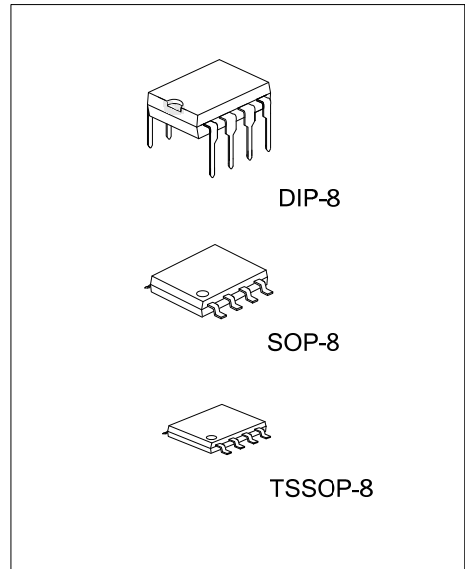




TL082

LINEAR INTEGRATED CIRCUIT

GENERAL PURPOSE DUAL J-FET OPERATIONAL AMPLIFIER



■ DESCRIPTION

The UTC **TL082** is a high speed J-FET input dual operational amplifier. It incorporates well matched, high voltage J-FET and bipolar transistors in a monolithic integrated circuit.

The device features high slew rates, low input bias and offset current, and low offset voltage temperature coefficient.

■ FEATURES

- * Low input bias and offset current
- * Wide common-mode (up to V_{CC}^+) and differential voltage range
- * Output short-circuit protection
- * High input impedance J-FET input stage
- * Internal frequency compensation
- * Latch up free operation
- * High slewrate: 16V/ μ s (typ.)

■ ORDERING INFORMATION

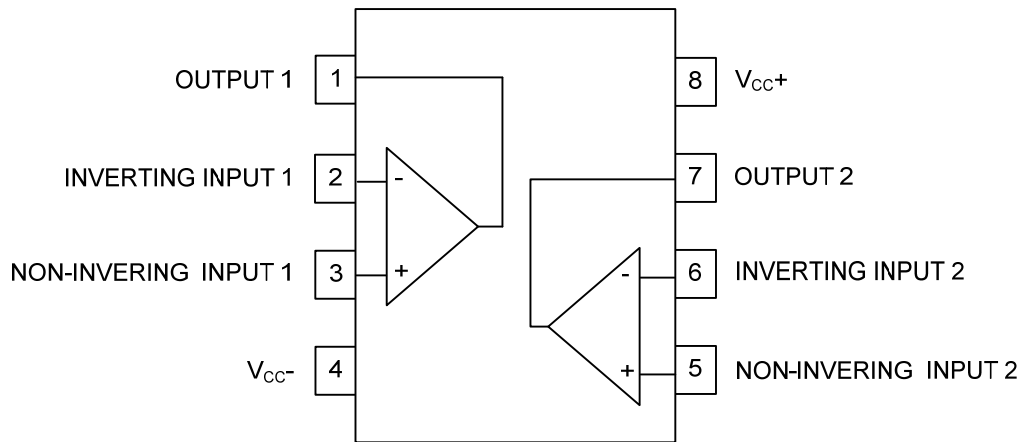
Ordering Number		Package	Packing
Lead Free	Halogen Free		
TL082L-D08-T	TL082G-D08-T	DIP-8	Tube
TL082L-S08-R	TL082G-S08-R	SOP-8	Tape Reel
TL082L-P08-R	TL082G-P08-R	TSSOP-8	Tape Reel

