

GENERAL-PURPOSE SINGLE OP-AMPS

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

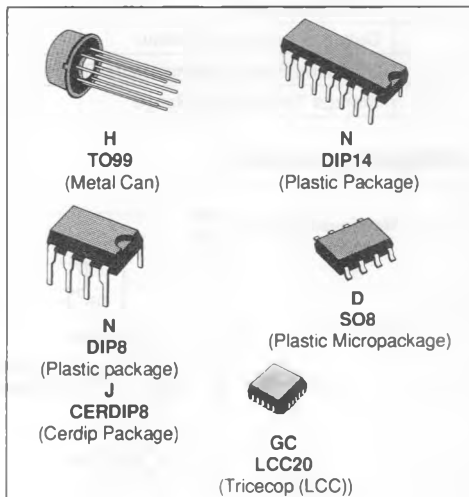
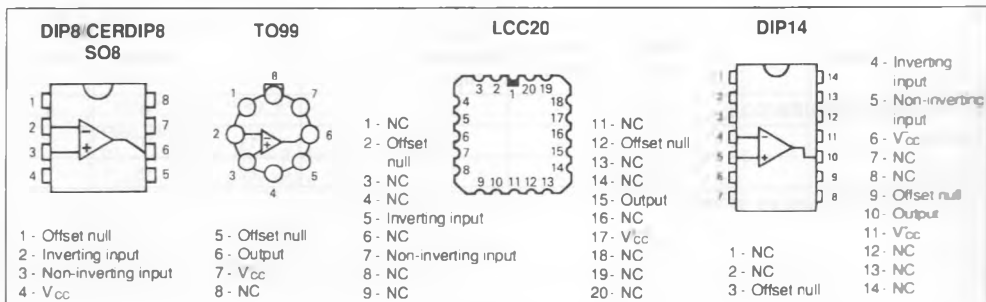
DESCRIPTION

The UA741 is a high performance monolithic operational 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 provides superior performance integrator, summing amplifier, and general feedback applications. the internal compensation network (6 dB/octave) insures stability in closed loop applications.

PIN CONNECTIONS (top views)



ORDER CODES

Part Number	Temperature Range	Package					
		H	J	GC	N	N ₁₄	D
UA741C/E	0 °C to + 70 °C	•	•		•	•	•
UA741I	-40 °C to + 105 °C	•	•		•	•	
UA741M/A	-55 °C to + 125 °C	•	•	•			

