



# JCS8HN60C

## 主要参数 MAIN CHARACTERISTICS

|                                        |              |
|----------------------------------------|--------------|
| $I_D$                                  | 8.0 A        |
| $V_{DS}$                               | 600 V        |
| $R_{DS(on)}$ -max<br>(@ $V_{GS}=10V$ ) | 1.6 $\Omega$ |
| $Q_g$ -typ                             | 32 nC        |

## 用途

- 高频开关电源
- 电子镇流器
- LED 电源

## 产品特性

- 低栅极电荷
- 低  $C_{RSS}$  (典型值 14pF)
- 开关速度快
- 产品全部经过雪崩测试
- 高抗  $dv/dt$  能力
- RoHS 产品

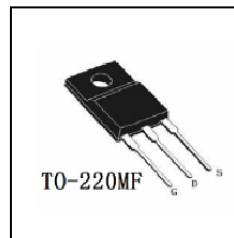
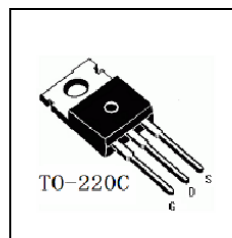
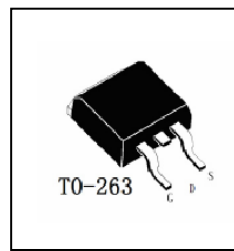
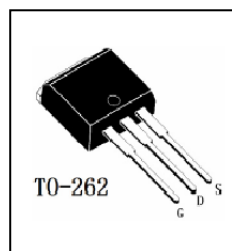
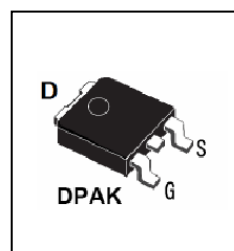
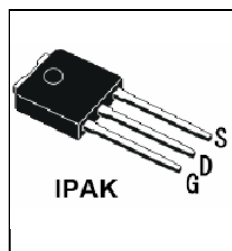
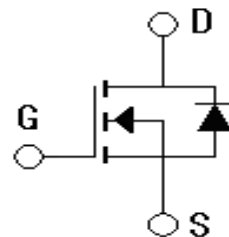
## APPLICATIONS

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

## FEATURES

- Low gate charge
- Low  $C_{RSS}$  (typical 14pF )
- Fast switching
- 100% avalanche tested
- Improved  $dv/dt$  capability
- RoHS product

## 封装 Package



## 订货信息 ORDER MESSAGE

| 订货型号<br>Order codes | 印记<br>Marking | 封装<br>Package | 无卤素<br>Halogen Free | 包装<br>Packaging | 器件重量<br>Device Weight |
|---------------------|---------------|---------------|---------------------|-----------------|-----------------------|
| JCS8HN60VC-O-V-N-B  | JCS8HN60VC    | IPAK          | 否 NO                | 条管 Tube         | 0.35 g(typ)           |
| JCS8HN60RC-O-R-N-B  | JCS8HN60RC    | DPAK          | 否 NO                | 条管 Tube         | 0.30 g(typ)           |
| JCS8HN60RC-O-R-N-A  | JCS8HN60RC    | DPAK          | 否 NO                | 编带 Reel         | 0.30 g(typ)           |
| JCS8HN60CC-O-C-N-B  | JCS8HN60CC    | TO-220C       | 否 NO                | 条管 Tube         | 2.15 g(typ)           |
| JCS8HN60FC-O-F-N-B  | JCS8HN60FC    | TO-220MF      | 否 NO                | 条管 Tube         | 2.20 g(typ)           |
| JCS8HN60SC-O-F-N-B  | JCS8HN60SC    | TO-263        | 否 NO                | 条管 Tube         | 1.37 g(typ)           |
| JCS8HN60SC-O-F-N-A  | JCS8HN60SC    | TO-263        | 否 NO                | 编带 Reel         | 1.37 g(typ)           |
| JCS8HN60BC-O-F-N-B  | JCS8HN60BC    | TO-262        | 否 NO                | 条管 Tube         | 1.71 g(typ)           |



