

## Monolithic Integrated Circuit

Applications: FM-front end for Hi-Fi and car-radios, mixer modulator and phase-sensitive detectors up to 250 MHz.

## Features:

- Excellent large signal behavior
  - High oscillator frequency stability, even by large input signals
  - Low external power level of the oscillator
  - Low radiation
  - Low noise figure
  - Build-in AGC amplifier for external PIN-diode
  - High overall amplification
  - Specially recommended for varactor tuned front ends
  - Buffered oscillator output
- Pinning and function fully compatible with TDA 1062

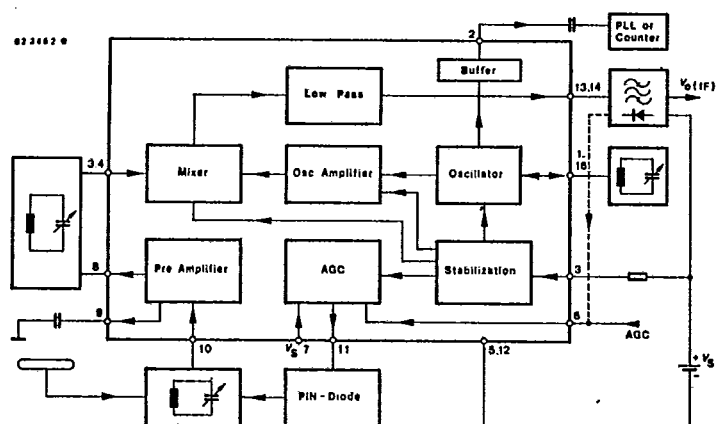


Fig. 1 Block diagram

## Absolute maximum ratings

|                              |       |           |            |                  |
|------------------------------|-------|-----------|------------|------------------|
| Supply voltage               | Pin 6 | $V_S$     | 16         | V                |
| Power dissipation            |       | $P_{tot}$ | 400        | mW               |
| $T_{amb} = 85^\circ\text{C}$ |       | $T_j$     | 125        | $^\circ\text{C}$ |
| Junction temperature         |       | $T_{amb}$ | -25...+85  | $^\circ\text{C}$ |
| Ambient temperature range    |       | $T_{stg}$ | -55...+125 | $^\circ\text{C}$ |
| Storage temperature range    |       |           |            |                  |

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| Thermal resistance |            | Min. | Typ. | Max. |     |
|--------------------|------------|------|------|------|-----|
| Junction ambient   | $R_{thJA}$ |      |      | 100  | K/W |

Electrical characteristics

$V_S = 10\text{ V}$ , reference point Pin 5, 12,  $f_i = 50.3\text{ MHz}$ ,  $f_{osc} = 100\text{ MHz}$ ,  $P_i = -40\text{ dBm}$ ,

$V_{AGC} = 0$ ,  $R_G = R_L = 50\ \Omega$ ,  $T_{amb} = 25^\circ\text{C}$ , see test circuit Fig. 3, unless otherwise specified

|                                    |        |           |            |     |      |      |    |
|------------------------------------|--------|-----------|------------|-----|------|------|----|
| Supply voltage range               |        | Pin 6     | $V_S$      | 8   | 16   | V    |    |
| Total supply current               |        |           | $I_S$      | 28  |      | mA   |    |
| Mixer current                      |        | Pin 13/14 |            | 10  | 16.5 | mA   |    |
| Stabilized base voltage            |        | Pin 3     |            | 3.8 | 4.2  | 4.8  | V  |
| RF stage collector voltage         |        | Pin 8     | $V_{CE}$   | 4.4 | 5    | 6.6  | V  |
| $V_{AGC} = 5\text{ V}$             |        | Pin 8     | $V_{CE}$   |     | 1.2  | 1.8  | V  |
| RF stage base voltage              |        | Pin 9     | $V_{BE}$   |     | 0.7  |      | V  |
| Oscillator stage collector voltage |        | Pin 1/16  | $V_{CE}$   | 1.7 | 2.3  | 2.6  | V  |
| Power gain                         |        |           |            |     |      |      |    |
| $f_{if} = f_{osc} - f_i$           | Fig. 4 | Pin 13/14 | $G_P$      | 13  | 17   | 20.5 | dB |
| RF rejection                       | Fig. 4 | Pin 13/14 | $d_{RF}$   | 17  | 30   |      | dB |
| 3 <sup>rd</sup> order distortion   | Fig. 4 | Pin 13/14 | $d_{3rd}$  |     | 48   |      | dB |
| Oscillator output                  |        |           |            |     |      |      |    |
| $R_L = 50\ \Omega$                 |        | Pin 2     | $V_{oosc}$ | 25  | 40   |      | mV |