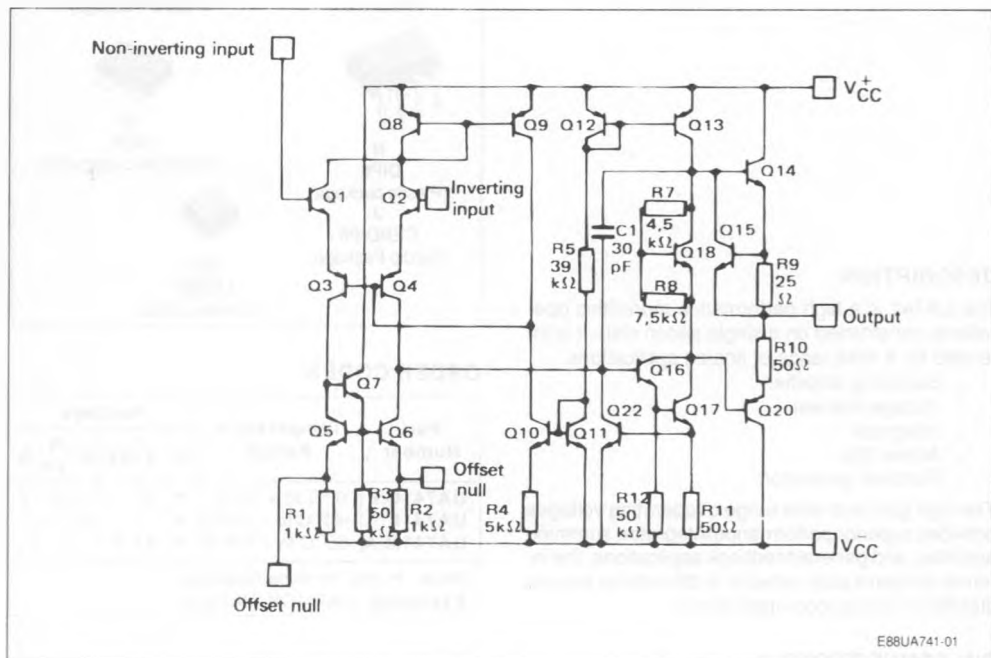
Note : Hi-Rel Versions Available

Examples : UA741CN, UA741IH

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value			Unit
		UA741M, A	UA741I	UA741C, E	
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

SCHEMATIC DIAGRAM



Case	Offset Null	Inverting Input	Non-inverting Input	V _{CC}	V _{CC}	Output	N.C.
T099/DIP8/CERDIP8/SO8	1, 5	2	3	4	7	6	8
DIP14	3, 9	4	5	6	11	10	*
LCC20	2, 12	5	7	10	17	15	*

TO116, LCC20 : Other pins are not connected.

ELECTRICAL CHARACTERISTICS

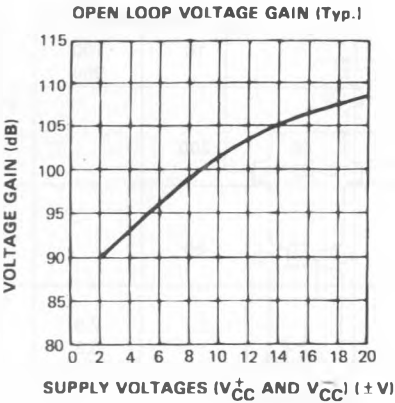
UA741M/A : $-55^{\circ}\text{C} \leq T_{\text{amb}} \leq +125^{\circ}\text{C}$, $V_{\text{CC}} = \pm 15\text{ V}$ UA741I : $-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +105^{\circ}\text{C}$, $V_{\text{CC}} = \pm 15\text{ V}$ UA741C/E : $0^{\circ}\text{C} \leq T_{\text{amb}} \leq +70^{\circ}\text{C}$, $V_{\text{CC}} = \pm 15\text{ V}$

(unless otherwise specified)

