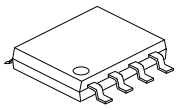
LOW-NOISE, PRECISION, HIGH SPEED OPERATIONAL AMPLIFIER



SOP-8

■ DESCRIPTION

The UTC **OP37** provides the same high performance as the UTC **OP27**, but the design is optimized for circuits with gains greater than five.

The UTC **OP37** provides the low offset and drift of the OP07 plus higher speed and lower noise.

The low input bias current of 80nA and offset current of 75nA are achieved by using a bias-current cancellation circuit. Over the military temperature range this typically holds I_B and I_{OS} to 150nA and 135nA respectively.

The output stage has good load driving capability. A guaranteed swing of 10V into 600Ω and low output distortion make the UTC **OP37** an excellent choice for professional audio applications.

■ FEATURES

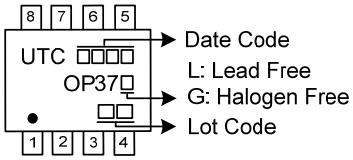
* Supply Voltage: ±4.0 ~ ±22.0V
* Supply Current/Amplifier: 6.2mA (Max.)
* Input Offset Voltage: 110μV (Max.)
* Slew Rate: 9.4V/μs (Typ.)
* Excellent CMRR: 120dB at V_{CM} of ±11V

■ ORDERING INFORMATION

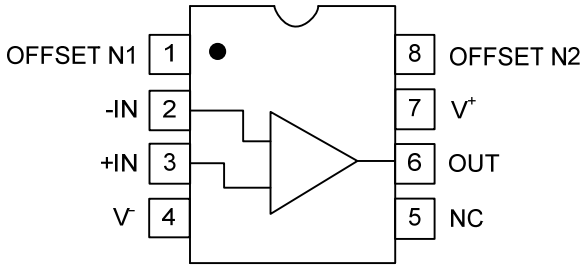
Ordering Number		Package	Packing
Lead Free	Halogen Free		
OP37L-S08-R	OP37G-S08-R	SOP-8	Tape Reel

OP37G-S08-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



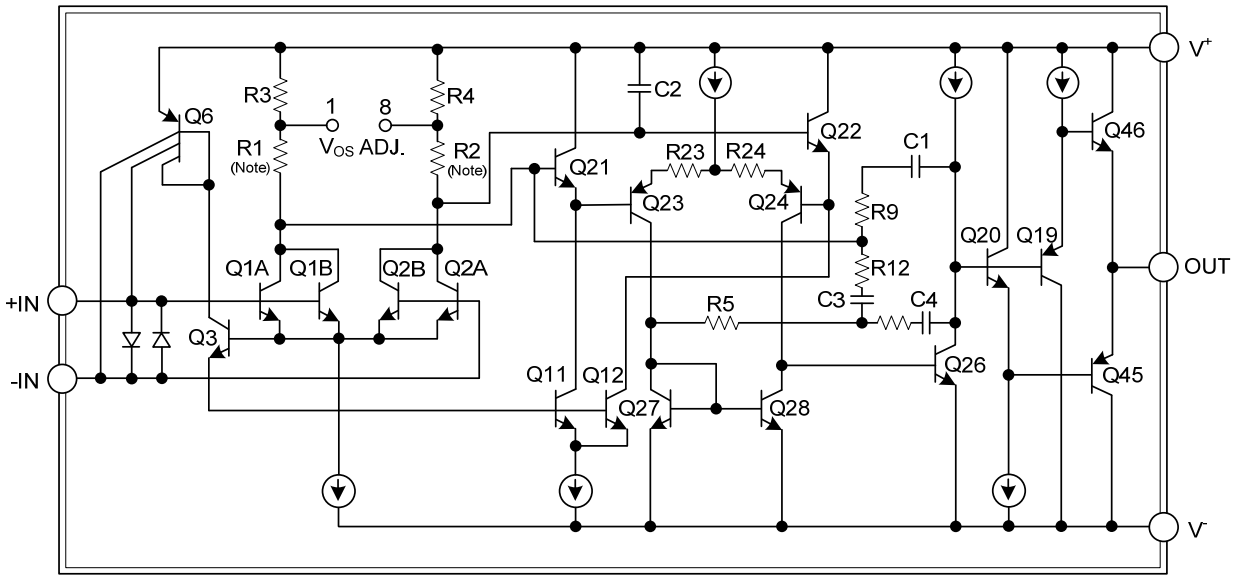
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	OFFSET N1	External input offset voltage adjustment
2	-IN	Inverting
3	+IN	Non-Inverting
4	V^-	Negative Power supply
5	NC	No connect
6	OUT	Output
7	V^+	Positive power supply
8	OFFSET N2	External input offset voltage adjustment

■ BLOCK DIAGRAM



Note: R1 and R2 are permanently adjusted at wafer test for minimum offset voltage.

