



概述

HT71xx-1是一款采用 CMOS 技术的低压差线性稳压器。最大输出电流为 50mA 且允许的最高输入电压为 30V。具有几个固定的输出电压，范围从 2.5V 到 5.0V。COMS 技术可确保其具有低压降和低静态电流的特性。

功能特点

- 低功耗
- 低压降
- 较低的温度系数
- 最高输入电压：30V
- 典型静态电流：1.5uA
- 最大输出电流：50mA
- 输出电压精度：±2%
- 封装类型：SOT-23，SOT-89

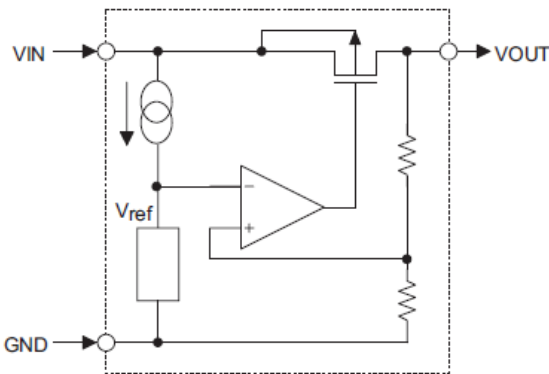
应用领域

- 电池供电设备
- 通信设备
- 音频/视频设备

选型表

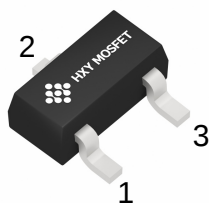
| 型号       | 输出电压 | 封装类型                 | 最小包装数                                      |
|----------|------|----------------------|--------------------------------------------|
| HT7125-1 | 2.5V | SOT-23<br><br>SOT-89 | 3000PCS/盘(SOT-23)<br><br>1000PCS/盘(SOT-89) |
| HT7130-1 | 3.0V |                      |                                            |
| HT7133-1 | 3.3V |                      |                                            |
| HT7136-1 | 3.6V |                      |                                            |
| HT7140-1 | 4.0V |                      |                                            |
| HT7144-1 | 4.4V |                      |                                            |
| HT7150-1 | 5.0V |                      |                                            |

电路功能框图

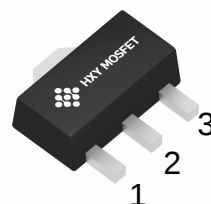




## 引脚图



SOT-23



SOT-89

## 引脚说明

| 引脚序号 | 引脚名称 | 说明  |
|------|------|-----|
| 1    | GND  | 地   |
| 2    | VIN  | 输入脚 |
| 3    | VOUT | 输出脚 |

## 极限参数

电源供应电压 ----- -0.3V ~+30V      工作环境温度 ----- -40℃~+85℃  
储存温度范围 ----- -50℃~+125℃

注：这里只强调额定功率，超过极限参数所规定的范围将对芯片造成损害，无法预期芯片在上述标示范围外的工作状态，而且若长期在标示范围外的条件下工作，可能影响芯片的可靠性。

## 热能信息

| 符号            | 参数                      | 封装类型   | 最大值 | 单位  |
|---------------|-------------------------|--------|-----|-----|
| $\theta_{JA}$ | 热阻（与环境连接）（假设无环境气流、无散热片） | SOT-23 | 500 | ℃/W |
|               |                         | SOT-89 | 200 | ℃/W |
| $P_D$         | 功耗                      | SOT-23 | 0.2 | W   |
|               |                         | SOT-89 | 0.5 | W   |

