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FAIRCHILD SEMICONDUCTOR®

2013 年 3 月

# FGL35N120FTD

## 1200V、35A 场截止沟槽式 IGBT

### 特性

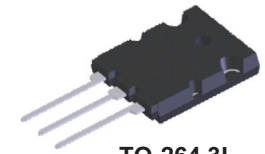
- 场截止沟槽技术
- 高速开关
- 低饱和电压： 当 $I_C$ = 35 A 时, VCE(sat)= 1.68 V
- 高输入阻抗

### 概述

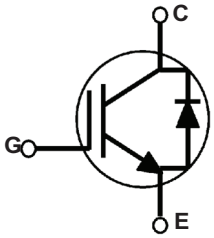
飞兆半导体®的 1200V 沟槽式 IGBT 系列采用先进的场截止沟槽 IGBT 技术，为太阳能逆变器、UPS 和焊机等硬开关应用提供最佳性能。

### 应用

太阳能逆变器，不间断电源，电焊机，功率因素校正




TO-264 3L




### 绝对最大额定值

| 符号 | 说明 | | 额定值 | 单位 |
|---|---|---|---|---|
| $V_{CES}$ | 集电极-发射极之间电压 | | 1200 | V |
| $V_{CES}$ | 栅极－发射极间电压 | | ± 25 | V |
| IC | 集电极电流 | @ TC = 25°C | 70 | A |
| | 集电极电流 | @ TC = 100°C | 35 | A |
| $I_{CM\ (1)}$ | 集电极脉冲电流 | @ TC = 25°C | 105 | A |
| $I_F$ | 二极管正向连续电流 | @ TC = 100°C | 40 | A |
| $P_D$ | 最大功耗 | @ TC = 25°C | 368 | W |
| | 最大功耗 | @ TC = 100°C | 147 | W |
| $T_J$ | 工作结温 | | -55 to +150 | °C |
| $T_{stg}$ | 存储温度范围 | | -55 to +150 | °C |
| $T_L$ | 适用的最大引脚温度，距离外壳 1/8 英寸处焊接 5 秒 | | 300 | °C |

**注意：**
1: 可重复的规格： 脉宽受最大结温限制

### 热性能

| 符号 | 参数 | 额定值 | 单位 |
|---|---|---|---|
| $R_{\theta JC}$(IGBT) | 结点-壳体的热阻 | 0.34 | °C/W |
| $R_{\theta JC}$(Diode) | 结点-壳体的热阻 | 0.9 | °C/W |
| $R_{\theta JA}$ | 结至环境热阻 | 25 | °C/W |

## 封装标识与定购信息

| 器件标识 | 设备 | 封装 | 规格 | 带宽 | 数量 |
|---|---|---|---|---|---|
| FGL35N120FTD | FGL35N120FTDT | TO-264 | - | - | 30 |

