Signetics

μA747/747C/SA747C
Dual Operational Amplifier

Product Specification

Linear Products

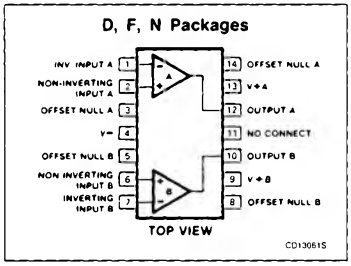
DESCRIPTION

The 747 is a pair of high-performance monolithic operational amplifiers constructed on a single silicon chip. High common-mode voltage range and absence of "latch-up" make the 747 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 747 is short-circuit protected and requires no external components for frequency compensation. The internal 6dB/octave roll-off insures stability in closed-loop applications. For single amplifier performance, see μA741 data sheet.

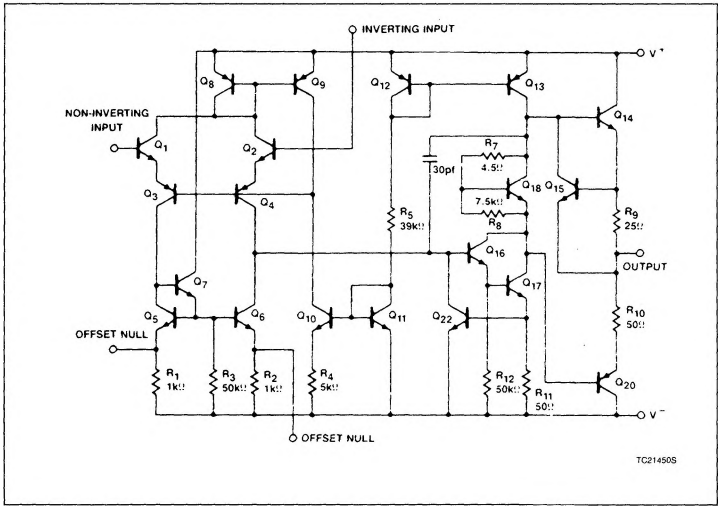
FEATURES

- **No frequency compensation required**
- **Short-circuit protection**
- **Offset voltage null capability**
- **Large common-mode and differential voltage ranges**
- **Low power consumption**
- **No latch-up**

PIN CONFIGURATION



EQUIVALENT SCHEMATIC



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
14-Pin Plastic DIP	−55°C to +125°C	μA747N
14-Pin Plastic DIP	0 to +70°C	μA747CN
14-Pin Plastic DIP	−45°C to +85°C	SA747CN
14-Pin Cerdip	−55°C to +125°C	μA747F
14-Pin Cerdip	0 to +70°C	μA747CF
14-Pin SO	0 to +70°C	μA747CD

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_S	Supply voltage		
	μA747	±22	V
	μA747C	±18	V
	SA747C	±18	V
$P_{D\ MAX}$	Maximum power dissipation $T_A = 25°C$ (still air)[1]		
	D package	1000	mW
	F package	1200	mW
	N package	1500	mW
V_{IN}	Differential input voltage	±30	V
V_{IN}	Input voltage[2]	±15	V
	Voltage between offset null and V−	±0.5	V
T_{STG}	Storage temperature range	−65 to +150	°C
T_A	Operating temperature range		
	μA747	−55 to +125	°C
	μA747C	0 to +70	°C
	SA747C	−40 to +85	°C
T_{SOLD}	Lead temperature (soldering, 10sec)	300	°C
I_{SC}	Output short-circuit duration	Indefinite	

NOTES:
1. Derate above 25°C at the following rates:
   D package at 8.3mW/°C
   F package at 9.7mW/°C
   N package at 12mW/°C
2. For supply voltages less than ± 15V, the absolute maximum input voltage is equal to the supply voltage.

