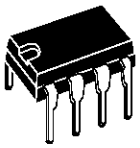
SGS-THOMSON MICROELECTRONICS

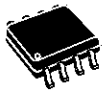
UA741

GENERAL PURPOSE SINGLE OPERATIONAL AMPLIFIER

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



N
DIP8
(Plastic Package)



D
SO8
(Plastic Micropackage)

DESCRIPTION

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

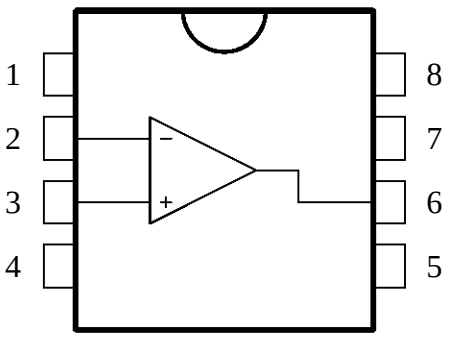
- Summing amplifier
- Voltage follower
- Integrator
- Active filter
- Function generator

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.

ORDER CODES

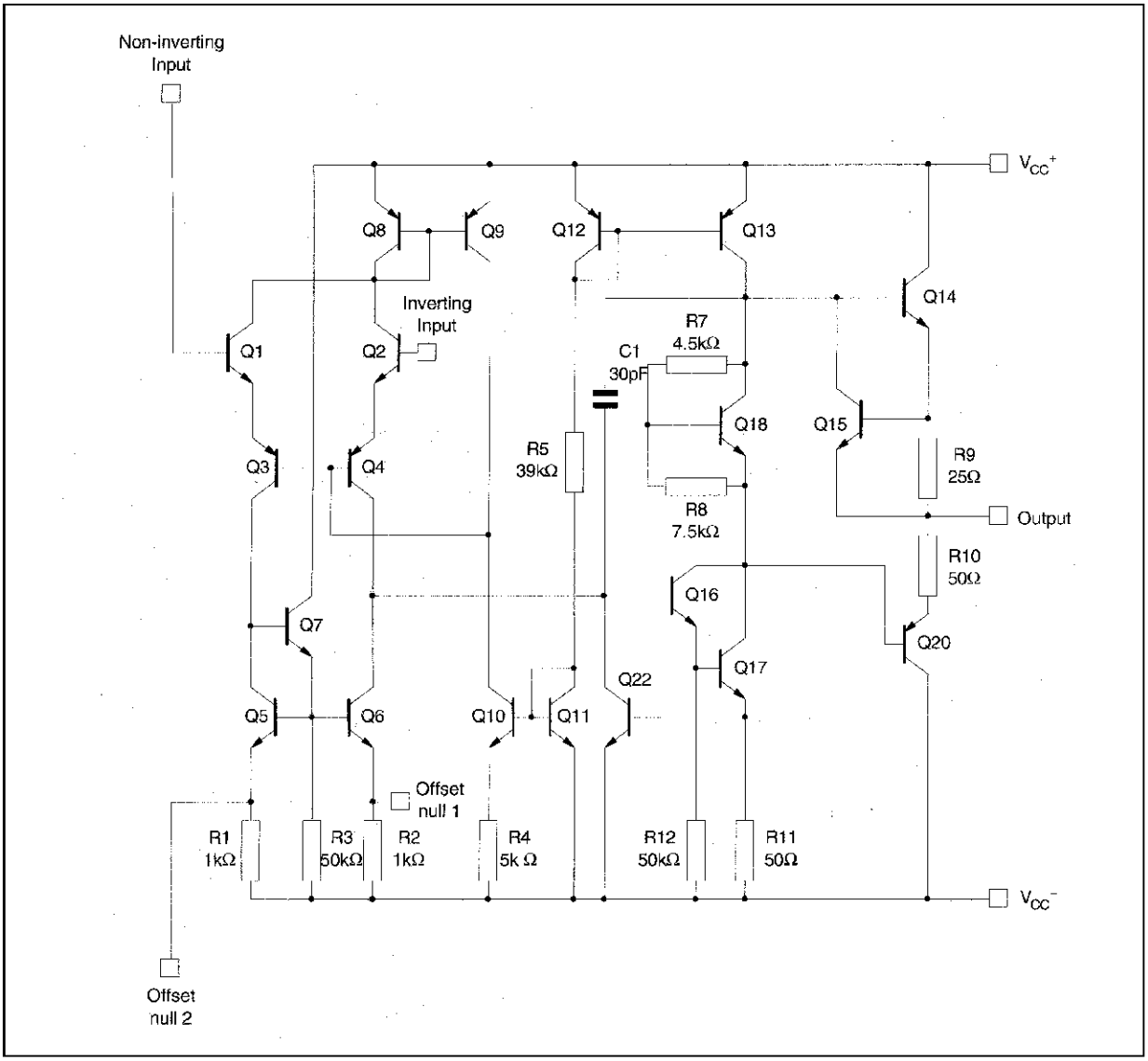
Part Number	Temperature Range	Package	
		N	D
UA741C	0^oC, $+70^oC$	•	•
UA741I	-40^oC, $+105^oC$	•	•
UA741M	-55^oC, $+125^oC$	•	•
Example : UA741CN			

