



# JCS3910

## 主要参数 MAIN CHARACTERISTICS

|                         |         |
|-------------------------|---------|
| ID                      | 16A     |
| VDSS                    | 100 V   |
| Rdson-max<br>(@Vgs=10V) | 115 mΩ  |
| Qg-typ                  | 18.9 nC |

### 用途

- 高频开关电源
- 电子镇流器
- UPS 电源

### APPLICATIONS

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- UPS

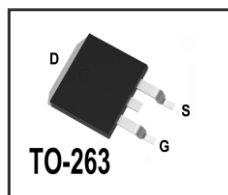
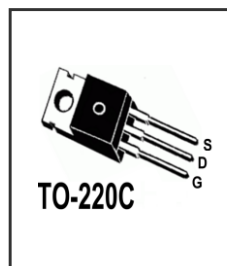
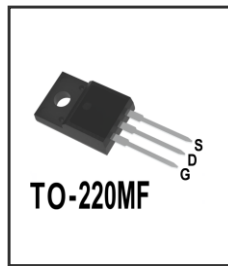
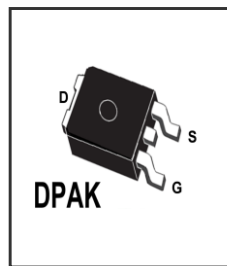
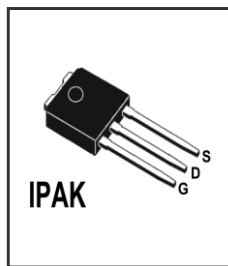
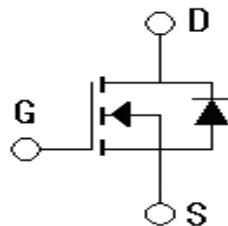
### 产品特性

- 低栅极电荷
- 低  $C_{rss}$  (典型值 90pF)
- 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 90pF )
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- 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 |                |                |
| JCS3910V-V-B          | JCS3910V-V-BR              | N/A                   | N/A                        | JCS3910V       | IPAK           |
| JCS3910R-R-B          | JCS3910R-R-BR              | JCS3910R-R-A          | JCS3910R-R-AR              | JCS3910R       | DPAK           |
| JCS3910F-F-B          | JCS3910F-F-BR              | N/A                   | N/A                        | JCS3910F       | TO-220MF       |
| JCS3910C-C-B          | JCS3910C-C-BR              | N/A                   | N/A                        | JCS3910C       | TO-220C        |
| JCS3910S-S-B          | JCS3910S-S-BR              | N/A                   | N/A                        | JCS3910S       | TO-263         |



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<br>Value    |          | 单 位<br>Unit           |
|-------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------|----------|-----------------------|
|                                                             |                                                                               | JCS3910V/R/C/S  | JCS3910F |                       |
| 最高漏极-源极直流电压<br>Drain-Source Voltage                         | $V_{DS}$                                                                      | 100             |          | V                     |
| 连续漏极电流<br>Drain Current -continuous                         | $I_D$<br>$T=25^{\circ}\text{C}$                                               | 16*             |          | A                     |
|                                                             | $T=100^{\circ}\text{C}$                                                       | 12*             |          | A                     |
| 最大脉冲漏极电流 (注1)<br>Drain Current - pulse (note 1)             | $I_{DM}$                                                                      | 64*             |          | A                     |
| 最高栅源电压<br>Gate-Source Voltage                               | $V_{GS}$                                                                      | $\pm 30$        |          | V                     |
| 单脉冲雪崩能量 (注2)<br>Single Pulsed Avalanche Energy(note 2)      | $E_{AS}$                                                                      | 153.6           |          | mJ                    |
| 雪崩电流 (注1)<br>Avalanche Current (note 1)                     | $I_{AR}$                                                                      | 16              |          | A                     |
| 重复雪崩能量 (注1)<br>Repetitive Avalanche Current (note 1)        | $E_{AR}$                                                                      | 7.9             |          | mJ                    |
| 二极管反向恢复最大电压变化速率 (注3)<br>Peak Diode Recovery dv/dt (note 3)  | dv/dt                                                                         | 5.1             |          | V/ns                  |
| MOSFET 最大电压变化速率<br>MOSFET dv/dt ruggedness                  | dv/dt                                                                         | 20.5            |          | V/ns                  |
| 耗散功率<br>Power Dissipation                                   | $P_D$<br>$T_c=25^{\circ}\text{C}$<br>-Derate<br>above<br>$25^{\circ}\text{C}$ | 79              | 47       | W                     |
|                                                             |                                                                               | 0.53            | 0.31     | W/ $^{\circ}\text{C}$ |
| 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             |          | $^{\circ}\text{C}$    |