注：  $P_D$  值是在  $T_a=25^{\circ}\text{C}$  时测得。



直流电特性（除特别说明外， $T_A = +25^\circ\text{C}$ ）

输出型号 HT7125-1

| 参数说明  | 符号                                                   | 测试条件                                                                                    | 最小值   | 典型值  | 最大值   | 单位                       |
|-------|------------------------------------------------------|-----------------------------------------------------------------------------------------|-------|------|-------|--------------------------|
| 输出电压  | $V_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$                                                  | 2.425 | 2.50 | 2.575 | V                        |
| 输出电流  | $I_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$                                                                   | 20    | 50   | —     | mA                       |
| 负载调整率 | $\Delta V_{OUT}$                                     | $V_{IN}=V_{OUT}+2.0V$<br>$1mA \leq I_{OUT} \leq 50mA$                                   | —     | 25   | 60    | mV                       |
| 低压差   | $V_{DIF}$                                            | $I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$                                                    | —     | 30   | 100   | mV                       |
| 静态电流  | $I_{SS}$                                             | 无负载                                                                                     | —     | 1.5  | 3.0   | $\mu A$                  |
| 线性调整率 | $\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \Delta V_{IN}$ | $V_{OUT}+1.0V \leq V_{IN} \leq 24V$ ,<br>$I_{OUT}=1mA$                                  | —     | —    | 0.2   | %/V                      |
| 输入电压  | $V_{IN}$                                             | —                                                                                       | —     | —    | 24    | V                        |
| 温度系数  | $\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$    | $V_{OUT}+2.0V$ , $I_{OUT}=10mA$ ,<br>$-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$ | —     | 100  | —     | ppm/<br>$^\circ\text{C}$ |

注：当  $V_{IN}=V_{OUT}+2.0V$ ，固定负载条件下使输出电压下降 2%，此时输入电压和输出电压的差值为低压差值  $V_{DIF}$ 。

输出型号 HT7130-1

| 参数说明  | 符号                                                   | 测试条件                                                                                           | 最小值  | 典型值  | 最大值  | 单位                       |
|-------|------------------------------------------------------|------------------------------------------------------------------------------------------------|------|------|------|--------------------------|
| 输出电压  | $V_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$                                                         | 2.91 | 3.00 | 3.09 | V                        |
| 输出电流  | $I_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$                                                                          | 20   | 50   | —    | mA                       |
| 负载调整率 | $\Delta V_{OUT}$                                     | $V_{IN}=V_{OUT}+2.0V$<br>$1mA \leq I_{OUT} \leq 50mA$                                          | —    | 25   | 60   | mV                       |
| 低压差   | $V_{DIF}$                                            | $I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$                                                           | —    | 30   | 100  | mV                       |
| 静态电流  | $I_{SS}$                                             | 无负载                                                                                            | —    | 1.5  | 3.0  | $\mu A$                  |
| 线性调整率 | $\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \Delta V_{IN}$ | $V_{OUT}+1.0V \leq V_{IN} \leq 24V$ ,<br>$I_{OUT}=1mA$                                         | —    | —    | 0.2  | %/V                      |
| 输入电压  | $V_{IN}$                                             | —                                                                                              | —    | —    | 24   | V                        |
| 温度系数  | $\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$    | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ ,<br>$-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$ | —    | 100  | —    | ppm/<br>$^\circ\text{C}$ |

注：当  $V_{IN}=V_{OUT}+2.0V$ ，固定负载条件下使输出电压下降 2%，此时输入电压和输出电压的差值为低压差值  $V_{DIF}$ 。



输出型号 HT7133-1

| 参数说明  | 符号                                                   | 测试条件                                                                               | 最小值   | 典型值  | 最大值   | 单位                 |
|-------|------------------------------------------------------|------------------------------------------------------------------------------------|-------|------|-------|--------------------|
| 输出电压  | $V_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$                                             | 3.201 | 3.30 | 3.399 | V                  |
| 输出电流  | $I_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$                                                              | 20    | 50   | —     | mA                 |
| 负载调整率 | $\Delta V_{OUT}$                                     | $V_{IN}=V_{OUT}+2.0V$<br>$1mA \leq I_{OUT} \leq 50mA$                              | —     | 25   | 60    | mV                 |
| 低压差   | $V_{DIF}$                                            | $I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$                                               | —     | 25   | 55    | mV                 |
| 静态电流  | $I_{SS}$                                             | 无负载                                                                                | —     | 1.5  | 3.0   | $\mu A$            |
| 线性调整率 | $\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \Delta V_{IN}$ | $V_{OUT}+1.0V \leq V_{IN} \leq 24V$ ,<br>$I_{OUT}=1mA$                             | —     | —    | 0.2   | %/V                |
| 输入电压  | $V_{IN}$                                             | —                                                                                  | —     | —    | 24    | V                  |
| 温度系数  | $\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$    | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ ,<br>$-40^\circ C \leq T_A \leq 85^\circ C$ | —     | 100  | —     | ppm/<br>$^\circ C$ |

