

N-沟道功率 MOS 管/ N-CHANNEL POWER MOSFET

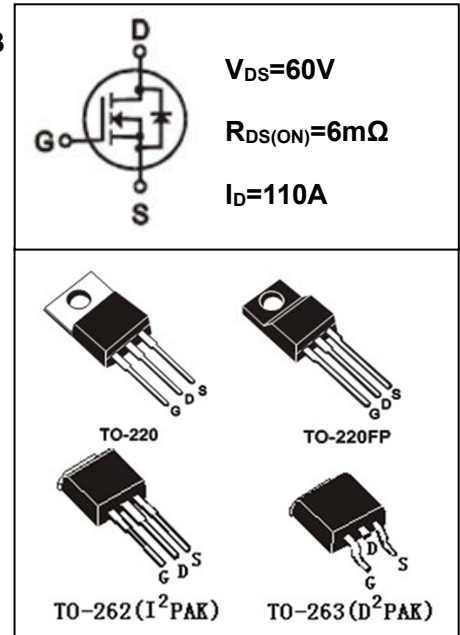
SIF110N060

- 特点：热阻低 导通电阻低 栅极电荷低，开关速度快 输入阻抗高 符合RoHS规范
- FEATURES: ■LOW THERMAL RESISTANCE ■LOW $R_{DS(ON)}$ TO MINIMIZE CONDUCTIVE LOSS ■LOW GATE CHARGE FOR FAST SWITCHING ■HIGH INPUT RESISTANCE ■RoHS COMPLIANT
- 应用：低压高频逆变电路 同步整流 开关应用
- APPLICATION: ■LOW VOLTAGE,HIGH FREQUENCY INVERTERS ■SYNCHRONOUS RECTIFICATION ■SWITCH APPLICATIONS

●最大额定值 (TC=25°C)

●Absolute Maximum Ratings (Tc=25°C) TO-220/220FP/262/263

| 参数 PARAMETER | 符号 SYMBOL | 额定值 VALUE | 单位 UNIT |
|---|--------------|--|------------|
| 漏-源电压 Drain-source Voltage | V_{DS} | 60 | V |
| 栅-源电压 gate-source Voltage | V_{GS} | ±20 | V |
| 漏极电流 Continuous Drain Current TC=25°C ① | I_D | 110* | A |
| 耗散功率 Total Power Dissipation ① | P_{tot} | TO-220/262/263 : 110 TO-220FP:36 | W |
| 最高结温 Junction Temperature | T_j | 150 | °C |
| 存储温度 Storage Temperature | T_{STG} | -55-175 | °C |
| 单脉冲雪崩能量 Single Pulse Avalanche Energy ② | E_{AS} | 300 | mJ |



●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} | $V_{GS}=0V, I_D=250\mu A$ | 60 | 65 | | V |
| 栅极开启电压 Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ ③ | 1.2 | 1.8 | 2.5 | V |
| 漏-源漏电流 Drain-source Leakage Current | I_{DSS} | $V_{DS}=60V, V_{GS}=0V$ | | | 1 | μA |
| 栅极漏电流 Gate-body Leakage Current ($V_{DS}=0$) | I_{GSS} | $V_{GS}=\pm 20V$ | | | ±100 | nA |
| 漏-源导通电阻 Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=20A$ ③ $V_{GS}=4.5V, I_D=16A$ ③ | | 6 7.2 | 8 9 | mΩ |
| 跨导 Forward Transconductance | g_{FS} | $V_{DS}=10V, I_D=40A$ ③ | 40 | 49 | | S |

●订单信息/ORDERING INFORMATION:

| 包装形式/PACKING | 订货编码/ORDERING CODE | |
|---------------------------------------|---------------------------------------|--|
| | 普通塑封料/ Normal Package Material | 无卤塑封料/Halogen Free |
| TO-220/220FP/262/263 条管装/TUBE PACKING | SIF110N060 TO-220/220FP/262/263-TU | SIF110N060 TO-220/220FP/262/263-TU-HF |
| TO-263 编带装/TAPE & REEL PACKING | SIF110N060 TO-263-TR | SIF110N060 TO-263-TR-HF |

