



## TL071

## LINEAR INTEGRATED CIRCUIT

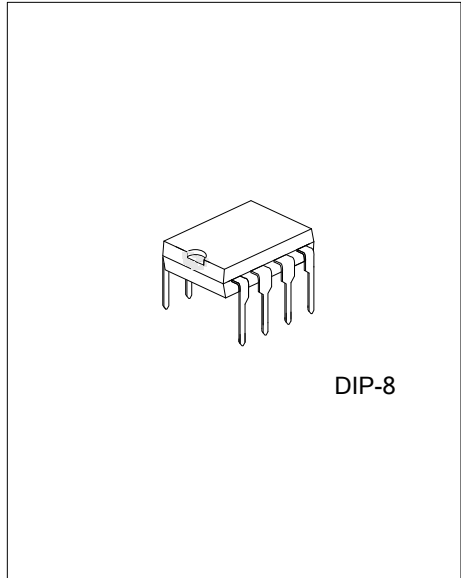
### LOW NOISE DUAL J-FET OPERATIONAL AMPLIFIER

#### DESCRIPTION

The UTC **TL071** is a high speed J-FET input quad 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

- \* Supply Voltage:  $\pm 3.0V \sim \pm 18V$
- \* Supply Current: 1.4mA/amplifier (Typ.)
- \* Input Offset Voltage: 10mV (Max.)
- \* Slew Rate: 10V/ $\mu s$  (Typ.)

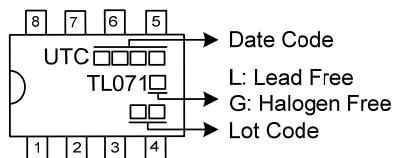


#### ORDERING INFORMATION

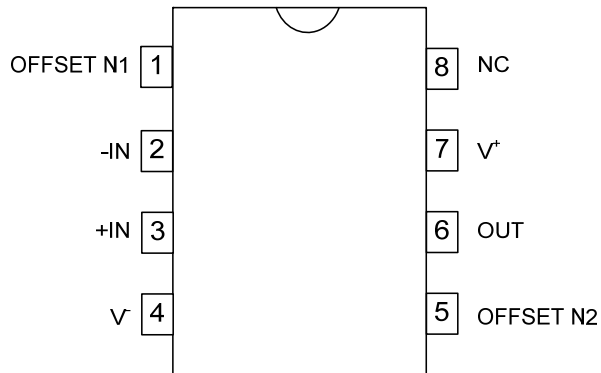
Ordering Number		Package	Packing
Lead Free	Halogen Free		
TL071L-D08-T	TL071G-D08-T	DIP-8	Tube

<p>TL071G-D08-T</p> <ul style="list-style-type: none"> <li>(1)Packing Type</li> <li>(2)Package Type</li> <li>(3)Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) T: Tube</li> <li>(2) D08: DIP-8</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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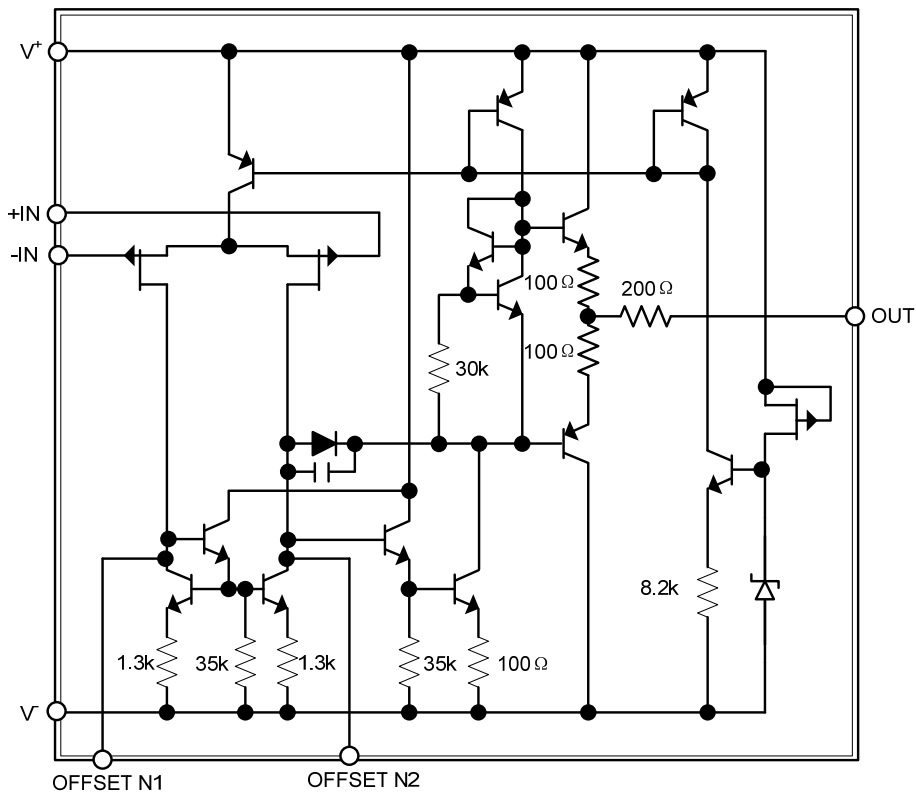
#### MARKING