注：当  $V_{IN}=V_{OUT}+2.0V$ ，固定负载条件下使输出电压下降 2%，此时输入电压和输出电压的差值为低压差值  $V_{DIF}$ 。

输出型号 HT7136-1

| 参数说明  | 符号                                                   | 测试条件                                                                               | 最小值   | 典型值  | 最大值   | 单位                 |
|-------|------------------------------------------------------|------------------------------------------------------------------------------------|-------|------|-------|--------------------|
| 输出电压  | $V_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$                                             | 3.492 | 3.60 | 3.708 | V                  |
| 输出电流  | $I_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$                                                              | 20    | 50   | —     | mA                 |
| 负载调整率 | $\Delta V_{OUT}$                                     | $V_{IN}=V_{OUT}+2.0V$<br>$1mA \leq I_{OUT} \leq 50mA$                              | —     | 25   | 60    | mV                 |
| 低压差   | $V_{DIF}$                                            | $I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$                                               | —     | 25   | 55    | mV                 |
| 静态电流  | $I_{SS}$                                             | 无负载                                                                                | —     | 1.5  | 3.0   | $\mu A$            |
| 线性调整率 | $\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \Delta V_{IN}$ | $V_{OUT}+1.0V \leq V_{IN} \leq 24V$ ,<br>$I_{OUT}=1mA$                             | —     | —    | 0.2   | %/V                |
| 输入电压  | $V_{IN}$                                             | —                                                                                  | —     | —    | 24    | V                  |
| 温度系数  | $\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$    | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ ,<br>$-40^\circ C \leq T_A \leq 85^\circ C$ | —     | 100  | —     | ppm/<br>$^\circ C$ |

注：当  $V_{IN}=V_{OUT}+2.0V$ ，固定负载条件下使输出电压下降 2%，此时输入电压和输出电压的差值为低压差值  $V_{DIF}$ 。



输出型号 HT7140-1

| 参数说明  | 符号                                                   | 测试条件                                                                               | 最小值  | 典型值 | 最大值  | 单位                 |
|-------|------------------------------------------------------|------------------------------------------------------------------------------------|------|-----|------|--------------------|
| 输出电压  | $V_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$                                             | 3.92 | 4.0 | 4.08 | V                  |
| 输出电流  | $I_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$                                                              | 20   | 50  | —    | mA                 |
| 负载调整率 | $\Delta V_{OUT}$                                     | $V_{IN}=V_{OUT}+2.0V$<br>$1mA \leq I_{OUT} \leq 50mA$                              | —    | 25  | 60   | mV                 |
| 低压差   | $V_{DIF}$                                            | $I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$                                               | —    | 25  | 55   | mV                 |
| 静态电流  | $I_{SS}$                                             | 无负载                                                                                | —    | 1.5 | 3.0  | $\mu A$            |
| 线性调整率 | $\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \Delta V_{IN}$ | $V_{OUT}+1.0V \leq V_{IN} \leq 24V$ ,<br>$I_{OUT}=1mA$                             | —    | —   | 0.2  | %/V                |
| 输入电压  | $V_{IN}$                                             | —                                                                                  | —    | —   | 24   | V                  |
| 温度系数  | $\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$    | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ ,<br>$-40^\circ C \leq T_A \leq 85^\circ C$ | —    | 100 | —    | ppm/<br>$^\circ C$ |

注：当  $V_{IN}=V_{OUT}+2.0V$ , 固定负载条件下使输出电压下降 2%，此时输入电压和输出电压的差值为低压差值  $V_{DIF}$ 。

输出型号 HT7144-1

| 参数说明  | 符号                                                   | 测试条件                                                                               | 最小值   | 典型值 | 最大值   | 单位                 |
|-------|------------------------------------------------------|------------------------------------------------------------------------------------|-------|-----|-------|--------------------|
| 输出电压  | $V_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$                                             | 4.268 | 4.4 | 4.532 | V                  |
| 输出电流  | $I_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0V$                                                              | 20    | 50  | —     | mA                 |
| 负载调整率 | $\Delta V_{OUT}$                                     | $V_{IN}=V_{OUT}+2.0V$<br>$1mA \leq I_{OUT} \leq 50mA$                              | —     | 25  | 60    | mV                 |
| 低压差   | $V_{DIF}$                                            | $I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$                                               | —     | 25  | 55    | mV                 |
| 静态电流  | $I_{SS}$                                             | 无负载                                                                                | —     | 1.5 | 3.0   | $\mu A$            |
| 线性调整率 | $\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \Delta V_{IN}$ | $V_{OUT}+1.0V \leq V_{IN} \leq 24V$ ,<br>$I_{OUT}=1mA$                             | —     | —   | 0.2   | %/V                |
| 输入电压  | $V_{IN}$                                             | —                                                                                  | —     | —   | 24    | V                  |
| 温度系数  | $\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$    | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ ,<br>$-40^\circ C \leq T_A \leq 85^\circ C$ | —     | 100 | —     | ppm/<br>$^\circ C$ |