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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 |
|--|--------------|--|------------|------------|------------|------------|
| 输入电容 Input Capacitance | Ciss | $V_{GS} = 0V, V_{DS} = 25V$ $F = 1.0MHz$ | | 3300 | | pF |
| 输出电容 Output Capacitance | Coss | | | 380 | | |
| 反向传输电容 Reverse Transfer Capacitance | Crss | | | 270 | | |
| 导通延迟 Turn -On Delay Time | Td(on) | $V_{DD}=30V, I_D = 2A, R_L=1\Omega$ $V_{GS} = 10V, R_G=3\Omega$ | | 15 | | ns |
| 开启上升时间 Turn -On Rise Time | T_r | | | 18 | | |
| 关断延迟 Turn -Off Delay Time | Td(off) | | | 32 | | |
| 关断下降时间 Turn -Off Fall Time | T_f | | | 23 | | |
| 栅极电荷 Total Gate Charge | Qg | $I_D = 17A, V_{DS} = 20V$ $V_{GS} = 10V$ | | 45 | | nC |
| 栅源电荷 Gate-to-Source Charge | Qgs | | | 10.5 | | nC |
| 栅漏电荷 Gate-to-Drain Charge | Qgd | | | 4.9 | | nC |
| 二极管正向压降 Diode Forward Voltage | V_{SD} | $T_j=25^\circ C, I_s=40A$ $V_{GS} = 0V$ ③ | | 0.79 | 1.3 | V |
| 反向恢复时间 Reverse Recovery Time | trr | $T_j=25^\circ C, I_s=30A$ $di/dt=100A/\mu s$ ③ | | 38 | | ns |
| 反向恢复电荷 Reverse Recovery Charge | Qrr | | | 21 | | nC |

●热特性

●Thermal Characteristics

| 参数 PARAMETER | 符号 SYMBOL | 最大值 MAX | | 单位 UNIT |
|--|--------------|----------------|----------|------------|
| | | TO-220/262/263 | TO-220FP | |
| 热阻结-壳 Thermal Resistance Junction-case | RthJC | 1.14 | 3.47 | °C/W |
| 热阻结-壳 Thermal Resistance Junction-ambient | RthJA | 62.5 | 62.5 | °C/W |

注释(Notes):

- ① 以最高结温为限制, $T_c=25^\circ C$ 时测试, 封装限制电流为 80A。
 I_D & P_D base on maximum allowable junction temperature, test at $T_c=25^\circ C$ 。Package limited current is 80A。
- ② 初始结温= $25^\circ C$, $L=1mH$ 。
Starting $T_j=25^\circ C, L=1mH$ 。
- 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

