

## 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

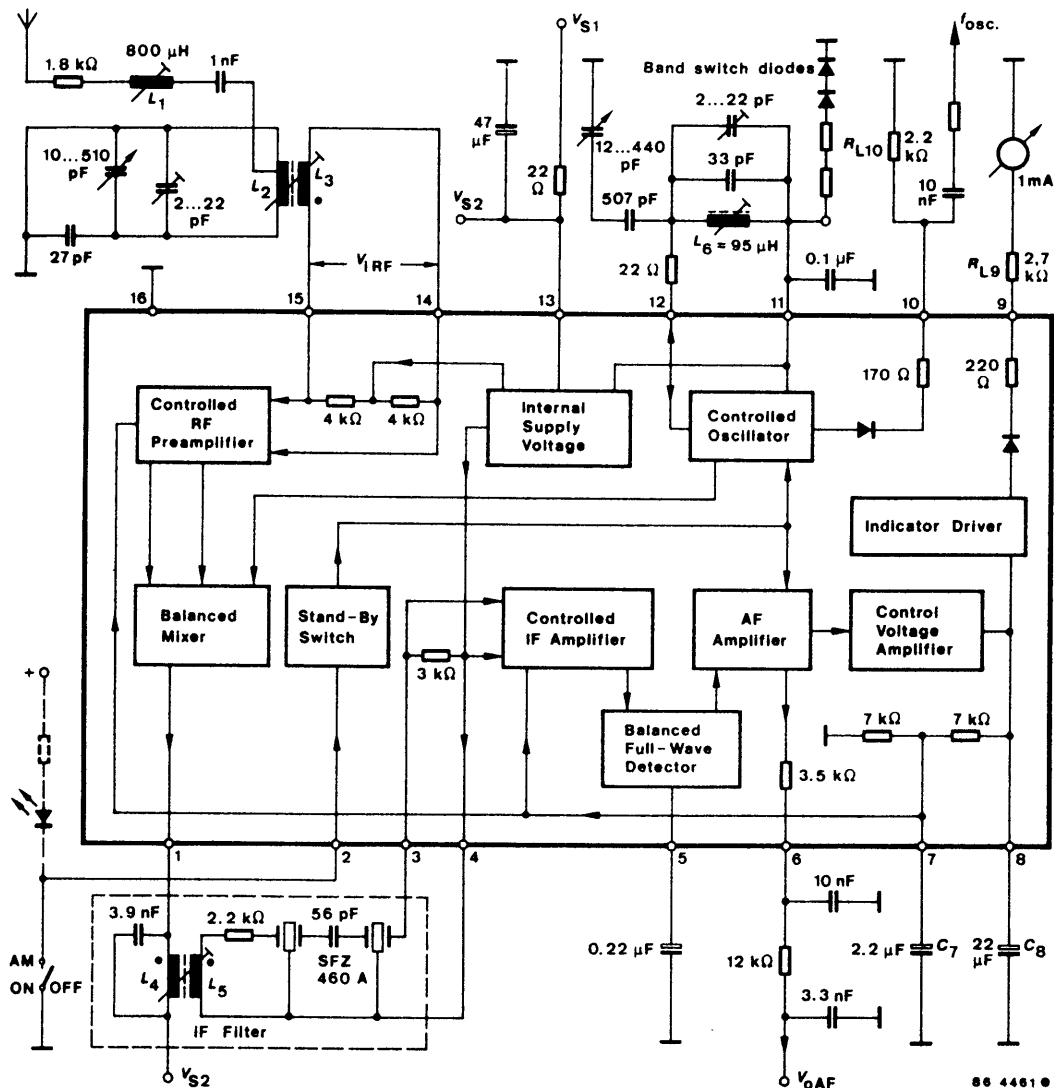


Figure 1 Block diagram and application circuit

## 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	$\pm V_{i\ 14/15}$ $V_i$ $-V_i$ $V_i$ $-V_i$	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
<b>RF preamplifier and mixer</b>						
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 $\Omega$
		$C_i$		25		pF
	$V_{iRF} > 10$ mV, Pin 14, 15	$R_i$		8.0		k $\Omega$
		$C_i$		22		pF
Output impedance	Pin 1	$R_o$	500			k $\Omega$
		$C_o$		6.0		pF
Maximum conversion conductance	$I_{o\ 1\ IF}/V_{iRF}$	$\Delta S_M$			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	$V_{pp}$
<b>Oscillator</b>						
Frequency range	Pin 12	$f_{OSC}$	0.6		60	MHz
Oscillator circuit impedance range	Pin 12	$Z_{LOSC}$	0.5		200	k $\Omega$