注：当  $V_{IN}=V_{OUT}+2.0V$ , 固定负载条件下使输出电压下降 2%，此时输入电压和输出电压的差值为低压差值  $V_{DIF}$ 。



输出型号 HT7150-1

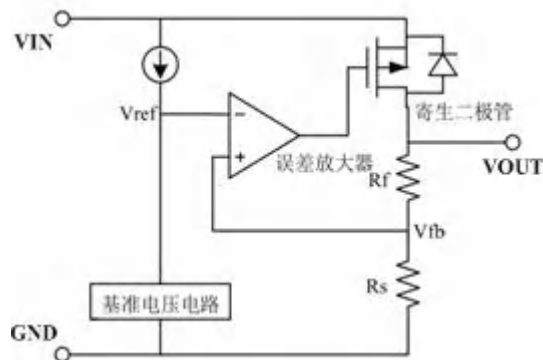
| 参数说明  | 符号                                                                   | 测试条件                                                                                 | 最小值   | 典型值 | 最大值   | 单位                  |
|-------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------|-----|-------|---------------------|
| 输出电压  | $V_{OUT}$                                                            | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$                                               | 4.850 | 5.0 | 5.150 | V                   |
| 输出电流  | $I_{OUT}$                                                            | $V_{IN}=V_{OUT}+2.0V$                                                                | 20    | 50  | —     | mA                  |
| 负载调整率 | $\Delta V_{OUT}$                                                     | $V_{IN}=V_{OUT}+2.0V$<br>$1mA \leq I_{OUT} \leq 70mA$                                | —     | 25  | 60    | mV                  |
| 低压差   | $V_{DIF}$                                                            | $I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$                                                 | —     | 25  | 55    | mV                  |
| 静态电流  | $I_{SS}$                                                             | 无负载                                                                                  | —     | 1.5 | 3.0   | $\mu A$             |
| 线性调整率 | $\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \frac{V_{OUT}}{\Delta V_{IN}}$ | $V_{OUT}+1.0V \leq V_{IN} \leq 24V$ ,<br>$I_{OUT}=1mA$                               | —     | —   | 0.2   | %/V                 |
| 输入电压  | $V_{IN}$                                                             | —                                                                                    | —     | —   | 24    | V                   |
| 温度系数  | $\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$                    | $V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ ,<br>$-40^{\circ}C \leq T_A \leq 85^{\circ}C$ | —     | 100 | —     | ppm/<br>$^{\circ}C$ |

注：当  $V_{IN}=V_{OUT}+2.0V$ ，固定负载条件下使输出电压下降 2%，此时输入电压和输出电压的差值为低压差值  $V_{DIF}$ 。



## 功能描述

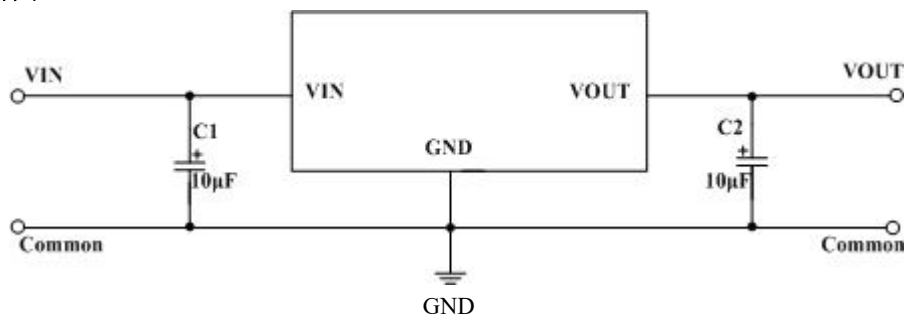
误差放大器根据反馈电阻  $R_s$  及  $R_f$  所构成的分压电阻的输入电压  $V_{fb}$  同基准电压 ( $V_{ref}$ ) 相比较。通过此误差放大器向输出晶体管提供必要的门极电压，而使输出电压不受输入电压或温度变化的影响而保持一定。



- 1、应用时尽量将电容接到 VIN 和 VOUT 脚位附近。
- 2、电路内部使用了相位补偿电路和利用输出电容的 ESR 来补偿。所以输出到地一定要接大于  $2.2\mu F$  的电容器，推荐使用钽电容。
- 3、注意输入输出电压、负载电流的使用条件，避免 IC 内部的功耗超出封装允许的最大功耗值。

