LM4250
High Reliability Programmable Operational Amplifier

GENERAL DESCRIPTION

The 4250 is an extremely versatile programmable monolithic operational amplifier. A single external master bias current setting resistor programs the input bias current, input offset current, quiescent power consumption, slew rate, input noise, and the gain-bandwidth product.

RESISTOR BIASING

Set Current Setting Resistor to V⁻

	I_{SET}				
V_S	0.1 μA	0.5 μA	1.0 μA	5 μA	10 μA
±1.5V	25.6 MΩ	5.04 MΩ	2.5 MΩ	492 kΩ	244 kΩ
±3.0V	55.6 MΩ	11.0 MΩ	5.5 MΩ	1.09 MΩ	544 kΩ
±6.0V	116 MΩ	23.0 MΩ	11.5 MΩ	2.29 MΩ	1.14 MΩ
±9.0V	176 MΩ	35.0 MΩ	17.5 MΩ	3.49 MΩ	1.74 MΩ
±12.0V	236 MΩ	47.0 MΩ	23.5 MΩ	4.69 MΩ	2.34 MΩ
±1.50V	296 MΩ	59.0 MΩ	29.5 MΩ	5.89 MΩ	2.94 MΩ

FEATURES

- ±1V to ±18V Power Supply Operation
- 3 nA Input Offset Current
- Standby Power Consumption as Low as 500 nW
- No Frequency Compensation Required
- Programmable Electrical Characteristics
- Offset Voltage Nulling Capability
- Can be Powered by Two Flashlight Batteries
- Short Circuit Protection

ORDERING INFORMATION

Part Number	Temperature Range	Package
LM4250 J	−55°C to +125°C	8 Lead CERDIP
LM4250 H	−55°C to +125°C	TO-99 CAN

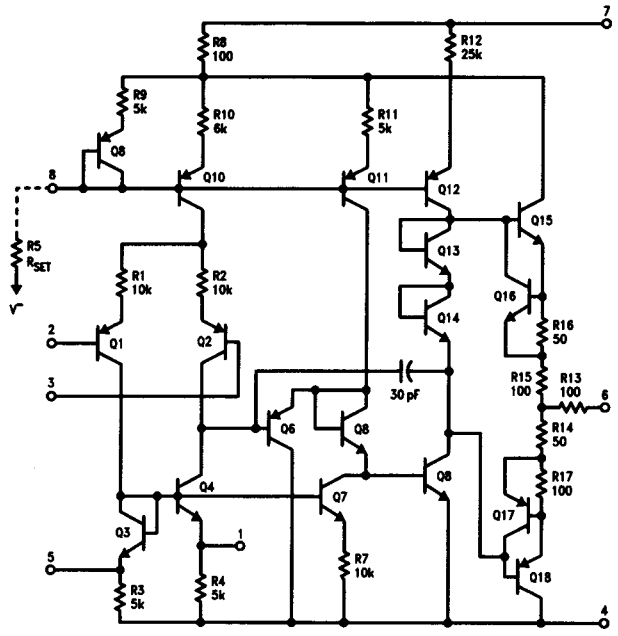

Figure 1: Functional Diagram

LM4250

ABSOLUTE MAXIMUM RATINGS

Supply Voltage ..... ±18V
Power Dissipation (Note 1) ..... 500 mW
Differential Input Voltage ..... ±30V
Input Voltage (Note 2) ..... ±15V
I_{SET} Current ..... 150 μA
Operating Temperature Range ..... −55°C to +125°C
Output Short Circuit Duration ..... Indefinite
Storage Temperature Range ..... −65°C to +150°C
Lead Temperature (Soldering, 10 sec.) ..... +300°C

