LM748QML Operational Amplifier

Check for Samples: LM748QML

FEATURES

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

DESCRIPTION

The LM748 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 LM748 is specified for operation over the −55°C to +125°C military temperature range.

Connection Diagram

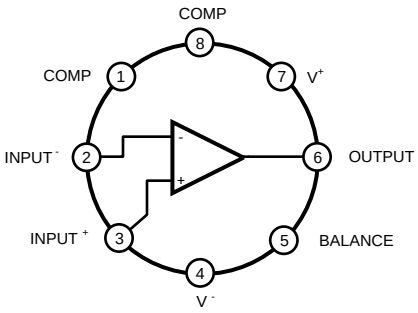


Figure 1. 8LD Metal Can Package (Top View)
See Package Number LMC0008C

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.

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Absolute Maximum Ratings(1)

Supply Voltage	±22V
Power Dissipation(2)	500mW
Differential Input Voltage	±30V
Input Voltage(3)	±15V
Output Short-Circuit Duration(4)	Indefinite
Operating Temperature Range	$-55°C \le T_A \le 125°C$
Storage Temperature Range	$-65°C \le T_A \le 150°C$
Maximum Junction Temperature	150°C
Lead Temperature (Soldering, 10 seconds)	300°C

(1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not ensure specific performance limits. For ensured specifications and test conditions, see the Electrical Characteristics. The ensured specifications apply only for the test conditions listed. Some performance characteristics may degrade when the device is not operated under the listed test conditions.
(2) For operating at elevated temperatures, the device must be derated based on a maximum junction to case thermal resistance of 45°C/W, or 150°C/W
(3) For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
(4) Continuous short circuit is allowed for case temperatures to +125°C.

Quality Conformance Inspection

Table 1. Mil-Std-883, Method 5005 - Group A

Subgroup	Description	Temp (°C)
1	Static tests at	+25
2	Static tests at	+125
3	Static tests at	-55
4	Dynamic tests at	+25
5	Dynamic tests at	+125
6	Dynamic tests at	-55
7	Functional tests at	+25
8A	Functional tests at	+125
8B	Functional tests at	-55
9	Switching tests at	+25
10	Switching tests at	+125
11	Switching tests at	-55
12	Settling time at	+25
13	Settling time at	+125
14	Settling time at	-55

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LM748 Electrical Characteristics DC Parameters

The following conditions apply, unless otherwise specified. DC: V_{CC} = ±15V, V_{CM} = 0V

Symbol	Parameter	Conditions	Notes	Min	Max	Units	Sub-groups
V_{IO}	Input Offset Voltage	V_{CM} = 12V			3.0	mV	1
					4.0	mV	2, 3
		V_{CM} = -12V			3.0	mV	1
					4.0	mV	2, 3
					3.0	mV	1
					4.0	mV	2, 3
		V_{CC} = ±5V			3.0	mV	1
					4.0	mV	2, 3
I_{IO}	Input Offset Current	V_{CM} = 12V			200	nA	1
					500	nA	2, 3
		V_{CM} = -12V			200	nA	1
					500	nA	2, 3
					200	nA	1
					500	nA	2, 3
		V_{CC} = ±5V			200	nA	1
					500	nA	2, 3
I_{IB}	Input Bias Current	V_{CM} = 12V			500	nA	1
					1500	nA	2, 3
		V_{CM} = -12V			500	nA	1
					1500	nA	2, 3
					500	nA	1
					1500	nA	2, 3
		V_{CC} = ±5V			500	nA	1
					1500	nA	2, 3
PSRR+	Power Supply Rejection Ratio	+V_{CC} = 15V to 5V, -V_{CC} = -15V		77		dB	1, 2, 3
PSRR-	Power Supply Rejection Ratio	-V_{CC} = -15V to -5V, +V_{CC} = +15V		77		dB	1, 2, 3
CMRR	Common Mode Rejection Ratio	-12V ≤ V_{CM} ≤ +12V		70		dB	1, 2, 3
$-A_{VS}$	Large Signal Voltage Gain	R_L = 2KΩ, V_O = -10V	See (1)	50		V/mV	1
				25		V/mV	2, 3
$+A_{VS}$	Large Signal Voltage Gain	R_L = 2KΩ, V_O = +10V	See (1)	50		V/mV	1
				25		V/mV	2, 3
$+V_{IO\ Adj}$	Offset Null	V_{CC} = ±20V		4.0		mV	1
$-V_{IO\ Adj}$	Offset Null	V_{CC} = ±20V			-4.0	mV	1

(1) Datalog reading in K = V/mV.

