

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## HT71XX

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### 产品规格手册

## 概述

HT71XX 是一款采用 CMOS 技术的低压差线性稳压器。最高耐压可达 30V，有几种固定输出电压值，输出范围为 2.8V~9.0V，具有较低的静态功耗，广泛用于各类音频、视频设备和通信等设备的供电。

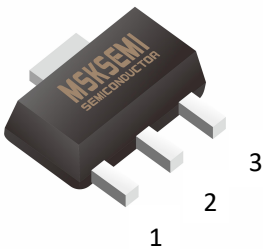
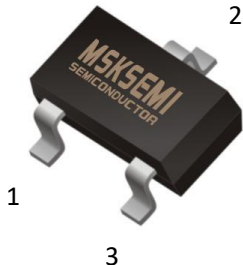
## 典型应用

- 各类电源设备
- 通信设备
- 音频、视频设备

## 主要特点

- 低功耗
- 输入输出电压差低
- 温度漂移系数小
- 最高工作电压可达 24V
- 静态电流 1.5 $\mu$ A
- 输出电压精度： $\pm 2\%$
- 高输出电流：100mA

## 参考信息

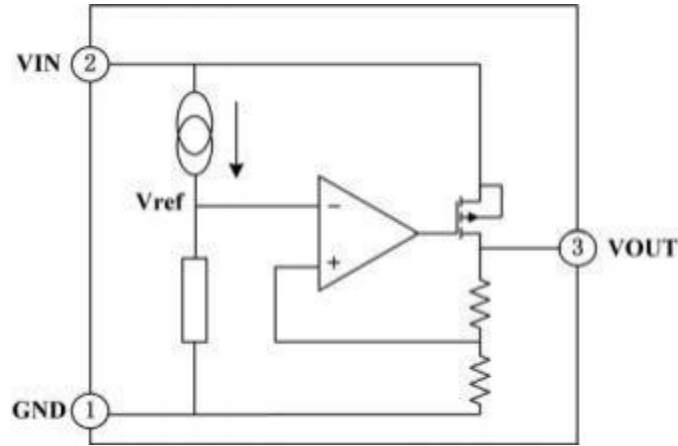
封装		引脚排列
		1. GND 接地脚 2. VIN 输入端 3. VOUT 输出端
SOT-89	SOT-23	

## 输出电压选型表

P/N	输出电压	封装类型
HT7128-1	2.8V	SOT-89/SOT-23/T0-92
HT7130-1	3.0V	
HT7133-1	3.3V	
HT7136-1	3.6V	
HT7140-1	4.0V	
HT7144-1	4.4V	
HT7150-1	5.0V	
HT7190-1	9.0V	

注：“XX”代表输出电压。

## 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~+30	V
贮存温度	TSTG	-50~+125	°C
工作温度	TA	-40~+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	$\theta_{JA}$	SOT89	200	°C/W
		T092	200	°C/W
功耗	Pd	SOT89	500	mW
		T092	500	mW

**直流电特性 (除特别说明外, TA = +25°C)**

输出型号 HT7128-1

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 <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> = 10mA	2.744	2.80	2.856	V
输出电流	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	70	100	—	mA
负载调整率	ΔV <sub>OUT</sub>	V <sub>IN</sub> = V <sub>OUT</sub> +2.0V 1 mA ≤ I <sub>OUT</sub> ≤ 50 mA	—	25	60	mV
低压差	VDIF	I <sub>OUT</sub> = 1mA, ΔV <sub>OUT</sub> =2%	—	30	100	mV
静态电流	ISS	无负载	—	1.5	3.0	μA
线性调整率	ΔV <sub>OUT</sub> / V <sub>OUT</sub> * ΔV <sub>IN</sub>	I <sub>OUT</sub> + 1.0V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> = 1mA	—	—	0.2	%/V
输入电压	V <sub>IN</sub>	—	—	—	24	V
温度系数	ΔV <sub>OUT</sub> / ΔTA * V <sub>OUT</sub>	V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, - 40 °C ≤ TA ≤ 85 °C	—	100	—	ppm/ °C

注: 当 V<sub>IN</sub>=V<sub>OUT</sub>+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 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 <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> = 10mA	2.94	3.00	3.06	V
输出电流	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	70	100	—	mA
负载调整率	ΔV <sub>OUT</sub>	V <sub>IN</sub> = V <sub>OUT</sub> +2.0V 1 mA ≤ I <sub>OUT</sub> ≤ 50 mA	—	25	60	mV
低压差	VDIF	I <sub>OUT</sub> = 1mA, ΔV <sub>OUT</sub> =2%	—	30	100	mV
静态电流	ISS	无负载	—	1.5	3.0	μA
线性调整率	ΔV <sub>OUT</sub> / V <sub>OUT</sub> * ΔV <sub>IN</sub>	I <sub>OUT</sub> + 1.0V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> = 1mA	—	—	0.2	%/V
输入电压	V <sub>IN</sub>	—	—	—	24	V
温度系数	ΔV <sub>OUT</sub> / ΔTA * V <sub>OUT</sub>	V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, - 40 °C ≤ TA ≤ 85 °C	—	100	—	ppm/ °C

