

# DATA SHEET

## **TDA5636B; TDA5637B** 9 V VHF hyperband and UHF mixer/oscillator for TV and VCR 3-band tuners

Product specification  
Supersedes data of 1995 August 01  
File under Integrated Circuits, IC02

1996 Dec 02

## 9 V VHF hyperband and UHF mixer/oscillator for TV and VCR 3-band

## TDA5636B; TDA5637B

### FEATURES

- Balanced mixer with a common emitter input for band A (single input)
- 2-pin oscillator for bands A and B
- Balanced mixer with a common base input for bands B and C (balanced input)
- 4-pin oscillator for band C
- Local oscillator buffer output for external prescaler
- SAW filter preamplifier with a low output impedance to drive the SAW filter directly
- Band gap voltage stabilizer for oscillator stability
- Electronic band switch
- External IF filter between the mixer output and the IF amplifier input
- Pin-to-pin compatible with TDA5636; TDA5637 family (same function with asymmetrical IF output).

### APPLICATIONS

- 3-band all channel TV and VCR tuners
- Any standard.

### GENERAL DESCRIPTION

The TDA5636B and TDA5637B are monolithic integrated circuits that perform the mixer/oscillator functions for bands A, B and C in TV and VCR tuners. These low-power mixer/oscillators require a power supply of 9 V and are available in a very small package.

The devices give the designer the capability to design an economical and physically small 3-band tuner.

They are suitable for European standards, as illustrated in Fig.17, with the following RF bands:

- 48.25 to 168.25 MHz
- 175.25 to 447.25 MHz
- 455.25 to 855.25 MHz.

With an appropriate tuned circuit, they are also suitable for NTSC all channel tuners (USA and Japan). The tuner development time can be drastically reduced by using these devices.

These circuits belong to the TDA5636/TDA5737 family which has exactly the same function with an IF amplifier having an asymmetrical IF output to drive a 75  $\Omega$  load. It is possible to build tuners with either an asymmetrical or a symmetrical IF output with one main tuner lay-out.

# 9 V VHF hyperband and UHF mixer/oscillator for TV and VCR 3-band tuners

TDA5636B; TDA5637B

**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_P$	supply voltage		–	9.0	–	V
$I_P$	supply current	band A	–	43	–	mA
		band B	–	39	–	mA
		band C	–	42	–	mA
$f_{RF}$	frequency range	RF input; band A; note 1	45	–	180	MHz
		RF input; band B; note 1	160	–	470	MHz
		RF input; band C; note 1	430	–	860	MHz
$G_v$	voltage gain	band A	–	25	–	dB
		band B	–	36	–	dB
		band C	–	36	–	dB
NF	noise figure	band A	–	7.5	–	dB
		band B	–	6	–	dB
		band C	–	7	–	dB
$V_o$	output voltage to get 1% cross modulation in channel	band A	–	121	–	dB $\mu$ V
		band B	–	120	–	dB $\mu$ V
		band C	–	119	–	dB $\mu$ V

**Note**

- The limits are related to the tank circuits used in Fig.17 and the intermediate frequency. Frequency bands may be adjusted by the choice of external components.

**ORDERING INFORMATION**

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TDA5636BT <sup>(1)</sup>	SO24	plastic small outline package; 24 leads; body width 7.5 mm	SOT137-1
TDA5636BM	SSOP24	plastic shrink small outline package; 24 leads; body width 5.3 mm	SOT340-1
TDA5637BT	SO24	plastic small outline package; 24 leads; body width 7.5 mm	SOT137-1
TDA5637BM	SSOP24	plastic shrink small outline package; 24 leads; body width 5.3 mm	SOT340-1