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		$\Omega$
<b>Oscillator frequency output</b> Pin 10						
Output voltage	$R_{L10} = 4.7$ k $\Omega$	$V_0$		320		mV <sub>pp</sub>
Output resistance		$R_0$		170		$\Omega$
Allowable output current		$I_0$			3	mA <sub>p</sub>
<b>IF amplifier an AF stage</b>						
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 $\Omega$ pF
Max. IF input voltage	m = 80%, d = 3% Pin 3	$V_i$		90		mV
Control range	$V_{0AF} = -6$ dB	$\Delta V_i$	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 $\Omega$
<b>Field-strength indication</b>						
DC indicator voltages	$R_{L9} = 2.7$ k $\Omega$ , $V_i = 0$ Pin 9 $V_i = 500$ mV Pin 9	$V_O$ $V_O$	0 2.5	2.8	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		$\Omega$
Reverse voltage at the output	AM switch-Off, $\pm I_0 \leq 1$ $\mu$ A	$V_0$		6		V
<b>Stand-by switch</b>						
Switching voltage	Pin 2	$V_i$		2.75		V
Required control voltage	AM ON Pin 2 AM OFF Pin 2	$V_i$ $V_i$ <sup>1)</sup>	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	$\mu$ A $\mu$ A

<sup>1)</sup> 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		$\mu\text{V}$ $\mu\text{V}$ $\mu\text{V}$
RF input for agc operation		$V_{iRF}$		30		$\mu\text{V}$
Control range for	(Reference value $V_i = 500 \text{ mV}$ ) $\Delta V_0 = 6 \text{ dB}$ $\Delta V_0 = 1 \text{ dB}$	$\Delta V_{iRF}$ $\Delta V_{iRF}$		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		$\mu\text{V}$
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 ( $-3 \text{ dB}$ )		$B_{iF}$		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

