

通用 J-FET 输入双运算放大器

概述

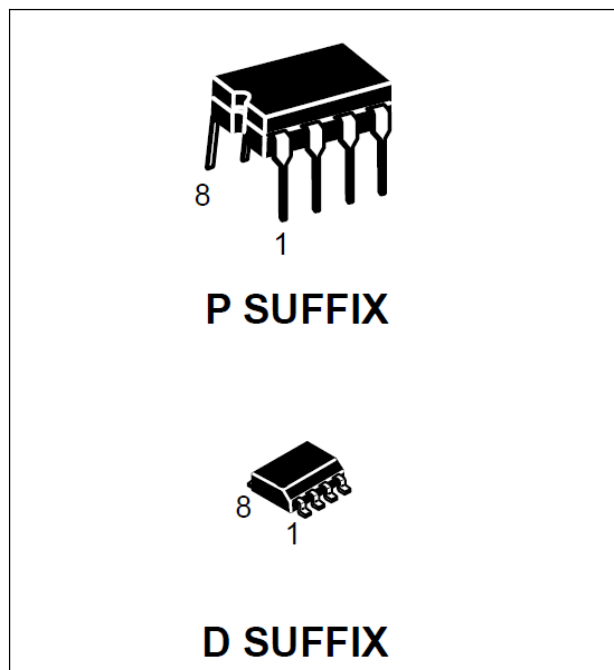
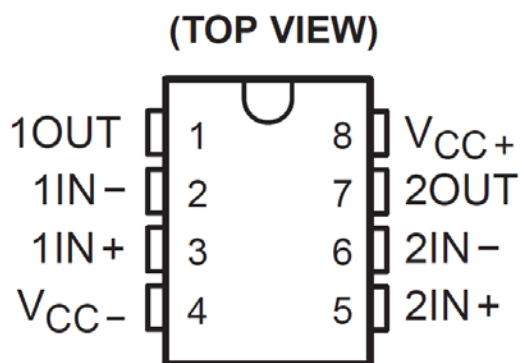
TL082 是一款高速 J-FET 输入的双运算放大器，由高压 J-FET 和双极晶体管构成。具有高的转换速率、低的输入偏置电流和失调电流以及具有很低的失调电压温度系数。工作范围 0°C — 70°C 。

TL082 提供了 DIP8 和 SOP8 封装形式。

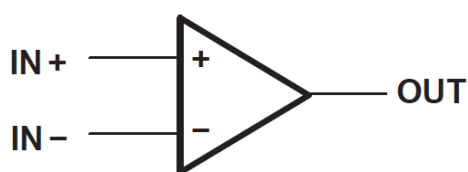
主要特点

- 较低功耗
- 宽的共模和差模输入电压范围
- 低的输入偏置电流和失调电流
- 输出短路电流保护
- 高输入阻抗
- 高转换速率
- 高增益带宽积，高达 4MHz

