

PRECISION SINGLE OPERATIONAL AMPLIFIER

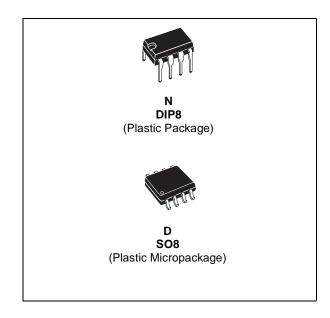
- INPUT OFFSET VOLTAGE : 3mV max. OVER **TEMPERATURE**
- FREQUENCY COMPENSATION WITH A SINGLE 30pF CAPACITOR (C1)
- OPERATION FROM ±5V to ±15V
- LOW POWER CONSUMPTION: 50mW AT ±15V
- CONTINUOUS SHORT-CIRCUIT PROTEC-TION
- **OPERATION AS A COMPARATOR WITH** DIFFERENTIAL INPUTS AS HIGH AS ±30V
- NO LATCH-UP WHEN COMMON-MODE RANGE IS EXCEEDED
- SAME PIN CONFIGURATION AS THE LM101A

DESCRIPTION

The UA748 is a general purpose operational amplifier built on a single silicon chip. The resulting close match and tight thermal coupling gives low offsets and temperature drift as well as fast recovery from thermal transients.

- Short-circuit protection
- Offset voltage null capability
- Large common-mode and differential voltage ranges
- Low power consumption
- No latch-up

The unity-gain compensation specified makes the circuit stable for all feedback configurations, even with capacitive loads. However, it is possible to optimize compensation for best high frequency performance at any gain. The low power dissipation permits high voltage operation and simplifies packaging in full-temperature range systems.

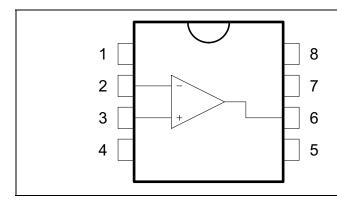


ORDER CODE

Part Number	Temperature Range	Package				
Fait Number	Temperature Name	N	D			
UA748C	0°C, +70°C	•	•			
UA748I	-40°C, +105°C	•	•			
UA748M	-55°C, +125°C		•			
Example: UA748CN						

- N = Dual in Line Package (DIP)
 D = Small Outline Package (SO) also available in Tape & Reel (DT)

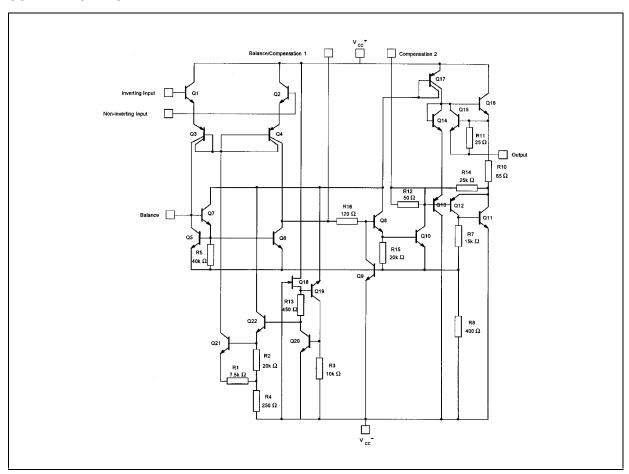
PIN CONNECTIONS (top view)



- 1 Offset null 1/frequency compensation
- 2 Inverting input
- 3 Non-inverting input
- 4 V_{CC}
- 5 Offset null 2
- 6 Output
- 7 V_{CC}+
- 8 Frequency compensation

December 2001

SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	UA748M	UA748I	UA748C	Unit
V _{CC}	Supply voltage	±22			V
V _{id}	Differential Input Voltage	±30			
V _i	Input Voltage	±15			V
P _{tot}	Power Dissipation 1)	500			mW
	Output Short-circuit Duration	Infinite			
T _{oper}	Operating Free-air Temperature Range	-55 to +125	-40 to +105	0 to +70	°C
T _{stg}	Storage Temperature Range	-65 to +150			°C

^{1.} Power dissipation must be considered to ensure maximum junction temperature (Tj) is not exceeded.

