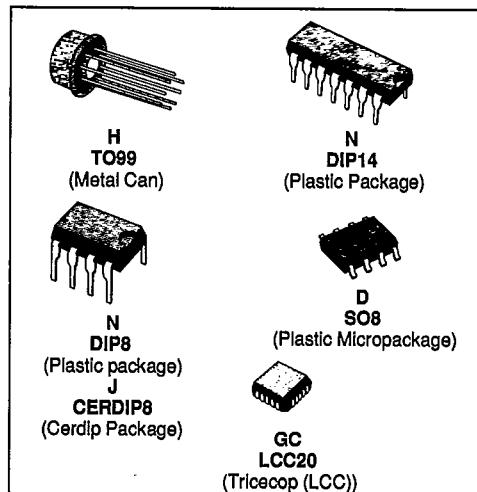


S G S-THOMSON

30E ▶

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.

ORDER CODES

Part Number	Temperature Range	Package				
		H	J	GC	N	14
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

PIN CONNECTIONS (top views)

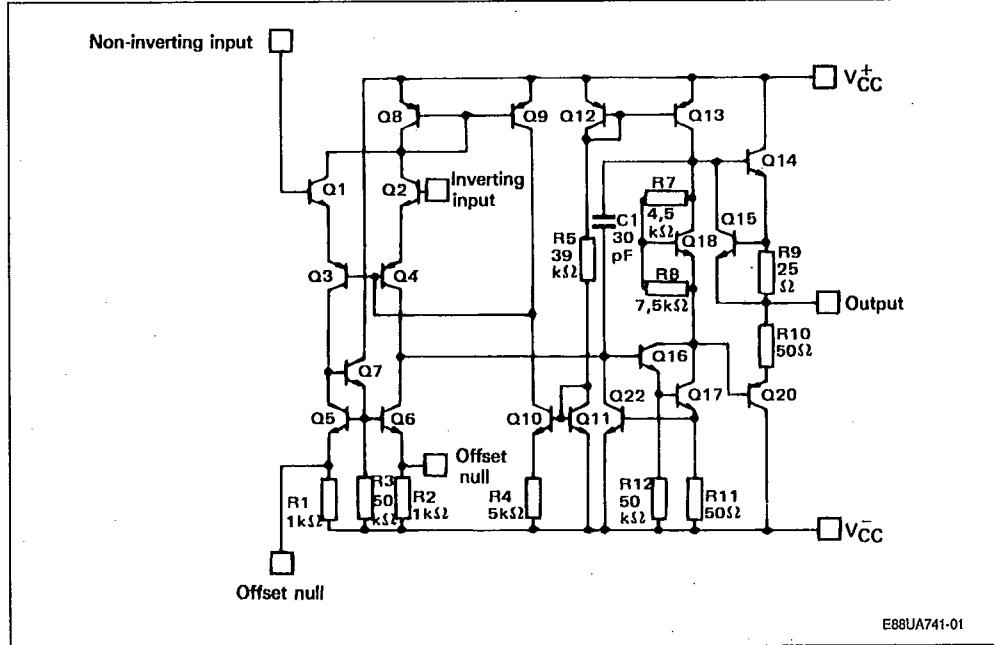
DIP8/CERDIP8 SO8	TO99	LCC20	DIP14
1 - Offset null 2 - Inverting Input 3 - Non-Inverting Input 4 - V _{cc}	5 - Offset null 6 - Output 7 - V _{cc} 8 - NC	1 - NC 2 - Offset null 3 - NC 4 - NC 5 - Inverting Input 6 - NC 7 - Non-Inverting Input 8 - NC 9 - NC	4 - NC 5 - NC 6 - NC 7 - NC 8 - NC 9 - NC 10 - NC 11 - NC 12 - Offset null 13 - NC 14 - NC 15 - Output 16 - NC 17 - V _{cc} 18 - NC 19 - NC 20 - NC

ABSOLUTE MAXIMUM RATINGS S G S-THOMSON

30E D

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.
TO99/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

S G S-THOMSON

30E D

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)