Electrical characteristics

$V_S = 10\text{ V}$ ,  $T_{amb} = 25^\circ\text{C}$ , reference point Pin 5, 12,  $f_i = 95\text{ MHz}$ ,  $R_G = R_L = 50\ \Omega$ , Fig. 5

|                                                              |       |                  |     |      |     |     |
|--------------------------------------------------------------|-------|------------------|-----|------|-----|-----|
| Total supply current                                         |       | $I_S$            |     | 30   |     | mA  |
| Tuning range                                                 |       | $\Delta f$       | 88  |      | 108 | MHz |
| IF-frequency                                                 |       | $f_{if}$         |     | 10.7 |     | MHz |
| Tuning voltage range                                         |       | $V_{tun}$        | 2   |      | 7.5 | V   |
| Power gain                                                   |       | $G_p$            |     | 30   |     | dB  |
| Noise figure                                                 |       | $F$              |     | 5.5  |     | dB  |
| IF bandwidth                                                 |       | $B_{IF}$         |     | 0.5  |     | MHz |
| RF-bandwidth                                                 |       | $B_{RF}$         |     | 1.7  |     | MHz |
| Image rejection                                              |       | $S_{IR}$         |     | 80   |     | dB  |
| IF-rejection                                                 |       | $IFR$            | 100 |      |     | dB  |
| Ultimate quieting                                            |       |                  |     |      |     |     |
| -40 dBm, $\Delta f = \pm 75\text{ kHz}$ , $f = 1\text{ kHz}$ |       |                  |     |      |     |     |
| $B_{AF} = 30\text{ Hz} \dots 15\text{ kHz}$                  |       | $\alpha_{for}$   |     | 70   |     | dB  |
| Oscillator pulling                                           |       |                  |     |      |     |     |
| $P_i = 0\text{ dBm}$                                         |       | $\Delta f_{osc}$ |     | 10   |     | kHz |
| with AGC                                                     |       | $\Delta f_{osc}$ |     | 2    |     | kHz |
| AGC threshold                                                |       | $P_{IAGC}$       |     | -30  |     | dBm |
| Radiation at antenna input                                   |       | $P_{RI}$         |     | -60  |     | dBm |
| Gain difference                                              |       |                  |     |      |     |     |
| $f = 88 \dots 108\text{ MHz}$                                |       | $\Delta G_p$     |     | 1.5  |     | dB  |
| Oscillator output                                            |       |                  |     |      |     |     |
| $R_L = 50\ \Omega$                                           | Pin 2 | $V_{oosc}$       |     | 40   |     | mV  |