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              |
|----------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------|------------|--------------------------|
|                                                                |                                                                            | JCS8HN60<br>CC/SC/BC/VC/RC | JCS8HN60FC |                          |
| 最高漏极-源极直流电压<br>Drain-Source Voltage                            | $V_{DSS}$                                                                  | 600                        | 600        | V                        |
| 连续漏极电流<br>Drain Current -continuous                            | $I_D$ $T=25^{\circ}\text{C}$<br>$T=100^{\circ}\text{C}$                    | 7.0                        | 7.0*       | A                        |
|                                                                |                                                                            | 4.6                        | 4.6*       | A                        |
| 最大脉冲漏极电流 (注 1)<br>Drain Current - pulse<br>(note 1)            | $I_{DM}$                                                                   | 28                         | 28*        | A                        |
| 最高栅源电压<br>Gate-Source Voltage                                  | $V_{GSS}$                                                                  | $\pm 30$                   |            | V                        |
| 单脉冲雪崩能量 (注 2)<br>Single Pulsed Avalanche<br>Energy (note 2)    | $E_{AS}$                                                                   | 420                        |            | mJ                       |
| 雪崩电流 (注 1)<br>Avalanche Current (note 1)                       | $I_{AR}$                                                                   | 7.0                        |            | A                        |
| 重复雪崩能量 (注 1)<br>Repetitive Avalanche<br>Energy (note 1)        | $E_{AR}$                                                                   | 12.8                       |            | mJ                       |
| 二极管反向恢复最大电压变化速率 (注 3)<br>Peak Diode Recovery dv/dt<br>(note 3) | dv/dt                                                                      | 4.5                        |            | V/ns                     |
| 耗散功率<br>Power Dissipation                                      | $P_D$<br>$T_C=25^{\circ}\text{C}$<br>-Derate<br>above $25^{\circ}\text{C}$ | 120                        | 40         | W                        |
|                                                                |                                                                            | 1.04                       | 0.31       | W/<br>$^{\circ}\text{C}$ |
| 最高结温及存储温度<br>Operating and Storage<br>Temperature Range        | $T_J, T_{STG}$                                                             | $-55 \sim +150$            |            | $^{\circ}\text{C}$       |
| 引线最高焊接温度<br>Maximum Lead Temperature<br>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  |
|-------------------------------------------------------|------------------------------|---------------------------------------------|-----------|-----------|-----------|---------------|
| <b>关态特性 Off –Characteristics</b>                      |                              |                                             |           |           |           |               |
| 漏—源击穿电压<br>Drain-Source Voltage                       | $BV_{DSS}$                   | $I_D=250\mu A, V_{GS}=0V$                   | 600       | -         | -         | 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 $25^\circ C$ | -         | 0.65      | -         | V/ $^\circ C$ |
| 零栅压下漏极漏电流<br>Zero Gate Voltage Drain Current          | $I_{DSS}$                    | $V_{DS}=600V, V_{GS}=0V, T_C=25^\circ C$    | -         | -         | 10        | $\mu A$       |
|                                                       |                              | $V_{DS}=480V, T_C=125^\circ C$              | -         | -         | 100       | $\mu A$       |
| 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            |
| <b>通态特性 On-Characteristics</b>                        |                              |                                             |           |           |           |               |
| 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           | $R_{DS(ON)}$                 | $V_{GS}=10V, I_D=3.5A$                      | -         | 1.26      | 1.6       | $\Omega$      |
| 正向跨导<br>Forward Transconductance                      | $g_{fs}$                     | $V_{DS}=40V, I_D=3.5A$ (note 4)             | -         | 5.6       | -         | S             |
| <b>动态特性 Dynamic Characteristics</b>                   |                              |                                             |           |           |           |               |
| 输入电容<br>Input capacitance                             | $C_{iss}$                    | $V_{DS}=25V, V_{GS}=0V, f=1.0MHz$           | -         | 1620      | 1890      | pF            |
| 输出电容<br>Output capacitance                            | $C_{oss}$                    |                                             | -         | 125       | 170       | pF            |
| 反向传输电容<br>Reverse transfer capacitance                | $C_{rss}$                    |                                             | -         | 14        | 20        | pF            |





## 电特性 ELECTRICAL CHARACTERISTICS

| 开关特性 Switching Characteristics                                        |                   |                                                    |   |     |     |         |
|-----------------------------------------------------------------------|-------------------|----------------------------------------------------|---|-----|-----|---------|
| 延迟时间 Turn-On delay time                                               | $t_d(\text{on})$  | $V_{DD}=300V, I_D=7A, R_G=25\Omega$<br>(note 4, 5) | - | 11  | 31  | ns      |
| 上升时间 Turn-On rise time                                                | $t_r$             |                                                    | - | 35  | 80  | ns      |
| 延迟时间 Turn-Off delay time                                              | $t_d(\text{off})$ |                                                    | - | 46  | 95  | ns      |
| 下降时间 Turn-Off Fall time                                               | $t_f$             |                                                    | - | 40  | 92  | ns      |
| 栅极电荷总量 Total Gate Charge                                              | $Q_g$             | $V_{DS}=480V$ ,                                    | - | 32  | 41  | nC      |
| 栅—源电荷 Gate-Source charge                                              | $Q_{gs}$          | $I_D=7A$                                           | - | 6   | -   | nC      |
| 栅—漏电荷 Gate-Drain charge                                               | $Q_{gd}$          | $V_{GS}=10V$ (note 4, 5)                           | - | 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 | $I_S$             |                                                    | - | -   | 7.0 | A       |
| 正向最大脉冲电流<br>Maximum Pulsed Drain-Source<br>Diode Forward Current      | $I_{SM}$          |                                                    | - | -   | 28  | A       |
| 正向压降<br>Drain-Source Diode Forward<br>Voltage                         | $V_{SD}$          | $V_{GS}=0V,$ $I_S=7.0A$                            | - | -   | 1.4 | V       |
| 反向恢复时间<br>Reverse recovery time                                       | $t_{rr}$          | $V_{GS}=0V,$ $I_S=7.0A$                            | - | 345 | -   | ns      |
| 反向恢复电荷<br>Reverse recovery charge                                     | $Q_{rr}$          | $di_f/dt=100A/\mu s$ (note 4)                      | - | 3.2 | -   | $\mu C$ |

