

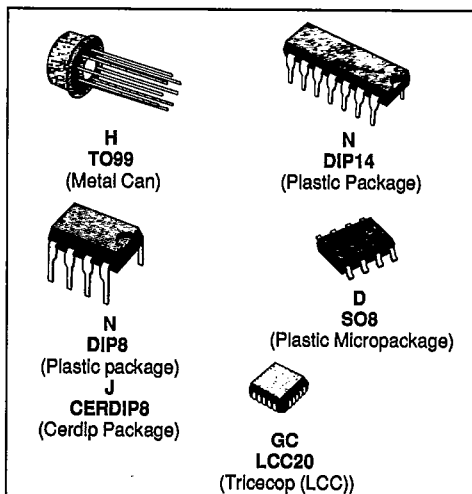


SGS-THOMSON

30E D

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.

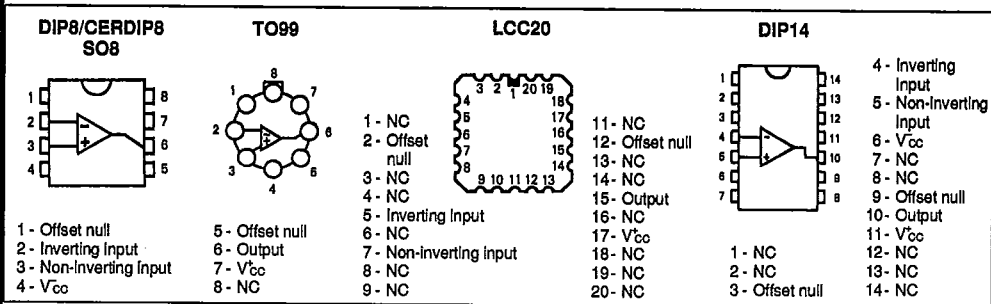
The high gain and wide range of operating voltages provides superior performance integrator, summing amplifier, and general feedback applications. the internal compensation network (6 dB/octave) insures stability in closed loop applications.

ORDER CODES

| Part Number | Temperature Range | Package | | | | | |
|-------------|--------------------|---------|---|----|---|-----|---|
| | | H | J | GC | N | N14 | 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

PIN CONNECTIONS (top views)

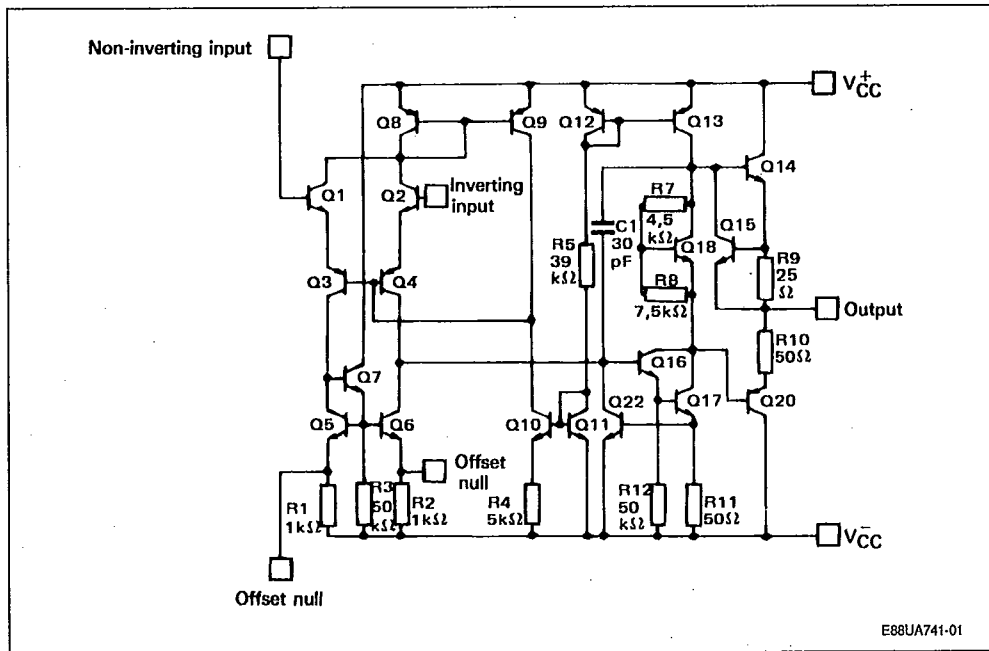


ABSOLUTE MAXIMUM RATINGS S G S-THOMSON

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| 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



