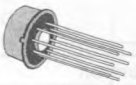
SGS-THOMSON MICROELECTRONICS

MC1458
MC1558

DUAL OPERATIONAL AMPLIFIERS

- LOW POWER CONSUMPTION
- LARGE INPUT VOLTAGE RANGE
- NO LATCH-UP
- HIGH GAIN
- SHORT-CIRCUIT PROTECTION
- NO FREQUENCY COMPENSATION REQUIRED

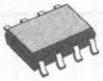


H
TO-99
(Metal Can)

GC
LCC20
(Tricecop (LCC))

N
DIP8
(Plastic Package)

J
CERDIP8
(Cerdip Package)



D
SO8
(Plastic Micropackage)

DESCRIPTION

The MC1458 is a high performance monolithic dual 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 performance in integrator, summing amplifier, and general feed back applications. The internal compensation network (6 dB/octave) insures stability in closed loop applications.

ORDER CODES

Part Number	Temperature Range	Package				
		H	N	J	D	GC
MC1458	0 to + 70 °C	•	•		•	
MC1458I	– 40 + 105 °C	•	•	•	•	
MC1558	– 55 to + 125 °C	•				•

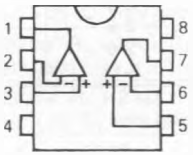
Note : HI-Rel Versions Available
Example : MC1458H. MC1558GC.

PIN CONNECTIONS (top views)

TO-99

1 - Output 1
2 - Inverting input 1
3 - Non-inverting input 1
4 - V_{cc}^-

DIP8/CERDIP8/SO8



5 - Non-inverting input 2
6 - Inverting input 2
7 - Output 2
8 - V_{cc}^+

LCC20

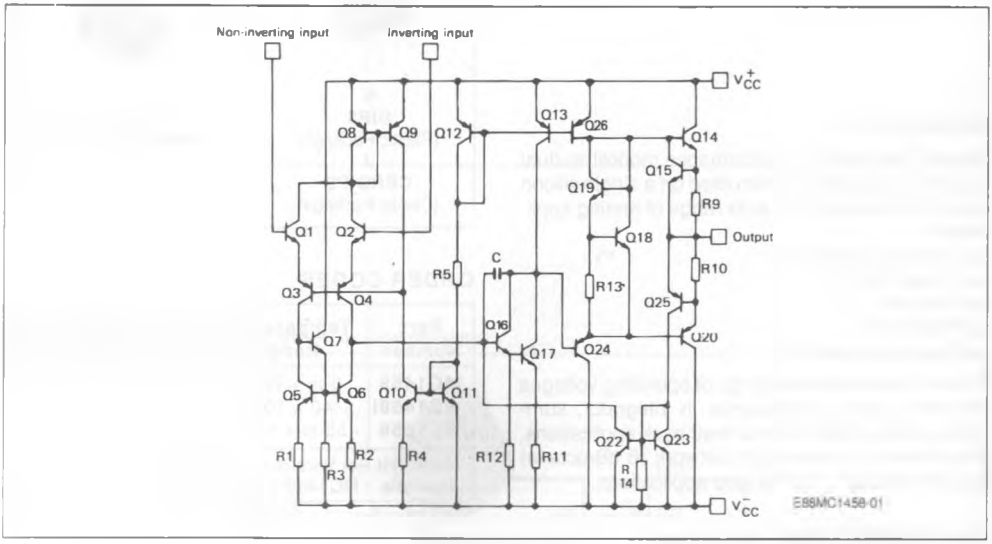
1 - NC
2 - Output 1
3 - NC
4 - NC
5 - Inverting input 1
6 - NC
7 - Non-inverting input 1
8 - NC
9 - NC
10 - V_{cc}^-

11 - NC
12 - Non-inverting input 2
13 - NC
14 - NC
15 - Inverting input 2
16 - NC
17 - Output 2
18 - NC
19 - NC
20 - V_{cc}^+

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		LM1458	LM1458I	LM1558	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	J Suffix		660		mW
		GC Suffix			665	
		H Suffix	660	660	660	
		D Suffix	300	300		
		N Suffix	500	500		
	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	Outputs	Non-inverting Inputs	Inverting Inputs	V_{CC}^+	V_{CC}^-
DIP8/CERDIP8	1-7	3-5	2-6	8	4
TO-99	1-7	3-5	2-6	8	4
SO8	1-7	3-5	2-6	8	4
LCC20*	2-17	7-12	5-15	20	10

* LCC20 : Other pins not connected.