## IGBT 的电气特性 TC = 25°C，除非另有说明

| 符号 | 参数 | 测试条件 | 最小值 | 典型值 | 最大值 | 单位 |
|---|---|---|---|---|---|---|
| **关断特性** | | | | | | |
| $^{BV}CES$ | 集电极−发射极击穿电压 | $V_{GE}$ = 0 V, $I_Q$ = 250 μA | 1200 | - | - | V |
| $^{I}CES$ | 集电极切断电流 | VCE = VQES, VGE = 0 V | - | - | 1 | mA |
| $^{I}GES$ | G-E 漏电流 | VGE = VGES, VQE = 0 V | - | - | ±250 | nA |
| **导通特性** | | | | | | |
| $^{V}GE(th)$ | G-E 阈值电压 | IQ = 35 mA, VCE = VGE | 3.5 | 6.2 | 7.5 | V |
| $^{V}CE(sat)$ | 集电极−发射极间饱和电压 | $I_C$ = 35 A, $V_{GE}$ = 15 V | - | 1.68 | 2.2 | V |
| | | $I_C$ = 35 A, $V_{GE}$ = 15 V, $T_C$=125°C | - | 2.0 | - | V |
| **动态特性** | | | | | | |
| $^{C}ies$ | 直流母线电容值 | $V_{CE}$ = 30 V $V_{GE}$ = 0 V, f = 1MHz ' | - | 5090 | - | pF |
| $^{C}oes$ | 输出电容 | | - | 180 | - | pF |
| $^{C}res$ | 反向传输电容 | | - | 95 | - | pF |
| **开关特性** | | | | | | |
| td(on) | 导通延迟时间 | $V_{CC}$ = 600 V, $I_Q$ = 35 A, $R_G$ = 10Ω, $V_{GE}$ = 15 V，电感负载，$T_C$ = 25°C | - | 34 | - | ns |
| tr | 上升时间 | | - | 63 | - | ns |
| td(off) | 关断延迟时间 | | - | 172 | - | ns |
| tf | 下降时间 | | - | 107 | - | ns |
| Eon | 导通开关损耗 | | - | 2.5 | - | mJ |
| Eoff | 关断开关损耗 | | - | 1.7 | - | mJ |
| Ets | 总开关损耗 | | - | 4.2 | - | mJ |
| td(on) | 导通延迟时间 | $V_{CC}$ = 600 V，$I_C$ = 35 A，$R_G$ = 10Ω, $V_{GE}$ = 15 V, Inductive Load, $T_C$ = 125°C | - | 33 | - | ns |
| tr | 上升时间 | | - | 66 | - | ns |
| td(off) | 关断延迟时间 | | - | 180 | - | ns |
| tf | 下降时间 | | - | 146 | - | ns |
| Eon | 导通开关损耗 | | - | 3.1 | - | mJ |
| Eoff | 关断开关损耗 | | - | 2.1 | - | mJ |
| Ets | 总开关损耗 | | - | 5.2 | - | mJ |
| Qg | 总栅极电荷 | VCE = 600 V, $I_C$ = 35 A, VGE = 15 V | - | 210 | - | nC |
| Qge | 栅极－发射极间电荷 | | - | 42 | - | nC |
| Qgc | 栅极－发射极间电荷 | | - | 101 | - | nC |

## 二极管的电气特性 TC - 25°C，除非另有说明

| 符号 | 参数 | 测试条件 | | 最小值 | 典型值 | 最大值 | 单位 |
|---|---|---|---|---|---|---|---|
| VFM | 二极管正向电压 | $I_F$ = 35 A | $T_C$ = 25°C | - | 2.7 | 3.4 | V |
| | | | $T_C$ = 125°C | - | 2.5 | - | |
| trr | 二极管反向恢复时间 | $I_F$ = 35 A, di/dt = 200 A/μs | $T_C$ = 25°C | - | 337 | - | ns |
| | | | $T_C$ = 125°C | - | 520 | - | |
| Irr | 二极管反向恢复峰值电流 | | $T_C$ = 25°C | - | 7.6 | - | A |
| | | | $T_C$ = 125°C | - | 12.9 | - | |
| Qrr | 二极管反向恢复电荷 | | $T_C$ = 25°C | - | 1292 | - | nC |
| | | | $T_C$ = 125°C | - | 3377 | - | |