PIN CONNECTIONS (top view)



1 - Offset null 1
2 - Inverting input
3 - Non-inverting input
4 - V_{CC}^-
5 - Offset null 2
6 - Output
7 - V_{CC}^+
8 - N.C.

SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

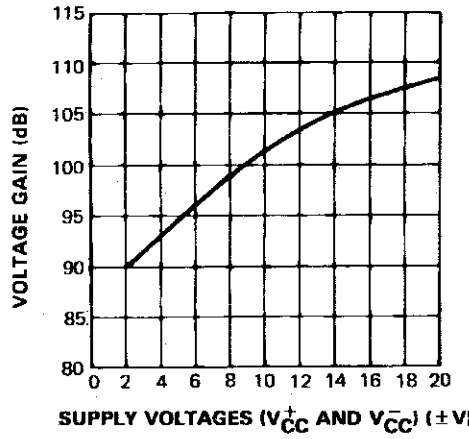
Symbol	Parameter	UA741M	UA741I	UA741C	Unit
V_{cc}	Supply Voltage	±22			V
V_{id}	Differential Input Voltage	±30			V
V_i	Input Voltage	±15			V
P_{tot}	Power Dissipation	500			mW
	Output Short-circuit Duration	Infinite			
T_{oper}	Operating Free Air Temperature Range	-55 to +125	-40 to +105	0 to +70	°C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

ELECTRICAL CHARACTERISTICS

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

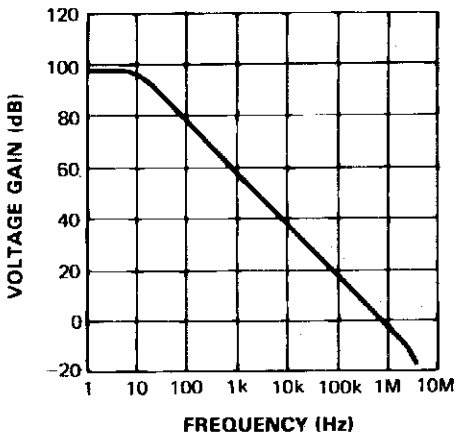
Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{io}	Input Offset Voltage ($R_S \leq 10k\Omega$) T_{amb} = +25°C $T_{min.} \leq T_{amb} \leq T_{max.}$		1	5 6	mV
I_{io}	Input Offset Current T_{amb} = +25°C $T_{min.} \leq T_{amb} \leq T_{max.}$		2	30 70	nA
I_{ib}	Input Bias Current T_{amb} = +25°C $T_{min.} \leq T_{amb} \leq T_{max.}$		10	100 200	nA
A_{vd}	Large Signal Voltage Gain * (V_O ±10V, R_L = 2kΩ) T_{amb} = +25°C $T_{min.} \leq T_{amb} \leq T_{max.}$	 50 25	200		V/mV
SVR	Supply Voltage Rejection Ratio ($R_S \leq 10k\Omega$) T_{amb} = +25°C $T_{min.} \leq T_{amb} \leq T_{max.}$	 77 77	90		dB
I_{CC}	Supply Current, no load T_{amb} = +25°C $T_{min.} \leq T_{amb} \leq T_{max.}$		1.7	2.8 3.3	mA
V_{icm}	Input Common Mode Voltage Range T_{amb} = +25°C $T_{min.} \leq T_{amb} \leq T_{max.}$	 ±12 ±12			V
CMR	Common-mode Rejection Ratio ($R_S \leq 10k\Omega$) T_{amb} = +25°C $T_{min.} \leq T_{amb} \leq T_{max.}$	 70 70	90		dB
I_{OS}	Output Short-circuit Current	10	25	40	mA
$\pm V_{OPP}$	Output Voltage Swing T_{amb} = +25°C R_L = 10kΩ R_L = 2kΩ $T_{min.} \leq T_{amb} \leq T_{max.}$ R_L = 10kΩ R_L = 2kΩ	 12 10 12 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, CL = 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