### ■ PIN CONFIGURATION



### ■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage (Note 2)	V <sup>+</sup> - V <sup>-</sup>	±18	V
Input Voltage (Note 3)	V <sub>IN</sub>	±15	V
Differential Input Voltage (Note 4)	V <sub>ID</sub>	±30	V
Storage Temperature	T <sub>STG</sub>	-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. 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<sub>CC-</sub> and V<sub>CC+</sub>.
3. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 volts, whichever is less.
4. Differential voltages are at the non-inverting input terminal with respect to the inverting input terminal.
5. 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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATING	UNIT
Operating Free-Air Temperature	T <sub>OPR</sub>	-40 ~ +125	°C

■ ELECTRICAL CHARACTERISTICS (V<sup>±</sup>=±15V, T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current	I <sub>Q</sub>	No load		1.4	2.5	mA
Power Supply Rejection Ratio	PSRR	R <sub>S</sub> = 50Ω	70	86		dB
Input Offset Voltage (Note1)	V <sub>OS</sub>	R <sub>S</sub> = 50Ω, see Figure 3		3	10	mV
Input Offset Voltage Drift	ΔV <sub>OS</sub> /ΔT	R <sub>S</sub> = 50Ω, T <sub>A</sub> = -40°C to +125°C		10		μV/°C
Input Bias Current (Note2)	I <sub>B</sub>			20	200	pA
Input Offset Current (Note2)	I <sub>OS</sub>			5	100	pA
Common-Mode Voltage Range	V <sub>CM</sub>		±11			V
Common-Mode Rejection Ratio	CMRR	R <sub>S</sub> = 50Ω	70	86		dB
Large Signal Voltage Gain	A <sub>V</sub>	R <sub>L</sub> = 10kΩ, V <sub>OUT</sub> = ±10V	88	106		dB
Output Voltage	V <sub>O</sub>	R <sub>L</sub> = 2kΩ	±10	±12		V
		R <sub>L</sub> = 10kΩ	±12	±13.5		V
Short-Circuit Current	I <sub>SC</sub>		10	40	60	mA
Slew Rate	SR	V <sub>IN</sub> = 10V, R <sub>L</sub> = 2kΩ, C <sub>L</sub> = 100pF	6	10		V/μs
Gain Bandwidth Product	GBW	R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 100pF	2.5	4		MHz
Phase Margin	Φ <sub>M</sub>			45		Degree s
Voltage Noise Density	e <sub>n</sub>	R <sub>S</sub> = 100Ω, f = 1KHz		15		nV/ √Hz
Total Harmonic Distortion	THD	G <sub>V</sub> = 20dB, f = 1kHz, R <sub>L</sub> = 2kΩ, C <sub>L</sub> = 100pF, V <sub>OUT</sub> = 2Vpp		0.01		%

- Notes: 1. Input offset voltage measurements are according Figure 3, use external resistors to balance the resistance values from V<sup>-</sup> to Pin OFFSET N1 and Pin OFFSET N2 then measure.
2. The Input bias currents are junction leakage currents, which approximately double for every 10°C increase in the junction temperature.