NOTE: *Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.*

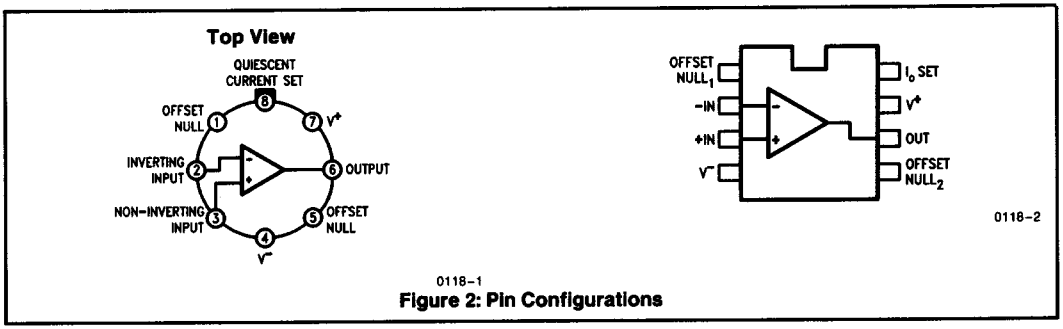

Figure 2: Pin Configurations

ELECTRICAL CHARACTERISTICS (0°C ≤ T_A ≤ +70°C unless otherwise specified)

Parameters	Conditions	V_S = ±1.5V			
		I_{SET} = 1 μA		I_{SET} = 10 μA	
		Min	Max	Min	Max
V_{OS}	T_A = 25°C, R_S ≤ 100 kΩ		5 mV		6 mV
I_{OS}	T_A = 25°C		6 nA		20 nA
I_{bias}	T_A = 25°C		10 nA		75 nA
Large Signal Voltage Gain	T_A = 25°C, R_L = 100 kΩ V_O = ± 0.6V, R_L = 10 kΩ	25k		25k	
Supply Current	T_A = 25°C		8 μA		90 μA
Power Consumption	T_A = 25°C		24 μW		270 μW
V_{OS}	R_S ≤ 10 kΩ		6.5 mV		7.5 mV
I_{OS}			8 nA		25 nA
I_{bias}			10 nA		80 nA
Input Voltage Range		±0.6V		±0.6V	
Large Signal Voltage Gain	V_O = ±0.6V, R_L = 100 kΩ R_L = 10 kΩ	25k		25k	
Output Voltage Swing	R_L = 100 kΩ R_L = 10 kΩ	±0.6V		±0.6V	
Common Mode Rejection Ratio	R_S ≤ 10 kΩ	70 dB		70 dB	
Supply Voltage Rejection Ratio	R_S ≤ 10 kΩ	65 dB		65 dB	
Supply Current			8 μA		90 μA
Power Consumption			24 μW		270 μW

ELECTRICAL CHARACTERISTICS ($0°C \leq T_A \leq +70°C$ unless otherwise specified) (Continued)

Parameters	Conditions	$V_S = \pm 15V$			
		$I_{SET} = 1\ \mu A$		$I_{SET} = 10\ \mu A$	
		Min	Max	Min	Max
V_{OS}	$T_A = 25°C$, $R_S \leq 100\ k\Omega$		5 mV		6 mV
I_{OS}	$T_A = 25°C$		6 nA		20 nA
I_{bias}	$T_A = 25°C$		10 nA		75 nA
Large Signal Voltage Gain	$T_A = 25°C$, $R_L = 100\ k\Omega$ $V_O = \pm 0.6V$, $R_L = 10\ k\Omega$	60k		60k	
Supply Current	$T_A = 25°C$		11 μA		100 μA
Power Consumption	$T_A = 25°C$		330 μW		3 mW
V_{OS}	$R_S \leq 10\ k\Omega$		6.5 mV		7.5 mV
I_{OS}			8 nA		25 nA
I_{bias}			10 nA		80 nA
Input Voltage Range		$\pm 13.5V$		$\pm 13.5V$	
Large Signal Voltage Gain	$V_O = \pm 10V$, $R_L = 100\ k\Omega$ $R_L = 10\ k\Omega$	50k		50k	
Output Voltage Swing	$R_L = 100\ k\Omega$ $R_L = 10\ k\Omega$	$\pm 12V$		$\pm 12V$	
Common Mode Rejection Ratio	$R_S \leq 10\ k\Omega$	70 dB		70 dB	
Supply Voltage Rejection Ratio	$R_S \leq 10\ k\Omega$	74 dB		74 dB	
Supply Current			11 μA		100 μA
Power Consumption			300 μW		3 mW

