

N-沟道功率 MOS 管/ N-CHANNEL POWER MOSFET

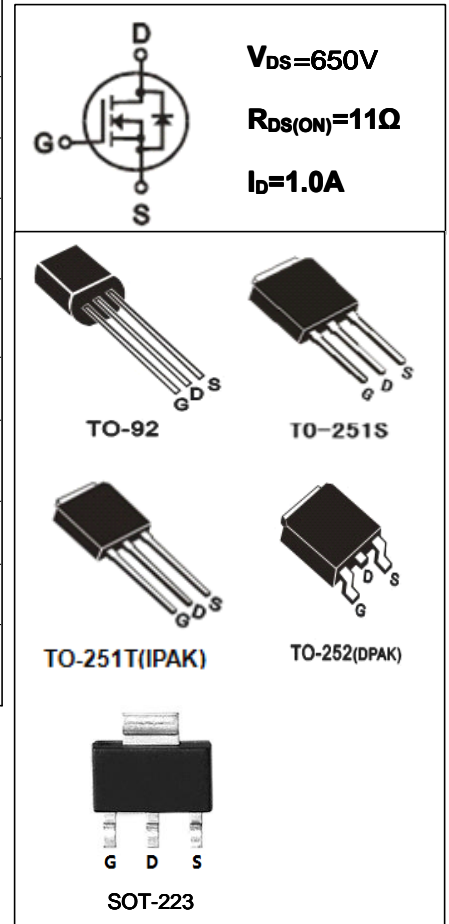
●最大额定值 (TC=25°C)

● Absolute Maximum Ratings (Tc=25°C) TO-92/251T/251S/252/223

| 参数 PARAMETER | 符号 SYMBOL | 额定值 VALUE | 单位 UNIT |
|--|------------------|----------------------|------------|
| 漏-源电压 Drain-source Voltage | V _{DS} | 650 | V |
| 栅-源电压 gate-source Voltage | V _{GS} | ± 30 | V |
| 漏极电流 Continuous Drain Current TC=25°C | I _D | 1.0* | A |
| 漏极电流 Continuous Drain Current TC=100°C | I _D | 0.6* | A |
| 最大脉冲电流 Drain Current – Pulsed ① | I _{DM} | 4.0* | A |
| 耗散功率 Power Dissipation (T _L =25°C) | P _D | TO-92 | W |
| | | TO-251T/251S/252/223 | |
| 最高结温 Junction Temperature | T _J | 150 | °C |
| 存储温度 Storage Temperature | T _{STG} | -55-150 | °C |
| 单脉冲雪崩能量 Single Pulse Avalanche Energy② | E _{AS} | 14 | mJ |

*漏极电流由最高结温限制

*Drain current limited by maximum junction temperature



●电特性 (Tc=25°C)

● Electronic Characteristics (Tc=25°C)

| 参数 PARAMETER | 符号 SYMBOL | 测试条件 TEST CONDITION | 最小值 MIN | 典型值 TYP | 最大值 MAX | 单位 UNIT |
|--|---|--|------------|------------|------------|------------|
| 漏-源击穿电压 Drain-source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 650 | | | V |
| 击穿电压温度系数 Breakdown Voltage Temperature Coefficient | ΔBV _{DSS} / ΔT _J | I _D =250uA, Referenced to 25°C | | 0.6 | | V/°C |
| 栅极开启电压 Gate Threshold Voltage | V _{GS(TH)} | V _{GS} =V _{DS} , I _D =250μA | 2.0 | | 4.0 | V |
| 漏-源漏电流 Drain-source Leakage Current | I _{DSS} | V _{DS} =600V, V _{GS} =0V, T _J =25°C | | | 25 | μA |
| | | V _{DS} =480V, V _{GS} =0V, T _J =125°C | | | 250 | μA |
| 跨导 Forward Transconductance | g _{fs} | V _{DS} =40V, I _D =0.5A ③ | 0.5 | | | S |

