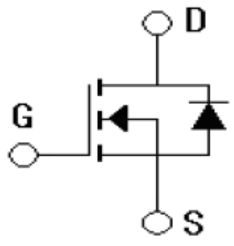
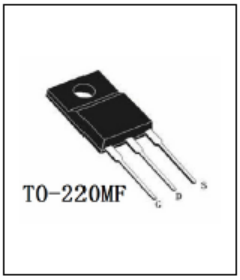
# JCS5N65FB

## 主要参数 MAIN CHARACTERISTICS

| | |
|---|---|
| $I_D$ | 4.0 A |
| $V_{DSS}$ | 650 V |
| Rdson-max (@Vgs=10V) | 2.4Ω |
| Qg-typ | 13.3nC |

封装 Package




## 用途

- 高频开关电源
- 电子镇流器
- UPS 电源

## APPLICATIONS

- High frequency switching mode power supply
- Electronic ballast
- UPS

## 产品特性

- 低栅极电荷
- 低 $C_{rss}$ (典型值 9pF)
- 开关速度快
- 产品全部经过雪崩测试
- 高抗 dv/dt 能力
- RoHS 产品

## FEATURES

- Low gate charge
- Low $C_{rss}$ (typical 9pF )
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product

## 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 | | |
| JCS5N65FB-F-B | JCS5N65FB-F-BR | N/A | N/A | JCS5N65FB | TO-220MF |

## 绝对最大额定值 ABSOLUTE RATINGS (Tc=25℃)

| 项 目 Parameter | 符 号 Symbol | 数 值 Value | 单位 Unit |
|---|---|---|---|
| | | JCS5N65FB | |
| 最高漏极－源极直流电压 Drain-Source Voltage | $V_{DSS}$ | 650 | V |
| 连续漏极电流 Drain Current -continuous | $I_D$T=25℃ | 4.0* | A |
| | T=100℃ | 2.5* | A |
| 最大脉冲漏极电流（注 1） Drain Current - pulse （note 1） | $I_{DM}$ | 16* | A |
| 最高栅源电压 Gate-Source Voltage | $V_{GSS}$ | ±30 | V |
| 单脉冲雪崩能量（注 2） Single Pulsed Avalanche Energy (note 2） | $E_{AS}$ | 240 | mJ |
| 雪崩电流（注 1） Avalanche Current （note 1） | $I_{AR}$ | 4.0 | A |
| 重复雪崩能量（注 1） Repetitive Avalanche Energy （note 1） | $E_{AR}$ | 10.0 | mJ |
| 二极管反向恢复最大电压变化速率（注 3） Peak Diode Recovery dv/dt （note 3） | dv/dt | 5.5 | V/ns |
| 耗散功率 Power Dissipation | $P_D$ $T_C$=25℃ | 33 | W |
| | -Derate above 25℃ | 0.26 | W/℃ |
| 最高结温及存储温度 Operating and Storage Temperature Range | $T_J$，$T_{STG}$ | -55～+150 | ℃ |
| 引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes | $T_L$ | 300 | ℃ |
| 阻燃 等级 Flame-retardant grade | | UL94-V0 | |

*漏极电流由最高结温限制

*Drain current 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 |
|---|---|---|---|---|---|---|
| **关态特性 Off –Characteristics** | | | | | | |
| 漏－源击穿电压<br>Drain-Source Voltage | $BV_{DSS}$ | $I_D$=250μA, $V_{GS}$=0V | 650 | - | - | V |
| 击穿电压温度特性<br>Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | $I_D$=250μA, referenced to 25℃ | - | 0.65 | - | V/℃ |
| 零栅压下漏极漏电流<br>Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=650V,$V_{GS}$=0V, $T_C$=25℃ | - | - | 10 | μA |
| | | $V_{DS}$=500V, $T_C$=125℃ | - | - | 100 | μA |
| 正向栅极体漏电流<br>Gate-body leakage current, forward | $I_{GSSF}$ | $V_{DS}$=0V, $V_{GS}$ =30V | - | - | 100 | nA |
| 反向栅极体漏电流<br>Gate-body leakage current, reverse | $I_{GSSR}$ | $V_{DS}$=0V, $V_{GS}$ =-30V | - | - | -100 | nA |
| **通态特性 On-Characteristics** | | | | | | |
| 阈值电压<br>Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$ , $I_D$=250μA | 2.0 | - | 4.0 | V |
| 静态导通电阻<br>Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$ =10V , $I_D$=2A | - | 1.7 | 2.4 | Ω |
| 正向跨导<br>Forward Transconductance | $g_{fs}$ | $V_{DS}$ = 40V , $I_D$=2A（note 4） | - | 4.7 | - | S |
| **动态特性 Dynamic Characteristics** | | | | | | |
| 输入电容<br>Input capacitance | $C_{iss}$ | $V_{DS}$=25V, $V_{GS}$ =0V, f=1.0MHz | - | 490 | 642 | pF |
| 输出电容<br>Output capacitance | $C_{oss}$ | | - | 95 | 124 | pF |
| 反向传输电容<br>Reverse transfer capacitance | $C_{rss}$ | | - | 9 | 12 | pF |

