µA777
Precision Operational Amplifier

FEATURES
- Low offset voltage and offset current
- Low offset voltage and current drift
- Low input bias current
- Low input noise voltage
- Large common mode and differential voltage ranges

ABSOLUTE MAXIMUM RATINGS

Supply Voltage .... ±22V
Internal Power Dissipation (Note 1)
Metal Can 500mW
Differential Input Voltage .... ±30V
Input Voltage (Note 2) .... ±15V
Storage Temperature Range ...... −65°C to +150°C
Operating Temperature Range (HC) .... 0°C to 70°C
(HM) .. −55°C to +125°C
Lead Temperature (Soldering, 10s) .... 300°C
.... 260°C
Output Short Circuit Duration (Note 3) ..... Indefinite

Note 1: Rating applies to ambient temperatures up to 70°C. Above 70°C ambient derate linearly at 6.3mW/°C for Metal Can, 8.3mW/°C for the DIP, and 5.6mW/°C for the Mini DIP.

Note 2. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

Note 3. Short Circuit may be to ground or either supply. Rating applies to +125°C case temperature or +75°C ambient temperature for $I_{SET} \leq 30\mu A$.

ORDERING INFORMATION

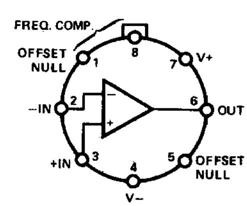
	Dice	TO-99 Can
µA777C	µA777C/D	µA777HC
µA777M	µA777M/D	µA777MC

GENERAL DESCRIPTION

The µA777 is a monolithic Precision Operational Amplifier. It is an excellent choice when performance versus cost trade-offs are possible between super beta or FET input operational amplifiers and low cost general purpose operational amplifiers. Low offset and bias currents improve system accuracy when used in applications such as long term integrators, sample and hold circuits and high source impedance summing amplifiers. Even though the input bias current is extremely low, the µA777 maintains full ±30V differential voltage range. High common mode input voltage range, latch-up protection, short circuit protection and simple frequency compensation make the device versatile and easily used.

PIN CONFIGURATION

8-LEAD METAL CAN
(TOP VIEW)



(outline dwg TY)

ELECTRICAL CHARACTERISTICS FOR μA777 (V_S = ±15V, T_A = 25°C, C_C = 30pF unless otherwise specified

PARAMETERS		CONDITIONS	MIN	TYP	MAX	UNITS
Input Offset Voltage		$R_S \leq 50k\Omega$		0.7	5.0	mV
Input Offset Current				0.7	20.0	nA
Input Bias Current				25	100	nA
Input Resistance			1.0	2.0		MΩ
Input Capacitance				3.0		pF
Offset Voltage Adjustment Range				±25		mV
Large Signal Voltage Gain		$R_L \geq 2k\Omega$, V_{OUT} = ±10V	25,000	250,000		V/V
Output Resistance				100		Ω
Output Short Circuit Current				±25		mA
Supply Current				1.9	2.8	mA
Power Consumption				60	85	mW
Transient Response (Voltage Follower, Gain of 1)	Rise Time	V_{IN} = 20mV, C_C = 30pF R_L = 2kΩ, $C_L \leq$ 100pF		0.3		μs
	Overshoot			5.0		%
Slew Rate (Voltage Follower, Gain of 1)		$R_L \geq 2k\Omega$		0.5		V/μs
Transient Response (Voltage Follower, Gain of 10)	Rise Time	V_{IN} = 20mV, C_C = 3.5pF R_L = 2kΩ, $C_L \leq$ 100pF		0.3		μs
	Overshoot			5.0		%
Slew Rate (Voltage Follower, Gain of 10)		$R_L \leq 2k\Omega$, C_C = 3.5pF		5.5		V/μs
The following specifications apply over operating temperature range.						
Input Offset Voltage		$R_S \leq 50k\Omega$		0.8	5.0	mV
Average Input Offset Voltage Drift		$R_S \leq 50k\Omega$		4.0	30	μV/°C
Input Offset Current					40	nA
Average Input Offset Current Drift		25°C ≤ T_A ≤ +70°C		0.01	10.3	nA/°C
		0°C ≤ T_A ≤ +25°C		0.02	0.6	nA/°C
Input Bias Current					200	nA
Input Voltage Range			±12	±13		V
Common Mode Rejection Ratio		$R_S \leq 50k\Omega$	70	95		dB
Supply Voltage Rejection Ratio		$R_S \leq 50k\Omega$		15	150	μV/V
Large Signal Voltage Gain		$R_L \geq 2k\Omega$, V_{OUT} = ±10V	15,000			V/V
Output Voltage Swing		$R_L \geq 10k\Omega$	±12	±14		V
		$R_L \geq 2k\Omega$	±10	±13		V
Power Consumption				60	100	mW