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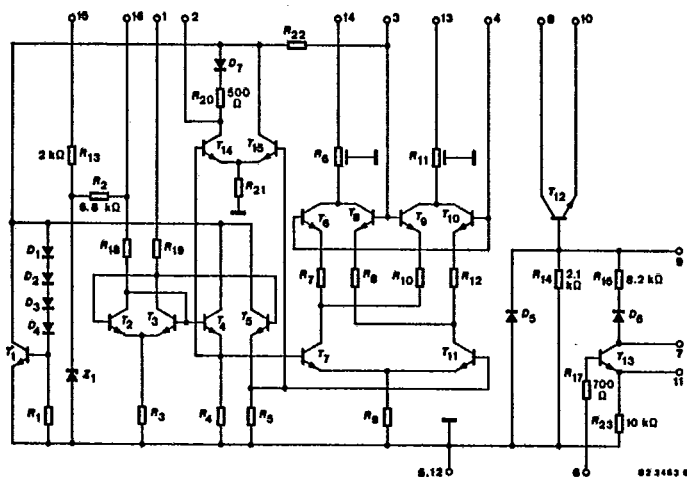
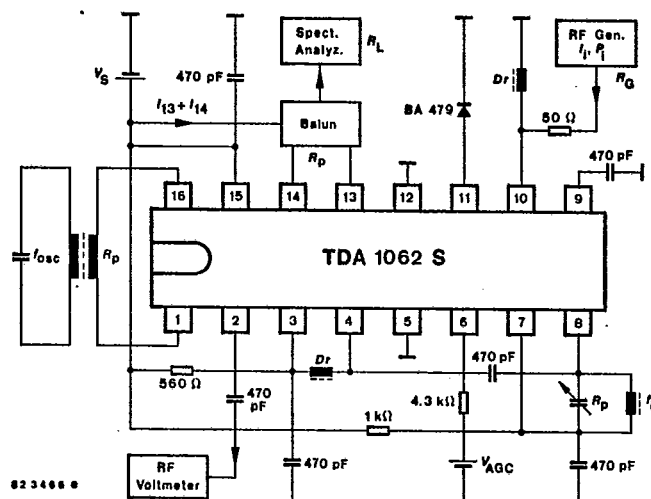