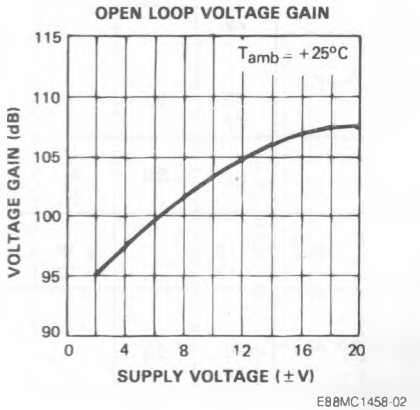
ELECTRICAL CHARACTERISTICS

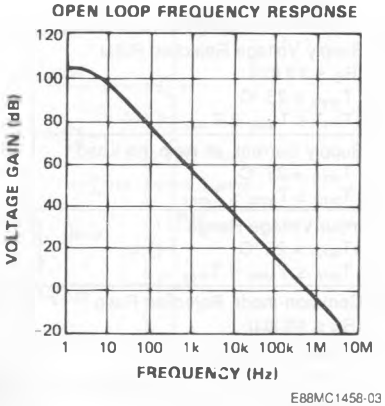
MC1458 : $0 \leq T_{amb} \leq +70$ °C $V_{CC} = \pm 15$ V
MC1458I: $-40 \leq T_{amb} \leq +105$ °C $V_{CC} = \pm 15$ V
MC1558 : $-55 \leq T_{amb} \leq +125$ °C $V_{CC} = \pm 15$ V
(unless otherwise specified)

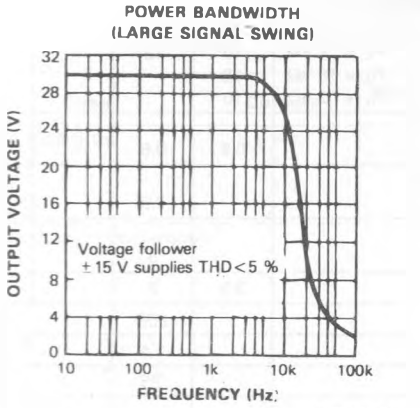
Symbol	Parameter	MC1458 / 1458I / 1558			Unit
		Min.	Typ.	Max.	
V_{IO}	Input Offset Voltage $R_S \leq 10$ kΩ $T_{amb} = 25$ °C $T_{min} \leq T_{amb} \leq T_{max}$		1	5 6	mV
I_{IO}	Input Offset Current $T_{amb} = 25$ °C $T_{min} \leq T_{amb} \leq T_{max}$		2	20 40	nA
I_{IB}	Input Bias Current $T_{amb} = 25$ °C $T_{min} \leq T_{amb} \leq T_{max}$		30	100 200	nA
A_{VD}	Large Signal Voltage Gain ($V_O = \pm 10$ V, $R_L = 2$ kΩ) $T_{amb} = 25$ °C $T_{min} \leq T_{amb} \leq T_{max}$	 50 25	200		V/mV
SVR	Supply Voltage Rejection Ratio ($R_S \leq 10$ kΩ) $T_{amb} = 25$ °C $T_{min} \leq T_{amb} \leq T_{max}$	 77 77	90		dB
I_{CC}	Supply Current, all Amp. no Load $T_{amb} = 25$ °C $T_{min} \leq T_{amb} \leq T_{max}$		2.3	5 6	mA
V_I	Input Voltage Range $T_{amb} = 25$ °C $T_{min} \leq T_{amb} \leq T_{max}$	−12 −12		+12 +12	V
CMR	Common-mode Rejection Ratio ($R_S \leq 10$ kΩ) $T_{amb} = 25$ °C $T_{min} \leq T_{amb} \leq T_{max}$	 70 70	90		dB
I_{OS}	Output Short-circuit Current $T_{amb} = 25$ °C	10	20	35	mA
$\pm V_{OPP}$	Output Voltage Swing $T_{amb} = 25$ °C $R_L = 10$ kΩ $R_L = 2$ kΩ $T_{min} \leq T_{amb} \leq T_{max}$ $R_L = 10$ kΩ $R_L = 2$ kΩ	 12 10 12 10	 14 13		V
S_{VO}	Slew-rate ($V_I = \pm 10$ V, $R_L = 2$ kΩ, $C_L \leq 100$ pF, $T_{amb} = 25$ °C, unity gain)	0.2	0.8		V/µs
t_r	Rise Time ($V_I = 20$ mV, $R_L = 2$ kΩ, $C_L \leq 100$ pF, $T_{amb} = 25$ °C, unity gain)		0.3		µs
K_{OV}	Overshoot ($V_I = 20$ mV, $R_L = 2$ kΩ, $C_L \leq 100$ pF, $T_{amb} = 25$ °C, unity gain)		5		%
R_I	Input Resistance, $T_{amb} = 25$ °C	0.3	2		MΩ
Zic	Common-mode Input Impedance		200		MΩ
C_I	Input Capacitance, $T_{amb} = 25$ °C		1.4		pF
R_O	Output Resistance, $T_{amb} = 25$ °C		75		Ω
Bom	Large Signal Bandwidth ($R_L = 2$ kΩ, $V_O \geq \pm 10$ V, $A_{VD} = 1$, THD ≤ 5 %)		14		KHz