OPEN LOOP VOLTAGE GAIN (Typ.)



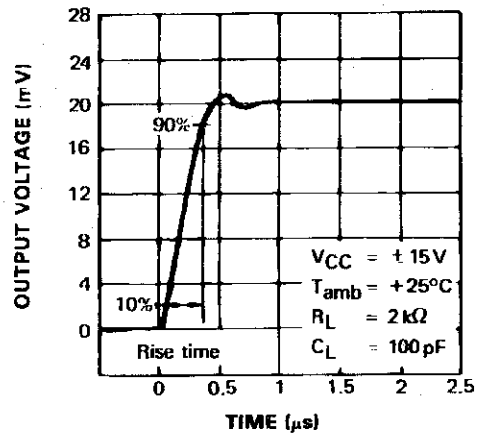
741-04.EPS

OPEN LOOP FREQUENCY RESPONSE (Typ.)



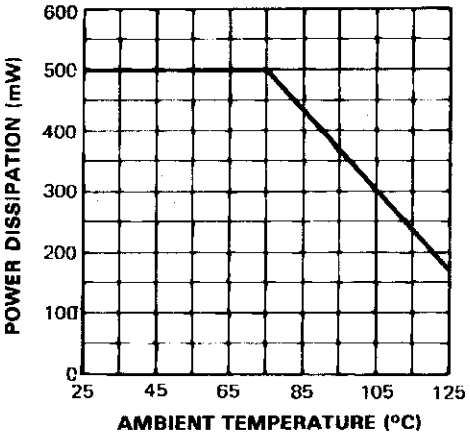
741-05.EPS

TRANSIENT RESPONSE (Typ.)



