

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



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PLED

## HT73XX-A-MS

产品规格手册

## 概述

HT73XX-A-MS是一款采用CMOS技术的低压差线性稳压器。输出电流最大250mA，允许的最高输入电压为12V。具有几个固定的输出电压，范围从2.5V到5.0V。CMOS 技术可确保其具有低压降和低静态电流的特性。

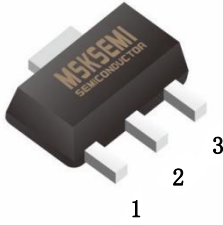
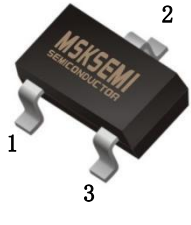
## 典型应用

- 各类电源设备
- 通信设备
- 音频、视频设备

## 主要特点

- 低功耗
- 低压降
- 较低的温度系数
- 最高工作电压可达 12V
- 静态电流 3 $\mu$ A
- 输出电压精度:  $\pm 3\%$
- 输出电流: 250mA
- 封装类型: SOT23,SOT89

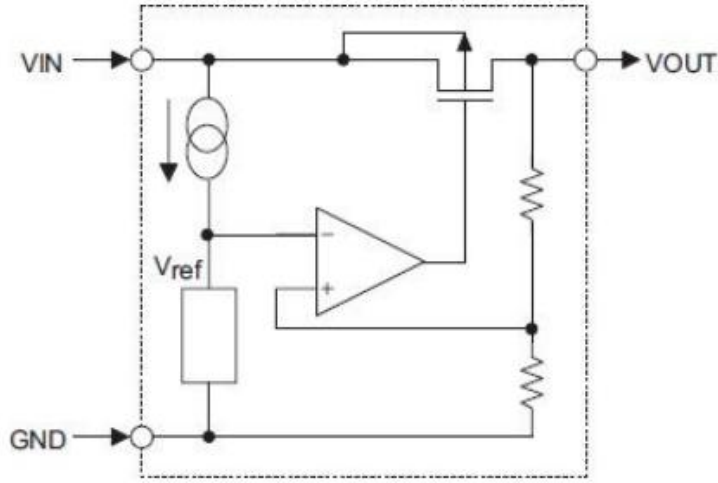
## 参考信息

| 封装  |   | 引脚排列                                    |
|---|---|---|
|  |  | 1. GND 接地脚<br>2. VIN 输入端<br>3. VOUT 输出端 |
| SOT-89  | SOT-23  |   |

## 输出电压选型表

| P/N         | 输出电压 | 封装类型          |
|-------------|------|---------------|
| HT7330-A-MS | 3.0V | SOT-89/SOT-23 |
| HT7333-A-MS | 3.3V |               |
| HT7336-A-MS | 3.6V |               |
| HT7350-A-MS | 5.0V |               |

## 电路功能框图



## 最大额定值

| 参数说明 | 符号   | 数值范围      | 单位 |
|------|------|-----------|----|
| 工作电压 | VIN  | -0.3-± 15 | V  |
| 贮存温度 | TSTG | -40-± 125 | °C |
| 工作温度 | TA   | -25-± 85  | °C |

**注意：**如果器件运行条件超过上述各项最大额定值，可能对器件造成永久性损坏。上述参数仅是运行条件的极大值，我们不建议器件在该规范范围外运行。如果器件长时间工作在绝对最大极限条件下，其稳定性可能会受到影响。

## 散热信息

| 参数说明 | 符号            | 封装类型  | 数值范围 | 单位   |
|------|---------------|-------|------|------|
| 热阻   | $\theta_{JA}$ | SOT23 | 200  | °C/W |
|      |               | SOT89 | 500  | °C/W |
| 功耗   | Pd            | SOT23 | 0.2  | W    |
|      |               | SOT89 | 0.5  | W    |