注: 当 V<sub>IN</sub>=V<sub>OUT</sub>+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 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 <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> = 10mA	3.234	3.30	3.366	V
输出电流	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	70	100	—	mA
负载调整率	ΔV <sub>OUT</sub>	V <sub>IN</sub> = V <sub>OUT</sub> +2.0V 1 mA ≤ I <sub>OUT</sub> ≤ 50 mA	—	25	60	mV
低压差	VDIF	I <sub>OUT</sub> = 1mA , ΔV <sub>OUT</sub> =2%	—	25	55	mV
静态电流	ISS	无负载	—	1.5	3.0	μA
线性调整率	ΔV <sub>OUT</sub> / V <sub>OUT</sub> * ΔV <sub>IN</sub>	I <sub>OUT</sub> + 1.0V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> = 1mA	—	—	0.2	%/V
输入电压	V <sub>IN</sub>	—	—	—	24	V
温度系数	ΔV <sub>OUT</sub> / ΔT <sub>A</sub> *V <sub>OUT</sub>	V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> =10mA, - 40 °C ≤ T <sub>A</sub> ≤ 85 °C	—	100	—	ppm/ °C

注：当 V<sub>IN</sub>=V<sub>OUT</sub>+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 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 <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> = 10mA	3.528	3.60	3.672	V
输出电流	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	70	100	—	mA
负载调整率	ΔV <sub>OUT</sub>	V <sub>IN</sub> = V <sub>OUT</sub> +2.0V 1 mA ≤ I <sub>OUT</sub> ≤ 50 mA	—	25	60	mV
低压差	VDIF	I <sub>OUT</sub> = 1mA , ΔV <sub>OUT</sub> =2%	—	25	55	mV
静态电流	ISS	无负载	—	1.5	3.0	μA
线性调整率	ΔV <sub>OUT</sub> / V <sub>OUT</sub> * ΔV <sub>IN</sub>	I <sub>OUT</sub> + 1.0V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> = 1mA	—	—	0.2	%/V
输入电压	V <sub>IN</sub>	—	—	—	24	V
温度系数	ΔV <sub>OUT</sub> / ΔT <sub>A</sub> *V <sub>OUT</sub>	V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> =10mA, - 40 °C ≤ T <sub>A</sub> ≤ 85 °C	—	100	—	ppm/ °C

注：当 V<sub>IN</sub>=V<sub>OUT</sub>+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 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 <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> = 10mA	3.92	4.0	4.08	V
输出电流	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	70	100	—	mA
负载调整率	ΔV <sub>OUT</sub>	V <sub>IN</sub> = V <sub>OUT</sub> +2.0V 1 mA ≤ I <sub>OUT</sub> ≤ 50 mA	—	25	60	mV
低压差	VDIF	I <sub>OUT</sub> = 1mA , ΔV <sub>OUT</sub> =2%	—	25	55	mV
静态电流	I <sub>SS</sub>	无负载	—	1.5	3.0	μA
线性调整率	ΔV <sub>OUT</sub> / V <sub>OUT</sub> * ΔV <sub>IN</sub>	I <sub>OUT</sub> + 1.0V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> = 1mA	—	—	0.2	%/V
输入电压	V <sub>IN</sub>	—	—	—	24	V
温度系数	ΔV <sub>OUT</sub> / ΔT <sub>A</sub> *V <sub>OUT</sub>	V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> =10mA, - 40 °C ≤ T <sub>A</sub> ≤ 85 °C	—	100	—	ppm/ °C

注：当 V<sub>IN</sub>=V<sub>OUT</sub>+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 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 <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> = 10mA	4.312	4.4	4.488	V
输出电流	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	70	100	—	mA
负载调整率	ΔV <sub>OUT</sub>	V <sub>IN</sub> = V <sub>OUT</sub> +2.0V 1 mA ≤ I <sub>OUT</sub> ≤ 50 mA	—	25	60	mV
低压差	VDIF	I <sub>OUT</sub> = 1mA , ΔV <sub>OUT</sub> =2%	—	25	55	mV
静态电流	I <sub>SS</sub>	无负载	—	1.5	3.0	μA
线性调整率	ΔV <sub>OUT</sub> / V <sub>OUT</sub> * ΔV <sub>IN</sub>	I <sub>OUT</sub> + 1.0V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> = 1mA	—	—	0.2	%/V
输入电压	V <sub>IN</sub>	—	—	—	24	V
温度系数	ΔV <sub>OUT</sub> / ΔT <sub>A</sub> *V <sub>OUT</sub>	V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> =10mA, - 40 °C ≤ T <sub>A</sub> ≤ 85 °C	—	100	—	ppm/ °C