■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	±22	V
Differential Input Voltage (Note 1)		±0.7	V
Voltage at Input or Output Pin (Note 2)		±22	V
Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°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.
2. The UTC **OP37**'s inputs are protected by back-to-back diodes. Current limiting resistors are not used in order to achieve low noise. If differential input voltage exceeds 0.7V, the input current should be limited to 25mA.
3. For supply voltages less than 22V, the absolute maximum input voltage is equal to the supply voltage.

■ ELERECOMMENDED OPWRAING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	±4 ~ ±22	V
Operating Junction Temperature Range	T_{OPR}	-40 ~ +125	°C

■ ELECTRICAL CHARACTERISTICS ($V^+ - V^-$ =±15V, T_A=25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Supply Current/Amplifier	I_Q				3.2	6.2	mA
Power Supply Rejection Ratio	PSRR	V_S=±4V~±18V			125	150	dB
Input Offset Voltage (Note 1)	V_{OS}				50	110	μV
Offset Adjustment Range		R_P=10kΩ			±4.0		mV
Input Bias Current	I_B				±70	±110	nA
Input Offset Current	I_{OS}				12	80	nA
Common-Mode Voltage Range	V_{CM}			±11	±12.3		V
Common Mode Rejection Ratio	CMRR	V_{CM}=±11V		100	120		dB
Large Signal Voltage Gain	AV	R_L≥600Ω, V_O=±10V		95	115		dB
		R_L≥2kΩ, V_O=±10V		95	115		dB
Output Voltage	V_O	R_L≥600Ω	V_{OH}	10	11.5		V
			V_{OL}		-11.5	-10	V
		R_L≥2kΩ	V_{OH}	11.5	13.5		V
			V_{OL}		-13.5	-11.5	V
Slew Rate (Note 2)	SR	R_L≥2kΩ			9.4		V/μs
Gain Bandwidth Product (Note 2)	GBW				40		MHz
Input Noise Voltage Density (Note 3)	e_n	f_O=10Hz			3.8		nV/$\sqrt{Hz}$
		f_O=30Hz			3.3		nV/$\sqrt{Hz}$
		f_O=1000Hz			3.2		nV/$\sqrt{Hz}$
Input Noise Current Density (Note 3, 4)	i_n	f_O=10Hz			1.7		pA/$\sqrt{Hz}$
		f_O=30Hz			1.0		pA/$\sqrt{Hz}$
		f_O=1000Hz			0.7		pA/$\sqrt{Hz}$
Input Noise Voltage (Note 3, 5)	$e_{n\ p-p}$	0.1Hz to 10Hz			0.1		μV p-p

Notes: 1. Input offset voltage measurements are according Figure 1, use external resistors to balance the resistance values from V^+ to Pin1 (OFFSET N1) and Pin8 (OFFSET N2) then measure.
2. Guaranteed by design.
3. Sample tested.
4. See test circuit for current noise measurement.
5. See test circuit and frequency response curve for 0.1Hz to 10Hz tester.

■ PARAMETER MEASUREMENT INFORMATION

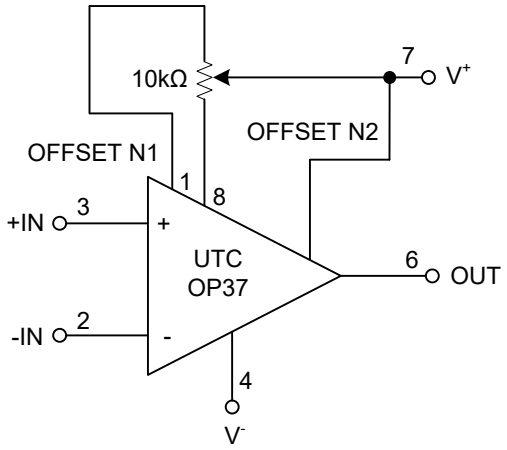
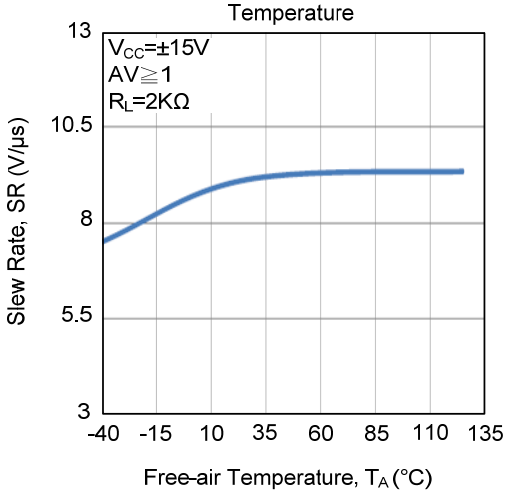


