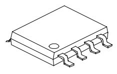
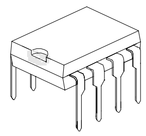
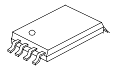
GENERAL PURPOSE DUAL J-FET OPERATIONAL AMPLIFIER



SOP-8



DIP-8



TSSOP-8

DESCRIPTION

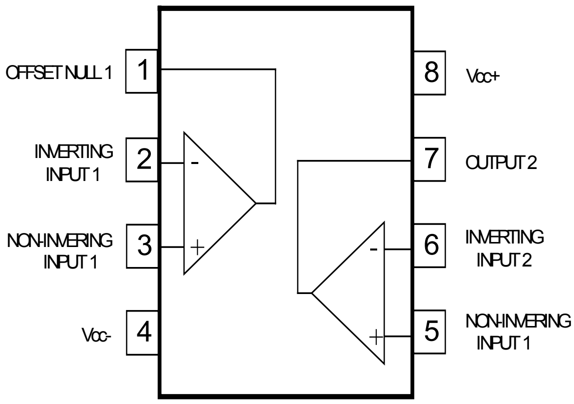
The UTC TL082 is a high speed J-FET input dual operational amplifier. It incorporates well matched, high voltage J-FET and bipolar transistors in a monolithic integrated circuit.

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

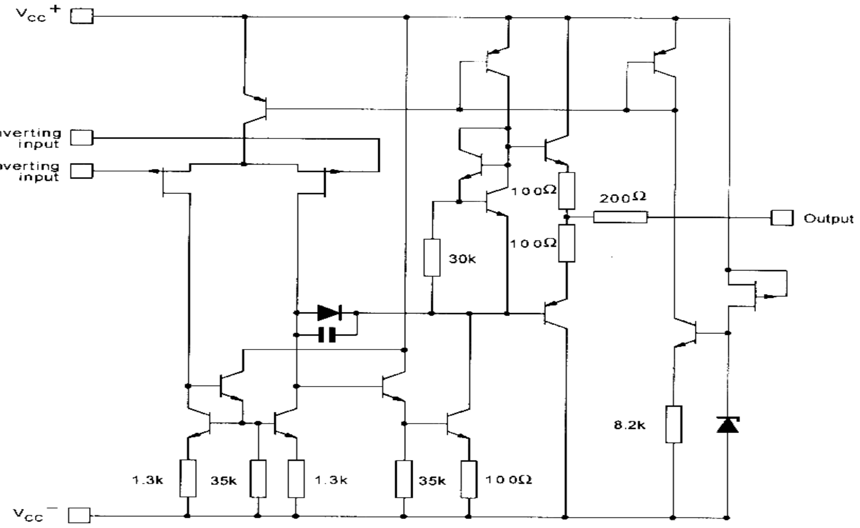
FEATURES

*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/μs(typ)

PIN CONFIGURATIONS



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage (note 1)	Vcc	+-18	V
Input Voltage (note 2)	Vi	+-15	V
Differential Input Voltage (note 3)	Vid	+-30	V
Power Dissipation	Ptot	680	mW
Output Short-Circuit Duration (note 4)		Infinite	
Operating Free Air Temperature Range	Toper	0 to 70	°C
Storage Temperature Range	Tstg	-65 to 150	°C

NOTES:
1. 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 Vcc- and Vcc+.
2. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 volts, whichever is less.
3. Differential voltages are at the non-inverting input terminal with respect to the inverting input terminal.
4. 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.

