

LINEAR INTEGRATED CIRCUITS

PIN CONFIGURATION

DESCRIPTION

The μ A747 is a pair of high performance monolithic operational amplifiers constructed on a single silicon chip. They are intended for a wide range of analog applications where board space or weight are important. High common mode voltage range and absence of "latch-up" make the μ A747 ideal for use as a voltage follower. The high gain and wide range of operating voltage provides superior performance in integrator, summing amplifier, and general feedback applications. The μ A747 is short-circuit protected and requires no external components for frequency compensation. The internal 6 db/octave roll-off insures stability in closed loop applications. For single amplifier performance, see μ A741 data sheet.

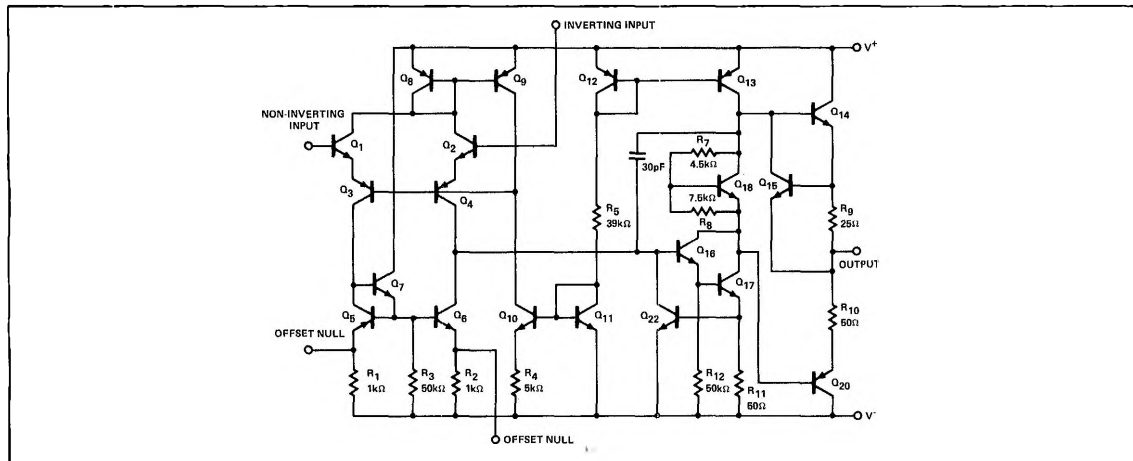
FEATURES

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

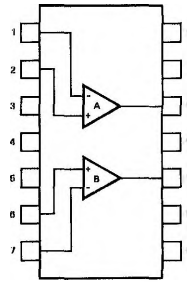
ABSOLUTE MAXIMUM RATINGS

Supply Voltage μ A747		+22V
μ A747C		+18V
Internal Power Dissipation (Note 1)	Metal Can	500 mW
	DIP	670 mW
Differential Input Voltage		+30V
Input Voltage (Note 2)		+15V
Voltage between Offset Null and V^-		+0.5V
Storage Temperature Range		-65°C to +155°C
Operating Temperature Range	μ A747	-55°C to +125°C
	μ A747C	0°C to +70°C
Lead Temperature (Soldering 60 seconds)		300°C
Output Short Circuit Duration (Note 3)		Indefinite

EQUIVALENT CIRCUIT (Each Side)



A PACKAGE (Top View)

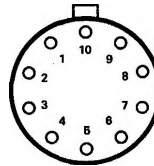


1. Inv Input A
2. Non-Inv Input A
3. Offset Null A
4. V^-
5. Offset Null B
6. Non-Inv Input B
7. Inv Input B
8. Offset Null B
9. V^+
10. Output B
11. No Connect
12. Output A
13. V^+
14. Offset Null A

ORDER PART NOS.

μ A747A
 μ A747CA

K PACKAGE



1. Output A
2. V^+
3. Inverting Input A
4. Non-inverting Input A
5. V^-
6. Non-inverting Input B
7. Inverting Input B
8. V^+
9. Output B
10. NC

ORDER PART NOS.