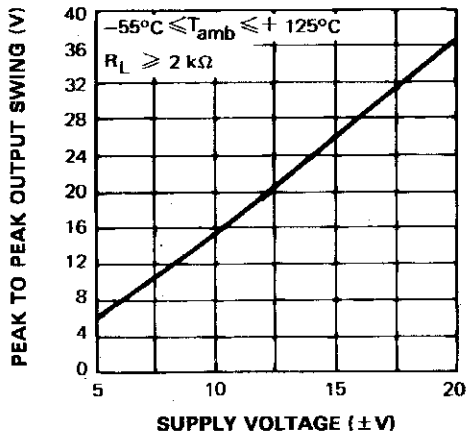
741-06.EPS

ABSOLUTE MAXIMUM POWER DISSIPATION



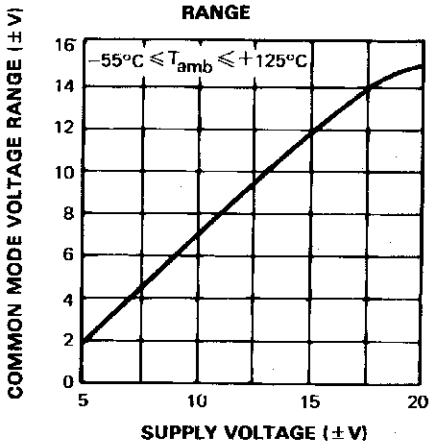
741-07.EPS

OUTPUT VOLTAGE SWING



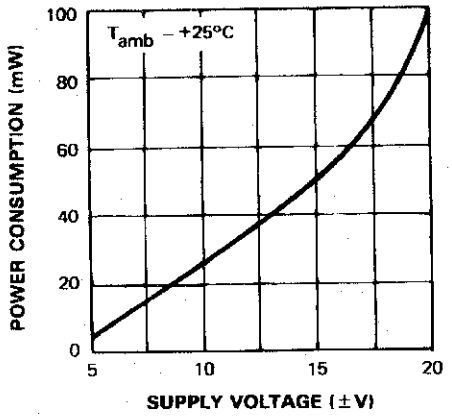
741-08.EPS

INPUT COMMON MODE VOLTAGE RANGE



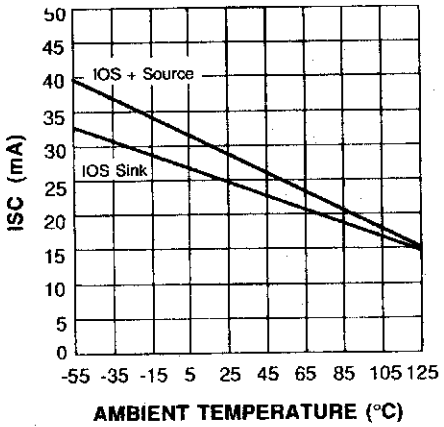
741-09.EPS

POWER CONSUMPTION



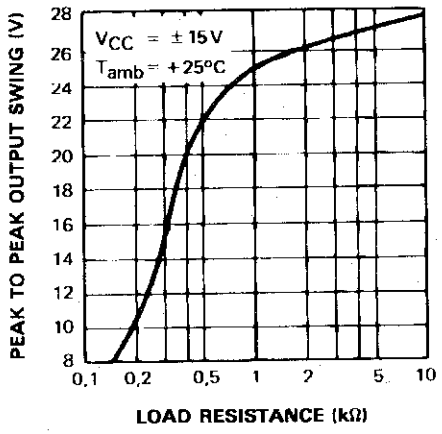
741-10.EPS

OUTPUT CURRENT vs AMBIENT TEMPERATURE