\*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                       | $BV_{DSS}$                     | $I_D=250\mu A, V_{GS}=0V$                   | 100       | —         | —         | V             |
| 击穿电压温度特性<br>Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS} / \Delta T_J$ | $I_D=250\mu A$ , referenced to $25^\circ C$ | —         | 0.09      | —         | V/ $^\circ C$ |
| 零栅压下漏极漏电流<br>Zero Gate Voltage Drain Current          | $I_{DSS}$                      | $V_{DS}=100V, V_{GS}=0V, T_C=25^\circ C$    | 0         | —         | 1         | $\mu A$       |
|                                                       |                                | $V_{DS}=80V, T_C=125^\circ C$               | 0         | —         | 10        | $\mu A$       |
| 正向栅极体漏电流<br>Gate-body leakage current, forward        | $I_{GSSF}$                     | $V_{DS}=0V, V_{GS}=30V$                     | 0         | —         | 100       | nA            |
| 反向栅极体漏电流<br>Gate-body leakage current, reverse        | $I_{GSSR}$                     | $V_{DS}=0V, V_{GS}=-30V$                    | 0         | —         | -100      | nA            |
| 通态特性 On-Characteristics                               |                                |                                             |           |           |           |               |
| 阈值电压<br>Gate Threshold Voltage                        | $V_{GS(th)}$                   | $V_{DS} = V_{GS}, I_D=250\mu A$             | 2.0       | —         | 4.0       | V             |
| 静态导通电阻<br>Static Drain-Source On-Resistance           | $R_{DS(on)}$                   | $V_{GS}=10V, I_D=8.0A$                      | 0         | 95        | 115       | m $\Omega$    |
| 正向跨导<br>Forward Transconductance                      | $g_{fs}$                       | $V_{DS}=40V, I_D=16.0A$ (note 4)            | —         | 7.8       | —         | S             |
| 动态特性 Dynamic Characteristics                          |                                |                                             |           |           |           |               |
| 输入电容<br>Input capacitance                             | $C_{iss}$                      | $V_{DS}=25V, V_{GS}=0V, f=1.0MHz$           | 318       | 623       | 828       | pF            |
| 输出电容<br>Output capacitance                            | $C_{oss}$                      |                                             | 80        | 164       | 218       | pF            |
| 反向传输电容<br>Reverse transfer capacitance                | $C_{rss}$                      |                                             | 40        | 90        | 119       | pF            |





## 电特性 ELECTRICAL CHARACTERISTICS

| 开关特性 Switching Characteristics                                        |                      |                                                                                   |   |      |     |    |
|-----------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------|---|------|-----|----|
| 延迟时间 Turn-On delay time                                               | t <sub>d</sub> (on)  | V <sub>DD</sub> =50V, I <sub>D</sub> =16A, R <sub>G</sub> =25Ω<br><br>(note 4, 5) | — | 7.1  | 9.4 | ns |
| 上升时间 Turn-On rise time                                                | t <sub>r</sub>       |                                                                                   | — | 31   | 41  | ns |
| 延迟时间 Turn-Off delay time                                              | t <sub>d</sub> (off) |                                                                                   | — | 42   | 55  | ns |
| 下降时间 Turn-Off Fall time                                               | t <sub>f</sub>       |                                                                                   | — | 24   | 31  | ns |
| 栅极电荷总量 Total Gate Charge                                              | Q <sub>g</sub>       | V <sub>DS</sub> =80V ,                                                            | 9 | 18.9 | 27  | nC |
| 栅—源电荷 Gate—Source charge                                              | Q <sub>gs</sub>      | I <sub>D</sub> =16A                                                               | 2 | 4.1  | 10  | nC |
| 栅—漏电荷 Gate—Drain charge                                               | Q <sub>gd</sub>      | V <sub>GS</sub> =10V (note 4, 5)                                                  | 3 | 7.4  | 15  | 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<br>Maximum Continuous Drain<br>—Source Diode Forward Current | I <sub>S</sub>       |                                                                                   | — | —    | 16  | A  |
| 正向最大脉冲电流<br>Maximum Pulsed Drain—Source<br>Diode Forward Current      | I <sub>SM</sub>      |                                                                                   | — | —    | 64  | A  |
| 正向压降<br>Drain—Source Diode Forward<br>Voltage                         | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =16A                                          | — | —    | 1.4 | V  |
| 反向恢复时间<br>Reverse recovery time                                       | t <sub>rr</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =16A                                          | — | 127  | —   | ns |
| 反向恢复电荷<br>Reverse recovery charge                                     | Q <sub>rr</sub>      | dI <sub>F</sub> /dt=100A/ μ s (note 4)                                            | — | 710  | —   | nC |