E88UA741-01

| 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

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UA741M/A : -55 °C ≤ T_{amb} ≤ +125 °C, V_{CC} = ±15 VUA741I : -40 °C ≤ T_{amb} ≤ +105 °C, V_{CC} = ±15 VUA741C/E : 0 °C ≤ T_{amb} ≤ +70 °C, V_{CC} = ±15 V

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(unless otherwise specified)

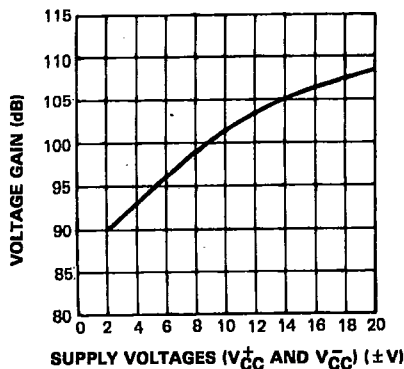
| Symbol | Parameter | UA741C, E, I, M, A | | | Unit |
|-------------------|--|----------------------|----------|------------------|------|
| | | Min. | Typ. | Max. | |
| V _{IO} | Input Offset Voltage R _S ≤ 10 kΩ T _{amb} = 25 °C T _{min} ≤ T _{amb} ≤ T _{max} UA741E, A T _{amb} = 25 °C T _{min} ≤ T _{amb} ≤ T _{max} | | 1 | 5 6 2 4 | mV |
| I _{IO} | Input Offset Current T _{amb} = 25 °C T _{min} ≤ T _{amb} ≤ T _{max} | | 2 | 20 40 | nA |
| I _B | 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 = ±10 V, R _L = 2 kΩ) T _{amb} = 25 °C T _{min} ≤ T _{amb} ≤ T _{max} | 50 25 | 200 | | V/mV |
| SVR | Supply Voltage Rejection Ratio (R _S ≤ 10 kΩ) 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 _I | Input Voltage Range T _{amb} = 25 °C T _{min} ≤ T _{amb} ≤ T _{max} | -12 -12 | | +12 +12 | V |
| CMR | Common Mode Rejection Ratio (R _S ≤ 10 kΩ) T _{amb} = 25 °C T _{min} ≤ T _{amb} ≤ T _{max} | 70 70 | 90 | | dB |
| I _{OS} | Output Short-circuit Current T _{amb} = 25 °C | 10 | 25 | 40 | mA |
| ±V _{OPP} | Output Voltage Swing T _{amb} = 25 °C R _L = 10 kΩ R _L = 2 kΩ T _{min} ≤ T _{amb} ≤ T _{max} R _L = 10 kΩ R _L = 2 kΩ | 12 10 12 10 | 14 13 | | V |
| S _{VO} | Slew-rate (V _I = ±10 V, R _L = 2 kΩ, C _L ≤ 100 pF, T _{amb} = 25 °C, unity gain) | 0.25 | 0.5 | | V/μs |
| t _r | Rise Time (V _I = ±20 mV, R _L = 2 kΩ, C _L ≤ 100 pF, T _{amb} = 25 °C, unity gain) | | 0.3 | | μs |
| K _{OV} | Overshoot (V _I = ±20 mV, R _L = 2 kΩ, C _L ≤ 100 pF, T _{amb} = 25 °C, unity gain) | | 5 | | % |
| R _I | Input Resistance, T _{amb} = 25 °C | 0.3 | 2 | | mΩ |

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 ($f = 1\text{ kHz}$, $A_V = 20\text{ dB}$, $R_L = 2\text{ k}\Omega$, $V_O = 2\text{ V}_{\text{pp}}$, $C_L \leq 100\text{ pF}$, $T_{\text{amb}} = 25\text{ }^\circ\text{C}$) | | 0.06 | | % |
| V_N | Equivalent Input Noise Voltage ($f = 1\text{ kHz}$, $R_G = 100\text{ }\Omega$) | | 23 | | $\text{nV}/\sqrt{\text{Hz}}$ |
| | Phase Margin | | 50 | | Degrees |

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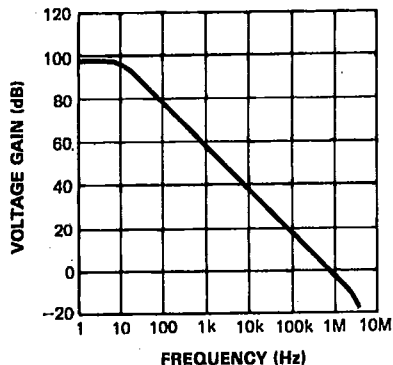
OPEN LOOP VOLTAGE GAIN (Typ.)



