

## Dual JFET Input Precision High Speed Op Amp

### FEATURES

- 13V/ $\mu$ s Slew Rate 8V/ $\mu$ s Min.
- 5MHz Gain-Bandwidth Product
- Fast Settling Time 1.3 $\mu$ s to 0.02%
- 300 $\mu$ V Offset Voltage (LT1057)
- 5 $\mu$ V/ $^{\circ}$ C  $V_{OS}$  Drift
- 60pA Bias Current at 70 $^{\circ}$ C
- Low Voltage Noise 13nV/ $\sqrt{\text{Hz}}$  at 1kHz  
26nV/ $\sqrt{\text{Hz}}$  at 10Hz

### APPLICATIONS

- Precision, High Speed Instrumentation
- Fast, Precision Sample and Hold
- Logarithmic Amplifiers
- D/A Output Amplifiers
- Photodiode Amplifiers
- Voltage to Frequency Converters
- Frequency to Voltage Converters

### DESCRIPTION

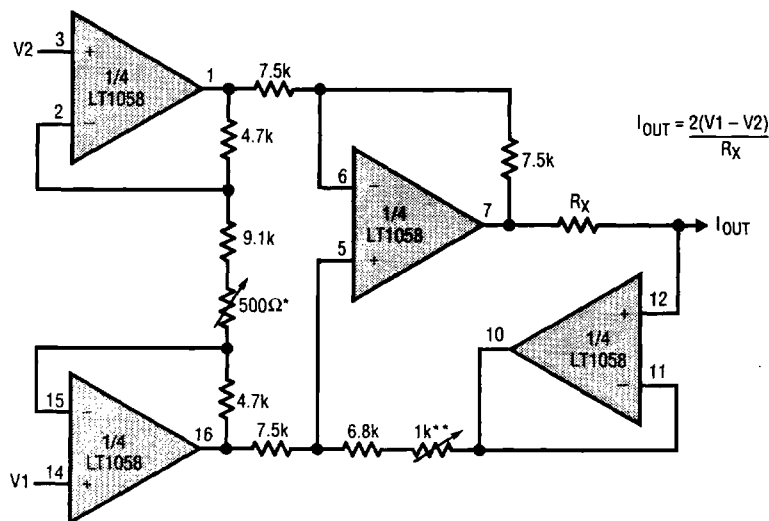
The LT1057 is a matched JFET input dual op amp featuring a combination of outstanding high speed and precision specifications. It replaces all the popular bipolar and JFET input dual op amps. In particular, the LT1057 upgrades the performance of systems using the LF412A and OP-215 JFET input duals.

The LT1058 is the lowest offset quad JFET input operational amplifier. It offers significant accuracy improvement over presently available JFET input quad operational amplifiers. It can replace four single precision JFET input op amps, while saving board space, power dissipation and cost.

For the first time, precision dual and quad JFET op amps are available in a surface mounted package. For extended operating temperatures ( $-40^{\circ}\text{C} \leq T_A \leq 85^{\circ}\text{C}$ ) the LT1057IS and LT1058IS are offered.

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Current Output, High Speed, High Input Impedance Instrumentation Amplifier



\*GAIN ADJUST  
\*\*COMMON-MODE REJECTION ADJUST  
BANDWIDTH  $\approx$  2MHz

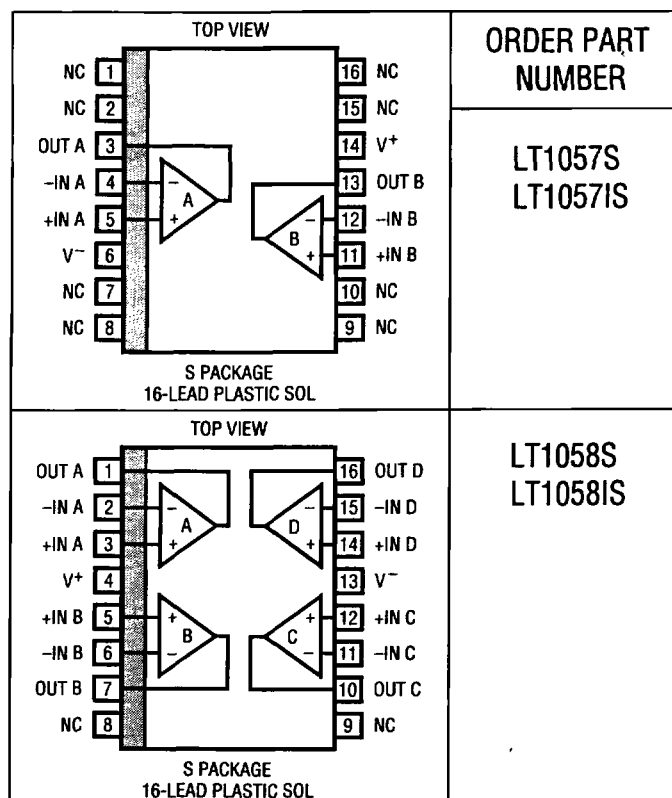
LT1058S-1A01

LT1057S/LT1057IS  
LT1058S/LT1058IS

**ABSOLUTE MAXIMUM RATINGS**

Supply Voltage .....	±20V
Differential Input Voltage .....	±40V
Input Voltage .....	±20V
Output Short Circuit Duration .....	Indefinite
Operating Temperature Range	
LT1057S, LT1058S .....	0°C to 70°C
LT1057IS, LT1058IS .....	-40°C to 85°C
Storage Temperature Range	
All Devices .....	-65°C to 150°C
Lead Temperature (Soldering, 10 sec.) .....	300°C