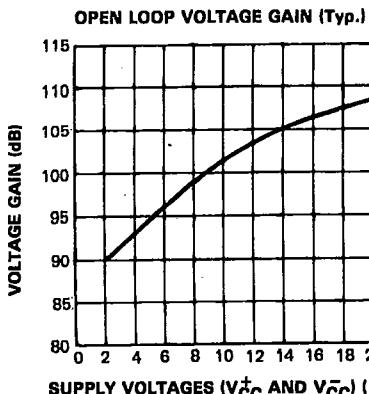
T-79-05-10

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		1 1	5 6 2 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
$\pm V_{OPP}$	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 ($V_I = \pm 10\text{ V}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$, $T_{\text{amb}} = 25^{\circ}\text{C}$, unity gain)	0.25	0.5		V/ μ s
t_r	Rise Time ($V_I = \pm 20\text{ mV}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$ $T_{\text{amb}} = 25^{\circ}\text{C}$, unity gain)		0.3		μ s
K_{OV}	Overshoot ($V_I = \pm 20\text{ mV}$, $R_L = 2\text{ k}\Omega$, $C_L \leq 100\text{ pF}$, $T_{\text{amb}} = 25^{\circ}\text{C}$, unity gain)		5		%
R_I	Input Resistance, $T_{\text{amb}} = 25^{\circ}\text{C}$	0.3	2		m Ω

ELECTRICAL CHARACTERISTICS (continued)

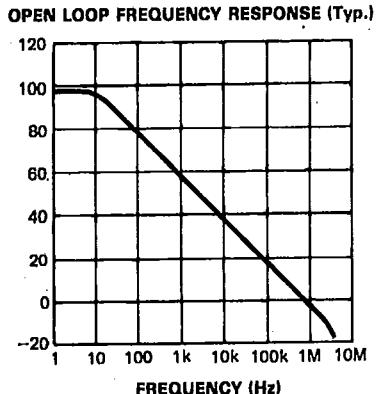
Symbol	Parameter	UA741C, E, I, M, A			Unit
		Min.	Typ.	Max.	
GPB	Gain Bandwidth Product ($V_I = 10 \text{ mV}$, $R_L = 2 \text{ k}\Omega$, $C_L \leq 100 \text{ pF}$, $f = 100 \text{ kHz}$, $T_{amb} = 25^\circ \text{C}$)	0.7	1	1.6	MHz
THD	Total Harmonic Distortion ($f = 1 \text{ kHz}$, $A_V = 20 \text{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

S G S-THOMSON



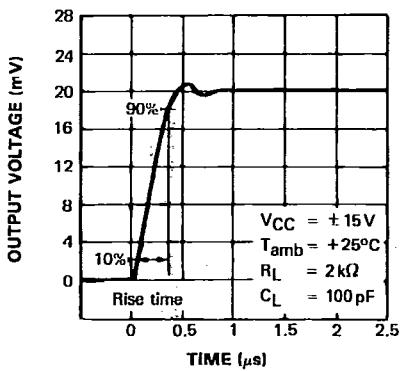
E88UA741-02

30E D



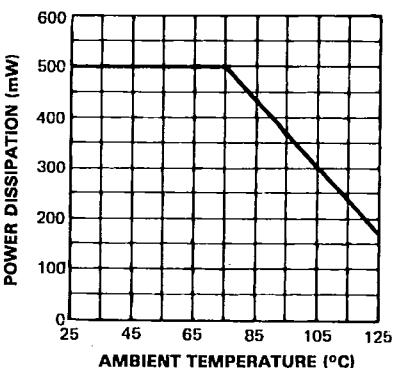
E88UA741-03

TRANSIENT RESPONSE (Typ.)