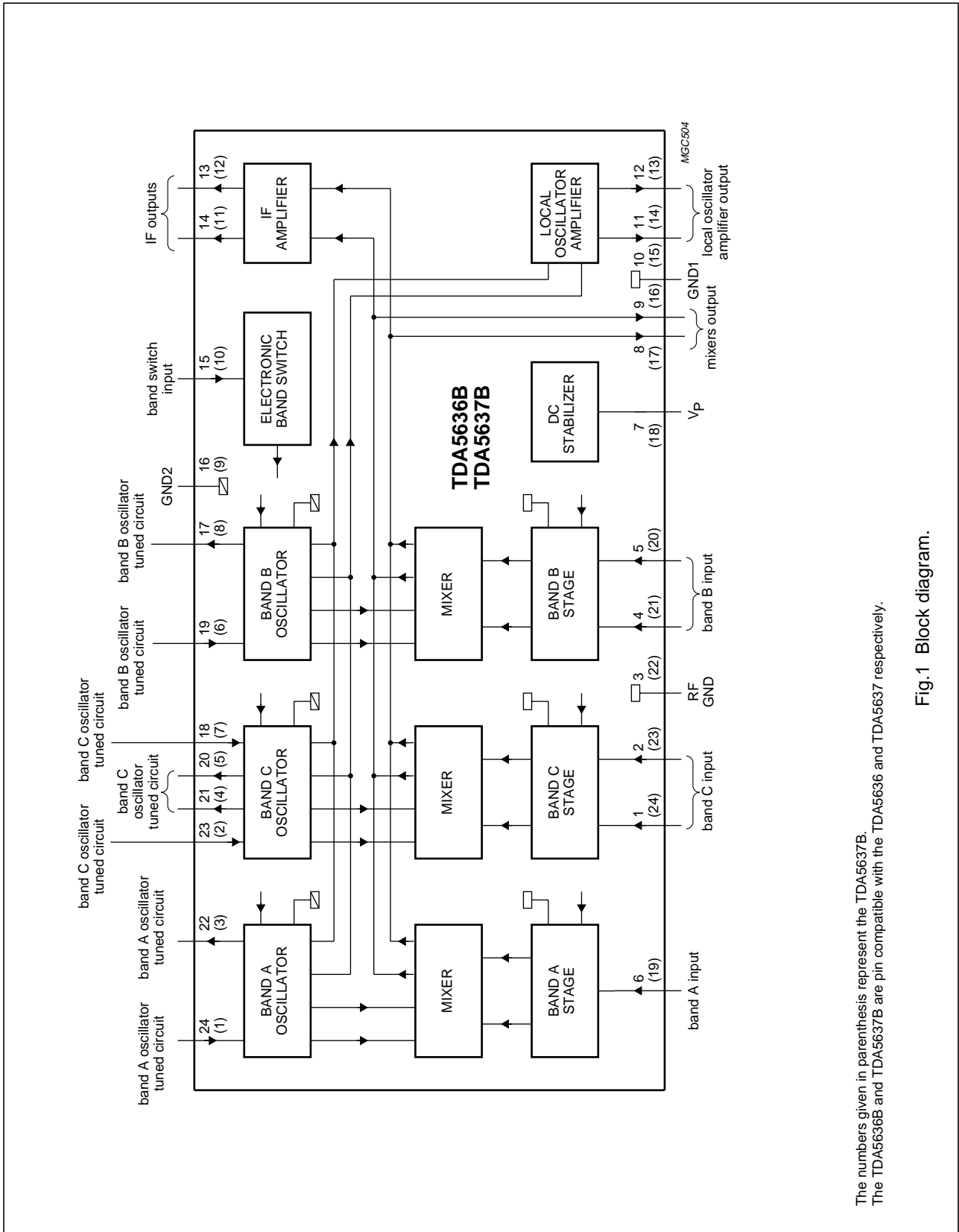
**Note**

- The TDA5636BT is available on request.

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**BLOCK DIAGRAM**



The numbers given in parenthesis represent the TDA5636B.  
 The TDA5636B and TDA5637B are pin compatible with the TDA5636 and TDA5637 respectively.

Fig.1 Block diagram.

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**PINNING**

SYMBOL	PIN		DESCRIPTION
	TDA5636B	TDA5637B	
CIN1	1	24	band C input 1
CIN2	2	23	band C input 2
RFGND	3	22	ground for RF inputs
BIN1	4	21	band B input 1
BIN2	5	20	band B input 2
AIN	6	19	band A input
V <sub>P</sub>	7	18	supply voltage
MIXOUT1	8	17	mixers output 1
MIXOUT2	9	16	mixers output 2
GND1	10	15	ground 1 (0 V)
LOOUT1	11	14	local oscillator amplifier output 1
LOOUT2	12	13	local oscillator amplifier output 2
IFOUT1	13	12	IF amplifier output 1
IFOUT2	14	11	IF amplifier output 2
BS	15	10	electronic band switch input
GND2	16	9	ground 2 (0 V)
BOSCOC	17	8	band B oscillator output collector
COSCIB1	18	7	band C oscillator input base 1
BOSCIB	19	6	band B oscillator input base
COSCOC1	20	5	band C oscillator output collector 1
COSCOC2	21	4	band C oscillator output collector 2
AOSCOC	22	3	band A oscillator output collector
COSCIB2	23	2	band C oscillator input base 2
AOSCIB	24	1	band A oscillator input base

