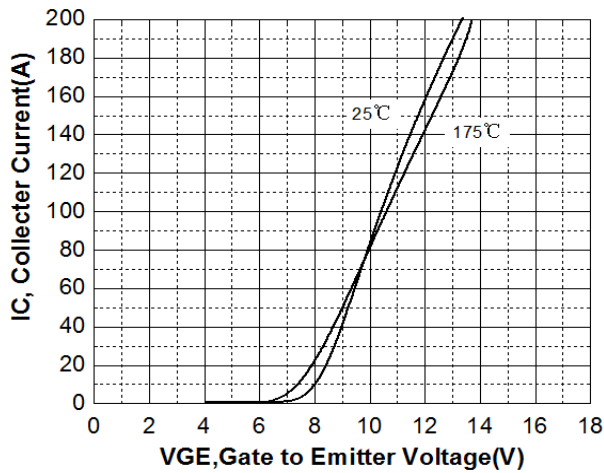
Output Characteristics (25°C)



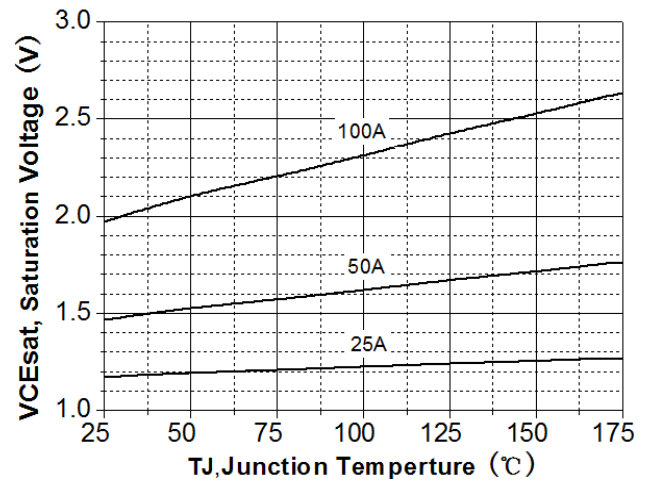
Output Characteristics (175°C)