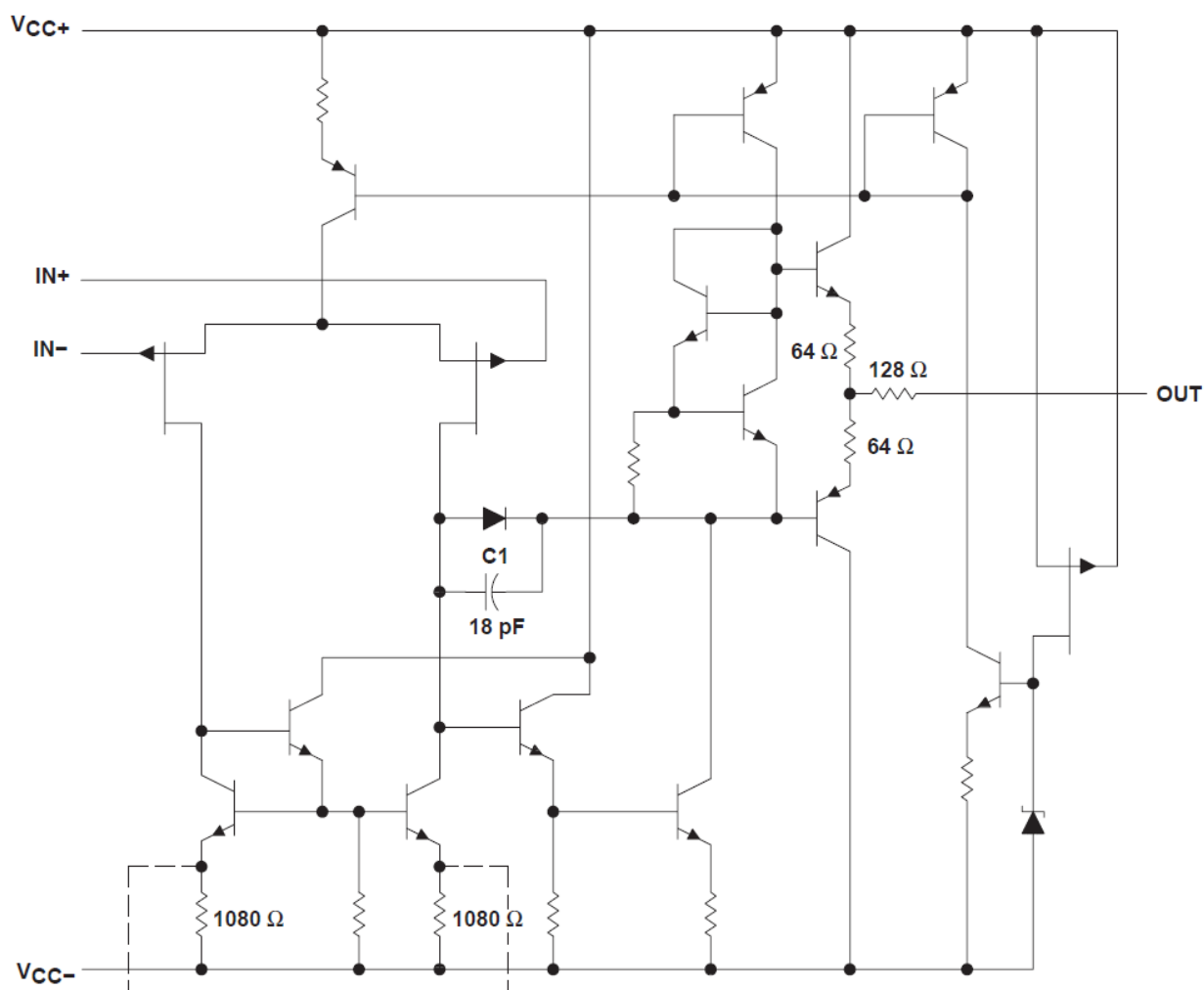
引脚图



符号（每路运放）



内部框图（每路运放）



极限参数

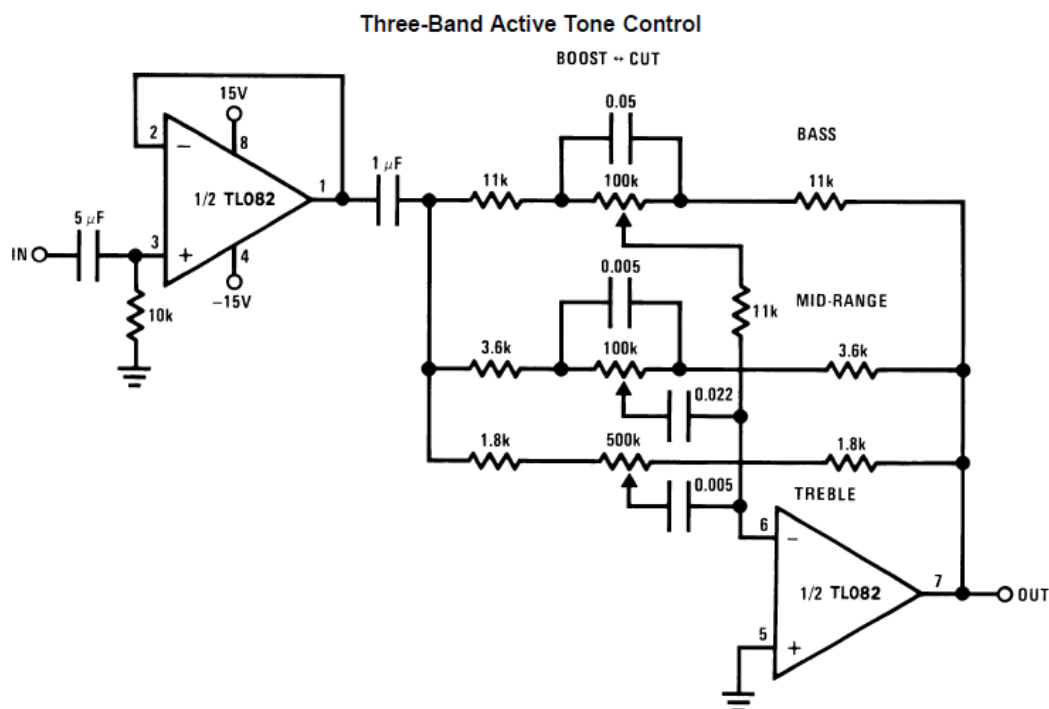
符号	描述	极限值	单位
V _{cc}	电源电压	±18	V
V _i	输入电压	±14	V
V _{id}	差模输入电	±28	V
T _{oper}	工作温度	0—70	℃
T _{stg}	储藏温度	-65—150	℃

电特性 ($V_{CC} = \pm 15$, $T_{amp} = 25^\circ\text{C}$ 特殊情况另外说明)

符号	参数名称	测试条件	测试值			单位
			Min	Typ	Max	
V_{io}	失调电压	$V_o = 0\text{V}$		3	6	mV
I_{io}	输入失调电流	$V_o = 0\text{V}$			1.5	nA
I_{ib}	输出偏置电流	$V_o = 0\text{V}$			2.5	nA
V_{icr}	输入共模电压		-12	± 11	15	V
V_{om}	输出电压峰值	$R_L = 10\text{ k}\Omega$ $R_L \geq 2\text{ k}\Omega$	± 12 ± 10	± 13.5 ± 12.5		V
AVD	大信号电压增益	$R_L \geq 2\text{ k}\Omega$, $V_O = \pm 10\text{ V}$	80	95		dB
B1	增益带宽积			3		MHz
CMRR	共模抑制比		70	85		dB
kSVR	电源抑制比	$V_{CC} = \pm 15\text{ V to } \pm 9\text{ V}$ $V_o = 0\text{V}$	70	86		dB
ICC	静态电流-每通道			1.4	2.8	mA
SR	转换速率	$V_I = 10\text{ V}$,	8	13		V/ μs
t_r	上升时间			0.05		μs