(PD 值是在 Ta=25°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 HT7330-A-MS

| 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  | $V_{OUT}$  | $V_{IN}=V_{OUT}+1V$ $I_{OUT}=40\text{mA}$  | 2.910 | 3.000     | 3.090 | V                          |
| 输出电流  | $I_{OUT}$  | $V_{IN}=V_{OUT}+1V$ $I_{OUT} \geq 2.7V$  | 250   | —         | —     | mA                         |
| 负载调整率 | $\Delta V_{OUT}$                                 | $V_{IN} = V_{OUT} + 1.0V$<br>$1 \text{ mA} \leq I_{OUT} \leq 80 \text{ mA}$                          | —     | 45        | 90    | mV                         |
| 低压差   | VDIF   | $I_{OUT} = 40\text{mA}$ , $\Delta V_{OUT} = 2\%$   | —     | 95        | —     | mV                         |
| 静态电流  | ISS  | 无负载  | —     | 2         | 3     | $\mu\text{A}$              |
| 线性调整率 | $\frac{\Delta V_{OUT}}{V_{OUT} * \Delta V_{IN}}$ | $I_{OUT} + 1.0V \leq V_{IN} \leq 12V$ ,<br>$I_{OUT} = 40\text{mA}$                                   | —     | 0.2       | 0.3   | %/V                        |
| 输入电压  | $V_{IN}$   | —  | —     | —         | 12    | V                          |
| 温度系数  | $\frac{\Delta V_{OUT}}{\Delta T_A}$              | $V_{OUT} + 1.0V$ , $I_{OUT} = 40\text{mA}$ , $-40^\circ\text{C}$<br>$\leq T_A \leq 85^\circ\text{C}$ | —     | $\pm 0.7$ | —     | $\text{mV}/^\circ\text{C}$ |

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 VDIF。

输出型号 HT7333-A-MS

| 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  | $V_{OUT}$  | $V_{IN}=V_{OUT}+1V$ $I_{OUT}=40\text{mA}$  | 3.201 | 3.300     | 3.399 | V                          |
| 输出电流  | $I_{OUT}$  | $V_{IN}=V_{OUT}+1V$ $I_{OUT} \geq 2.97V$   | 250   | —         | —     | mA                         |
| 负载调整率 | $\Delta V_{OUT}$                                 | $V_{IN} = V_{OUT} + 1.0V$<br>$1 \text{ mA} \leq I_{OUT} \leq 80 \text{ mA}$                          | —     | 45        | 90    | mV                         |
| 低压差   | VDIF   | $I_{OUT} = 40\text{mA}$ , $\Delta V_{OUT} = 2\%$   | —     | 90        | —     | mV                         |
| 静态电流  | ISS  | 无负载  | —     | 2         | 3     | $\mu\text{A}$              |
| 线性调整率 | $\frac{\Delta V_{OUT}}{V_{OUT} * \Delta V_{IN}}$ | $I_{OUT} + 1.0V \leq V_{IN} \leq 12V$ ,<br>$I_{OUT} = 40\text{mA}$                                   | —     | 0.2       | 0.3   | %/V                        |
| 输入电压  | $V_{IN}$   | —  | —     | —         | 12    | V                          |
| 温度系数  | $\frac{\Delta V_{OUT}}{\Delta T_A * V_{OUT}}$    | $V_{OUT} + 1.0V$ , $I_{OUT} = 40\text{mA}$ , $-40^\circ\text{C}$<br>$\leq T_A \leq 85^\circ\text{C}$ | —     | $\pm 0.7$ | —     | $\text{mV}/^\circ\text{C}$ |

注: 当  $V_{IN} = V_{OUT} + 1.0V$ , 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 VDIF。

输出型号 HT7336-A-MS

| 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 <sub>OUT</sub>   | V <sub>IN</sub> =V <sub>OUT</sub> +1V I <sub>OUT</sub> =40mA               | 3.492 | 3.6  | 3.708 | V     |
| 输出电流  | I <sub>OUT</sub>   | V <sub>IN</sub> =V <sub>OUT</sub> +1V I <sub>OUT</sub> ≥3.2V               | 250   | —    | —     | mA    |
| 负载调整率 | ΔV <sub>OUT</sub>  | V <sub>IN</sub> = V <sub>OUT</sub> +1.0V<br>1 mA≤ I <sub>OUT</sub> ≤ 80 mA | —     | 45   | 90    | mV    |
| 低压差   | VDIF   | I <sub>OUT</sub> = 40mA , ΔV <sub>OUT</sub> =2%                            | —     | 80   | —     | mV    |
| 静态电流  | ISS  | 无负载  | —     | 2    | 3     | μA    |
| 线性调整率 | ΔV <sub>OUT</sub> /<br>V <sub>OUT</sub> * ΔV <sub>IN</sub> | I <sub>OUT</sub> + 1.0V≤V <sub>IN</sub> ≤12V,<br>I <sub>OUT</sub> = 40mA   | —     | 0.2  | 0.3   | %/V   |
| 输入电压  | V <sub>IN</sub>  | —  | —     | —    | 12    | V     |
| 温度系数  | ΔV <sub>OUT</sub> /<br>ΔTA *V <sub>OUT</sub>               | V <sub>OUT</sub> +1.0V , I <sub>OUT</sub> =80mA, - 40 °C<br>≤ TA≤ 85 °C    | —     | ±0.7 | —     | Mv/°C |

注：当V<sub>IN</sub>=V<sub>OUT</sub>+1.0V，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 VDIF。