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| 参数 PARAMETER | 符号 SYMBOL | 测试条件 TEST CONDITION | 最小值 MIN | 典型值 TYP | 最大值 MAX | 单位 UNIT |
|--|--------------|---|------------|------------|------------|------------|
| 栅极漏电流 Gate-body Leakage Current ($V_{DS} = 0$) | I_{GSS} | $V_{GS} = \pm 30V$ | | | ± 100 | nA |
| 漏-源导通电阻 Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 0.5A$ ③ | | 8.5 | 11 | Ω |
| 输入电容 Input Capacitance | C_{iss} | $V_{GS} = 0V, V_{DS} = 25V$ $F = 1.0MHz$ | | 150 | | pF |
| 输出电容 Output Capacitance | C_{oss} | | | 25 | | |
| 反向传输电容 Reverse transfer Capacitance | C_{rss} | | | 5.4 | | |
| 关断延迟 Turn -Off Delay Time | $T_d(off)$ | $V_{DD} = 300V, I_D = 1.0A$ $R_G = 25\Omega$ ③ | | 13 | | ns |
| 栅极电荷 Total Gate Charge | Q_g | $I_D = 1.0A, V_{DS} = 480V$ $V_{GS} = 10V$ ③ | | 4.8 | | nC |
| 栅源电荷 Gate-to-Source Charge | Q_{gs} | | | 0.7 | | nC |
| 栅漏电荷 Gate-to-Drain Charge | Q_{gd} | | | 2.7 | | nC |
| 二极管正向电流 Continuous Diode Forward Current | I_S | | | | 1.0 | A |
| 二极管正向压降 Diode Forward Voltage | V_{SD} | $T_j = 25^\circ C, I_S = 0.5A$ $V_{GS} = 0V$ ③ | | | 1.4 | V |
| 反向恢复时间 Reverse Recovery Time | t_{rr} | $T_j = 25^\circ C, I_f = 1.0A$ $di/dt = 100A/\mu s$ ③ | | 190 | | ns |
| 反向恢复电荷 Reverse Recovery Charge | Q_{rr} | | | 0.53 | | μC |

●热特性

● Thermal Characteristics

| 参数 PARAMETER | 符号 SYMBOL | 最大值 MAX | | 单位 UNIT |
|---|--------------|------------|----------------------|--------------|
| | | TO-92 | TO-251T/251S/252/223 | |
| 热阻结-环境 Thermal Resistance Junction-lead | R_{thJL} | 41.67 | 4.46 | $^\circ C/W$ |
| 热阻结-环境 Thermal Resistance Junction-ambient | R_{thJA} | 140.0 | 110.0 | $^\circ C/W$ |

注释(Notes):

- ① 脉冲宽度：以最高节温为限制
Repetitive rating: Pulse width limited by maximum junction temperature
- ② 初始结温= $25^\circ C$, $V_{DD} = 50V$, $L = 30mH$, $R_G = 25\Omega$, $I_{AS} = 1.0A$
Starting $T_j = 25^\circ C$, $V_{DD} = 50V$, $L = 30mH$, $R_G = 25\Omega$, $I_{AS} = 1.0A$
- ③ 脉冲测试：脉冲宽度 $\leq 300\mu s$ ，占空比 $\leq 2\%$
Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

