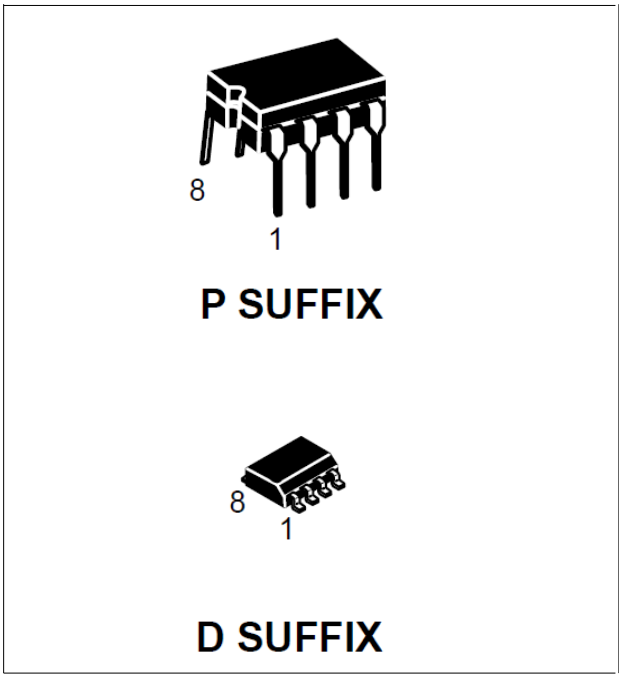
General J-FET input dual operational amplifier

summary

The TL082 is a high-speed dual operational amplifier with high-speed J-FET input, consisting of a high-voltage J-FET and a bipolar transistor. It has a high switching rate, low input bias current and offset current, and a very low offset voltage temperature coefficient. The operating range is 0 --70 .

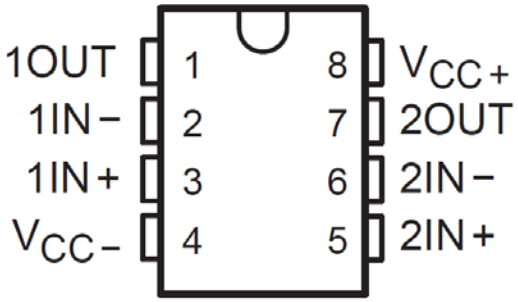
TL082 Provides DIP8 and SOP8 packages.



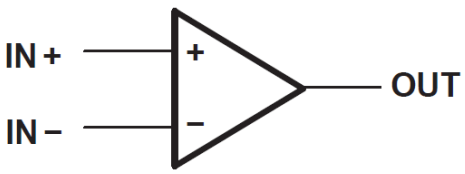
main features

- Lower power consumption
- Wide common and differential mode input voltage range
- Low input bias current and offset current
- Output short circuit current protection
- high input impedance
- High conversion rate
- High gain bandwidth product, up to 4MHz pin diagram