QW-R105-019,A

UTC TL082C ELECTRICAL CHARACTERISTICS

(Vcc=±15V, Ta=25°C,Tmin=0°C ,Tmax=70°C , unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Input Offset Voltage (Rs=50Ω) Ta=25°C Tmin≦Ta≦Tmax	Vio		3	10 13	mV
Input Offset Voltage Drift	Dvio		10		μV/°C
Input Offset Current * Ta=25°C Tmin≦Ta≦Tmax	Iio		5	100 10	pA nA
Input Bias Current * Ta=25°C Tmin≦Ta≦Tmax	Iib		20	400 20	pA nA
Input Common Mode Voltage Range	Vicm	±11	-12~+15		V
Output Voltage Swing Ta=25°C, R_L=2kΩ, Ta=25°C, R_L=10kΩ Tmin≦Ta≦Tmax, R_L=2kΩ Tmin≦Ta≦Tmax, R_L=10kΩ	±Vopp	10 12 10 12	12 13.5		V
Large Signal Voltage Gain (R_L=2kΩ, Vo=±10V) Ta=25°C Tmin≦Ta≦Tmax	Avd	25 15	200		V/mV
Gain Bandwidth Product (Ta=25°C) Vin=10mV,R_L=2kΩ, C_L=100pF,f=100kHZ	GBP	2.5	4		MHz
Input Resistance	Ri		10^{12}		Ω
Common Mode Rejection Ratio (R_S=50Ω) Ta=25°C Tmin≦Ta≦Tmax	CMR	70 70	86		dB
Supply Voltage Rejection Ratio (R_S=50Ω) Ta=25°C Tmin≦Ta≦Tmax	SVR	70 70	86		dB
Supply Current,no load Ta=25°C Tmin≦Ta≦Tmax	Icc		1.4	2.5 2.5	mA
Channel Separation (Av=100, Ta=25°C)	V_{01}/V_{02}		120		dB
Output Short-circuit Current Ta=25°C Tmin≦Ta≦Tmax	Ios	10 10	40	60 60	mA
Slew Rate (Ta=25°C) Vi=10V, R_L=2kΩ, C_L=100pF,unity gain	SR	8	16		V/μs
Rise Time (Ta=25°C) Vi=20mV, R_L=2kΩ, C_L=100pF,unity gain	t_r		0.1		μs
Overshoot (Ta=25°C) Vi=20mV, R_L=2kΩ, C_L=100pF,unity gain	Kov		10		%
Total Harmonic Distortion (Ta=25°C) Av=20dB, f=1kHzR_L=2kΩ, C_L=100pF, Vo=2Vpp)	THD		0.01		%
Phase Margin	φm		45		Degrees
Equivalent Input Noise Voltage (R_S=100Ω, f=1KHz)	e_n		15		$\frac{nV}{\sqrt{Hz}}$

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

UTC TL082AC ELECTRICAL CHARACTERISTICS

(Vcc=±15V, Ta=25°C, Tmin=0°C ,Tmax=70°C, unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Input Offset Voltage (Rs=50Ω) Ta=25°C Tmin≦Ta≦Tmax	Vio		3	6 7	mV
Input Offset Voltage Drift	Dvio		10		μV/°C
Input Offset Current * Ta=25°C Tmin≦Ta≦Tmax	Iio		5	100 4	pA nA
Input Bias Current * Ta=25°C Tmin≦Ta≦Tmax	Iib		20	200 20	pA nA
Input Common Mode Voltage Range	Vicm	±11	-12~+15		V
Output Voltage Swing Ta=25Ω, R_L=2kΩ, Ta=25°C, R_L=10kΩ Tmin≦Ta≦Tmax, R_L=2kΩ Tmin≦Ta≦Tmax, R_L=10kΩ	±Vopp	10 12 10 12	12 13.5		V
Large Signal Voltage Gain (R_L=2kΩ, Vo=±10V) Ta=25°C Tmin≦Ta≦Tmax	Avd	50 25	200		V/mV
Gain Bandwidth Product (Ta=25°C) Vin=10mV,R_L=2kΩ, C_L=100pF,f=100kHZ	GBP	2.5	4		MHz
Input Resistance	Ri		10^{12}		Ω
Common Mode Rejection Ratio (R_S=50Ω) Ta=25°C Tmin≦Ta≦Tmax	CMR	80 80	86		dB
Supply Voltage Rejection Ratio (R_S=50Ω) Ta=25°C Tmin≦Ta≦Tmax	SVR	80 80	86		dB
Supply Current,no load Ta=25°C Tmin≦Ta≦Tmax	Icc		1.4	2.5 2.5	mA
Channel Separation (Av=100, Ta=25°C)	V_{01}/V_{02}		120		dB
Output Short-circuit Current Ta=25°C Tmin≦Ta≦Tmax	Ios	10 10	40	60 60	mA
Slew Rate (Ta=25°C) Vi=10V, R_L=2kΩ, C_L=100pF,unity gain	SR	8	16		V/μs
Rise Time (Ta=25°C) Vi=20mV, R_L=2kΩ, C_L=100pF, unity gain	t_r		0.1		μs
Overshoot (Ta=25°C) Vi=20mV, R_L=2kΩ, C_L=100pF,unity gain	Kov		10		%
Total Harmonic Distortion (Ta=25°C) Av=20dB, f=1kHz,R_L=2kΩ, C_L=100pF, Vo=2Vpp	THD		0.01		%
Phase Margin	φm		45		Degrees
Equivalent Input Noise Voltage (R_S=100Ω, f=1KHz)	e_n		15		$\frac{nV}{\sqrt{Hz}}$

