DUAL OPERATIONAL AMPLIFIER μA747

LINEAR INTEGRATED CIRCUITS

DESCRIPTION

The μA747 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 μA747 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 μA747 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 μA741 data sheet.

FEATURES

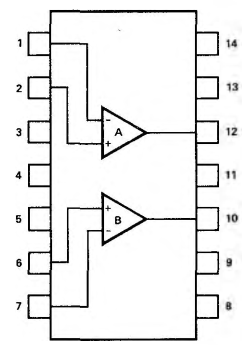
- NO FREQUENCY COMPENSATION REQUIRED
- SHORT-CIRCUIT PROTECTION
- OFFSET VOLTAGE NULL CAPABILITY
- LARGE COMMON-MODE AND DIFFERENTIAL
- VOLTAGE RANGES
- LOW POWER CONSUMPTION
- NO LATCH UP

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	A747	+22V
	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	A747	-55°C to +125°C
	A747C	0°C to +70°C
Lead Temperature (Soldering 60 seconds)		300°C
Output Short Circuit Duration (Note 3)		Indefinite

PIN CONFIGURATION

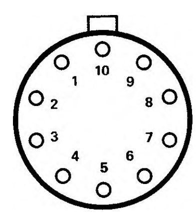
A PACKAGE
(Top View)



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+ B
10. Output B
11. No Connect
12. Output A
13. V+ A
14. Offset Null A

ORDER PART NOS.
μA747A
μA747CA

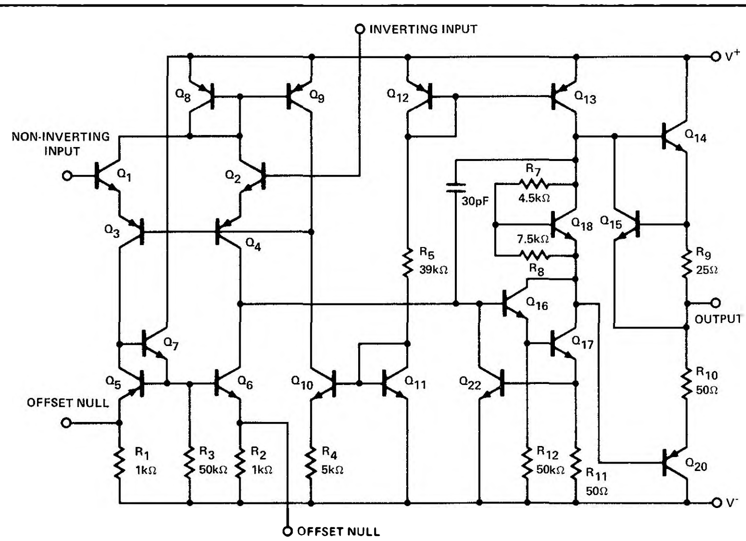
K PACKAGE



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

ORDER PART NOS.
μA747K
μA747CK

EQUIVALENT CIRCUIT



ELECTRICAL CHARACTERISTICS ($V_S = \pm15$ V, $T_A = 25^oC$ unless otherwise specified)