## 热特性 THERMAL CHARACTERISTIC

| 项 目<br>Parameter                                   | 符 号<br>Symbol | 最大 Max                 |            | 单 位<br>Unit   |
|----------------------------------------------------|---------------|------------------------|------------|---------------|
|                                                    |               | JCS8HN60VC/RC/CC/SC/BC | JCS8HN60FC |               |
| 结到管壳的热阻<br>Thermal Resistance, Junction to Case    | $R_{th(j-c)}$ | 1.04                   | 3.2        | $^{\circ}C/W$ |
| 结到环境的热阻<br>Thermal Resistance, Junction to Ambient | $R_{th(j-A)}$ | 62.5                   | 62.5       | $^{\circ}C/W$ |

注释:

- 1: 脉冲宽度由最高结温限制
- 2:  $L=14mH, I_{AS}=7.0A, V_{DD}=50V, R_G=25\Omega$ , 起始结温  $T_J=25^{\circ}C$
- 3:  $I_{SD}\leq 6.0A, di/dt\leq 300A/\mu s, V_{DD}\leq BV_{DSS}$ , 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:

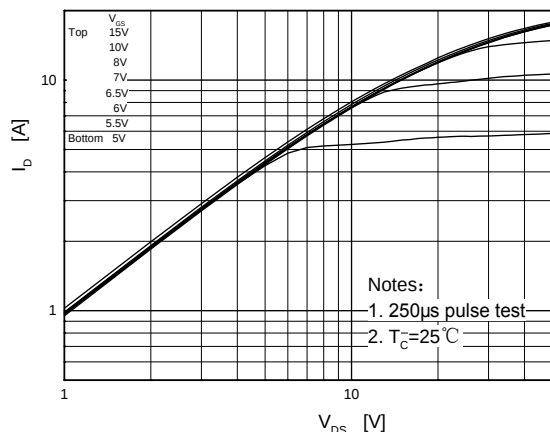
- 1: Pulse width limited by maximum junction temperature
- 2:  $L=14mH, I_{AS}=7.0A, V_{DD}=50V, R_G=25\Omega$ , Starting  $T_J=25^{\circ}C$
- 3:  $I_{SD}\leq 6.0A, di/dt\leq 300A/\mu s, V_{DD}\leq BV_{DSS}$ , Starting  $T_J=25^{\circ}C$
- 4: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycles  $\leq 2\%$
- 5: Essentially independent of operating temperature