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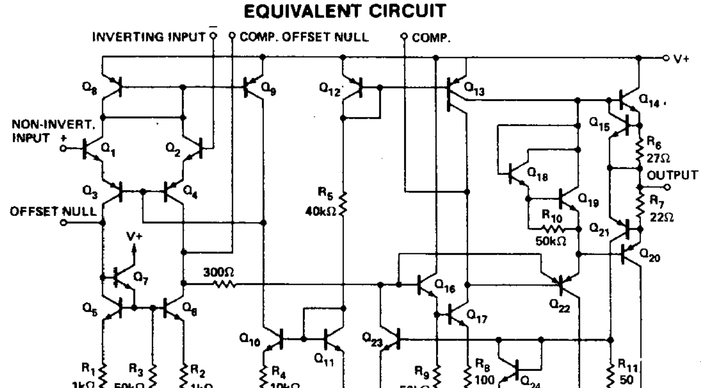
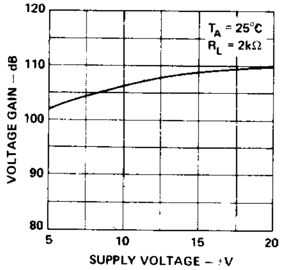
EQUIVALENT CIRCUIT

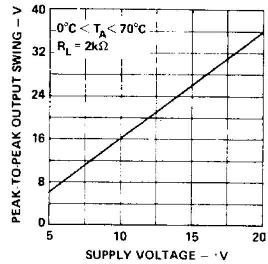


TYPICAL PERFORMANCE CURVES

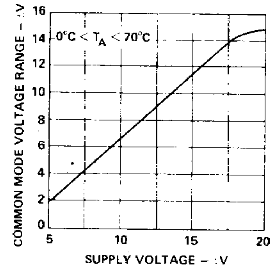
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



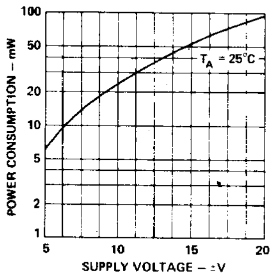
OUTPUT VOLTAGE SWING AS A FUNCTION OF SUPPLY VOLTAGE



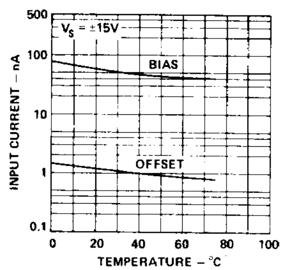
INPUT COMMON MODE VOLTAGE RANGE AS A FUNCTION OF SUPPLY VOLTAGE



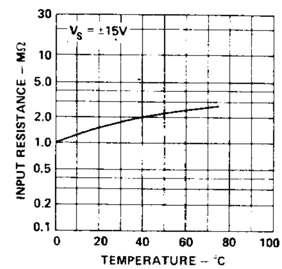
POWER CONSUMPTION AS A FUNCTION OF SUPPLY VOLTAGE



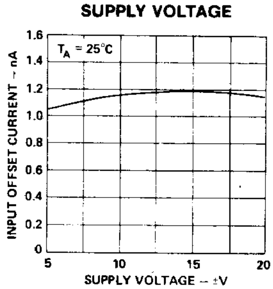
INPUT CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



