LM748 Operational Amplifier

Check for Samples: LM748

FEATURES

- **Frequency Compensation with a Single 30 pF Capacitor**
- **Operation from ±5V to ±20V**
- **Continuous Short-Circuit Protection**
- **Operation as a Comparator with Differential Inputs as High as ±30V**
- **No Latch-Up When Common Range is Exceeded**
- **Same Pin Configuration as the LM101**

DESCRIPTION

The LM48 is a general purpose operational amplifier with external frequency compensation.

The unity-gain compensation specified makes the circuit stable for all feedback configurations, even with capacitive loads. It is possible to optimize compensation for best high frequency performance at any gain. As a comparator, the output can be clamped at any desired level to make it compatible with logic circuits.

The LM748C is specified for operation over the 0°C to +70°C temperature range.

Connection Diagram

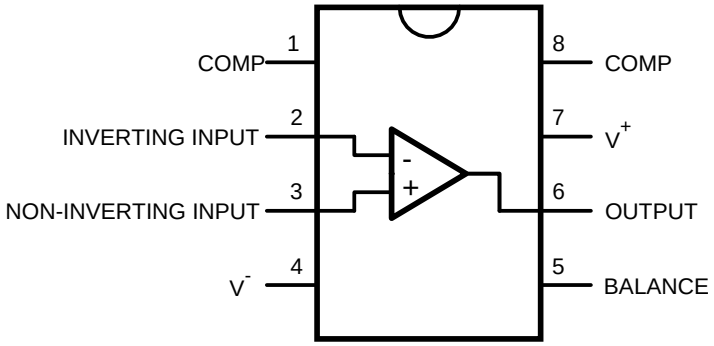


Figure 1. Dual-In-Line Package (Top View)
See Package Number P0008E

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

ABSOLUTE MAXIMUM RATINGS (1)(2)

Supply Voltage		±22V
Power Dissipation (3)		500 mW
Differential Input Voltage		±30V
Input Voltage (4)		±15V
Output Short-Circuit Duration		See (5)
Operating Temperature Range:	LM748C	0°C to +70°C
Storage Temperature Range		−65°C to +150°C
Lead Temperature (Soldering, 10 sec.)		+300°C

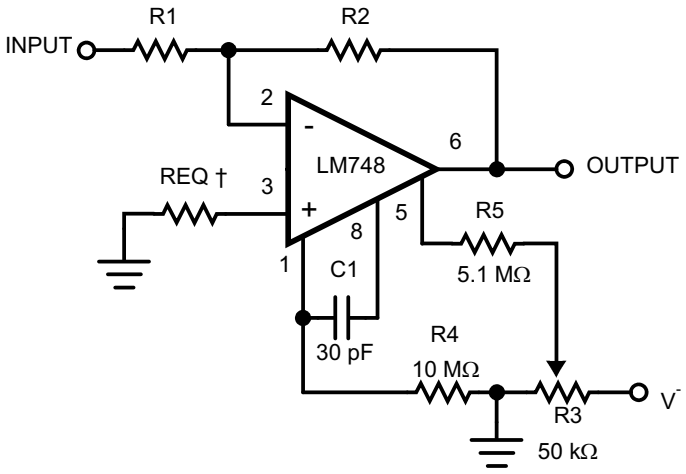
(1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Electrical characteristic specifications do not apply when operating the device outside of its rated operating conditions.
(2) If Military/Aerospace specified devices are required, please contact the Texas Instruments Sales Office/ Distributors for availability and specifications.
(3) For operating at elevated temperatures, the device must be derated based on a maximum junction to case thermal resistance of 45°C per watt, or 150°C per watt junction to ambient. (See Curves in the SPECIFIED PERFORMANCE CHARACTERISTICS section).
(4) For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
(5) Continuous short circuit is allowed for case temperatures to +125°C and ambient temperatures to +70°C.

ELECTRICAL CHARACTERISTICS (1)