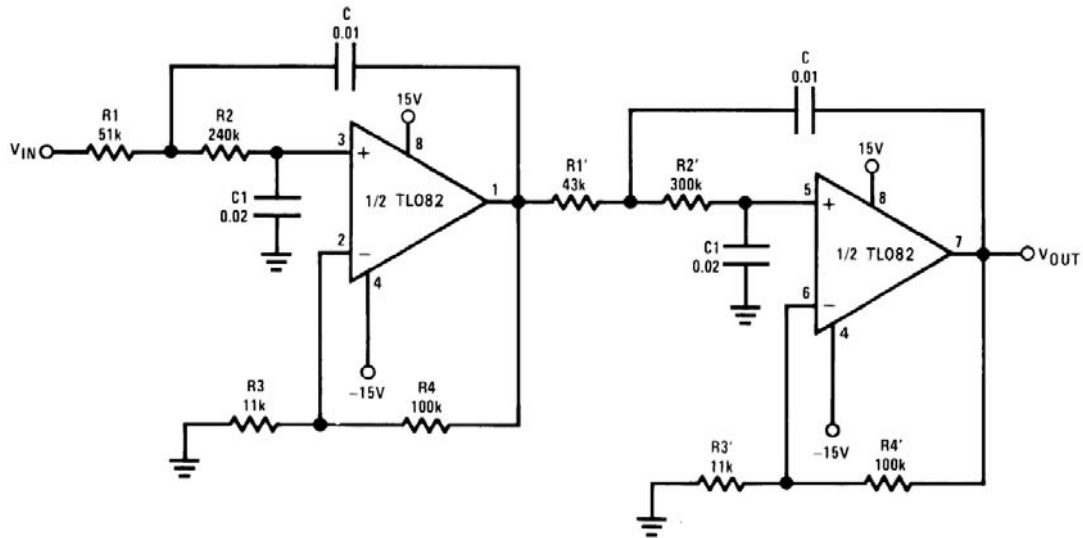
应用电路图典型（其中一路运算放大器）

1) 三段音调控制 Three-Band Active Tone Control



2) 四阶低通滤波

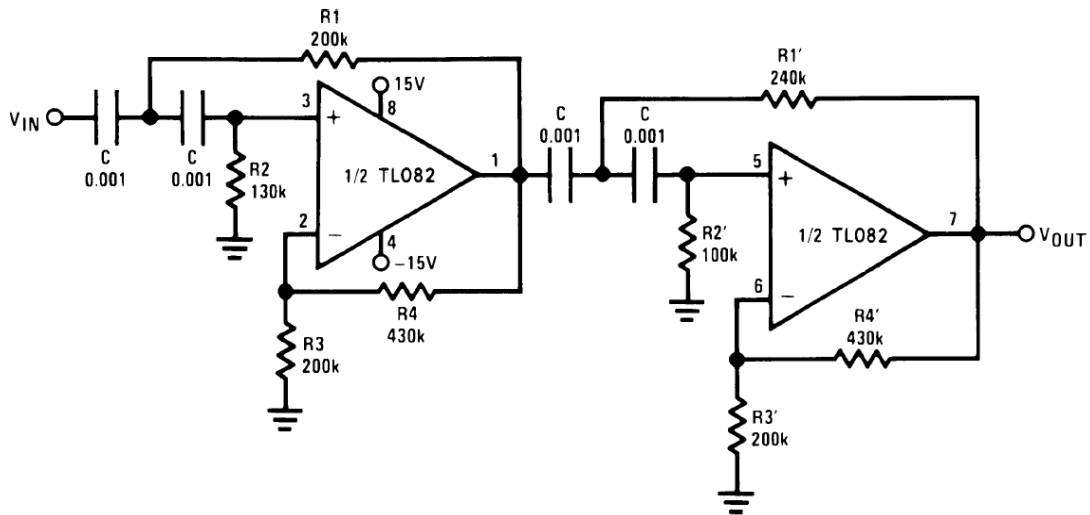
Fourth Order Low Pass Butterworth Filter



- Corner frequency (f_c) = $\sqrt{\frac{1}{R_1 R_2 C C_1}} \cdot \frac{1}{2\pi} = \sqrt{\frac{1}{R_1' R_2' C C_1}} \cdot \frac{1}{2\pi}$
- Passband gain (H_0) = $(1 + R_4/R_3) (1 + R_4'/R_3')$
- First stage $Q = 1.31$
- Second stage $Q = 0.541$
- Circuit shown uses nearest 5% tolerance resistor values for a filter with a corner frequency of 100 Hz and a passband gain of 100
- Offset nulling necessary for accurate DC performance