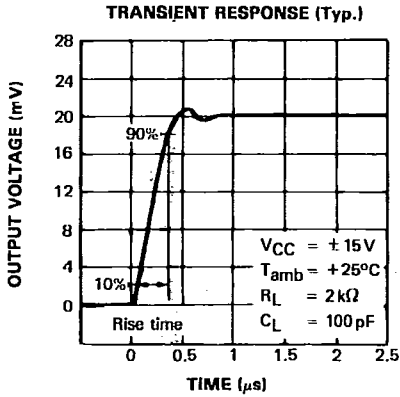
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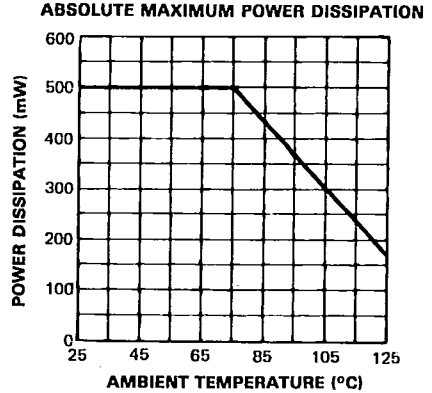
OPEN LOOP FREQUENCY RESPONSE (Typ.)



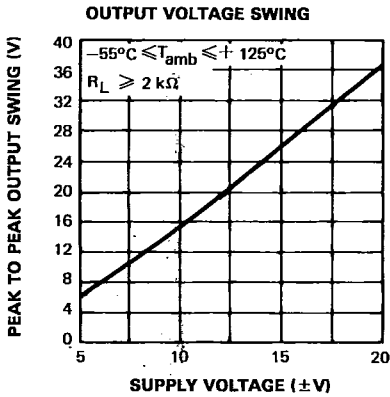
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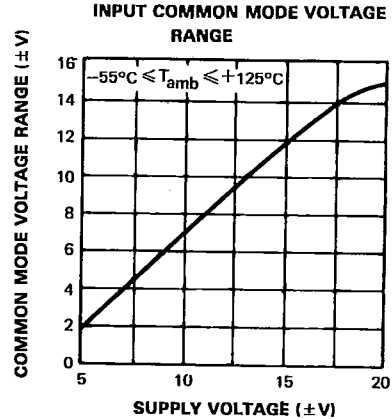
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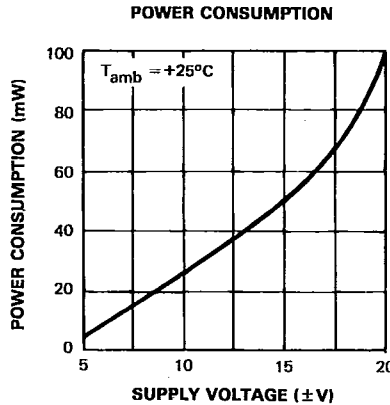
E88UA741-05



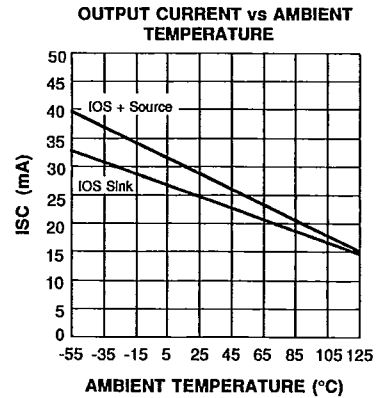
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E88UA741-07