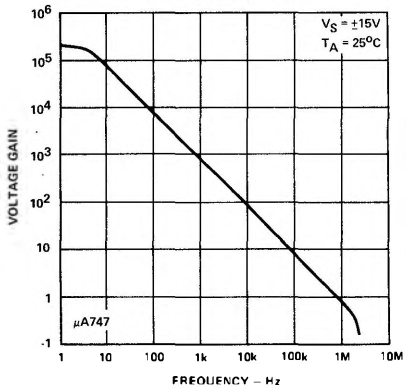
PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Offset Voltage	$R_S \le 10$ kΩ		1.0		mV
μA747			5.0		mV
μA747C			6.0		mV
Input Offset Current			20	200	nA
Input Bias Current			80	500	nA
Input Resistance		0.3	2.0		MΩ
Input Capacitance			1.4		pF
Offset Voltage Adjustment Range			±15		mV
Large-Signal Voltage Gain	$R_L \ge 2K\Omega, V_{out} = \pm10V$		200,000		
μA747		50,000			
μA747C		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 mV, R_L = 2kΩ, $C_L \le 100$ pF				
Risetime			0.3		μS
Overshoot			5.0		%
Slew Rate	$R_L \ge 2k\Omega$		0.5		V/μS
Channel Separation			120		dB
μA747 ONLY The following specifications apply for $-55^oC \le T_A \le +125^oC$					
Input Offset Voltage	$R_S \le 10k\Omega$		1.0	6.0	mV
Input Offset Current	$T_A = +125^oC$		7.0	200	nA
	$T_A = -55^oC$		85	500	nA
Input Bias Current	$T_A = +125^oC$		0.03	0.5	μA
	$T_A = -55^oC$		0.3	1.5	μA
Input Voltage Range		±12	±13		V
Common Mode Rejection Ratio	$R_S \le 10k\Omega$	70	90		dB
Supply Voltage Rejection Ratio	$R_S \le 10k\Omega$		30	150	μV/V
Large-Signal Voltage Gain	$R_L \ge 2k\Omega, V_{out} = \pm10V$	25,000			
Output Voltage Swing	$R_L \ge 10k\Omega$	±12	±14		V
	$R_L \ge 2k\Omega$	±10	±13		V
Supply Current	$T_A = +125^oC$		1.5	2.5	mA
	$T_A = -55^oC$		2.0	3.3	mA
Power Consumption	$T_A = +125^oC$		45	75	mW
	$T_A = -55^oC$		60	100	mW
μA747C The following specifications apply for $0^oC \le T_A \le +70^oC$					
Input Offset Voltage	$R_S \le 10k\Omega$		1.0	7.5	mV
Input Offset Current			7.0	300	nA
Input Bias Current			0.03	0.8	μA
Input Voltage Range		±12	±13		V
Common Mode Rejection Ratio	$R_S \le 10k\Omega$	70	90		dB
Supply Voltage Rejection Ratio	$R_S \le 10k\Omega$		30	150	μV/V
Large-Signal Voltage Gain	$R_L \ge 2k\Omega, V_{out} = \pm10V$	15,000			
Output Voltage Swing	$R_L \ge 10k\Omega$	±12	±14		V
	$R_L \ge 2k\Omega$	±10	±13		V
Supply Current			2.0	3.3	mA
Power Consumption			60	100	mW

NOTES:

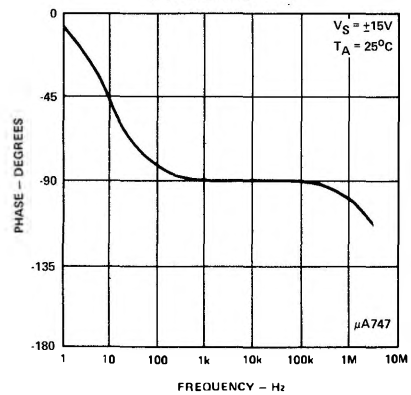
1. Rating applied to ambient temperatures up to 70^oC ambient derate linearly at 6.3 mW/^oC for the Metal Can and 8.3 mW/^oC for the Ceramic DIP package.
2. For supply voltages less than +15V, the absolute maximum input voltage is equal to the supply voltage.
3. Short circuit may be to ground or either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

TYPICAL CHARACTERISTIC CURVES

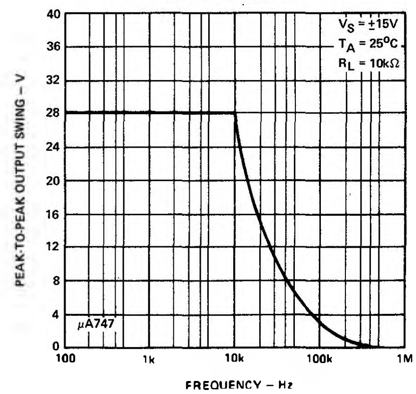
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF FREQUENCY