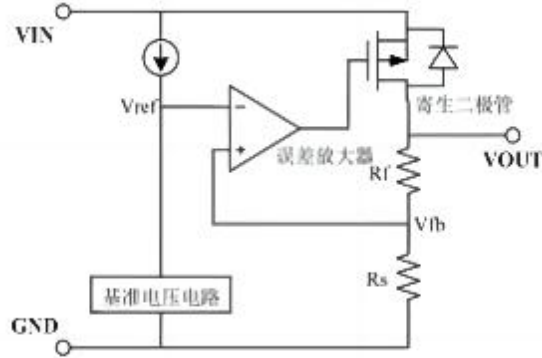
输出型号 HT350-A-MS

| 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 <sub>OUT</sub>   | V <sub>IN</sub> =V <sub>OUT</sub> +1V I <sub>OUT</sub> =40mA               | 4.85 | 5    | 5.150 | V     |
| 输出电流  | I <sub>OUT</sub>   | V <sub>IN</sub> =V <sub>OUT</sub> +1V I <sub>OUT</sub> ≥4.5V               | 250  | —    | —     | mA    |
| 负载调整率 | ΔV <sub>OUT</sub>  | V <sub>IN</sub> = V <sub>OUT</sub> +1.0V<br>1 mA≤ I <sub>OUT</sub> ≤ 80 mA | —    | 45   | 90    | mV    |
| 低压差   | VDIF   | I <sub>OUT</sub> = 40mA , ΔV <sub>OUT</sub> =2%                            | —    | 60   | —     | mV    |
| 静态电流  | ISS  | 无负载  | —    | 2    | 3     | μA    |
| 线性调整率 | ΔV <sub>OUT</sub> /<br>V <sub>OUT</sub> * ΔV <sub>IN</sub> | I <sub>OUT</sub> + 1.0V≤V <sub>IN</sub> ≤12V,<br>I <sub>OUT</sub> = 40mA   | —    | 0.2  | 0.3   | %/V   |
| 输入电压  | V <sub>IN</sub>  | —  | —    | —    | 12    | V     |
| 温度系数  | ΔV <sub>OUT</sub> /<br>ΔTA *V <sub>OUT</sub>               | V <sub>OUT</sub> +1.0V , I <sub>OUT</sub> =80mA, - 40 °C<br>≤ TA≤ 85 °C    | —    | ±0.7 | —     | Mv/°C |

注：当V<sub>IN</sub>=V<sub>OUT</sub>+1.0V，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 VDIF。

### 功能描述

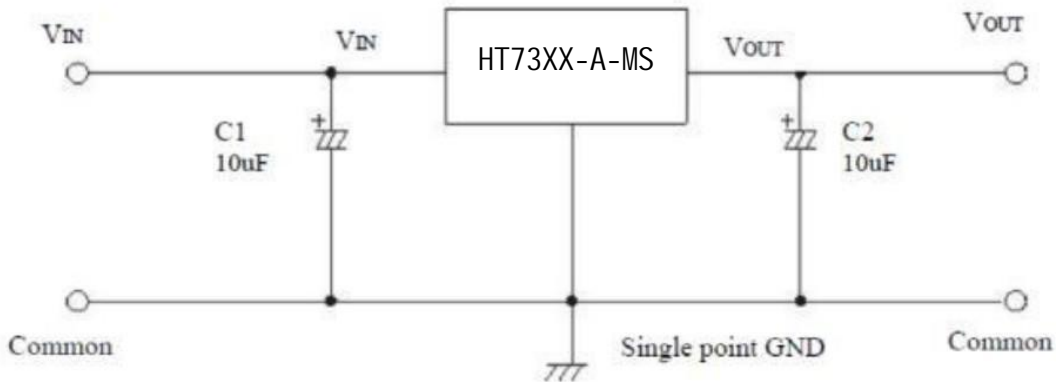
误差放大器根据反馈电阻 $R_s$ 及 $R_f$ 所构成的分压电阻的输入电压 $V_{fb}$ 同基准电压( $V_{ref}$ )相比较。通过此误差放大器向输出晶体管提供必要的门极电压，而使输出电压不受输入电压或温度变化的影响而保持一定。