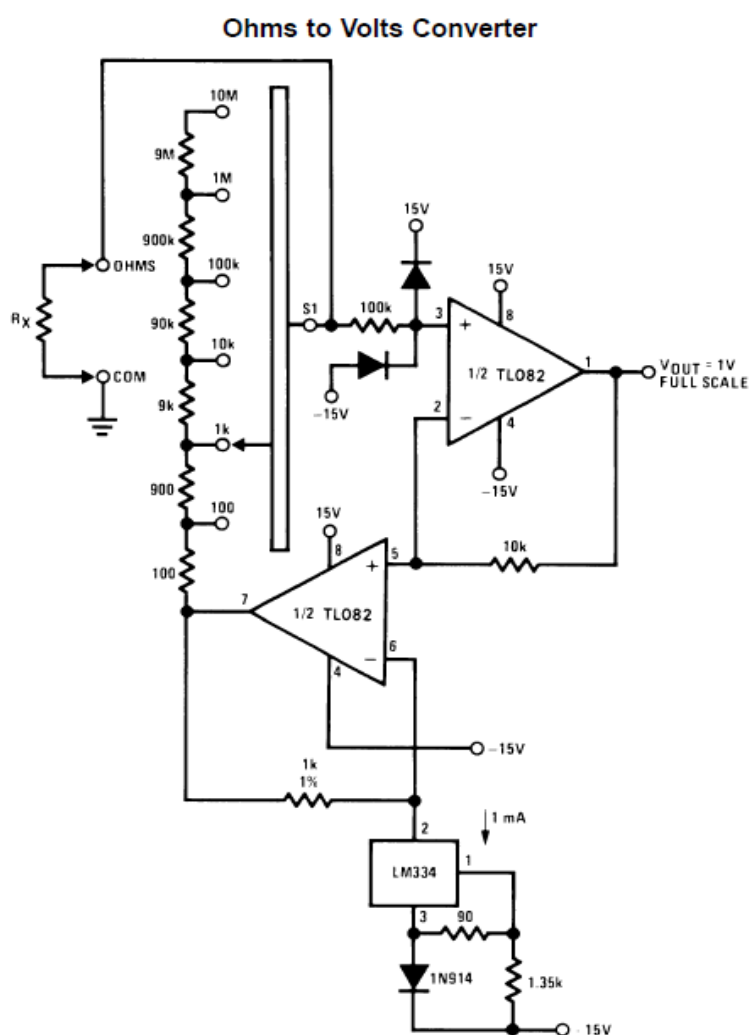
3) 四阶高通滤波

Fourth Order High Pass Butterworth Filter



- Corner frequency (f_c) = $\sqrt{\frac{1}{R_1 R_2 C^2}} \cdot \frac{1}{2\pi} = \sqrt{\frac{1}{R_1' R_2' C^2}} \cdot \frac{1}{2\pi}$
- Passband gain (H_0) = $(1 + R_4/R_3) (1 + R_4'/R_3')$
- First stage $Q = 1.31$
- Second stage $Q = 0.541$
- Circuit shown uses closest 5% tolerance resistor values for a filter with a corner frequency of 1 kHz and a passband gain of 10

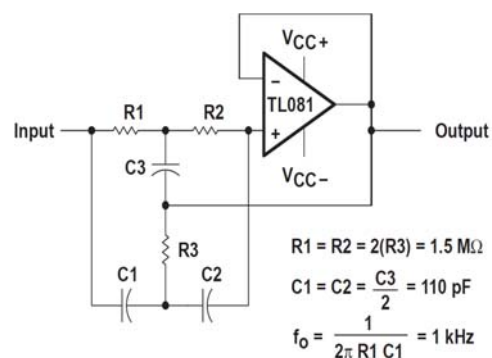
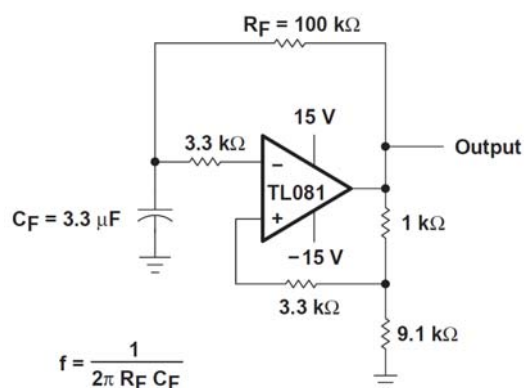
4) 电阻电压转换