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LM748 Electrical Characteristics DC Parameters (continued)

The following conditions apply, unless otherwise specified. DC: V_{CC} = ±15V, V_{CM} = 0V

Symbol	Parameter	Conditions	Notes	Min	Max	Units	Sub-groups
$+I_{OS}$	Short Circuit Current			-45	-7.0	mA	1
				-45	-5.0	mA	2
				-55	-7.0	mA	3
$-I_{OS}$	Short Circuit Current			7.0	45	mA	1
				5.0	45	mA	2
				7.0	55	mA	3
V_O+	Output Voltage Swing	R_L = 10KΩ		12		V	1, 2, 3
		R_L = 2KΩ		10		V	1, 2, 3
V_O-	Output Voltage Swing	R_L = 2KΩ			-10	V	1, 2, 3
		R_L = 10KΩ			-12	V	1, 2, 3
I_{CC}	Supply Current				2.8	mA	1
					2.25	mA	2
					3.3	mA	3

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REVISION HISTORY

Released	Revision	Section	Changes
12/16/2010	A	New Release, Corporate format	1 MDS data sheet converted into one Corp. data sheet format. The drift table was eliminated from the 883 section since it did not apply; MNLM748-X Rev 0BL will be archived.
03/26/13	A	All	Changed layout of National Data Sheet to TI format.

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PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
LM748H/883	Active	Production	TO-99 (LMC) | 8	20 | JEDEC TRAY (5+1)	Yes	Call TI	Level-1-NA-UNLIM	-55 to 125	LM748H/883 Q ACO LM748H/883 Q >T

(1) Status: For more details on status, see our product life cycle.

(2) Material type: When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) RoHS values: Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) Lead finish/Ball material: Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) MSL rating/Peak reflow: The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

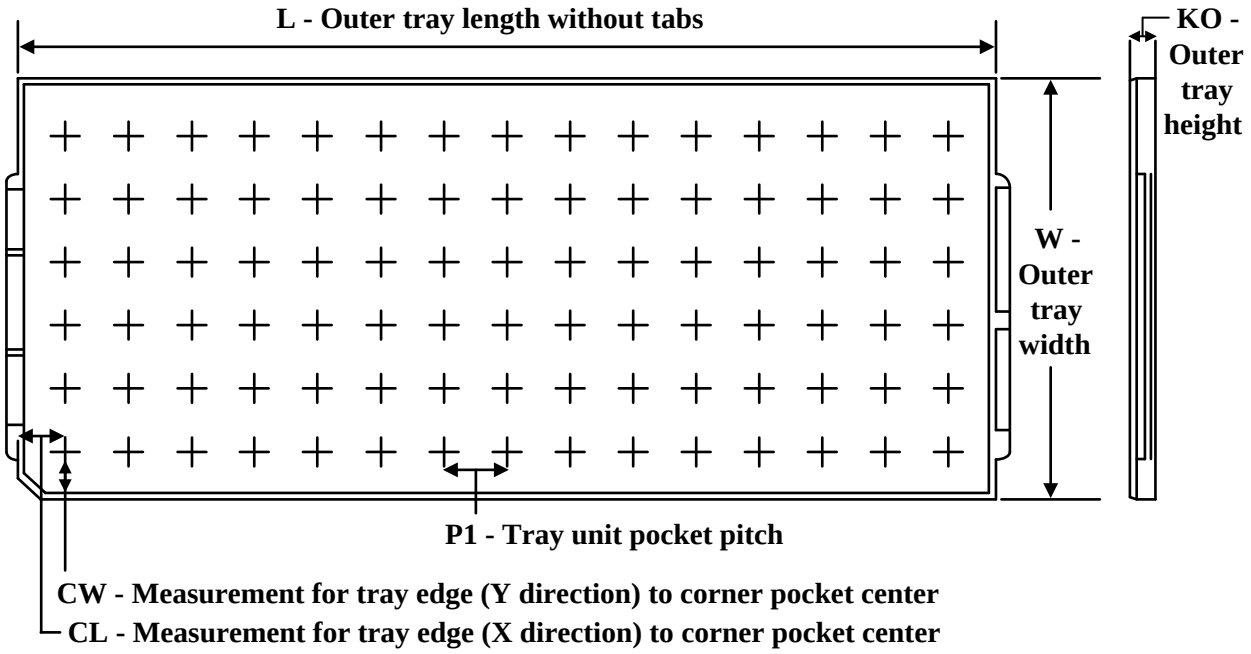
(6) Part marking: There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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TRAY



