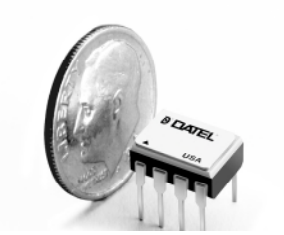
AM-606HT

Extended Temperature, High Speed Dual Operational Amplifiers



FEATURES

- Extended temperature -55 to +200°C
- Dual amplifier in a hermetic sealed ceramic, 8-pin DIP or SMT package
- High slew rate: 250 V/µs
- Wide bandwidth: 28 MHz
- Fast settling time: <180 ns to 0.01%
- Low offset voltage: <500 µV
- Unity-gain stable
- Low voltage operation: ±5 V to ±15 V
- Low supply current: <10 mA
- Drives capacitive loads
- Qualified and characterized for more than 1,000-hour operating life
- Available in three grades: 150°C (-A), 180°C (-B) and 220°C (-C)

PRODUCT OVERVIEW

The AM-606HT series of Harsh Environment Amplifiers are developed and manufactured using processes that originate with DATEL's MIL-PRF-38534 standards and controls. These standards have been extended and increased to meet the demanding -55 to +200°C operating temperature ranges.

Offered in either a standard 8-pin hermetically sealed ceramic DIP (MHT) or Gull-Wing SMT (GHT) package, the AM-606HT is a dual, high speed, precision operational amplifier specified for operation from ±5 V to ±15 V supplies. This dual amplifier combines high speed performance with the advantages of a precision operational amplifier in a single package. The internal compensation of the AM-606HT ensures stable unity gain operation, while driving large capacitive loads.

A gain bandwidth product of 28 MHz coupled with a slew rate of 250V/µs provides a settling time to 0.01% in less than 180ns while delivering excellent dynamic performance for harsh environment data acquisition systems. The DC performance of the AM-606HT includes less than 1.5mV of offset, a voltage noise density below 8nV/√Hz, and a total supply current under 18mA.

This family of extended temperature amplifiers are designed and qualified to provide more than 1,000 hours of high-confidence-level operation. The series is offered in three temperature grades: A (-55 to 150°C), B (-55 to 180°C) and C (-55 to 200°C).

APPLICATIONS

- Down-Hole and geothermal exploration
- Hot engine control
- Undersea cabling
- Harsh environment data acquisition systems
- Aerospace

ORDERING INFORMATION		
MODEL NUMBER	OPERATING TEMP. RANGE	PACKAGE
AM-606HT-A	–55 to +150°C	SMT
AM-606HT-B	–55 to +180°C	SMT
AM-606HT-C	–55 to +200°C	SMT
AM-60MHT-A	–55 to +150°C	DIP
AM-60MHT-B	–55 to +180°C	DIP
AM-606MT-C	–55 to +200°C	DIP

FUNCTIONAL BLOCK DIAGRAM

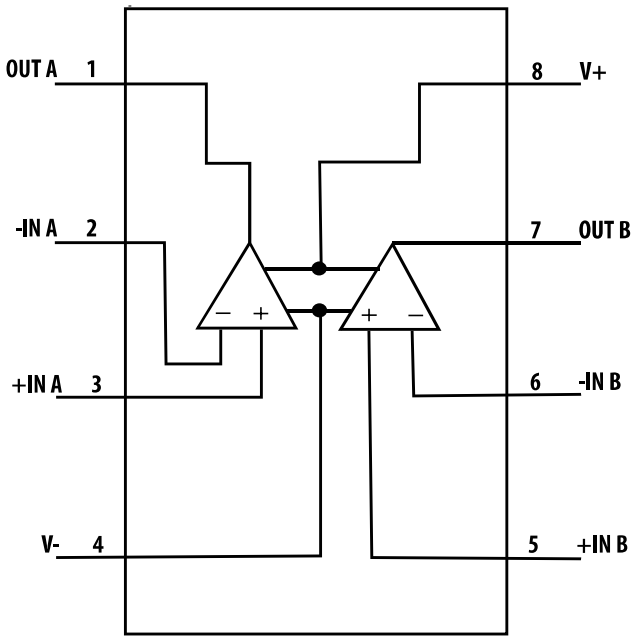


Figure 1. Functional Block Diagram

ABSOLUTE MAXIMUM RATINGS	MIN.	TYP.	MAX.	UNITS
Supply Voltage	—	—	±18	Volts
Input Voltage	—	—	±18	Volts
Differential Input Voltage	—	—	±26	Volts
Output Short Circuit Duration	—	—	Limited	
Operating Temperature	—	—	225	°C
Storage Temperature	-65	—	225	°C
Lead Temperature (soldering 60 sec.)	—	—	300	°C

FUNCTIONAL SPECIFICATIONS

(Typical over extended temperature -55 to +150°C range at ±15V supplies, unless otherwise noted.)

