InterFET HYBRID TECHNOLOGY

Features

- – 55°C to + 200°C Specifications
- 300nA Max Input Bias Current at + 200°C
- ± 6 mV Max Input Offset Voltage at + 200°C
- ± 5 μV/°C Typical Input Offset Voltage Coefficient
- 12 MHz Bandwidth Typical
- Hermetic Package with Standard Pinout (741) Type
- Pin Compatible with Burr Brown OPA11HT

Description

The I-6H001 is a wide-temperature range, general purpose, operational amplifier ideally suited for 200°C applications. Model I-6H001 is internally compensated for stability at all gains. Pins are available for special tailoring of the bandwidth compensation. Inputs are protected against common-mode voltages up to the value of the power supplied, while the output is current limited to offer short-circuited protection. TO-99 hermetic package has standard 741-type pinout arrangement.

Absolute Maximum Ratings

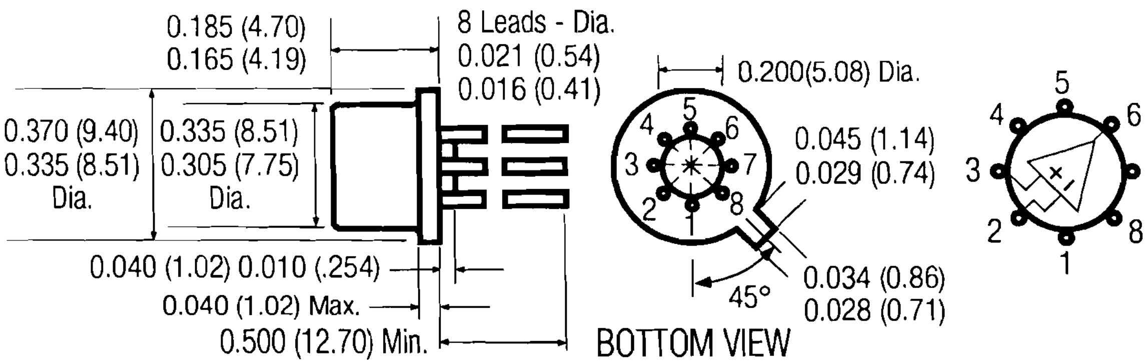
Supply Voltage	± 22 V
Differential Input Voltage	± 12 V
Operating Temperature Range	– 55°C to + 200°C
Storange Temperature Range	– 65°C to + 250°C
Lead Temperature (soldering, 10 sec)	+ 300°C
Output Short-Circuit Duration	
Continuous Junction Temperature	+250°C

TO–99 Package

Dimensions in Inches (mm)

Pin Configuration

Pin 1 Offset Adjustment, Pin 2 Neg In, Pin 3 Pos In, Pin 4 Neg V & Case,
Pin 5 Offset Adjustment, Pin 6 Out, Pin 7 Pos V, Pin 8 Bandwidth Control



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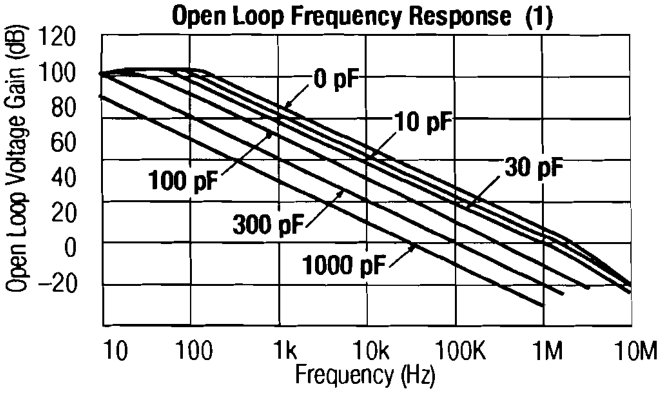
Specifications at ±15VDC and T_A = +200°C unless otherwise noted.