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ELECTRICAL CHARACTERISTICS ($-55°C \le T_A \le +125°C$ unless otherwise specified)

Parameters	Conditions	$V_S = \pm 1.5V$			
		$I_{SET} = 1\ \mu A$		$I_{SET} = 10\ \mu A$	
		Min	Max	Min	Max
V_{OS}	$T_A = 25°C$, $R_S \le 100\ k\Omega$		6 mV		6 mV
I_{OS}	$T_A = 25°C$		6 nA		20 nA
I_{bias}	$T_A = 25°C$		10 nA		75 nA
Large Signal Voltage Gain	$T_A = 25°C$, $R_L = 100\ k\Omega$ $V_O = \pm 0.6V$, $R_L = 10\ k\Omega$	25k		25k	
Supply Current	$T_A = 25°C$		8 μA		90 μA
Power Consumption	$T_A = 25°C$		24 μW		270 mW
V_{OS}	$R_S \le 10\ k\Omega$		7.5 mV		7.5 mV
I_{OS}			8 nA		25 nA
I_{bias}			10 nA		80 nA
Input Voltage Range		±0.6V		±0.6V	
Large Signal Voltage Gain	$V_O = \pm 0.5V$, $R_L = 100\ k\Omega$ $R_L = 10\ k\Omega$	25k		25k	
Output Voltage Swing	$R_L = 100\ k\Omega$ $R_L = 10\ k\Omega$	±0.6V		±0.6V	
Common Mode Rejection Ratio	$R_S \le 10\ k\Omega$	70 dB		70 dB	
Supply Voltage Rejection Ratio	$R_S \le 10\ k\Omega$	65 dB		65 dB	
Supply Current			8 μA		90 μA
Power Consumption			24 μW		270 μW

ELECTRICAL CHARACTERISTICS ($-55°C \leq T_A \leq +125°C$ unless otherwise specified) (Continued)

Parameters	Conditions	$V_S = \pm 15V$			
		$I_{SET} = 1\ \mu A$		$I_{SET} = 10\ \mu A$	
		Min	Max	Min	Max
V_{OS}	$T_A = 25°C$, $R_S \leq 100\ k\Omega$		6 mV		6 mV
I_{OS}	$T_A = 25°C$		6 nA		20 nA
I_{bias}	$T_A = 25°C$		10 nA		75 nA
Large Signal Voltage Gain	$T_A = 25°C$, $R_L = 100\ k\Omega$ $V_O = \pm 0.6V$, $R_L = 10\ k\Omega$	60k		60k	
Supply Current	$T_A = 25°C$		11 μA		100 μA
Power Consumption	$T_A = 25°C$		330 μW		3 mW
V_{OS}	$R_S \leq 10\ k\Omega$		7.5 mV		7.5 mV
I_{OS}			8 nA		25 nA
I_{bias}			10 nA		80 nA
Input Voltage Range		$\pm 13.5V$		$\pm 13.5V$	
Large Signal Voltage Gain	$V_O = \pm 10V$, $R_L = 100\ k\Omega$ $R_L = 10\ k\Omega$	50k		50k	
Output Voltage Swing	$R_L = 100\ k\Omega$ $R_L = 10\ k\Omega$	$\pm 12V$		$\pm 12V$	
Common Mode Rejection Ratio	$R_S \leq 10\ k\Omega$	70 dB		70 dB	
Supply Voltage Rejection Ratio	$R_S \leq 10\ k\Omega$	74 dB		74 dB	
Supply Current			11 μA		100 μA
Power Consumption			300 μW		3 mW