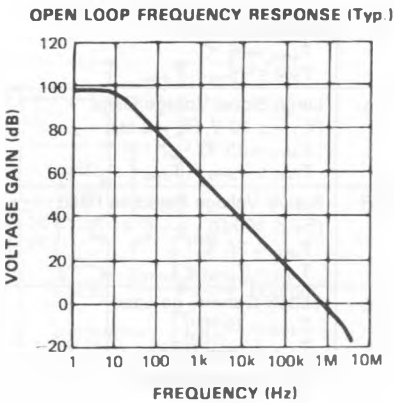
Symbol	Parameter	UA741C, E, I, M, A			Unit
		Min.	Typ.	Max.	
V_{IO}	Input Offset Voltage $R_S \leq 10\text{ k}\Omega$ $T_{\text{amb}} = 25^{\circ}\text{C}$ $T_{\text{min}} \leq T_{\text{amb}} \leq T_{\text{max}}$ UA741E, A $T_{\text{amb}} = 25^{\circ}\text{C}$ $T_{\text{min}} \leq T_{\text{amb}} \leq T_{\text{max}}$		1 1	5 2 6 4	mV
I_{IO}	Input Offset Current $T_{\text{amb}} = 25^{\circ}\text{C}$ $T_{\text{min}} \leq T_{\text{amb}} \leq T_{\text{max}}$		2	20 40	nA
I_{IB}	Input Bias Current $T_{\text{amb}} = 25^{\circ}\text{C}$ $T_{\text{min}} \leq T_{\text{amb}} \leq T_{\text{max}}$		10	100 200	nA
A_{VD}	Large Signal Voltage Gain ($V_O = \pm 10\text{ V}$, $R_L = 2\text{ k}\Omega$) $T_{\text{amb}} = 25^{\circ}\text{C}$ $T_{\text{min}} \leq T_{\text{amb}} \leq T_{\text{max}}$	50 25	200		V/mV
SVR	Supply Voltage Rejection Ratio ($R_S \leq 10\text{ k}\Omega$) $T_{\text{amb}} = 25^{\circ}\text{C}$ $T_{\text{min}} \leq T_{\text{amb}} \leq T_{\text{max}}$	77 77	90		dB
I_{CC}	Supply Current, no Load $T_{\text{amb}} = 25^{\circ}\text{C}$ $T_{\text{min}} \leq T_{\text{amb}} \leq T_{\text{max}}$		1.7	2.8 3.3	mA
V_{I}	Input Voltage Range $T_{\text{amb}} = 25^{\circ}\text{C}$ $T_{\text{min}} \leq T_{\text{amb}} \leq T_{\text{max}}$	-12 -12		+12 +12	V
CMR	Common Mode Rejection Ratio ($R_S \leq 10\text{ k}\Omega$) $T_{\text{amb}} = 25^{\circ}\text{C}$ $T_{\text{min}} \leq T_{\text{amb}} \leq T_{\text{max}}$	70 70	90		dB
I_{OS}	Output Short-circuit Current $T_{\text{amb}} = 25^{\circ}\text{C}$	10	25	40	mA