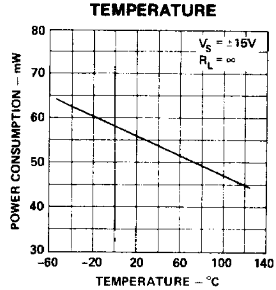
INPUT RESISTANCE AS A FUNCTION OF AMBIENT TEMPERATURE



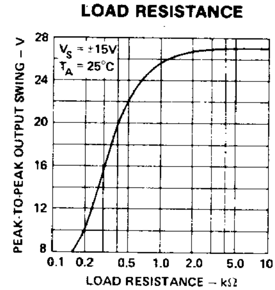
INPUT OFFSET CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



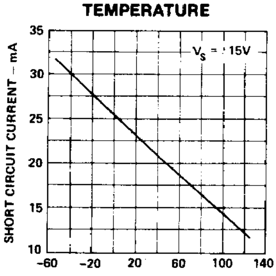
POWER CONSUMPTION AS A FUNCTION OF AMBIENT TEMPERATURE



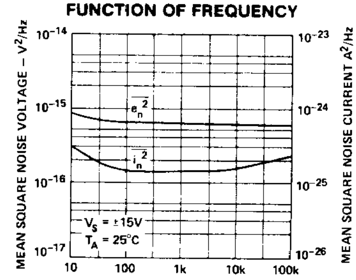
OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE



OUTPUT SHORT-CIRCUIT CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



INPUT NOISE VOLTAGE AND CURRENT AS A FUNCTION OF FREQUENCY



TYPICAL PERFORMANCE CURVES

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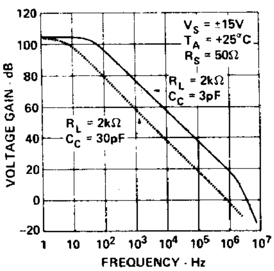
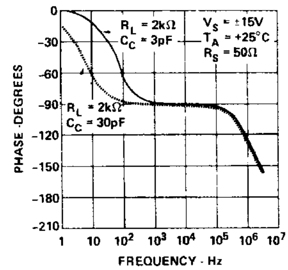
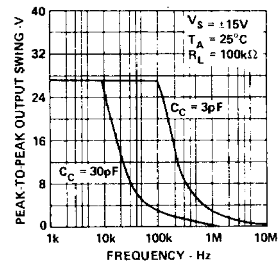
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF FREQUENCY



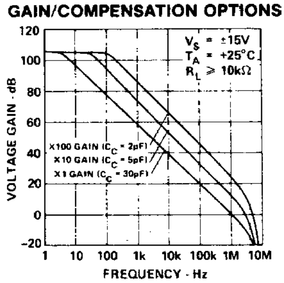
OPEN LOOP PHASE RESPONSE AS A FUNCTION OF FREQUENCY



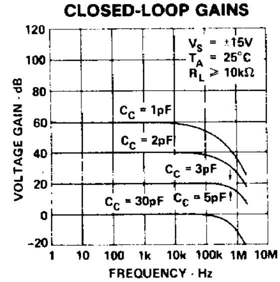
OUTPUT VOLTAGE SWING AS A FUNCTION OF FREQUENCY



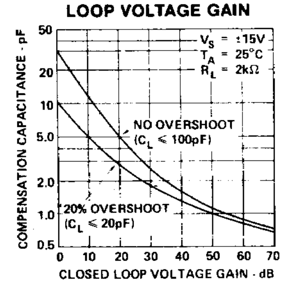
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF FREQUENCY FOR VARIOUS GAIN/COMPENSATION OPTIONS