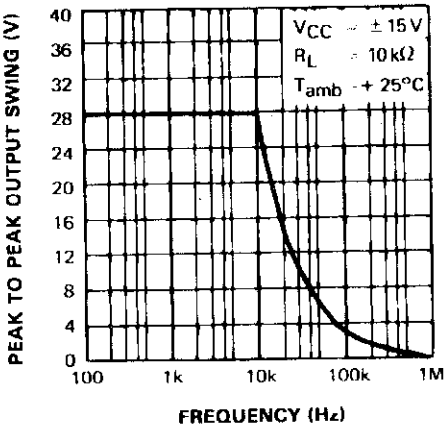
741-11.EPS

OUTPUT VOLTAGE SWING



741-12.EPS

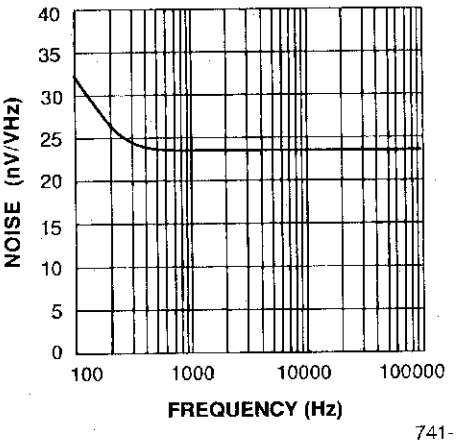
OUTPUT VOLTAGE SWING



741-13.EPS

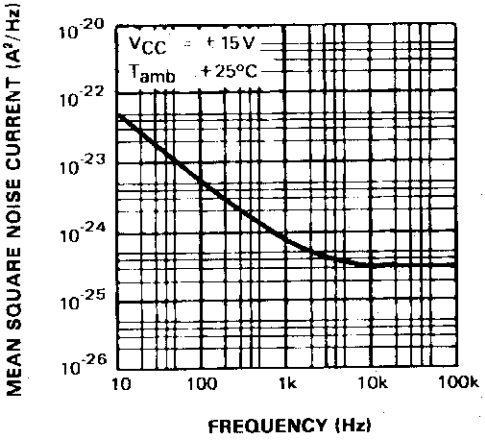
EQUIVALENT INPUT NOISE vs FREQUENCY

Rg = 100 Ω



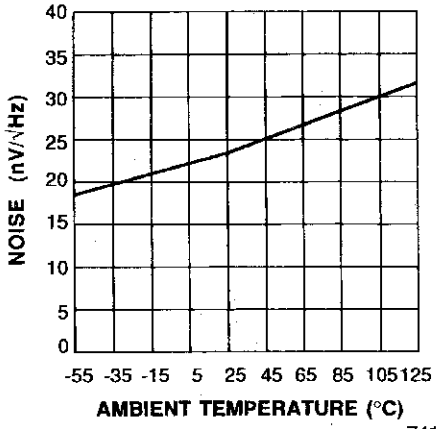
741-14.EPS

INPUT NOISE CURRENT



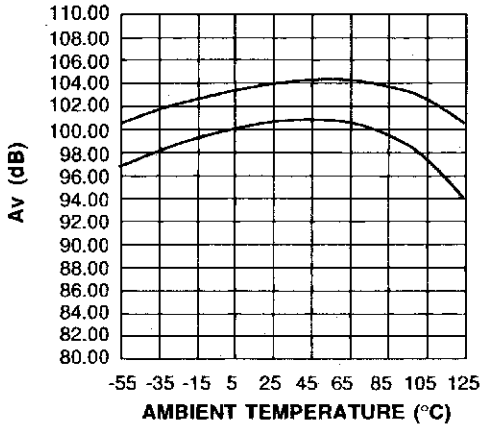
741-15.EPS

EQUIVALENT INPUT NOISE vs AMBIENT TEMPERATURE



