signetics

HIGH PERFORMANCE OPERATIONAL AMPLIFIER | μA748

LINEAR INTEGRATED CIRCUITS

DESCRIPTION

The μA748 is a High Performance Operational Amplifier featuring high gain, short circuit immunity, offset voltage null capability, simplified compensation and excellent temperature stability.

FEATURES

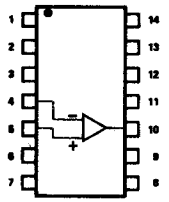
- SHORT CIRCUIT PROTECTION
- OFFSET VOLTAGE NULL CAPABILITY
- LARGE COMMON-MODE AND DIFFERENTIAL VOLTAGE RANGES
- LOW POWER CONSUMPTION
- NO LATCH UP

ABSOLUTE MAXIMUM RATINGS:

Supply Voltage	
μA748	±22V
μA748C	±18V
Internal Power Dissipation (Note 1)	500mW
Differential Input Voltage	±30V
Input Voltage (Note 2)	±15V
Storage Temperature Range	-65°C to +150°C
Operating Temperature Range	
μA748	-55°C to +125°C
μA748C	0°C to +70°C
Lead Temperature	300°C
Output Short Circuit Duration (Note 3)	Indefinite

PIN CONFIGURATIONS

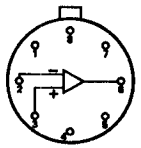
A PACKAGE
(Top View)



1. NC
2. NC
3. Freq. Comp. A/Offset Null
4. Inverting Input
5. Noninverting Input
6. V^-
7. NC
8. NC
9. Offset Null
10. Output
11. V^+
12. Freq. Comp. B
13. NC
14. NC

ORDER PART NOS.
μA748A/μA748CA

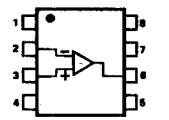
T PACKAGE



1. Freq. Comp. A/ Offset Null.
2. Inverting Input
3. Noninverting Input
4. V^-
5. Offset Null
6. Output
7. V^+
8. Freq. Comp. B

ORDER PART NOS.
μA748T/μA748CT

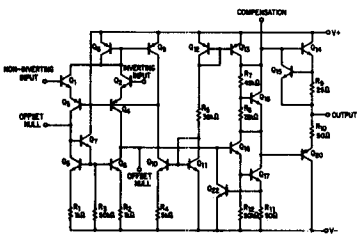
V PACKAGE



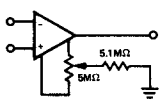
1. Freq. Comp. A/ Offset Null.
2. Inverting Input
3. Noninverting Input
4. V^-
5. Offset Null
6. Output
7. V^+
8. Freq. Comp. B

ORDER PART NO.
μA748CV

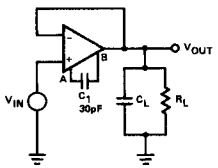
EQUIVALENT CIRCUIT



VOLTAGE OFFSET NULL CIRCUIT



TRANSIENT RESPONSE TEST CIRCUIT



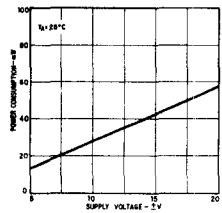
NOTES:
1. Rating applies for case temperatures to +70°C.
2. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
3. Short circuit may be to ground or either supply. Rating applies to +70°C ambient temperature.

ELECTRICAL CHARACTERISTICS (V_S = ±15V, T_A = 25°C unless otherwise specified)