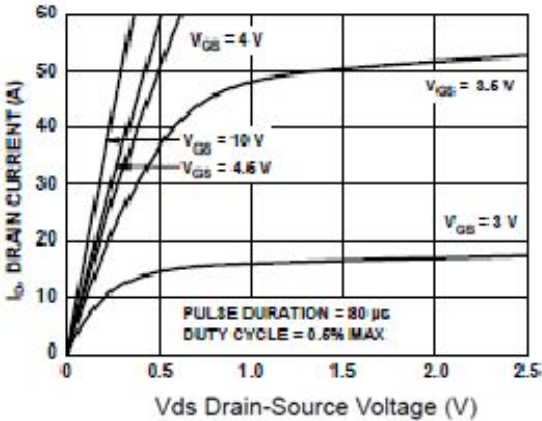


Figure 1 Output Characteristics

图 1 输出特性曲线, Tc=25°C

Fig1 Typical Output Characteristics, Tc=25°C

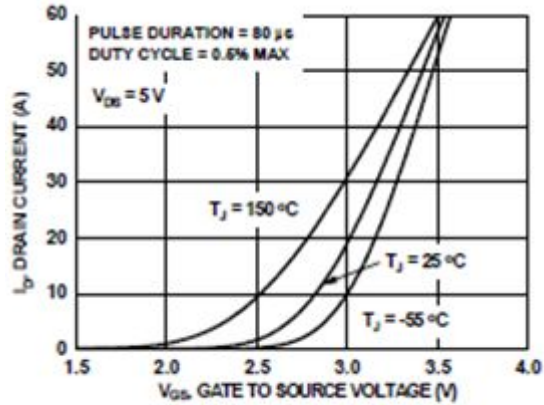


Figure 2 Transfer Characteristics

图 2 转移特性曲线

Fig2 Resistance V.S Drain Current

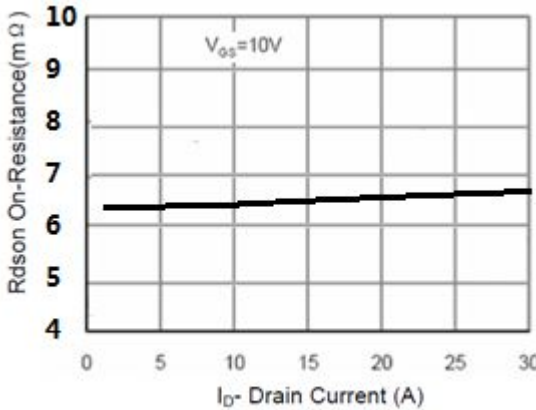


Figure 3 Rdson- Drain Current

图 3 导通电阻与漏极电流的曲线

Fig3 Threshold Voltage V.S Junction Temperature

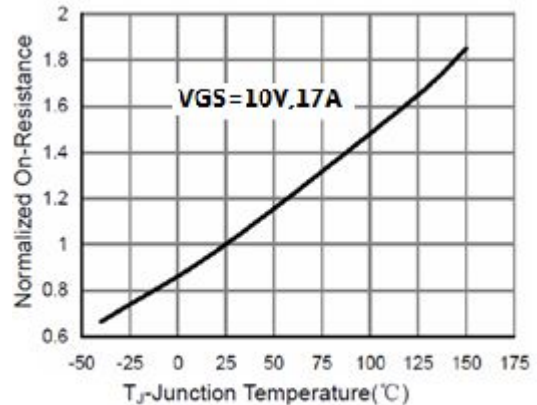


Figure 4 Rdson-Junction Temperature

图 4 导通电阻与结温度曲线

Fig4 Resistance V.S Junction Temperature

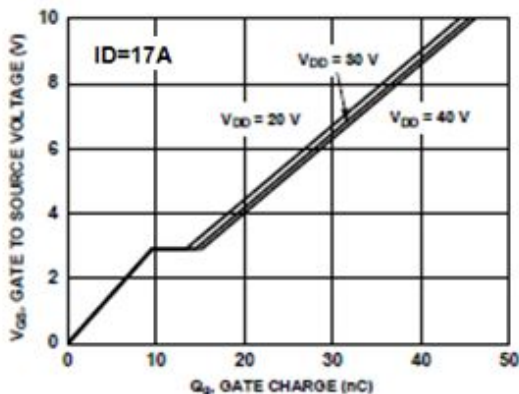


Figure 5 Gate Charge

图 5 典型栅极电荷与栅源电压曲线

Fig5 Typical Gate Charge V.S Gate-to-Source Voltage

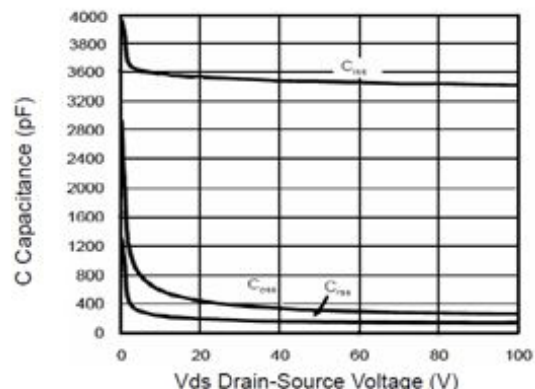


Figure 6 Capacitance vs Vds