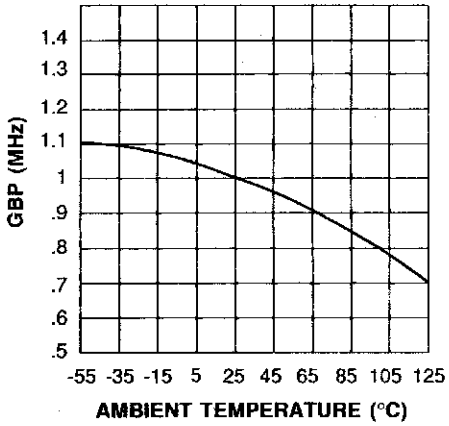
741-16.EPS

LARGE SIGNAL VOLTAGE GAIN vs AMBIENT TEMPERATURE



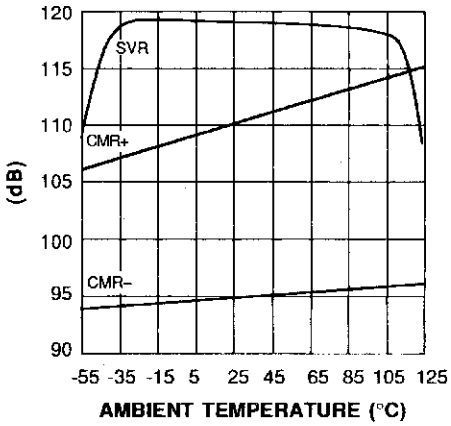
741-17.EPS

GAIN BANDWIDTH PRODUCT vs AMBIENT TEMPERATURE



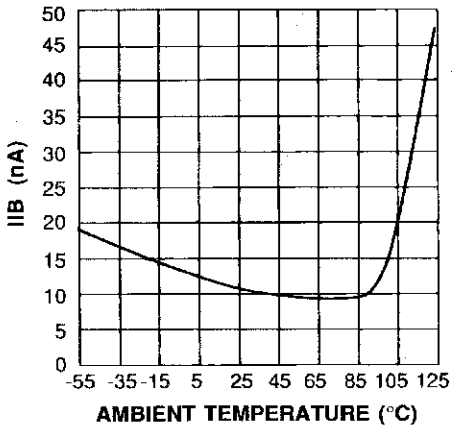
741-18.EPS

POWER SUPPLY & COMMON MODE REJECTION RATIO vs AMBIENT TEMPERATURE



741-19.EPS

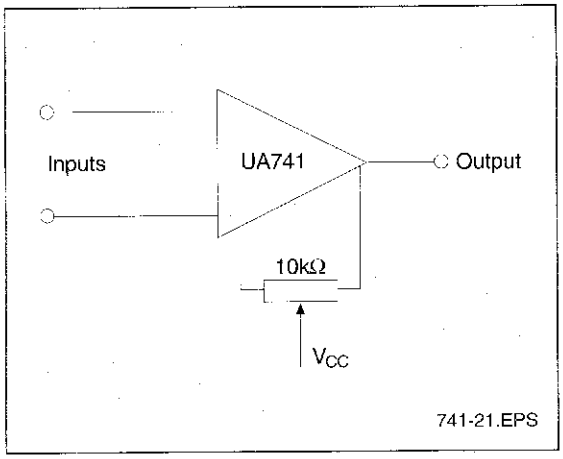
INPUT BIAS CURRENT vs AMBIENT TEMPERATURE



