

GENERAL PURPOSE SINGLE OPERATIONAL AMPLIFIERS

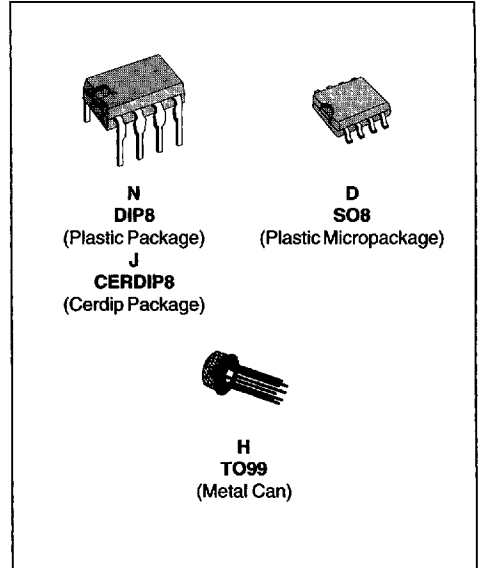
- LARGE INPUT VOLTAGE RANGE
- NO LATCH-UP
- HIGH GAIN
- SHORT-CIRCUIT PROTECTION
- NO FREQUENCY COMPENSATION REQUIRED
- SAME PIN CONFIGURATION AS THE UA709

DESCRIPTION

The UA741 is a high performance monolithic operational amplifier constructed on a single silicon chip. It is intended for a wide range of analog applications.

- Summing amplifier
- Voltage follower
- Integrator
- Active filter
- Function generator

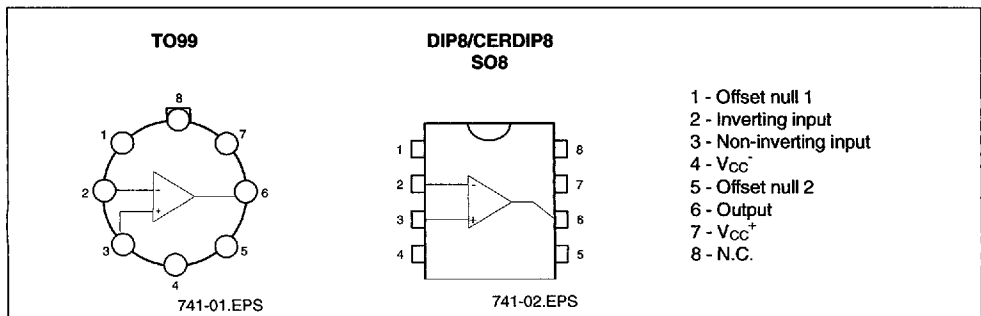
The high gain and wide range of operating voltages provide superior performances in integrator, summing amplifier and general feedback applications. The internal compensation network (6dB / octave) insures stability in closed loop circuits.



Part Number	Temperature Range	Package			
		H	N	J	D
UA741C/E	0°C, +70°C	•	•	•	•
UA741I	-40°C, +105°C	•	•	•	•
UA741M/A	-55°C, +125°C	•	•	•	•