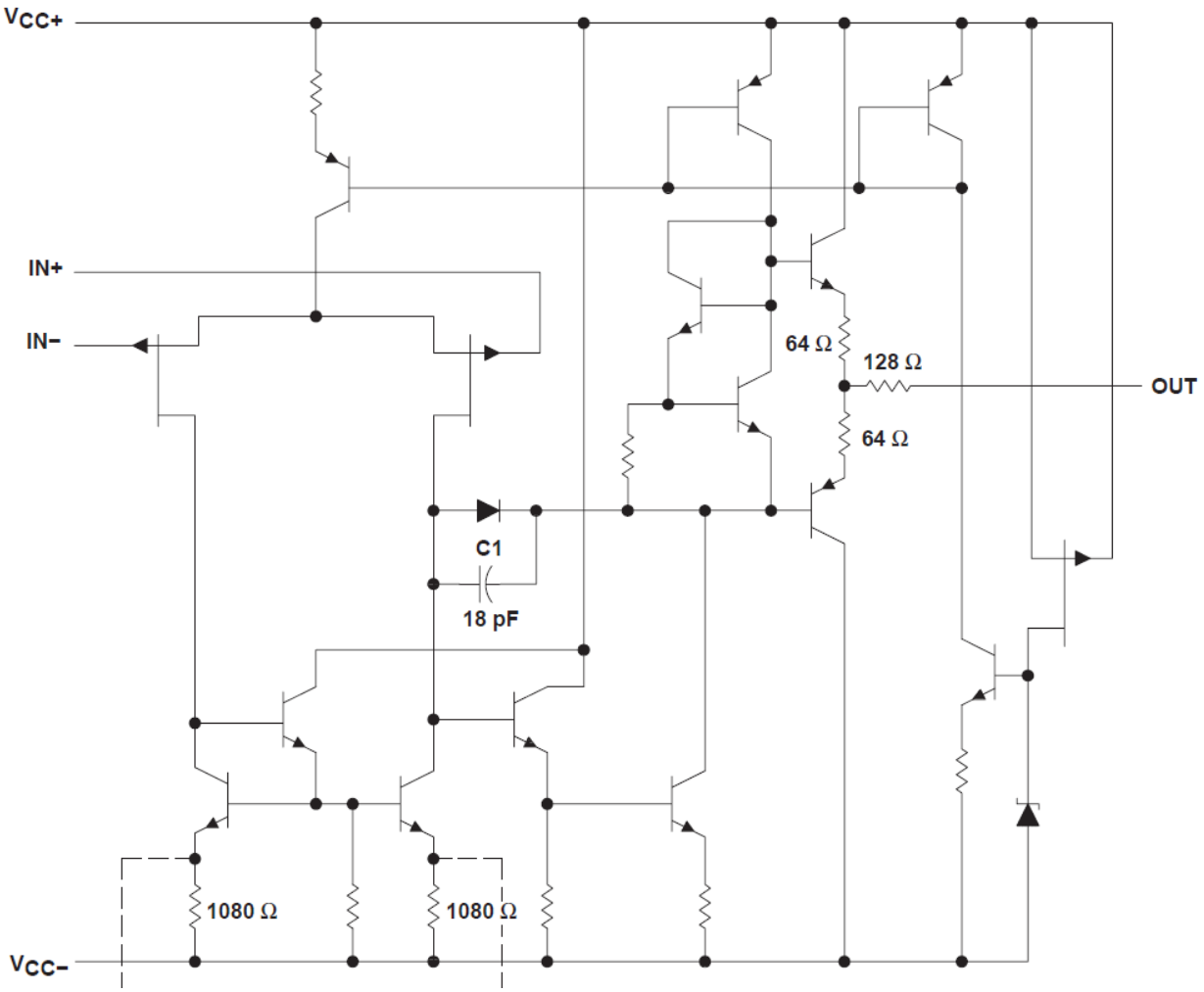
(TOP VIEW)



Symbols (per amplifier)



Internal block diagram (each amplifier)



absolute rating

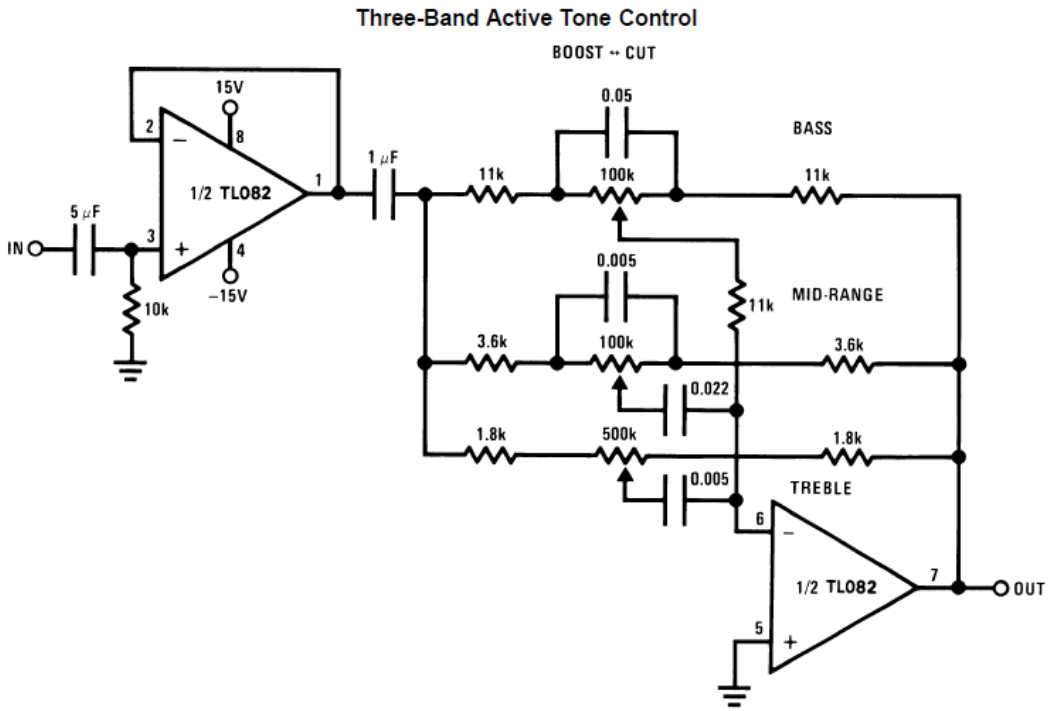
Symbol	Description	Extreme	Unit
Vcc	Supply voltage	±18	V
Vi	Input voltage	±14	V
Vid	Differential mode input voltage	±28	V
Toper	Working temperature	0—70	℃
Tstg	Storage temperature	-65—150	℃