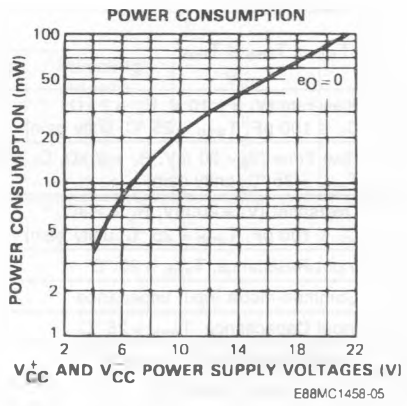
ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	MC1458 / 1458I / 1558			Unit
		Min.	Typ.	Max.	
B	Unity Gain Bandwidth (V_I = 10 mV, R_L = 2 kΩ, $C_L \leq$ 100 pF, T_{amb} = 25 °C)		1		MHz
GPB	Gain Bandwidth Product (V_I = 10 mV, R_L = 2 kΩ, $C_L \leq$ 100 pF, f = 100 KHz, T_{amb} = 25 °C)	0.4	1		MHz
THD	Total Harmonic Distortion (f = 1 KHz, A_V = 20 dB, R_L = 2 kΩ, V_O = 2 V_{PP}, $C_L \leq$ 100 pF, T_{amb} = 25 °C)		0.02		%
V_n	Equivalent Input Noise Voltage (f = KHz, R_g = 100 Ω)		45		nV/√Hz
φM	Phase Margin		65		Degrees
Am	Gain Margin		11		dB

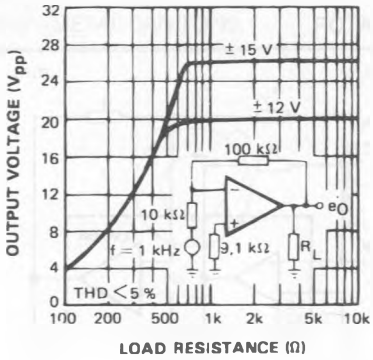






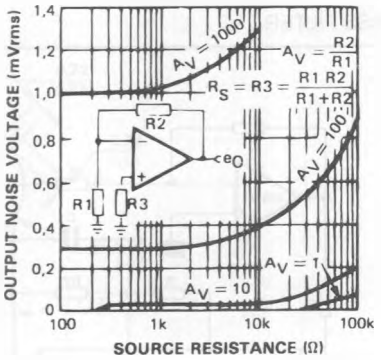


OUTPUT VOLTAGE SWING



E88MC1458-06

OUTPUT NOISE VOLTAGE



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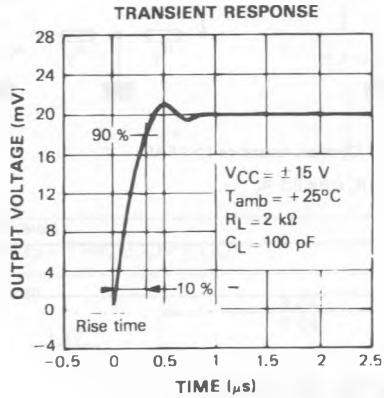
TRANSIENT RESPONSE