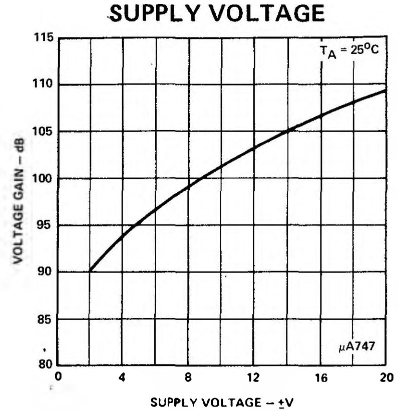
OPEN LOOP PHASE RESPONSE AS A FUNCTION OF FREQUENCY



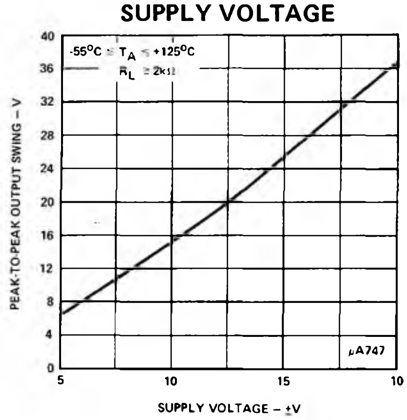
OUTPUT VOLTAGE SWING AS A FUNCTION OF FREQUENCY



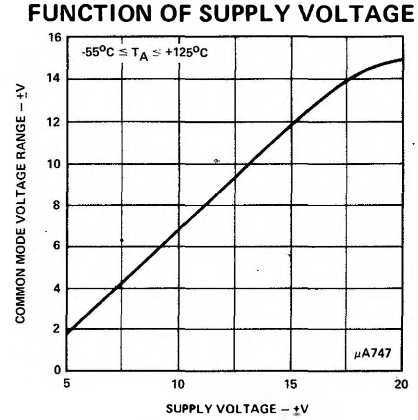
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