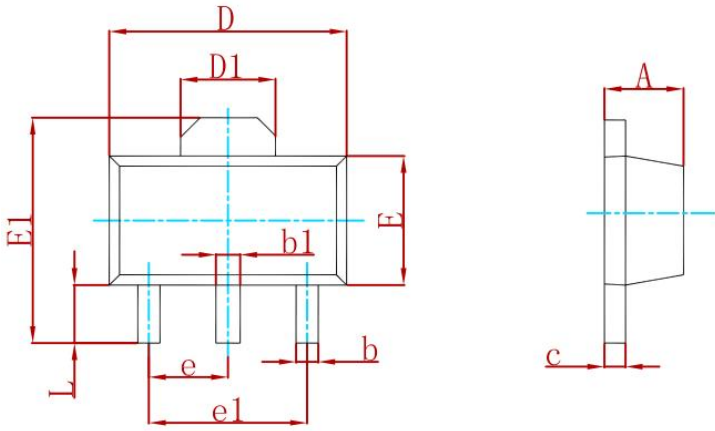
1. 应用时尽量将电容接到 VIN 和 VOUT 脚位附近。
2. 电路内部使用了相位补偿电路和利用输出电容的 ESR 来补偿。  
所以输出到地一定要接大于  $10\mu\text{F}$  的电容器，推荐使用钽电容。
3. 注意输入输出电压、负载电流的使用条件，避免 IC 内部的功耗超出封装允许的最大功耗值。

### 典型应用线路图

基本应用图

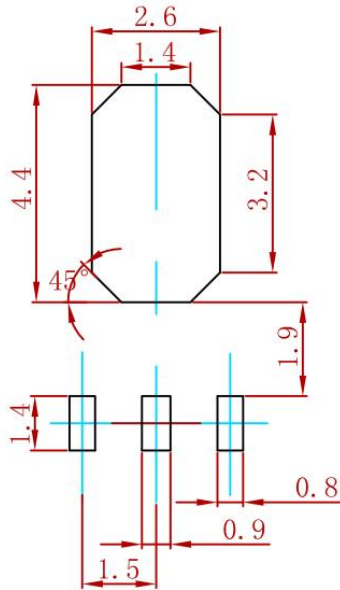


包装数据



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.400                     | 1.600 | 0.055                | 0.063 |
| b      | 0.320                     | 0.520 | 0.013                | 0.020 |
| 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      | 2.300                     | 2.600 | 0.091                | 0.102 |
| E1     | 3.940                     | 4.250 | 0.155                | 0.167 |
| e      | 1.500 TYP.                |       | 0.060 TYP.           |       |
| e1     | 3.000 TYP.                |       | 0.118 TYP.           |       |
| L      | 0.900                     | 1.200 | 0.035                | 0.047 |

参考焊盘布局



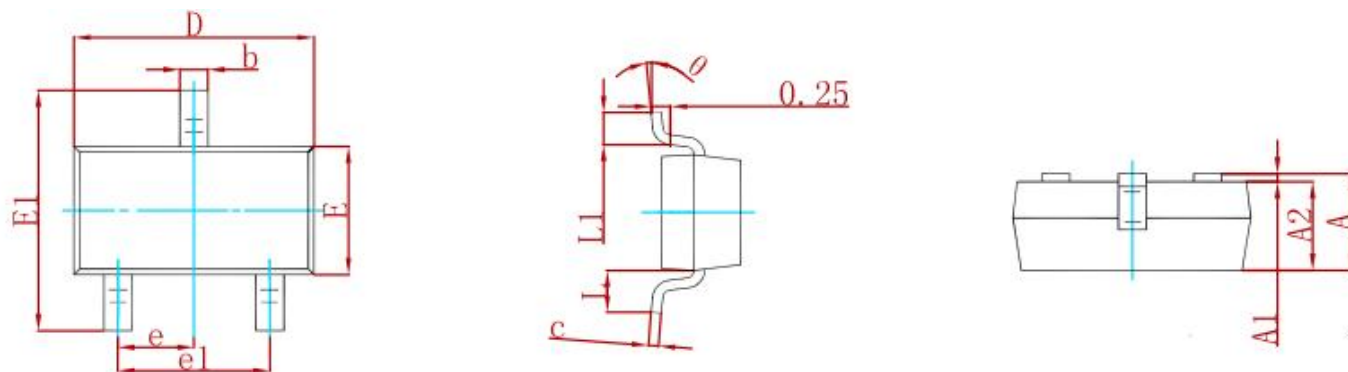
Note:

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

卷轴规格

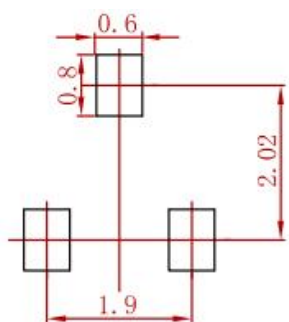
| P/N         | PKG    | QTY  |
|-------------|--------|------|
| HT73XX-A-MS | SOT-89 | 1000 |

包装数据



| 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°    |

参考焊盘布局



Note:  
 1. Controlling dimension: In millimeters.  
 2. General tolerance: ±0.05mm.  
 3. The pad layout is for reference purposes only.

卷轴规格

| P/N         | PKG    | QTY  |
|-------------|--------|------|
| HT73XX-A-MS | SOT-23 | 3000 |



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