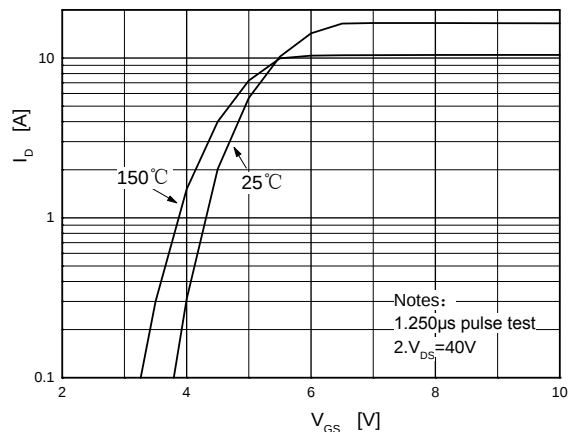


## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

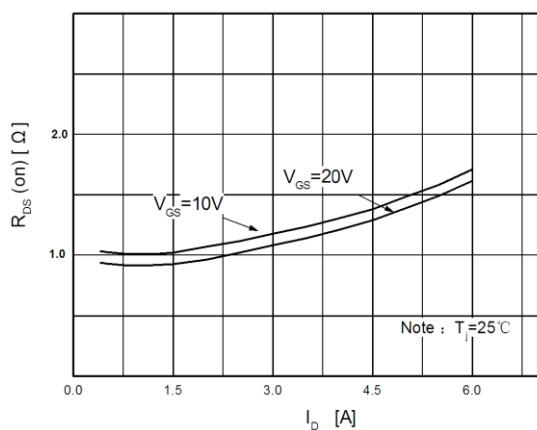
On-Region Characteristics



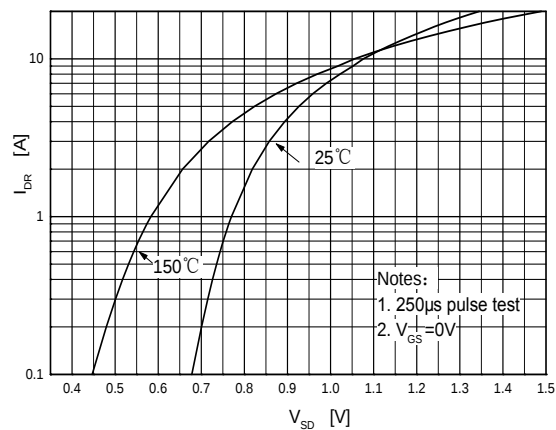
Transfer Characteristics



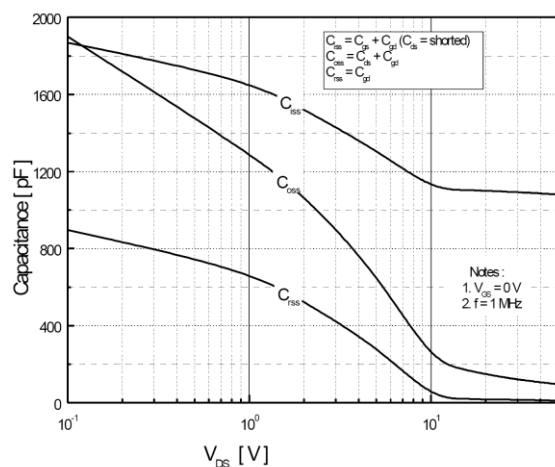
On-Resistance Variation vs. Drain Current and Gate Voltage



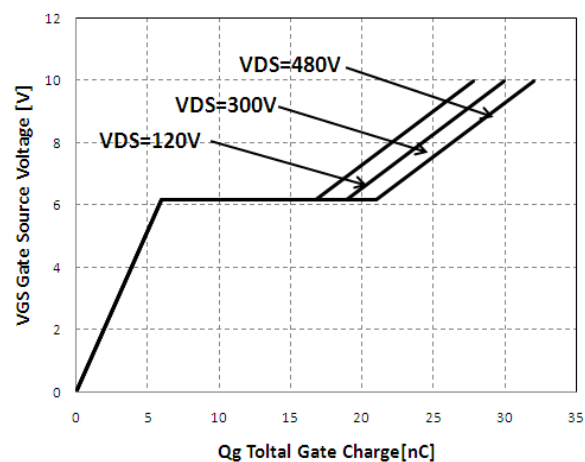
Body Diode Forward Voltage Variation vs. Source Current and Temperature



Capacitance Characteristics

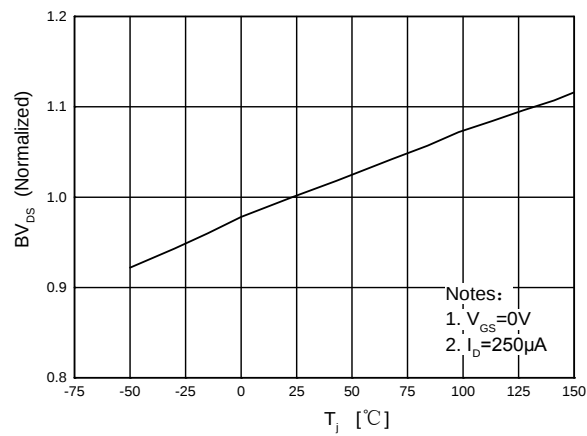
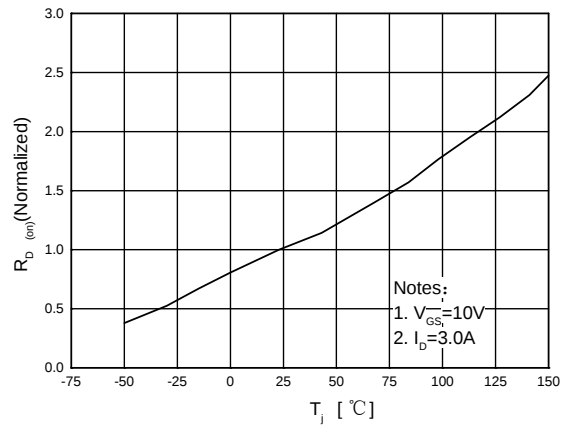
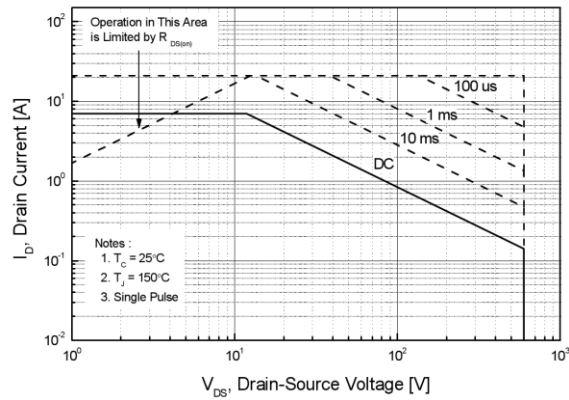
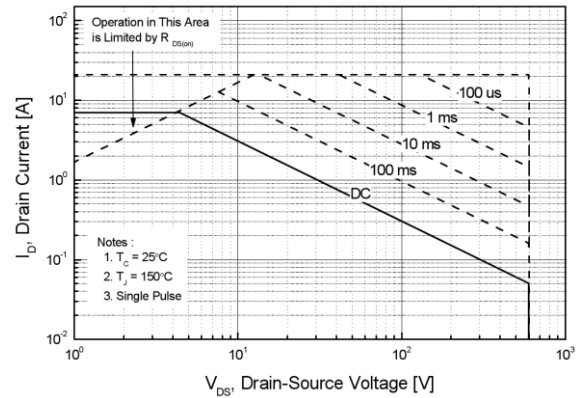
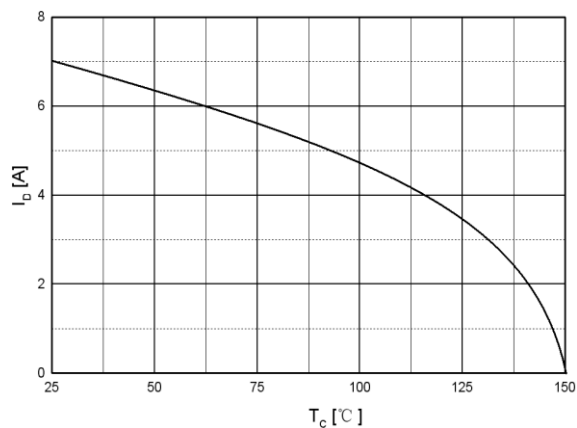