Chamfer on Tray corner indicates Pin 1 orientation of packed units.

*All dimensions are nominal

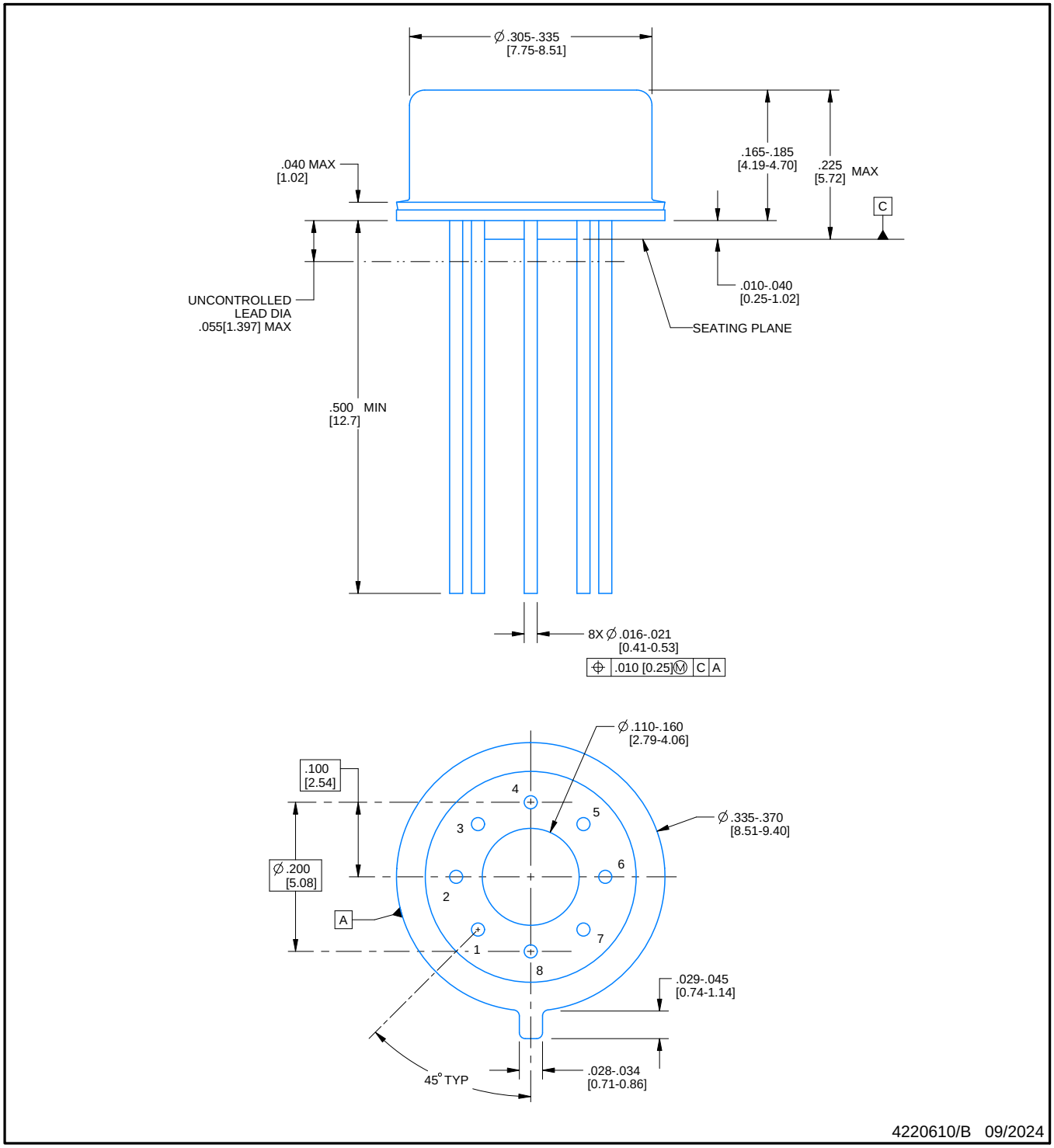
Device	Package Name	Package Type	Pins	SPQ	Unit array matrix	Max temperature (°C)	L (mm)	W (mm)	K0 (µm)	P1 (mm)	CL (mm)	CW (mm)
LM748H/883	LMC	TO-CAN	8	20	2 X 10	150	126.49	61.98	8890	11.18	12.95	18.54