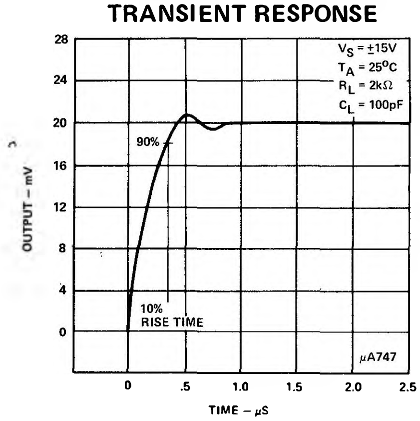
OUTPUT VOLTAGE SWING AS A FUNCTION OF SUPPLY VOLTAGE



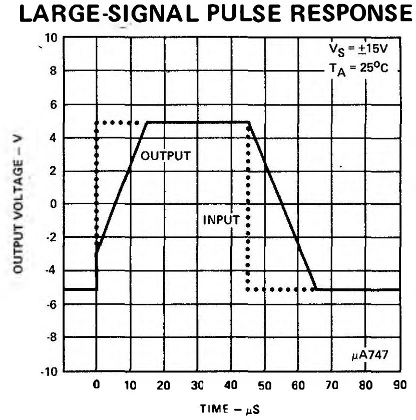
INPUT COMMON MODE VOLTAGE RANGE AS A FUNCTION OF SUPPLY VOLTAGE



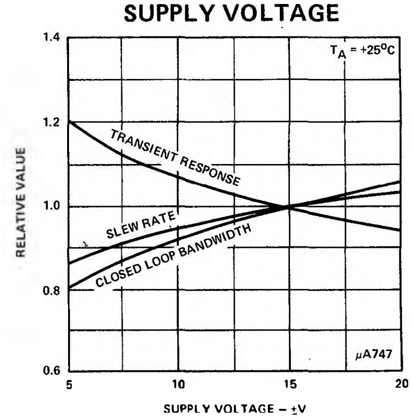
TRANSIENT RESPONSE



VOLTAGE FOLLOWER LARGE-SIGNAL PULSE RESPONSE

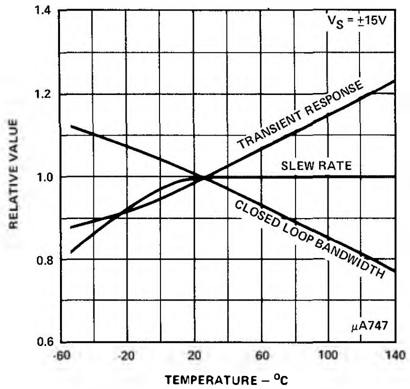


FREQUENCY CHARACTERISTICS AS A FUNCTION OF SUPPLY VOLTAGE

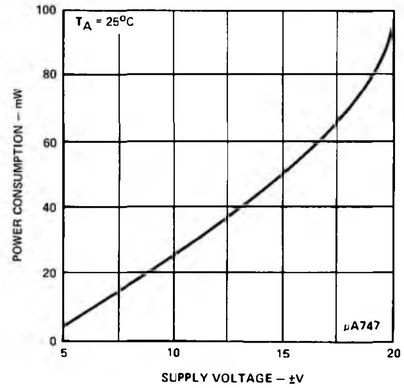


TYPICAL CHARACTERISTIC CURVES (Cont'd.)

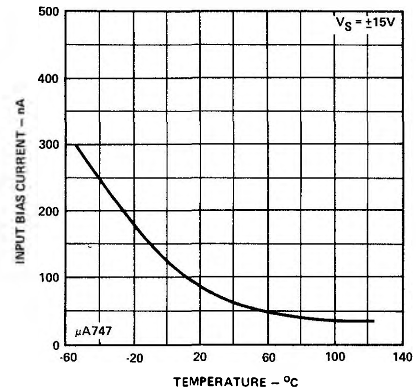
FREQUENCY CHARACTERISTICS AS A FUNCTION OF AMBIENT TEMPERATURE



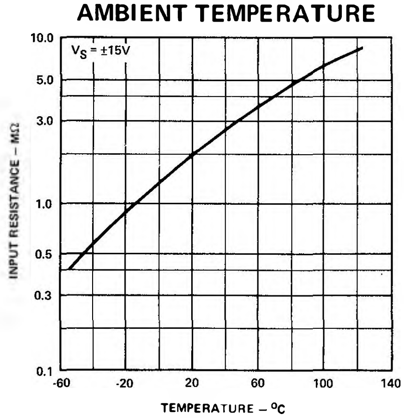
POWER CONSUMPTION AS A FUNCTION OF SUPPLY VOLTAGE



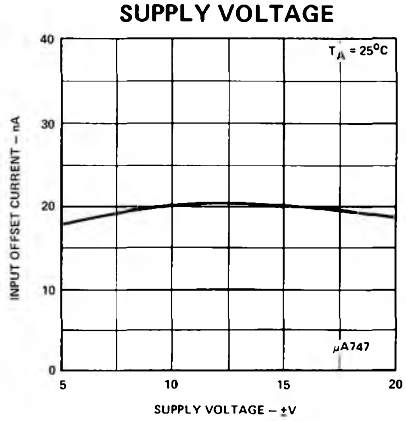
INPUT BIAS CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



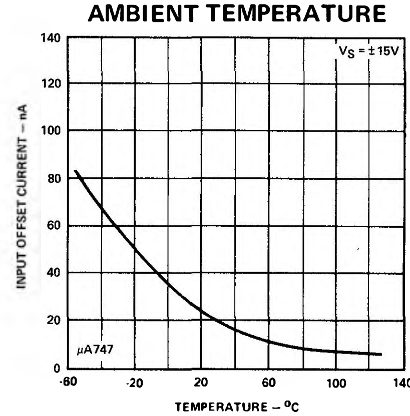
INPUT RESISTANCE AS A FUNCTION OF AMBIENT TEMPERATURE



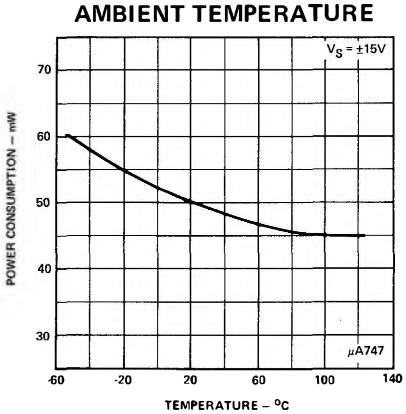
INPUT OFFSET CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