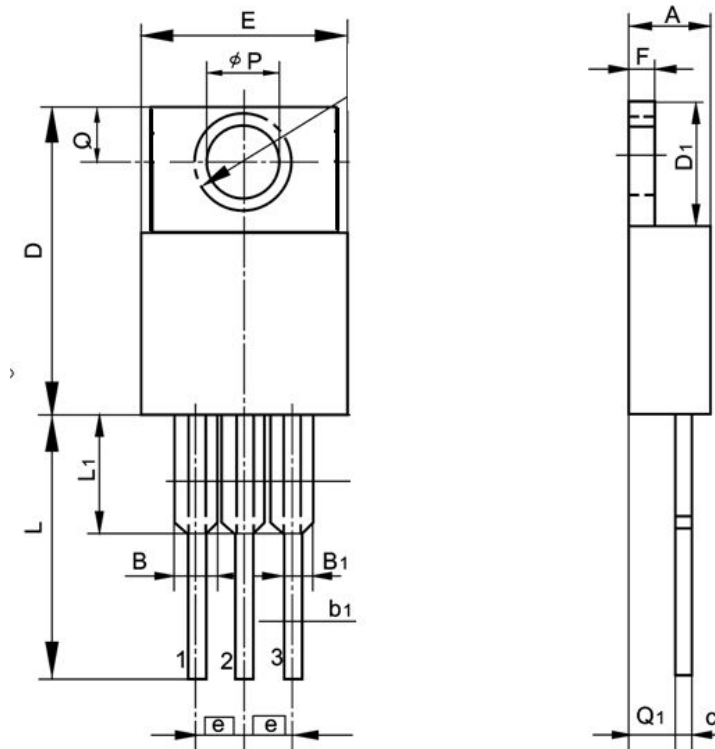
图 6 典型电容与漏源电压的曲线

Fig6 Typical Capacitance V.S Drain-to-Source Voltage

TO-220 封装机械尺寸 TO-220 MECHANICAL DATA

单位：毫米/UNIT: mm

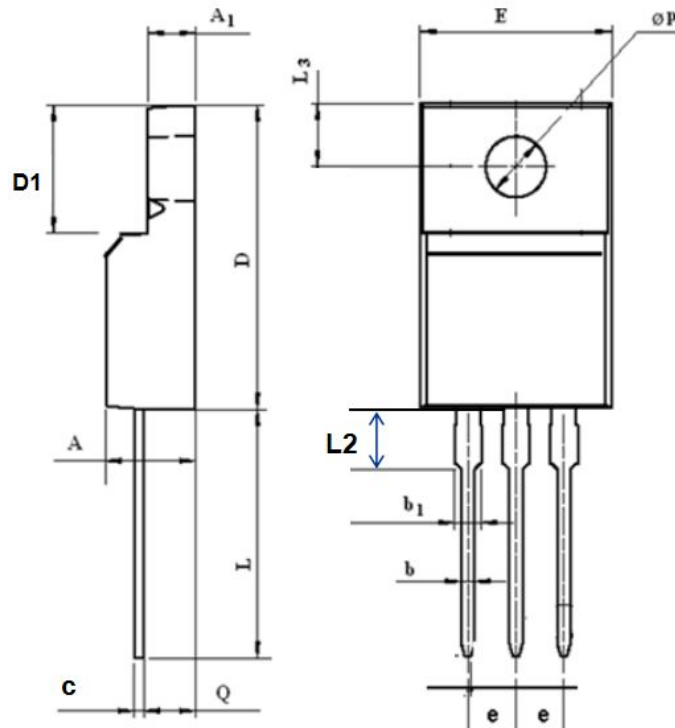
| 符号 SYMBOL | 最小值 min | 典型值 nom | 最大值 max | 符号 SYMBOL | 最小值 min | 典型值 nom | 最大值 max |
|--------------|------------|------------|------------|--------------|------------|------------|------------|
| A | 4.00 | | 4.80 | E | 9.90 | | 10.70 |
| B | 1.20 | | 1.50 | e | | 2.54 | |
| B1 | 1.00 | | 1.40 | F | 1.10 | | 1.45 |
| b1 | 0.65 | | 1.00 | L | 12.50 | | 14.50 |
| c | 0.35 | | 0.75 | L1 | 3.00 | 3.50 | 4.00 |
| D | 15.00 | | 16.50 | Q | 2.50 | | 3.00 |
| D1 | 5.90 | | 6.90 | Q1 | 2.00 | | 3.00 |
| | | | | φP | 3.60 | | 3.90 |