Electrical characteristics (Vcc=±15, Tamp=25 special conditions are explained separately)

Symbol	Parameter name	Test condition	Test value			Unit
			Min	Typ	Max	
Vio	Offset voltage	Vo=0V		3	6	mV
Iio	Input offset curr-ent	Vo=0V			1.5	nA
Iib	Output bias current	Vo=0V			2.5	nA
Vicr	Enter the common mode voltage		-12	±11	15	V
Vom	Output voltage peak	RL = 10 kΩ RL ⩾ 2 kΩ	±12 ±10	±13.5 ±12.5		V
AVD	Large signal volt-age gain	RL ⩾ 2 kΩ, VO = ±10 V	80	95		dB
B1	Gain bandwidth pr-oduct			3		MHz
CMRR	Cmrr		70	85		dB
kSVR	Power supply reje-ction ratio	VCC = ±15 V to ± 9 V Vo=0V	70	86		dB
ICC	Static current-per channel			1.4	2.8	mA
SR	Slew rate	VI = 10 V,	8	13		V/us
tr	Rise time			0.05		us

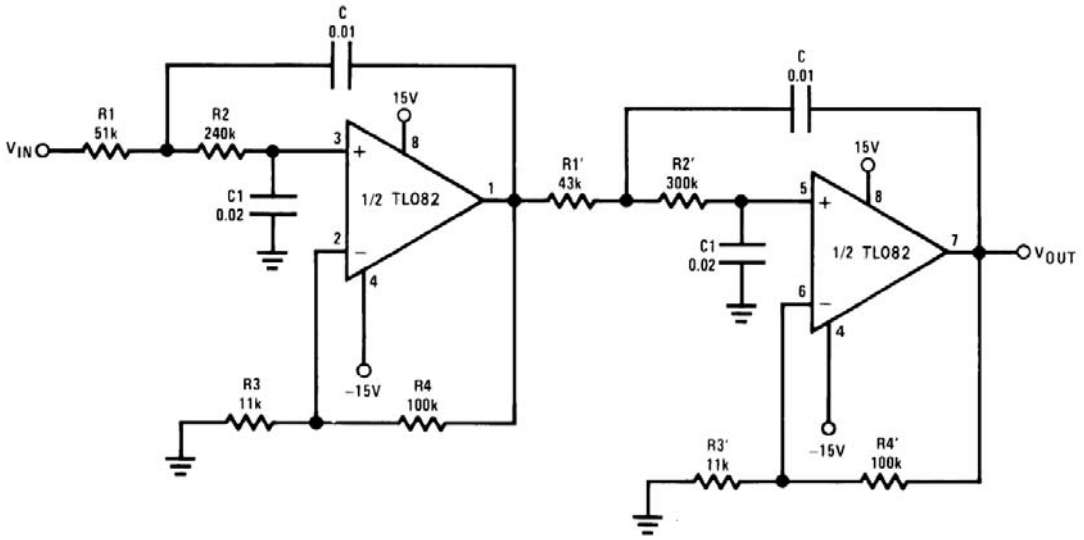
Application circuit diagram typical (one of the operational amplifiers)