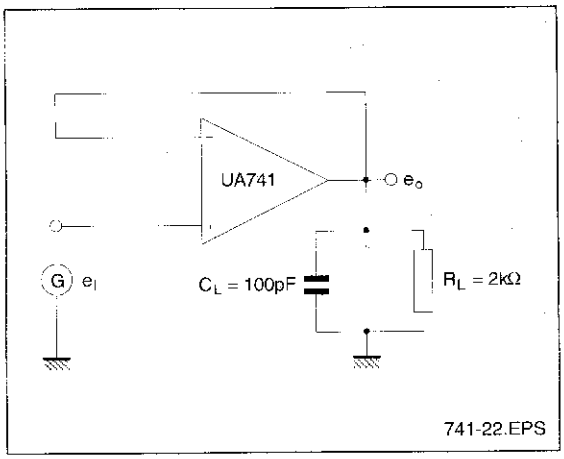
741-20.EPS

MEASUREMENT DIAGRAMS

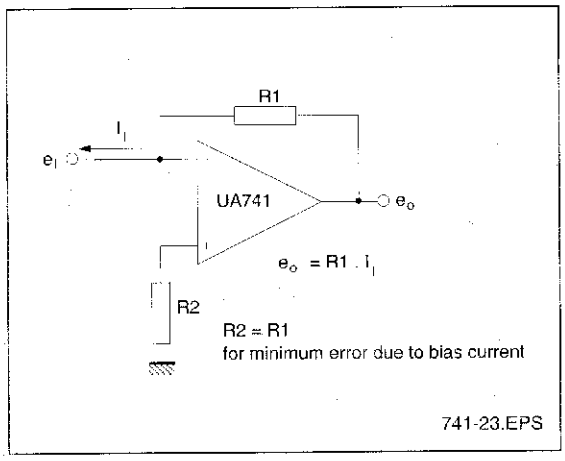
OFFSET VOLTAGE NULL CIRCUIT



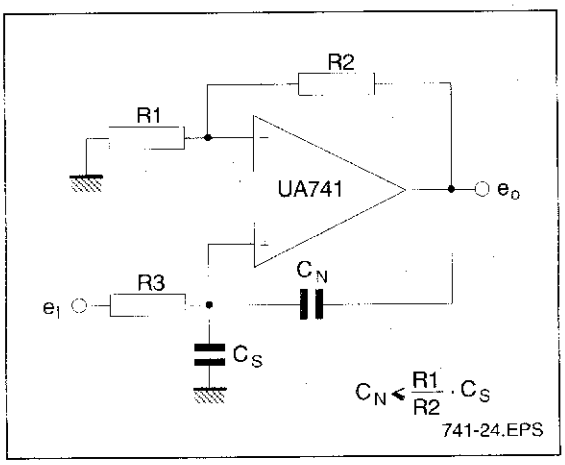
TRANSIENT RESPONSE TEST CIRCUIT



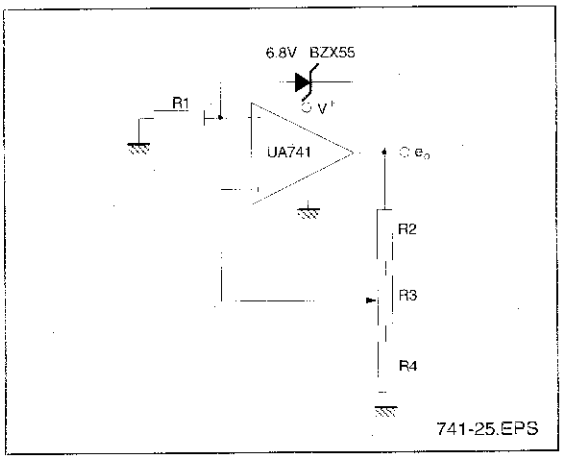
CURRENT TO VOLTAGE CONVERTER



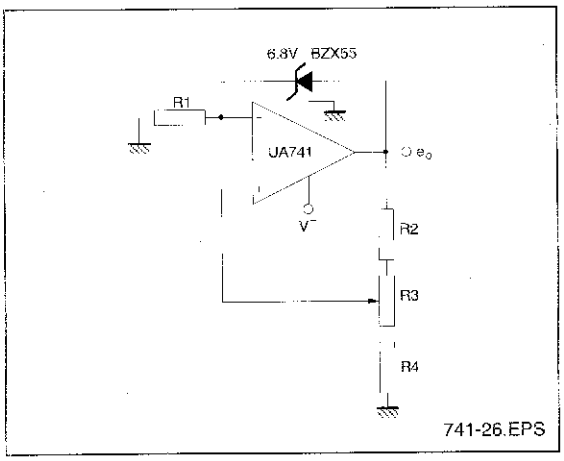
NEUTRALIZING INPUT CAPACITANCE TO OPTIMIZE RESPONSE TIME



POSITIVE VOLTAGE REFERENCE

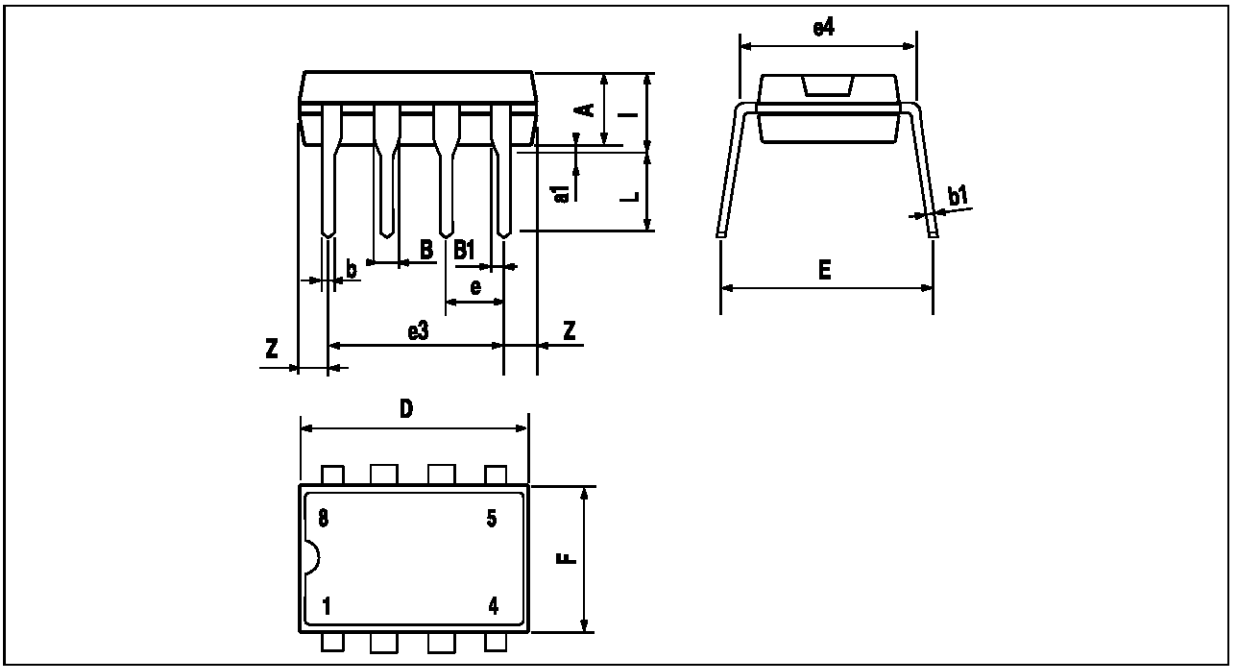