■ PARAMETER MEASUREMENT INFORMATION

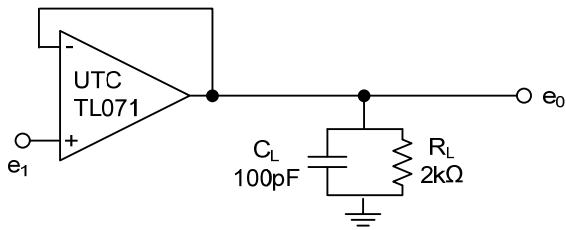


Figure 1. Voltage Follower

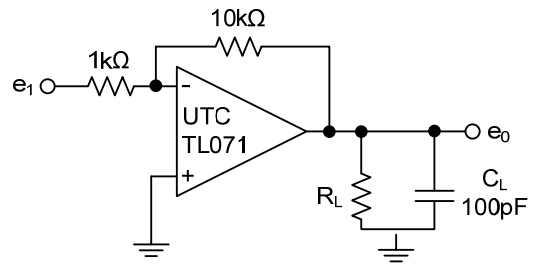


Figure 2. Gain-of-10 Inverting Amplifier

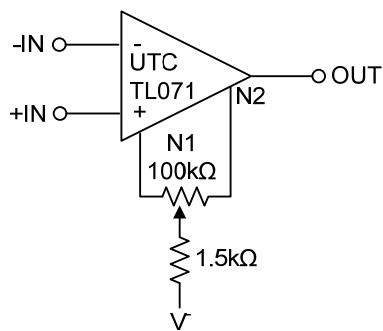
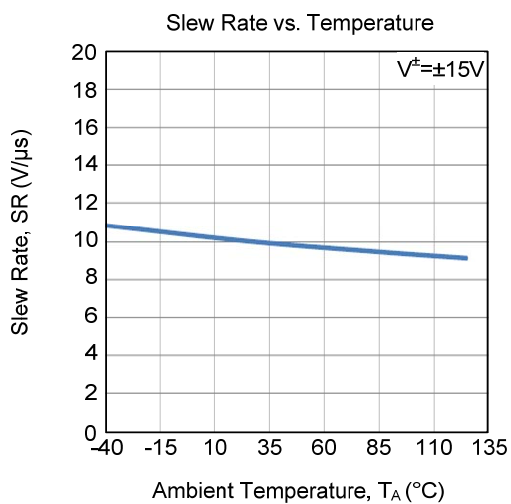
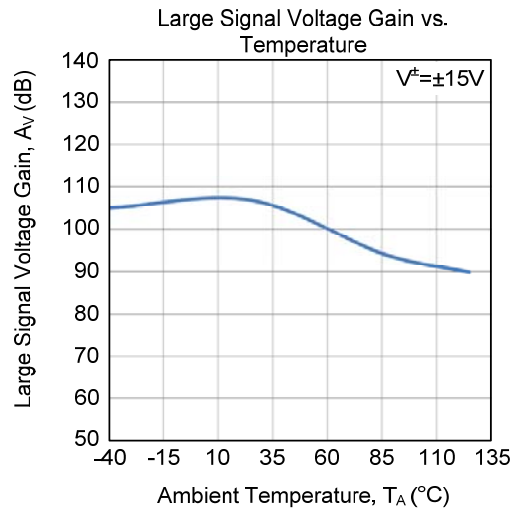
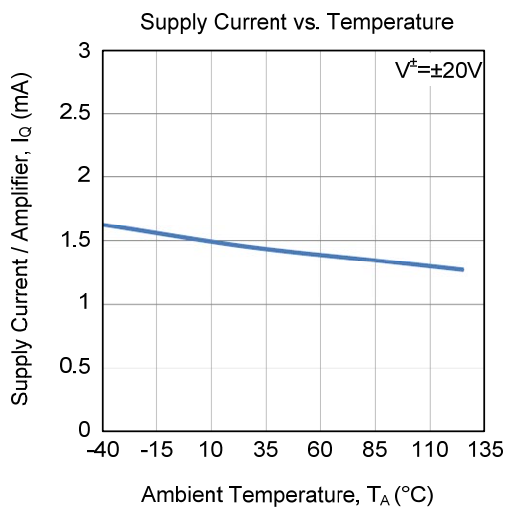


Figure 3. Input Offset Voltage Null Circuit

■ TYPICAL CHARACTERISTICS



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