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

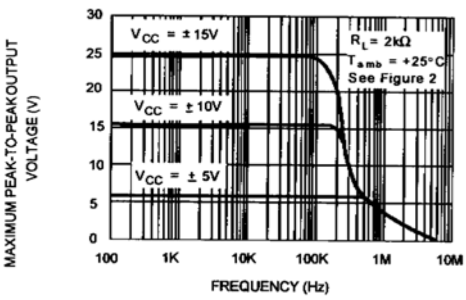
UTC TL082BC ELECTRICAL CHARACTERISTICS

(Vcc=±15V, Ta=25°C, Tmin=0°C ,Tmax=70°C, unless otherwise specified)

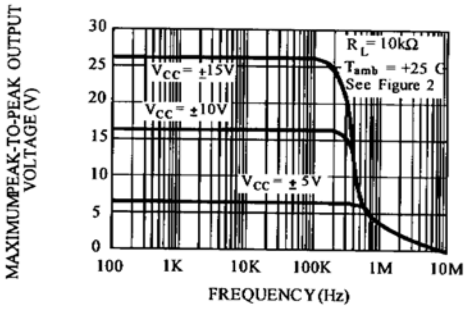
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Input Offset Voltage (Rs=50Ω) Ta=25°C Tmin≦Ta≦Tmax	Vio		1	3 5	mV
Input Offset Voltage Drift	Dvio		10		μV/°C
Input Offset Current * Ta=25°C Tmin≦Ta≦Tmax	Iio		5	100 4	pA nA
Input Bias Current * Ta=25°C Tmin≦Ta≦Tmax	Iib		20	200 20	pA nA
Input Common Mode Voltage Range	Vicm	±11	-12~+15		V
Output Voltage Swing Ta=25Ω, R_L=2kΩ, Ta=25°C, R_L=10kΩ Tmin≦Ta≦Tmax, R_L=2kΩ Tmin≦Ta≦Tmax, R_L=10kΩ	±Vopp	10 12 10 12	12 13.5		V
Large Signal Voltage Gain (R_L=2kΩ, Vo=±10V) Ta=25°C Tmin≦Ta≦Tmax	Avd	50 25	200		V/mV
Gain Bandwidth Product (Ta=25°C) Vin=10mV,R_L=2kΩ, C_L=100pF,f=100kHZ	GBP	2.5	4		MHz
Input Resistance	Ri		10^{12}		Ω
Common Mode Rejection Ratio (R_S=50Ω) Ta=25°C Tmin≦Ta≦Tmax	CMR	80 80	86		dB
Supply Voltage Rejection Ratio (R_S=50Ω) Ta=25°C Tmin≦Ta≦Tmax	SVR	80 80	86		dB
Supply Current,no load Ta=25°C Tmin≦Ta≦Tmax	Icc		2.4	3.5 2.5	mA
Channel Separation (Av=100, Ta=25°C)	V_{01}/V_{02}		120		dB
Output Short-circuit Current Ta=25°C Tmin≦Ta≦Tmax	Ios	10 10	40	60 60	mA
Slew Rate (Ta=25°C) Vi=10V, R_L=2kΩ, C_L=100pF,unity gain	SR	8	16		V/μs
Rise Time (Ta=25°C) Vi=20mV, R_L=2kΩ, C_L=100pF, unity gain	t_r		0.1		μs
Overshoot (Ta=25°C) Vi=20mV, R_L=2kΩ, C_L=100pF,unity gain	Kov		10		%
Total Harmonic Distortion (Ta=25°C) Av=20dB, f=1kHz,R_L=2kΩ, C_L=100pF, Vo=2Vpp	THD		0.01		%
Phase Margin	φm		45		Degrees
Equivalent Input Noise Voltage (R_S=100Ω, f=1KHz)	e_n		15		$\frac{nV}{\sqrt{Hz}}$