NEGATIVE VOLTAGE REFERENCE



PACKAGE MECHANICAL DATA

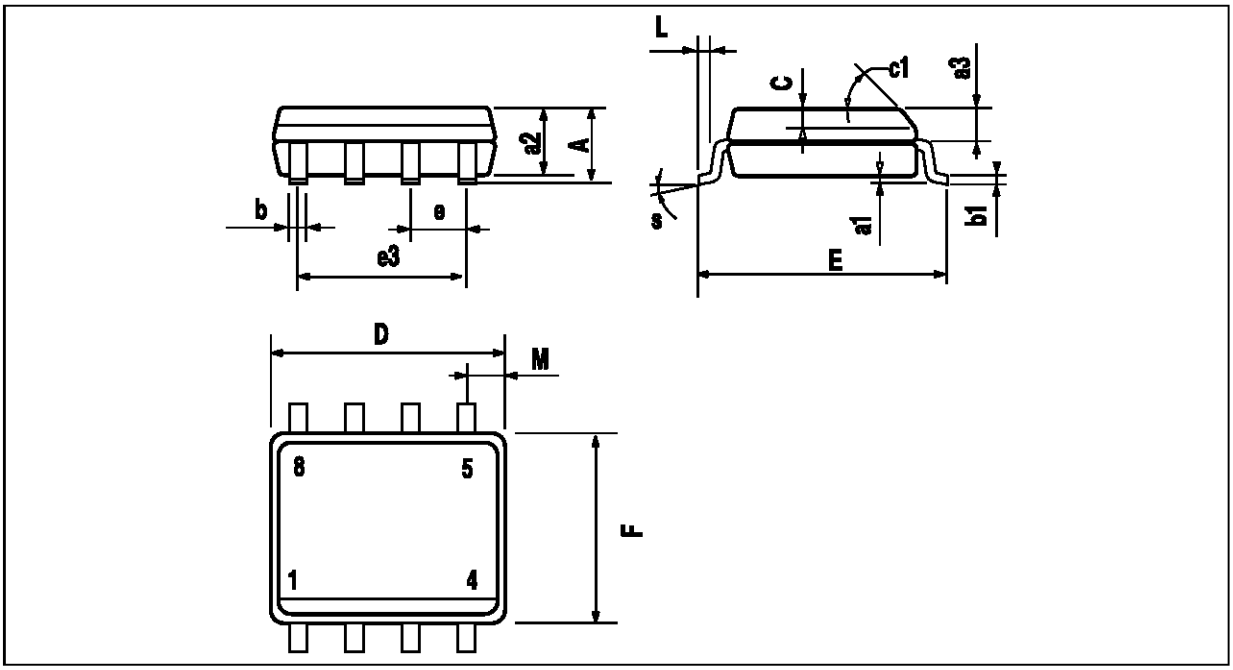
8 PINS - PLASTIC DIP



Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0260
i			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

PACKAGE MECHANICAL DATA

8 PINS - PLASTIC MICROPACKAGE (SO)



Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45^o (typ.)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.150		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8^o (max.)					