



ULV347

Preliminary

CMOS IC

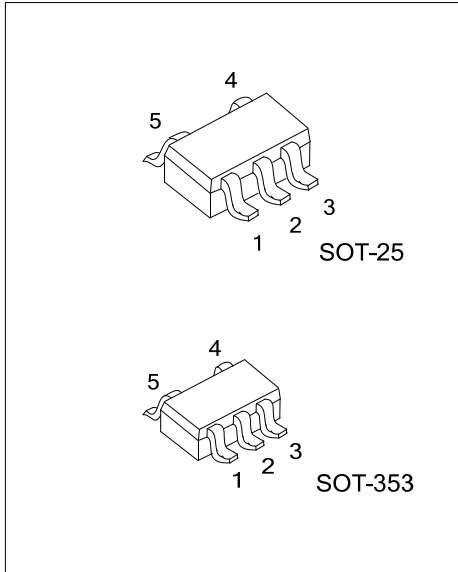
MICROPOWER, RAIL-TO-RAIL OPERATIONAL AMPLIFIERS

DESCRIPTION

The UTC **ULV347** is a microPower, low-cost operational amplifier available in micropackages. The UTC **ULV347** (single version) is available in the SOT-25 package.

The small size and low power consumption (32µA typ.) of the UTC **ULV347** make it ideal for portable and battery-powered applications. The input range of the UTC **ULV347** extends 200mV beyond the rails, and the output range is within 5mV of the rails. The UTC **ULV347** also features an excellent speed/power ratio with a bandwidth of 350kHz.

The UTC **ULV347** can be operated with a single or dual power supply from 2.5V to 5.5V.



FEATURES

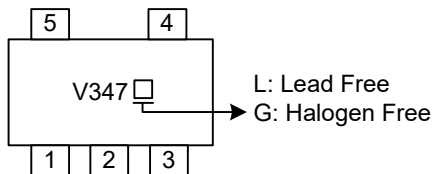
- * Low I_Q: 32µA (typ.)
- * High Speed/Power Ratio With Bandwidth: 350kHz
- * Rail-to-Rail Input and Output
- * Single Supply: 2.5V ~ 5.5V

ORDERING INFORMATION

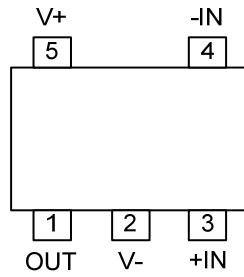
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULV347L-AF5-R	ULV347G-AF5-R	SOT-25	Tape Reel
ULV347L-AL5-R	ULV347G-AL5-R	SOT-353	Tape Reel

<p>ULV347G-AF5-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AF5: SOT-25, AL5: SOT-353</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



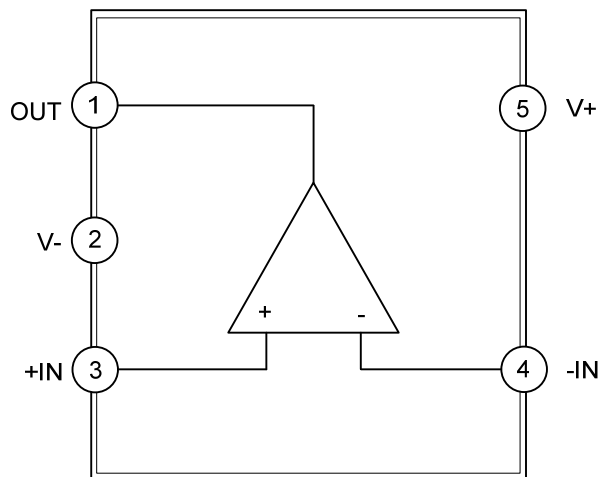
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	OUT	Output pin of AMP
2	V-	Negative power supply
3	+IN	Non-inverting input of AMP
4	-IN	Inverting input pin of AMP
5	V+	Positive power supply

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage, V+ to V-		7.0	V
Signal Input Terminals	Voltage (Note 1)	(V-) - 0.5 ~ (V+) + 0.5	V
	Current (Note 1)	10	mA
Output Short-Circuit (Note 2)		Continuous	
Junction Temperature	T _J	+150	°C
Operating Temperature	T _{OPR}	-40 ~ +125	°C
Storage Temperature	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. Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.5V beyond the supply rails should be current-limited to 10mA or less.