DC ELECTRICAL CHARACTERISTICS (μA747, μ747C) $T_A = 25°C$, $V_{CC} = \pm 15V$ unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	μA747			μA747C			UNIT
			Min	Typ	Max	Min	Typ	Max	
V_{OS}	Offset voltage	$R_S \leq 10k\Omega$		2.0	5.0		2.0	6.0	mV
		$R_S \leq 10k\Omega$, over temp.		3.0	6.0		3.0	7.5	mV
$\Delta V_{OS}/\Delta T$				10			10		μV/°C
I_{OS}	Offset current			20	200		20	200	nA
		$T_A = +125°C$		7.0	200				nA
		$T_A = -55°C$		85	500				nA
		Over temperature					7.0	300	nA
$\Delta I_{OS}/\Delta T$				200			200		pA/°C
I_{BIAS}	Input current			80	500		80	500	nA
		$T_A = +125°C$		30	500				nA
		$T_A = -55°C$		300	1500				nA
		Over temperature					30	800	nA
$\Delta I_B/\Delta T$				1			1		nA/°C
V_{OUT}	Output voltage swing	$R_L \geq 2k\Omega$, over temp.	±10	±13		±10	±13		V
		$R_L \geq 10k\Omega$, over temp.	±12	±14		±12	±14		V
I_{CC}	Supply current each side			1.7	2.8		1.7	2.8	mA
		$T_A = +125°C$		1.5	2.5				mA
		$T_A = -55°C$		2.0	3.3				mA
		Over temperature					2.0	3.3	mA
P_d	Power consumption			50	85		50	85	mW
		$T_A = +125°C$		45	75				mW
		$T_A = -55°C$		60	100				mW
		Over temperature					60	100	mW
C_{IN}	Input capacitance			1.4			1.4		pF
	Offset voltage adjustment range			±15			±15		mV
R_{OUT}	Output resistance			75			75		Ω
	Channel separation			120			120		dB
PSRR	Supply voltage rejection ratio	$R_S \leq 10k\Omega$, over temp.		30	150		30	150	μV/V
A_{VOL}	Large-signal voltage gain (DC)	$R_L \geq 2k\Omega$, $V_{OUT} = \pm 10V$	50,000			25,000			V/V
		Over temperature	25,000			15,000			V/V
CMRR	Common-mode rejection ratio	$R_S \leq 10k\Omega$, $V_{CM} = \pm 12V$ Over temperature	70			70			dB

DC ELECTRICAL CHARACTERISTICS (SA747C) $T_A = 25°C$, $V_S = \pm 15V$ unless otherwise specified.

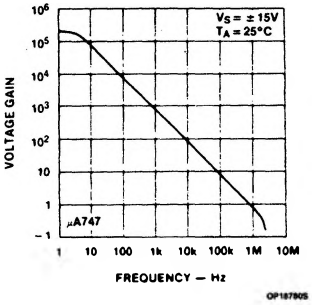
SYMBOL	PARAMETER	TEST CONDITIONS	SA747C			UNIT
			Min	Typ	Max	
V_{OS}	Offset voltage	$R_S \leq 10\Omega$ $R \leq 10k\Omega$, over temperature		2.0 3.0	6.0 7.5	mV mV
$\Delta V_{OS}/\Delta T$				10		μV/°C
I_{OS}	Offset current	Over temperature		20	200 500	mA mA
$\Delta I_{OS}/\Delta T$				300		pA/°C
I_{BIAS}	Input bias current	Over temperature		80	500 1500	mA mA
$\Delta i_B/\Delta T$				1		mA/°C
V_{OUT}	Output voltage swing	$R_L \geq 2k\Omega$, over temperature $R_L \geq 10k\Omega$, over temperature	±10 ±12	±13 ±14		V V
I_{CC}	Supply current, each side	Over temperature		1.7 2.0	2.8 3.3	mA mA
P_d	Power consumption	Over temperature		50 60	85 100	mW mW
C_{IN}	Input capacitance			1.4		pF
	Offset voltage adjustment range			±15		mV
R_{OUT}	Output resistance			75		Ω
	Channel separation			120		dB
PSRR	Supply voltage rejection ratio	$R_S \leq 10k\Omega$, over temperature		30	150	μV/V
A_{VOL}	Large signal voltage gain (DC)	$R_L \geq 2k\Omega$, $V_{OUT} = \pm 10V$	25,000			V/V
CMRR	Common-mode rejection ratio	$R_S \leq 10k\Omega$, $V_{CM} = \pm 12V$ Over temperature	70			dB
I_{SC}	Output short-circuit current		10	25	60	mA

AC ELECTRICAL CHARACTERISTICS $T_A = 25°C$, $V_S = \pm 15V$ unless otherwise specified.

