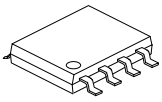
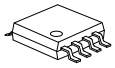
MICRO-POWER, ZERO-DRIFT, RAIL-TO-RAIL INPUT/OUTPUT CMOS DUAL OPERATIONAL AMPLIFIERS



SOP-8



MSOP-8

■ DESCRIPTION

The UTC **ULV2333** CMOS dual operational amplifiers provide very low offset voltage and zero-drift over time and temperature.

The miniature, high precision, low quiescent current amplifiers offer high-impedance inputs that have a wide input common mode range of 100mV beyond the rails and rail-to-rail output that swings within 35mV of the rails. Single or dual supplies as low as 1.8V (±0.9V) and up to 5.5V (±2.75V) may be used. They are optimized for low voltage, single or dual supply operation.

The UTC **ULV2333** offers excellent CMRR without the crossover associated with traditional complementary input stages. This design results in superior performance for driving analog-to-digital converters (ADCs) without degradation of differential linearity.

■ FEATURES

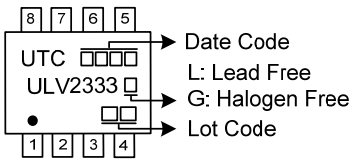
* Supply Voltage Range: 1.8V ~ 5.5V
* Supply Current: 80μA/Amplifier (Typ.)
* Low Offset Voltage: 25μV (Max.)
* Rail-to-Rail Input / Output
* Slew Rate: 0.25V/μs (Typ.)

■ ORDERING INFORMATION

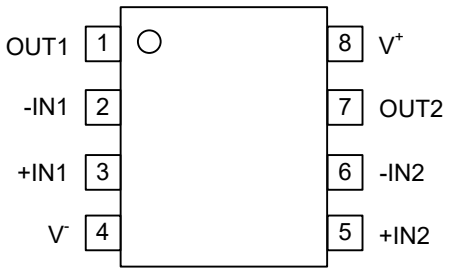
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULV2333L-S08-R	ULV2333G-S08-R	SOP-8	Tape Reel
ULV2333L-SM1-R	ULV2333G-SM1-R	MSOP-8	Tape Reel

ULV2333G-S08-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) S08: SOP-8, SM1: MSOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



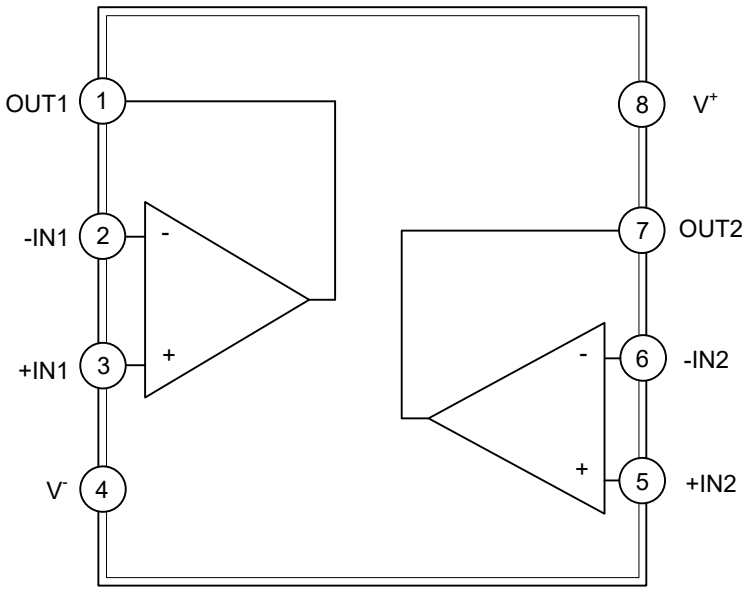
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	OUT1	Output of 1 AMP
2	-IN1	Inverting input of 1 AMP
3	+IN1	Non-inverting input of 1 AMP
4	V^-	Negative power supply
5	-IN2	Inverting input of 2 AMP
6	+IN2	Non-inverting input of 2 AMP
7	OUT2	Output of 2 AMP
8	V^+	Positive power supply

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	6.0	V
Input Voltage	V_{IN}	$V^- - 0.3 \sim V^+ + 0.3$	V
Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C