## 典型性能特征

图 1 典型输出特性

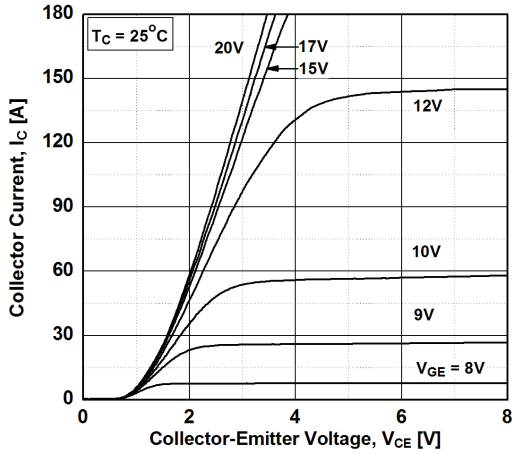



图 2. 典型输出特性

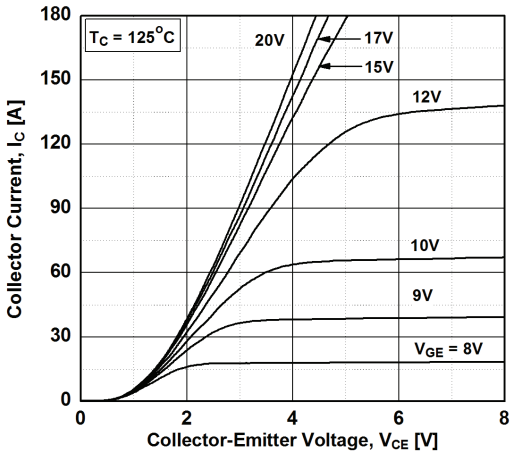



图 3. 典型饱和电压特性

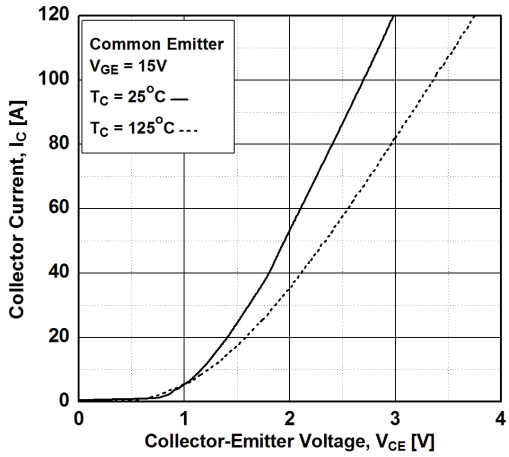



图 4. 转换特性

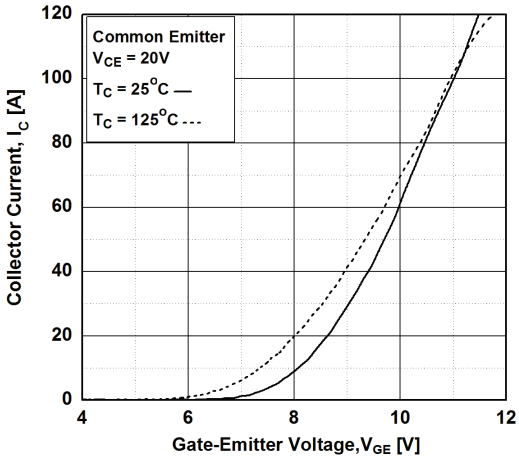



图 5. 饱和电压与不同电流强度下壳温的关系

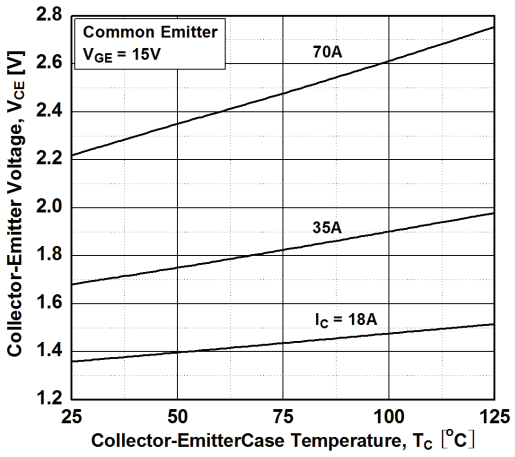
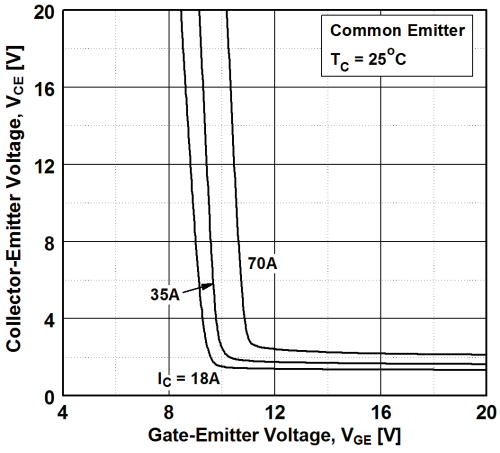
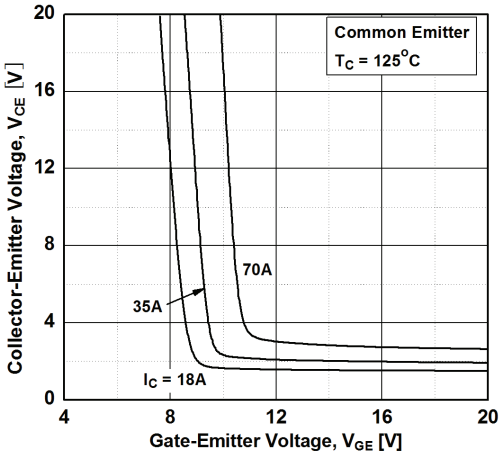