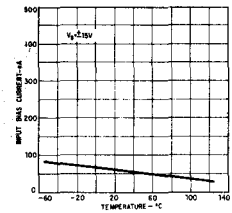
PARAMETER	CONDITIONS	μA748C			μA748			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	$R_S \leq 10\ k\Omega$		2.0	6.0		1.0	5.0	mV
Input Offset Current			20	200		20	200	nA
Input Bias Current			80	500		80	500	nA
Input Resistance		0.3	2.0		0.3	2.0		MΩ
Input Capacitance			1.4			1.4		pF
Offset Voltage Adjustment Range			±15			±15		mV
Input Voltage Range		±12	±13		±12	±13		V
Large-Signal Voltage Gain	$R_L \geq 2\ k\Omega$, $V_{out} = \pm 10V$	50K	200K		50K	200K		
Output Resistance			75			75		Ω
Output Short-Circuit Current			25			25		mA
Supply Voltage Rejection Ratio	$R_S \leq 10\ k\Omega$		30	150		30	150	μV/V
Common Mode Rejection Ratio	$R_S \leq 10\ k\Omega$	70	90		70	90		dB
Supply Current			1.7	2.8		1.7	2.8	mA
Power Consumption			50	85		50	85	mW
Transient Response (unity gain)	$V_{in} = 20mV$, $R_L = 2\ k\Omega$, $C_L \leq 100\ pF$							
Risetime	$C_1 = 30\ pF$		0.3			0.3		μs
Overshoot			5.0			5.0		%
Slew Rate	$R_L \geq 2\ k\Omega$ $C_1 = 30\ pF$		0.5			0.5		V/μs
The Following Specifications Apply Over the Operating Temperature Ranges								
Input Offset Voltage	$R_S \leq 10\ k\Omega$			7.5			6.0	mV
Input Offset Current	T_A max		9.0	300		7.0	200	nA
	T_A min		35	300		85	500	nA
Input Bias Current	T_A max		0.04	0.8		0.03	0.5	μA
	T_A min		0.13	0.8		0.3	1.5	μA
Input Voltage Range		±12	±13		±12	±13		V
Common Mode Rejection Ratio	$R_S \leq 10\ k\Omega$	70	90		70	90		dB
Supply Voltage Rejection Ratio	$R_S \leq 10\ k\Omega$		30	150		30	150	μV/V
Large-Signal Voltage Gain	$R_L \geq 2\ k\Omega$, $V_{out} = \pm 10V$	25			25			V/mV
Output Voltage Swing	$R_L \geq 10\ k\Omega$	±12	±14		±12	±14		V
	$R_L \geq 2\ k\Omega$	±10	±13		±10	±13		V
Supply Current	T_A max		1.6	3.3		1.5	2.5	mA
	T_A min		1.8	3.3		2.0	3.3	mA
Power Consumption	T_A max		48	100		45	75	mW
	T_A min		54	100		60	100	mW

TYPICAL CHARACTERISTIC CURVES

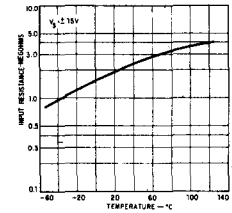
POWER CONSUMPTION AS A FUNCTION OF SUPPLY VOLTAGE



INPUT BIAS CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE

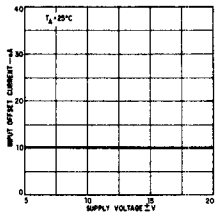


INPUT RESISTANCE AS A FUNCTION OF AMBIENT TEMPERATURE

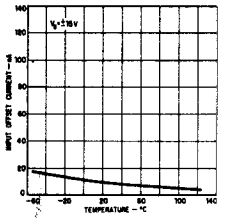


TYPICAL CHARACTERISTIC CURVES (Cont'd.)

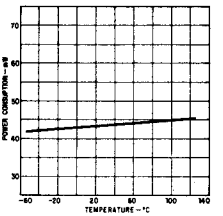
INPUT OFFSET CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



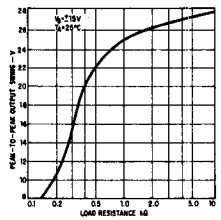
INPUT OFFSET CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



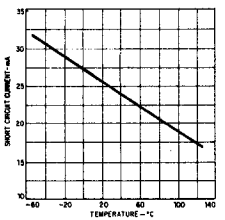
POWER CONSUMPTION AS A FUNCTION OF AMBIENT TEMPERATURE



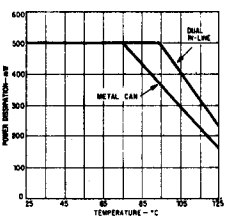
OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE