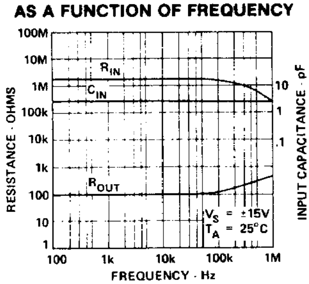
FREQUENCY RESPONSE FOR VARIOUS CLOSED-LOOP GAINS



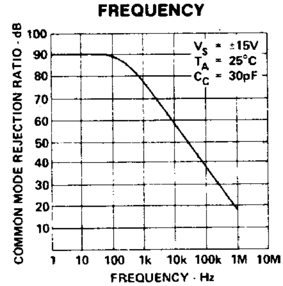
COMPENSATION CAPACITANCE AS A FUNCTION OF CLOSED LOOP VOLTAGE GAIN



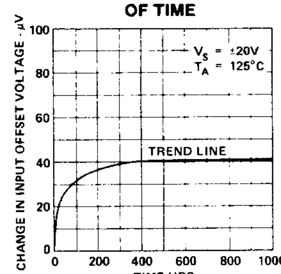
INPUT RESISTANCE, OUTPUT RESISTANCE, AND INPUT CAPACITANCE AS A FUNCTION OF FREQUENCY



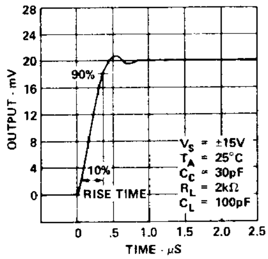
COMMON MODE REJECTION RATIO AS A FUNCTION OF FREQUENCY



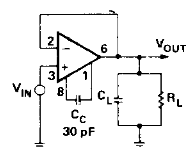
INPUT OFFSET VOLTAGE DRIFT AS A FUNCTION OF TIME



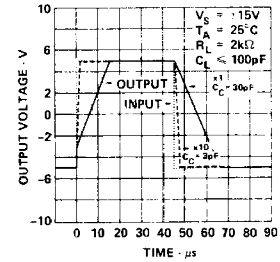
VOLTAGE FOLLOWER TRANSIENT RESPONSE (GAIN OF 1)