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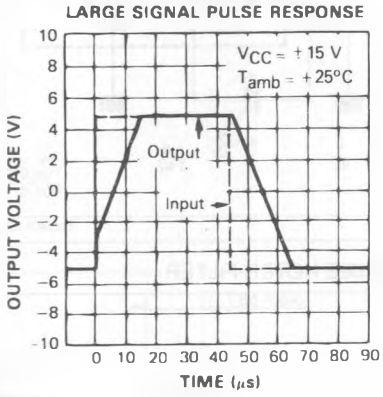
VOLTAGE FOLLOWER LARGE SIGNAL PULSE RESPONSE



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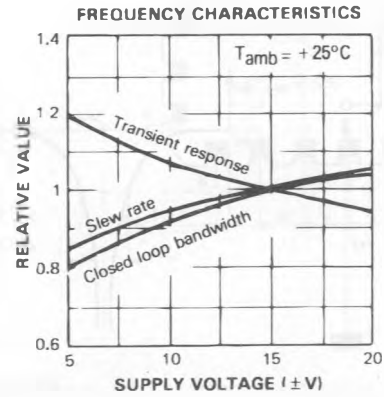
FREQUENCY CHARACTERISTICS



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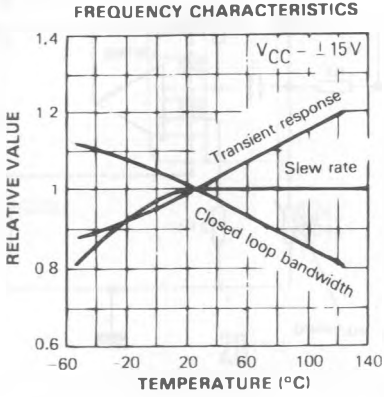
FREQUENCY CHARACTERISTICS



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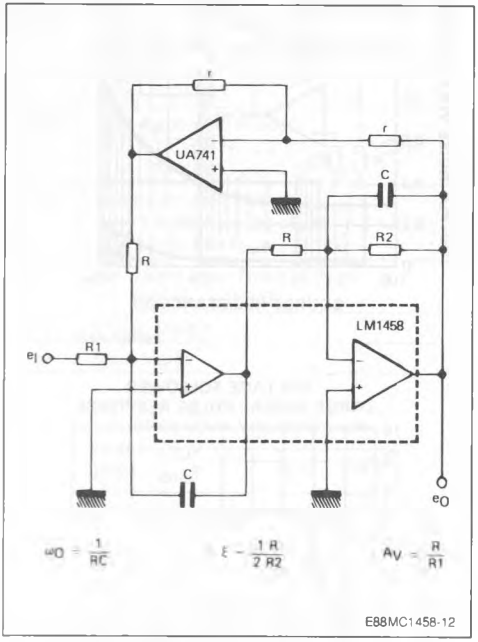
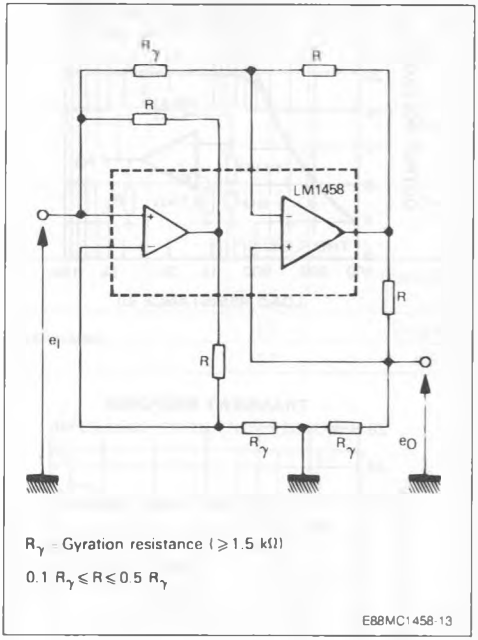
TYPICAL APPLICATIONS