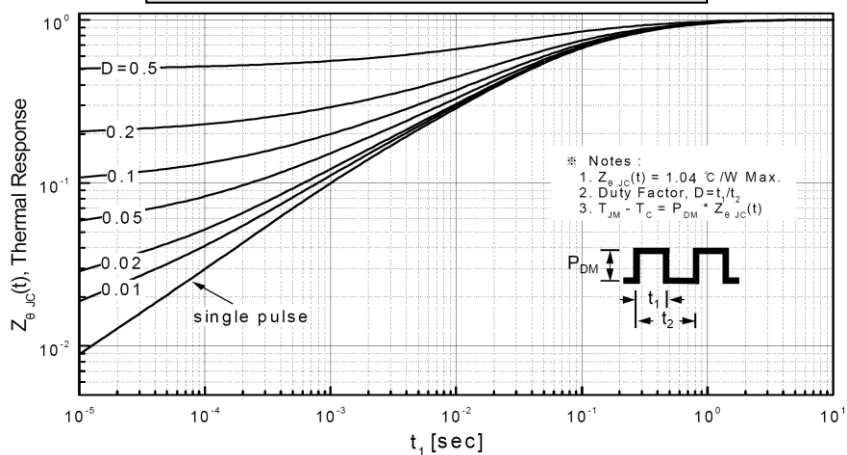
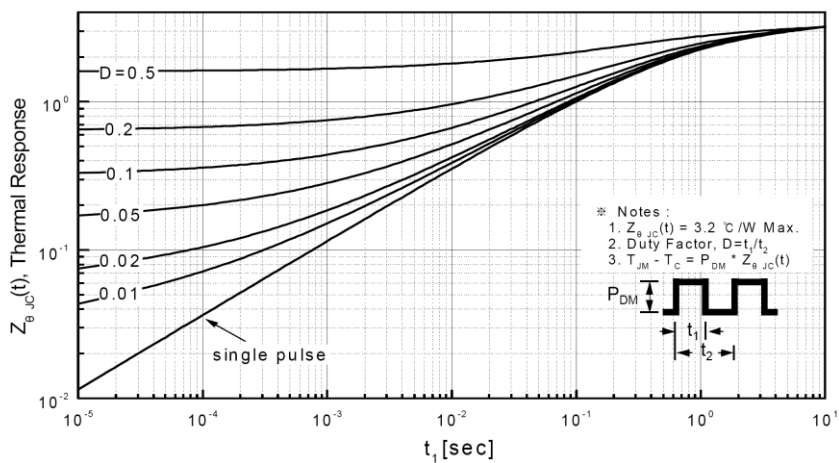
Gate Charge Characteristics





## 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

Breakdown Voltage Variation  
vs. TemperatureOn-Resistance Variation  
vs. TemperatureMaximum Safe Operating Area  
For JCS8HN60CC/SC/BC/RC/VCMaximum Safe Operating Area  
For JCS8HN60FCMaximum Drain Current  
vs. Case Temperature

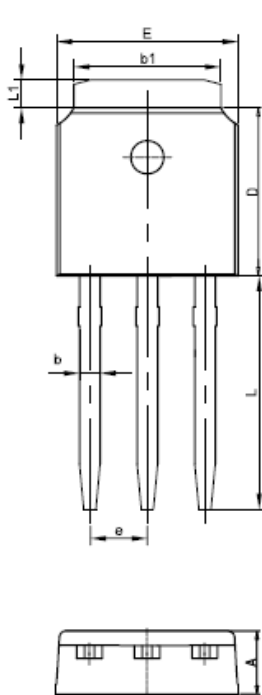
**Transient Thermal Response Curve  
For JCS8HN60CC/SC/BC/RC/VC****Transient Thermal Response Curve  
For JCS8HN60FC**