<p>TL082G-D08-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) D08: DIP-8, S08: SOP-8, P08: TSSOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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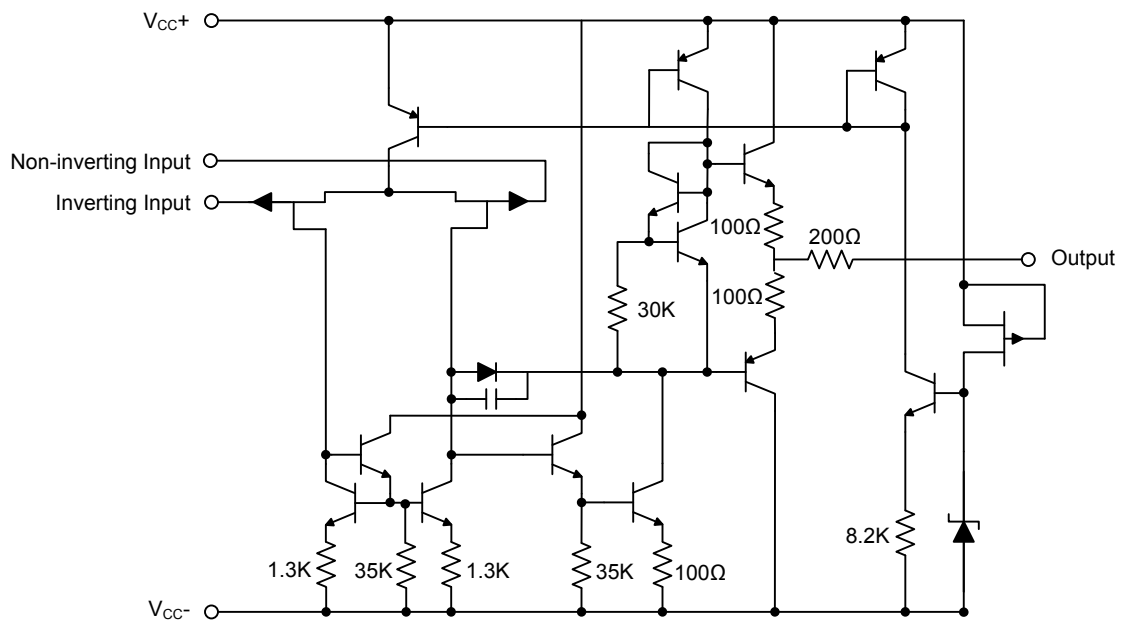
■ MARKING

DIP-8	SOP-8	TSSOP-8
<p>UTC □□□□ → Date Code</p> <p>TL082 □ □ → L: Lead Free</p> <p> □ □ → G: Halogen Free</p> <p> □ □ → Lot Code</p>	<p>UTC □□□□ → Date Code</p> <p>TL082 □ □ → L: Lead Free</p> <p> □ □ → G: Halogen Free</p> <p> □ □ → Lot Code</p>	<p>UTC □□□□ → Date Code</p> <p>TL082 □ □ → L: Lead Free</p> <p> □ □ → G: Halogen Free</p> <p> □ □ → Lot Code</p>

■ PIN CONFIGURATION



■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage (Note 2)	V_{CC}	± 18	V
Input Voltage (Note 3)	V_{IN}	± 15	V
Differential Input Voltage (Note 4)	V_{ID}	± 30	V
Power Dissipation	P_D	680	mW
Output Short-Circuit Duration (Note 5)		Infinite	
Operating Temperature	T_{OPR}	-20 ~ +85	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

- All voltage values, except differential voltage, are with respect to the zero reference level (ground) of the supply voltages where the zero reference level is the midpoint between V_{CC-} and V_{CC+} .
- The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 volts, whichever is less.
- Differential voltages are at the non-inverting input terminal with respect to the inverting input terminal.
- The output may be shorted to ground or to either supply. Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-8	θ_{JA}	125	$^{\circ}\text{C/W}$
	DIP-8		85	$^{\circ}\text{C/W}$
	TSSOP-8		120	$^{\circ}\text{C/W}$
Junction to Case	SOP-8	θ_{JC}	40	$^{\circ}\text{C/W}$
	DIP-8		41	$^{\circ}\text{C/W}$
	TSSOP-8		37	$^{\circ}\text{C/W}$