μ A747K
 μ A747CK

LINEAR INTEGRATED CIRCUITS ■ μ A747

PHYSICAL CHARACTERISTICS ($V_S = \pm 15$ V, $T_A = 25^\circ\text{C}$ unless otherwise specified)

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Offset Voltage	$R_S \leq 10\text{ k}\Omega$		1.0		mV
μ A747			5.0		mV
μ A747C			6.0		mV
Input Offset Current			20	200	nA
Input Bias Current			80	500	nA
Input Resistance		0.3	2.0		M Ω
Input Capacitance			1.4		pF
Offset Voltage Adjustment Range			± 15		mV
Large-Signal Voltage Gain	$R_L \geq 2\text{ k}\Omega, V_{out} = \pm 10\text{ V}$		200,000		
μ A747		50,000			
μ A747C		25,000			
Output Resistance			75		Ω
Output Short-Circuit Current			25		mA
Supply Current			1.7	2.8	mA
Power Consumption			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			0.3		μ S
Overshoot			5.0		%
Slew Rate	$R_L \geq 2\text{ k}\Omega$		0.5		V/ μ S
Channel Separation			120		dB

μ A747

The following specifications apply for $-55^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$

Input Offset Voltage	$R_S \leq 10\text{ k}\Omega$		1.0	6.0	mV
Input Offset Current	$T_A = +125^\circ\text{C}$		7.0	200	nA
	$T_A = -55^\circ\text{C}$		85	500	nA
Input Bias Current	$T_A = +125^\circ\text{C}$		0.03	0.5	μ A
	$T_A = -55^\circ\text{C}$		0.3	1.5	μ A
Input Voltage Range		± 12	± 13		V
Common Mode Rejection Ratio	$R_S \leq 10\text{ k}\Omega$	70	90		dB
Supply Voltage Rejection Ratio	$R_S \leq 10\text{ k}\Omega$		30	150	$\mu\text{V/V}$
Large-Signal Voltage Gain	$R_L \geq 2\text{ k}\Omega, V_{out} = \pm 10\text{ V}$	25,000			
Output Voltage Swing	$R_L \geq 10\text{ k}\Omega$	± 12	± 14		V
	$R_L \geq 2\text{ k}\Omega$	± 10	± 13		V
Supply Current	$T_A = +125^\circ\text{C}$		1.5	2.5	mA
	$T_A = -55^\circ\text{C}$		2.0	3.3	mA
Power Consumption	$T_A = +125^\circ\text{C}$		45	75	mW
	$T_A = -55^\circ\text{C}$		60	100	mW

μ A747C

The following specifications apply for $0^\circ\text{C} \leq T_A \leq +70^\circ\text{C}$

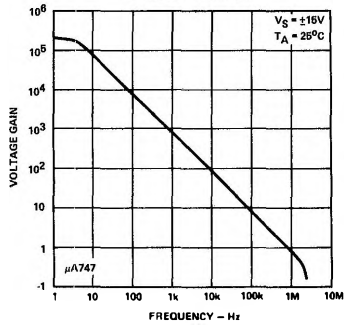
Input Offset Voltage	$R_S \leq 10\text{ k}\Omega$		1.0	7.5	mV
Input Offset Current			7.0	300	nA
Input Bias Current			0.03	0.8	μ A
Input Voltage Range		± 12	± 13		V
Common Mode Rejection Ratio	$R_S \leq 10\text{ k}\Omega$	70	90		dB
Supply Voltage Rejection Ratio	$R_S \leq 10\text{ k}\Omega$		30	150	$\mu\text{V/V}$
Large-Signal Voltage Gain	$R_L \geq 2\text{ k}\Omega, V_{out} = \pm 10\text{ V}$	15,000			
Output Voltage Swing	$R_L \geq 10\text{ k}\Omega$	± 12	± 14		V
	$R_L \geq 2\text{ k}\Omega$	± 10	± 13		V
Supply Current			2.0	3.3	mA
Power Consumption			60	100	mW

NOTES:

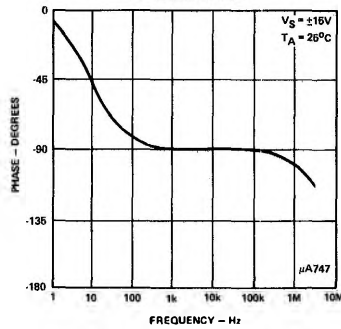
- Rating applied to ambient temperatures up to 70°C ambient derate linearly at $6.3\text{ mW}/^\circ\text{C}$ for the Metal Can and $8.3\text{ mW}/^\circ\text{C}$ for the Ceramic DIP package.
- For supply voltages less than $+15\text{ V}$, the absolute maximum input voltage is equal to the supply voltage.
- Short circuit may be to ground or either supply. Military rating applies to $+125^\circ\text{C}$ case temperature or $+60^\circ\text{C}$ ambient temperature for each side.