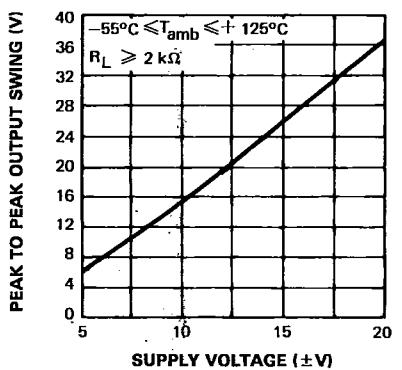
E88UA741-04

ABSOLUTE MAXIMUM POWER DISSIPATION



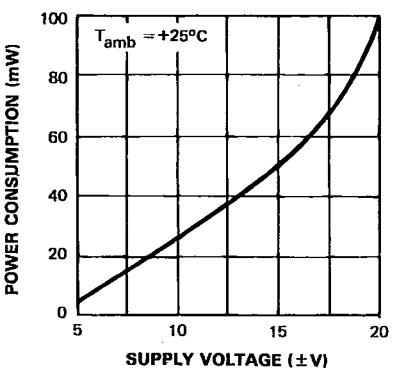
E88UA741-05

OUTPUT VOLTAGE SWING



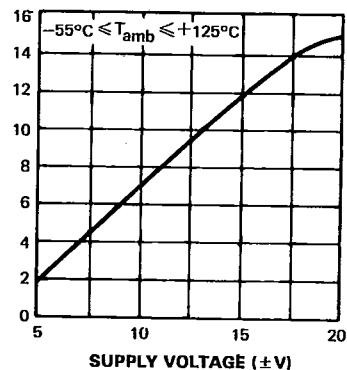
E88UA741-06

POWER CONSUMPTION



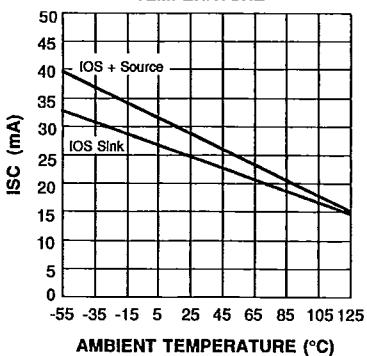
E88UA741-08

COMMON MODE VOLTAGE RANGE



E88UA741-07

OUTPUT CURRENT vs AMBIENT TEMPERATURE

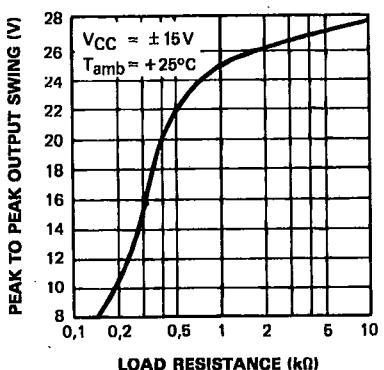


E88UA741-09

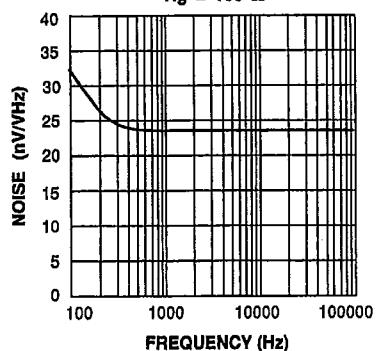
S G S-THOMSON

30E D

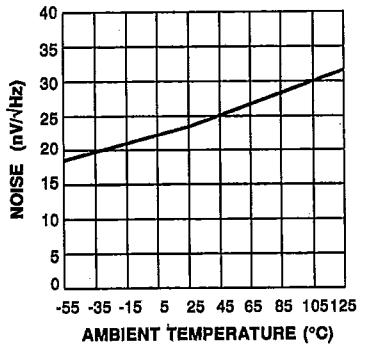
OUTPUT VOLTAGE SWING



E88UA741-10
EQUIVALENT INPUT NOISE vs FREQUENCY
 $R_g = 100 \Omega$

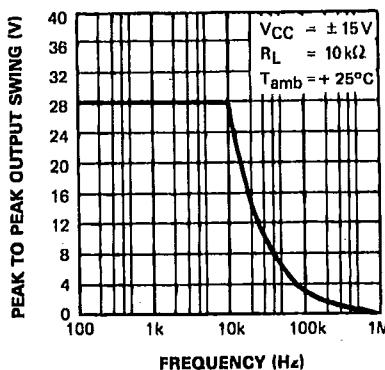


E88UA741-12

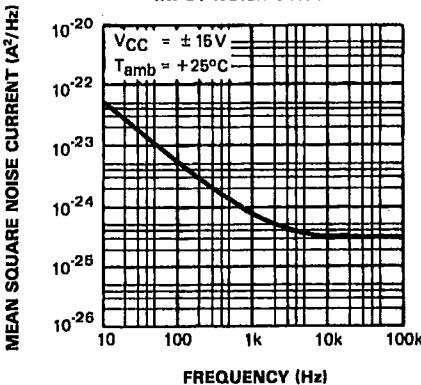
EQUIVALENT INPUT NOISE vs AMBIENT TEMPERATURE