TO-220FP 封装机械尺寸 TO-220FP MECHANICAL DATA

单位:毫米/UNIT: mm

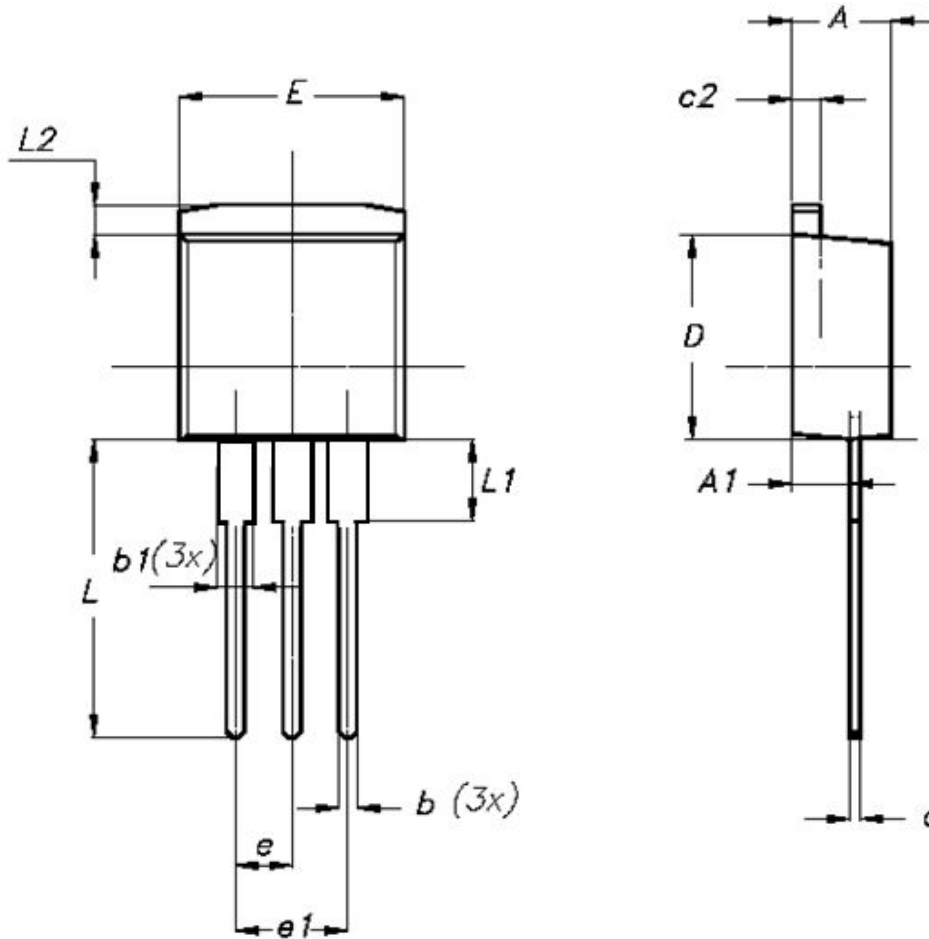
| 符号 SYMBOL | 最小值 min | 典型值 nom | 最大值 max | 符号 SYMBOL | 最小值 min | 典型值 nom | 最大值 max |
|----------------|-------------|------------|-------------|----------------------|--------------|------------|--------------|
| A | 4.40 | | 4.95 | E | 9.60 | | 10.30 |
| A ₁ | 2.30 | | 2.90 | e | | 2.54 | |
| b | 0.70 | | 0.90 | L | 12.40 | | 14.00 |
| b ₁ | 1.18 | | 1.45 | L₂ | 2.30 | | 2.60 |
| c | 0.40 | | 0.70 | L ₃ | 3.00 | | 4.00 |
| D | 14.50 | | 17.00 | øp | 3.00 | | 3.50 |
| D1 | 6.10 | | 9.00 | Q | 2.30 | | 2.80 |



TO-262 封装机械尺寸 TO-262 MECHANICAL DATA

单位：毫米/UNIT: mm

| 符号 SYMBOL | 最小值 min | 典型值 nom | 最大值 max | 符号 SYMBOL | 最小值 min | 典型值 nom | 最大值 max |
|--------------|------------|------------|------------|--------------|------------|------------|------------|
| A | 3.80 | | 4.80 | e | | 2.54 | |
| A1 | 2.00 | | 2.80 | e1 | | | 5.30 |
| b | 0.60 | | 1.00 | E | 9.90 | | 10.70 |
| b1 | 1.20 | | 1.40 | L | 12.50 | | 14.50 |
| c | 0.40 | | 0.70 | L1 | 0.80 | 1.00 | 1.20 |
| c2 | 1.10 | | 1.40 | L2 | | | 1.50 |
| D | | | 9.60 | | | | |