Fig. 2 Diagram and pin connections

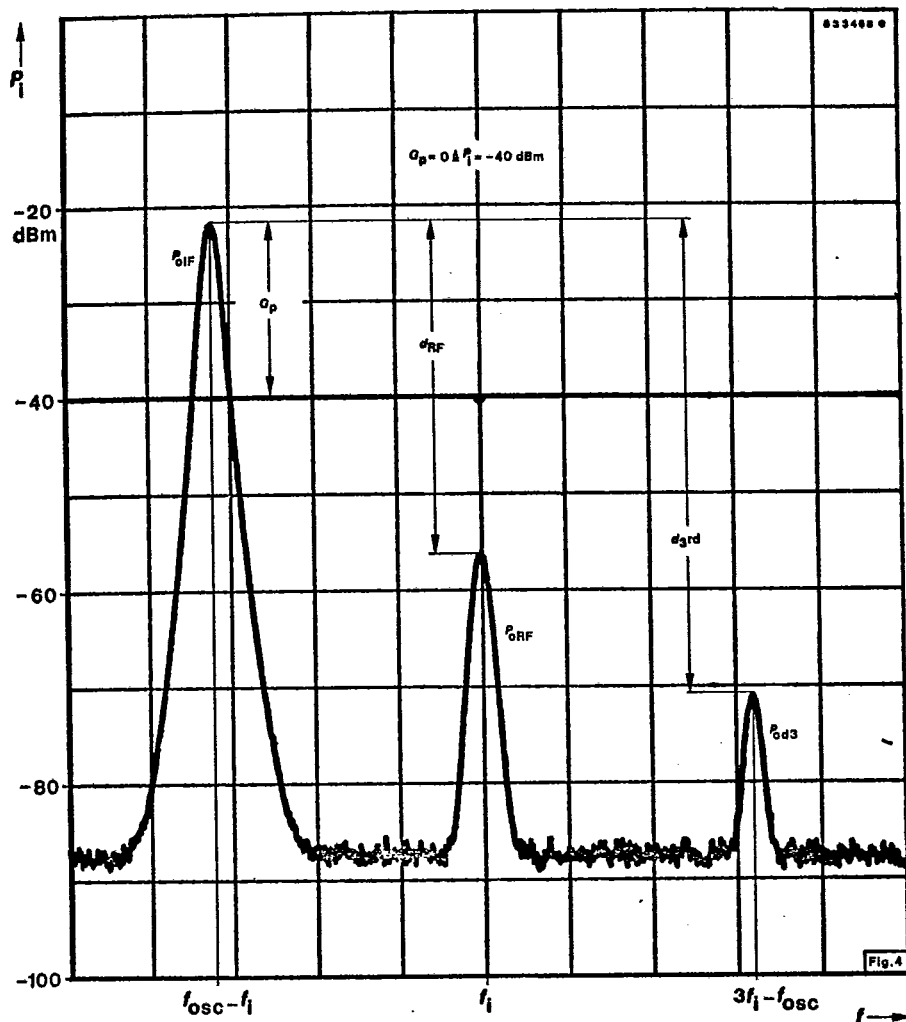


Electrical characteristics of the test circuit without IC in the socket

RF-Input Pin 10 with  $R_G = 50 \Omega$  terminatedRF-circuit Pin 8/5 at  $f = 50.3 \text{ MHz}$ :  $B = 5.6 \text{ MHz}$ ,  $C_p = 5.5 \text{ pF}$ ,  $R_p = 1 \Omega$ IF-circuit Pin 13/14 with  $R_L = 50 \Omega$  terminated: at  $f = 50 \text{ MHz}$ ,  $R_p = 200 \Omega$ Oscillator circuit Pin 1/16 at  $f = 100 \text{ MHz}$ :  $B = 2.3 \text{ MHz}$ ,  $C_p = 3 \text{ pF}$ ,  $R_p = 800 \Omega$ 

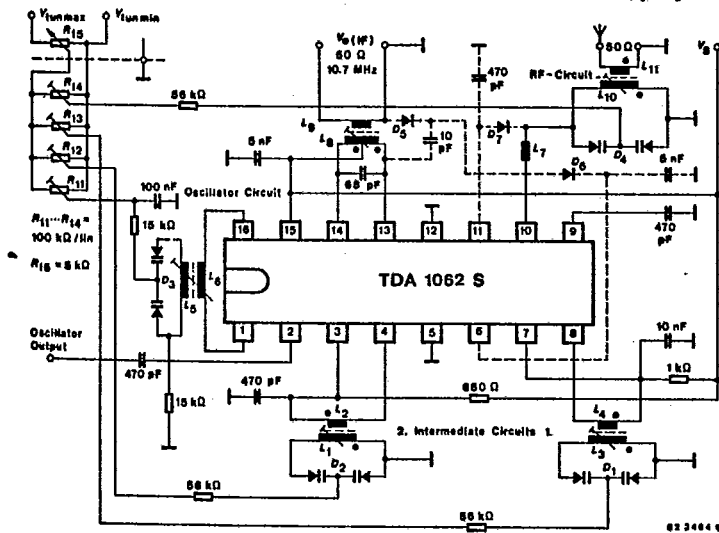
Fig. 3 Test circuit

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- $D_1, D_2, D_3, D_4$  = BB 304 blue (BB 204 blue)  
 $D_5, D_6$  = 1 N 4151 all resistors  $\pm 10\%$   
 $D_7$  = PIN Diode BA 479  
 $L_1, L_3, L_5, L_{10}$  = on 4 mm bobbin Fa. Kaschke, Göttingen, core 3/7.5x0.5 Mat. K 3/12/100  
 $L_4, L_9$  = Vogt Filter D 4, core 3/7.5x0.5 Mat. FI 05 F7  
 $L_1$  = 5 3/4 WdG  $\phi$  0.8 mm CuAg at the cold end of  $L_1$   
 $L_2$  = 2 3/4 WdG  $\phi$  0.4 mm CuLs  
 $L_3$  = 5 3/4 WdG  $\phi$  0.8 mm CuAg at the cold end of  $L_3$   
 $L_4$  = 4 3/4 WdG  $\phi$  0.4 mm CuLs  
 $L_5$  = 6 3/4 WdG  $\phi$  0.8 mm CuAg wound in  $L_5$   
 $L_6$  = 3 3/4 WdG  $\phi$  0.4 mm CuLs  
 $L_7$  = 19 WdG  $\phi$  0.15 mm Culs  $\phi$  3.5 mm air-core coil  
 $L_8$  = 2x15 WdG  $\phi$  0.15 mm CuLs double wound  
 $L_9$  = 2 WdG  $\phi$  0.2 mm Culs wound on  $L_9$   
 $L_{10}$  = 6 WdG  $\phi$  0.8 mm CuAG at the cold end of  $L_{10}$   
 $L_{11}$  = 1 WdG  $\phi$  0.4 mm CuLs  
 Culs  $\hat{=}$  single-nylon enamelled wire

Alignment: 88 MHz ( $V_{tunmin}$ ) Inductors, 108 MHz ( $V_{tunmax}$ )  $R_{11} \dots R_{14}$

No iteration of the alignment is necessary. The dotted line shows the external circuit for the AGC.