1) Three tone control Three-Band Active Tone Control



2) Fourth order low pass filter

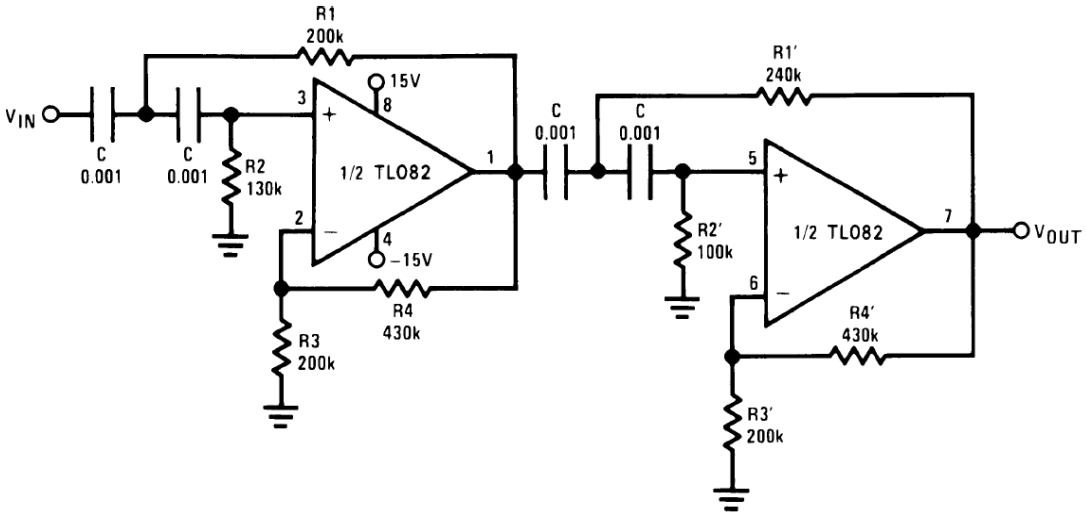
Fourth Order Low Pass Butterworth Filter



- Corner frequency (f_c) = $\sqrt{\frac{1}{R1R2CC1}} \cdot \frac{1}{2\pi} = \sqrt{\frac{1}{R1'R2'CC1}} \cdot \frac{1}{2\pi}$
- Passband gain (H_O) = (1 + R4/R3) (1 + R4'/R3')
- 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