**PACKAGE/ORDER INFORMATION**



**ELECTRICAL CHARACTERISTICS**  $V_S = \pm 15V$ ,  $T_A = 25^\circ C$ ,  $V_{CM} = 0V$  unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
$V_{OS}$	Input Offset Voltage	LT1057		0.3	2	mV
		LT1058		0.35	2.5	
$I_{OS}$	Input Offset Current	Fully Warmed Up		5	50	pA
$I_B$	Input Bias Current	Fully Warmed Up		±10	±100	pA
	Input Resistance – Differential – Common-Mode	$V_{CM} = -11V$ to $+8V$		0.4		$\Omega$
		$V_{CM} = +8V$ to $+11V$		0.4		
	Input Capacitance			4		pF
$e_n$	Input Noise Voltage	0.1Hz to 10Hz	LT1057	2.1		$\mu V_{p-p}$
			LT1058	2.5		
$e_n$	Input Noise Voltage Density	$f_0 = 10Hz$		26		nV/ $\sqrt{Hz}$
		$f_0 = 1kHz$		13		
$i_n$	Input Noise Current Density	$f_0 = 10Hz, 1kHz$		1.8		fA/ $\sqrt{Hz}$
$A_{VOL}$	Large Signal Voltage Gain	$V_0 = \pm 10V$	$R_L = 2k$	100	300	V/mV
			$R_L = 1k$	50	220	
	Input Voltage Range		±10.5	14.3	-11.5	V

**ELECTRICAL CHARACTERISTICS**  $V_S = \pm 15V$ ,  $T_A = 25^\circ C$ ,  $V_{CM} = 0V$  unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
CMRR	Common-Mode Rejection Ratio	$V_{CM} = \pm 10.5V$	LT1057	82	98	dB
			LT1058	80	98	
PSRR	Power Supply Rejection Ratio	$V_S = \pm 10V$ to $\pm 18V$	86	102		dB
$V_{OUT}$	Output Voltage Swing	$R_L = 2k$	$\pm 12$	$\pm 13$		V
SR	Slew Rate		8	13		V/ $\mu s$
GBW	Gain-Bandwidth Product	$f = 1MHz$ (Note 1)	3	5		MHz
$I_S$	Supply Current Per Amplifier			1.7	2.8	mA
	Channel Separation	DC to 5kHz, $V_{IN} = \pm 10V$		130		

**ELECTRICAL CHARACTERISTICS**  $V_S = \pm 15V$ ,  $V_{CM} = 0V$ ,  $0^\circ C \leq T_A \leq 70^\circ C$ , (LT1057S, LT1058S) or  $-40^\circ C \leq T_A \leq 85^\circ C$ , (LT1057IS, LT1058IS), unless otherwise noted.

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SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS	
$V_{OS}$	Input Offset Voltage	LT1057	•	0.5	2.5	mV	
		LT1058S	•	0.6	3.0		
		LT1058IS	•	0.7	4.0		
	Average Temperature Coefficient of Input Offset Voltage		•	5		$\mu V/^\circ C$	
$I_{OS}$	Input Offset Current	Warmed Up, $T_A = 70^\circ C$		20	250	pA	
		Warmed Up, $T_A = 85^\circ C$		35	400		
$I_B$	Input Bias Current	Warmed Up, $T_A = 70^\circ C$		$\pm 60$	$\pm 400$	pA	
		Warmed Up, $T_A = 85^\circ C$		$\pm 100$	$\pm 700$		
$A_{VOL}$	Large Signal Voltage Gain	$V_O = \pm 10V$ , $R_L = 2k$ LT1057	•	50	200	V/mV	
		LT1058	•	40	200		
CMRR	Common-Mode Rejection Ratio	$V_{CM} = \pm 10.5V$	LT1057	•	80	96	dB
			LT1058	•	78	96	
PSRR	Power Supply Rejection Ratio	$V_S = \pm 10V$ to $\pm 18V$	LT1057	•	84	100	dB
			LT1058	•	82	100	
$V_{OUT}$	Output Voltage Swing	$R_L = 2k$	•	$\pm 12$	$\pm 12.8$	V	

The • denotes the specifications which apply over the full operating temperature range.

**Note 1:** Gain bandwidth product is not tested. It is guaranteed by design and by inference from the slew rate measurement.