图 6. 饱和电压与 VGE 的关系

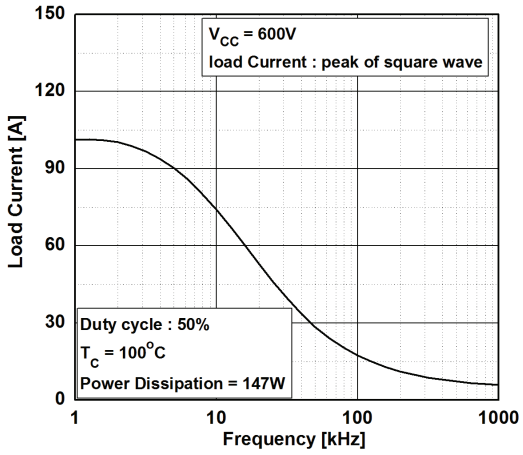


## 典型性能特征

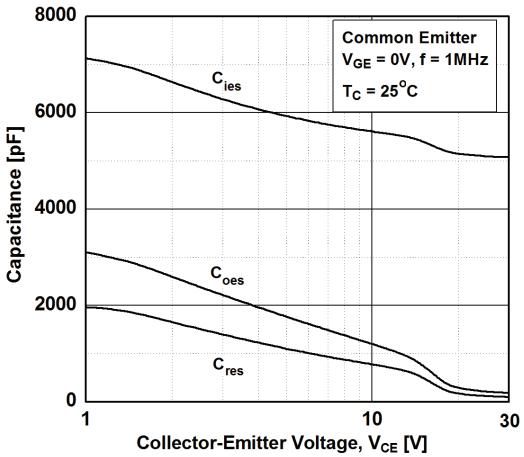
### 图 7. 饱和电压与 VGE 的关系



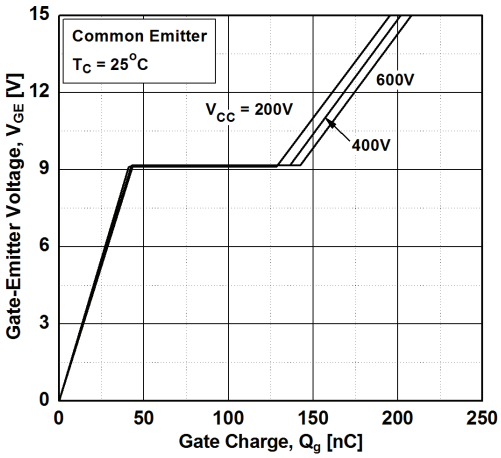

### 图 8. 负载电流与频率的关系



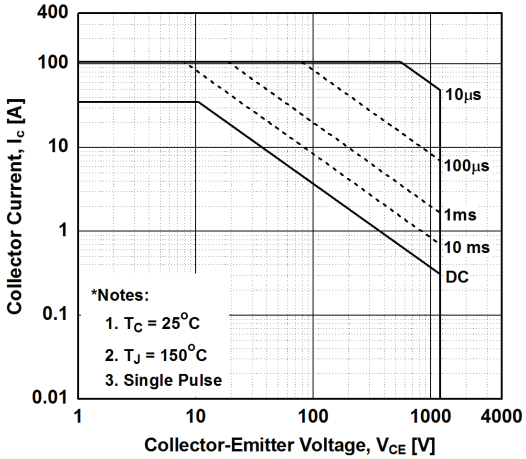

### 图 9. 电容特性



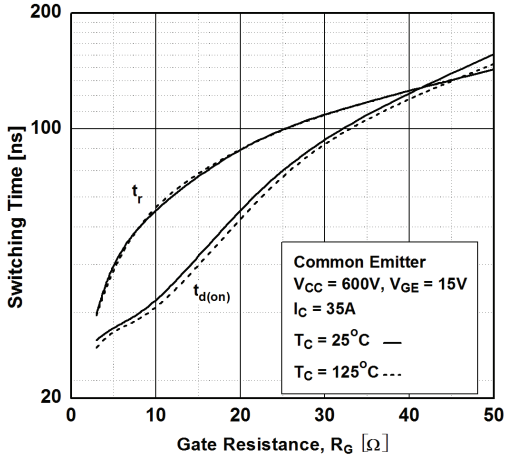

### 图 10. 栅极电荷特性




### 图 11. SOA 特性




### 图 12. 开通特性与栅极电阻的关系



## 典型性能特征

图 13. 关断特性与栅极电阻的关系