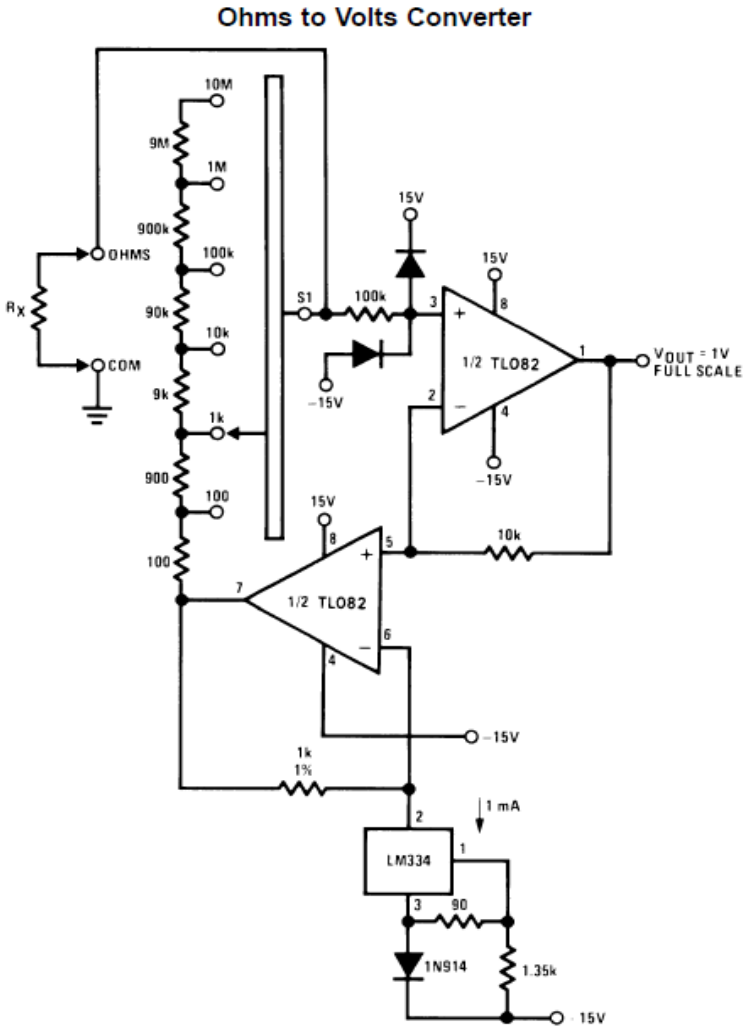
3) Fourth order high pass filter

Fourth Order High Pass Butterworth Filter



- Corner frequency (f_c) = $\sqrt{\frac{1}{R1R2C^2}} \cdot \frac{1}{2\pi} = \sqrt{\frac{1}{R1'R2'C^2}} \cdot \frac{1}{2\pi}$
- Passband gain (H_O) = (1 + R4/R3) (1 + R4'/R3')
- 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

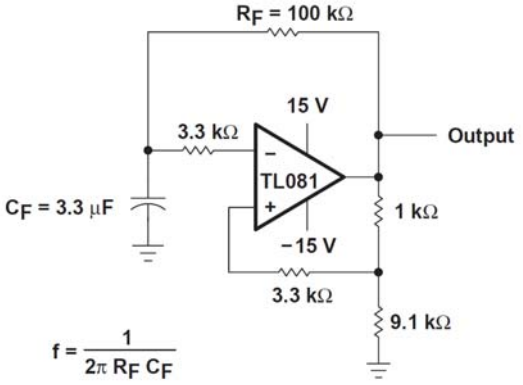
4) Conversion of resistance voltage

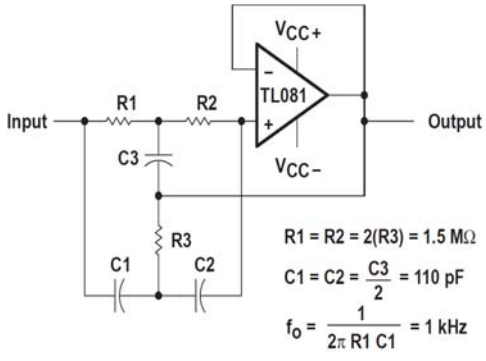


$$V_O = \frac{1V}{R_{LADDER}} \times R_X$$

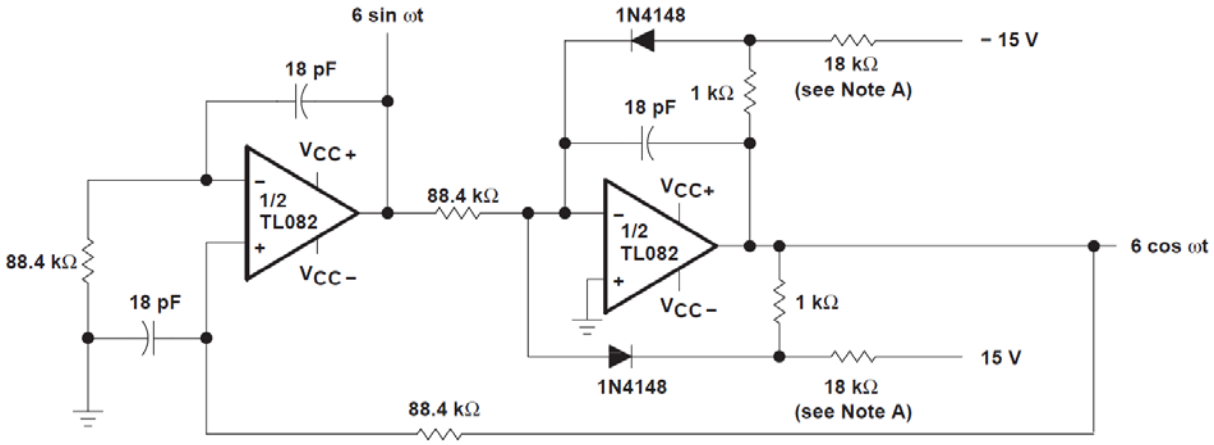
Where R_{LADDER} is the resistance from switch S1 pole to pin 7 of the TL082CP.