## 热特性 THERMAL CHARACTERISTIC

| 项 目<br>Parameter                                   | 符 号<br>Symbol | 最大<br>Max      |          | 单 位<br>Unit   |
|----------------------------------------------------|---------------|----------------|----------|---------------|
|                                                    |               | JCS3910V/R/C/S | JCS3910F |               |
| 结到管壳的热阻<br>Thermal Resistance, Junction to Case    | $R_{th(j-c)}$ | 1.89           | 3.2      | $^{\circ}C/W$ |
| 结到环境的热阻<br>Thermal Resistance, Junction to Ambient | $R_{th(j-A)}$ | 62.5           | 45.9     | $^{\circ}C/W$ |

注释:

- 1: 脉冲宽度由最高结温限制
- 2:  $L=1.2mH, I_{AS}=16A, V_{DD}=50V, R_G=25\Omega$ , 起始结温  $T_J=25^{\circ}C$
- 3:  $I_{SD} \leq 16A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$ , 起始结温  $T_J=25^{\circ}C$
- 4: 脉冲测试: 脉冲宽度  $\leq 300\mu s$ , 占空比  $\leq 2\%$
- 5: 基本与工作温度无关

Notes:

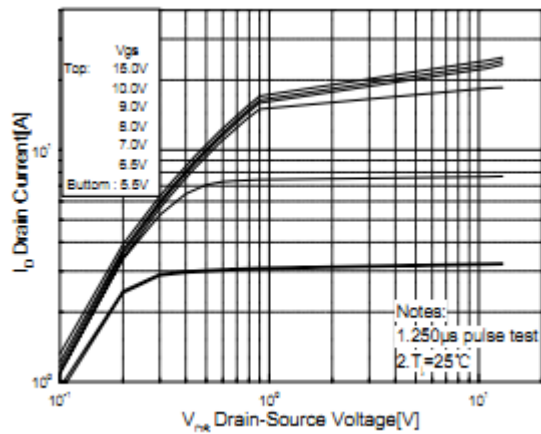
- 1: Pulse width limited by maximum junction temperature
- 2:  $L=1.2mH, I_{AS}=16A, V_{DD}=50V, R_G=25\Omega$ , Starting  $T_J=25^{\circ}C$
- 3:  $I_{SD} \leq 16A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^{\circ}C$
- 4: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$
- 5: Essentially independent of operating