Note: 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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	1.8 ~ 5.5	V
Operating Free-Air Temperature	T_{OPR}	-40 ~ +125	°C

■ ELECTRICAL CHARACTERISTICS

(V^+=1.8~5.5V, R_L=10kΩ connected to $V^+/2$, and $V_{CM} = V^+/2$, $V_{OUT} = V^+/2$, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current/Amplifier	I_Q	I_{OUT}=0		80	148	μA
Power Supply Rejection Ratio	PSRR	V^+=1.8V ~ 5.5V	93	120		dB
Input Offset Voltage	V_{OS}			14	25	uV
Input Bias Current	I_B			130		pA
Input Offset Current	I_{OS}			140		pA
Common-Mode Voltage Range	V_{CM}		V^--0.1		V^+-0.1	V
Common-Mode Rejection Ratio	CMRR	V_{IC}=0V ~ 5V	89	110		dB
Output Voltage Swing from Rail	Vo	R_L=10kΩ		24	35	mV
Large Signal Voltage Gain	A_V	R_L=10kΩ	95	121		dB
Short-Circuit Current	I_{SC}	Sourcing, V_O=V^+		-32		mA
		Sinking, V_O=V^-		38		mA
Slew Rate	SR	G_V=1		0.25		V/μs
Gain-Bandwidth Product	GBW	C_L=100pF		350		KHz
Input-Referred Voltage Noise	e_n	f=0.1kHz~10Hz		2		$nV/\sqrt{Hz}$

Note: Specified by design and characterization. Amplifiers are 100% production screened at 25°C to reduce defective units.

■ TYPICAL APPLICATION CIRCUIT

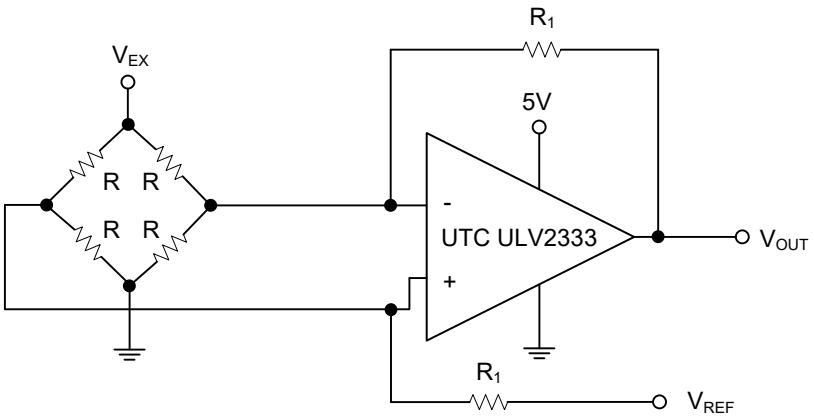


Figure 1. Bridge Amplifier Configuration

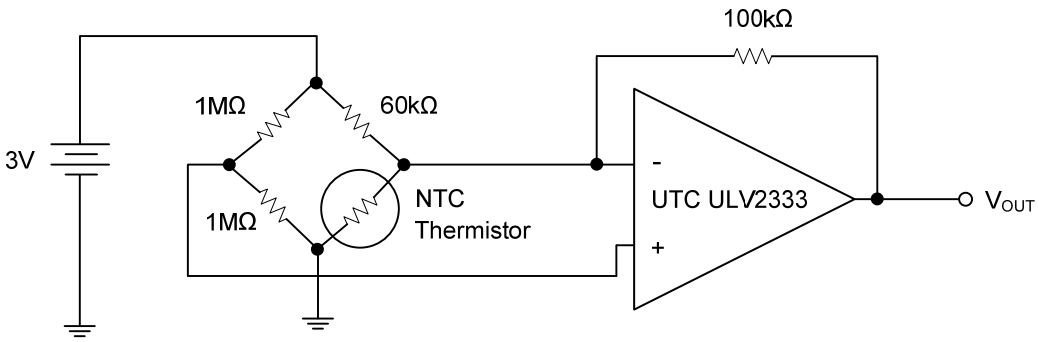


Figure 2. Thermistor Measurement