$\pm V_{\text{OPP}}$	Output Voltage Swing $T_{\text{amb}} = 25^{\circ}\text{C}$ $T_{\text{min}} \leq T_{\text{amb}} \leq T_{\text{max}}$ $R_L = 10\text{ k}\Omega$ $R_L = 2\text{ k}\Omega$ $R_L = 10\text{ k}\Omega$ $R_L = 2\text{ k}\Omega$	12 10 12 10	14 13		V
S_{VO}	Slew-rate ($V_{\text{I}} = \pm 10\text{ V}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$, $T_{\text{amb}} = 25^{\circ}\text{C}$, unity gain)	0.25	0.5		V/ μs
t_r	Rise Time ($V_{\text{I}} = \pm 20\text{ mV}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$, $T_{\text{amb}} = 25^{\circ}\text{C}$, unity gain)		0.3		μs
K_{OV}	Overshoot ($V_{\text{I}} = \pm 20\text{ mV}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$, $T_{\text{amb}} = 25^{\circ}\text{C}$, unity gain)		5		%
R_{I}	Input Resistance, $T_{\text{amb}} = 25^{\circ}\text{C}$	0.3	2		$\text{m}\Omega$

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	UA741C, E, I, M, A			Unit
		Min.	Typ.	Max.	
GPB	Gain Bandwidth Product ($V_I = 10\text{ mV}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$ $f = 100\text{ kHz}$, $T_{\text{amb}} = 25\text{ }^\circ\text{C}$)	0.7	1	1.6	MHz
THD	Total Harmonic Distortion ($f = 1\text{ kHz}$, $A_v = 20\text{ dB}$, $R_L = 2\text{ k}\Omega$, $V_O = 2\text{ V}_{pp}$, $C_L \leq 100\text{ pF}$, $T_{\text{amb}} = 25\text{ }^\circ\text{C}$)		0.06		%
V_N	Equivalent Input Noise Voltage ($f = 1\text{ kHz}$, $R_G = 100\text{ }\Omega$)		23		nV/ $\sqrt{\text{Hz}}$
	Phase Margin		50		Degrees

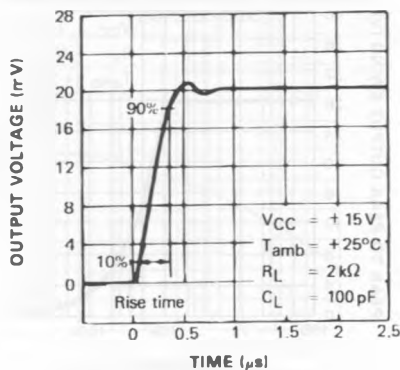


E88UA741-02



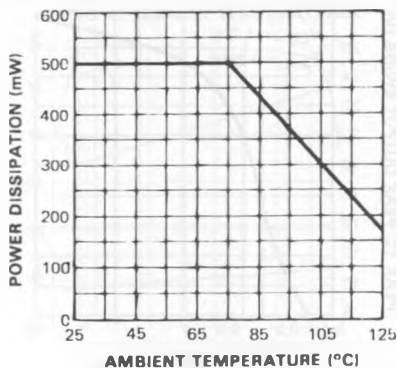
E88UA741-03

TRANSIENT RESPONSE (Typ.)