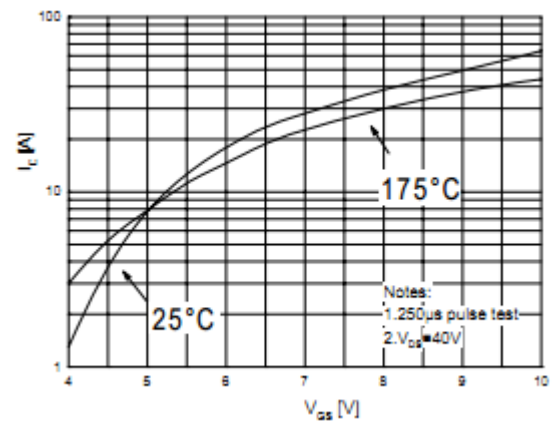


## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

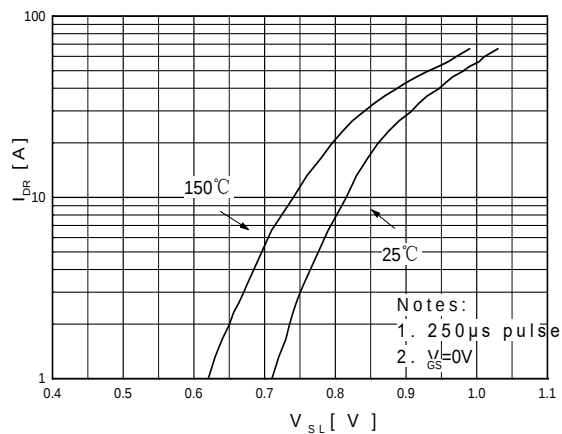
On-Region Characteristics



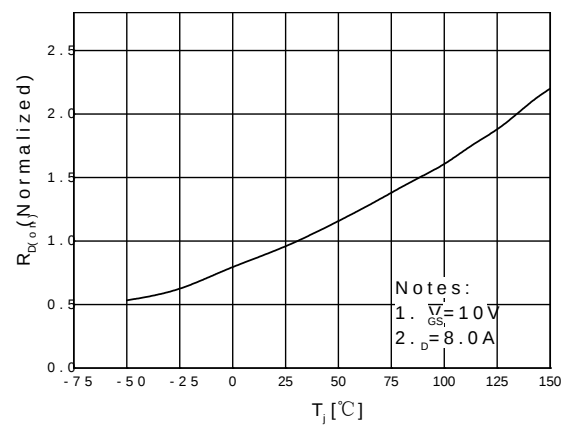
Transfer Characteristics



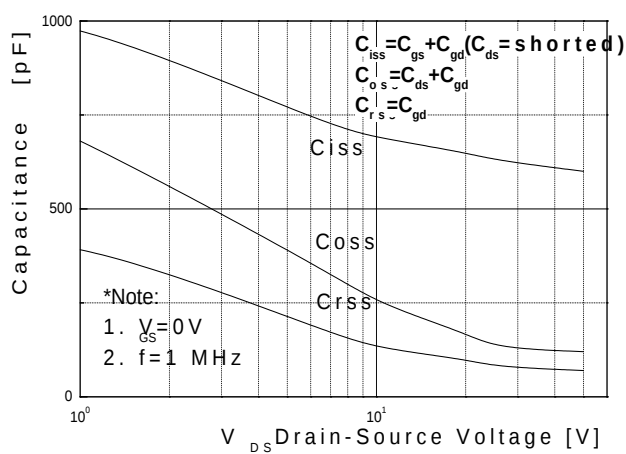
Body Diode Forward Voltage Variation vs. Source Current and Temperature



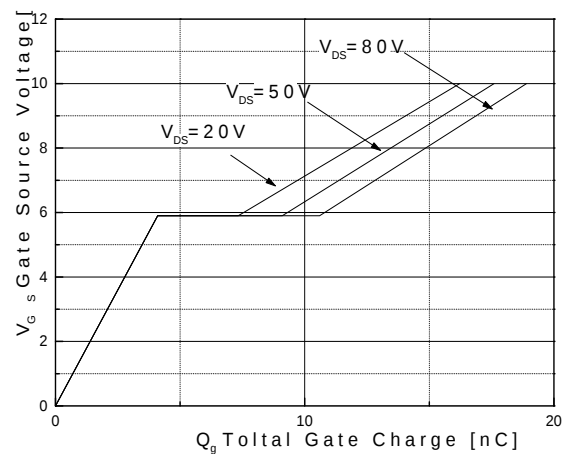
On-Resistance Variation vs. Temperature



Capacitance Characteristics

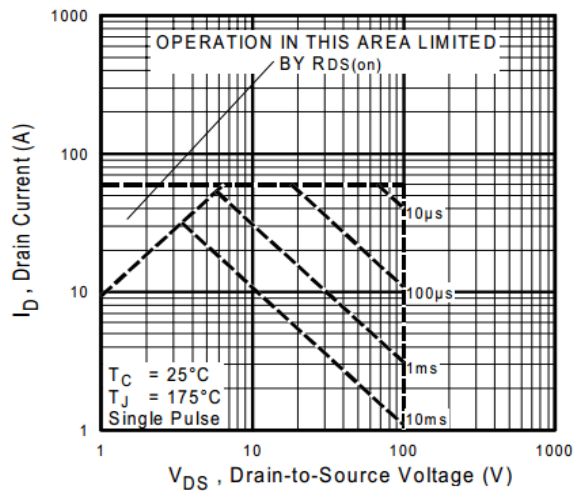
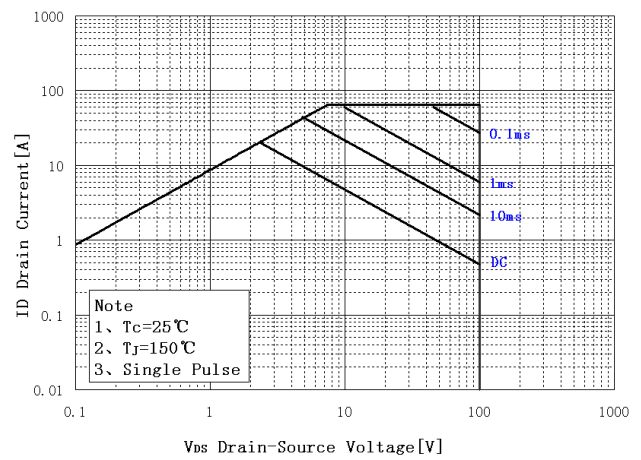
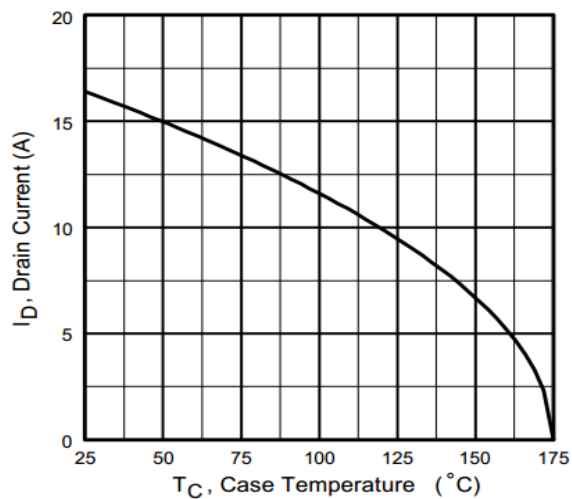