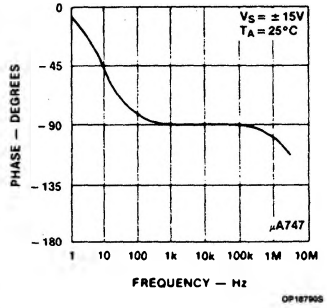
SYMBOL	PARAMETER	TEST CONDITIONS	μA747/μA747C/SA747C			UNIT
			Min	Typ	Max	
t_R	Transient response Rise time Overshoot	$V_{IN} = 20mV$, $R_L = 2k\Omega$, $C_L < 100pF$ Unity gain $C_L \leq 100pF$ Unity gain $C_L \leq 100pF$		 0.3 5.0		 μs %
SR	Slew rate	$R_L > 2k\Omega$		0.5		V/μs

TYPICAL PERFORMANCE CHARACTERISTICS

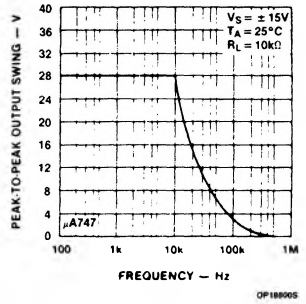
Open-Loop Voltage Gain as a Function of Frequency



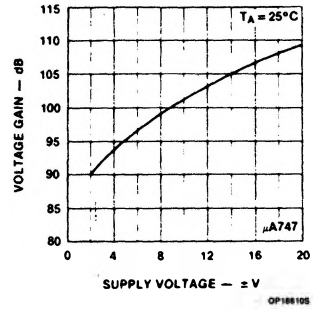
Open-Loop Phase Response as a Function of Frequency



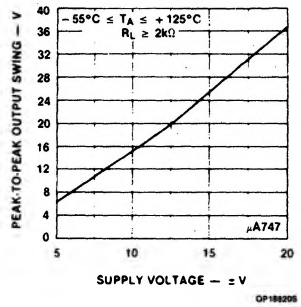
Output Voltage Swing as a Function of Frequency



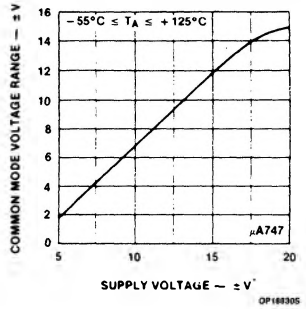
Open-Loop Voltage Gain as a Function of Supply Voltage



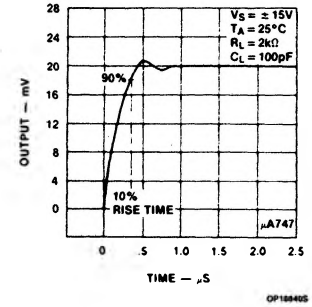
Output Voltage Swing as a Function of Supply Voltage



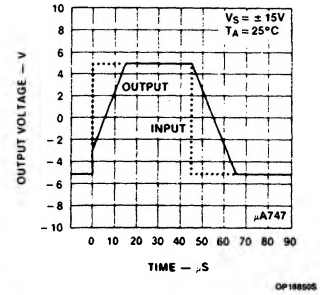
Input Common-Mode Voltage Range as a Function of Supply Voltage



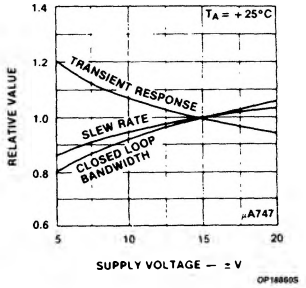
Transient Response



Voltage-Follower Large-Signal Pulse Response

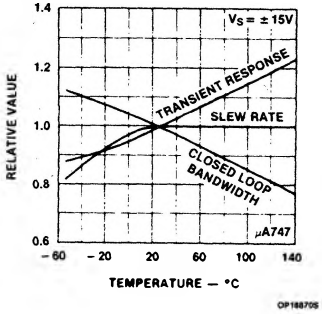


Frequency Characteristics as a Function of Supply Voltage

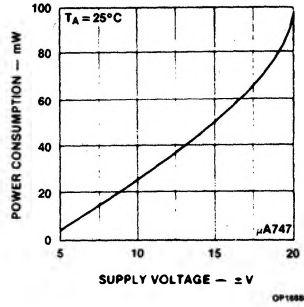


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

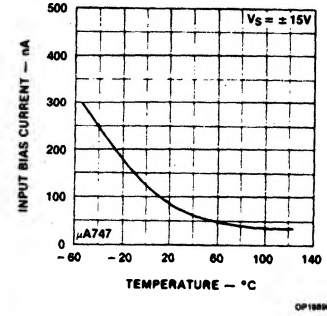
Frequency Characteristics as a Function of Ambient Temperature