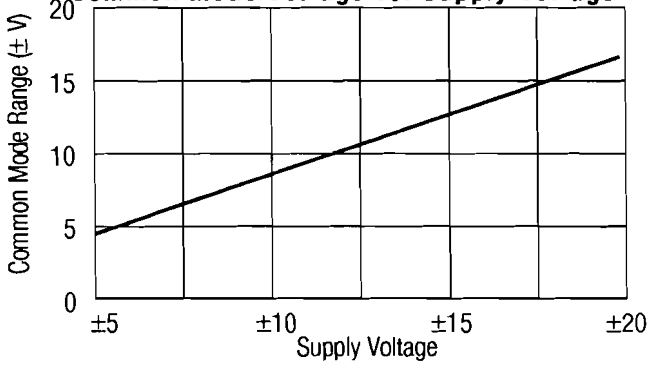
		Min	Typ	Max	Unit
OPEN LOOP GAIN					
DC, single-ended	A_V				
No Load			103		dB
R_L = 2kΩ		94	100		dB
RATED OUTPUT					
Voltatge: R_L = 2kΩ	V_{OM}	± 10	± 12		V
Current: (T_A = 25°C)	I_{OM}	±15	± 23		mA
DYNAMIC RESPONSE (T_A = 25°C)					
Small-Signal Bandwidth (OdB)		12			MH
Full-Power Bandwidth V out = ± 10V	BWfp	50	75		kHz
Slew Rate RL = 2KΩ	SR	± 4	± 7		V/µs
Settling Time: (0.1%)			1.5		µs
Rise Time (10% to 90%, small signal)			30		ns
INPUT OFFSET VOLTAGE					
Initial (without adj. at 25°C)	V_{IO}		± 2	± 5	mV
Over Temperature (T_A = + 200°C)				± 6	mV
Over Temperature (T_A = – 55°C)				± 7	mV
Average V_{IO} Coefficient			± 5		µV/°C
Average V_{IO} Coefficient vs. Supply Voltage (T_A = 25°C)			± 10	± 200	µV/V
INPUT BIAS CURRENT					
Initial at + 25°C	I_{IB}		± 10		nA
Over Temperature (T_A = + 200°C)				± 300	nA
Over Temperature (T_A = – 55°C)				± 40	nA
Average I_{IB} Coefficient			± 0.1		nA/°C
INPUT IMPEDANCE (T_A = 25°C)					
Differential	r_1	100	300		MΩ
Differential	C_1		3		pF
Common Mode	r_1 (CM)		1000		MΩ
Common Mode	C_1 (CM)		3		pF
INPUT VOLTAGE RANGE					
Common Mode				± 11	V
Differential Mode				± 12	V
Common Mode Rejection CMR	80	100		dB	
Over Temperature (– 55°C ≤ T_A ≤ + 200°C)					
POWER SUPPLY (T_A = 25°C)					
Rated Voltage	V_{CC}			± 15	V
Voltage Range, Derated			± 8 to ± 22		V
Current, Quiescent Over Temperature (– 55°C ≤ T_A ≤ + 200°C)	I_0		± 3	± 4.5	mA
Power Supply Rejection (T_A = 200°C)	P_{SRR}	80	100		dB
TEMPERATURE RANGE					
Operating			– 55	+ 200	°C
Storage			– 55	+ 200	°C

Specifications at ±15VDC and T_A = +200°C unless otherwise noted.

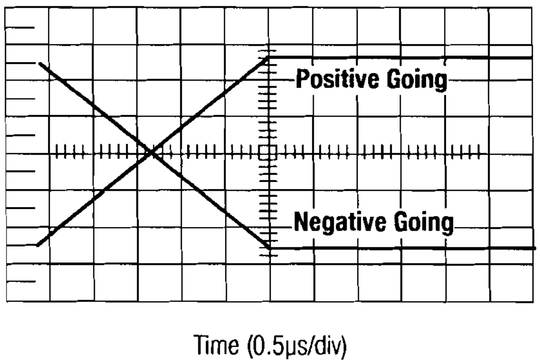
Open Loop Frequency Response (1)