Gate Charge Characteristics

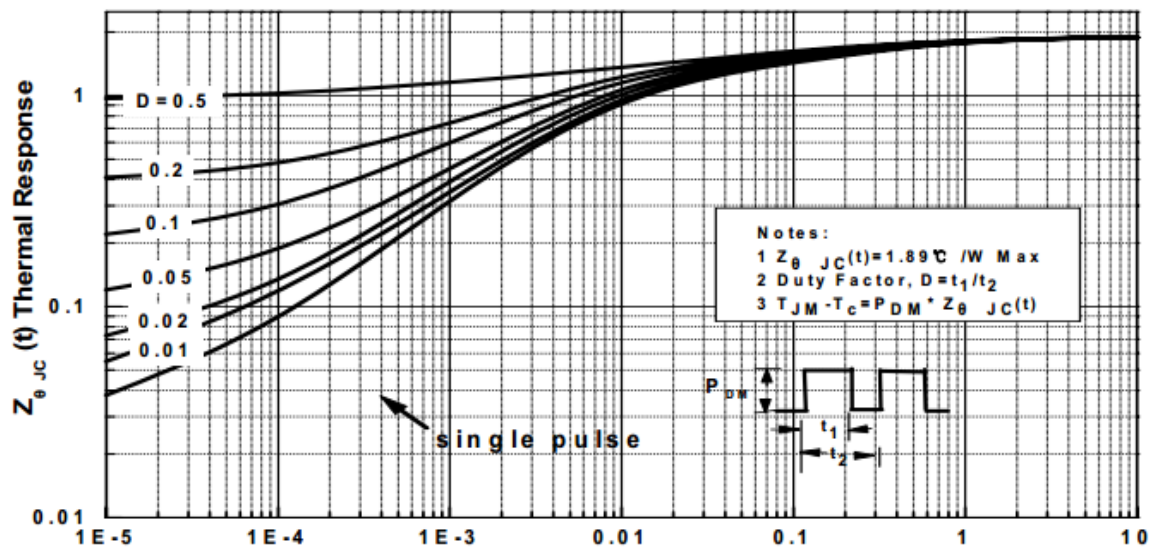




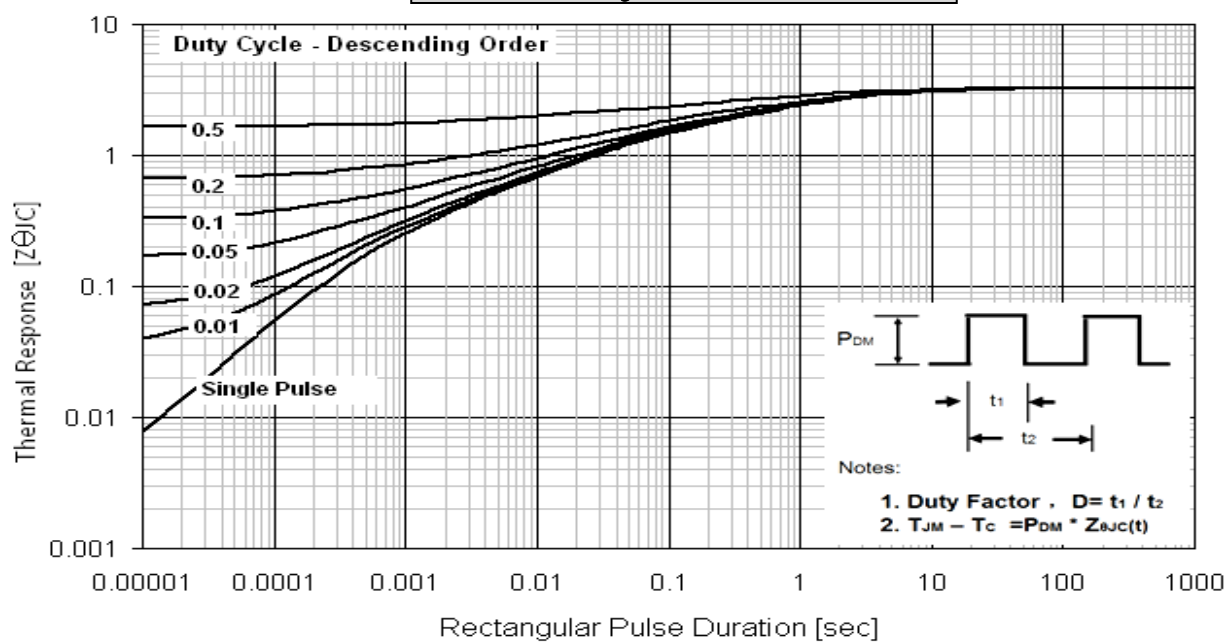
## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