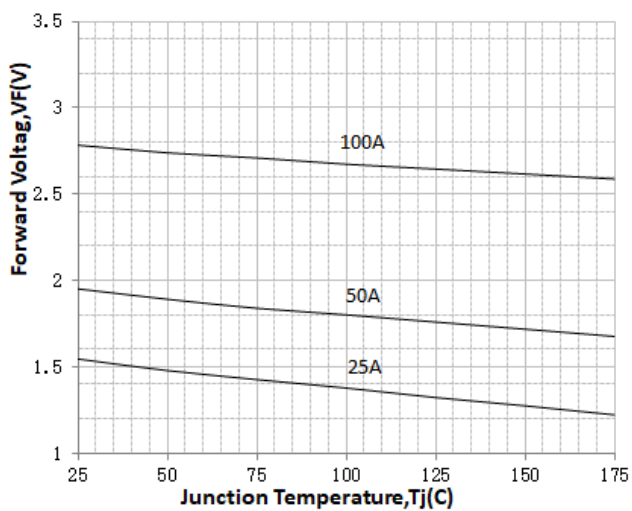
Transfer Characteristics



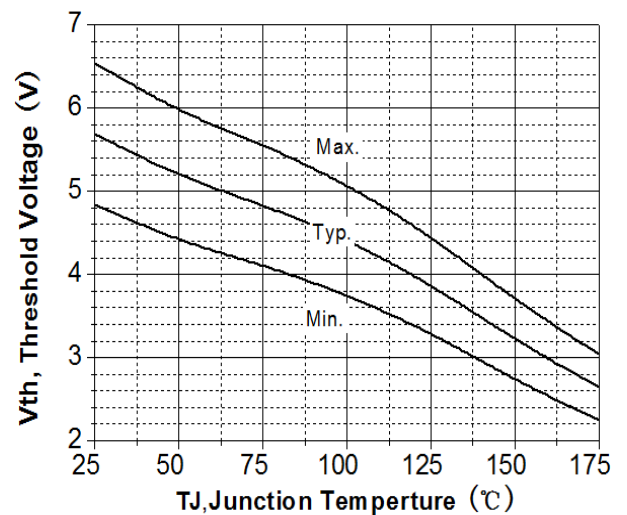
Vcesat vs. Tj

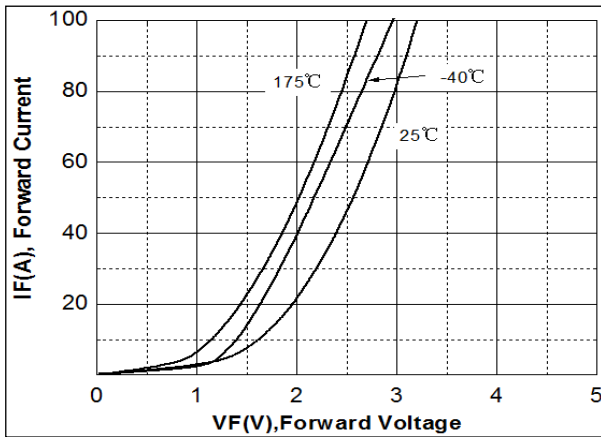
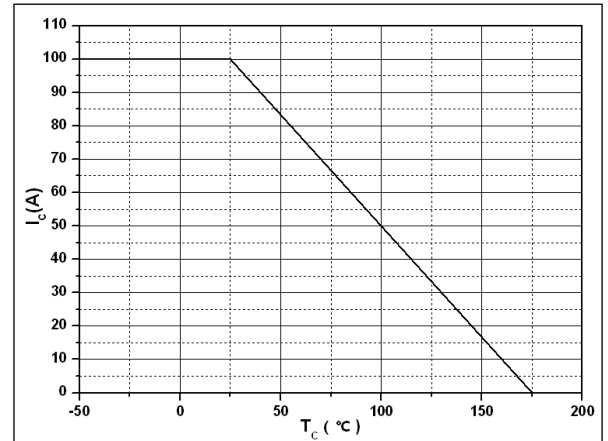
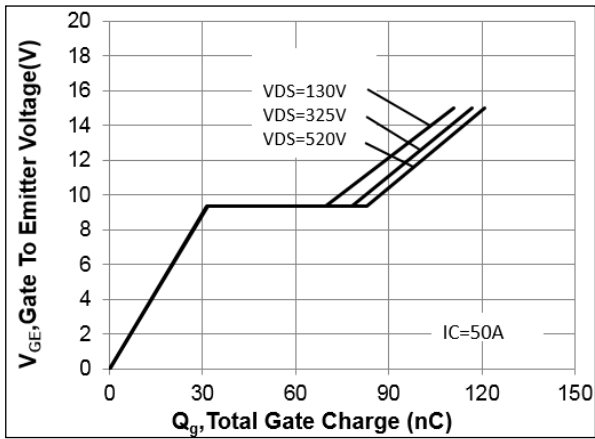
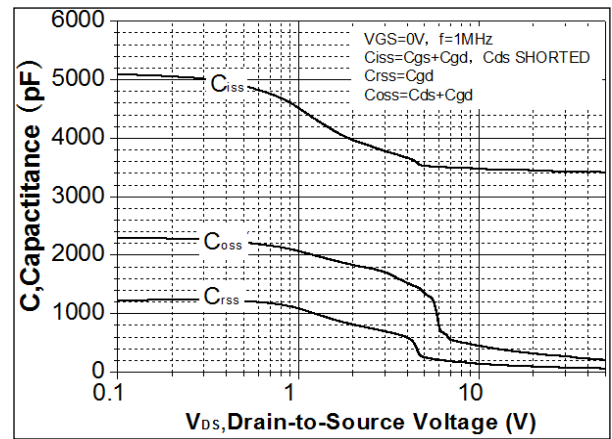
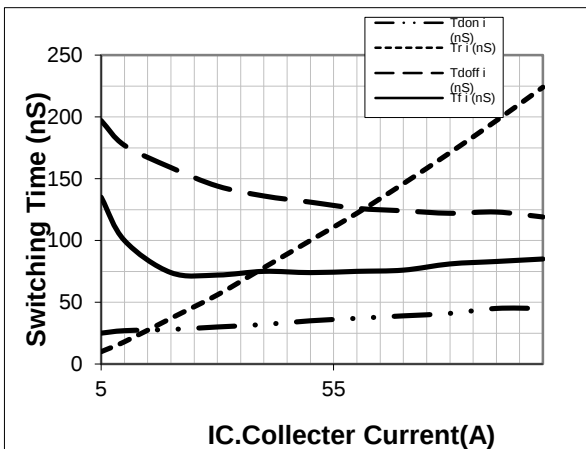
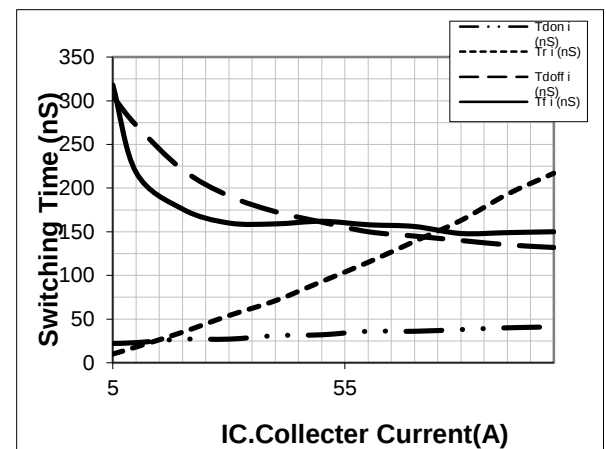