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● 特性曲线

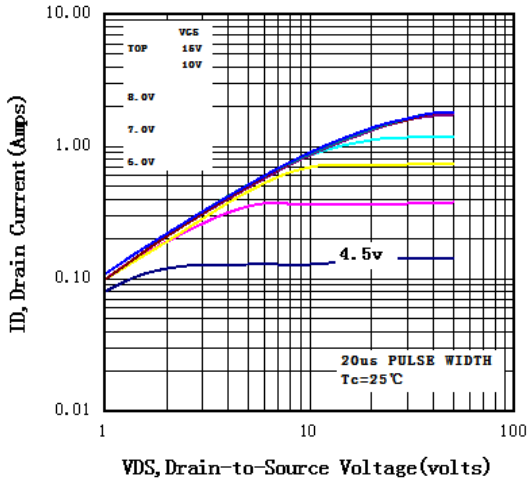


图 1 输出特性曲线, Tc=25°C

Fig1 Typical Output Characteristics, Tc=25°C

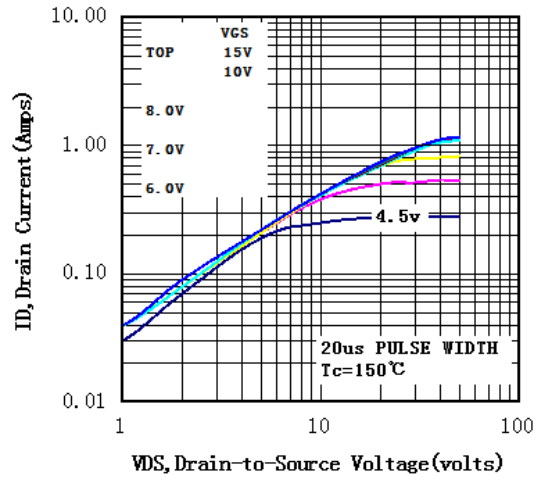


图 2 输出特性曲线, Tc=150°C

Fig2 Typical Output Characteristics, Tc=150°C

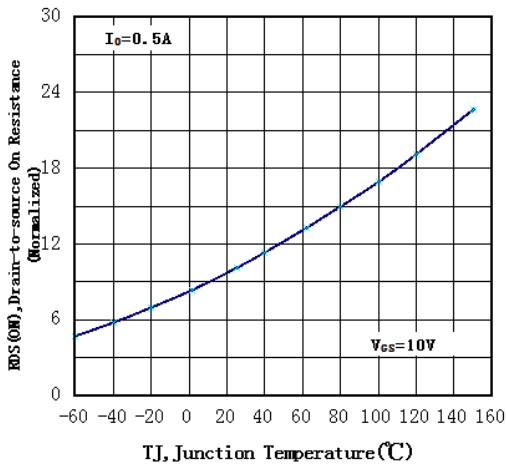


图 3 归一化导通电阻与温度曲线

Fig3 Normalized On-Resistance Vs. Temperature

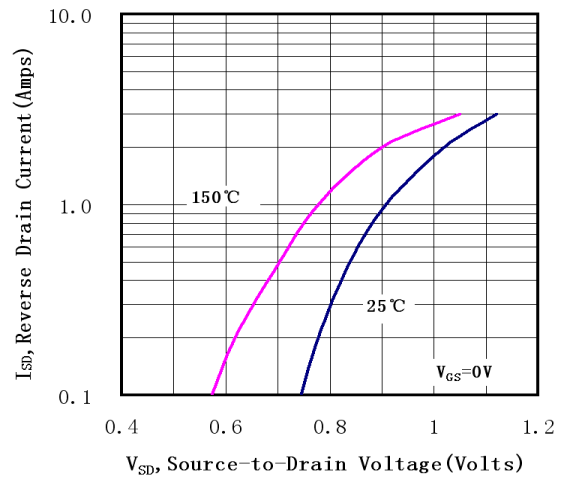


图 4 二极管正向电压曲线

Fig4 Typical Source-Drain Diode Forward Voltage

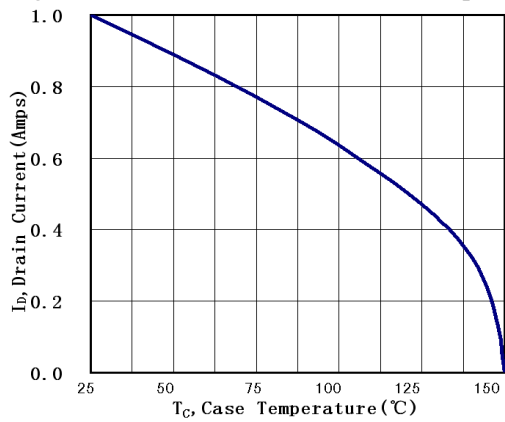


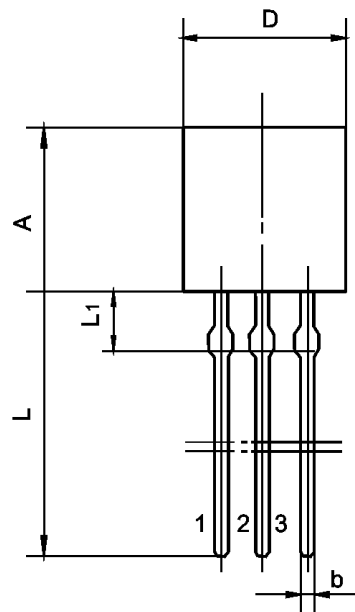
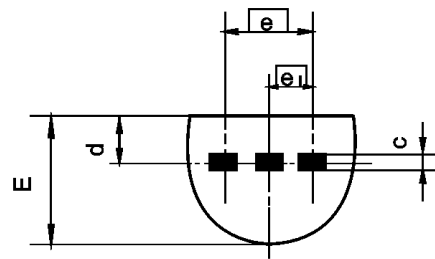
图 5 最大漏极电流与壳温曲线

Fig5 Maximum Drain Current Vs. Case Temperature

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TO-92 封装机械尺寸
TO-92 MECHANICAL DATA