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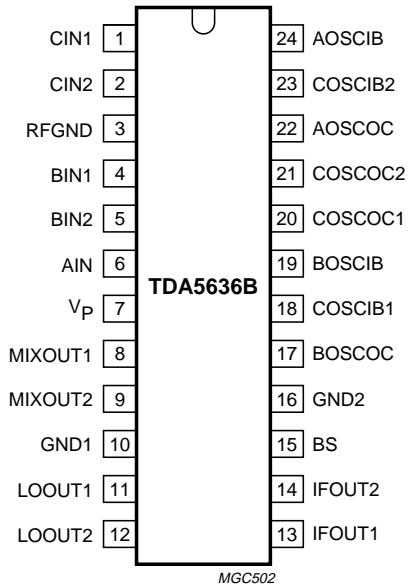


Fig.2 Pin configuration (TDA5636B).

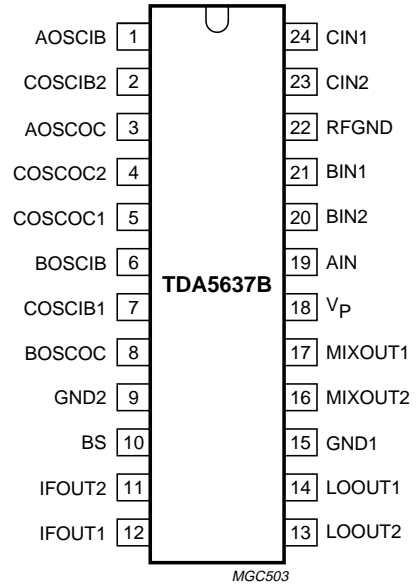


Fig.3 Pin configuration (TDA5637B).

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### LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
$V_P$	supply voltage	-0.3	+10.5	V
$V_{SW}$	switching voltage	0	+10.5	V
$I_O$	output current of each pin to ground	-	-10	mA
$t_{sc(max)}$	maximum short-circuit time (all pins)	-	10	s
$T_{stg}$	IC storage temperature	-55	+150	°C
$T_{amb}$	operating ambient temperature	-10	+80	°C
$T_j$	junction temperature	-	+150	°C

### HANDLING

Human Body Model:

- For TDA5636B GND (10) (16), RFGND (3), and  $V_P$  (7) are separate.
- For TDA5637B GND (9) (15), RFGND (22), and  $V_P$  (18) are separate.

All pins withstand 2000 V in accordance with the "UZW-B0/FQ-A302" specification equivalent to the "MIL-STD-883C" category B (2000 V); R = 1500  $\Omega$ ; C = 100 pF.

Machine Model:

- For TDA5636B GND (10) (16), RFGND (3), and  $V_P$  (7) are separate.
- For TDA5637B GND (9) (15), RFGND (22), and  $V_P$  (18) are separate.

All pins withstand 175 V in accordance with the "UZW-B0/FQ-A302" specification (date of issue: Nov 6th, 1990); R = 0  $\Omega$ ; C = 200 pF.

### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient in free air		
	SSOP24	120	K/W
	SO24	75	K/W

