

AM Receiver Circuit

Technology: Bipolar

Features

- Controlled RF preamplifier
- Multiplicative balanced mixer
- Separate oscillator with amplitude control
- IF amplifier with gain control
- Balanced full-wave detector
- Audio preamplifier
- Internal AGC voltage
- Amplifier for field-strength indication
- Electronic stand-by on/off switch

Case: 16 pin dual inline plastic

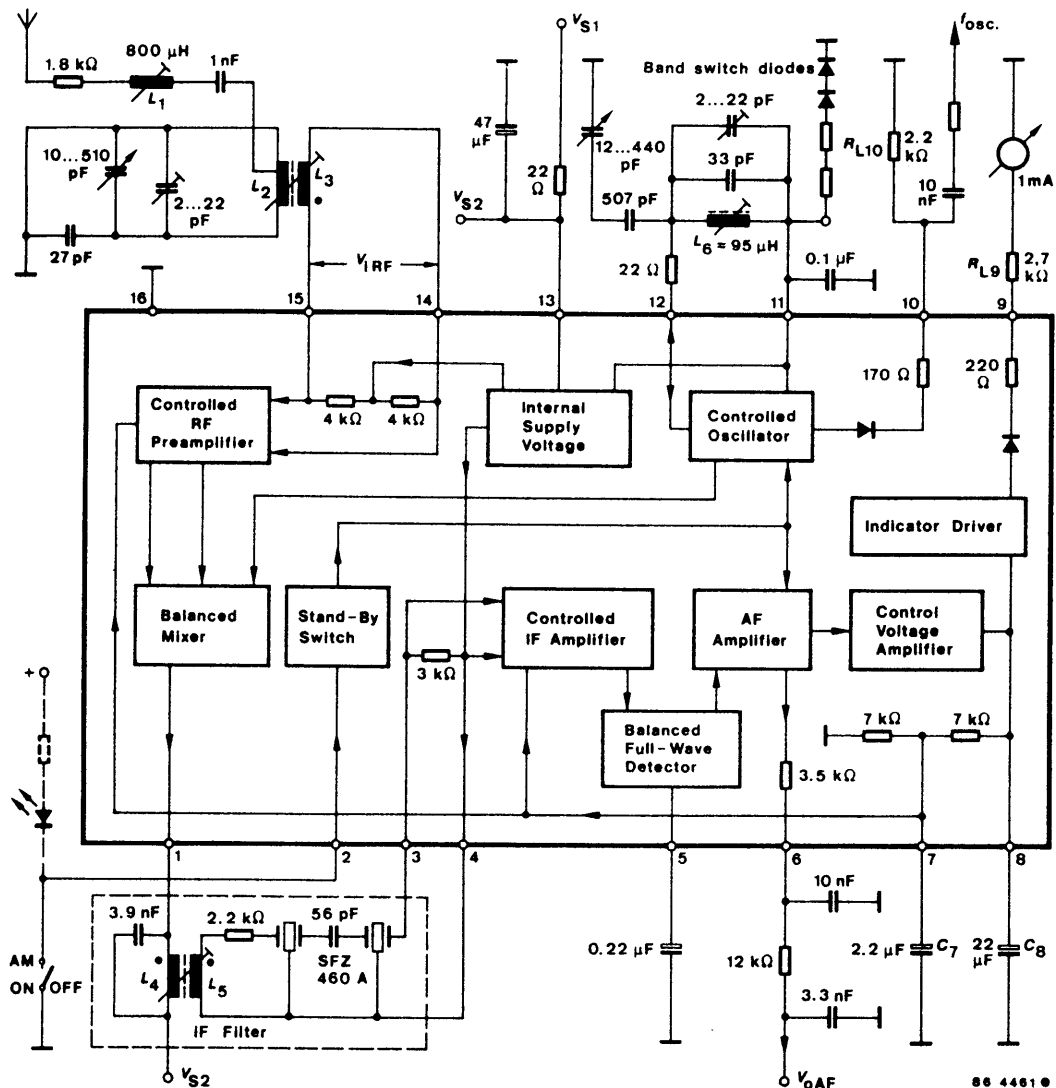


Figure 1 Block diagram and application circuit

Absolute maximum ratings

Reference point pin 16, unless otherwise specified

Parameters	Symbol	Value	Unit	
Supply voltage Pin 13	V_S	20	V	
Voltage on Pin 2	V_2	0 to 20	V	
RF inputs Voltages Reference point 15	Pin 14 Pin 14 Pin 14 Pin 15 Pin 15	$\pm V_{i14/15}$ V_i $-V_i$ V_i $-V_i$	12 V_S 0.6 V_i 0.6	V V V V V
RF inputs Currents Pin 14, 15	$\pm I_i$	200	mA	
Ambient temperature range	T_{amb}	- 30 to + 80	°C	
Storage temperature range	T_{stg}	- 55 to + 150	°C	

Electrical Characteristics

$V_S = 8.5$ V, reference point pin 16, $f_{IRF} = 1$ MHz, $R_G = 50 \Omega$, $f_{mod} = 0.4$ kHz, $m = 30\%$, $f_{IF} = 460$ kHz, $T_{amb} = + 25$ °C, unless otherwise specified

Parameters	Test Conditions / Pin	Symbol	Min	Type	Max	Unit
Supply voltage range	Pin 13	V_S	7.5	18		V
Supply current, without load, $I_L = 0$ (Pin 11)	Pin 13	I_S		23	30	mA
RF preamplifier and mixer						
DC input voltages	Pin 14, 15	V_i		$V_S/2$		V
Input impedances	$V_{iRF} < 300 \mu V$, Pin 14,15	R_i		5.5		k Ω
		C_i		25		pF
	$V_{iRF} > 10$ mV, Pin 14, 15	R_i		8.0		k Ω
		C_i		22		pF
Output impedance	Pin 1	R_o	500			k Ω
		C_o		6.0		pF
Maximum conversion conductance	I_{o1IF}/V_{iRF}	ΔS_M			6.5	mA/V