单位:毫米/UNIT: mm

| 符号/SYMBOL | 最小值/min | 典型值/nom | 最大值/max |
|------------------|---------|---------|---------|
| A | 4.30 | | 5.30 |
| b | 0.30 | | 0.55 |
| c | 0.30 | | 0.50 |
| φD D | 4.30 | | 5.20 |
| d | 1.00 | | 1.70 |
| E | 3.20 | | 4.20 |
| e | | 2.54 | |
| e1 | | 1.27 | |
| L | 12.70 | | 15.00 |
| L1 | 1.50 | | 2.00 |



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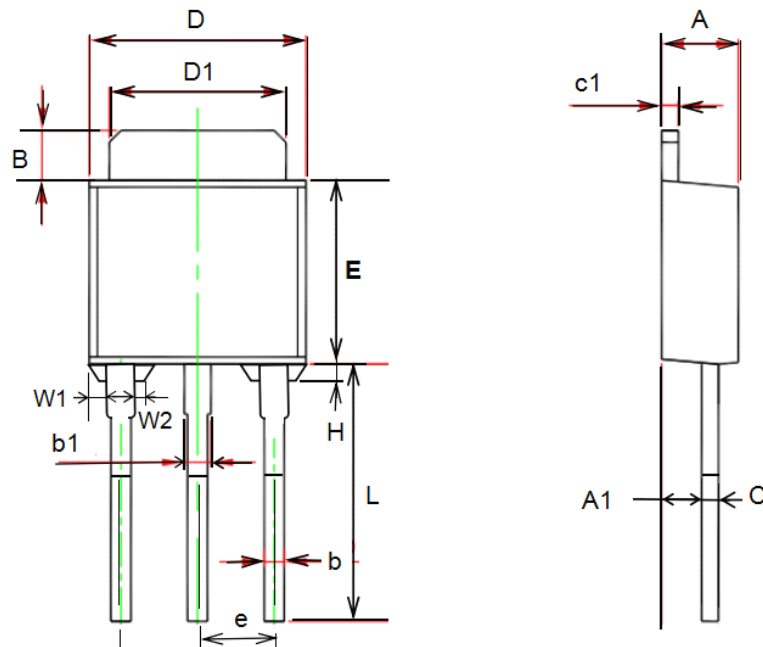
TO-251T 封装机械尺寸

TO-251T (IPAK) MECHANICAL DATA

单位:毫米/UNIT: mm

| 符号/SYMBOL | 最小值/min | 典型值/nom | 最大值/max |
|----------------|---------|---------|---------|
| A | 2.10 | | 2.50 |
| A ₁ | 0.95 | | 1.30 |
| B | 0.80 | | 1.25 |
| b | 0.50 | | 0.80 |
| b ₁ | 0.70 | | 0.80 |
| c | 0.45 | | 0.70 |
| c ₁ | 0.45 | | 0.70 |
| D | 6.35 | | 6.80 |
| D ₁ | 5.10 | | 5.50 |
| E | 5.30 | | 6.30 |
| e | 2.25 | 2.30 | 2.35 |
| L | 7.00 | | 9.20 |
| H | 0.35 | | 0.45 |
| W ₁ | 0.30 | | 0.50 |
| W ₂ | 0.20 | | 0.40 |

[S/L]