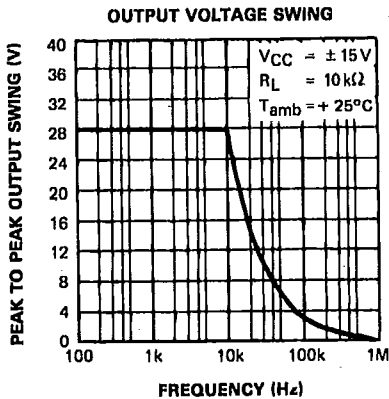
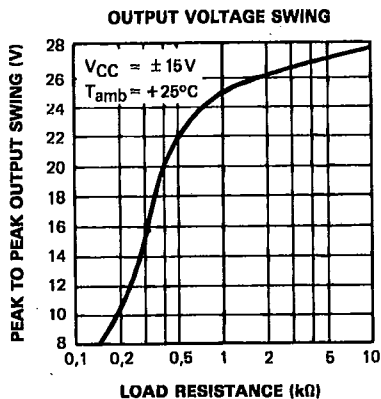
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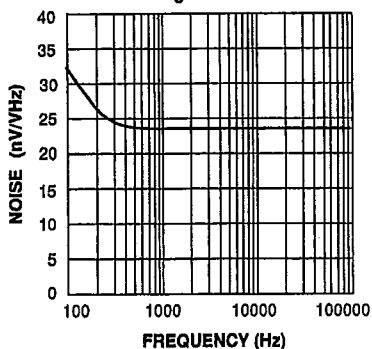
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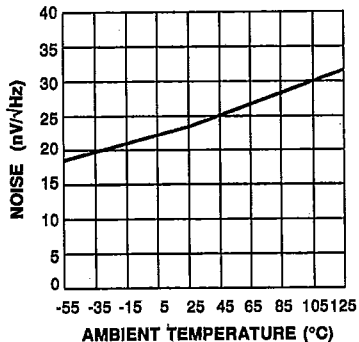


E88UA741-10
EQUIVALENT INPUT NOISE vs FREQUENCY
 $R_g = 100 \Omega$



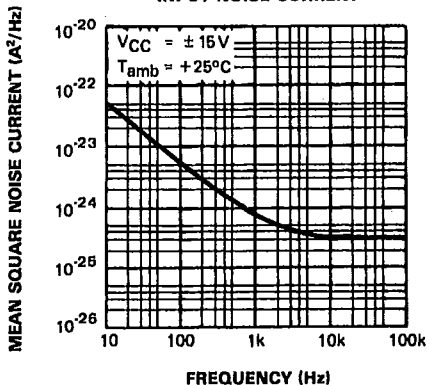
E88UA741-12

EQUIVALENT INPUT NOISE vs AMBIENT TEMPERATURE



E88UA741-14

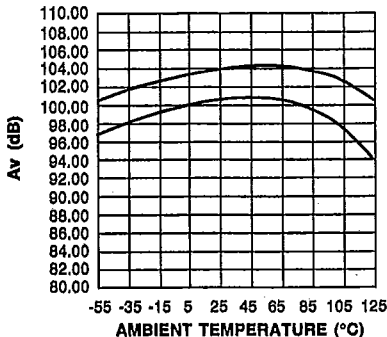
INPUT NOISE CURRENT



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E88UA741-13

LARGE SIGNAL VOLTAGE GAIN vs AMBIENT TEMPERATURE

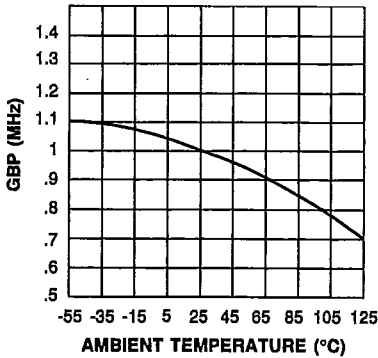


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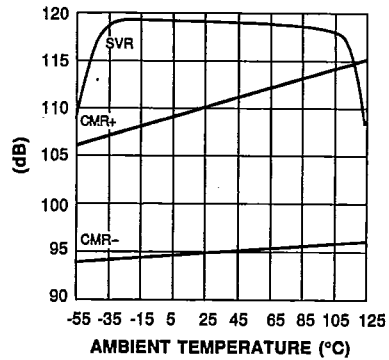
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GAIN BANDWIDTH PRODUCT vs AMBIENT TEMPERATURE