■ ELECTRICAL CHARACTERISTICS

($V_{CC}=\pm 15\text{V}$, $T_A=25^{\circ}\text{C}$, $T_{MIN}=0^{\circ}\text{C}$, $T_{MAX}=70^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage ($R_S=50\Omega$)	V_{IO}	$T_A=25^{\circ}\text{C}$		3	10	mV
		$T_{MIN}\leq T_A\leq T_{MAX}$			13	
Input Offset Voltage Drift	D_{VIO}			10		$\mu\text{V}/^{\circ}\text{C}$
Input Offset Current (Note)	I_{IO}	$T_A=25^{\circ}\text{C}$		5	100	pA
		$T_{MIN}\leq T_A\leq T_{MAX}$			10	nA
Input Bias Current (Note)	I_{IB}	$T_A=25^{\circ}\text{C}$		20	400	pA
		$T_{MIN}\leq T_A\leq T_{MAX}$			20	nA
Input Common Mode Voltage Range	V_{ICM}		± 11	-12~+15		V
Output Voltage Swing	$\pm V_{OPP}$	$T_A=25^{\circ}\text{C}$, $R_L=2\text{k}\Omega$,	10	12		V
		$T_A=25^{\circ}\text{C}$, $R_L=10\text{k}\Omega$	12	13.5		V
		$T_{MIN}\leq T_A\leq T_{MAX}$, $R_L=2\text{k}\Omega$	10			V
		$T_{MIN}\leq T_A\leq T_{MAX}$, $R_L=10\text{k}\Omega$	12			V
Large Signal Voltage Gain ($R_L=2\text{k}\Omega$, $V_{OUT}=\pm 10\text{V}$)	Avd	$T_A=25^{\circ}\text{C}$	25	200		V/mV
		$T_{MIN}\leq T_A\leq T_{MAX}$	15			
Gain Bandwidth Product ($T_A=25^{\circ}\text{C}$)	GBP	$V_{IN}=10\text{mV}$, $R_L=2\text{k}\Omega$, $C_L=100\text{pF}$, $f=100\text{kHz}$	2.5	4		MHz
Input Resistance	R_i			10^{12}		Ω
Common Mode Rejection Ratio ($R_S=50\Omega$)	CMR	$T_A=25^{\circ}\text{C}$	70	86		dB
		$T_{MIN}\leq T_A\leq T_{MAX}$	70			
Supply Voltage Rejection Ratio ($R_S=50\Omega$)	SVR	$T_A=25^{\circ}\text{C}$	70	86		dB
		$T_{MIN}\leq T_A\leq T_{MAX}$	70			

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current, No Load	I_{CC}	$T_A=25^\circ\text{C}$		2.3	5.6	mA
Channel Separation ($A_v=100$, $T_a=25^\circ\text{C}$)	V_{01}/V_{02}			120		dB
Output Short-Circuit Current	I_{OS}	$T_A=25^\circ\text{C}$	10	40	60	mA
		$T_{MIN} \leq T_A \leq T_{MAX}$	10		60	mA
Slew Rate ($T_a=25^\circ\text{C}$)	SR	$V_{IN}=10\text{V}$, $R_L=2\text{k}\Omega$ $C_L=100\text{pF}$, unity gain	8	16		V/ μs
Rise Time ($T_a=25^\circ\text{C}$)	t_R	$V_{IN}=20\text{mV}$, $R_L=2\text{k}\Omega$ $C_L=100\text{pF}$, unity gain		0.1		μs
Overshoot ($T_a=25^\circ\text{C}$)	K_{OV}	$V_{IN}=20\text{mV}$, $R_L=2\text{k}\Omega$ $C_L=100\text{pF}$, unity gain		10		%
Total Harmonic Distortion ($T_a=25^\circ\text{C}$)	THD	$A_v=20\text{dB}$, $f=1\text{kHz}$, $R_L=2\text{k}\Omega$, $C_L=100\text{pF}$, $V_{OUT}=2\text{Vpp}$)		0.01		%
Phase Margin	Φ_m			45		Degree s
Equivalent Input Noise Voltage ($R_S=100\Omega$, $f=1\text{KHz}$)	eN			15		$\frac{\text{nV}}{\sqrt{\text{Hz}}}$

Note: The Input bias currents are junction leakage currents, which approximately double for every 10°C increase in the junction temperature.