3. Short-circuit to ground, one amplifier per package

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	SOT-25	230	°C/W
	SOT-353	280	°C/W

■ ELECTRICAL CHARACTERISTICS

(Boldface limits apply over the specified temperature range, T_A = -40°C ~ +125°C.

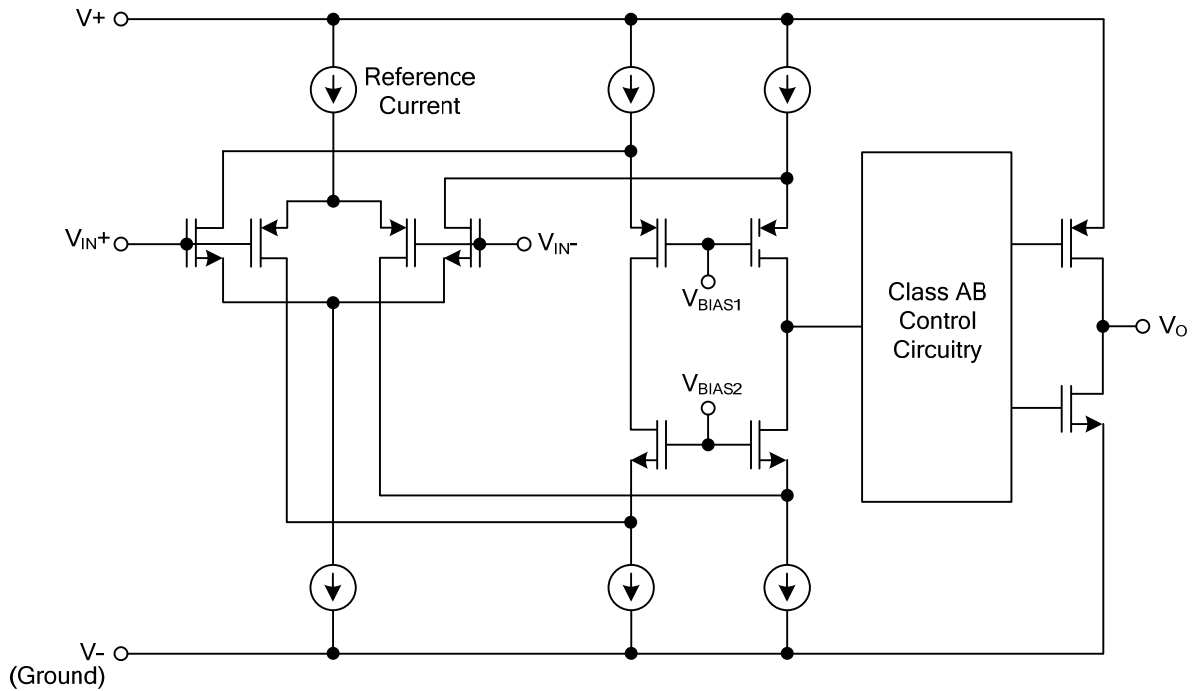
V_S = 2.5V ~ 5.5V. At T_A = +25°C, R_L = 100kΩ connected to V_S/2 and V_{OUT} = V_S/2, unless otherwise noted.