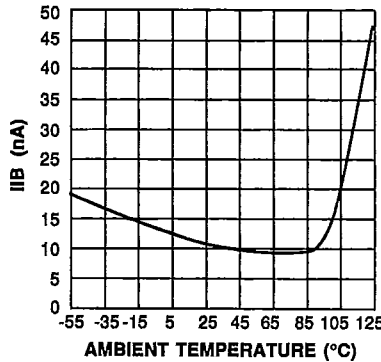
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POWER SUPPLY & COMMON MODE REJECTION RATIO vs AMBIENT TEMPERATURE



E88UA741-17

INPUT BIAS CURRENT vs AMBIENT TEMPERATURE



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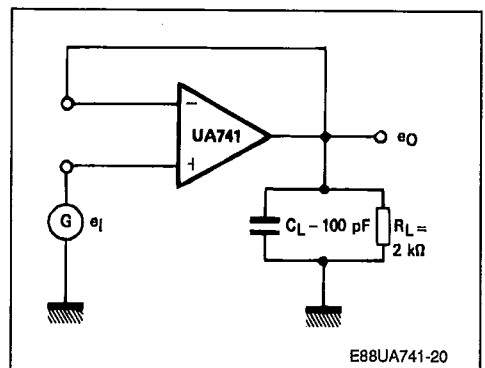
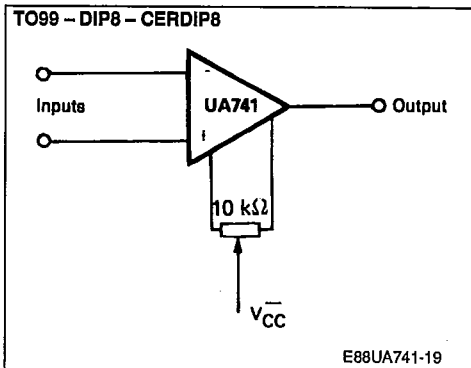
MEASUREMENT DIAGRAMS

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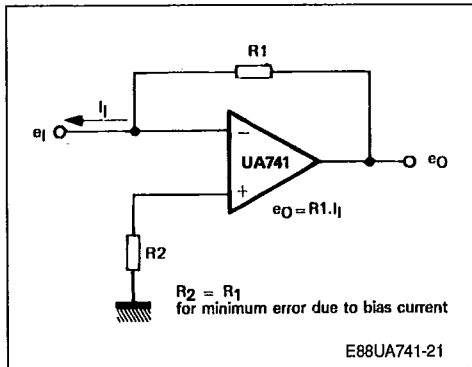
VOLTAGE OFFSET NULL CIRCUIT

TRANSIENT RESPONSE TEST CIRCUIT

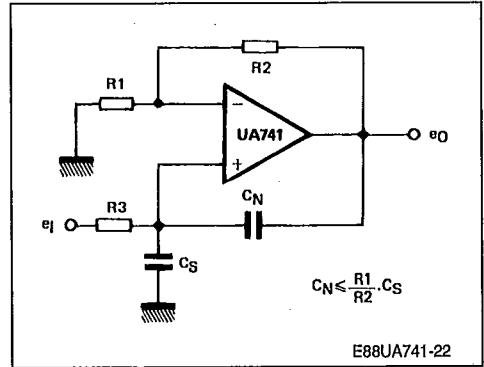


MEASUREMENT DIAGRAMS (continued)