PARAMETER MEASUREMENT INFORMATION

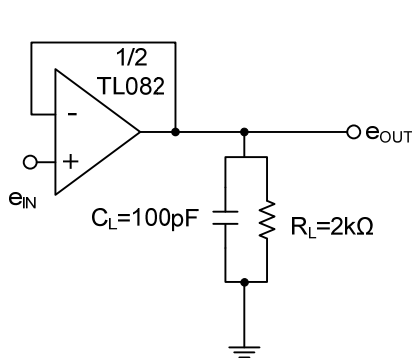


Figure 1. Voltage Follower

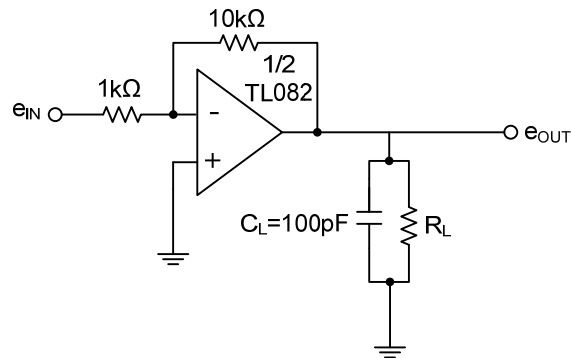
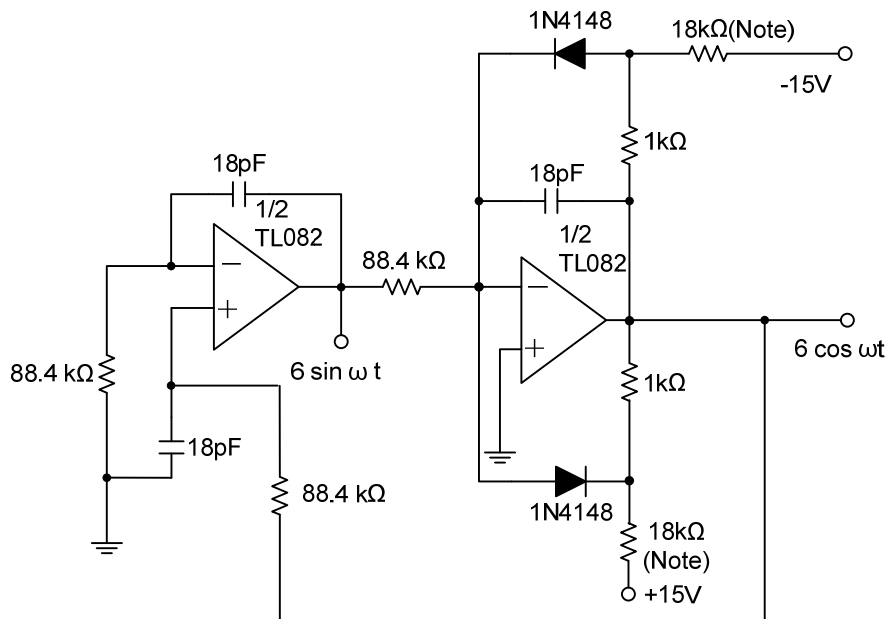