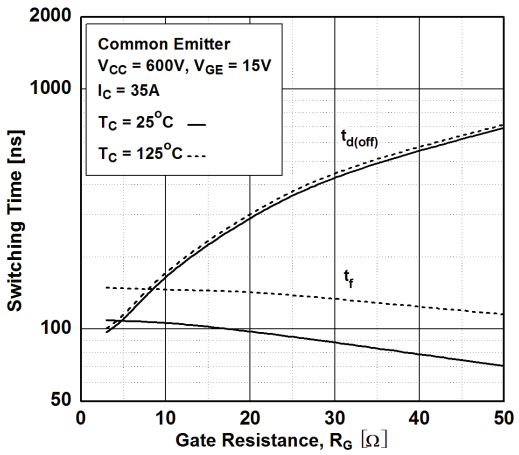



图 14. 开通特性与集电极电流的关系

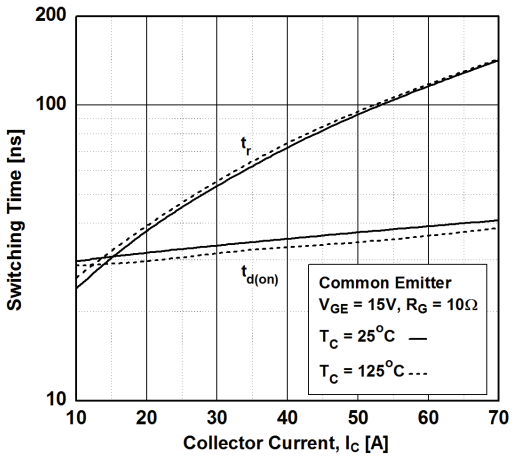



图 15. 关断特性与 集电极电流

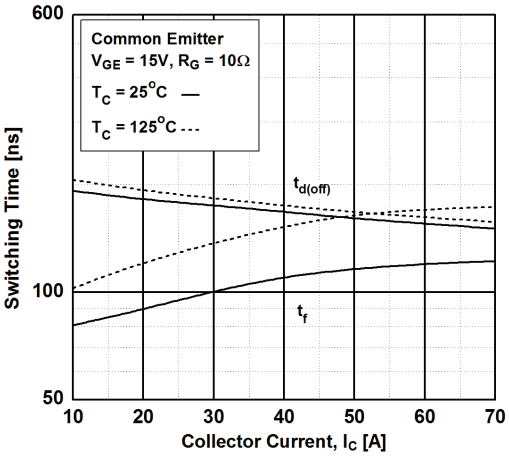



图 16. 开关损耗与栅极电阻的关系

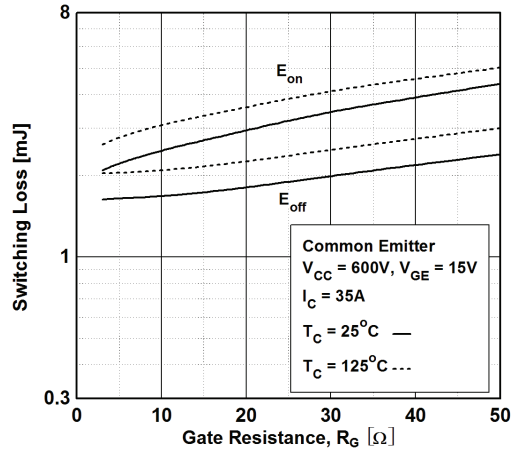



图 17. 开关损耗与集电极电流的关系

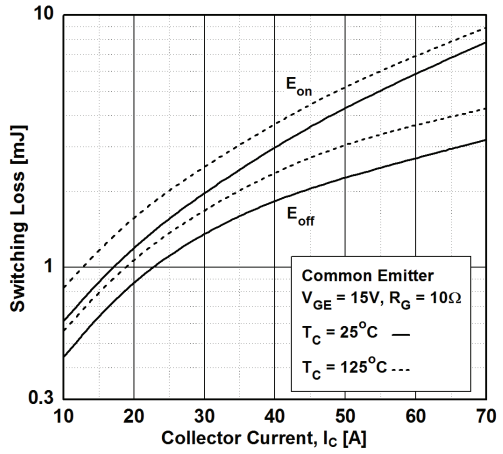
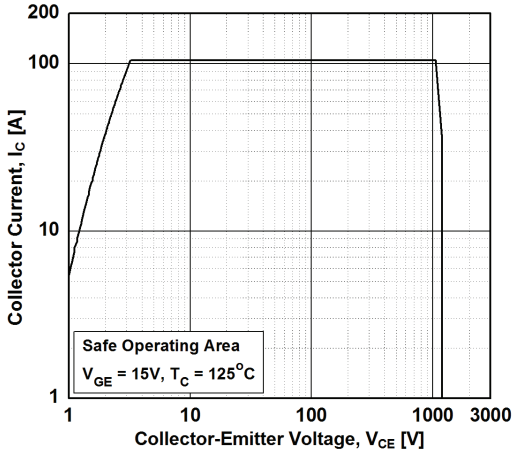



