

LINEAR INTEGRATED CIRCUITS

DESCRIPTION

The $\mu A748$ 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
 $\mu A748$ $\pm 22V$
 $\mu A748C$ $\pm 18V$

Internal Power Dissipation
 (Note 1) 500mW

Differential Input Voltage $\pm 30V$
 Input Voltage (Note 2) $\pm 15V$

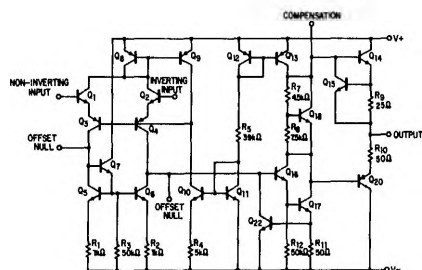
Storage Temperature
 Range $-65^{\circ}C$ to $+150^{\circ}C$

Operating Temperature Range
 $\mu A748$ $-55^{\circ}C$ to $+125^{\circ}C$
 $\mu A748C$ $0^{\circ}C$ to $+70^{\circ}C$

Lead Temperature $300^{\circ}C$

Output Short Circuit Duration
 (Note 3) Indefinite

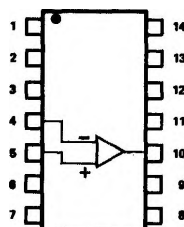
INTERNAL CIRCUIT



PIN CONFIGURATIONS

A PACKAGE

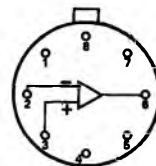
(Top View)



ORDER PART NOS.
 $\mu A748A/\mu A748CA$

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

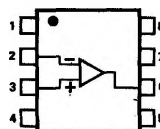
T PACKAGE



ORDER PART NOS.
 $\mu A748T/\mu A748CT$

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

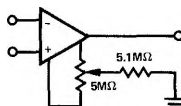
V PACKAGE



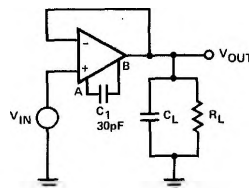
ORDER PART NO.
 $\mu A748CV$

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

VOLTAGE OFFSET NULL CIRCUIT



TRANSIENT RESPONSE TEST CIRCUIT



NOTES:

1. Rating applies for case temperatures to $+70^{\circ}C$.
2. For supply voltages less than $\pm 15V$, the absolute maximum input voltage is equal to the supply voltage.
3. Short circuit may be to ground or either supply. Rating applies to $+70^{\circ}C$ ambient temperature.

ELECTRICAL CHARACTERISTICS: ($V_S = \pm 15V$, $T_A = 25^\circ C$ unless otherwise specified)

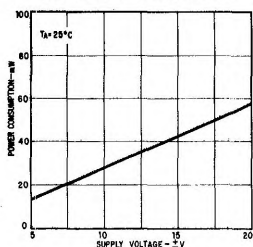
PARAMETER	CONDITIONS	$\mu A748C$			$\mu A748$			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	$R_S \leq 10\text{ k}\Omega$		2.0	6.0		1.0	5.0	mV
Input Offset Current			20	200		20	200	nA
Input Bias Current			80	500		80	500	nA
Input Resistance		0.3	2.0		0.3	2.0		M Ω
Input Capacitance			1.4			1.4		pF
Offset Voltage Adjustment Range			± 15			± 15		mV
Input Voltage Range		± 12	± 13		± 12	± 13		V
Large-Signal Voltage Gain	$R_L \geq 2\text{ k}\Omega$, $V_{out} = \pm 10V$	50K	200K		50K	200K		
Output Resistance			75			75		Ω
Output Short-Circuit Current			25			25		mA
Supply Voltage Rejection Ratio	$R_S \leq 10\text{ k}\Omega$		30	150		30	150	$\mu V/V$
Common Mode Rejection Ratio	$R_S \leq 10\text{ k}\Omega$	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)	$V_{in} = 20\text{mV}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$							
Risetime	$C_1 = 30\text{ pF}$		0.3			0.3		μs
Overshoot			5.0			5.0		%
Slew Rate	$R_L \geq 2\text{ k}\Omega$ $C_1 = 30\text{ pF}$		0.5			0.5		V/ μs