TRANSIENT RESPONSE TEST CIRCUIT

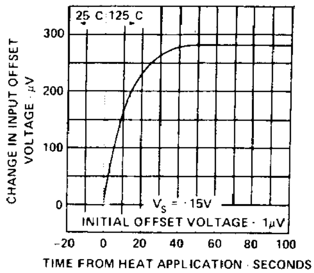


VOLTAGE FOLLOWER LARGE SIGNAL PULSE RESPONSE

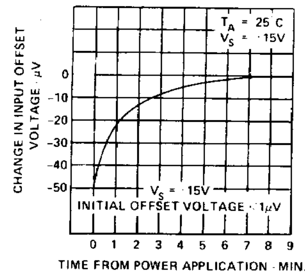


TYPICAL PERFORMANCE CURVES

THERMAL RESPONSE OF INPUT OFFSET VOLTAGE
TO STEP CHANGE OF CASE TEMPERATURE

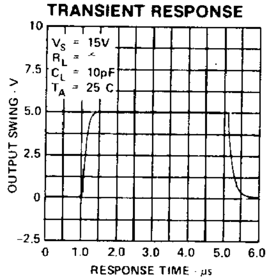


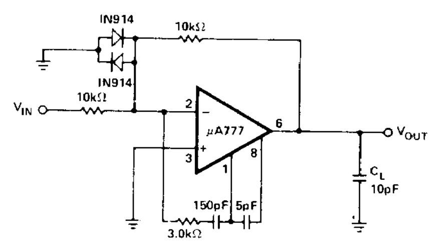
STABILIZATION TIME OF INPUT OFF—SET
VOLTAGE FROM POWER TURN-ON



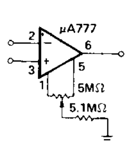
FEED FORWARD COMPENSATION

LARGE SIGNAL FEEDFORWARD
TRANSIENT RESPONSE

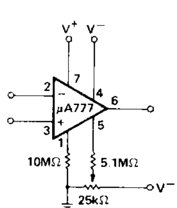




VOLTAGE OFFSET
NULL CIRCUIT

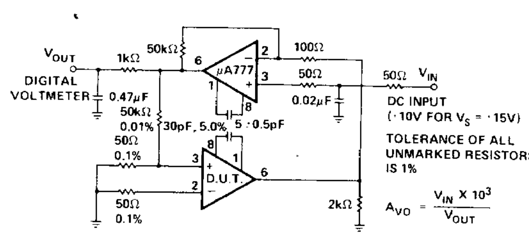


SUGGESTED



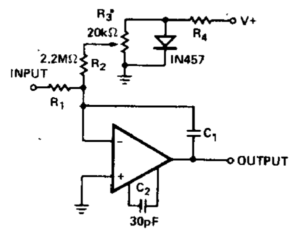
ALTERNATE

GAIN TEST CIRCUIT



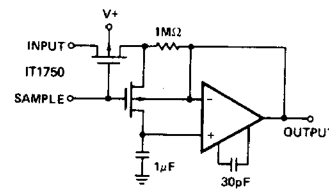
TYPICAL APPLICATIONS

BIAS COMPENSATED LONG TIME INTEGRATOR

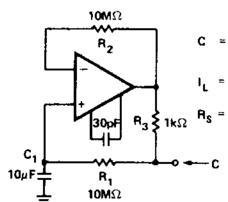


*ADJUST R_3 FOR MINIMUM INTEGRATOR DRIFT

SAMPLE AND HOLD



CAPACITANCE MULTIPLIER

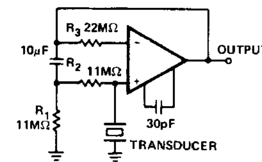


$$C = \frac{R_1}{R_3} C_1$$

$$I_L = \frac{V_{OS} + I_{OS} R_1}{R_3}$$

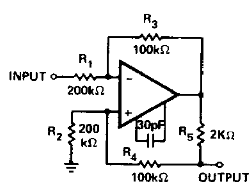
$$R_S = R_3$$

AMPLIFIER FOR CAPACITANCE TRANSDUCERS



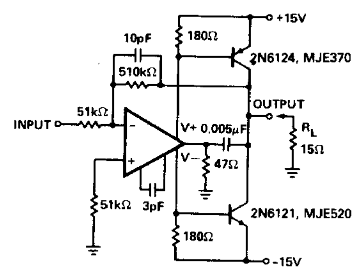
LOW FREQUENCY CUTOFF $R_1 \times C_1$

BILATERAL CURRENT SOURCE

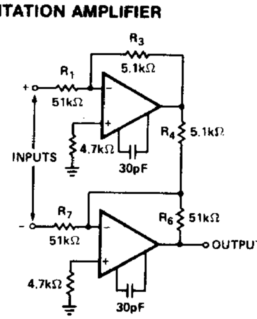


$$I_{OUT} = \frac{R_3 V_{IN}}{R_1 R_5} \;;\; R_1 = R_2;\; R_3 = R_4 + R_5$$

HIGH SLEW RATE POWER AMPLIFIER



±100V COMMON MODE RANGE INSTRUMENTATION AMPLIFIER



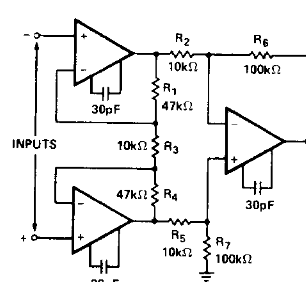
$\frac{R_1}{R_7} \equiv \frac{R_3}{R_4}$ for best CMRR

$R_3 = R_4$

$R_1 = R_6 = 10R_3$

$\text{Gain} = \frac{R_7}{R_6}$

INSTRUMENTATION AMPLIFIER WITH HIGH COMMON MODE REJECTION



$\frac{R_2}{R_5} \equiv \frac{R_6}{R_7}$ for best CMRR

$R_1 = R_4$

$R_2 = R_5$

$\text{Gain} = \frac{R_6}{R_2} \left(1 + \frac{2R_1}{R_3}\right)$

OCEAN CHIPS

Океан Электроники

Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения **«JONHON»**, а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов **«FORSTAR»**.

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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