INPUT CHARACTERISTICS	MIN.	TYP.	MAX.	UNITS
Offset Voltage	—	0.75	±1.5	Volts
Input Bias Current	—	—	1	mA
Input Offset Current	—	—	200	nA
Large Signal Voltage Gain (5kΩ)	76	—	—	dB
Common Mode Rejection ±12V	79	—	—	dB
Input Capacitance				
Common Mode	—	2	—	pf
Differential	—	1	—	pf
OUTPUT CHARACTERISTICS				
Output Voltage Swing (5kΩ)	-12.5	—	12.5	Volts
DYNAMIC PERFORMANCE				
Gain Bandwidth Product (Av +1, 30pf)	—	28	—	MHz
Slew Rate (10V step, load=5kΩ, 30pf)				
Av = +1	110	—	—	V/µs
Av = -1	250	—	—	V/µs
Full Power Bandwidth (10V step)	—	2.7	—	MHz
Settling Time (0.01%, 10V step)	—	180	—	ns
Phase Margin	—	45	—	Degrees
NOISE PERFORMANCE				
Voltage Noise (0.1Hz to 10Hz)	—	0.25	—	µV p-p
Voltage Noise Density (1kHz)	—	8	—	nV/√Hz
Stable Capacitative Load⑦	—	1	—	nV/√Hz
POWER REQUIREMENTS				
Supply Voltages	±4.5	±15	±18	Volts
Supply Current	—	—	18	mA
Power Supply Rejection	93	—	—	dB
PHYSICAL/ENVIRONMENTAL	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Operating Temp. Range, Case				
AM-606GHT/MHT-A	-55	—	+150	°C
AM-606GHT/MHT-B	-55	—	+180	°C
AM-606GHT/MHT-C	–55	—	+200	°C
Package Type	8-pin, hermetic-sealed ceramic DIP or Gull-Wing SMT			

TECHNICAL NOTES

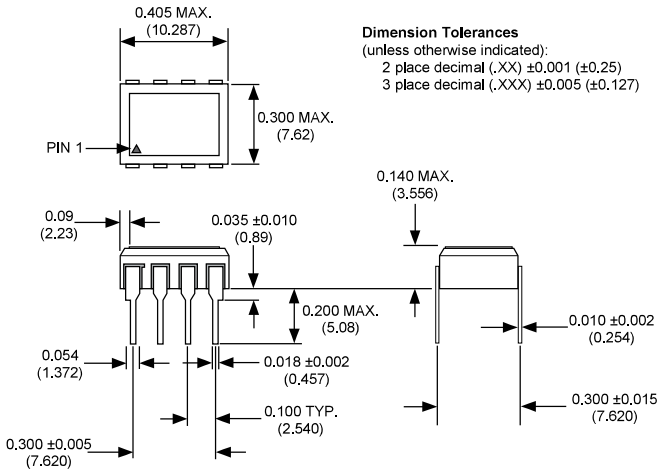
1 To achieve a wide bandwidth and high slew rate, the AM-606HT output is not short-circuit protected. Shorting the output to ground or to the supplies could damage the IC.

2. Outputs of high speed amplifiers are very sensitive to capacitive loads. A capacitive load introduces a pair of zero and a pole and to the frequency response of the circuit, thereby reducing the phase margin, which could lead to unstable operation. It is a good design practice to isolate the output of the amplifier from any capacitive load by placing a small series resistor (10Ω to 100Ω) between the output of the amplifier and the capacitive load. The OP467 is internally compensated to provide stable operation and is capable of driving large capacitive loads without oscillation. Sockets are not recommended because they increase the lead inductance/ capacitance.

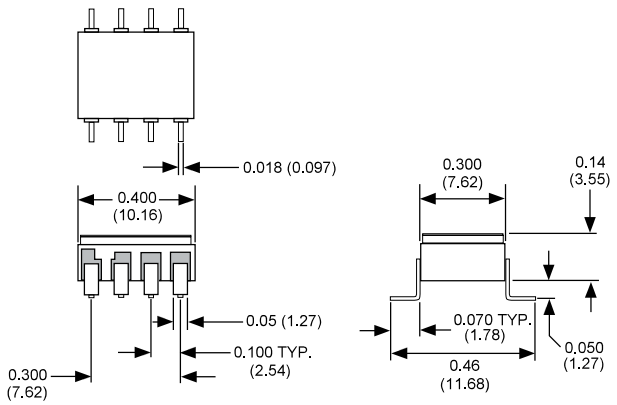
3. Connection lead length introduces inductance which, combined with stray capacitance creates a high-frequency resonant circuit. These circuits can create gain-peaking leading to instability.

4. A good ground plain is essential to achieve the optimum performance in high speed applications.

MECHANICAL DIMENSIONS - INCHES (mm)



DIP package



SMT package

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