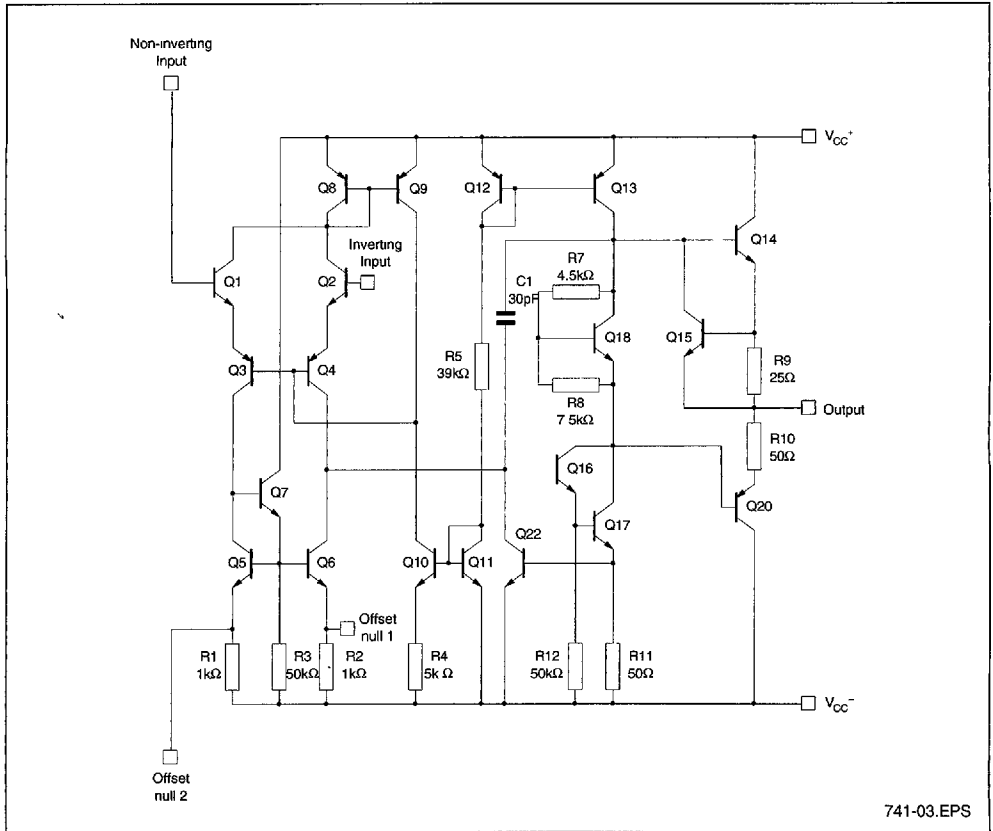
Examples : UA741CN, UA741IH

PIN CONNECTIONS (top views)



741-01.TBL

SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	UA741M-A	UA741I	UA741C-E	Unit
V _{CC}	Supply Voltage	±22	±22	±22	V
V _I	Input Voltage	±15	±15	±15	V
V _{id}	Differential Input Voltage	±30	±30	±30	V
P _{tot}	Power Dissipation	500	500	500	mW
	Output Short-circuit Duration	Infinite			
T _{oper}	Operating Free Air Temperature Range	-55 to +125	-40 to +105	0 to +70	°C
T _{stg}	Storage Temperature Range	-65 to +150	-65 to +150	-65 to +150	°C

741-02 TBL

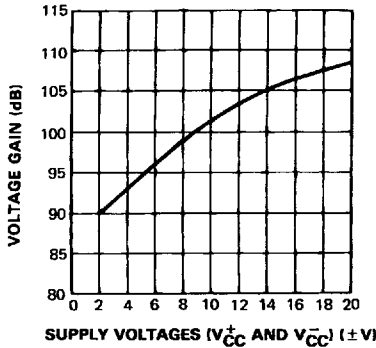
ELECTRICAL CHARACTERISTICS

V_{CC} = ±15V, T_{amb} = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V _{io}	Input Offset Voltage (R _s ≤ 10kΩ) T _{amb} = 25°C T _{min} ≤ T _{amb} ≤ T _{max}		1	5 6	mV
	UA741E,A T _{amb} = 25°C T _{min} ≤ T _{amb} ≤ T _{max} .		1	2 4	
I _{io}	Input Offset Current T _{amb} = 25°C T _{min} ≤ T _{amb} ≤ T _{max}		2	30 70	nA
I _{ib}	Input Bias Current T _{amb} = 25°C T _{min} ≤ T _{amb} ≤ T _{max}		10	100 200	nA
A _{vd}	Large Signal Voltage Gain (V _o = ±10V, R _L = 2kΩ) T _{amb} = 25°C T _{min} ≤ T _{amb} ≤ T _{max}	50 25	200		V/mV
SVR	Supply Voltage Rejection Ratio (R _s ≤ 10kΩ) T _{amb} = 25°C T _{min} ≤ T _{amb} ≤ T _{max}	77 77	90		dB
I _{cc}	Supply Current, no load T _{amb} = 25°C T _{min} ≤ T _{amb} ≤ T _{max}		1.7	2.8 3.3	mA
V _{icm}	Input Common Mode Voltage Range T _{amb} = 25°C T _{min} ≤ T _{amb} ≤ T _{max}	±12 ±12			V
CMR	Common Mode Rejection Ratio (R _s ≤ 10kΩ) T _{amb} = 25°C T _{min} ≤ T _{amb} ≤ T _{max}	70 70	90		dB
I _{os}	Output Short-circuit Current	10	25	40	mA
±V _{OPP}	Output Voltage Swing T _{amb} = 25°C T _{min} ≤ T _{amb} ≤ T _{max}	R _L = 10kΩ 12 R _L = 2kΩ 10 R _L = 10kΩ 12 R _L = 2kΩ 10	14 13		V
SR	Slew Rate (V _i = ±10V, R _L = 2kΩ, C _L = 100pF, T _{amb} = 25°C, unity gain)	0.25	0.5		V/μs
t _r	Rise Time (V _i = ±20mV, R _L = 2kΩ, C _L = 100pF, T _{amb} = 25°C, unity gain)		0.3		μs
K _{OV}	Overshoot (V _i = ±20mV, R _L = 2kΩ, C _L = 100pF, T _{amb} = 25°C, unity gain)		5		%
R _i	Input Resistance	0.3	2		MΩ
GBP	Gain Bandwidth Product (V _i = 10mV, R _L = 2kΩ, C _L = 100pF, f = 100kHz)	0.7	1		MHz
THD	Total Harmonic Distortion (f = 1kHz, A _v = 20dB, R _L = 2kΩ, V _o = 2V _{PP} , C _L = 100pF, T _{amb} = 25°C)		0.06		%
e _n	Equivalent Input Noise Voltage (f = 1kHz, R _s = 100Ω)		23		$\frac{nV}{\sqrt{Hz}}$
∅ _m	Phase Margin		50		Degrees