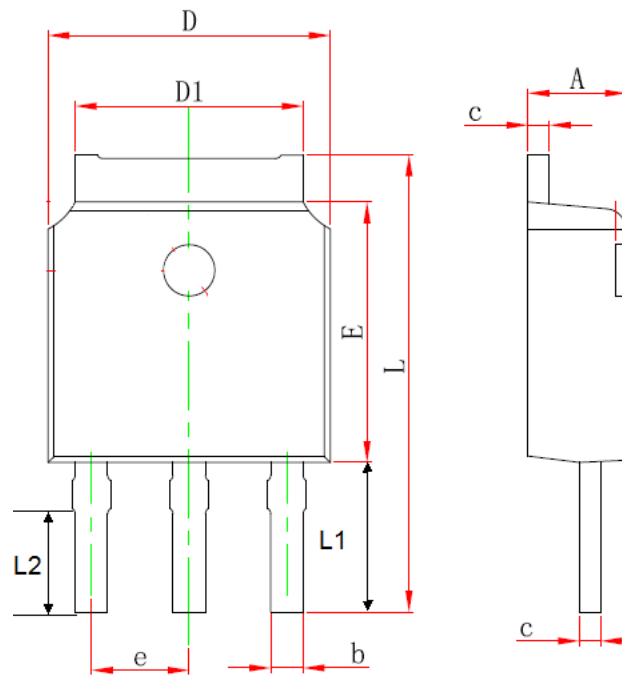


TO-251S 封装机械尺寸

TO-251S (IPAK) MECHANICAL DATA

单位:毫米/UNIT: mm

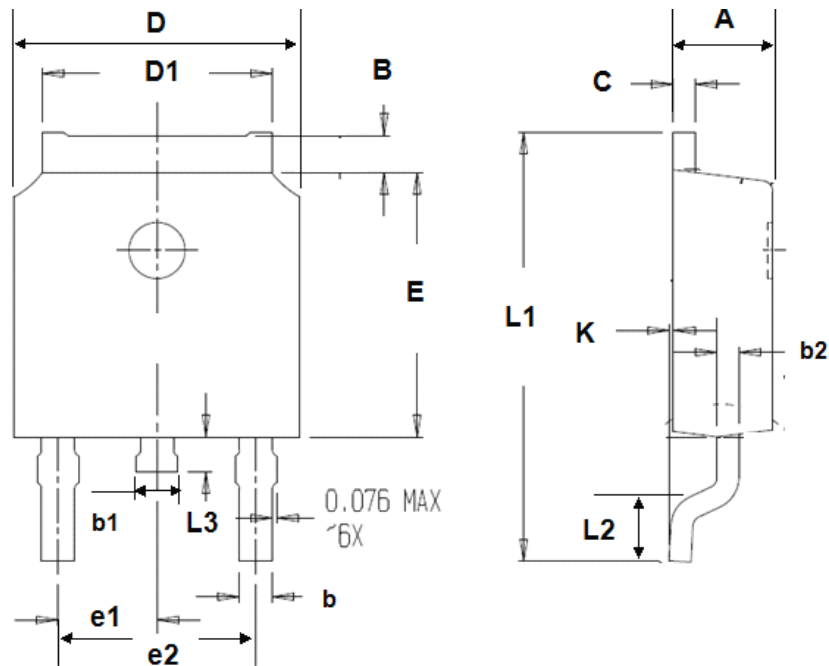
| 符号/SYMBOL | 最小值/min | 典型值/nom | 最大值/max |
|-----------|---------|---------|---------|
| A | 2.20 | | 2.40 |
| b | 0.60 | | 0.85 |
| C | 0.45 | 0.50 | 0.60 |
| D | 6.50 | | 6.70 |
| D1 | 5.10 | | 5.50 |
| E | 5.9 | | 6.20 |
| e | 2.18 | 2.29 | 2.38 |
| L | 11.00 | | 12.40 |
| L1 | 4.8 | | 5.3 |
| L2 | 3.5 | | 4.2 |