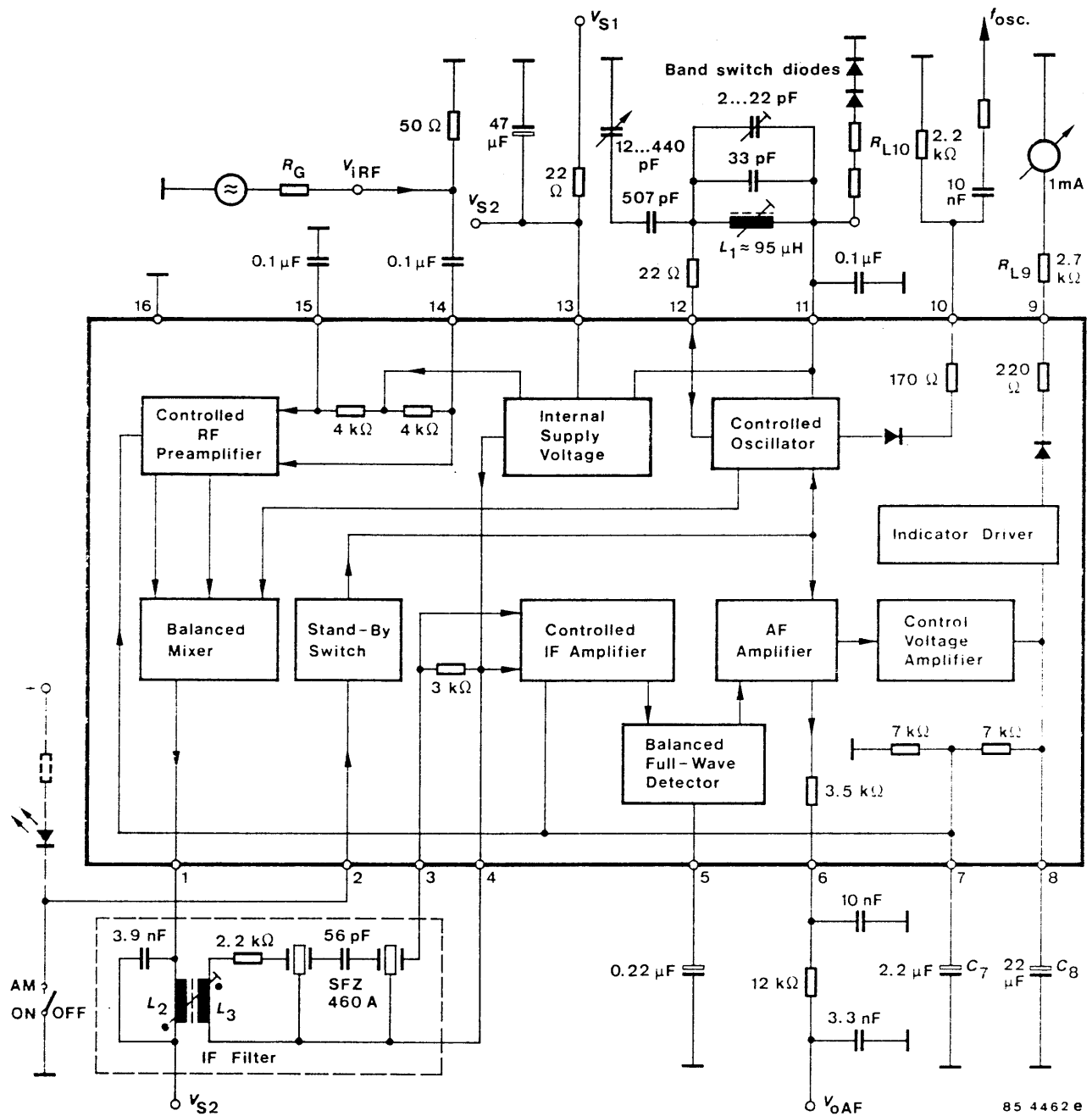
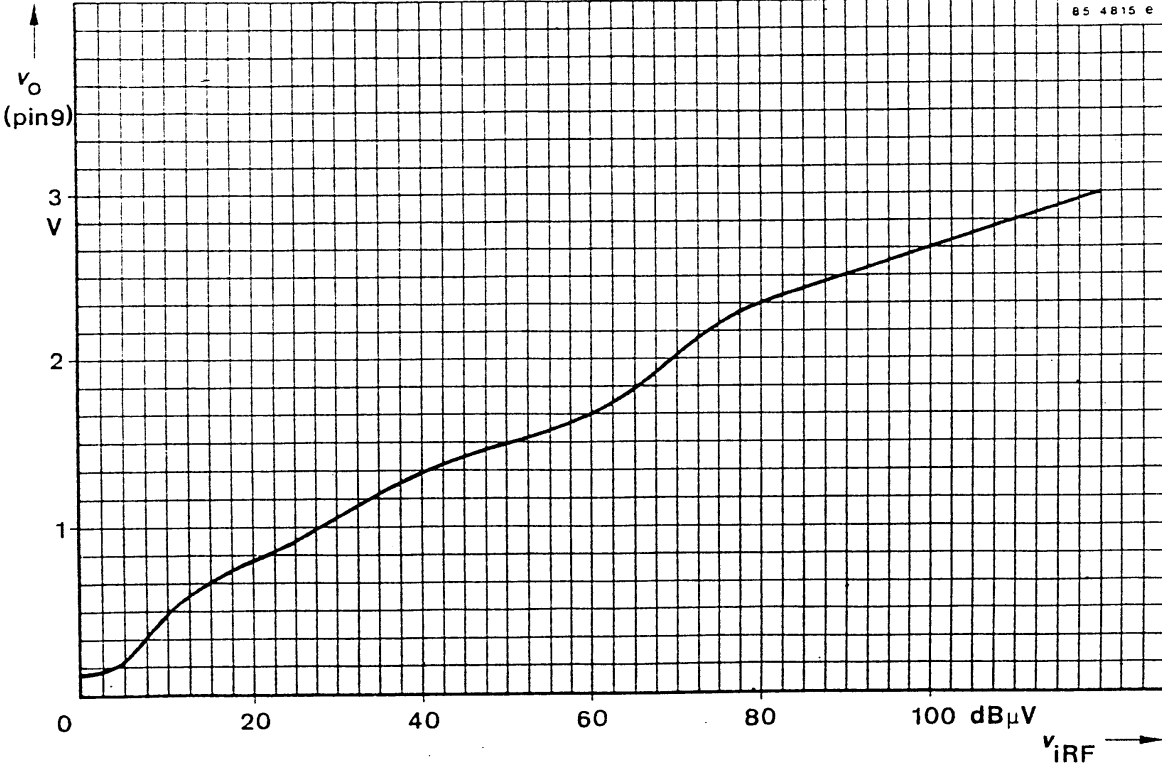
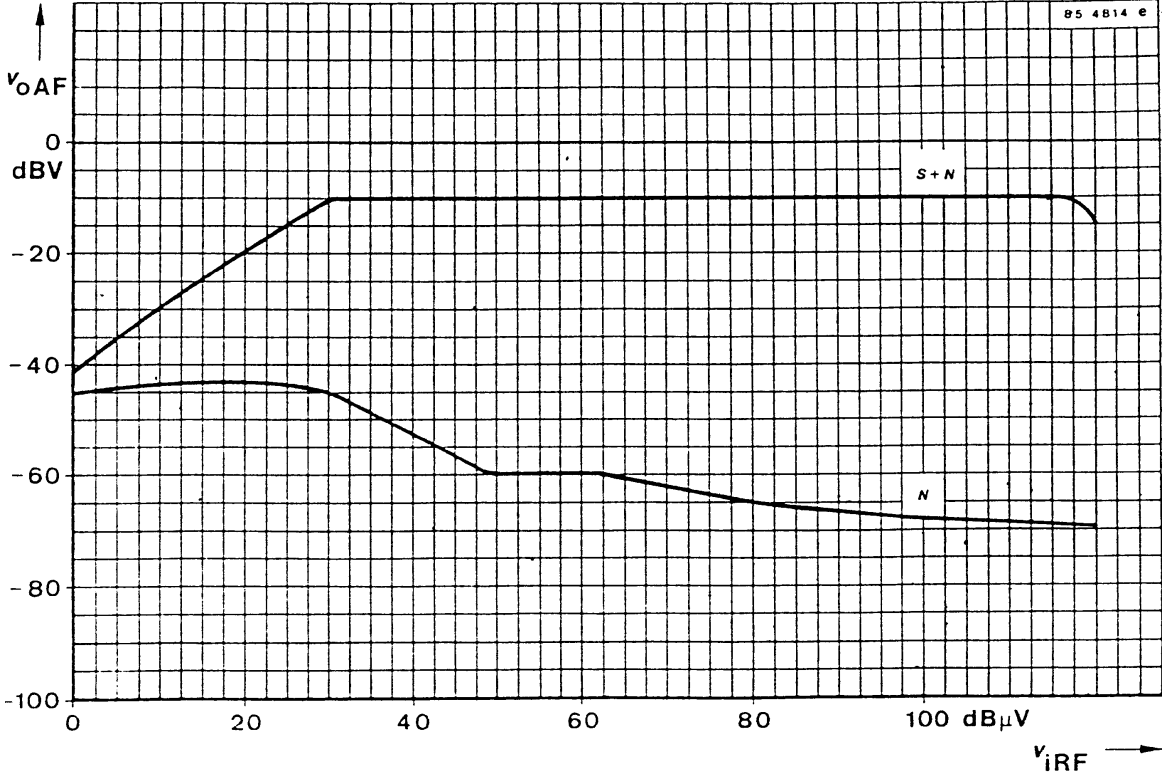