Fig. 5 Test circuit and application note

Supply voltage must be disconnected before inserting the integrated circuit in the socket.

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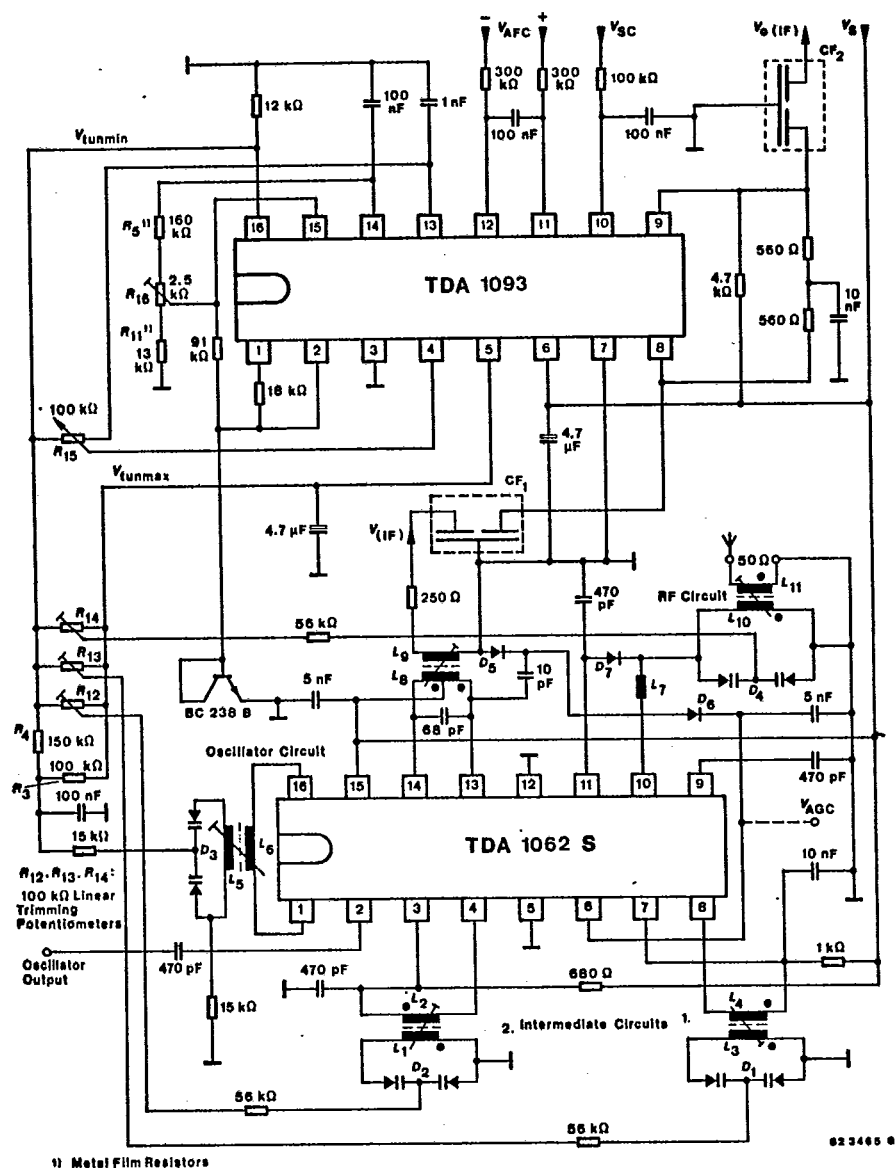


Fig. 6 FM-front end with tuning interface integrated circuit TDA 1093

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Dimensions in mm

