QUADRUPLE OPERATIONAL AMPLIFIERS

- LOW SUPPLY CURRENT: 0.53mA/AMPLIFIER
- CLASS AB OUTPUT STAGE: NO CROSS OVER DISTORTION
- PIN COMPATIBLE WITH LM124
- LOW INPUT OFFSET VOLTAGE: 1mV
- LOW INPUT OFFSET CURRENT: 2nA
- LOW INPUT BIAS CURRENT: 30nA
- GAIN BANDWIDTH PRODUCT: 1.3MHz
- HIGH DEGREE OF ISOLATION BETWEEN AMPLIFIERS: 120dB
- OVERLOAD PROTECTION FOR INPUTS AND OUTPUTS

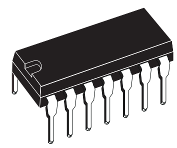
DESCRIPTION

The LM148 consists of four independent, high gain internally compensated, low power operational amplifiers which have been designed to provide functional characteristics identical to those of the familiar UA741 operational amplifier. In addition the total supply current for all four amplifiers is compatible to the supply current of a single UA741 type op amp. Other features include input offset current and input bias current which are much less than those of a standard UA741. Also, excellent isolation between amplifiers has been achieved by independently biasing each amplifier and using layout techniques qhich minimize thermal coupling.

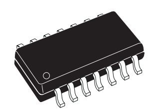
ORDER CODE

Part Number	Temperature Range	Package	
		N	M
LM148	-55°C, +125°C	•	•
LM248	-40°C, +105°C	•	•
LM348	0°C, +70°C	•	•
Example : LM348D			

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

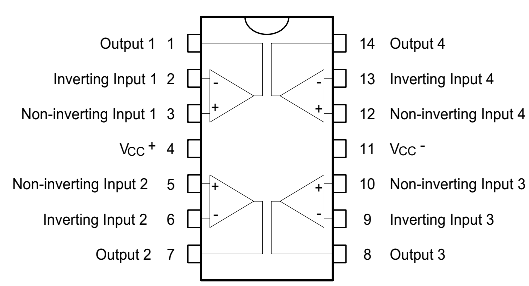


N
DIP14
(Plastic Package)