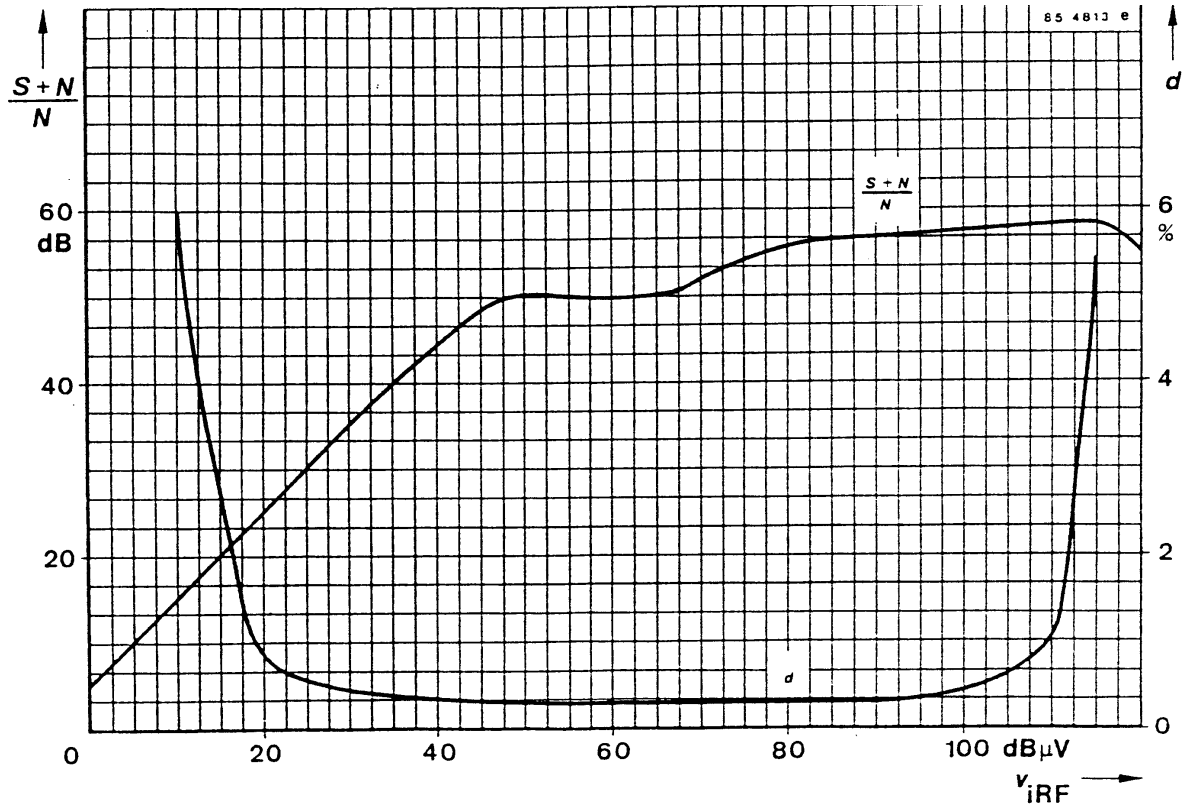
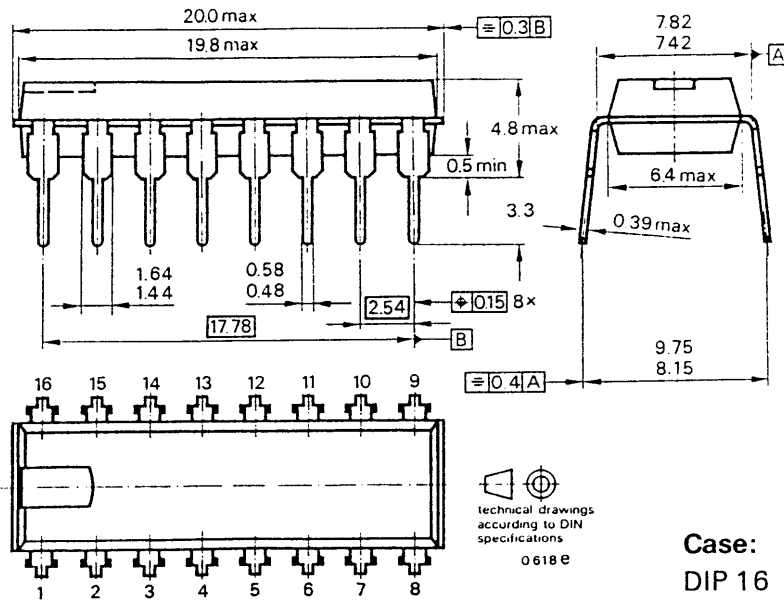


Figure 2 Test circuit





## Dimensions in mm



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