Parameter	Conditions	Min	Typ	Max	Units
Input Offset Voltage	T_A = 25°C, R_S ≤ 10 kΩ		1.0	5.0	mV
Input Offset Current	T_A = 25°C		40	200	nA
Input Bias Current	T_A = 25°C		120	500	nA
Input Resistance	T_A = 25°C	300	800		kΩ
Supply Current	T_A = 25°C, V_S = ± 15V		1.8	2.8	mA
Large Signal Voltage Gain	T_A = 25°C, V_S = ± 15V V_{OUT} = ± 10V, R_L ≥ 2 kΩ	50	160		V/mV
Input Offset Voltage	R_S ≤ 10 kΩ			6.0	mV
Average Temperature Coefficient of Input Offset Voltage	R_S ≤ 50Ω		3.0		µV/°C
	R_S ≤ 10 kΩ		6.0		µV/°C
Input Offset Current	T_A = 0°C to +70°C			300	nA
	T_A = −55°C to +125°C			500	nA
Input Bias Current	T_A = 0°C to +70°C			0.8	µA
	T_A = −55°C to +125°C			1.5	µA
Supply Current	T_A = +125°C, V_S = ± 15V		1.2	2.25	mA
	T_A = −55°C to +125°C		1.9	3.3	mA
Large Signal Voltage Gain	V_S = ± 15V, V_{OUT} = ± 10V R_L ≥ 2 kΩ	25			V/mV
Output Voltage Swing	V_S = ± 15V, R_L = 10 kΩ	±12	±14		V
	V_S = ± 15V, R_L = 2 kΩ	±10	±13		V
Input Voltage Range	V_S = ± 15V	±12			V
Common-Mode Rejection Ratio	R_S ≤ 10 kΩ	70	90		dB
Supply Voltage Rejection Mode	R_S ≤ 10 kΩ	77	90		dB

(1) These specifications apply for ±5V ≤ V_S ≤ +15V and 0°C ≤ T_A ≤ +70°C, unless otherwise specified.

TYPICAL APPLICATIONS



†May be zero or equal to parallel combination of R1 and R2 for minimum offset.

Figure 2. Inverting Amplifier with Balancing Circuit

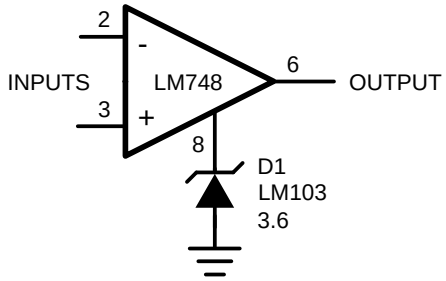


Figure 3. Voltage Comparable for Driving DTL or TTL Integrated Circuits

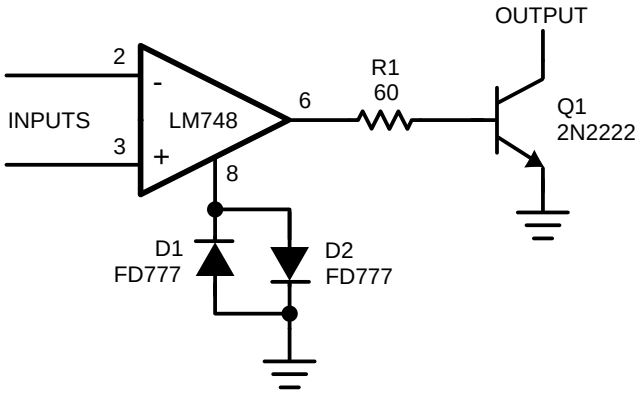


Figure 4. Voltage Comparable for Driving RTL Logic or High Current Driver

SPECIFIED PERFORMANCE CHARACTERISTICS

These specifications apply for ±5V ≤ V_S ≤ +15V and 0°C ≤ T_A ≤ +70°C, unless otherwise specified.

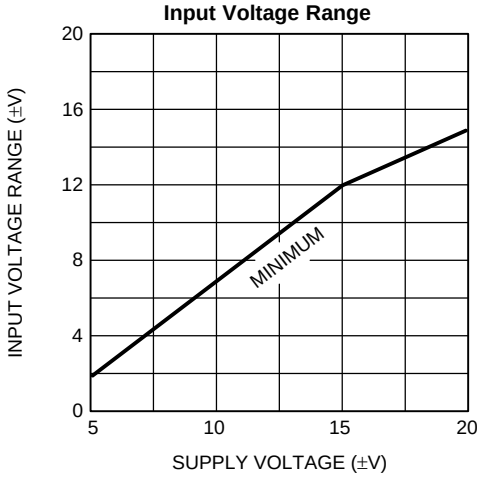


Figure 5.

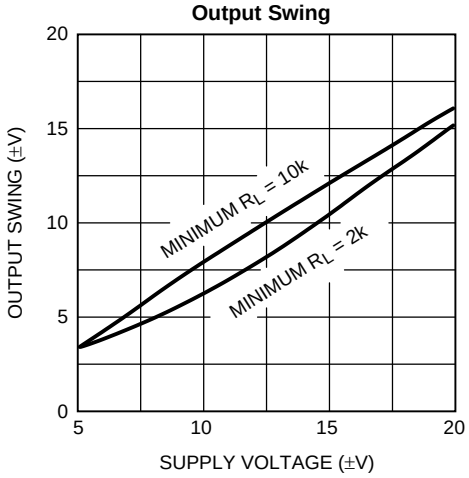


Figure 6.