外形尺寸 PACKAGE MECHANICAL DATA

IPAK

单位 Unit: mm



| SYMBOL         | MM       |      |
|----------------|----------|------|
|                | MIN      | MAX  |
| A              | 2.1      | 2.5  |
| A <sub>1</sub> | 0.87     | 1.27 |
| b              | 0.63     | 0.93 |
| b <sub>1</sub> | 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 |      |
| L <sub>1</sub> | 0.82     | 1.22 |

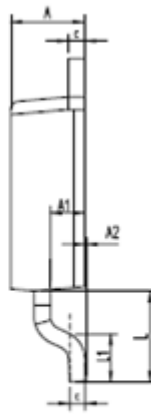
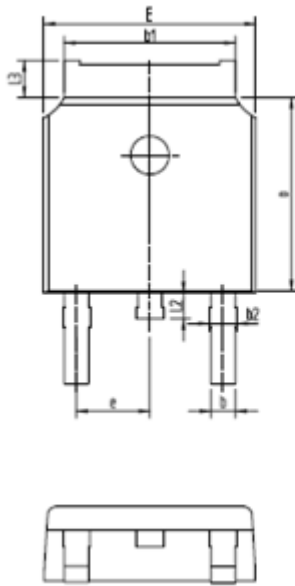




## 外形尺寸 PACKAGE MECHANICAL DATA

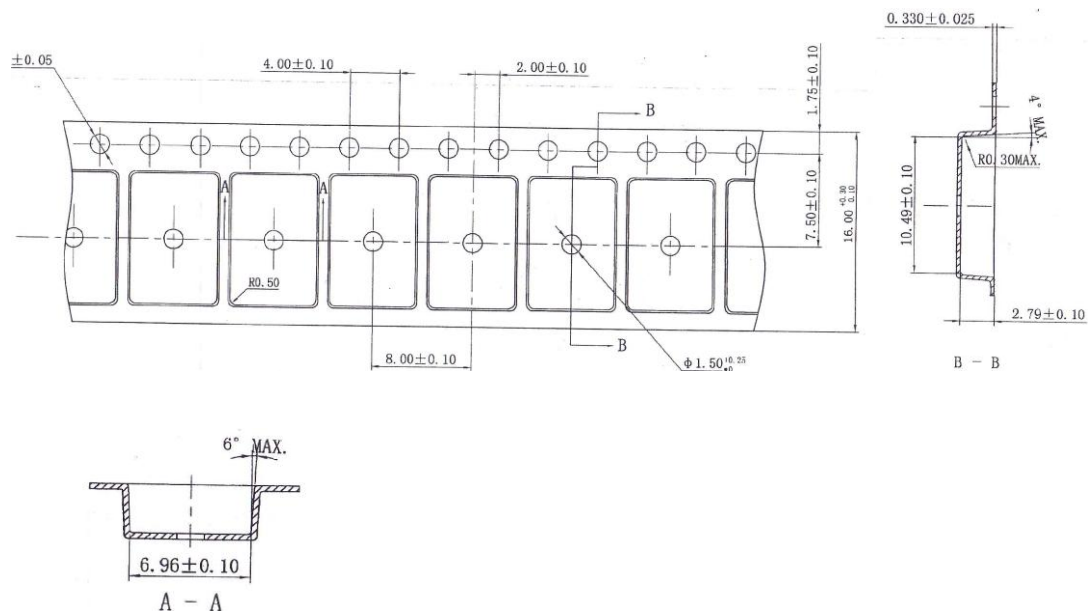
DPAK

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 |

## 编带 REEL

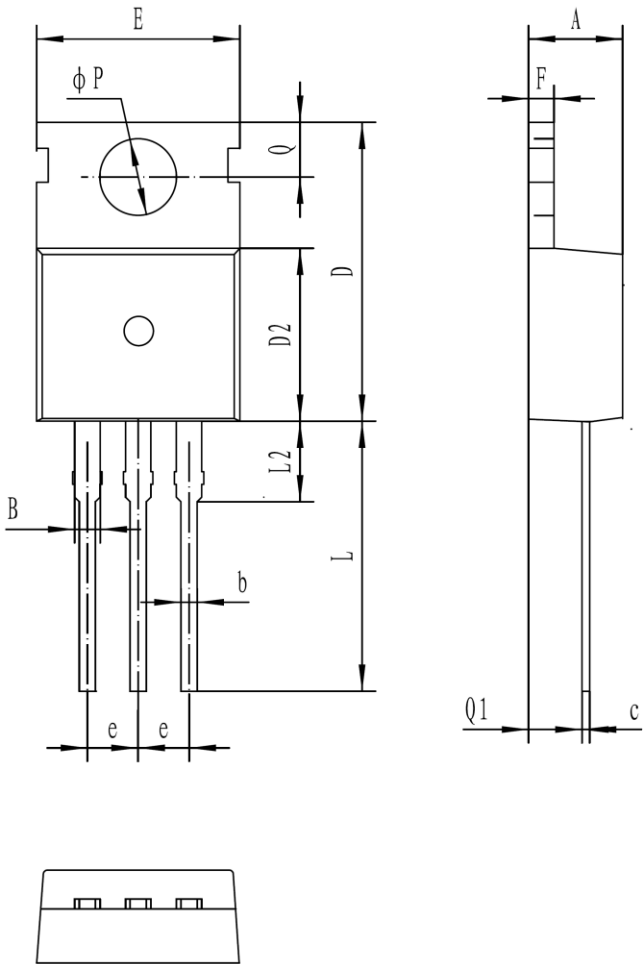