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
POWER SUPPLY						
Specified Voltage Range	V _S		2.5		5.5	V
Quiescent Current (Per Amplifier)	I _Q	I _O = 0		32	60	μA
		Over Temperature			70	μA
Power Supply Rejection Ratio	PSRR	V _S = 2.5V ~ 5.5V, V _{CM} < (V+) - 1.7V	83	100		dB
		Over Temperature V _S = 2.5V ~ 5.5V, V _{CM} < (V+) - 1.7V	80			μV/V
OFFSET VOLTAGE						
Input Offset Voltage	V _{OS}	V _S = 5.5V, V _{CM} = (V-) + 0.8V		2	8	mV
		Over Temperature		2	9	mV
Drift	dV _{OS} /dT			3		μV/°C
INPUT BIAS CURRENT						
Input Bias Current	I _B			±10		pA
Input Offset Current	I _{OS}			±10		pA
INPUT VOLTAGE RANGE						
Common-Mode Voltage Range	V _{CM}		(V-) - 0.2		(V+) + 0.2	V
Common-Mode Rejection Ratio	CMRR	V _S = 5.5V, (V-) - 0.2V < V _{CM} < (V+) - 1.7V	68	80		dB
		Over Temperature	64			dB
		V _S = 5.5V, V- < V _{CM} < (V+) - 1.7V	54	72		dB
		Over Temperature V _S = 5.5V, (V-) - 0.2V < V _{CM} < (V+) + 0.2V	48			dB

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OPEN-LOOP GAIN						
Open-Loop Voltage Gain	A _{OL}	V _S =5.5V, R _L =100kΩ, 0.015V < V _O < 5.485V	90	103		dB
		Over Temperature V _S =5.5V, R _L =100kΩ, 0.015V < V _O < 5.485V	80			dB
		V _S =5.5V, R _L =5kΩ, 0.125V < V _O < 5.375V	90	103		dB
		Over Temperature V _S =5.5V, R _L =5kΩ, 0.125V < V _O < 5.375V	80			dB
OUTPUT						
Voltage Output Swing from Rail		R _L =100kΩ, A _{OL} > 100dB		5	15	mV
		Over Temperature R _L =100kΩ, A _{OL} > 88dB			15	mV
		R _L =5kΩ, A _{OL} > 100dB		85	125	mV
		Over Temperature R _L =5kΩ, A _{OL} > 88dB			125	mV
Short-Circuit Current	I _{SC}			±50		mA
FREQUENCY RESPONSE (C_L = 100pF)						
Gain-Bandwidth Product	GBW			350		kHz
Slew Rate	SR	G = +1		0.17		V/μs
Settling Time	t _s	0.1%, V _S =5V, 2V Step, G=+1		21		μs
		0.01%, V _S =5V, 2V Step, G=+1		27		μs
Overload Recovery Time		V _{IN} × Gain = V _S		23		μs
NOISE (V_{CM} < (V+) - 1.7V)						
Input Voltage Noise		f = 0.1Hz ~10Hz		15		μV _{P-P}
Input Voltage Noise Density	e _n	f = 1kHz		65		nV/√Hz
Input Current Noise Density	i _n	f = 1kHz		0.8		fA/√Hz
INPUT IMPEDANCE						
Differential				10 ¹³ 3		Ω pF
Common-Mode				10 ¹³ 6		Ω pF

■ SIMPLIFIED SCHEMATIC



■ TYPICAL APPLICATION CIRCUIT

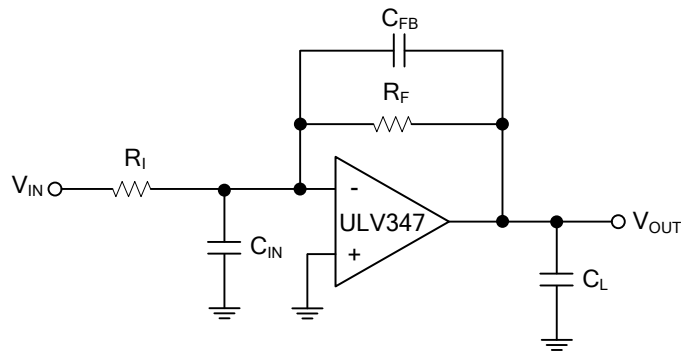


Figure 1. Adding a Feedback Capacitor In the Unity-Gain Inverter Configuration Improves Capacitive Load.

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