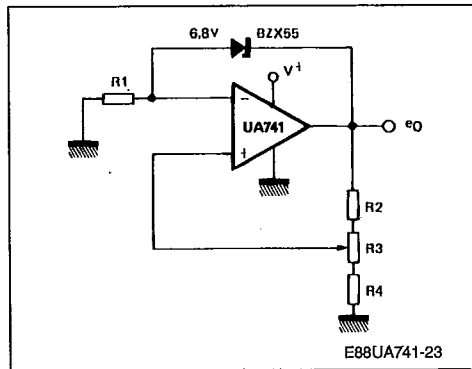
CURRENT TO VOLTAGE CONVERTER



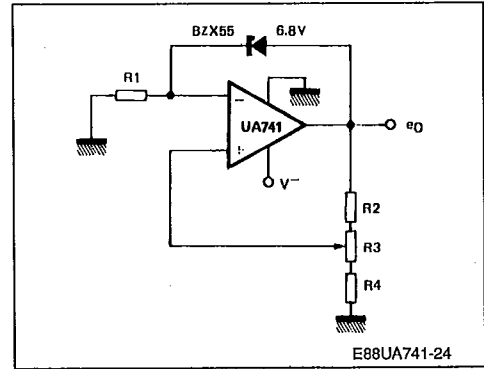
NEUTRALIZING INPUT CAPACITANCE TO OPTIMIZE RESPONSE TIME



POSITIVE VOLTAGE REFERENCE



NEGATIVE VOLTAGE REFERENCE



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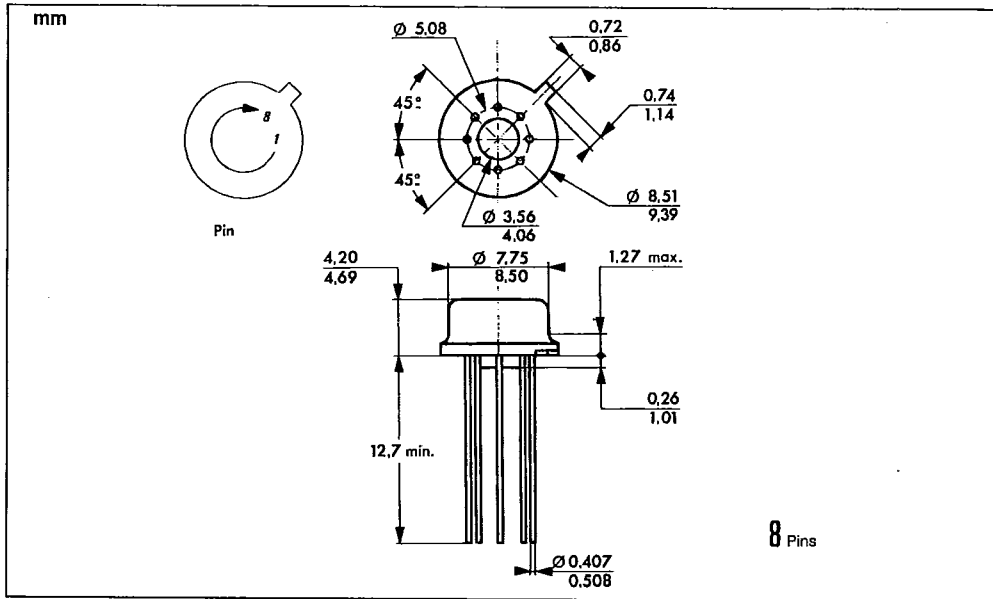
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PACKAGE MECHANICAL DATA

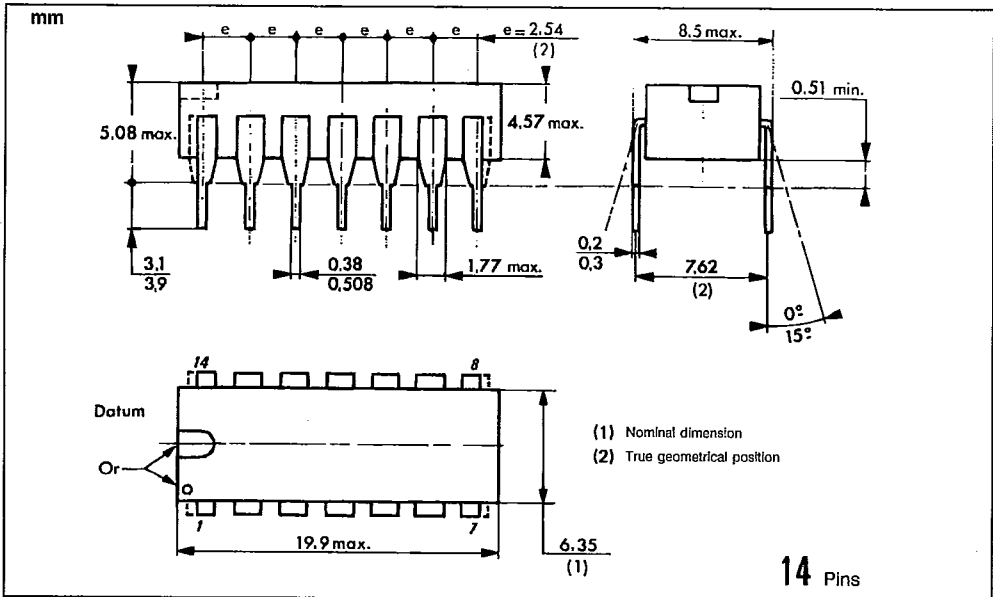
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8 PINS - TO99 - METAL CAN