5) Typical route



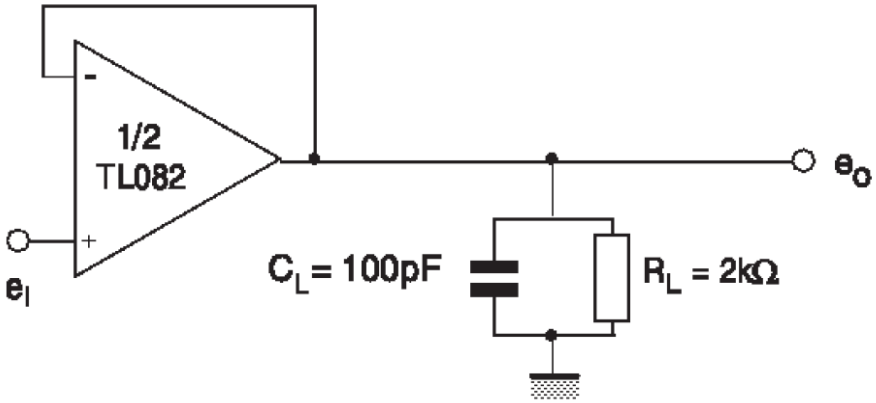


6) 100 kHz orthogonal oscillator 100-KHz Quadrature Oscillator

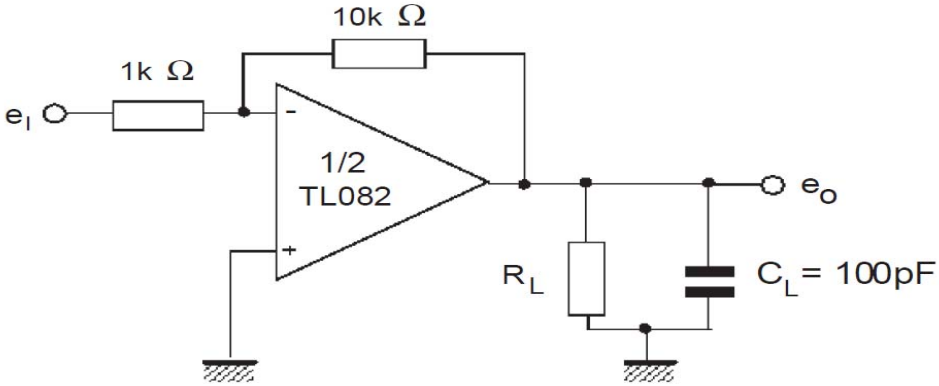


NOTE A: These resistor values may be adjusted for a symmetrical output.