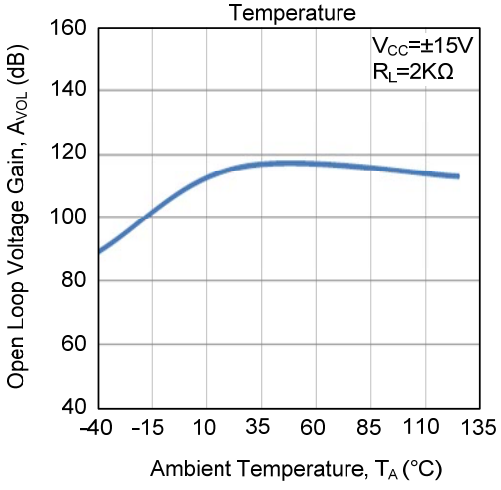
Figure 1. Input Offset Voltage Null Circuit

■ TYPICAL CHARACTERISTICS

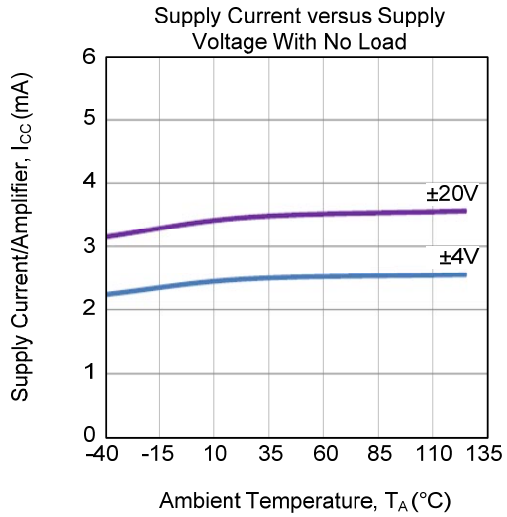
Normalized Slew Rate versus Temperature



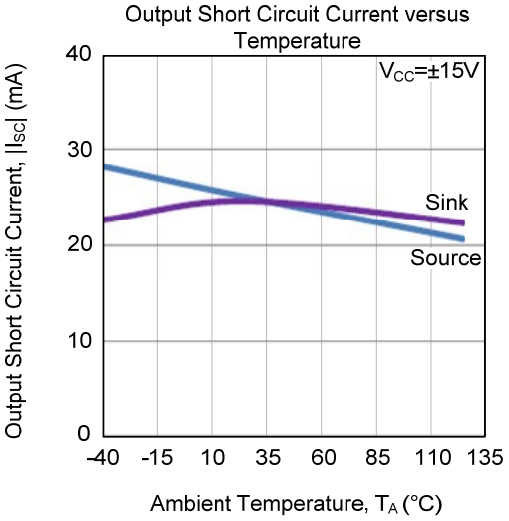
Open Loop Voltage Gain versus Temperature



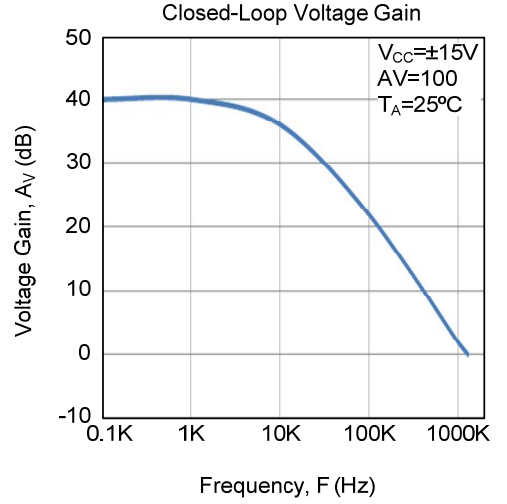
Supply Current versus Supply Voltage With No Load



Output Short Circuit Current versus Temperature



Closed-Loop Voltage Gain



Phase Shift vs Frequency