Maximum IF output voltage	Pin 1	V_{oIF}			5.0	V_{pp}
Output current	Pin 1	I_o		1.2		mA
Preamplifier control range		S_M		30		dB
Max. RF input voltage	Pin 14, 15	V_i			2.5	V_{pp}
Oscillator						
Frequency range	Pin 12	f_{OSC}	0.6		60	MHz
Oscillator circuit impedance range	Pin 12	Z_{LOSC}	0.5		200	k Ω

Parameters	Test Conditions / Pin	Symbol	Min	Type	Max	Unit
Controlled oscillator amplitude	Pin 12	V_{OSC}		130	150	mV
DC output voltage	$I_L = 0$ V Pin 11	V_O		$6 V_{BE(4V)}$		V
Output load current range	Pin 11	$-I_L$			20	mA
Output resistance	$I_L = 5 \pm 0.5$ mA, Pin 11	R_O		25		Ω
Oscillator frequency output Pin 10						
Output voltage	$R_{L10} = 4.7$ k Ω	V_0		320		mV _{pp}
Output resistance		R_0		170		Ω
Allowable output current		I_0			3	mA _p
IF amplifier an AF stage						
DC input voltages	Pin 3, 4	V_i		2		V
Input impedance	Pin 3	R_i C_i	2.4	3 7	3.9	k Ω pF
Max. IF input voltage	m = 80%, d = 3% Pin 3	V_i		90		mV
Control range	$V_{0AF} = -6$ dB	ΔV_i	61			dB
Audio output voltage	Pin 6 $V_i = 1$ mV (Pin 3), without load	V_0		310		mV
Audio output resistance	Pin 6	R_0		3.5		k Ω
Field-strength indication						
DC indicator voltages	$R_{L9} = 2.7$ k Ω , $V_i = 0$ Pin 9 $V_i = 500$ mV Pin 9	V_O V_O	0 2.5		140 3.1	mV V
Output current capability	Pin 9	$-I_O$	2.0			mA
Output resistance	$-I_0 = 0.5$ mA Pin 9	R_0		220		Ω
Reverse voltage at the output	AM switch-Off, $\pm I_0 \leq 1$ μ A	V_0		6		V
Stand-by switch						
Switching voltage	Pin 2	V_i		2.75		V
Required control voltage	AM ON Pin 2 AM OFF Pin 2	V_i V_i ¹⁾	3.5		2	V V
Input current	AM on, switching current AM off, reverse current ($V_2 = V_3$), Pin 2	$-I_i$ $\pm I_i$			200 10	μ A μ A