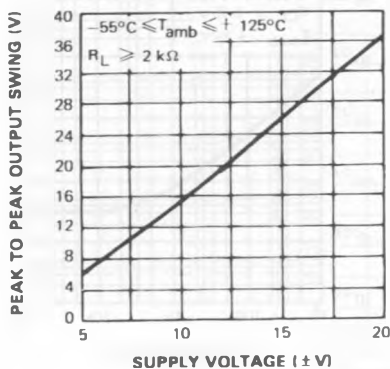
E88UA741-04

ABSOLUTE MAXIMUM POWER DISSIPATION



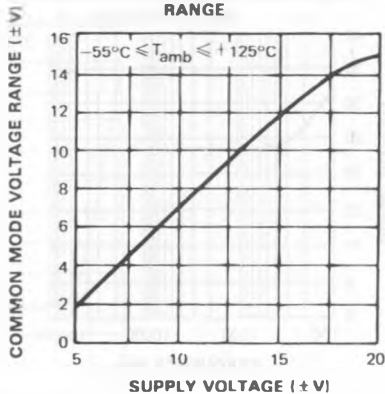
E88UA741-05

OUTPUT VOLTAGE SWING



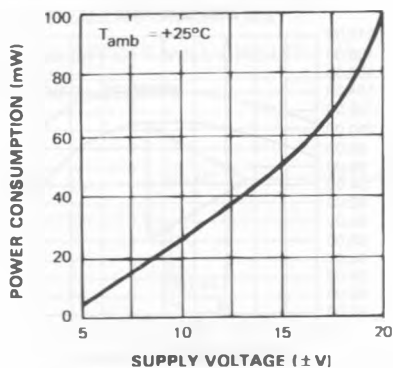
E88UA741-06

INPUT COMMON MODE VOLTAGE RANGE



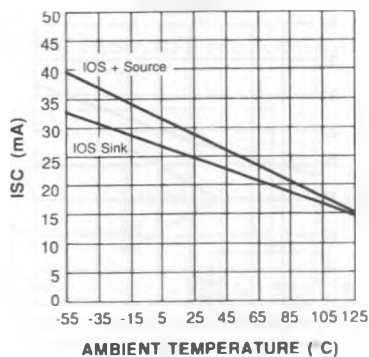
E88UA741-07

POWER CONSUMPTION

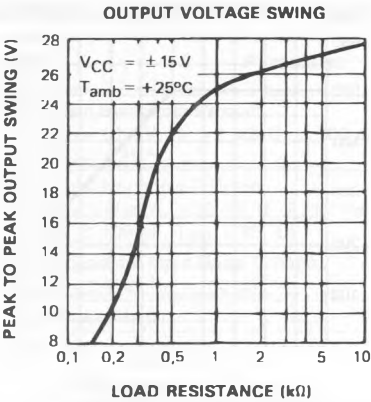


E88UA741-08

OUTPUT CURRENT vs AMBIENT TEMPERATURE

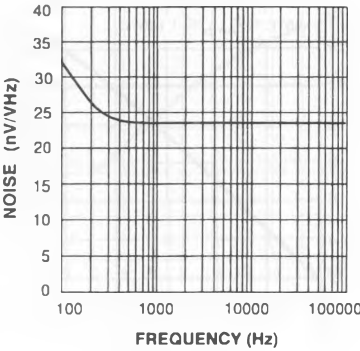


E88UA741-09



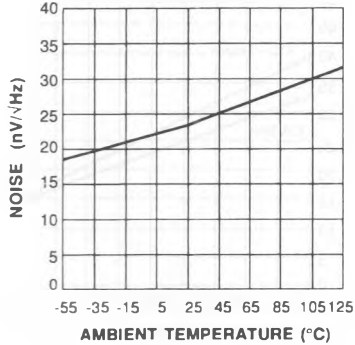
E88UA741-10

EQUIVALENT INPUT NOISE vs FREQUENCY
 $R_g = 100\ \Omega$

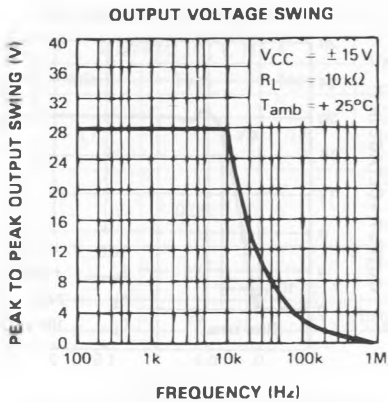


E88UA741-12

EQUIVALENT INPUT NOISE vs AMBIENT TEMPERATURE

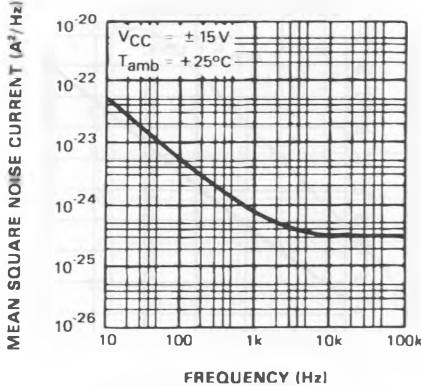


E88UA741-14



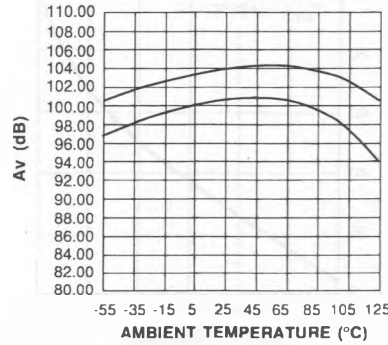