Maximum Safe Operating Area  
(JCS3910V/R/C/S)Maximum Safe Operating Area  
(JCS3910F)Maximum Drain Current  
vs. Case Temperature

Transient Thermal Response Curve  
(JCS3910V/R/C/S)



Transient Thermal Response Curve  
(JCS3910F)

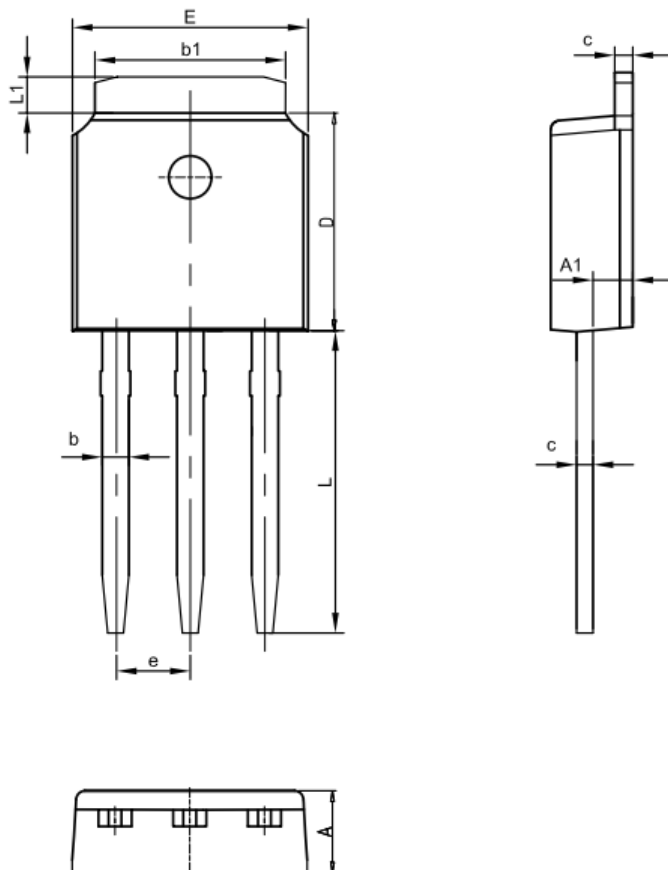




## 外形尺寸 PACKAGE MECHANICAL DATA

IPAK

单位 Unit: mm



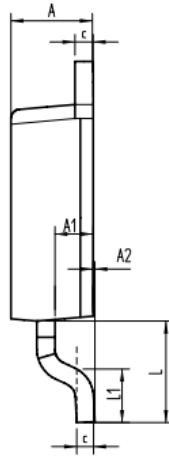
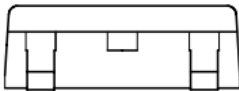
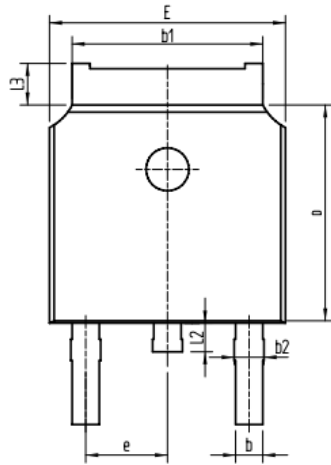
| SYMBOL | MM       |      |
|--------|----------|------|
|        | MIN      | MAX  |
| A      | 2.1      | 2.5  |
| A1     | 0.87     | 1.27 |
| b      | 0.63     | 0.93 |
| b1     | 5.13     | 5.53 |
| c      | 0.40     | 0.60 |
| D      | 5.80     | 6.40 |
| E      | 6.30     | 6.90 |
| L      | 9.10     | 9.70 |
| e      | 2.286BSC |      |
| L1     | 0.82     | 1.22 |



## 外形尺寸 PACKAGE MECHANICAL DATA

DPAK

单位 Unit: mm



| SYMBOL | mm       |      |
|--------|----------|------|
|        | MIN      | MAX  |
| A      | 2.16     | 2.41 |
| A1     | 0.97     | 1.17 |
| A2     | 0.00     | 0.15 |
| b      | 0.63     | 0.93 |
| b1     | 5.13     | 5.53 |
| b2     | 0.66     | 0.96 |
| c      | 0.40     | 0.60 |
| D      | 5.80     | 6.40 |
| E      | 6.30     | 6.90 |
| e      | 2.286BSC |      |
| L      | 2.50     | 3.30 |
| L1     | 1.20     | 1.80 |
| L2     | 0.60     | 1.00 |
| L3     | 0.85     | 1.30 |