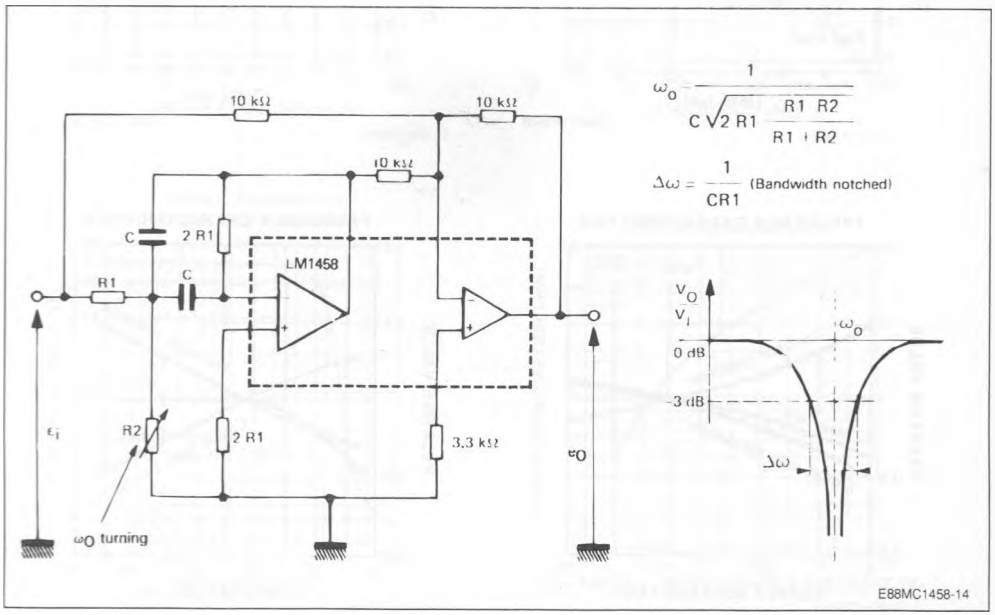
LOW PASS FILTER



GYRATOR

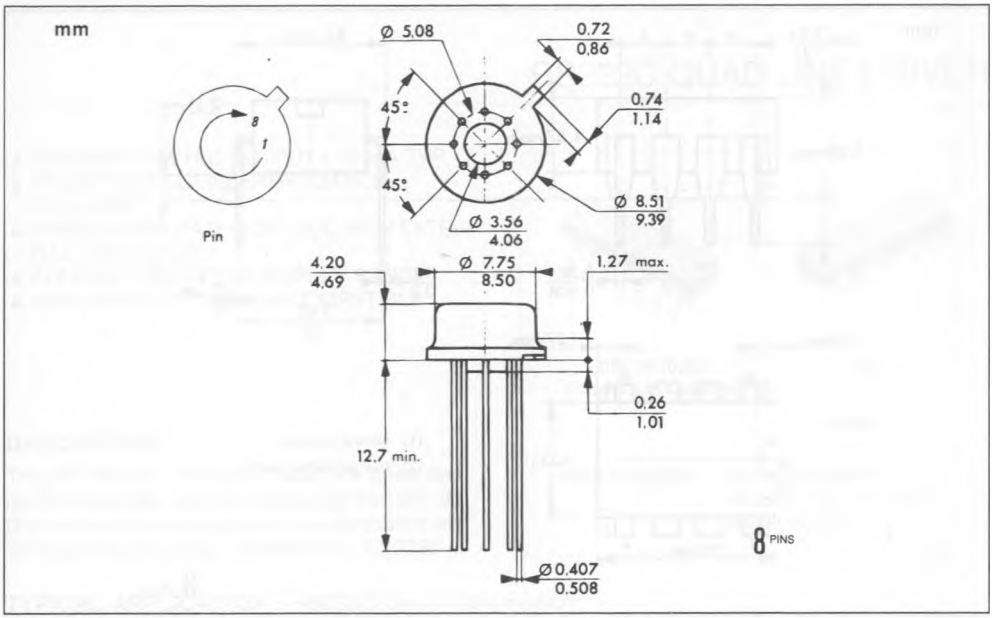


TURNABLE NOTCH FILTER

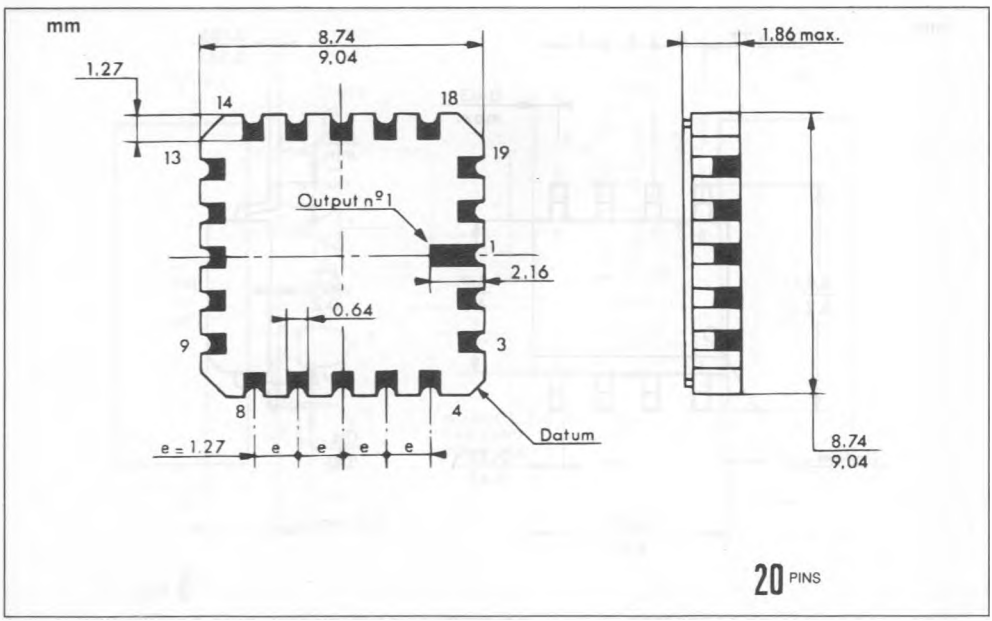


PACKAGE MECHANICAL DATA