## 电特性 ELECTRICAL CHARACTERISTICS

| | | | | | | |
|---|---|---|---|---|---|---|
| **开关特性 Switching Characteristics** | | | | | | |
| 延迟时间 Turn-On delay time | $t_d$(on) | $V_{DD}$=325V,$I_D$=4A,$R_G$=25Ω （note 4，5） | - | 16 | 42 | ns |
| 上升时间 Turn-On rise time | $t_r$ | | - | 49 | 111 | ns |
| 延迟时间 Turn-Off delay time | $t_d$(off) | | - | 46 | 102 | ns |
| 下降时间 Turn-Off Fall time | $t_f$ | | - | 37 | 84 | ns |
| 栅极电荷总量 Total Gate Charge | $Q_g$ | $V_{DS}$ =520V , $I_D$=4A $V_{GS}$ =10V （note 4，5） | - | 13.3 | 19 | nC |
| 栅－源电荷 Gate-Source charge | $Q_{gs}$ | | - | 3.6 | - | nC |
| 栅－漏电荷 Gate-Drain charge | $Q_{gd}$ | | - | 4.9 | - | nC |
| 漏－源二极管特性及最大额定值 **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| 正向最大连续电流 Maximum Continuous Drain -Source Diode Forward Current | $I_S$ | | - | - | 4 | A |
| 正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current | $I_{SM}$ | | - | - | 16 | A |
| 正向压降 Drain-Source Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_S$=4.0A | - | - | 1.4 | V |
| 反向恢复时间 Reverse recovery time | $t_{rr}$ | $V_{GS}$=0V, $I_S$=4.0A $dI_F/dt$=100A/μs (note 4) | - | 330 | - | ns |
| 反向恢复电荷 Reverse recovery charge | $Q_{rr}$ | | - | 2.67 | - | μC |

## 热特性 THERMAL CHARACTERISTIC

| 项 目 Parameter | 符 号 Symbol | 最大 Max JCS5N65FB | 单位 Unit |
|---|---|---|---|
| 结到管壳的热阻 Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | 3.79 | ℃/W |
| 结到环境的热阻 Thermal Resistance, Junction to Ambient | $R_{th(j-A)}$ | 62.5 | ℃/W |

注释：

1：脉冲宽度由最高结温限制

2：L=25mH, $I_{AS}$=4.0A, $V_{DD}$=50V, $R_G$=25 Ω,起始结温 $T_J$=25 ℃

3：$I_{SD}$ ≤4.0A,di/dt ≤200A/μs,VDD≤$BV_{DSS}$,起始结温 $T_J$=25 ℃

4：脉冲测试：脉冲宽度≤300μs,占空比≤2%

5：基本与工作温度无关

Notes:

1：Pulse width limited by maximum junction temperature

2：L=25mH, $I_{AS}$=4.0A, $V_{DD}$=50V, $R_G$=25 Ω,Starting $T_J$=25℃

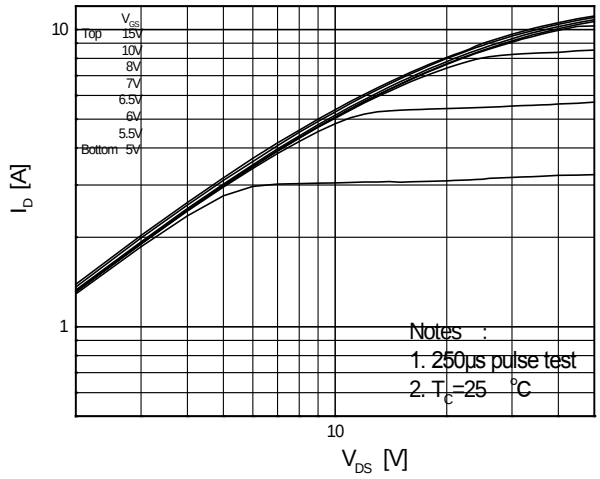
3：$I_{SD}$ ≤4.0A,di/dt ≤200A/μs,VDD≤$BV_{DSS}$, Starting $T_J$=25℃