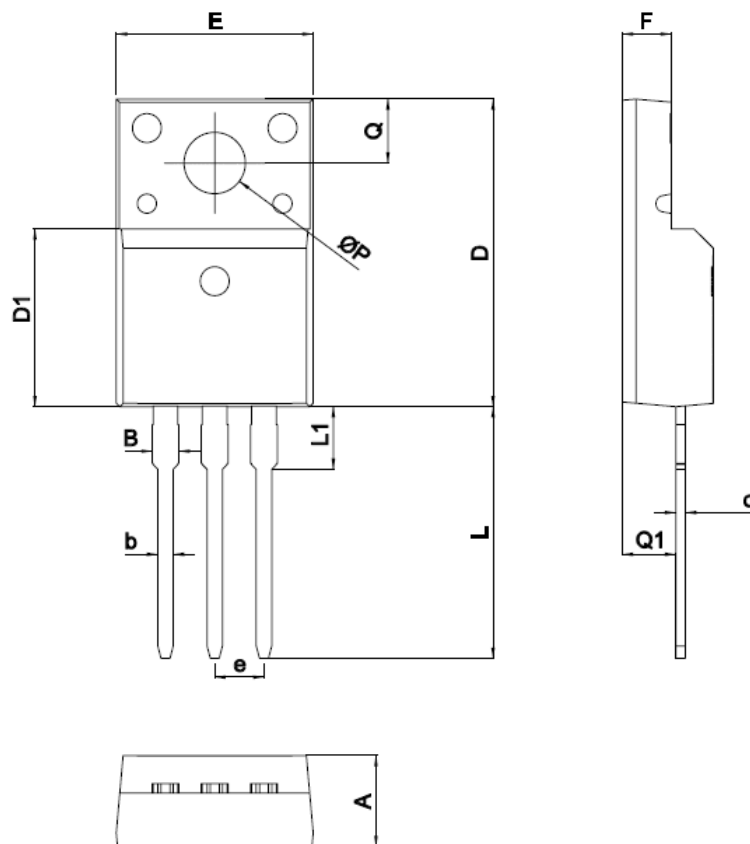




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T0-220MF

单位 Unit: mm



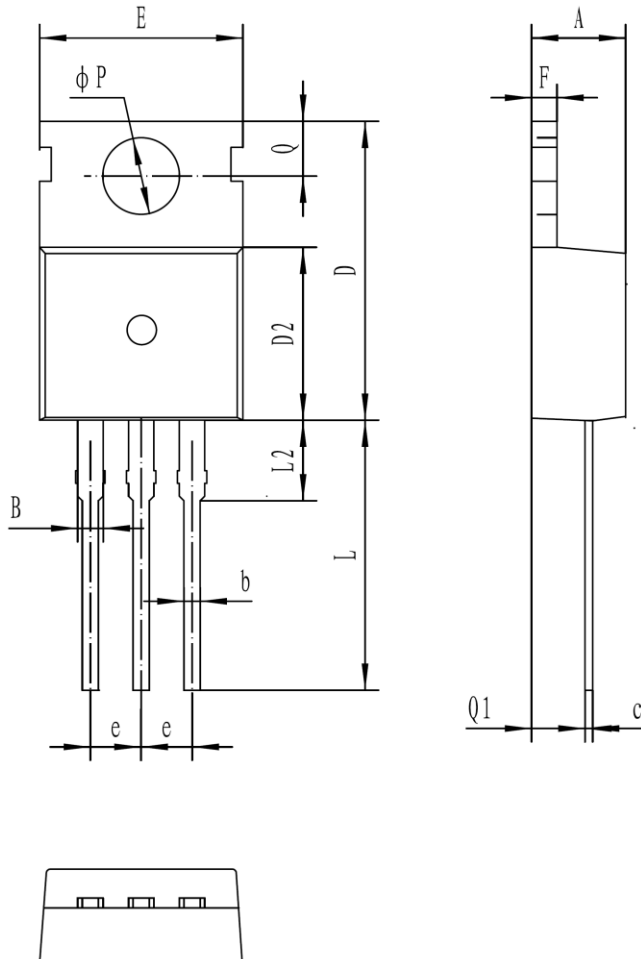
| SYMBOL | mm       |       |
|--------|----------|-------|
|        | MIN      | MAX   |
| A      | 4.5      | 4.9   |
| B      |          | 1.47  |
| b      | 0.7      | 0.9   |
| c      | 0.45     | 0.60  |
| D      | 15.67    | 16.07 |
| D1     | 9.04     | 9.20  |
| e      | 2.54TYPE |       |
| 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  |