TYPICAL CHARACTERISTIC CURVES

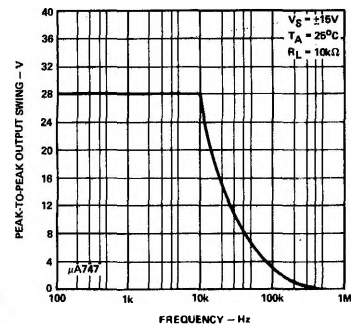
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF FREQUENCY



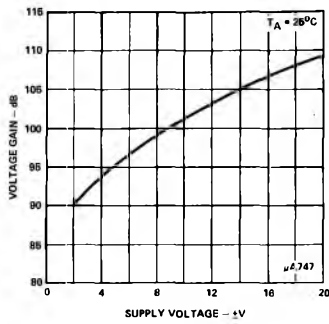
OPEN LOOP PHASE RESPONSE AS A FUNCTION OF FREQUENCY



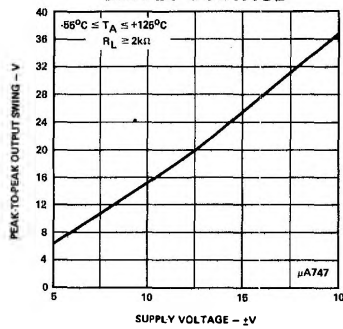
OUTPUT VOLTAGE SWING AS A FUNCTION OF FREQUENCY



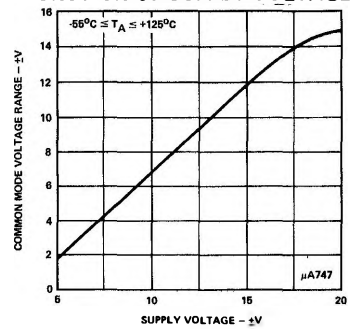
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



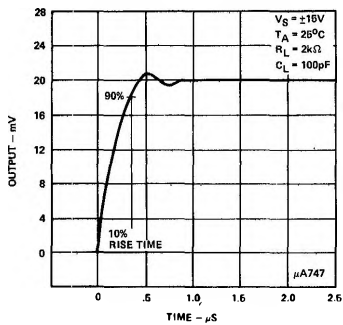
OUTPUT VOLTAGE SWING AS A FUNCTION OF SUPPLY VOLTAGE



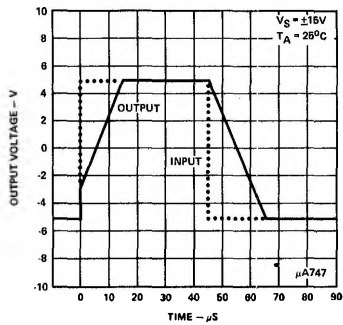
INPUT COMMON MODE VOLTAGE RANGE AS A FUNCTION OF SUPPLY VOLTAGE



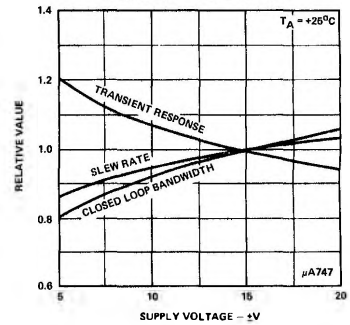
TRANSIENT RESPONSE



VOLTAGE FOLLOWER LARGE-SIGNAL PULSE RESPONSE

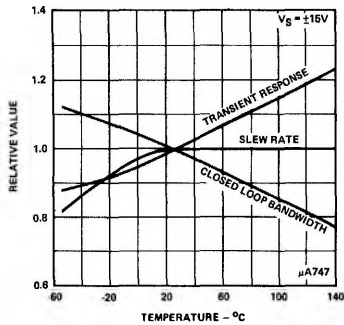


FREQUENCY CHARACTERISTICS AS A FUNCTION OF SUPPLY VOLTAGE

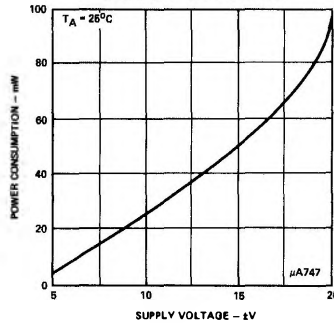


TYPICAL CHARACTERISTIC CURVES (Cont'd.)

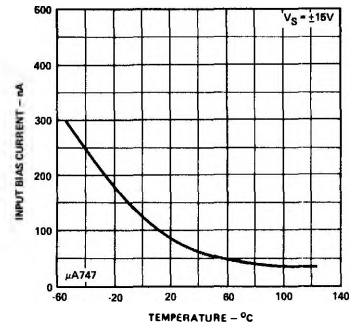
FREQUENCY CHARACTERISTICS AS A FUNCTION OF AMBIENT TEMPERATURE



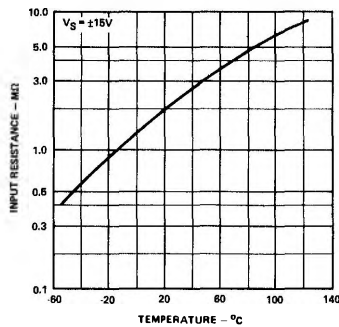
POWER CONSUMPTION AS A FUNCTION OF SUPPLY VOLTAGE



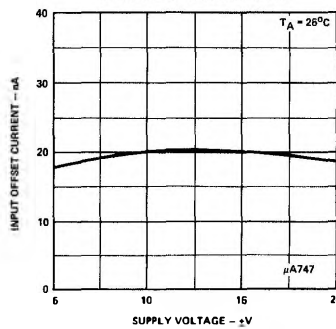
INPUT BIAS CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