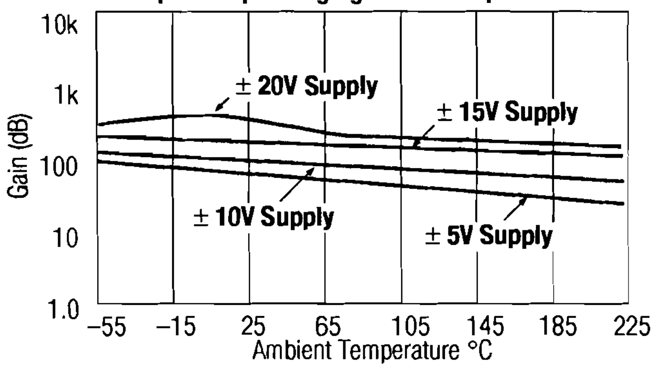
Common Mode Voltage vs. Supply Voltage



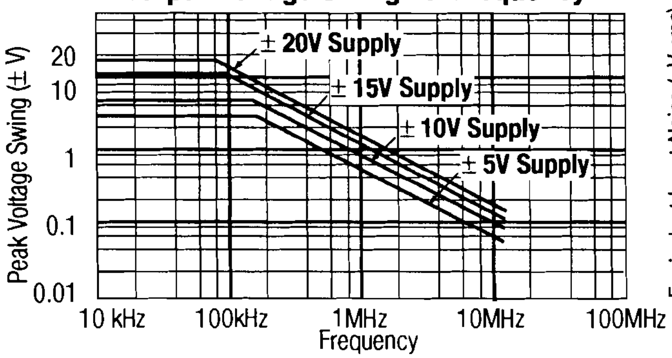
Step Response in Follower Configuration (2)



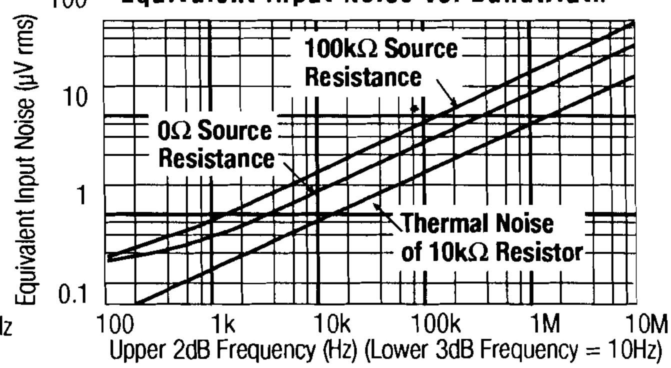
Open Loop Voltage gain vs. Temperature



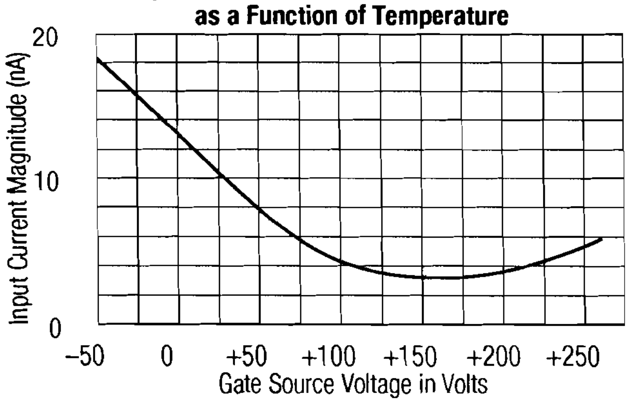
Output Voltage Swing vs. Frequency



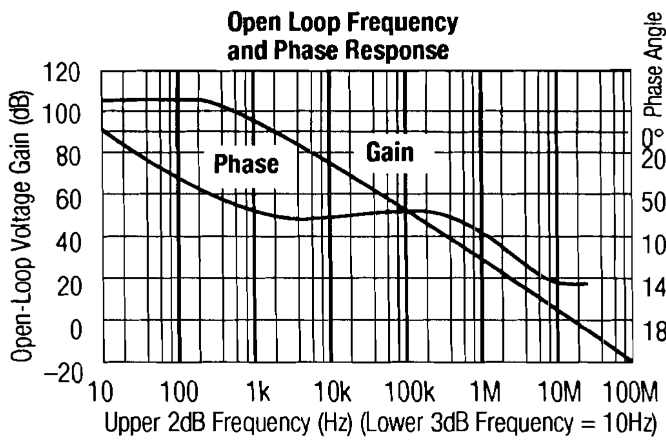
Equivalent Input Noise vs. Bandwidth



Input Bias Current and Difference Current as a Function of Temperature



Open Loop Frequency and Phase Response



Notes: (1) Capacitance values shown are compensation from pin 8 to common. Not required for stability. See Figure 1.
(2) See Figure 3.