577

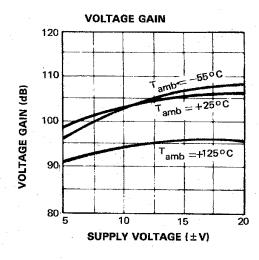
ELECTRICAL CHARACTERISTICS

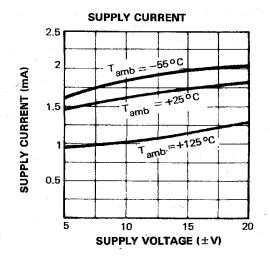
 $V_{CC} = \pm 15V$, $T_{amb} = +25$ °C, C1 = 30pF (unless otherwise specified)

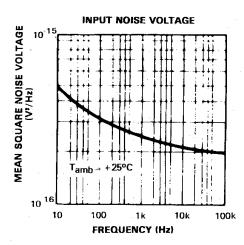
Symbol	Davayeetee	UA748I/M			UA748C			l lm!t
	Parameter		Тур.	Max.	Min.	Тур.	Max.	Unit
	Input Offset Voltage ($R_s \le 10k\Omega$)							
V_{io}	$T_{amb} = +25$ °C		0.7	2		2	7.5	mV
	$T_{min} \le T_{amb} \le T_{max}$			3			10	
	Input Offset Current							
I_{io}	$T_{amb} = +25$ °C		1.5	10		2	50	nA
	$T_{min} \le T_{amb} \le T_{max}$			20			70	
	Input Bias Current							
I_ib	$T_{amb} = +25$ °C		25	75		70	250	nA
	$T_{min} \le T_{amb} \le T_{max}$			10			300	
_	Large Signal Voltage Gain ($V_0 = \pm 10V$, $R_L = 2k\Omega$)							
A_{vd}	$T_{amb} = +25^{\circ}C$	50	100		25	100		V/mV
	$T_{min} \le T_{amb} \le T_{max}$	25			15			
	Supply Voltage Rejection Ratio ($R_s \le 10k\Omega$)							
SVR	$T_{amb} = +25^{\circ}C$	80	96		70	96		dB
	$T_{min} \le T_{amb} \le T_{max}$	80			70			
	Supply Current, no load			_			_	
I _{CC}	$T_{amb} = +25^{\circ}C$		1.8	3		1.8	3 3	mA
	$T_{min} \le T_{amb} \le T_{max}$			3			3	
	Input Common Mode Voltage Range (V _{CC} = ±20V)							.,
V_{icm}	$T_{amb} = +25$ °C	±15 ±15			±15 ±15			V
	$T_{min} \le T_{amb} \le T_{max}$	±13			±10			
0140	Common Mode Rejection Ratio (R _S ≤ 10kΩ)	00	00		70	0.0		
CMR	$T_{amb} = +25^{\circ}C$	80 80	96		70 70	96		dB
	$T_{min} \le T_{amb} \le T_{max}$							
los	Output short Circuit Current	10	30	50	10	30	50	mA
	Output Voltage Swing (V _{CC} = ±15V)							
	$T_{amb} = +25$ °C $R_L = 10$ k Ω	12	14		12	14		
$\pm V_{opp}$	$R_L = 2k\Omega$	10	13		10	13		V
	$T_{min} \le T_{amb} \le T_{max}$ $R_L = 10k\Omega$	12 10			12 10			
	$R_L = 2k\Omega$	-10			10			
SR	Slew Rate 1)							V/μs
	$V_i = \pm 10V$, $R_L = 2k\Omega$, $C_L = 100pF$, unity Gain	0.25	0.5		0.25	0.5		•
t _r	Rise Time		0.0			0.0		μs
	$V_i = \pm 20$ mV, $R_L = 2$ k Ω , $C_L = 100$ pF, unity Gain		0.3			0.3		•
K_{ov}	Overshoot $V_i = 20 \text{mV}, R_L = 2 \text{k}\Omega, C_L = 100 \text{pF}, unity Gain}$		_			_		%
7		4.5	5		4.5	5		Mo
Z _i	Input Impedance (V _{CC} = ±15V)	1.5	4		1.5	4		MΩ
Ro	Output Resistance (V _{CC} = ±15V)		75			75		Ω
GBP	Gain Bandwith Product	0.5			0.5	_		MHz
	$V_i = 10 \text{mV}, R_L = 2 \text{k}\Omega, C_L = 100 \text{pF}, f = 100 \text{kHz}$	0.5	1		0.5	1		
THD	Total Harmonic Distortion		0.015			0.015		%
	$f = 1 \text{kHz}$, $A_V = 20 \text{dB}$, $R_L = 2 \text{k}\Omega$, $V_O = 2 V_{pp}$, $C_L = 100 \text{pF}$		0.015			0.015		
DI _{io}	Input Offset Current Drift 25°C ≤ T _{max}		10	100		10	300	pA/°C
i _{io}	$T_{min} \le T_{amb} \le T_{max}$		10 20	200		10 20	300 600	pA/ C
	Input Offset Voltage Drift						000	
DV_{io}	$T_{min} \le T_{amb} \le T_{max}$		3	15		6	30	μV/°C
	IIIIII ailib İlidx]		3]

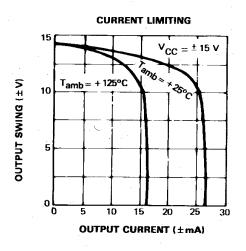
^{1.} May be improved up to 10V/µs in inverting amplifier configuration.