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

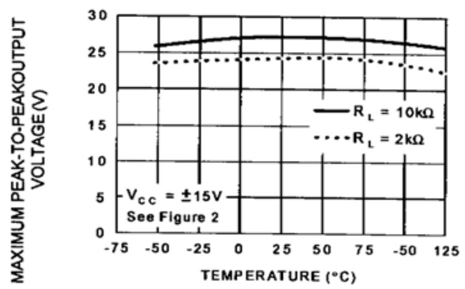
MAXIMUM PEAK-TO-PEAK OUTPUT VOLTAGE VERSUS FREQUENCY



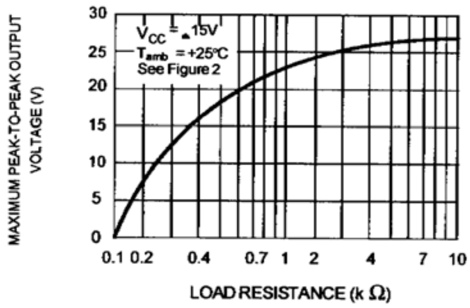
MAXIMUM PEAK-TO-PEAK OUTPUT VOLTAGE VERSUS FREQUENCY



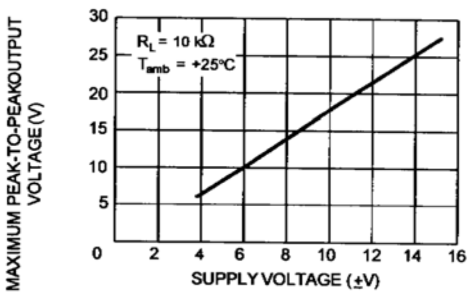
MAXIMUM PEAK-TO-PEAK OUTPUT VOLTAGE VERSUS FREE AIR TEMP.