¹⁾ or open input

Operating conditions

$V_S = 8.5 \text{ V}$, $f_{iRF} = 1 \text{ MHz}$, $f_{mod} = 0.4 \text{ kHz}$, $m = 30\%$, $T_{amb} = 25^\circ\text{C}$, reference point Pin 16, see figure 2, unless otherwise specified

Parameters	Test Conditions / Pin	Symbol	Min	Type	Max	Unit
RF input voltages	$(S + N)/N$ = 6 dB = 26 dB = 46 dB	V_{iRF} V_{iRF} V_{iRF}		1.5 15 150		μV μV μV
RF input for agc operation		V_{iRF}		30		μV
Control range for	(Reference value $V_i = 500 \text{ mV}$) $\Delta V_0 = 6 \text{ dB}$ $\Delta V_0 = 1 \text{ dB}$	ΔV_{iRF} ΔV_{iRF}		91 86		dB dB
Maximum RF input voltage	$d = 3\%$, $m = 80\%$ $d = 3\%$, $m = 30\%$ $d = 10\%$, $m = 30\%$	V_{iRF} V_{iRF} V_{iRF}		0.5 0.7 0.9		V V V
Audio output voltage	$V_1 = 1 \text{ mV}$ $V_2 = 4 \mu\text{V}$, $m = 0.8$	V_{0AF} V_{0AF}		310 ($\pm 2 \text{ dB}$) 130 ($\pm 3.5 \text{ dB}$)		mV mV
RF input voltage	$V_{0AF} = 60 \text{ mV}$	V_{iRF}		5.5		μV
Total distortion of audio output voltage	$m = 80\%$, $V_i = 1 \text{ mV}$ $V_i = 500 \text{ mV}$	d d		0.5 3.0		% %
Signal plus noise to noise ratio of audio output voltage	$V_i = 1 \text{ mV}$	$\frac{(S + N)}{N}$		50		dB
IF bandwidth (-3 dB)		B_{iF}		4.6		kHz
IF selectively	$\Delta f = \pm 9 \text{ kHz}$ $\Delta f = \pm 36 \text{ kHz}$	S_{iF} S_{iF}		30 60		dB dB