3/7



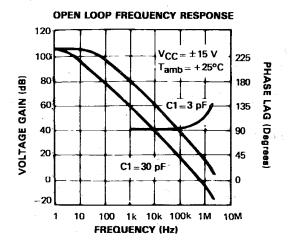


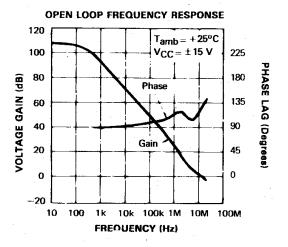




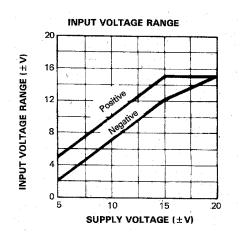
SINGLE POLE COMPENSATION

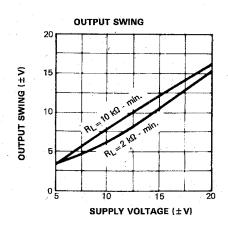
FEED FORWARD COMPENSATION



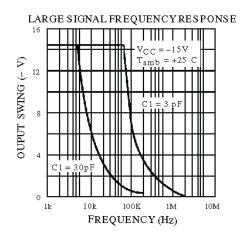


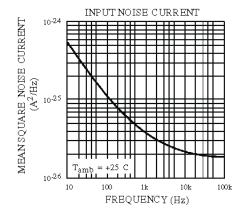
4/7

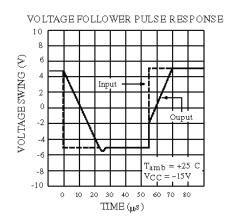


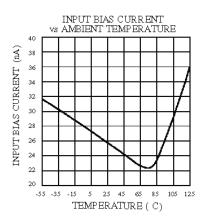


SINGLE POLE COMPENSATION



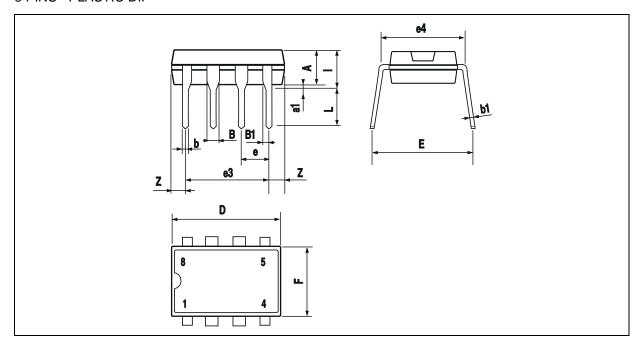






PACKAGE MECHANICAL DATA

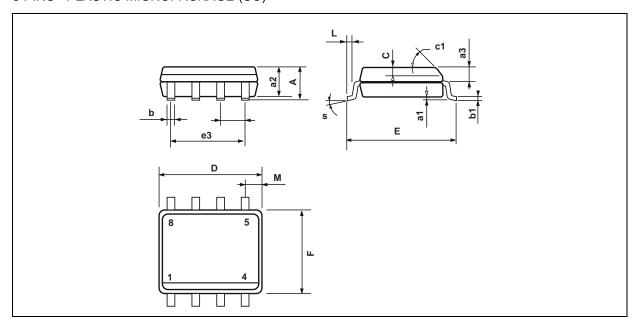
8 PINS - PLASTIC DIP



Dim.		Millimeters		Inches		
	Min.	Тур.	Max.	Min.	Тур.	Max.
Α		3.32			0.131	
a1	0.51			0.020		
В	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
Е	7.95		9.75	0.313		0.384
е		2.54			0.100	
е3		7.62			0.300	
е4		7.62			0.300	
F			6.6			0260
i			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

PACKAGE MECHANICAL DATA

8 PINS - PLASTIC MICROPACKAGE (SO)



Dim.		Millimeters		Inches				
	Min.	Тур.	Max.	Min.	Тур.	Max.		
Α			1.75			0.069		
a1	0.1		0.25	0.004		0.010		
a2			1.65			0.065		
a3	0.65		0.85	0.026		0.033		
b	0.35		0.48	0.014		0.019		
b1	0.19		0.25	0.007		0.010		
С	0.25		0.5	0.010		0.020		
c1			45°	(typ.)				
D	4.8		5.0	0.189		0.197		
E	5.8		6.2	0.228		0.244		
е		1.27			0.050			
e3		3.81			0.150			
F	3.8		4.0	0.150		0.157		
L	0.4		1.27	0.016		0.050		
М			0.6			0.024		
S	8° (max.)							

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2001 STMicroelectronics - Printed in Italy - All Rights Reserved STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States