注：当 V<sub>IN</sub>=V<sub>OUT</sub>+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 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 <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> = 10mA	4.9	5.0	5.1	V
输出电流	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	100	150	—	mA
负载调整率	ΔV <sub>OUT</sub>	V <sub>IN</sub> = V <sub>OUT</sub> +2.0V 1 mA ≤ I <sub>OUT</sub> ≤ 50 mA	—	25	60	mV
低压差	VDIF	I <sub>OUT</sub> = 1mA , ΔV <sub>OUT</sub> =2%	—	25	55	mV
静态电流	ISS	无负载	—	1.5	3.0	μA
线性调整率	ΔV <sub>OUT</sub> / V <sub>OUT</sub> * ΔV <sub>IN</sub>	I <sub>OUT</sub> + 1.0V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> = 1mA	—	—	0.2	%/V
输入电压	V <sub>IN</sub>	—	—	—	24	V
温度系数	ΔV <sub>OUT</sub> / ΔT <sub>A</sub> *V <sub>OUT</sub>	V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> =10mA, - 40 °C ≤ T <sub>A</sub> ≤ 85 °C	—	100	—	ppm/ °C

注：当 V<sub>IN</sub>=V<sub>OUT</sub>+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。

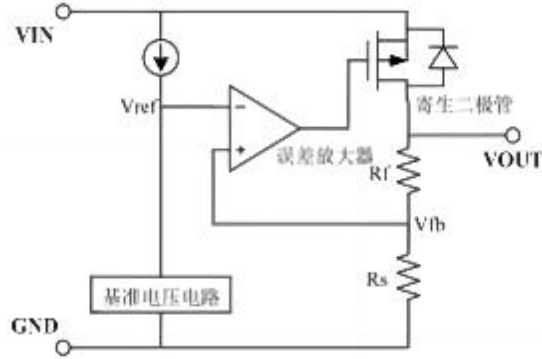
输出型号 HT790-1

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 <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> = 10mA	8.82	9.0	9.18	V
输出电流	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	100	150	—	mA
负载调整率	ΔV <sub>OUT</sub>	V <sub>IN</sub> = V <sub>OUT</sub> +2.0V 1 mA ≤ I <sub>OUT</sub> ≤ 50 mA	—	25	60	mV
低压差	VDIF	I <sub>OUT</sub> = 1mA , ΔV <sub>OUT</sub> =2%	—	25	55	mV
静态电流	ISS	无负载	—	1.5	3.0	μA
线性调整率	ΔV <sub>OUT</sub> / V <sub>OUT</sub> * ΔV <sub>IN</sub>	I <sub>OUT</sub> + 1.0V ≤ V <sub>IN</sub> ≤ 24V, I <sub>OUT</sub> = 1mA	—	—	0.2	%/V
输入电压	V <sub>IN</sub>	—	—	—	24	V
温度系数	ΔV <sub>OUT</sub> / ΔT <sub>A</sub> *V <sub>OUT</sub>	V <sub>OUT</sub> +2.0V , I <sub>OUT</sub> =10mA, - 40 °C ≤ T <sub>A</sub> ≤ 85 °C	—	100	—	ppm/ °C

注：当 V<sub>IN</sub>=V<sub>OUT</sub>+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。

### 功能描述

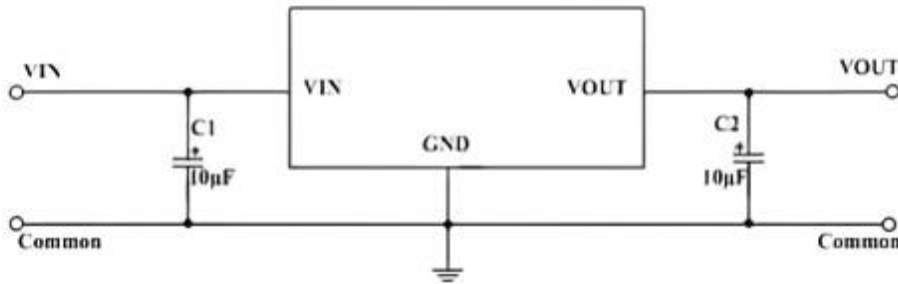
误差放大器根据反馈电阻  $R_s$  及  $R_f$  所构成的分压电阻的输入电压  $V_{fb}$  同基准电压 ( $V_{ref}$ ) 相比较。通过此误差放大器向输出晶体管提供必要的门极电压，而使输出电压不受输入电压或温度变化的影响而保持一定。