VF vs. Tj



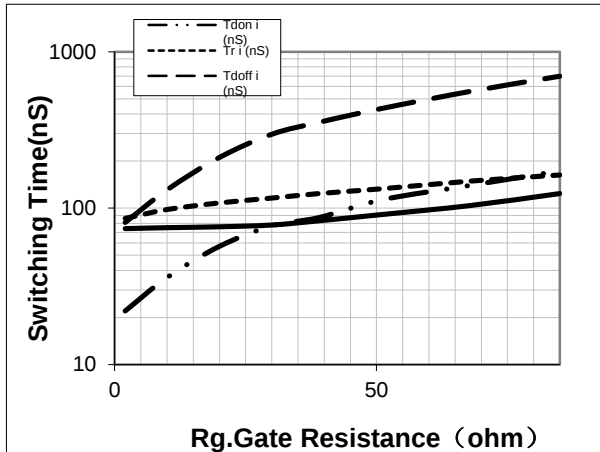
Vth vs. Tj



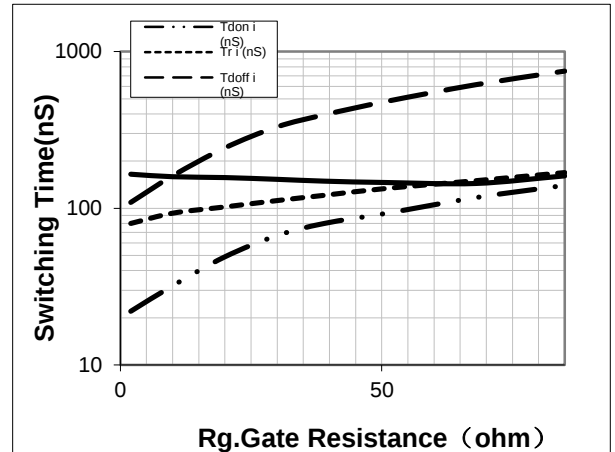
**Diode Characteristic****Collector current vs. case temperature** $V_{GE} \geq 15V, T_j \leq 175^\circ C$ **Gate Charge Characteristics** $V_{GE}=15V, I_C=50A$ **Capacitance Characteristic** $V_{GE}=0V, f=1.0MHz$ **Switching Time vs. IC(25°C)** $V_{CE}=400V, V_{GE}=15V, R_G=10\Omega$ **Switching Time vs. IC(175°C)** $V_{CE}=400V, V_{GE}=15V, R_G=10\Omega$ 