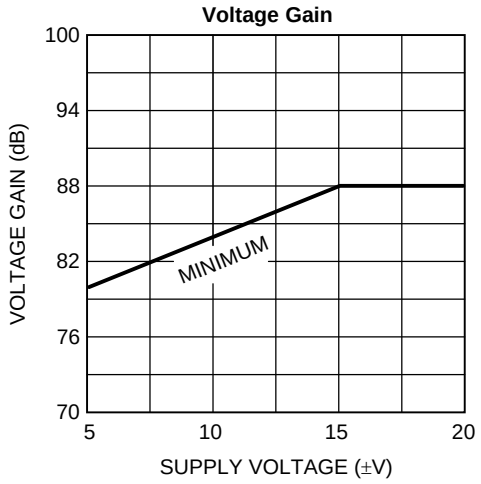


Figure 7.

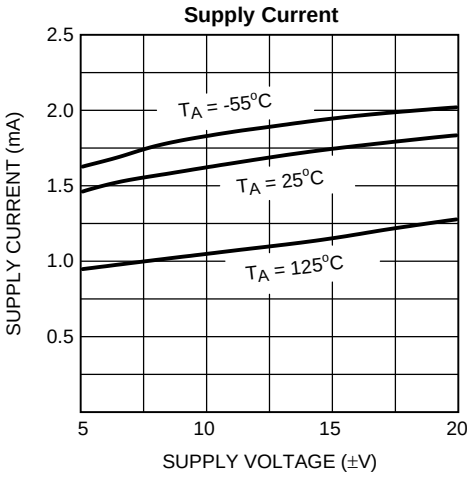


Figure 8.

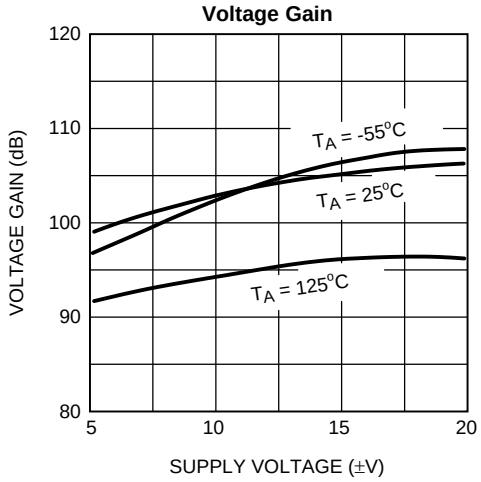


Figure 9.

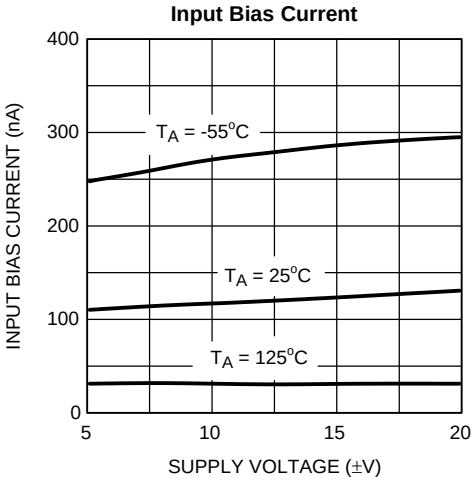


Figure 10.

SPECIFIED PERFORMANCE CHARACTERISTICS (continued)

These specifications apply for ±5V ≤ V_S ≤ +15V and 0°C ≤ T_A ≤ +70°C, unless otherwise specified.

Current Limiting

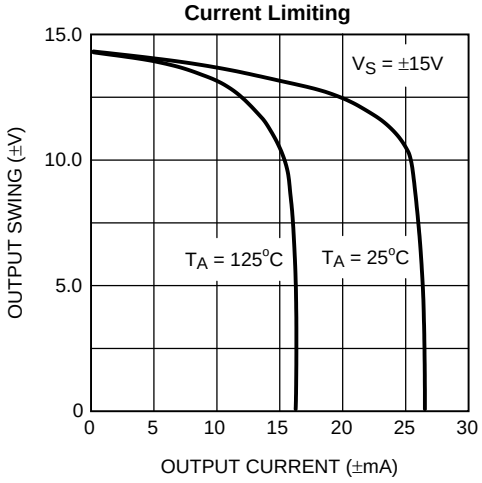


Figure 11.