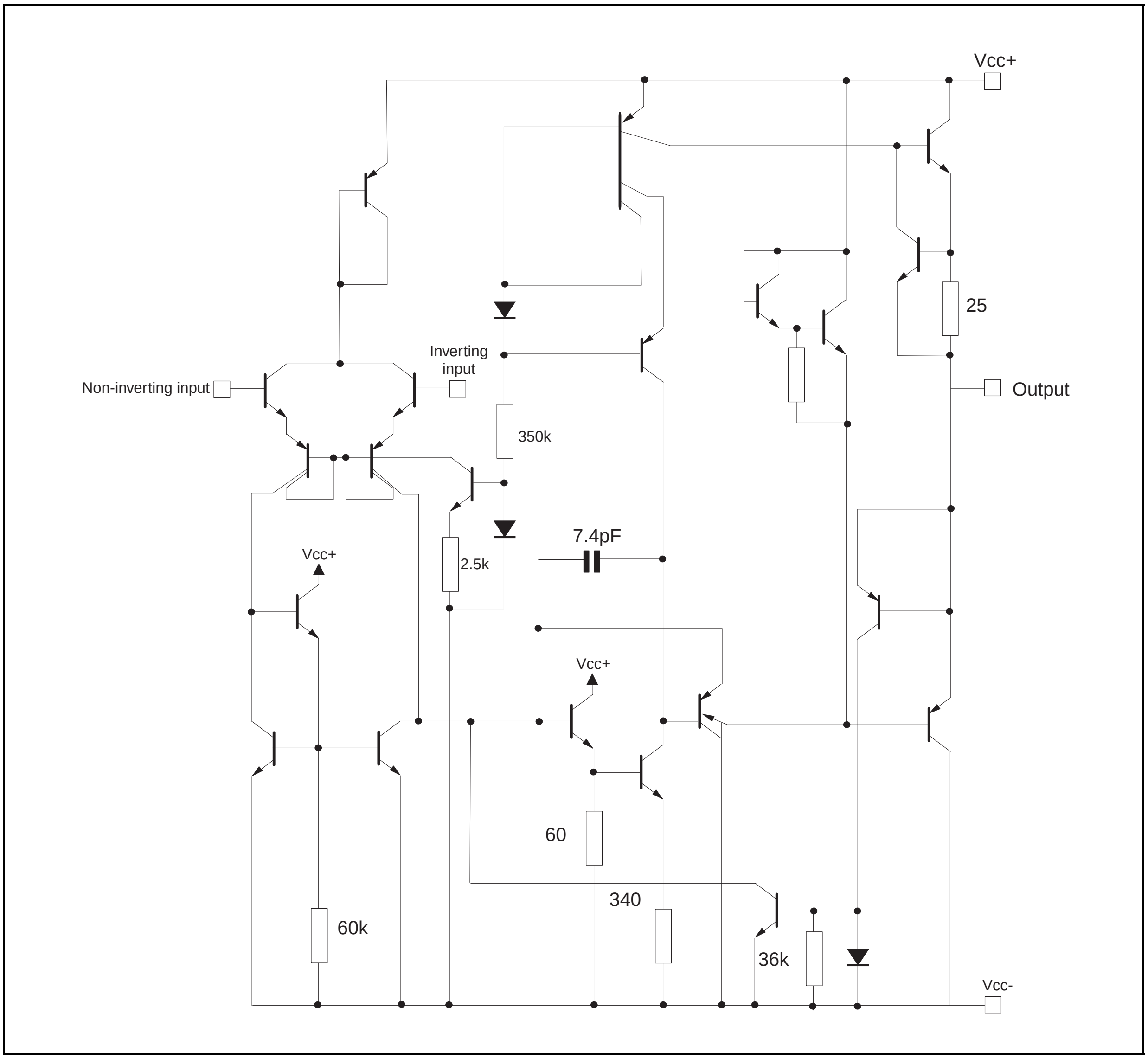


M
SO14
(Plastic Micropackage)

PIN CONNECTIONS (top view)



SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	LM148	LM248	LM348	Unit
V_{CC}	Supply voltage	±22			V
V_i	Input Voltage [1]	±22			V
V_{id}	Differential Input Voltage	±44			V
	Output Short-circuit Duration [2]	Infinite			
P_{tot}	Power Dissipation	500			mW
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. For supply voltage less than maximum value, the absolute maximum input voltage is equal to the supply voltage.
2. Any of the amplifier outputs can be shorted to ground indefinitly; however more than one should not be simultaneously shorted as the maximum junction will be exceeded.

ELECTRICAL CHARACTERISTICS

V_{CC} = ±15V, T_{amb} = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{io}	Input Offset Voltage ($R_S \leq 10k\Omega$) T_{amb} = 25°C $T_{min} \leq T_{amb} \leq T_{max}$		1	5 6	mV
I_{io}	Input Offset Current T_{amb} = 25°C $T_{min} \leq T_{amb} \leq T_{max}$		2	25 75	nA
I_{ib}	Input Bias Current T_{amb} = 25°C $T_{min} \leq T_{amb} \leq T_{max}$		30	100 300	nA
A_{vd}	Large Signal Voltage Gain (V_o = ±10V, R_L = 2kΩ) T_{amb} = 25°C $T_{min} \leq T_{amb} \leq T_{max}$	50 25	160		V/mV
SVR	Supply Voltage Rejection Ratio ($R_S \leq 10k\Omega$) T_{amb} = 25°C $T_{min} \leq T_{amb} \leq T_{max}$	77 77	100		dB
I_{cc}	Supply Current, all Amp, no load T_{amb} = 25°C $T_{min} \leq T_{amb} \leq T_{max}$		2.1	3.6 4.8	mA
V_{icm}	Input Common Mode Voltage Range T_{amb} = 25°C $T_{min} \leq T_{amb} \leq T_{max}$	±12 ±12			
CMR	Common Mode Rejection Ratio ($R_S \leq 10k\Omega$) T_{amb} = 25°C $T_{min} \leq T_{amb} \leq T_{max}$	70 70	110		dB
I_{os}	Output Short-circuit Current T_{amb} = 25°C	10	25	35	mA
$\pm V_{opp}$	Output Voltage Swing T_{amb} = 25°C $R_L \leq 10k\Omega$ $R_L \leq 2k\Omega$ $T_{min} \leq T_{amb} \leq T_{max}$ $R_L \leq 10k\Omega$ $R_L \leq 2k\Omega$	12 10 12 10	13 12		V
SR	Slew Rate (V_I = ±10V, R_L = 10kΩ, C_L = 100pF, unity Gain)	0.25	0.5		V/µs
t_r	Rsie Time (V_I = ±10V, R_L = 10kΩ, C_L = 100pF, unity Gain)		0.3		µs
K_{OV}	Overshoot (V_I = ±10V, R_L = 10kΩ, C_L = 100pF, unity Gain)		5		%
R_I	Input Resistance	0.8	2.5		MΩ
GBP	Gain Bandwith Product (V_I = 10 mV, R_L = 10kΩ, C_L = 100pF f =100kHz)	0.7	1.3		MHz
THD	Total Harmonic Distortion (f = 1kHz, A_v = 20dB, R_L = 10kΩ C_L = 100pF, V_o = $2V_{pp}$)		0.08		%
e_n	Equivalent Input Noise Voltage (f = 1kHz, R_s = 100Ω		40		$\frac{nV}{\sqrt{Hz}}$
V_{o1}/V_{o2}	Channel Separation		120		dB

Important statement:

Huaguan Semiconductor Co,Ltd. reserves the right to change the products and services provided without notice. Customers should obtain the latest relevant information before ordering, and verify the timeliness and accuracy of this information.

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