E88UA741-14

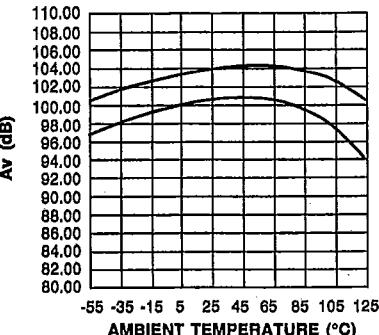
OUTPUT VOLTAGE SWING



E88UA741-11
INPUT NOISE CURRENT



E88UA741-13

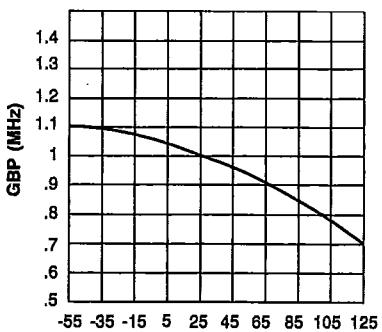
LARGE SIGNAL VOLTAGE GAIN vs AMBIENT TEMPERATURE

E88UA741-15

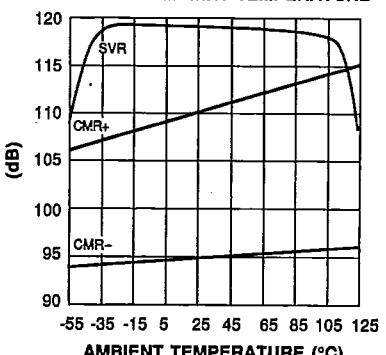
S G S-THOMSON

SGS-THOMSON
 MICROELECTRONICS

GAIN BANDWIDTH PRODUCT vs AMBIENT TEMPERATURE



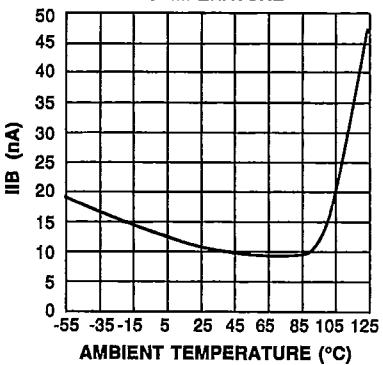
POWER SUPPLY & COMMON MODE REJECTION RATIO vs AMBIENT TEMPERATURE



E88UA741-16

E88UA741-17

INPUT BIAS CURRENT vs AMBIENT TEMPERATURE

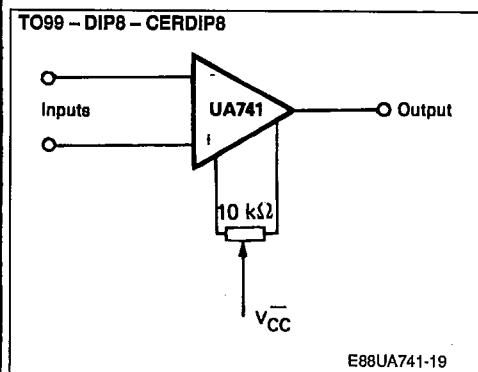


E88UA741-18

MEASUREMENT DIAGRAMS

VOLTAGE OFFSET NULL CIRCUIT

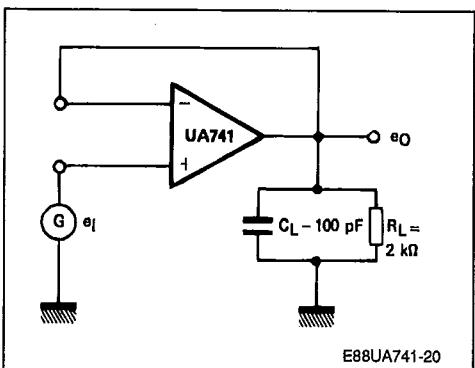
TO99 - DIP8 - CERDIP8



E88UA741-19

S G S-THOMSON

TRANSIENT RESPONSE TEST CIRCUIT

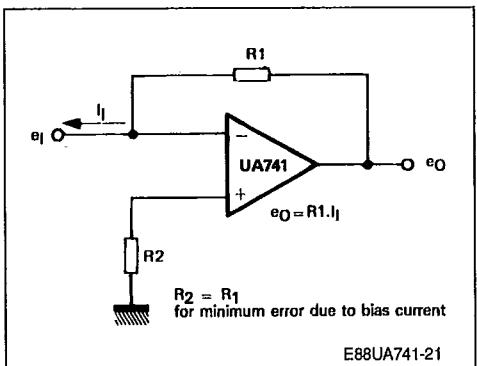


E88UA741-20

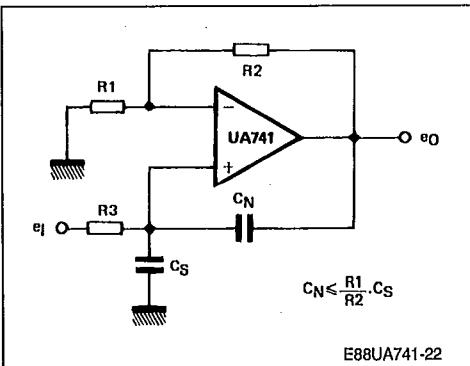
MEASUREMENT DIAGRAMS (continued)