8 PINS – METAL CAN TO-99

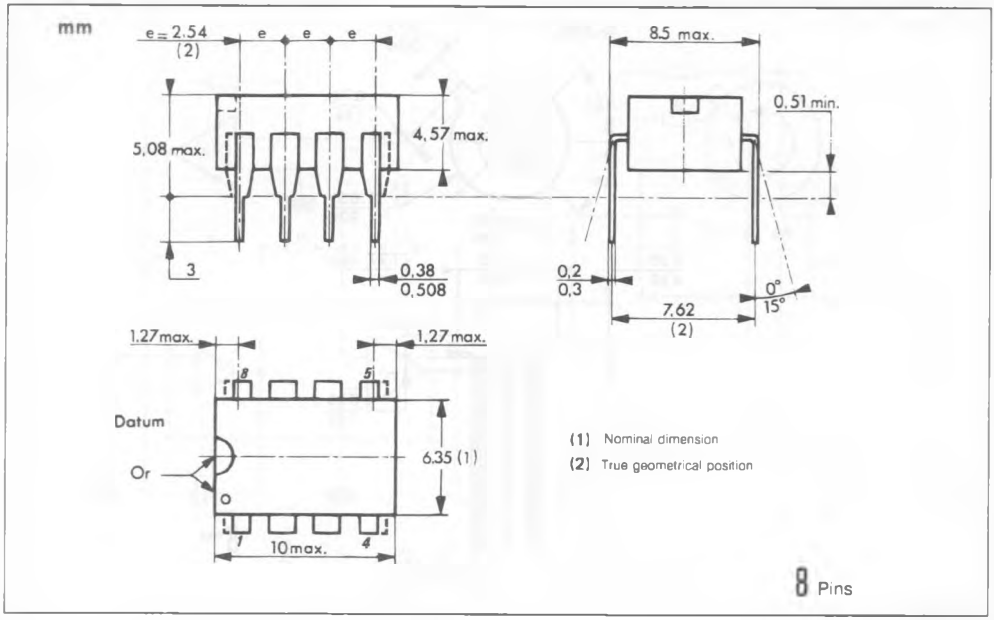


20 PINS – TRICECOP (LCC)



PACKAGE MECHANICAL DATA (continued)

8 PINS – PLASTIC DIP OR CERDIP



8 PINS – PLASTIC MICROPACKAGE (SO)