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**CHARACTERISTICS** $V_P = 9\text{ V}$ ;  $T_{\text{amb}} = 25\text{ °C}$ ; measured in circuit of Fig.17; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Supply</b>						
$V_P$	supply voltage		8.1	9.0	9.9	V
$I_P$	supply current	band A	–	43	48	mA
		band B	–	39	44	mA
		band C	–	42	47	mA
$V_{\text{SW}}$	switching voltage	band A	0	–	1.1	V
		band B	1.6	–	2.4	V
		band C	3.0	–	$V_P$	V
$I_{\text{SW}}$	switching current	band A	–	–	2	$\mu\text{A}$
		band B	–	–	5	$\mu\text{A}$
		band C; $V_{\text{SW}(C)} = 5\text{ V}$	–	–	10	$\mu\text{A}$
<b>Band A mixer (including IF amplifier)</b>						
$f_{\text{RF}}$	RF frequency	note 1	45	–	180	MHz
$G_v$	voltage gain	$f_{\text{RF}} = 50\text{ MHz}$ ; see Fig.4; note 2	22.5	25.0	27.5	dB
		$f_{\text{RF}} = 180\text{ MHz}$ ; see Fig.4; note 2	22.5	25.0	27.5	dB
NF	noise figure	$f_{\text{RF}} = 50\text{ MHz}$ ; see Figs 5 and 6	–	7.5	9.5	dB
		$f_{\text{RF}} = 180\text{ MHz}$ ; see Figs 5 and 6	–	7.5	9.5	dB
$V_o$	output voltage	1% cross modulation in channel; $f_{\text{RF}} = 50\text{ MHz}$ ; see Fig.7	118	121	–	$\text{dB}\mu\text{V}$
		1% cross modulation in channel; $f_{\text{RF}} = 180\text{ MHz}$ ; see Fig.7	119	122	–	$\text{dB}\mu\text{V}$
$V_i$	input voltage	10 kHz pulling in channel; $f_{\text{RF}} = 180\text{ MHz}$ ; note 3	–	104	–	$\text{dB}\mu\text{V}$
$g_{\text{os}}$	optimum source conductance	$f_{\text{RF}} = 50\text{ MHz}$	–	0.5	–	mS
		$f_{\text{RF}} = 180\text{ MHz}$	–	1	–	mS
$Y_i$	input admittance	see Fig.12	–	–	–	mS
$C_i$	input capacitance	$f_{\text{RF}} = 50\text{ to }180\text{ MHz}$ ; see Fig.12	–	2	–	pF
<b>Band A oscillator</b>						
$f_{\text{OSC}}$	oscillator frequency	note 4	80	–	216	MHz
$f_{\text{shift}}$	frequency shift	$\Delta V_P = 10\%$ ; note 5	–	–	200	kHz
$f_{\text{drift}}$	frequency drift	$\Delta T = 25\text{ °C}$ with no compensation; NP0 capacitors; note 6	–	–	600	kHz
		5 s to 15 min after switch on; note 7	–	–	200	kHz



## 9 V VHF hyperband and UHF mixer/oscillator for TV and VCR 3-band tuners

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Band B mixer (including IF amplifier)</b>						
$f_{RF}$	RF frequency	note 1	160	–	470	MHz
$G_v$	voltage gain	$f_{RF} = 170$ MHz; see Fig.8; note 2	33	36	39	dB
		$f_{RF} = 470$ MHz; see Fig.8; note 2	33	36	39	dB
NF	noise figure (not corrected for image)	$f_{RF} = 170$ MHz; see Fig.9	–	6.0	8.0	dB
		$f_{RF} = 470$ MHz; see Fig.9	–	7.0	9.0	dB
$V_o$	output voltage	1% cross modulation in channel; $f_{RF} = 170$ MHz; see Fig.10	118	121	–	dB $\mu$ V
		1% cross modulation in channel; $f_{RF} = 470$ MHz; see Fig.10	117	120	–	dB $\mu$ V
$V_i$	input voltage	10 kHz pulling in channel; $f_{RF} = 470$ MHz; note 3	–	91	–	dB $\mu$ V
	input voltage	N+5–1 MHz pulling; $f_{RF} = 430$ MHz; see Fig.11	–	77	–	dB $\mu$ V
$Z_i$	input impedance ( $R_s + jL_s\omega$ )	$f_{RF} = 170$ to 470 MHz; see Fig.13	–	30	–	$\Omega$
		$f_{RF} = 170$ to 470 MHz; see Fig.13	–	10	–	nH
<b>Band B oscillator</b>						
$f_{osc}$	oscillator frequency	note 4	200	–	500	MHz
$f_{shift}$	frequency shift	$\Delta V_p = 10\%$ ; note 5	–	–	400	kHz
$f_{drift}$	frequency drift	$\Delta T = 25$ °C with no compensation; NP0 capacitors; note 6	–	–	2	MHz
		5 s to 15 min. after switch on; note 7	–	–	300	kHz
<b>Band C mixer (including IF amplifier)</b>						
$f_{RF}$	RF frequency	note 1	430	–	860	MHz
$G_v$	voltage gain	$f_{RF} = 430$ MHz; see Fig.8; note 2	33	36	39	dB
		$f_{RF} = 860$ MHz; see Fig.8; note 2	33	36	39	dB
NF	noise figure (not corrected for image)	$f_{RF} = 430$ MHz; see Fig.9	–	7.0	9.0	dB
		$f_{RF} = 860$ MHz; see Fig.9	–	8.0	10.0	dB
$V_o$	output voltage	1% cross modulation in channel; $f_{RF} = 430$ MHz; see Fig.10	116	119	–	dB $\mu$ V
		1% cross modulation in channel; $f_{RF} = 860$ MHz; see Fig.10	116	119	–	dB $\mu$ V
$V_i$	input voltage	10 kHz pulling in channel; $f_{RF} = 860$ MHz; note 3	–	103	–	dB $\mu$ V
	input voltage	N+5–1 MHz pulling; $f_{RF} = 820$ MHz; see Fig.11	–	79	–	dB $\mu$ V
$Z_i$	input impedance ( $R_s + jL_s\omega$ )	$f_{RF} = 430$ to 860 MHz; see Fig.14	–	40	–	$\Omega$
		$f_{RF} = 430$ to 860 MHz; see Fig.14	–	10	–	nH