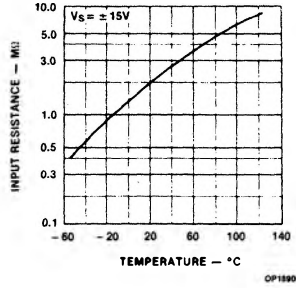
Power Consumption as a Function of Supply Voltage



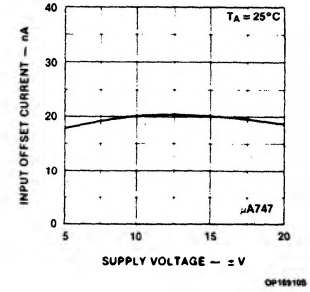
Input Bias Current as a Function of Ambient Temperature



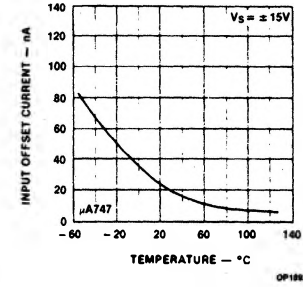
Input Resistance as a Function of Ambient Temperature



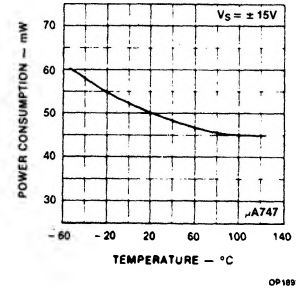
Input Offset Current as a Function of Supply Voltage



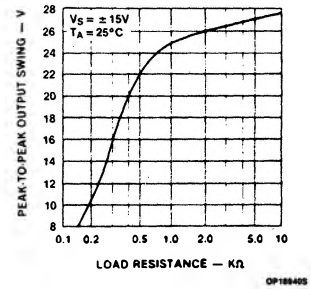
Input Offset Current as a Function of Ambient Temperature



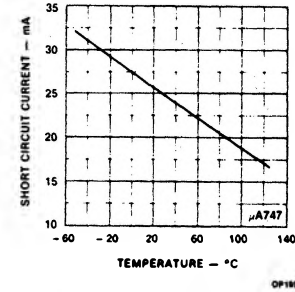
Power Consumption as a Function of Ambient Temperature



Output Voltage Swing as a Function of Load Resistance

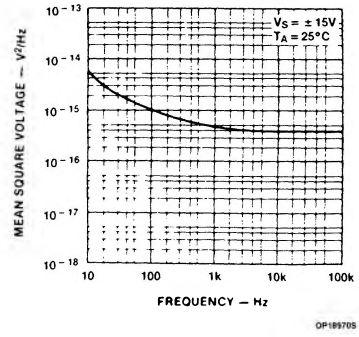


Output Short-Circuit Current as a Function of Ambient Temperature

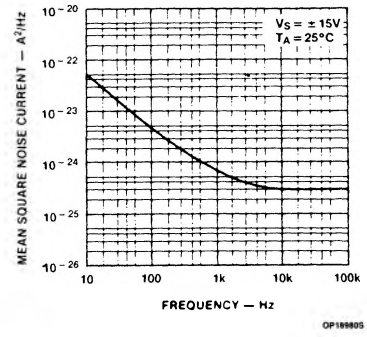


TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

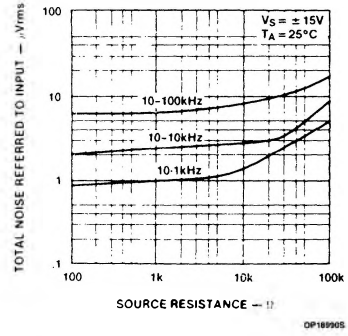
Input Noise Voltage as a Function of Frequency



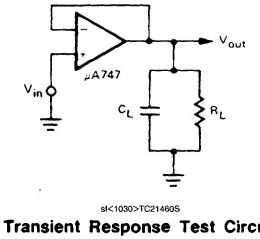
Input Noise Current as a Function of Frequency



Broadband Noise for Various Bandwidths



TEST CIRCUITS



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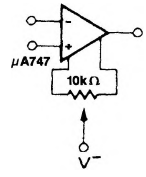
Transient Response Test Circuit



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Voltage Offset Null Circuit