外形尺寸 PACKAGE MECHANICAL DATA

TO-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  |

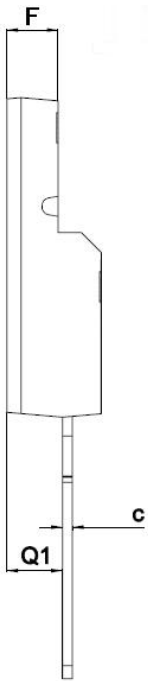
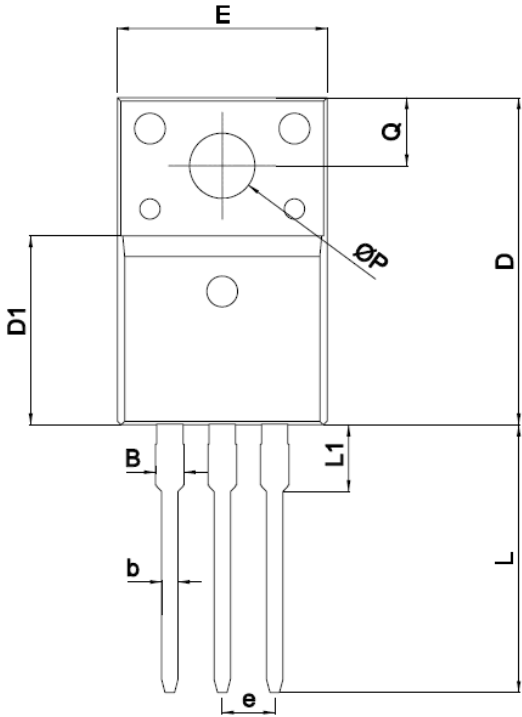




外形尺寸 PACKAGE MECHANICAL DATA

TO-220MF

单位 Unit: mm



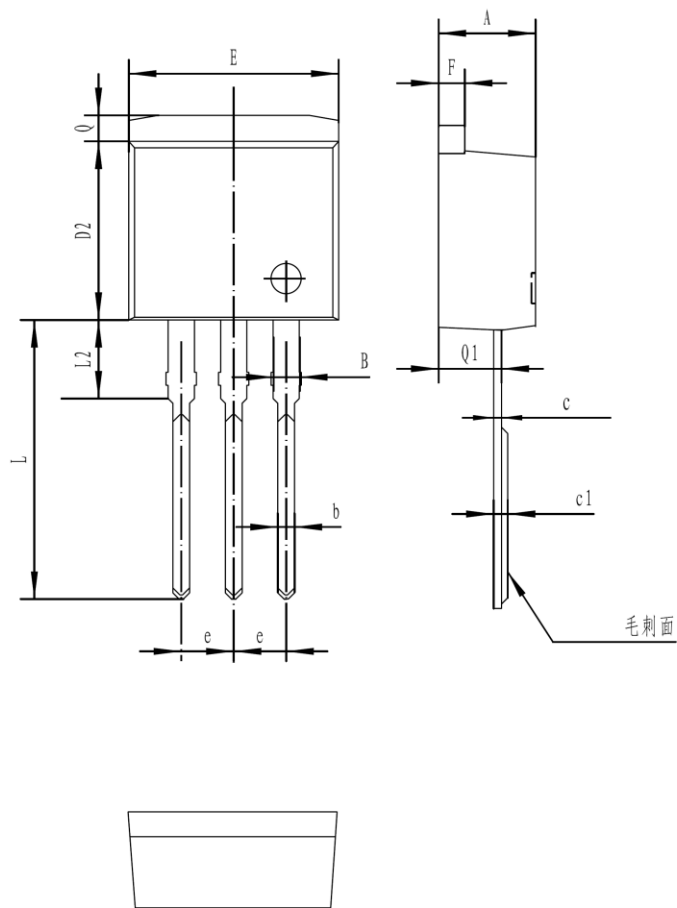
| SYMBOL   | mm       |       |
|----------|----------|-------|
|          | MIN      | MAX   |
| A        | 4.5      | 4.9   |
| B        |          | 1.47  |
| b        | 0.7      | 0.9   |
| c        | 0.45     | 0.60  |
| D        | 15.67    | 16.07 |
| D1       | 9.04     | 9.20  |
| e        | 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  |
| $\Phi P$ | 3.08     | 3.28  |