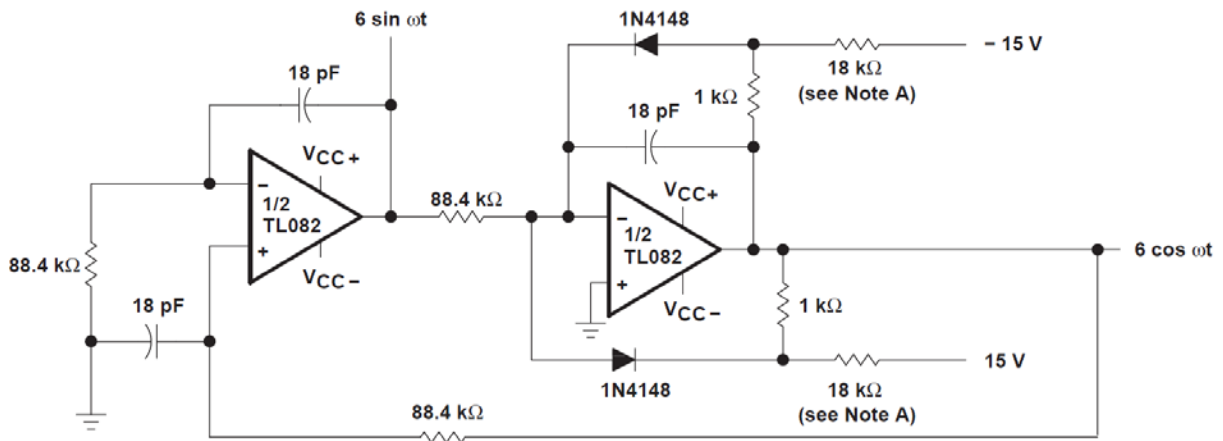
$$V_O = \frac{1V}{R_{LADDER}} \times R_X$$

Where R_{LADDER} is the resistance from switch S1 pole to pin 7 of the TL082CP.