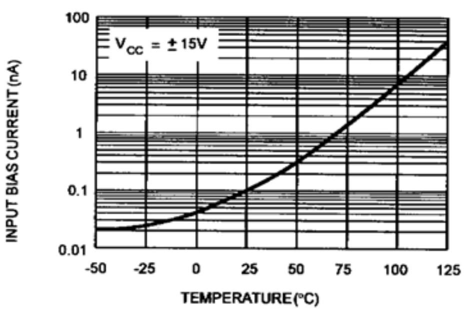
MAXIMUM PEAK-TO-PEAK OUTPUT VOLTAGE VERSUS LOAD RESISTANCE



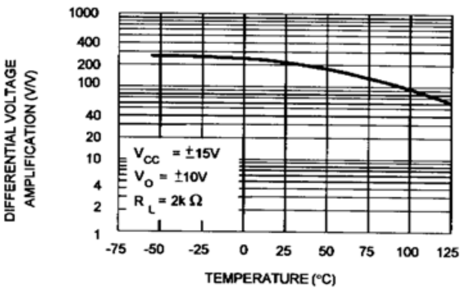
MAXIMUM PEAK-TO-PEAK OUTPUT VOLTAGE VERSUS SUPPLY VOLTAGE



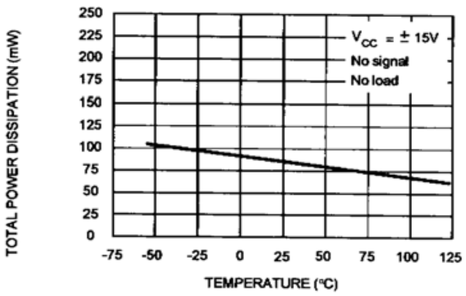
INPUT BIAS CURRENT VERSUS FREE AIR TEMPERATURE



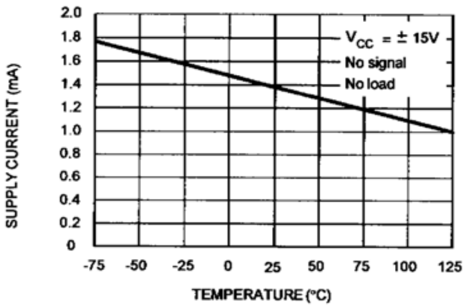
LARGE SIGNAL DIFFERENTIAL VOLTAGE AMPLIFICATION VERSUS FREE AIR TEMPERATURE



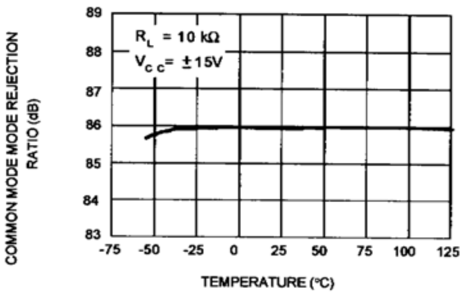
TOTAL POWER DISSIPATION VERSUS FREE AIR TEMPERATURE



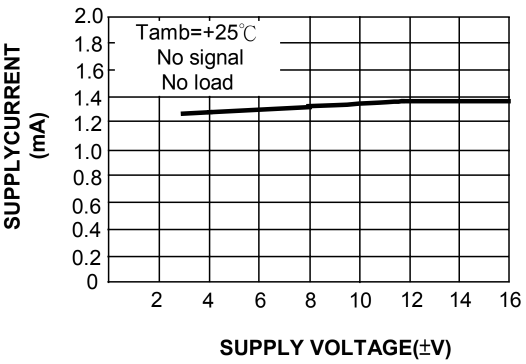
SUPPLY CURRENT PER AMPLIFIER VERSUS FREE AIR TEMPERATURE



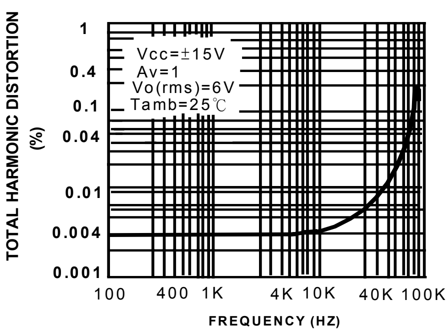
COMMON MODE REJECTION RATIO VERSUS FREE AIR TEMPERATURE



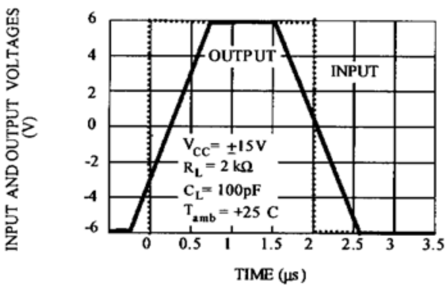
SUPPLY CURRENT PER AMPLIFIER versus SUPPLY VOLTAGE