**Switching Time vs. Rg(25℃)**

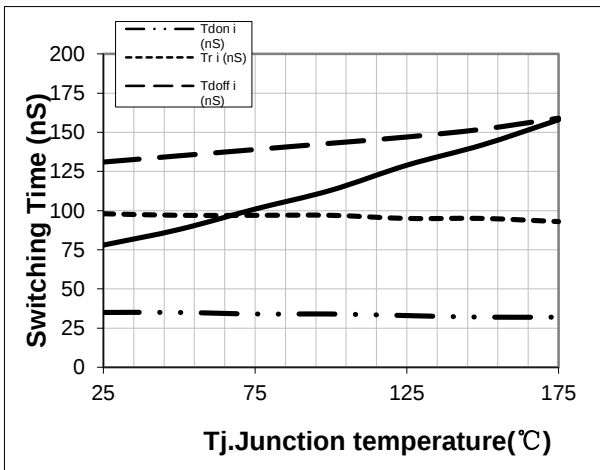
VGE=15V, VCE=400V, IC=50A

**Switching Time vs. Rg(175℃)**

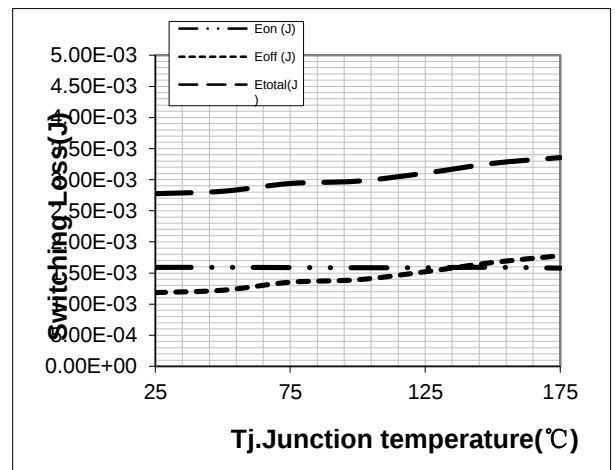
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**Switching Time vs. Tj**