CURRENT TO VOLTAGE CONVERTER

NEUTRALIZING INPUT CAPACITANCE TO OPTIMIZE RESPONSE TIME



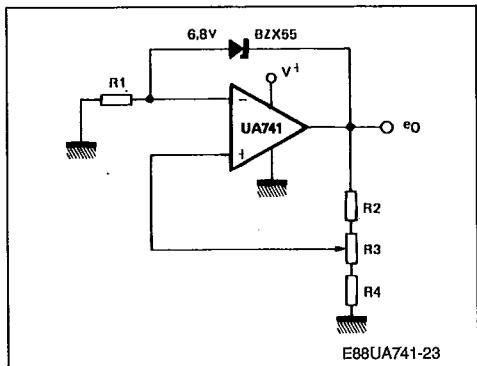
E88UA741-21



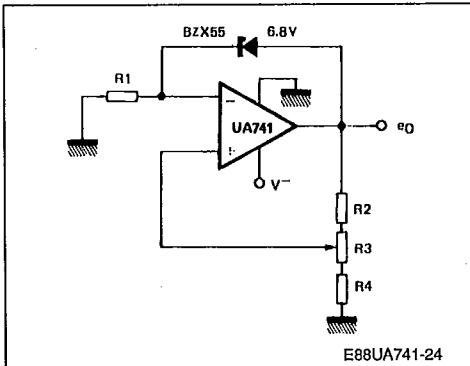
E88UA741-22

POSITIVE VOLTAGE REFERENCE

NEGATIVE VOLTAGE REFERENCE



E88UA741-23