TO-262

单位 Unit: mm



| 符号<br>symbol | MIN   | MAX   |
|--------------|-------|-------|
| A            | 4.40  | 4.90  |
| B            | 1.10  | 1.40  |
| b            | 0.70  | 0.95  |
| c            | 0.30  | 0.60  |
| c1           | 0.33  | 0.63  |
| D2           | 8.20  | 9.20  |
| E            | 9.60  | 10.50 |
| e            | 2.39  | 2.69  |
| F            | 1.20  | 1.35  |
| L            | 13.11 | 14.61 |
| L2           | 3.55  | 4.05  |
| Q            | 1.10  | 1.40  |
| Q1           | 2.65  | 2.85  |

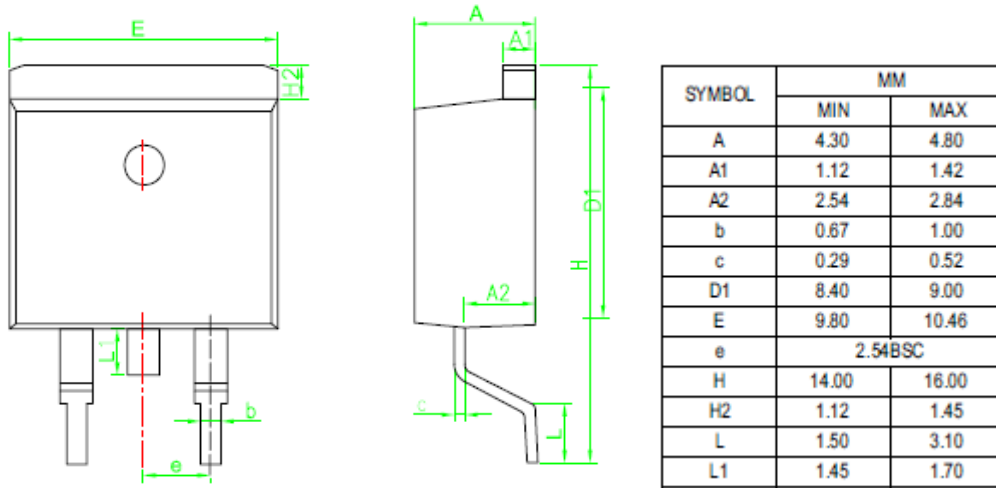




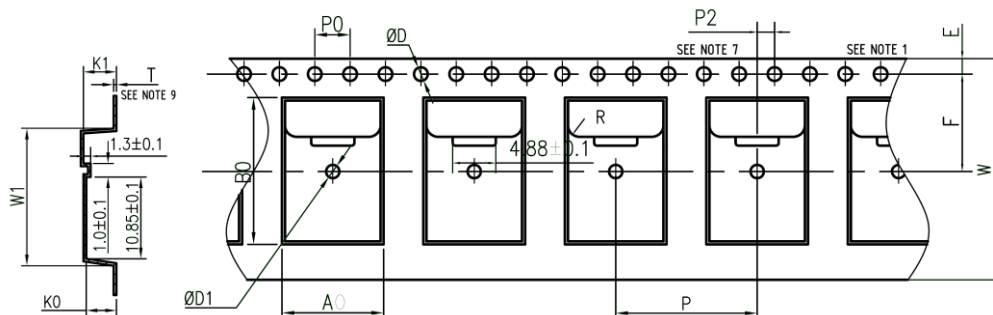
## 外形尺寸 PACKAGE MECHANICAL DATA

TO-263

单位 Unit: mm



编带 REEL



## NOTES

- 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE 0.2mm;  
任意10个传输孔间距累积误差0.2mm;
- MATERIAL: BLACK CONDUCTIVE POLYSTYRENE;  
材料: 黑色防静电聚苯乙烯;
- DEMENSIONS ARE IN mm (UNLESS OTHERWISE SPECIFIED);  
除非特别标注, 尺寸单位为毫米;
- K0 MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE ON THE CARRIER;  
K0是从凹槽底部上表面到载带顶面的测量尺寸;
- A0 AND B0 MEASURED ON A PLANE 0.30mm ABOVE THE BOTTOM OF THE POCKET;  
从凹槽底部上方测量A0和B0的平面度是0.30mm;
- SURFACE RESISTIVITY IS BETWEEN  $1 \times 10^6$  TO  $1 \times 10^{10}$  OHMS/SQUARE;  
表面电阻  $1 \times 10^6 \sim 1 \times 10^{10} \Omega/\square$ ;
- Allowable Camber to be 1 mm/100 mm  
载带100mm以内, 弯曲度不可超过1mm。

| 外观      |           | 尺寸 |           |          |
|---------|-----------|----|-----------|----------|
| P0      | 4.0±0.1   | W  | 24.0±0.3  |          |
| P2      | 2.0±0.1   | A0 | 10.8±0.2  |          |
| P       | 16.0±0.1  | E  | 1.75±0.1  |          |
| T       | 0.35±0.05 | F  | 11.5±0.1  |          |
| K0      | 4.85±0.1  | D  | 1.55±0.05 |          |
| B0      | 16.3±0.1  | D1 | 1.5±0.1   |          |
| POCKET; |           | W1 | 规格1       | 16.9±0.1 |
|         |           |    | 规格2       | 17.2±0.1 |





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