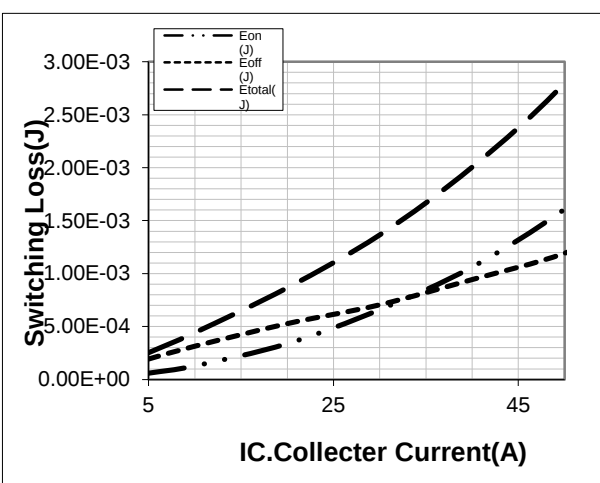
VGE=15V, VCE=400V, IC=50A, Rg=10Ω

**Switching Loss vs. Tj**

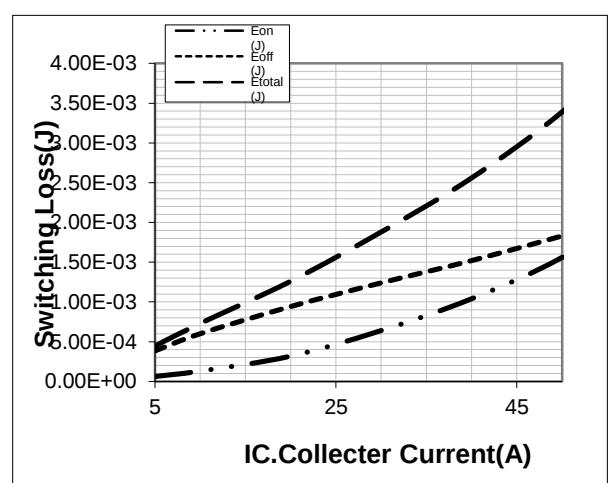
VGE=15V, VCE=400V, IC=50A, Rg=10Ω

**Switching Loss vs. IC(25℃)**

VGE=15V, VCE=400V, Rg=10Ω

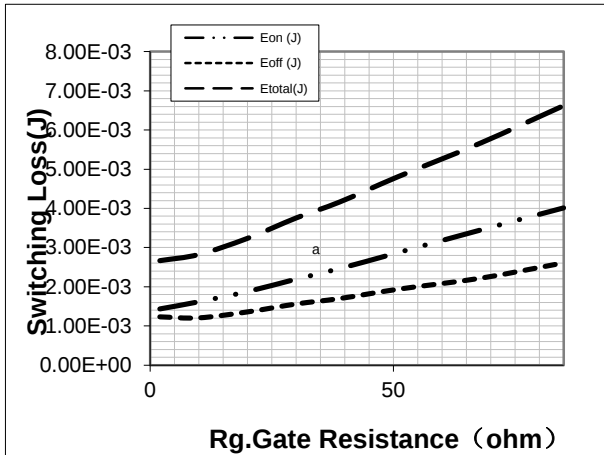
**Switching Loss vs. IC(175℃)**

VGE=15V, VCE=400V, Rg=10Ω

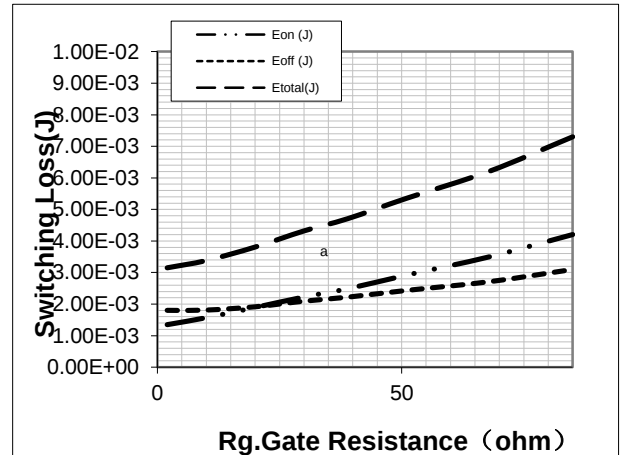


**Switching Loss vs. Rg(25°C)**

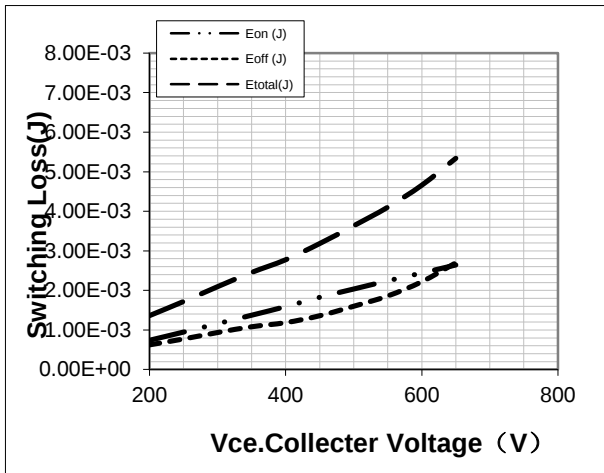
VGE=15V, VCE=400V, IC=50A

**Switching Loss vs. Rg(175°C)**

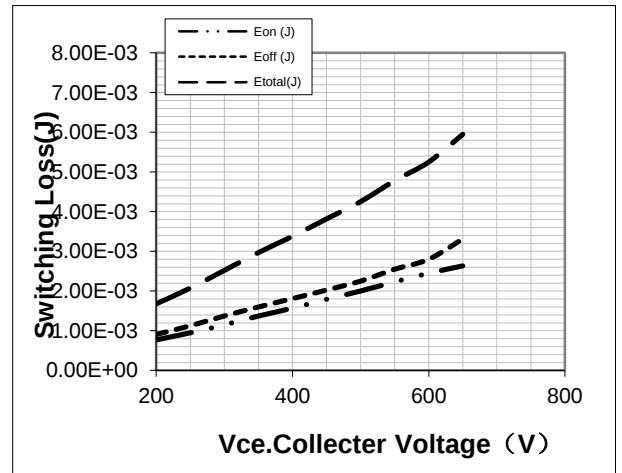
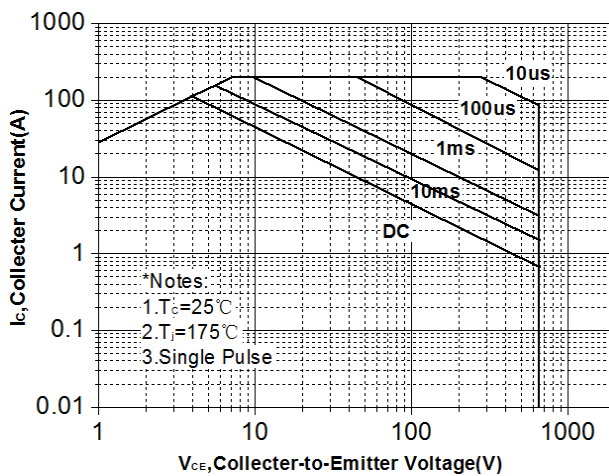
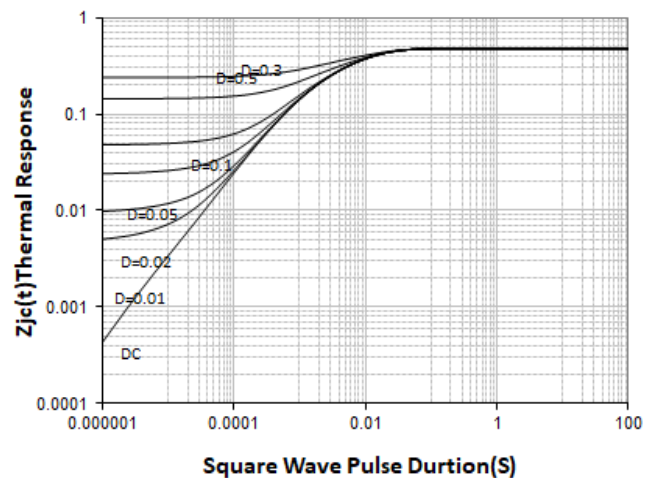
VGE=15V, VCE=400V, IC=50A