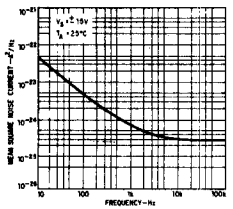
OUTPUT SHORT-CIRCUIT CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



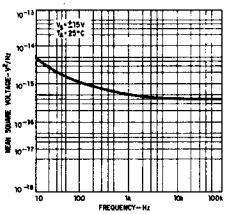
ABSOLUTE MAXIMUM POWER DISSIPATION AS A FUNCTION OF AMBIENT TEMPERATURE



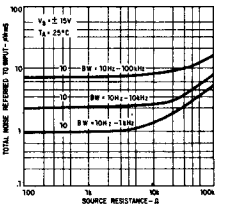
INPUT NOISE CURRENT AS A FUNCTION OF FREQUENCY



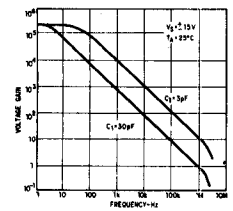
INPUT NOISE VOLTAGE AS A FUNCTION OF FREQUENCY



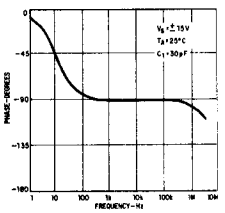
BROADBAND NOISE AS A FUNCTION OF SOURCE RESISTANCE



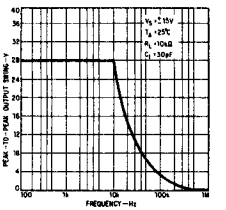
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF FREQUENCY



OPEN LOOP PHASE RESPONSE AS A FUNCTION OF FREQUENCY

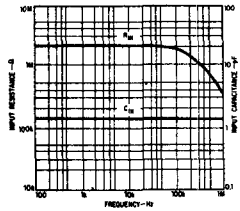


OUTPUT VOLTAGE SWING AS A FUNCTION OF FREQUENCY

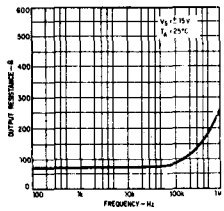


TYPICAL CHARACTERISTIC CURVES (Cont'd.)

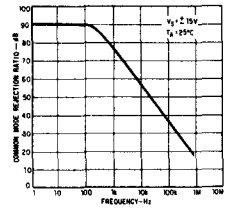
INPUT RESISTANCE AND INPUT CAPACITANCE AS A FUNCTION OF FREQUENCY



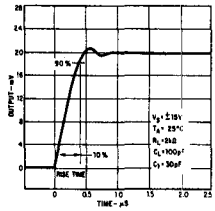
OUTPUT RESISTANCE AS A FUNCTION OF FREQUENCY



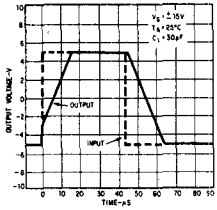
COMMON MODE REJECTION RATIO AS A FUNCTION OF FREQUENCY



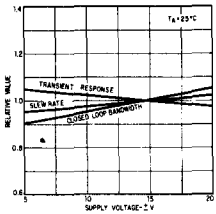
TRANSIENT RESPONSE



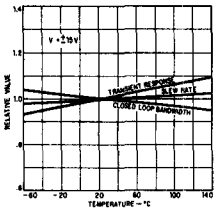
VOLTAGE FOLLOWER LARGE-SIGNAL PULSE RESPONSE



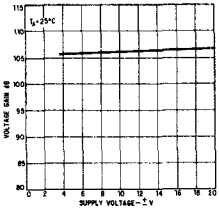
FREQUENCY CHARACTERISTICS AS A FUNCTION OF SUPPLY VOLTAGE



FREQUENCY CHARACTERISTICS AS A FUNCTION OF AMBIENT TEMPERATURE



OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



OUTPUT VOLTAGE SWING AS A FUNCTION OF SUPPLY VOLTAGE