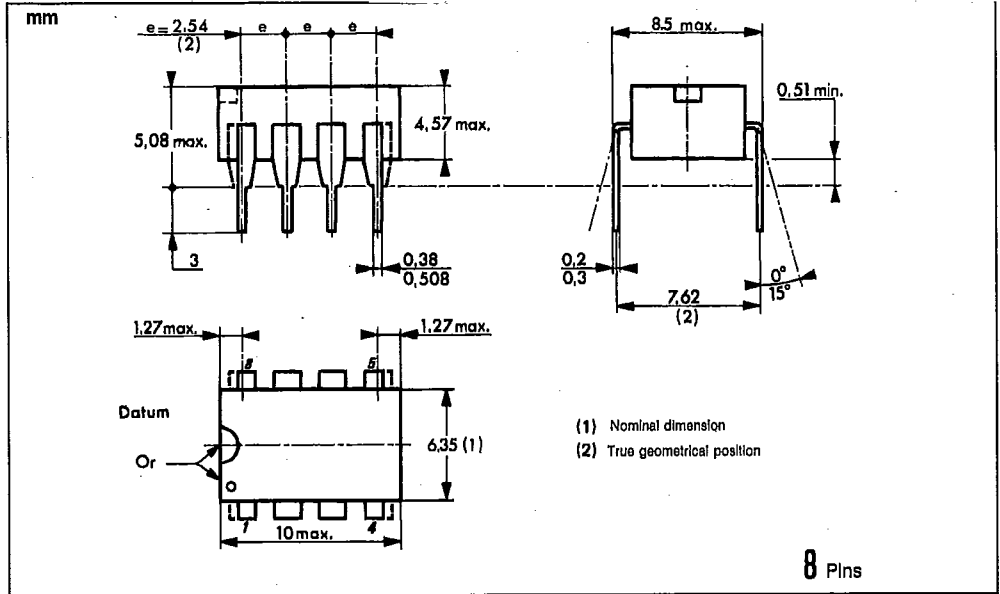
14 PINS - PLASTIC DIP



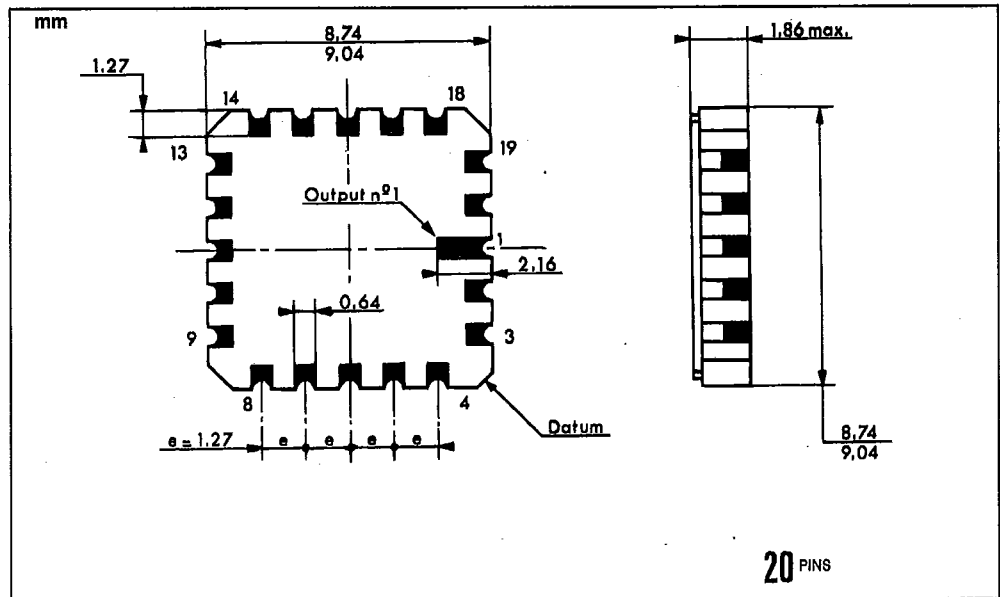
PACKAGE MECHANICAL DATA (continued)

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

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20 PINS - TRICECOP (LOC)



PACKAGE MECHANICAL DATA (continued)

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

30E D