5) 典型线路

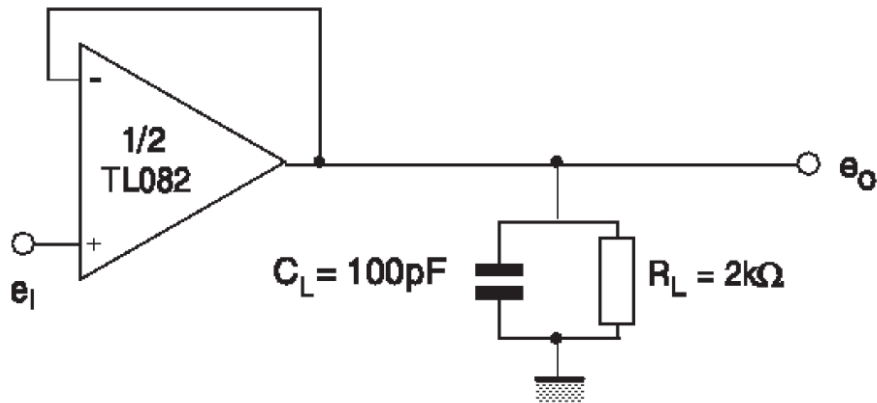


6) 100 kHz 的正交振荡器 100-KHz Quadrature Oscillator

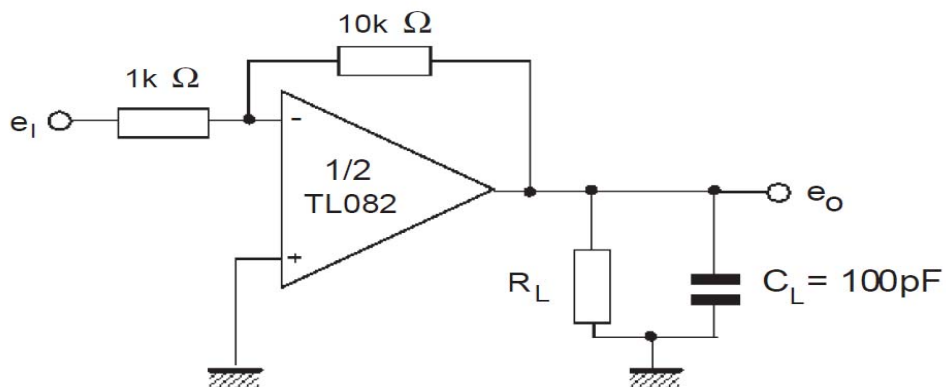


NOTE A: These resistor values may be adjusted for a symmetrical output.

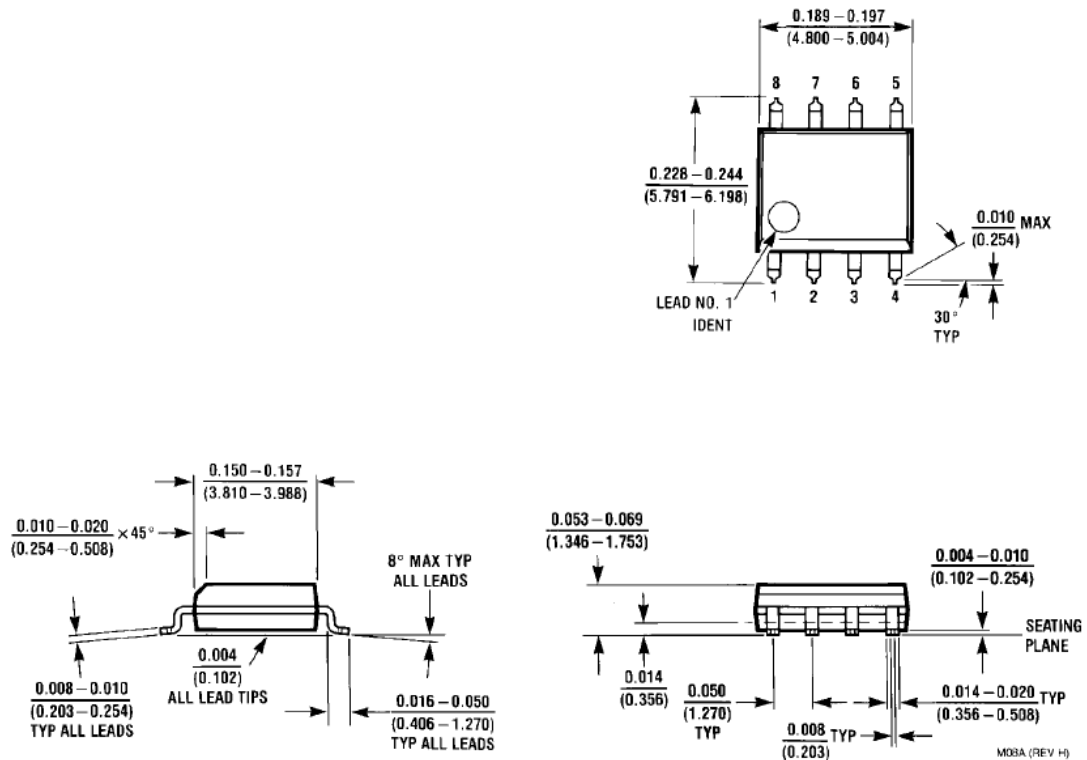
7) 电压跟随器 Voltage Follower



8) 增益为 10 反相放大器 Gain-of-10 Inverting Amplifier



封装信息



SOP8