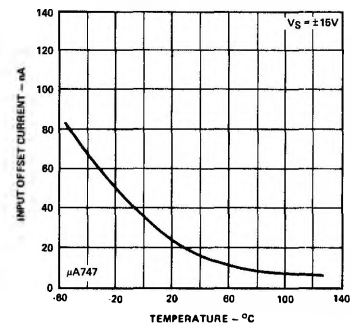
INPUT RESISTANCE AS A FUNCTION OF AMBIENT TEMPERATURE



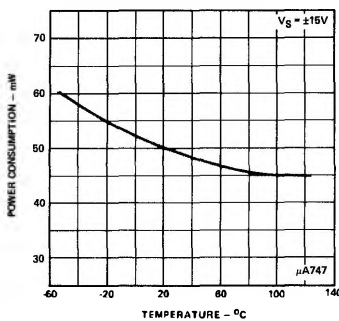
INPUT OFFSET CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



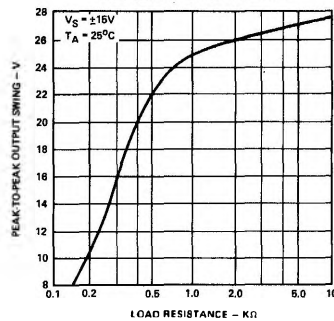
INPUT OFFSET CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



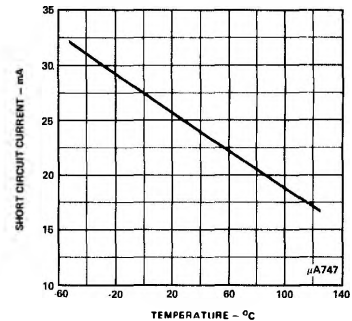
POWER CONSUMPTION AS A FUNCTION OF AMBIENT TEMPERATURE



OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE

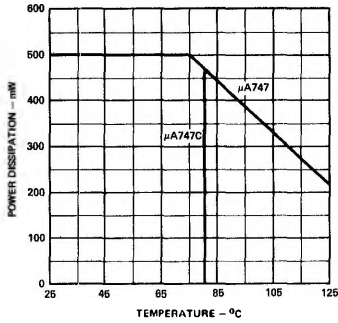


OUTPUT SHORT-CIRCUIT CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE

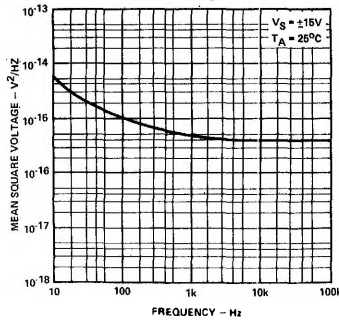


TYPICAL CHARACTERISTIC CURVES (Cont'd.)

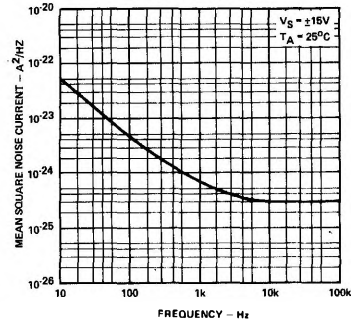
ABSOLUTE MAXIMUM POWER DISSIPATION AS A FUNCTION OF AMBIENT TEMPERATURE



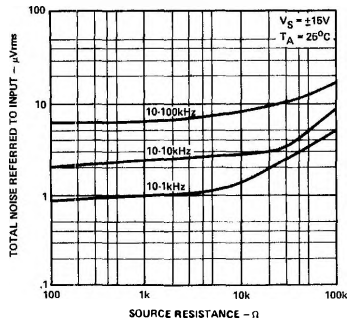
INPUT NOISE VOLTAGE AS A FUNCTION OF FREQUENCY



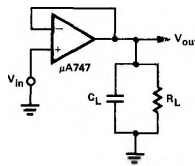
INPUT NOISE CURRENT AS A FUNCTION OF FREQUENCY



BROADBAND NOISE FOR VARIOUS BANDWIDTHS



TRANSIENT RESPONSE TEST CIRCUIT



VOLTAGE OFFSET NULL CIRCUIT