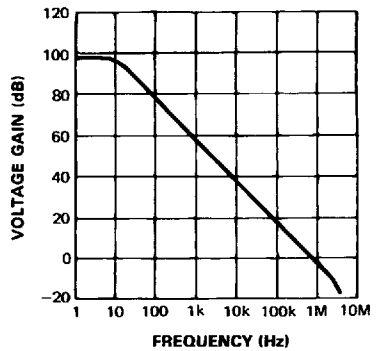
741-03.TBL

OPEN LOOP VOLTAGE GAIN (Typ.)



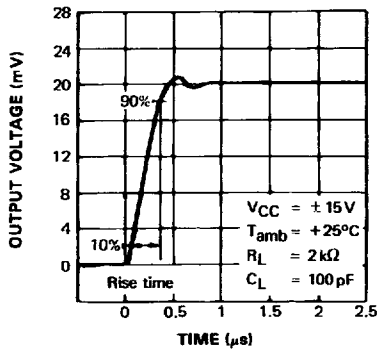
741-04.EPS

OPEN LOOP FREQUENCY RESPONSE (Typ.)



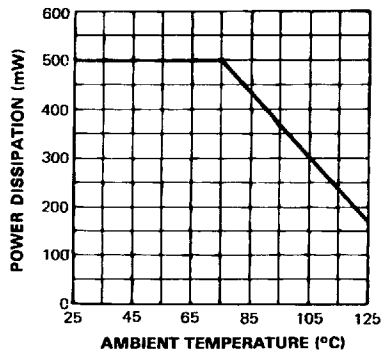
741-05.EPS

TRANSIENT RESPONSE (Typ.)