Input Current

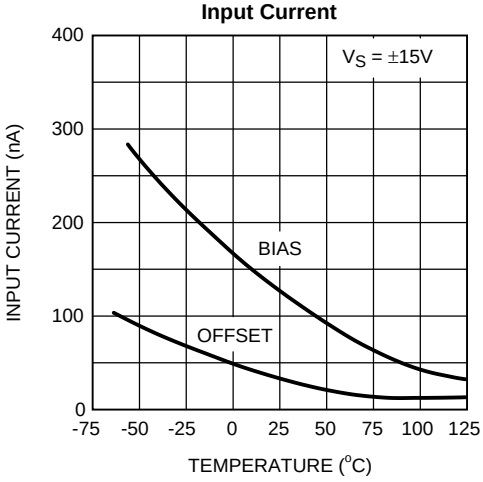


Figure 12.

Maximum Power Dissipation

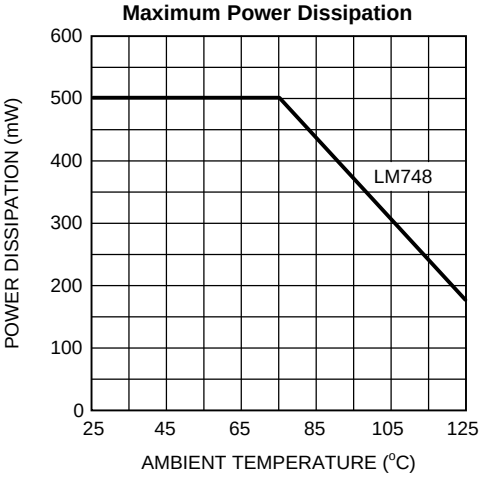


Figure 13.

Open Loop Frequency Response

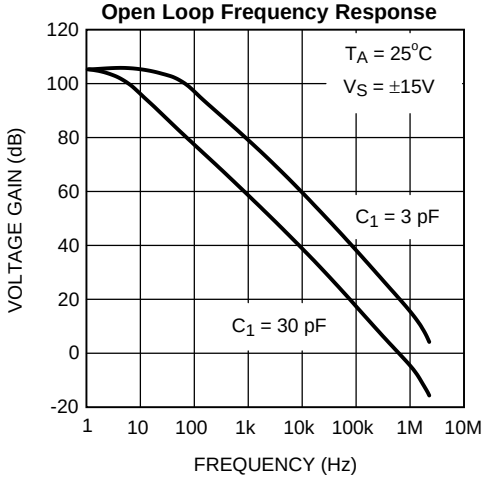


Figure 14.

Large Signal Frequency Response

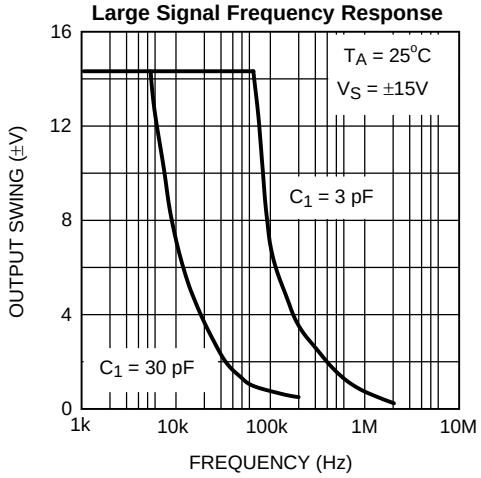


Figure 15.

Voltage Follower Pulse Response

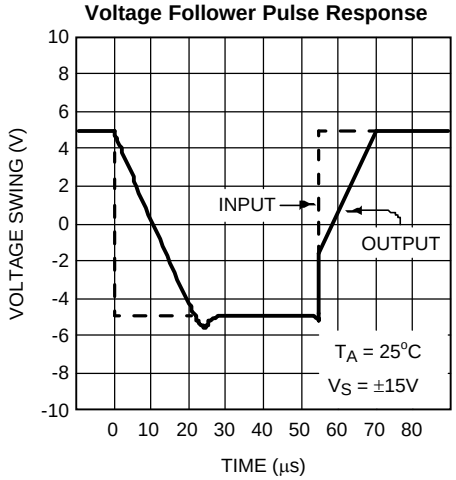


Figure 16.

REVISION HISTORY

Changes from Revision B (April 2013) to Revision C	Page
• Changed layout of National Data Sheet to TI format	5

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