**Switching Loss vs. VCE(25°C)**

VGE=15V, IC=50A, Rg=10Ω

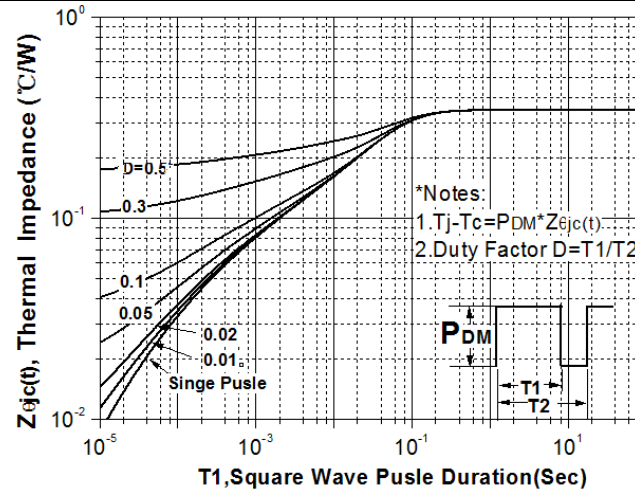
**Switching Loss vs. VCE(175°C)**

VGE=15V, IC=50A, Rg=10Ω

**Forward Bias SOA****Normalized Maximum Transient Thermal Impedance for FRD(RJC)**



## Normalized Maximum Transient Thermal Impedance for IGBT(RJC)

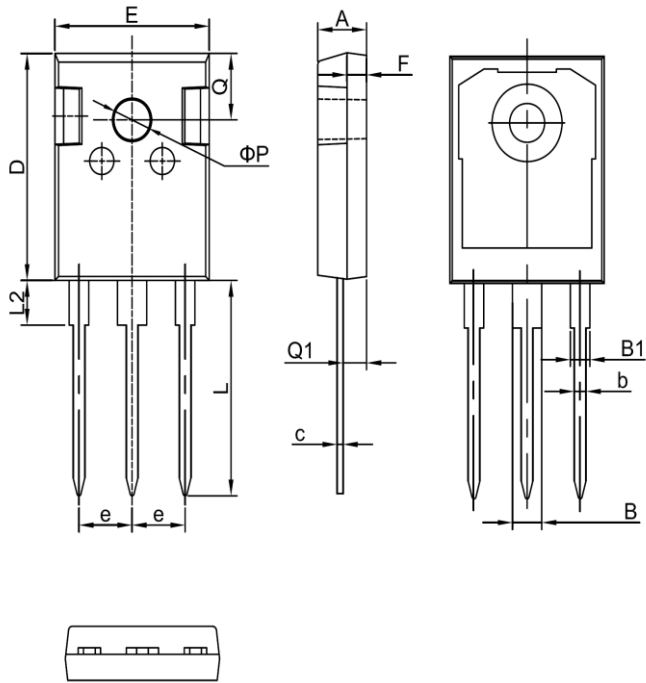




## 外形尺寸 PACKAGE MECHANICAL DATA

TO-247

单位 Unit : mm



| 符号<br>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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4. 本说明书如有版本变更不另外告知。

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3. Please do not exceed the absolute maximum ratings of the device when circuit designing.
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