E88UA741-11

INPUT NOISE CURRENT



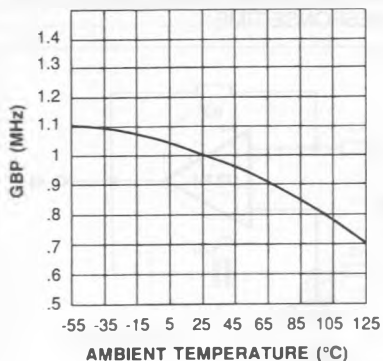
E88UA741-13

LARGE SIGNAL VOLTAGE GAIN vs AMBIENT TEMPERATURE



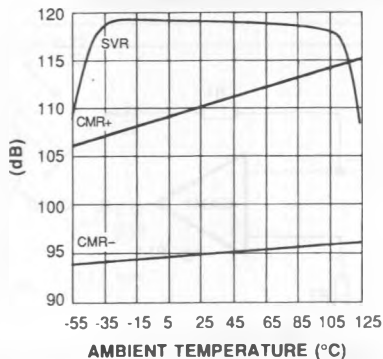
E88UA741-15

GAIN BANDWIDTH PRODUCT vs AMBIENT TEMPERATURE



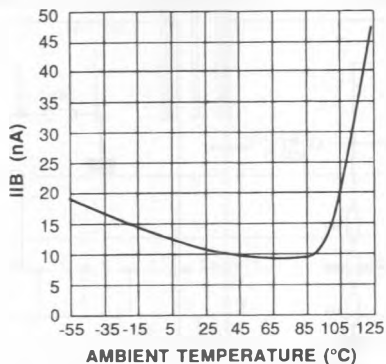
E88UA741-16

POWER SUPPLY & COMMON MODE REJECTION RATIO vs AMBIENT TEMPERATURE



E88UA741-17

INPUT BIAS CURRENT vs AMBIENT TEMPERATURE

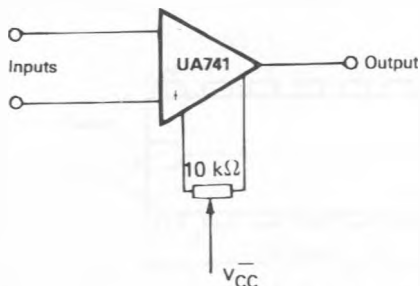


E88UA741-18

MEASUREMENT DIAGRAMS

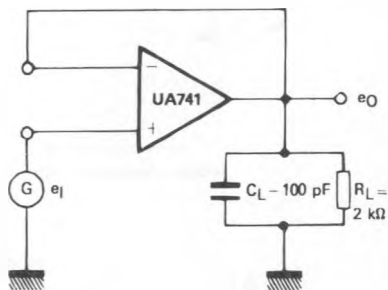
VOLTAGE OFFSET NULL CIRCUIT

TO99 – DIP8 – Cerdip8



E88UA741-19

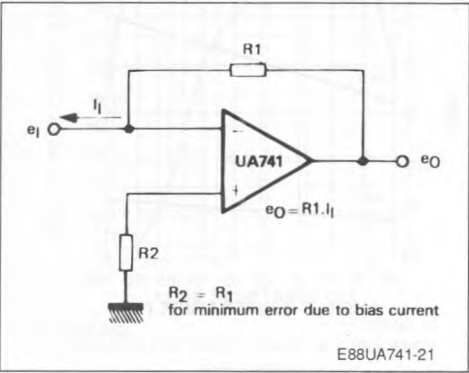
TRANSIENT RESPONSE TEST CIRCUIT



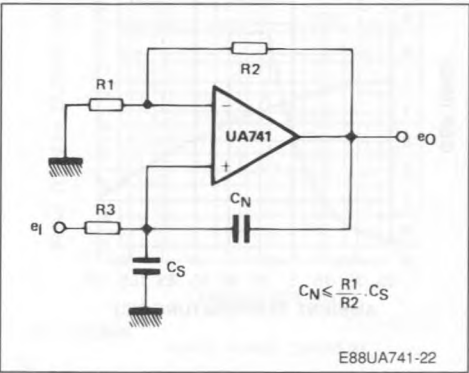
E88UA741-20

MEASUREMENT DIAGRAMS (continued)