Figure 2. Gain-of-10 Inverting Amplifier

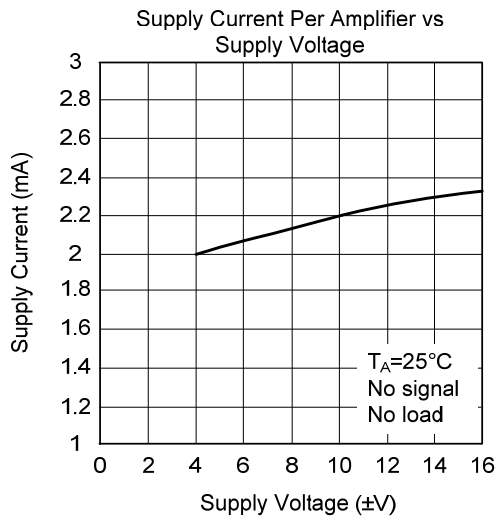
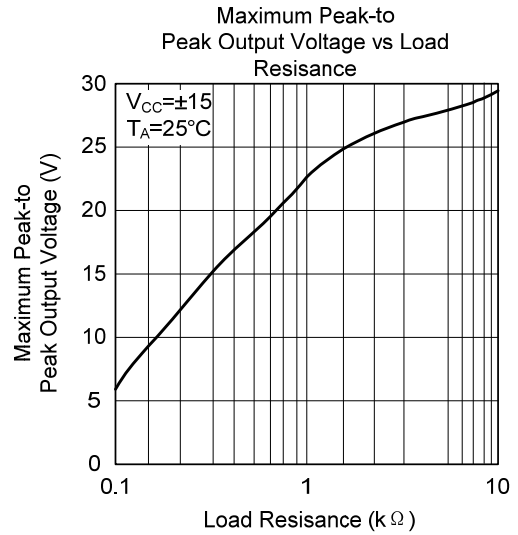
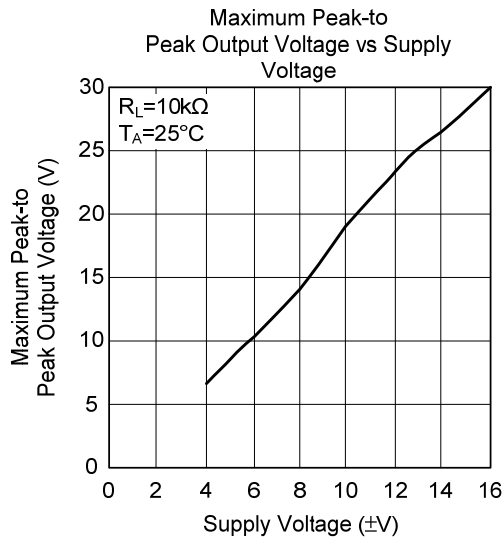
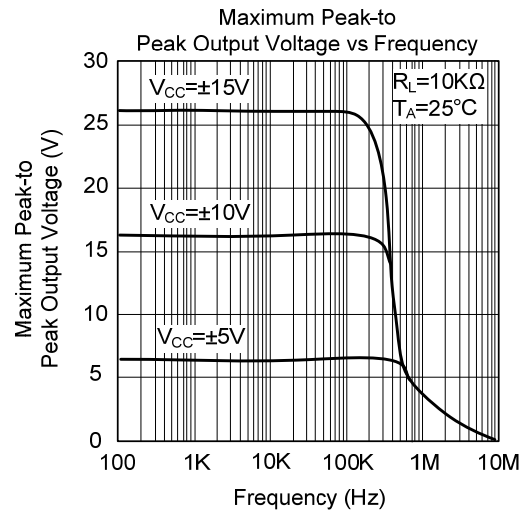
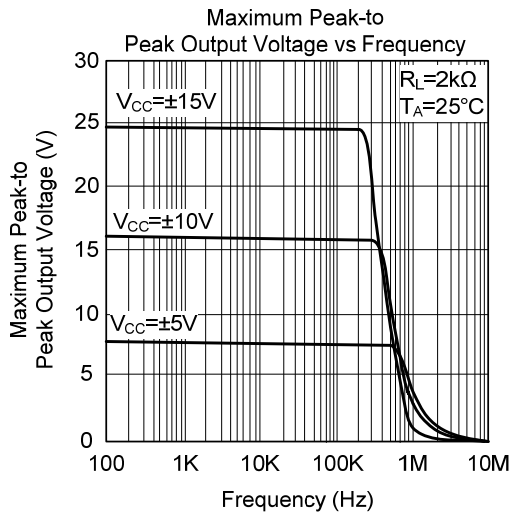
TYPICAL APPLICATION CIRCUIT

100 KHz Quadruple Oscillators



Note: These resistors values may be adjusted for a symmetrical output

■ TYPICAL CHARACTERISTICS



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