E88UA741-24

S G S-THOMSON

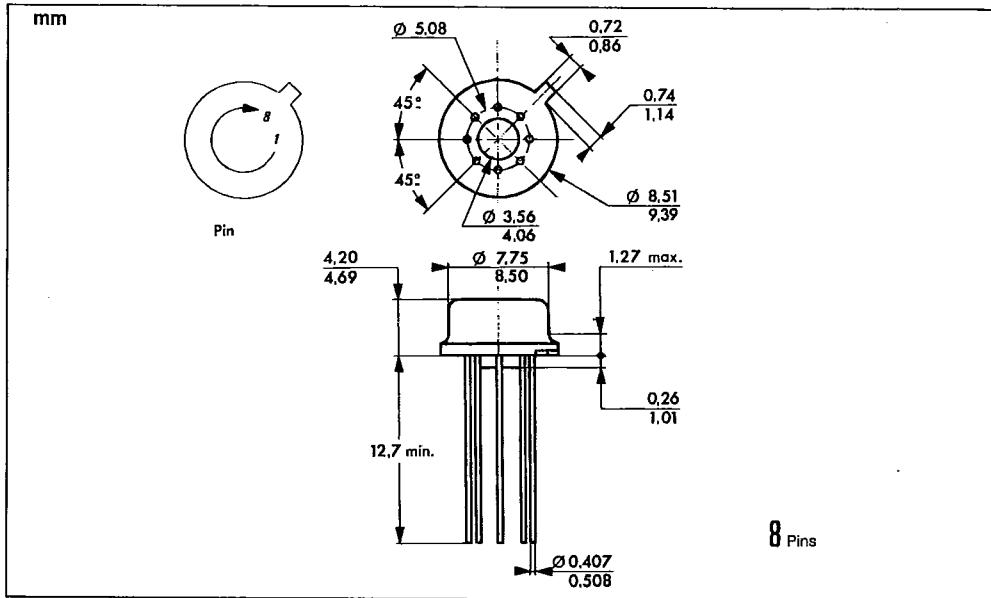
30E D

PACKAGE MECHANICAL DATA

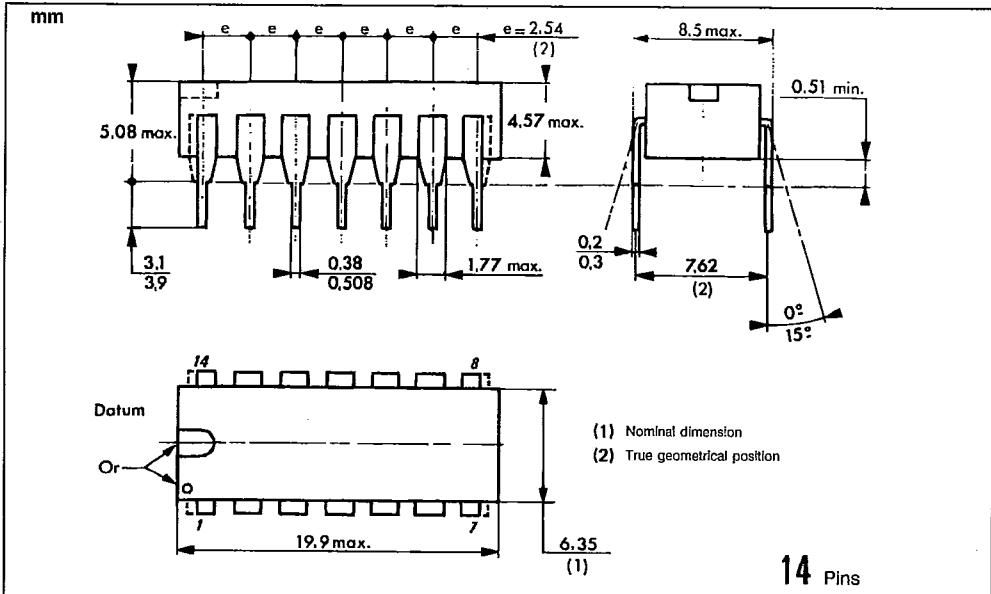
S G S-THOMSON

30E D

8 PINS – TO99 – METAL CAN



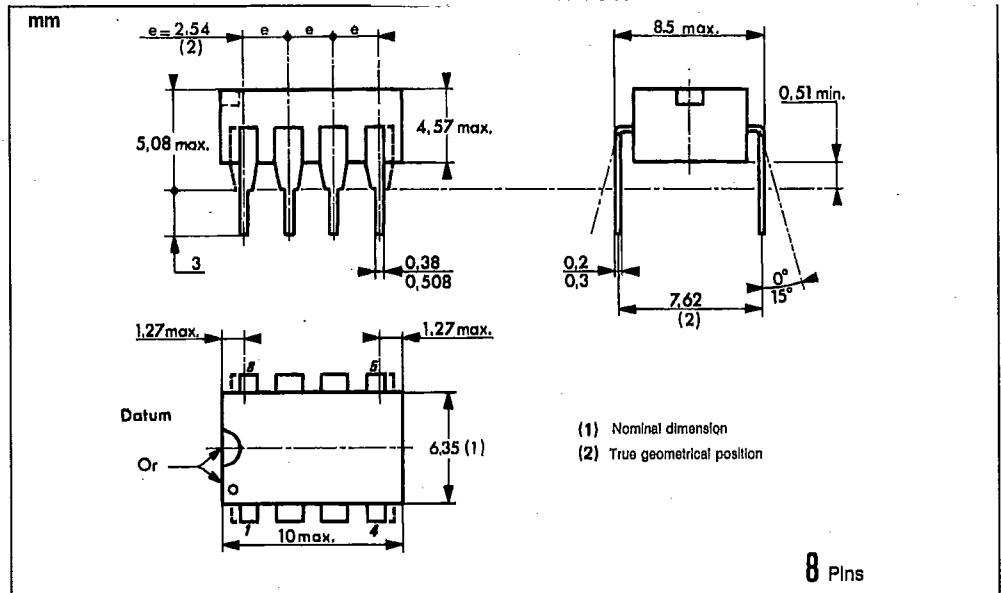
14 PINS – PLASTIC DIP