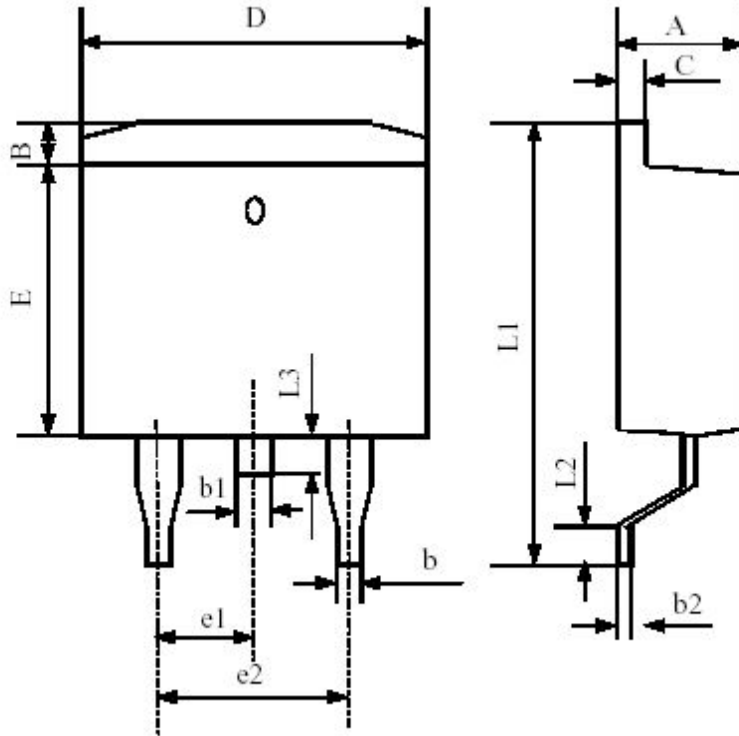


TO-263 封装机械尺寸

TO-263(D2PAK) MECHANICAL DATA

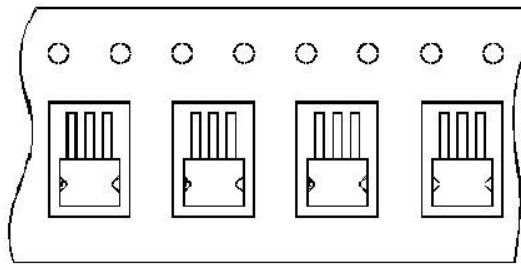
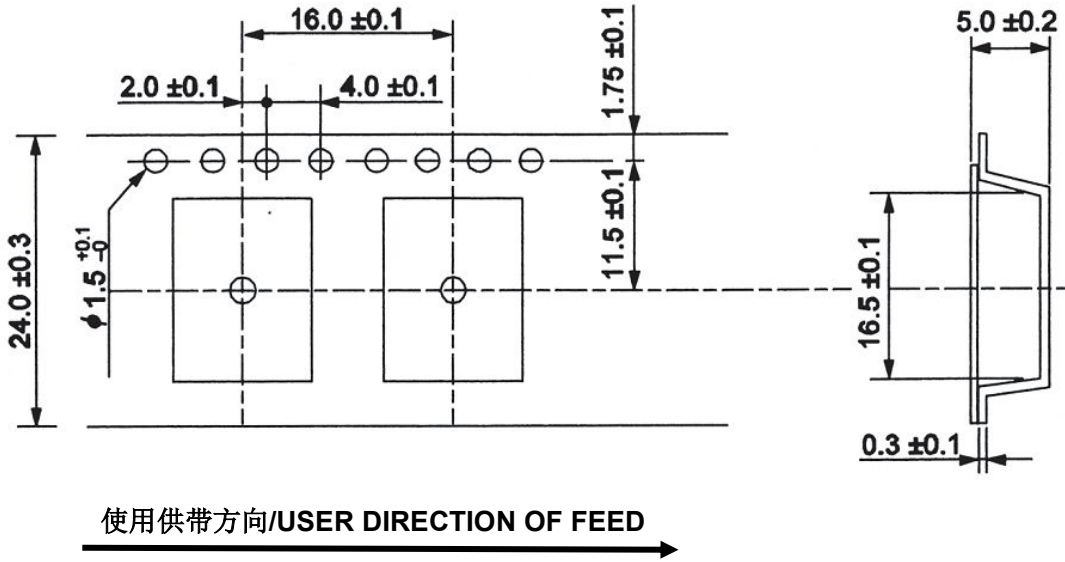
单位：毫米/UNIT: mm

| 符号 SYMBOL | 最小值 min | 典型值 nom | 最大值 max | 符号 SYMBOL | 最小值 min | 典型值 nom | 最大值 max |
|--------------|------------|------------|------------|--------------|------------|------------|------------|
| A | 4.42 | | 4.72 | E | 8.99 | | 9.29 |
| B | 1.22 | | 1.32 | e1 | 2.44 | | 2.64 |
| b | 0.76 | | 0.86 | e2 | 4.98 | | 5.18 |
| b1 | 1.22 | | 1.32 | L1 | 15.19 | | 15.79 |
| b2 | 0.33 | | 0.43 | L2 | 2.29 | | 2.79 |
| C | 1.22 | | 1.32 | L3 | 1.30 | | 1.75 |
| D | 9.95 | | 10.25 | | | | |



TO-263 编带规格尺寸 TO-263 TAPE AND REEL DATA

单位:毫米/UNIT: mm



编带器件定位示意图/UNIT ORIENTATION