4：Pulse Test：Pulse Width ≤300μs,Duty Cycle≤2%

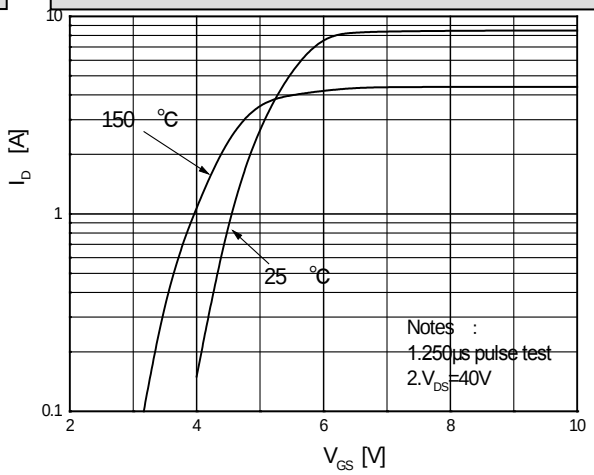
5：Essentially independent of operating temperature

## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

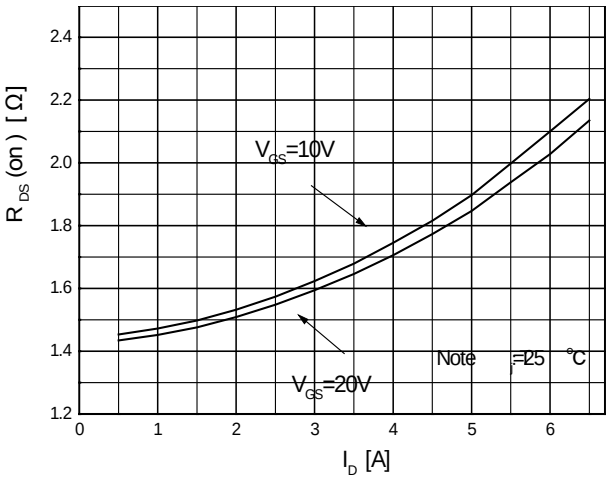
### On-Region Characteristics



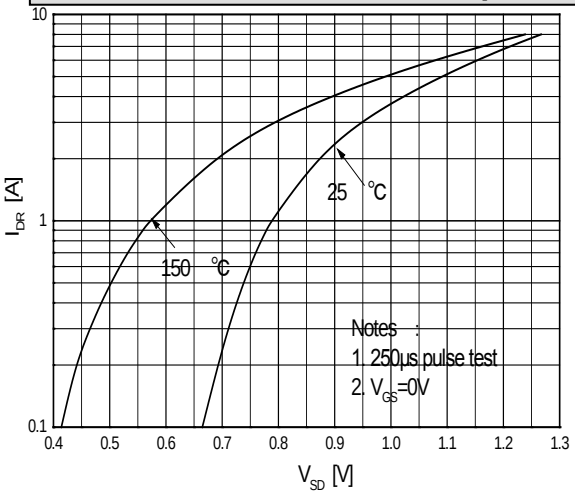

### Transfer Characteristics



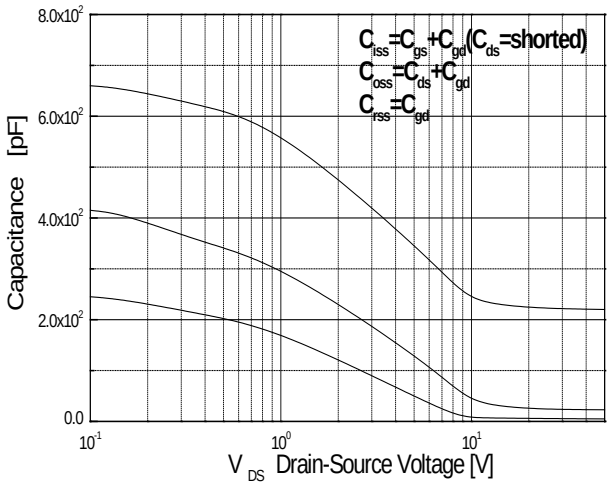