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Applications

Bandwidth Compensation

The frequency response of the I-6H001 can be adjusted by use of an external compensation capacitor from pin 8 to common as show in Figure 1. The open-loop frequency response curves illustrate the effect of various values of capacitance. The I-6H001 is stable at any gain level without the use of compensation, provided that stray wiring capacitance and/or load capacitance are not excessive, and that moderate values of feedback resistance are used ($R_{FB} \leq 10\ k\Omega$). A load capacitance of 50pF is desirable in all feed back configurations.

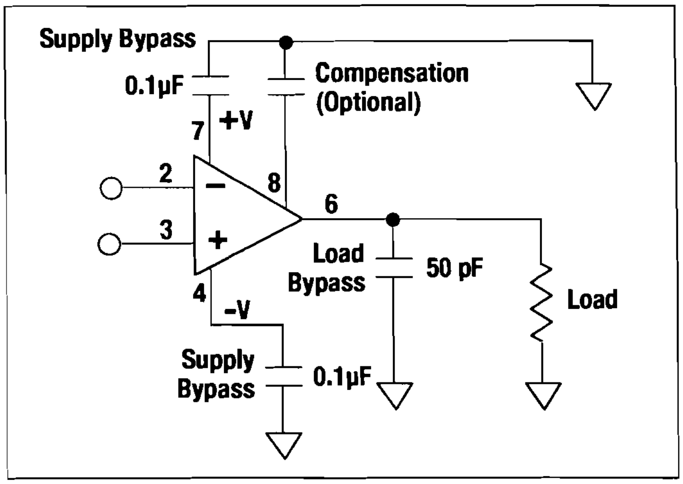

Figure 1

Stability

Because the I-6H001 is an extremely fast amplifier with high gain, stray wiring capacitance and inductance in power supply leads can cause circuit oscillation. This can be prevented by proper circuit layout (all leads or patterns as short as possible) and properly bypassing the power supply line to common at points close to the amplifier. In addition, it is recommended the the load be bypassed by a 50pF capacitor. See Figure 1.

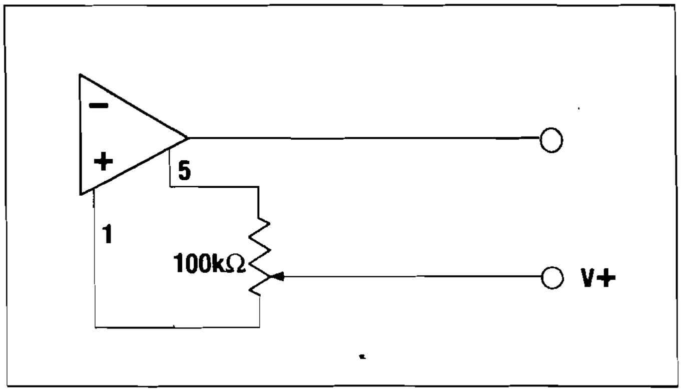

Figure 2

Offset Voltage and Adjustment

Although the offset voltage of these amplifiers is only a few millivolts, it may in some cases be desirable to null this offset. This is done by use of a 100kΩ potentiometer as shown in Figure 2.

Test Circuit–Dynamic Response

The test circuit of Figure 3 is used for measurement of slew rate, settling time, rise time and overshoot. Both rise time and overshoot are measured for a small output signal ($V_{OUT} = \pm 100mV$). Slew rate and settling time are measured by a 10V, peak-to-peak, square wave.

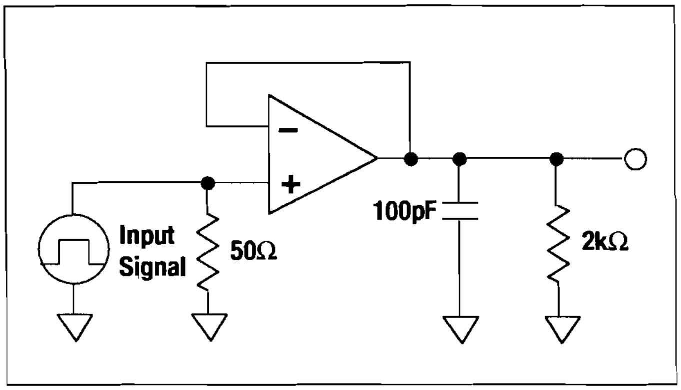

Figure 3

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