N-沟道功率 MOS 管/ N-CHANNEL POWER MOSFET
TO-252 封装机械尺寸
TO-252 MECHANICAL DATA

单位:毫米/UNIT: mm

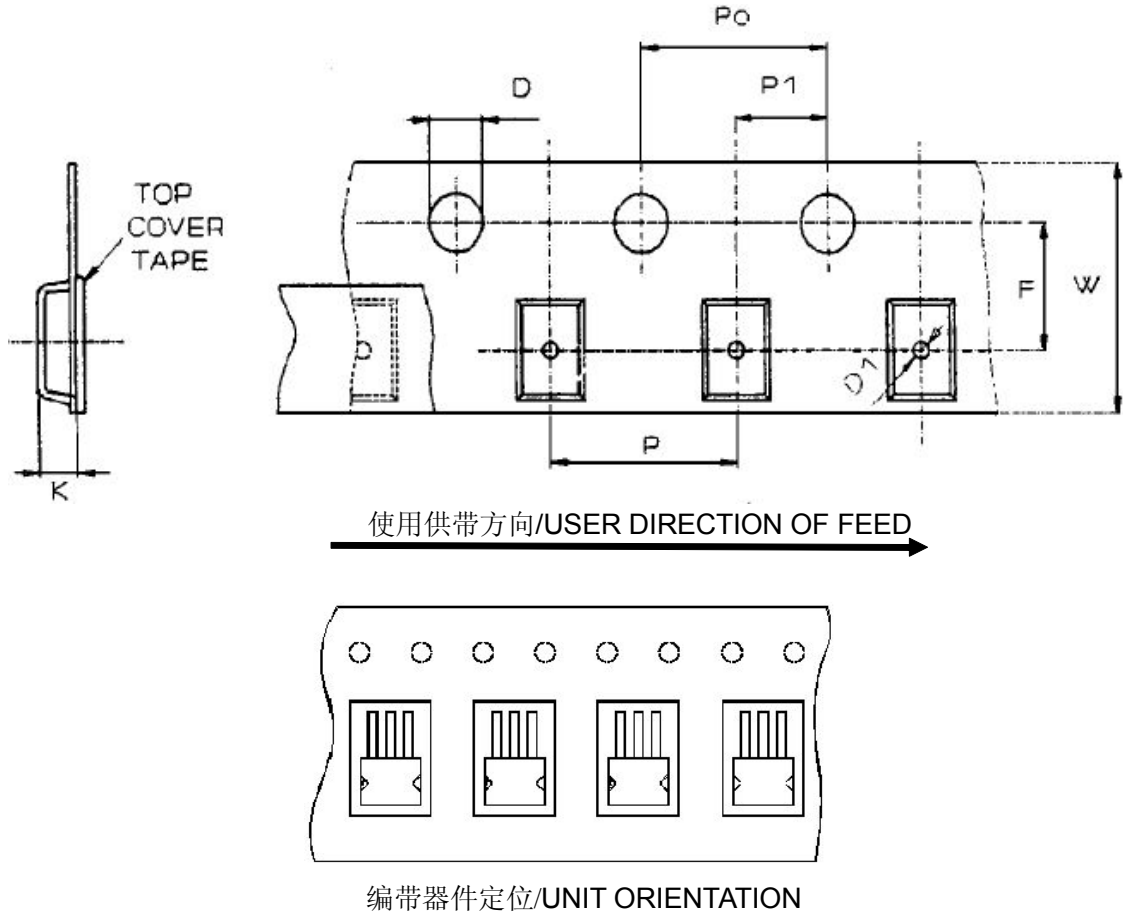
| 符号 SYMBOL | 最小值 min | 最大值 max | 符号 SYMBOL | 最小值 min | 最大值 max |
|--------------|------------|------------|--------------|------------|------------|
| A | 2.10 | 2.50 | B | 0.85 | 1.25 |
| b | 0.50 | 0.80 | b1 | 0.50 | 0.90 |
| b2 | 0.45 | 0.70 | C | 0.45 | 0.70 |
| D | 6.30 | 6.75 | D1 | 5.10 | 5.50 |
| E | 5.30 | 6.30 | e1 | 2.25 | 2.35 |
| L1 | 9.20 | 10.60 | e2 | 4.45 | 4.75 |
| L2 | 0.90 | 1.75 | L3 | 0.60 | 1.10 |
| K | 0.00 | 0.23 | | | |



TO-252 编带规格尺寸
TO-252 TAPE AND REEL DATA

单位:毫米/UNIT: mm

| 符号 SYMBOL | 最小值 min | 最大值 max | 符号 SYMBOL | 最小值 min | 最大值 max |
|--------------|------------|------------|--------------|------------|------------|
| W | 16.0-0.3 | 16.0+0.3 | F | 7.5-0.1 | 7.5+0.1 |
| P0 | 4.0-0.1 | 4.0+0.1 | D | 1.5-0.0 | 1.5+0.1 |
| P | 8.0-0.1 | 8.0+0.1 | P1 | 2.0-0.1 | 2.0+0.1 |
| K | 2.65 | 2.80 | D1 | 1.5-0.0 | 1.5+0.1 |



SOT-223 封装机械尺寸 SOT-223 MECHANICAL DATA

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 1.5 | 1.6 | 1.8 | 0.059 | 0.063 | 0.071 |
| A1 | 0.01 | 0.06 | 0.10 | 0.001 | 0.002 | 0.004 |
| B | 2.9 | 3.0 | 3.1 | 0.114 | 0.118 | 0.122 |
| B1 | 0.6 | 0.7 | 0.8 | 0.024 | 0.028 | 0.031 |
| C | 0.22 | 0.26 | 0.32 | 0.009 | 0.010 | 0.013 |
| D | 6.3 | 6.5 | 6.7 | 0.248 | 0.256 | 0.264 |
| E | 3.3 | 3.5 | 3.7 | 0.130 | 0.138 | 0.146 |
| F | | 4.6 | | | 0.181 | |
| F1 | | 2.3 | | | 0.091 | |
| G | 0.7 | 0.9 | 1.1 | 0.028 | 0.035 | 0.043 |
| H | 1.5 | 1.75 | 2 | 0.059 | 0.069 | 0.079 |
| J | 6.7 | 7.0 | 7.3 | 0.264 | 0.276 | 0.287 |
| K | | 0.9 | | | 0.035 | |