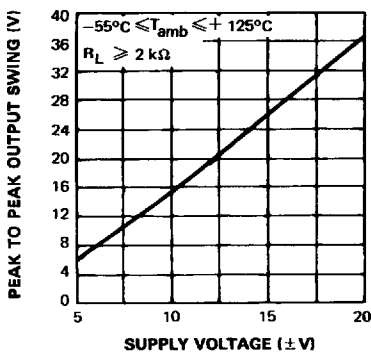
741-06.EPS

ABSOLUTE MAXIMUM POWER DISSIPATION



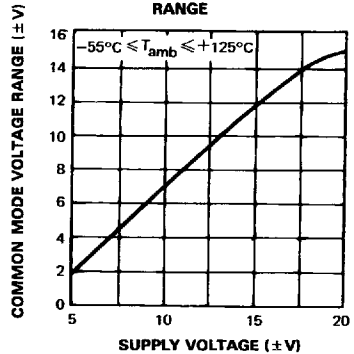
741-07.EPS

OUTPUT VOLTAGE SWING



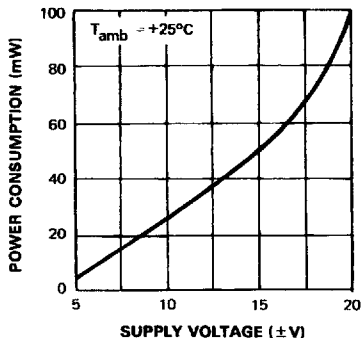
741-08.EPS

INPUT COMMON MODE VOLTAGE RANGE



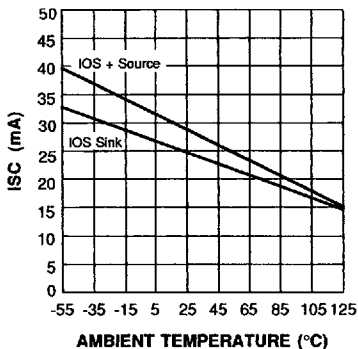
741-09.EPS

POWER CONSUMPTION



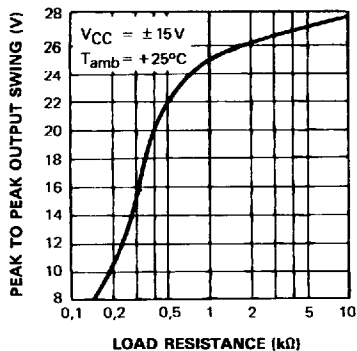
741-10.EPS

OUTPUT CURRENT vs AMBIENT TEMPERATURE



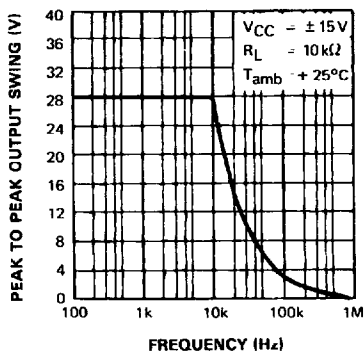
741-11.EPS

OUTPUT VOLTAGE SWING



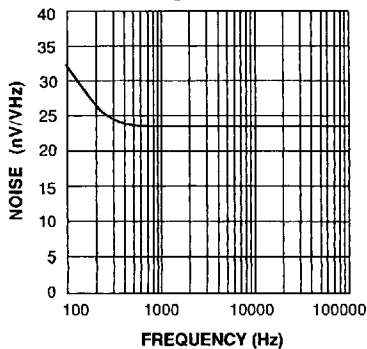
741-12.EPS

OUTPUT VOLTAGE SWING



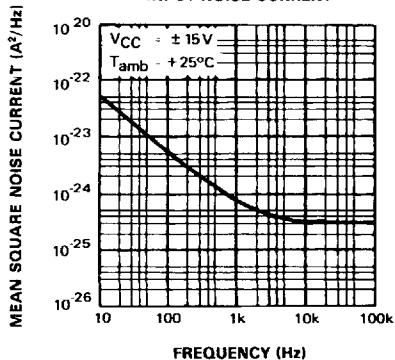
741-13.EPS

EQUIVALENT INPUT NOISE vs FREQUENCY
Rg = 100 Ω



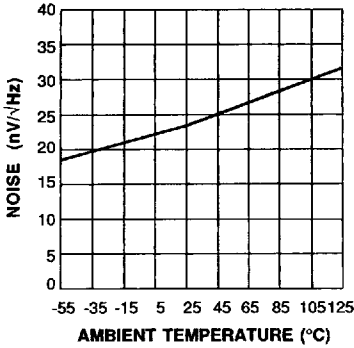
741-14.EPS

INPUT NOISE CURRENT



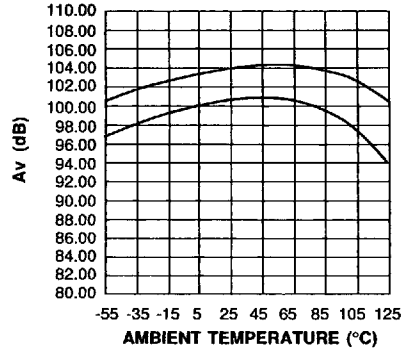
741-15.EPS

EQUIVALENT INPUT NOISE vs AMBIENT TEMPERATURE