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。

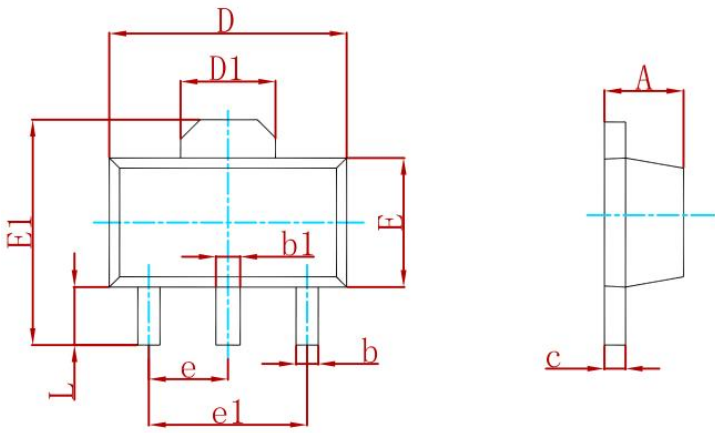
### 典型应用线路图

基本应用图



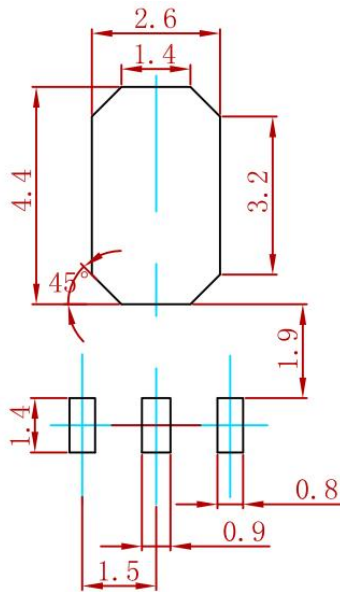


包装数据



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

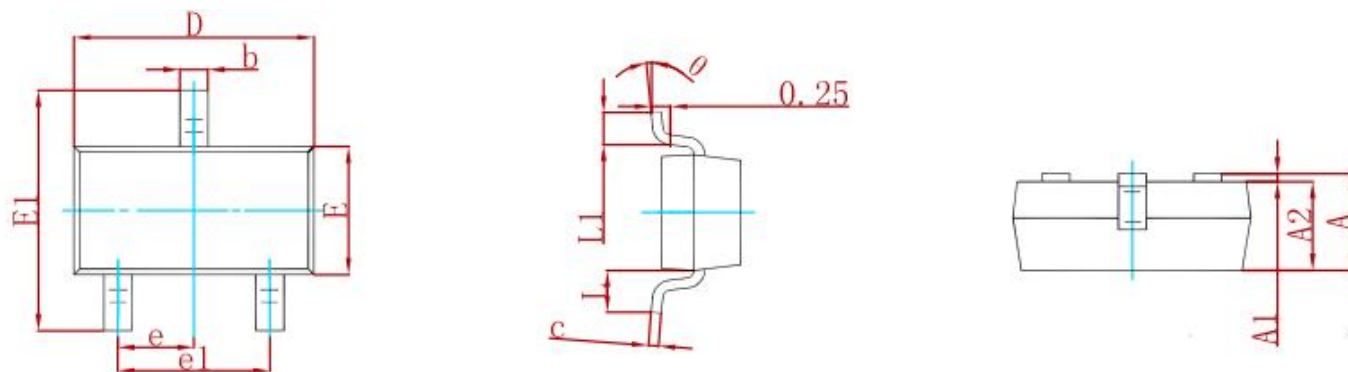


Note:  
 1. Controlling dimension: in millimeters.  
 2. General tolerance:  $\pm 0.05\text{mm}$ .  
 3. The pad layout is for reference purposes only.

卷轴规格

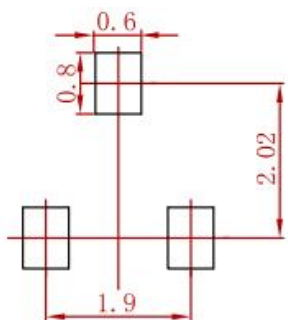
P/N	PKG	QTY
HT71XX	SOT-89	1000

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
HT71XX	SOT-23	3000

## Attention

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