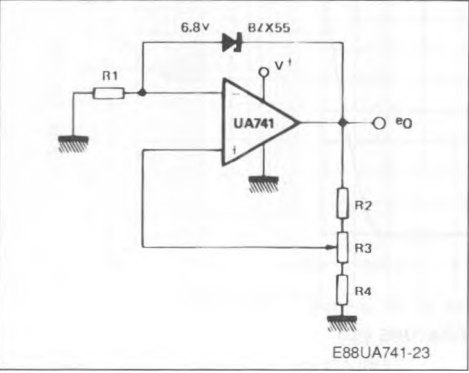
CURRENT TO VOLTAGE CONVERTER



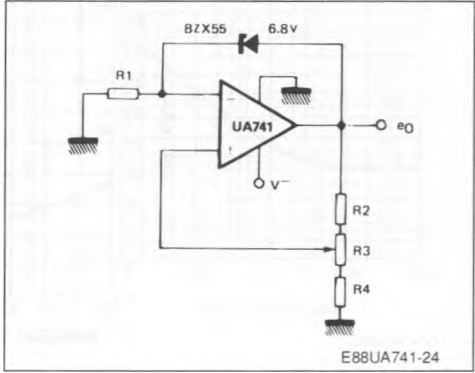
NEUTRALIZING INPUT CAPACITANCE TO OPTIMIZE RESPONSE TIME



POSITIVE VOLTAGE REFERENCE

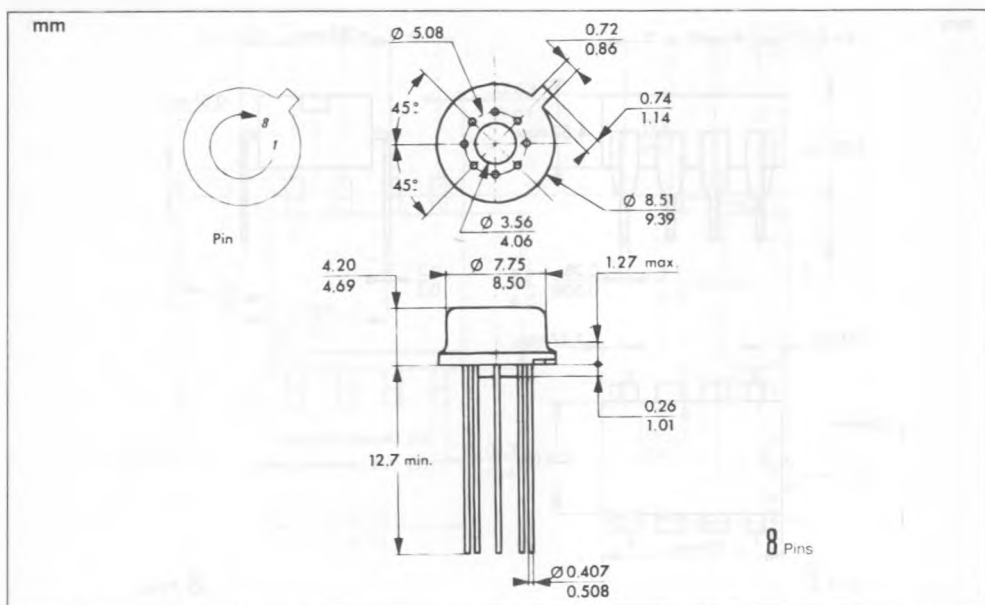


NEGATIVE VOLTAGE REFERENCE

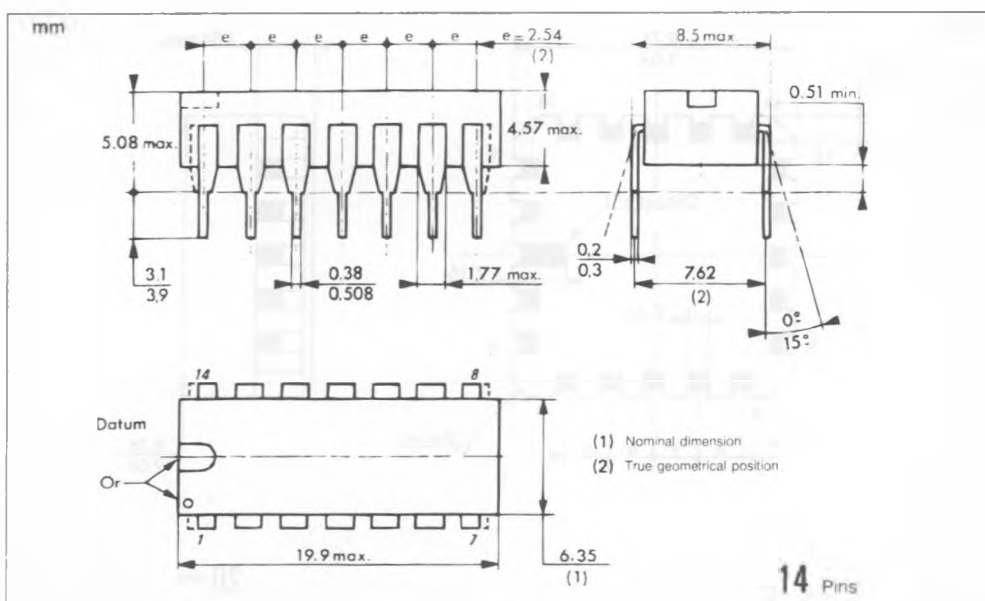


PACKAGE MECHANICAL DATA

8 PINS – TO99 – METAL CAN



14 PINS – PLASTIC DIP



PACKAGE MECHANICAL DATA (continued)

8 PINS – PLASTIC MICROPACKAGE (SO)