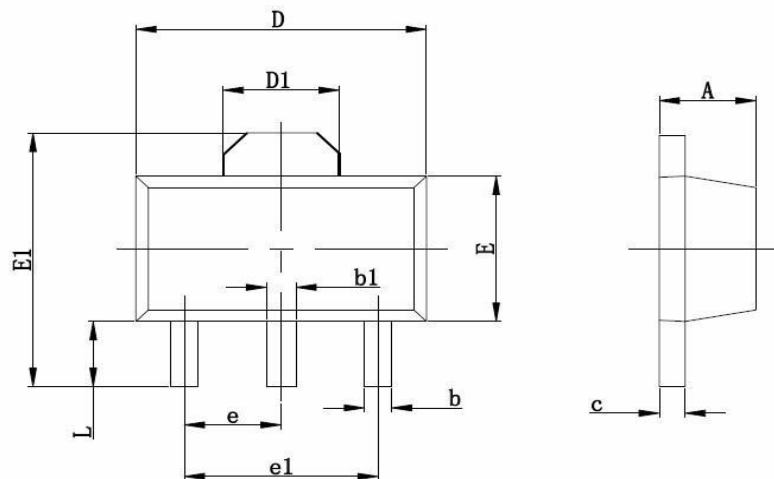
## 典型应用线路图

### 1、基本应用图





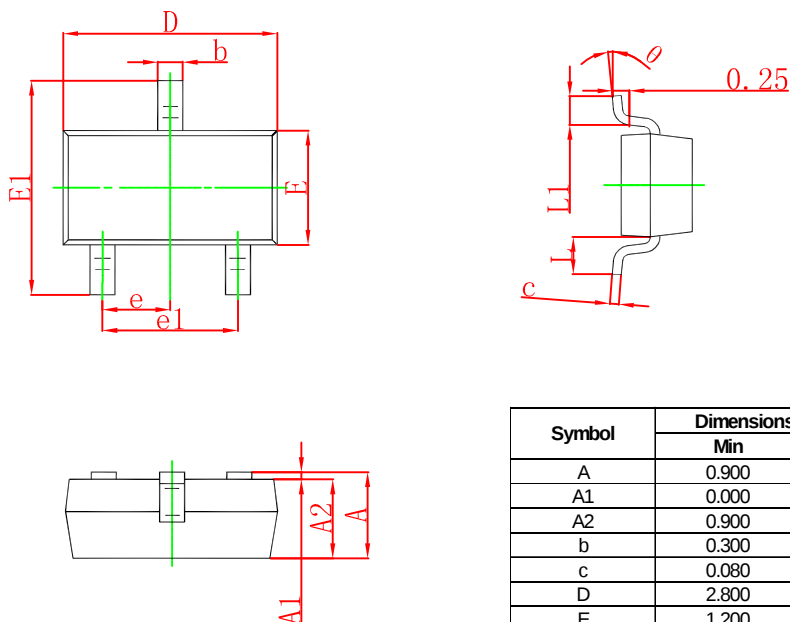
## SOT-89 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.400                     | 1.600 | 0.055                | 0.063 |
| b      | 0.350                     | 0.520 | 0.013                | 0.197 |
| b1     | 0.400                     | 0.580 | 0.016                | 0.023 |
| c      | 0.350                     | 0.440 | 0.014                | 0.017 |
| D      | 4.400                     | 4.600 | 0.173                | 0.181 |
| D1     | 1.550 REF                 |       | 0.061 REF            |       |
| E      | 2.350                     | 2.550 | 0.091                | 0.102 |
| E1     | 3.940                     | 4.250 | 0.155                | 0.167 |
| e      | 1.500 TYP                 |       | 0.060TYP             |       |
| e1     | 3.000 TYP                 |       | 0.118TYP             |       |
| L      | 0.900                     | 1.100 | 0.035                | 0.047 |

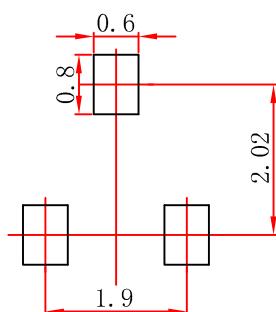


## SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF                 |       | 0.022 REF            |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOT-23 Suggested Pad Layout



### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.



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