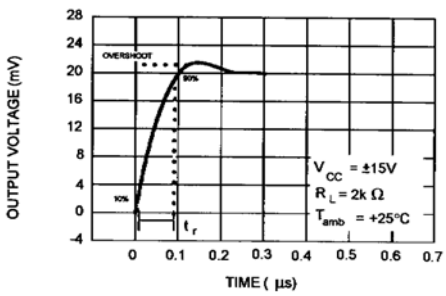
TOTAL HARMONIC DISTORTION versus FREQUENCY



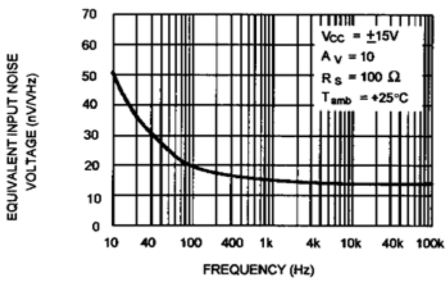
VOLTAGE FOLLOWER LARGE SIGNAL PULSE RESPONSE



OUTPUT VOLTAGE VERSUS ELAPSED TIME



EQUIVALENT INPUT NOISE VOLTAGE VERSUS FREQUENCY



PARAMETER MEASUREMENT INFORMATION

Figure 1: Voltage Follower

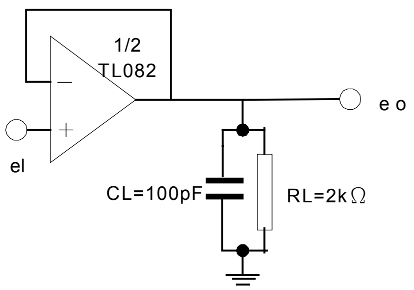
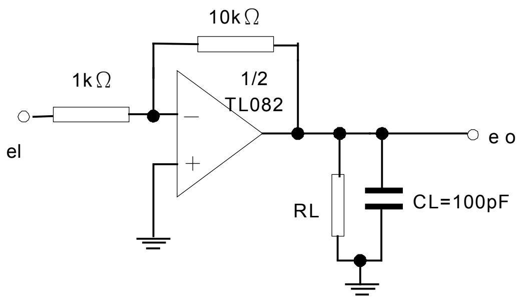
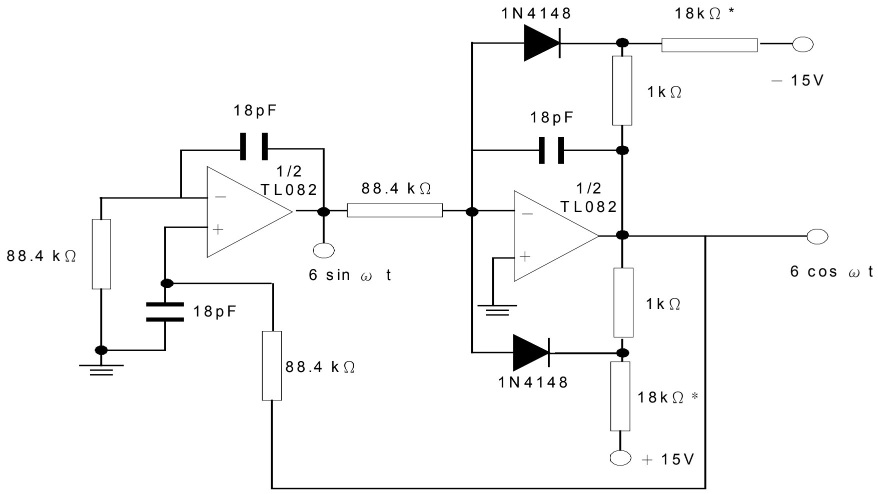


Figure2: Gain-of-10 Inverting Amplifier



TYPICAL APPLICATIONS

100KHZ QUADRUPLE OSCILLATOR



*These resistors values may be adjusted for a symmetrical output