## 外形尺寸 PACKAGE MECHANICAL DATA

T0-220C

单位 Unit: mm



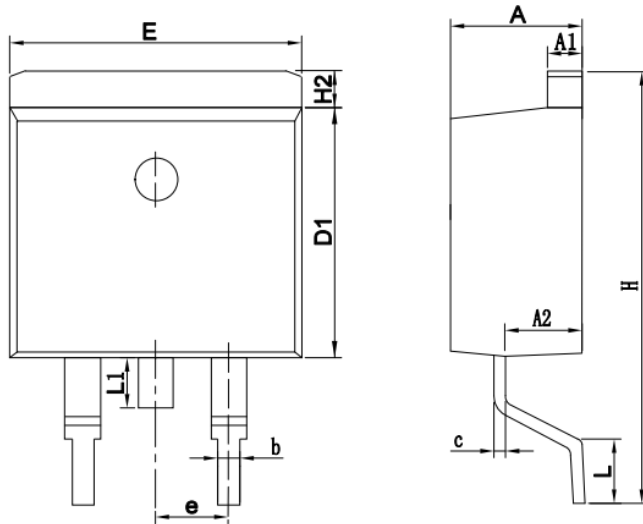
| 符号<br>symbol | MIN   | MAX   |
|--------------|-------|-------|
| A            | 4.30  | 4.70  |
| B            | 1.10  | 1.40  |
| b            | 0.70  | 0.95  |
| c            | 0.40  | 0.65  |
| D            | 15.20 | 16.20 |
| D2           | 9.00  | 9.40  |
| E            | 9.70  | 10.10 |
| e            | 2.39  | 2.69  |
| F            | 1.25  | 1.40  |
| L            | 12.60 | 13.60 |
| L2           | 2.80  | 3.20  |
| Q            | 2.60  | 3.00  |
| Q1           | 2.20  | 2.60  |
| P            | 3.50  | 3.80  |



## 外形尺寸 PACKAGE MECHANICAL DATA

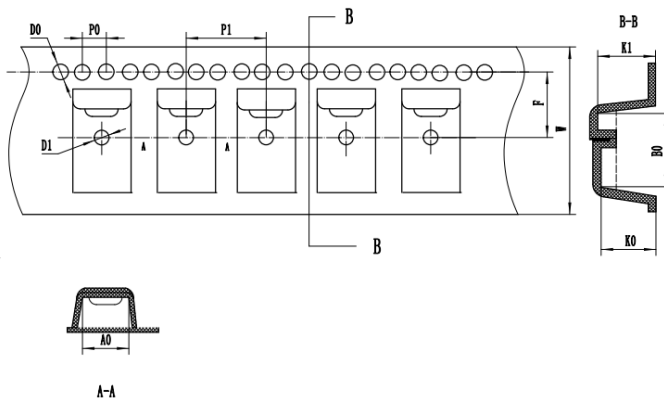
T0-263

单位 Unit: mm



| SYMBOL | MM      |       |
|--------|---------|-------|
|        | MIN     | MAX   |
| A      | 4.30    | 4.80  |
| A1     | 1.12    | 1.42  |
| A2     | 2.54    | 2.84  |
| b      | 0.67    | 1.00  |
| c      | 0.29    | 0.52  |
| D1     | 8.40    | 9.00  |
| E      | 9.80    | 10.46 |
| e      | 2.54BSC |       |
| H      | 14.00   | 16.00 |
| H2     | 1.12    | 1.45  |
| L      | 1.50    | 3.10  |
| L1     | 1.45    | 1.70  |

编带 REEL



| Symbol | 标准范围<br>(mm) |
|--------|--------------|
| A0     | 10.60±0.20   |
| B0     | 16.10±0.20   |
| D0     | 1.55±0.10    |
| D1     | 1.50±0.15    |
| F      | 11.50±0.20   |
| K0     | 4.85±0.20    |
| K1     | 5.26±0.20    |
| P0     | 4.00±0.20    |
| P1     | 16.00±0.20   |
| W      | 24.00±0.40   |



## 注意事项

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3. 在电路设计时请不要超过器件的绝对最大额定值，否则会影响整机的可靠性。
4. 本说明书如有版本变更不另外告知。

## NOTE

1. Jilin Sino-microelectronics co., Ltd sales its product either through direct sales or sales agent , thus, for customers, when ordering , please check with our company.
2. We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don' t be hesitate to contact us.
3. Please do not exceed the absolute maximum ratings of the device when circuit designing.
4. Jilin Sino-microelectronics co., Ltd reserves the right to make changes in this. specification sheet and is subject to change without prior notice.

## 联系方式

吉林华微电子股份有限公司

公司地址：吉林省吉林市深圳街 99 号

邮编：132013

总机：86-432-64678411

传真：86-432-64665812

网址：[www.hwdz.com.cn](http://www.hwdz.com.cn)

## CONTACT

JILIN SINO-MICROELECTRONICS CO., LTD.

ADD: No.99 Shenzhen Street, Jilin City, Jilin Province, China.

Post Code: 132013

Tel: 86-432-64678411

Fax: 86-432-64665812

Web Site: [www.hwdz.com.cn](http://www.hwdz.com.cn)