The Following Specifications Apply Over the Operating Temperature Ranges

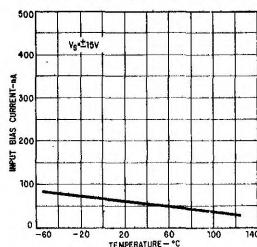
Input Offset Voltage	$R_S \leq 10\text{ k}\Omega$			7.5			6.0	mV
Input Offset Current	$T_A \text{ max}$		9.0	300		7.0	200	nA
	$T_A \text{ min}$		35	300		85	500	nA
Input Bias Current	$T_A \text{ max}$		0.04	0.8		0.03	0.5	μA
	$T_A \text{ min}$		0.13	0.8		0.3	1.5	μA
Input Voltage Range		± 12	± 13		± 12	± 13		V
Common Mode Rejection Ratio	$R_S \leq 10\text{ k}\Omega$	70	90		70	90		dB
Supply Voltage Rejection Ratio	$R_S \leq 10\text{ k}\Omega$		30	150		30	150	$\mu V/V$
Large-Signal Voltage Gain	$R_L \geq 2\text{ k}\Omega$, $V_{out} = \pm 10V$	25			25			V/mV
Output Voltage Swing	$R_L \geq 10\text{ k}\Omega$	± 12	± 14		± 12	± 14		V
	$R_L \geq 2\text{ k}\Omega$	± 10	± 13		± 10	± 13		V
Supply Current	$T_A \text{ max}$		1.6	3.3		1.5	2.5	mA
	$T_A \text{ min}$		1.8	3.3		2.0	3.3	mA
Power Consumption	$T_A \text{ max}$		48	100		45	75	mW
	$T_A \text{ min}$		54	100		60	100	mW

TYPICAL CHARACTERISTIC CURVES

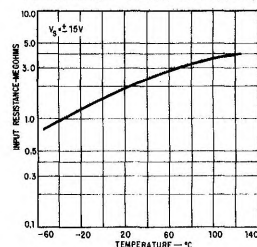
**POWER CONSUMPTION
AS A FUNCTION OF
SUPPLY VOLTAGE**



**INPUT BIAS CURRENT
AS A FUNCTION OF
AMBIENT TEMPERATURE**

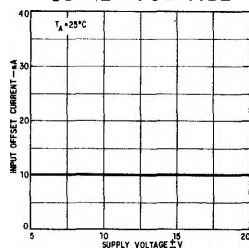


**INPUT RESISTANCE
AS A FUNCTION OF
AMBIENT TEMPERATURE**

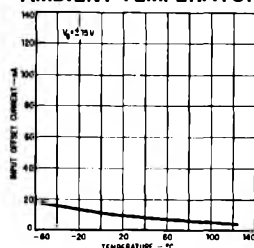


TYPICAL CHARACTERISTIC CURVES (Cont'd.)