图 18. 关断开关 SOA 特性



## 典型性能特征

图 19. 正向特性

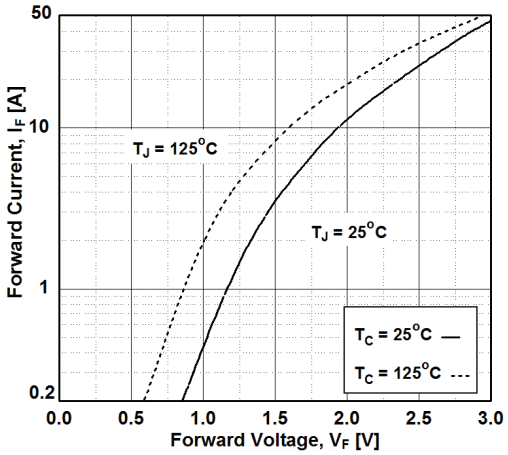



图 20. 反向恢复电流

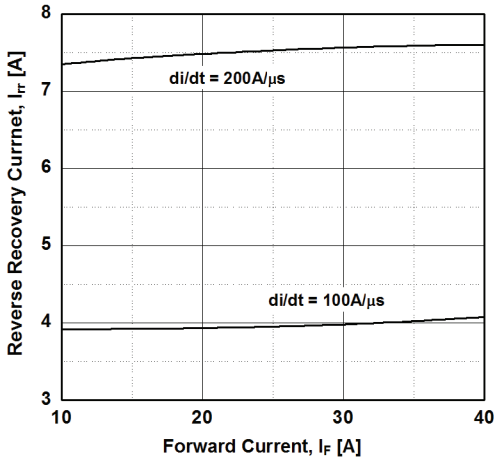



图 21. 存储电荷

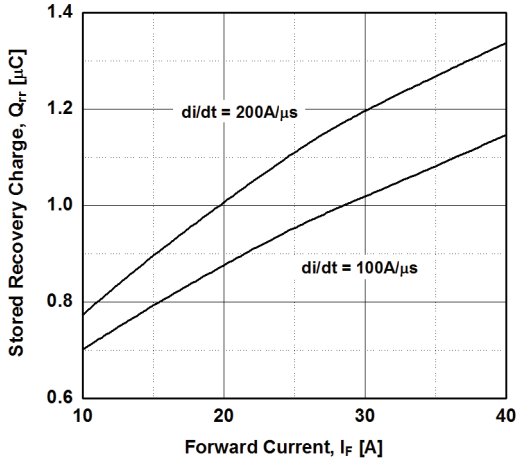



图 22. 反向恢复时间

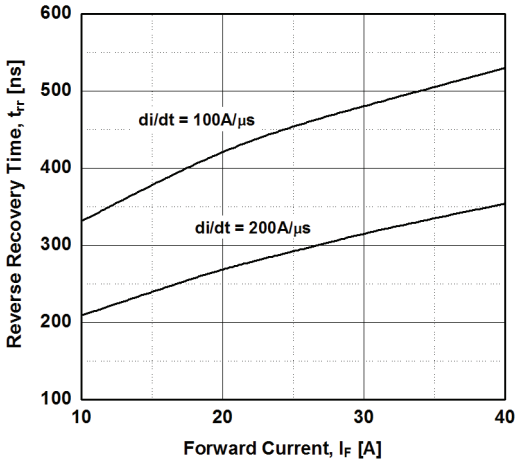
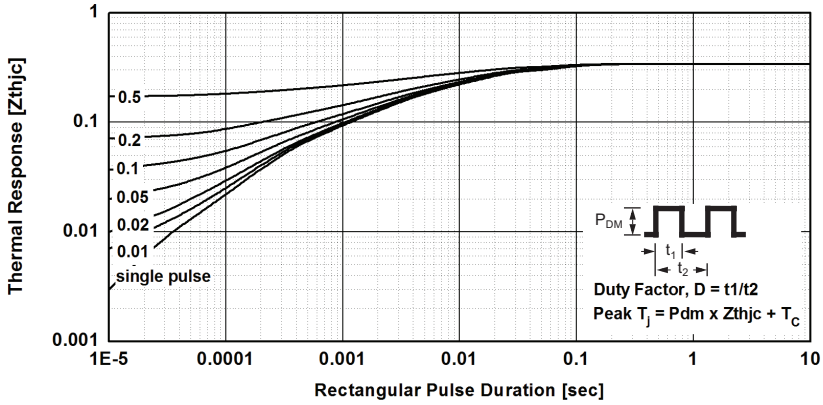
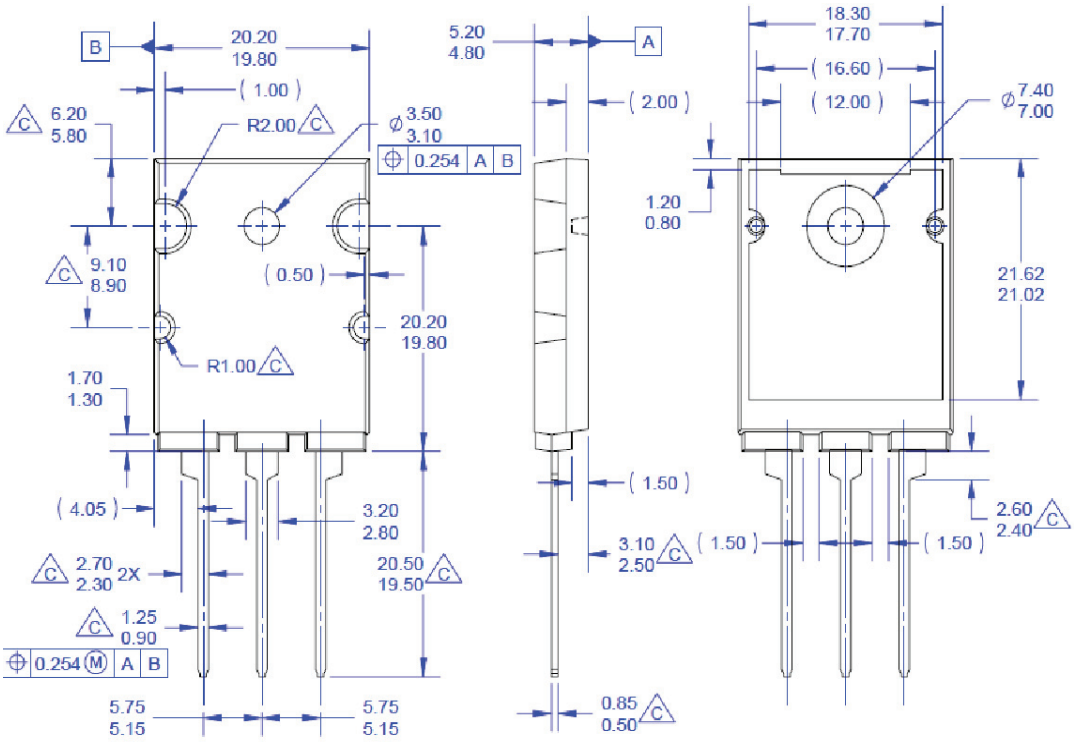



图 23. IGBT 的瞬态热阻抗



## 机械尺寸

# TO-264




NOTES:

A. PACKAGE REFERENCE: JEDEC TO264 VARIATION AA.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C. OUT OF JEDEC STANDARD VALUE.
D. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
E. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
F. THIS PACKAGE IS INTENDED ONLY FOR "FS PKG CODE AR"
G. DRAWING FILE NAME: TO264A03REV1

## * 前/后侧隔离电压： AC 2700V

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2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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**PRODUCT STATUS DEFINITIONS**

**Definition of Terms**

| Datasheet Identification | Product Status | Definition |
|---|---|---|
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