### On-Resistance Variation vs. Drain Current and Gate Voltage



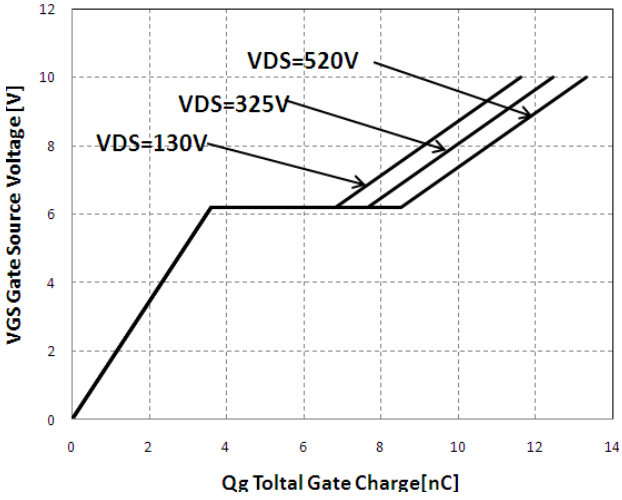

### Body Diode Forward Voltage Variation vs. Source Current and Temperature




### Capacitance Characteristics

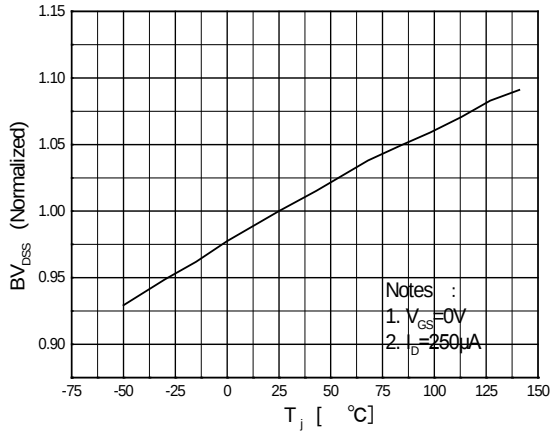



### Gate Charge Characteristics

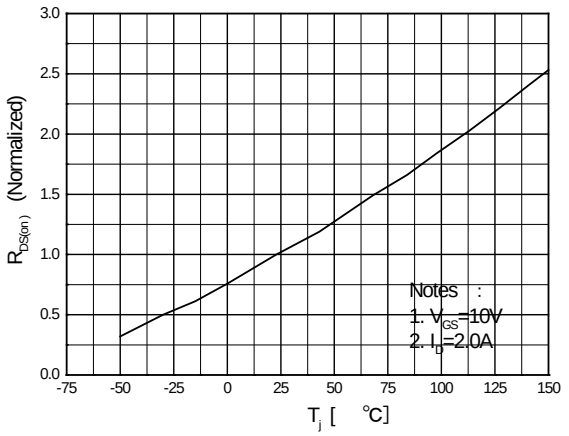


## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

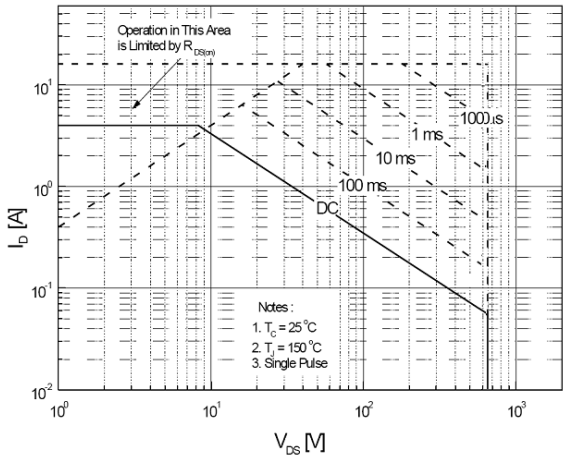
### Breakdown Voltage Variation vs. Temperature