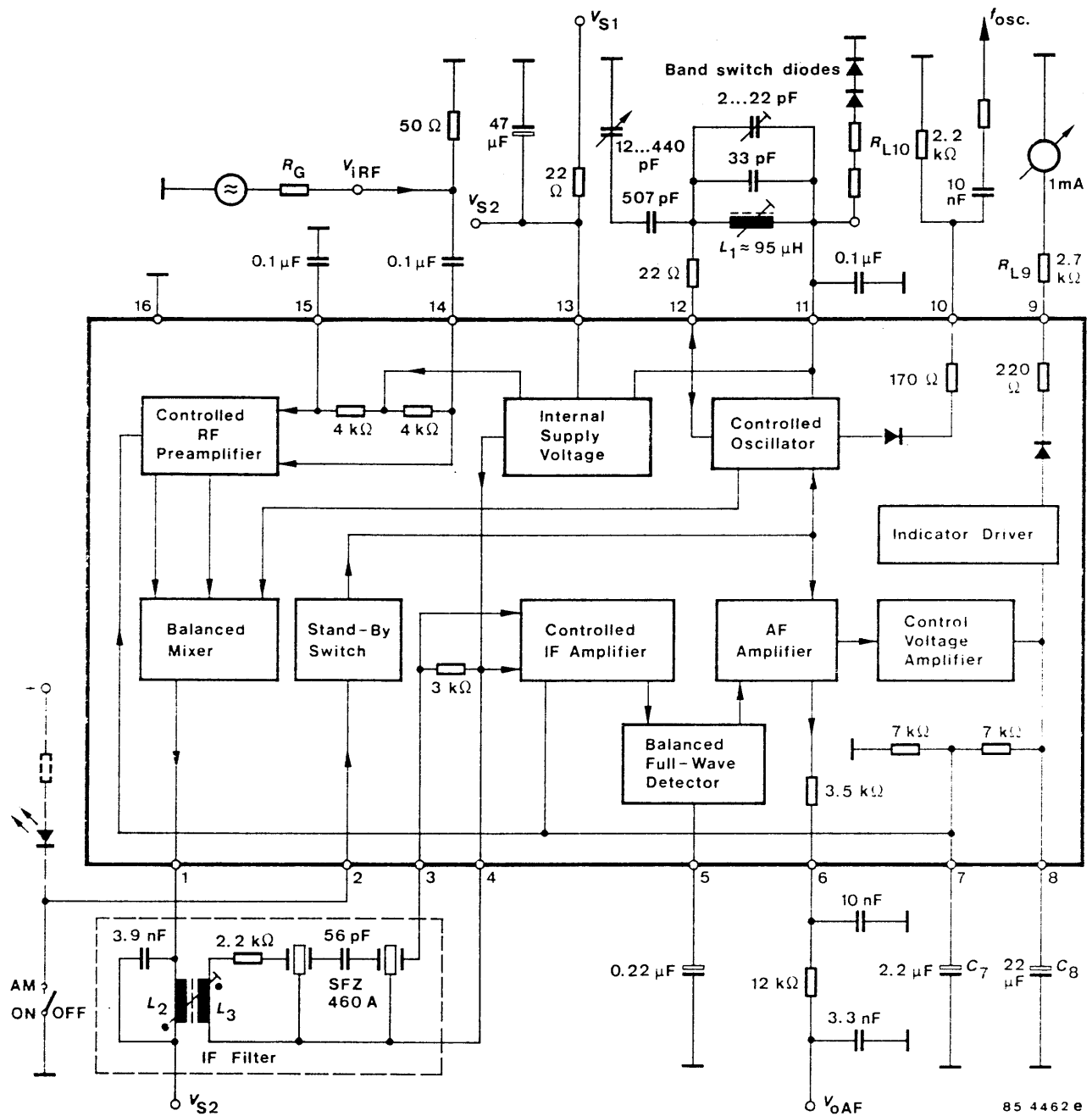
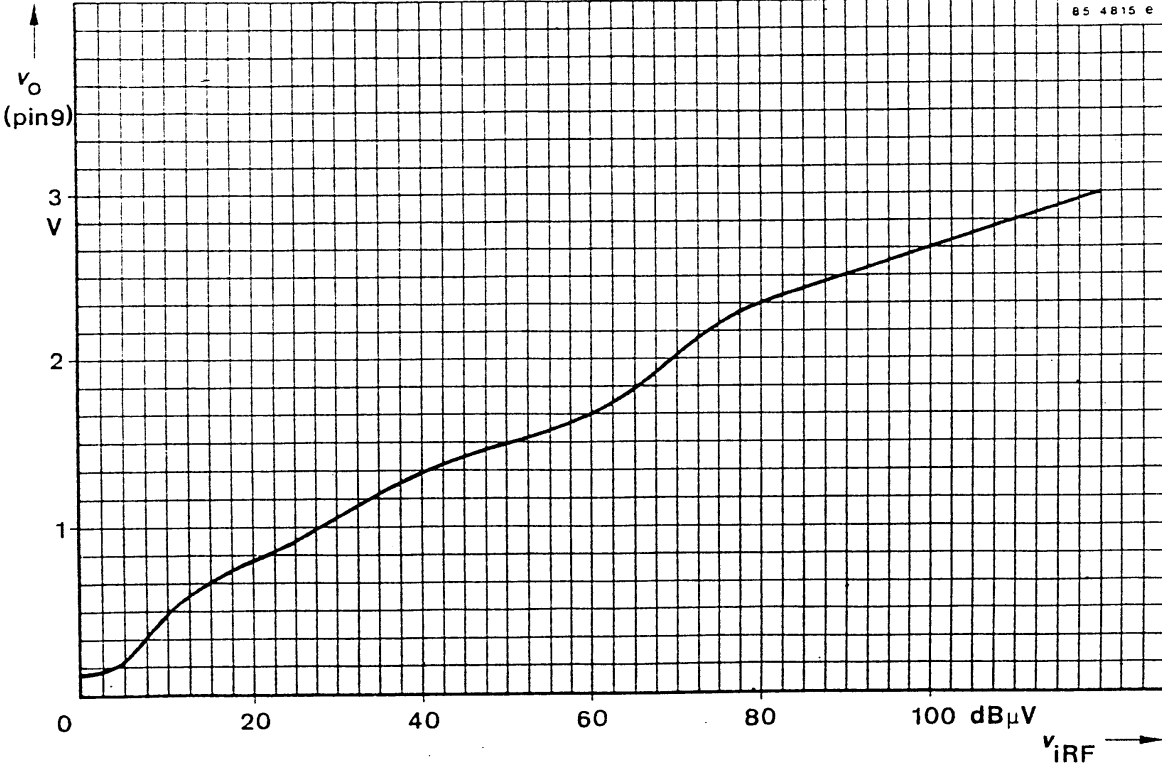
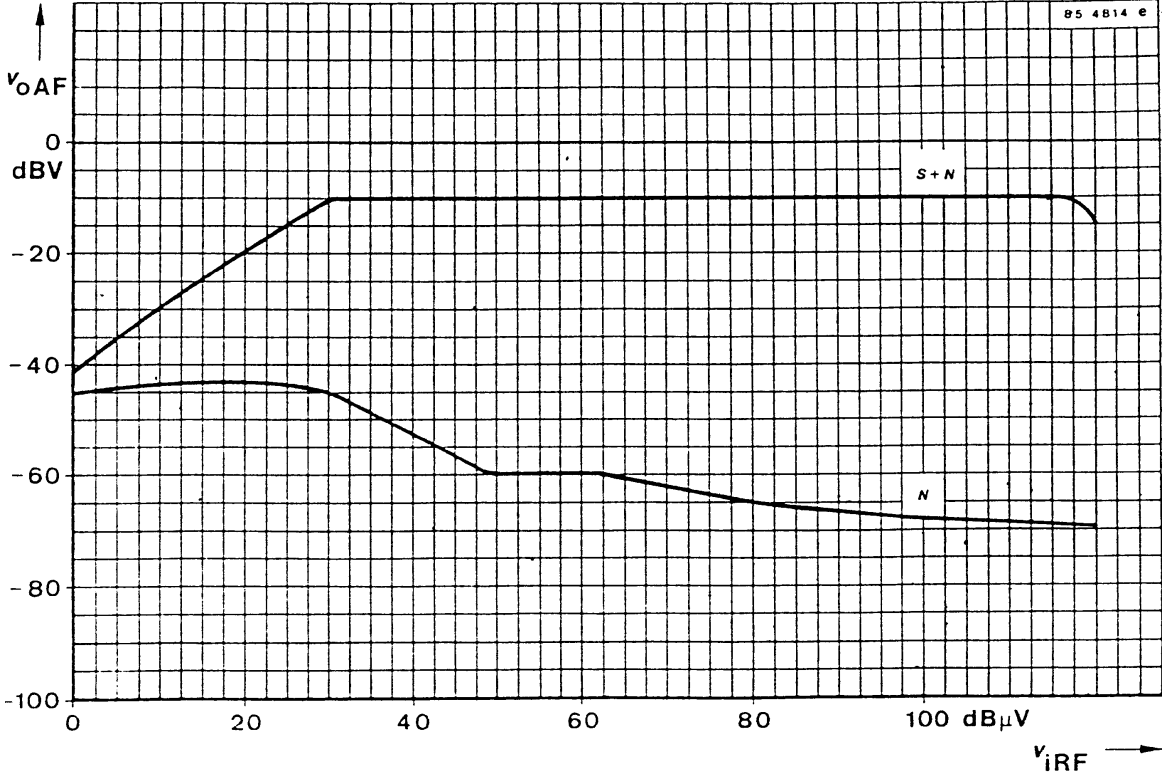
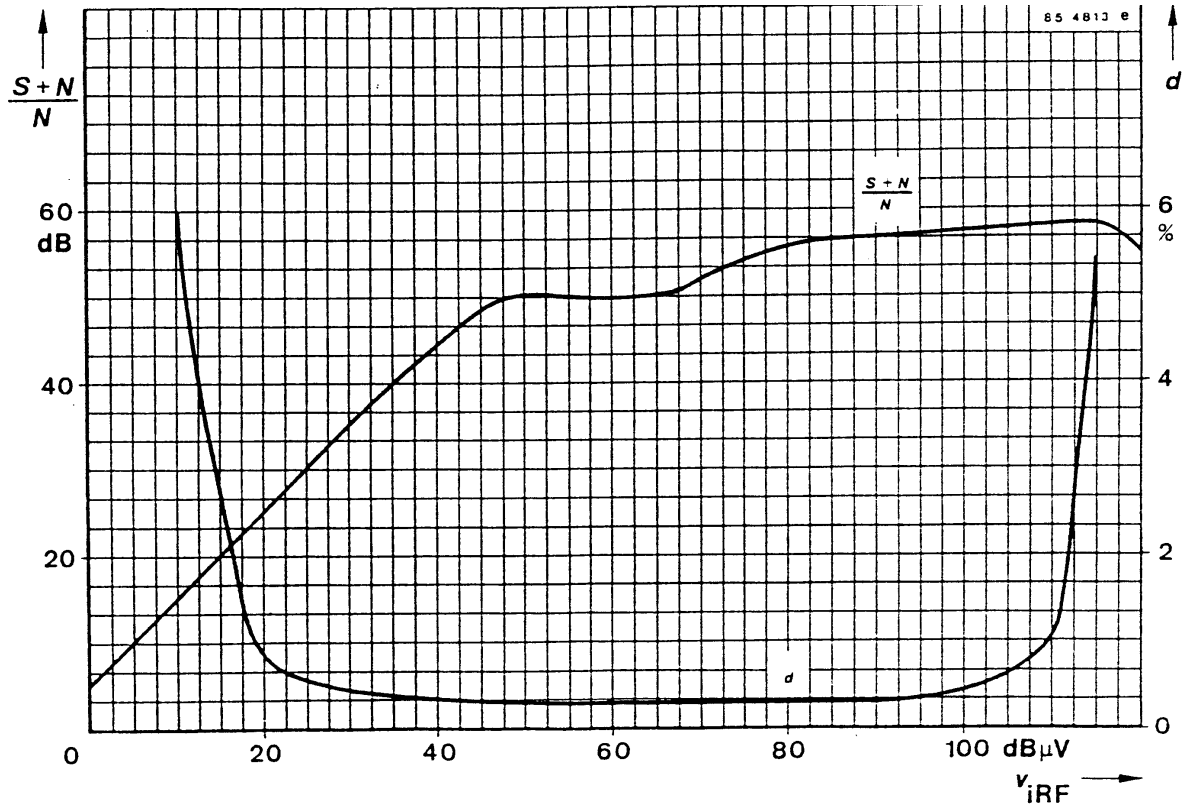