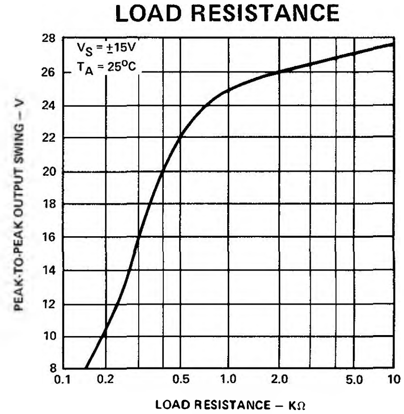
INPUT OFFSET CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



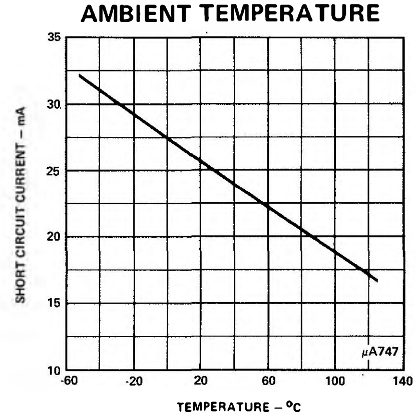
POWER CONSUMPTION AS A FUNCTION OF AMBIENT TEMPERATURE



OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE

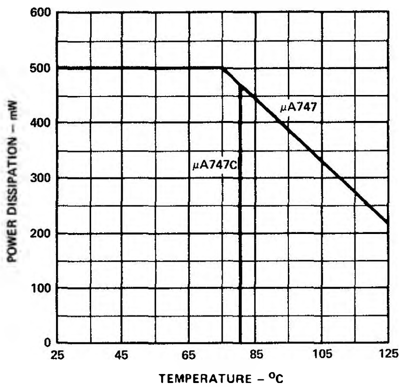


OUTPUT SHORT-CIRCUIT CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE

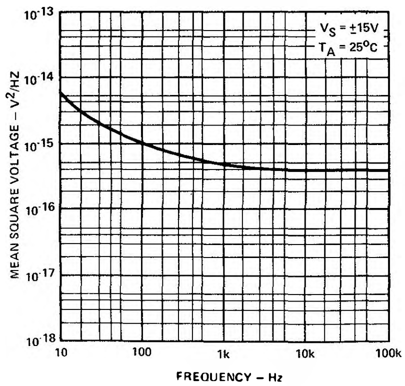


TYPICAL CHARACTERISTIC CURVES (Cont'd.)

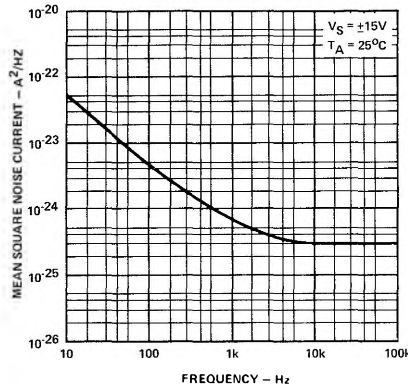
ABSOLUTE MAXIMUM POWER DISSIPATION AS A FUNCTION AMBIENT TEMPERATURE



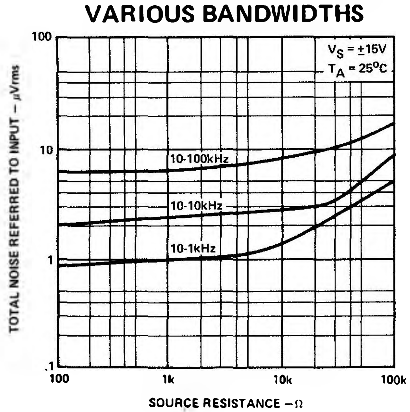
INPUT NOISE VOLTAGE AS A FUNCTION OF FREQUENCY



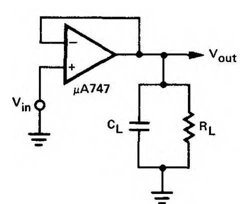
INPUT NOISE CURRENT AS A FUNCTION OF FREQUENCY



BROADBAND NOISE FOR VARIOUS BANDWIDTHS



TRANSIENT RESPONSE TEST CIRCUIT



VOLTAGE OFFSET NULL CIRCUIT