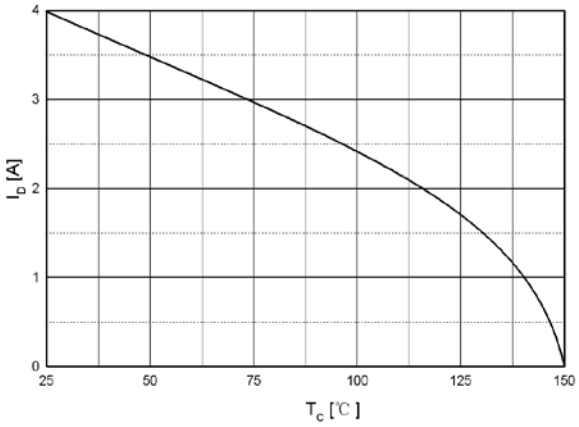

### On-Resistance Variation vs. Temperature




### Maximum Safe Operating Area For JCS5N65FB

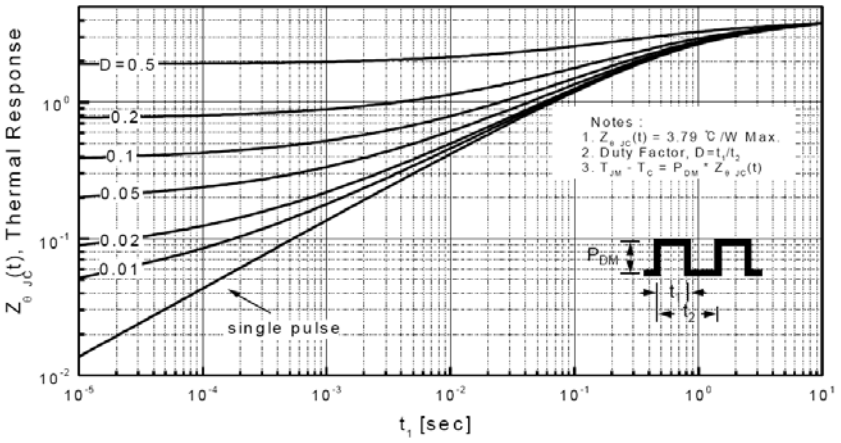



### Maximum Drain Current vs. Case Temperature



## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

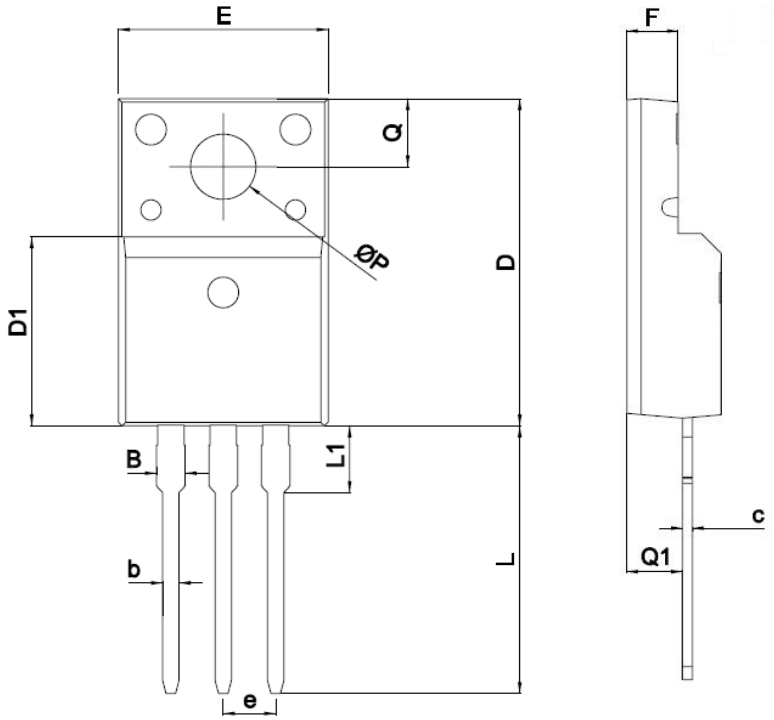
**Transient Thermal Response Curve For JCS5N65FB**



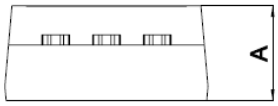
## 外形尺寸 PACKAGE MECHANICAL DATA

**TO-220MF**

**单位 Unit：mm**




| SYMBOL | mm | |
|---|---|---|
| | MIN | MAX |
| A | 4.5 | 4.9 |
| B | | 1.47 |
| b | 0.7 | 0.9 |
| c | 0.45 | 0.60 |
| D | 15.67 | 16.07 |
| D1 | 9.04 | 9.20 |
| e | 2.54TYPE | |
| E | 9.96 | 10.36 |
| F | 2.34 | 2.74 |
| L | 12.58 | 13.38 |
| L1 | 3.13 | 3.33 |
| Q | 3.2 | 3.4 |
| Q1 | 2.56 | 2.96 |
| ΦP | 3.08 | 3.28 |



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