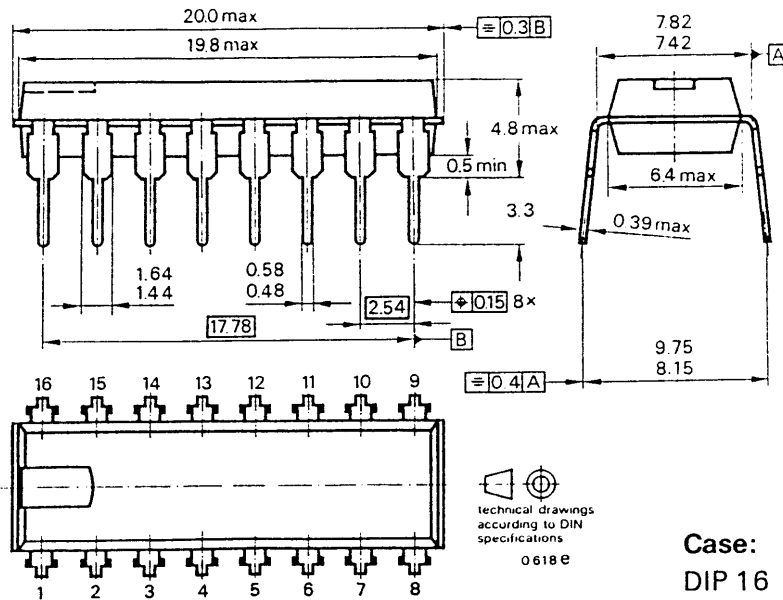


Figure 2 Test circuit





Dimensions in mm



Case:
DIP 16

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Of particular concern is the control or elimination of releases into the atmosphere of those substances which are known as ozone depleting substances (ODSs).

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