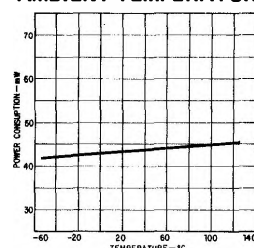
INPUT OFFSET CURRENT
AS A FUNCTION OF
SUPPLY VOLTAGE



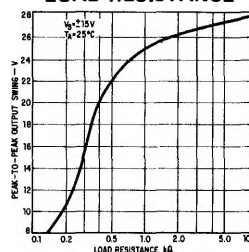
INPUT OFFSET CURRENT
AS A FUNCTION OF
AMBIENT TEMPERATURE



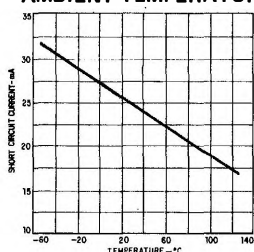
POWER CONSUMPTION
AS A FUNCTION OF
AMBIENT TEMPERATURE



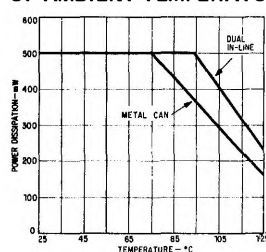
OUTPUT VOLTAGE SWING
AS A FUNCTION OF
LOAD RESISTANCE



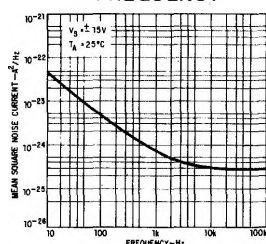
OUTPUT SHORT-CIRCUIT CURRENT
AS A FUNCTION OF
AMBIENT TEMPERATURE



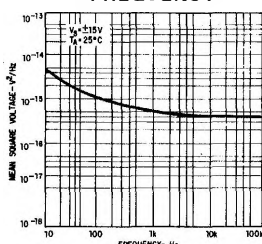
ABSOLUTE MAXIMUM POWER
DISSIPATION AS A FUNCTION
OF AMBIENT TEMPERATURE



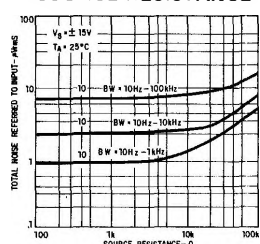
INPUT NOISE CURRENT
AS A FUNCTION OF
FREQUENCY



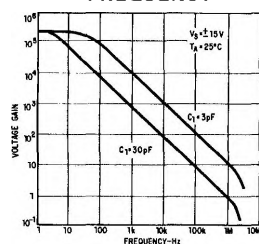
INPUT NOISE VOLTAGE
AS A FUNCTION OF
FREQUENCY



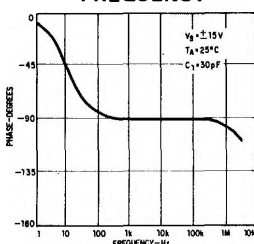
BROADBAND NOISE
AS A FUNCTION OF
SOURCE RESISTANCE



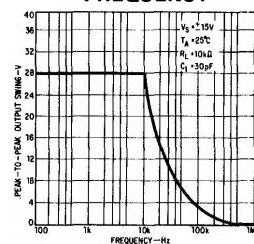
OPEN LOOP VOLTAGE GAIN
AS A FUNCTION OF
FREQUENCY



OPEN LOOP PHASE RESPONSE
AS A FUNCTION OF
FREQUENCY

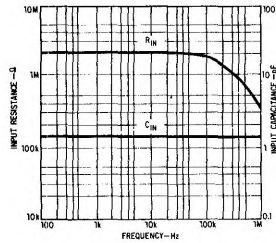


OUTPUT VOLTAGE SWING
AS A FUNCTION OF
FREQUENCY

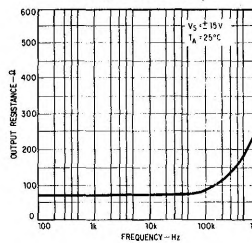


TYPICAL CHARACTERISTIC CURVES (Cont'd.)

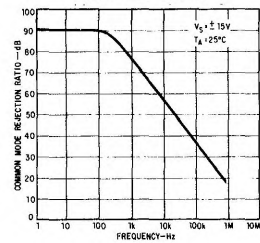
INPUT RESISTANCE AND INPUT CAPACITANCE AS A FUNCTION OF FREQUENCY



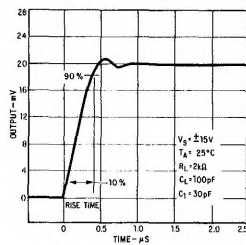
OUTPUT RESISTANCE AS A FUNCTION OF FREQUENCY



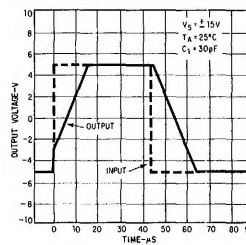
COMMON MODE REJECTION RATIO AS A FUNCTION OF FREQUENCY



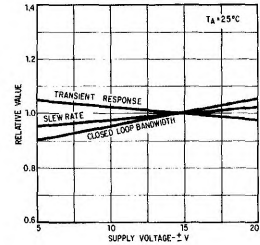
TRANSIENT RESPONSE



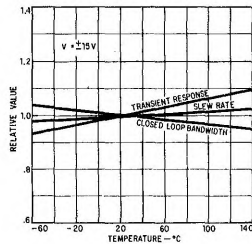
VOLTAGE FOLLOWER LARGE-SIGNAL PULSE RESPONSE



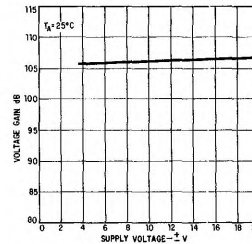
FREQUENCY CHARACTERISTICS AS A FUNCTION OF SUPPLY VOLTAGE



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