PACKAGE OUTLINE

LMC0008A

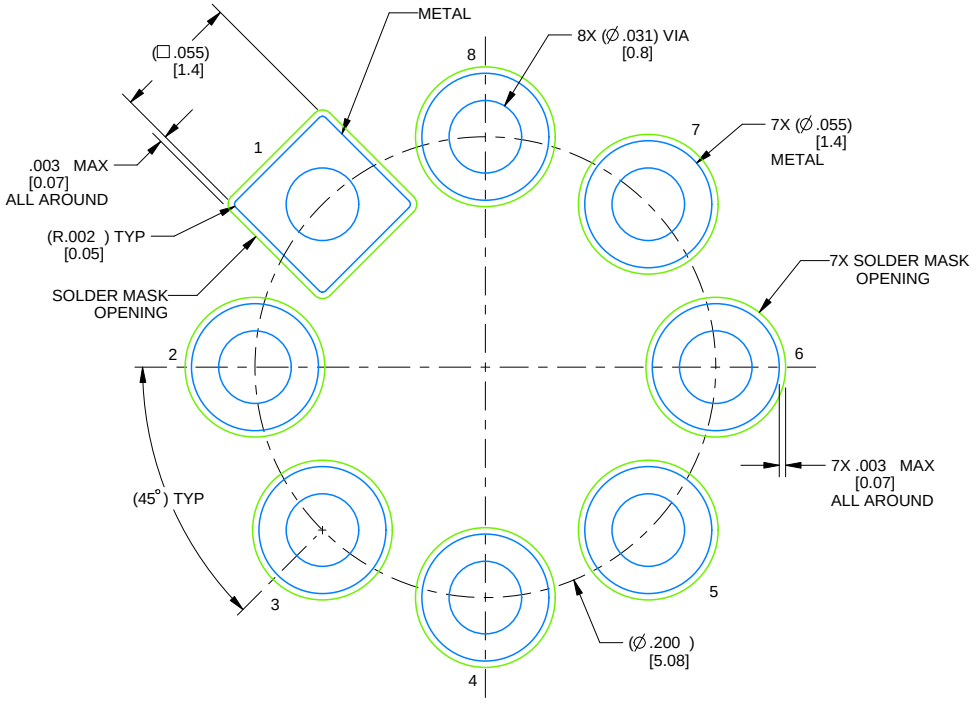
TO-CAN - 5.72 mm max height

TRANSISTOR OUTLINE



NOTES:

1. All linear dimensions are in inches [millimeters]. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Pin numbers shown for reference only. Numbers may not be marked on package.
4. Reference JEDEC registration MO-002/TO-99.



LAND PATTERN EXAMPLE
NON-SOLDER MASK DEFINED
SCALE: 12X

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