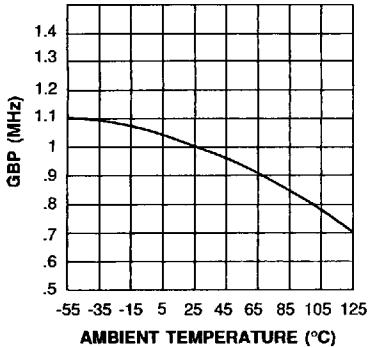
741-16.EPS

LARGE SIGNAL VOLTAGE GAIN vs AMBIENT TEMPERATURE



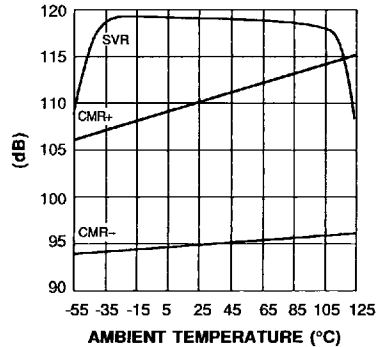
741-17.EPS

GAIN BANDWIDTH PRODUCT vs AMBIENT TEMPERATURE



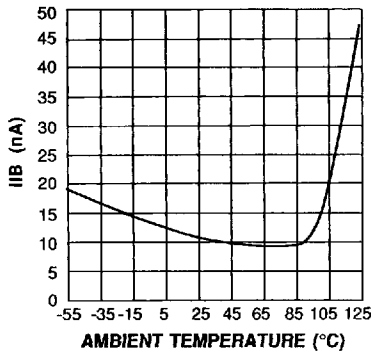
741-18.EPS

POWER SUPPLY & COMMON MODE REJECTION RATIO vs AMBIENT TEMPERATURE



741-19.EPS

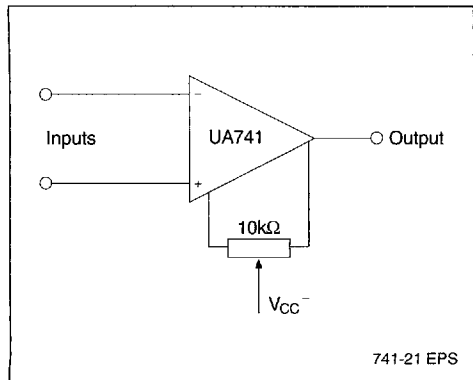
INPUT BIAS CURRENT vs AMBIENT TEMPERATURE



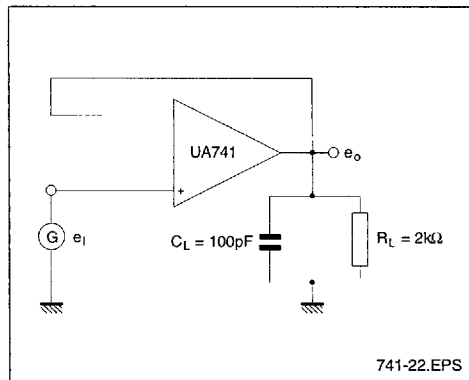
741-20.EPS

MEASUREMENT DIAGRAMS

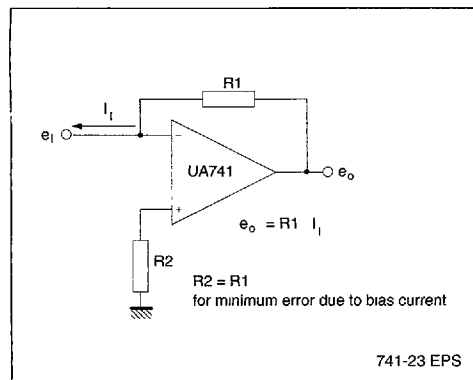
OFFSET VOLTAGE NULL CIRCUIT



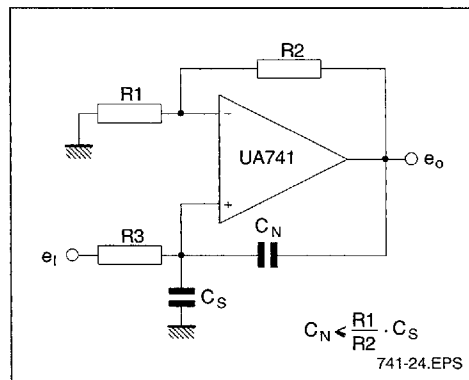
TRANSIENT RESPONSE TEST CIRCUIT



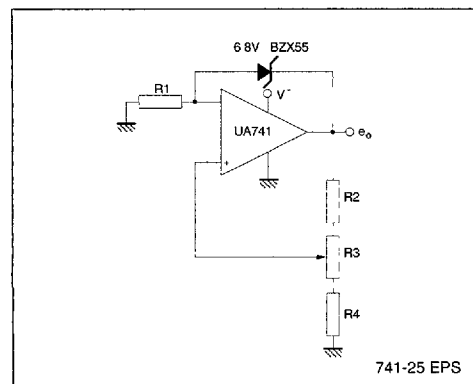
CURRENT TO VOLTAGE CONVERTER



NEUTRALIZING INPUT CAPACITANCE TO OPTIMIZE RESPONSE TIME



POSITIVE VOLTAGE REFERENCE



NEGATIVE VOLTAGE REFERENCE