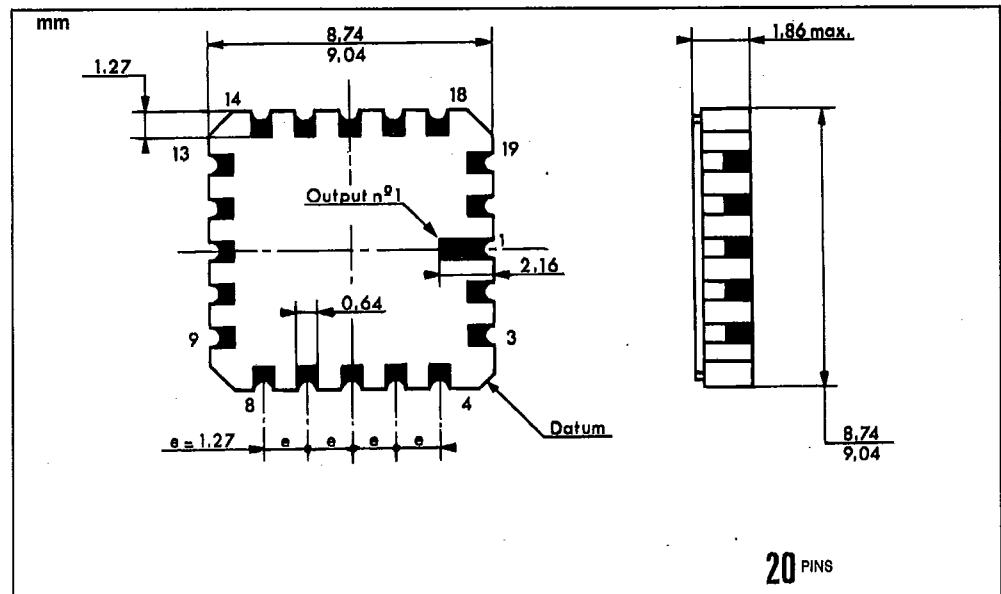
PACKAGE MECHANICAL DATA (continued)

8 PINS - PLASTIC DIP OR CERDIP S G S - THOMSON

30E D



20 PINS – TRICECOP (LCC)



T-79-05-10

PACKAGE MECHANICAL DATA (continued)

8 PINS - PLASTIC MICROPACKAGE (SO) S G S-THOMSON

30E D