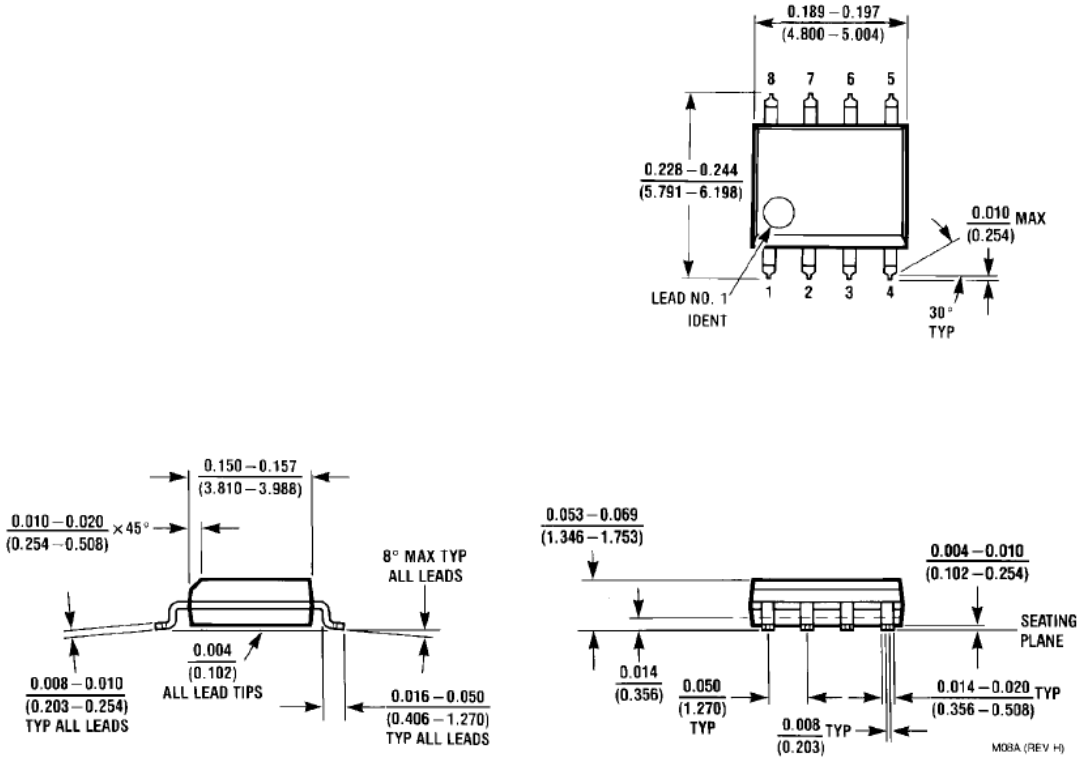
7) Voltage follower Voltage Follower



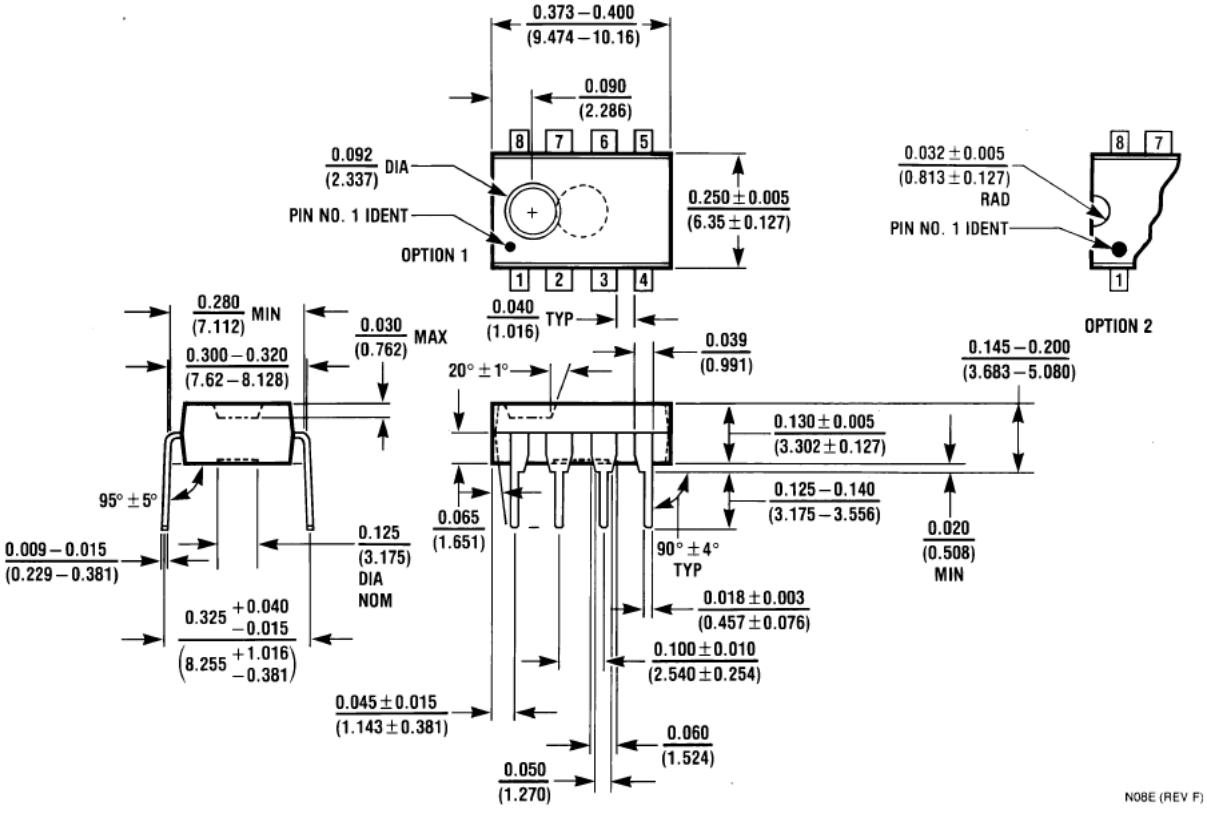
8) The gain is 10 The inverting amplifier has a gain of 10 Inverting Amplifier



Package information



SOP8



DIP8