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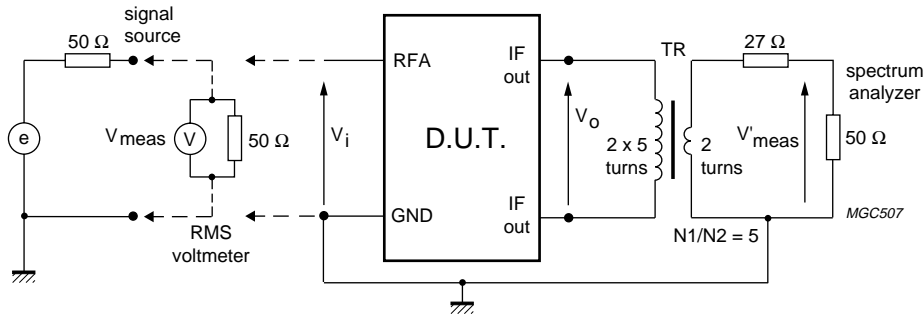
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Band C oscillator</b>						
$f_{osc}$	oscillator frequency	note 4	470	–	900	MHz
$f_{shift}$	frequency shift	$\Delta V_P = 10\%$ ; note 5	–	–	500	kHz
$f_{drift}$	frequency drift	$\Delta T = 25\text{ }^\circ\text{C}$ with compensation; note 6	–	–	1400	kHz
		5 s to 15 min. after switch on; note 7	–	–	400	kHz
<b>LO output</b>						
$S_{22}$	output reflection coefficient	see Fig.16	–	–	–	
$Y_o$	output admittance ( $Y_P + j\omega C_P$ )	see Fig.16	–	400	–	$\Omega$
		see Fig.16	–	1.0	–	pF
$V_o$	output voltage	$R_L = 50\ \Omega$	83	91	100	$\text{dB}\mu\text{V}$
SRF	spurious signal on LO output with respect to LO output signal	$R_L = 50\ \Omega$ ; note 8	–	–	–10	$\text{dBc}$
HLO	LO signal harmonics with respect to LO signal	$R_L = 50\ \Omega$	–	–	–10	$\text{dBc}$
<b>IF amplifier characteristics</b>						
$S_{22}$	output reflection coefficient	magnitude; through 1 nF; see Fig.15	–	–21.3	–	$\text{dB}$
		phase; through 1 nF; see Fig.15	–	49	–	deg
$Z_o$	output impedance ( $R_s + jL_s\omega$ )	$R_s$ ; through 1 nF	–	110	–	$\Omega$
		$L_s$ ; through 1 nF	–	65	–	nH

**Notes**

- The RF frequency range is defined by the oscillator frequency range and the intermediate frequency.
- The gain is defined as the transducer gain (measured in Fig.17) plus the voltage transformation ratio of L6 to L7 (10 : 2, 15.4 dB including transformer loss).
- The input level causing 10 kHz frequency detuning at the LO output;  $f_{osc} = f_{RF} + 33.4\text{ MHz}$ .
- Limits are related to the tank circuits used in Fig.17. Frequency bands may be adjusted by the choice of external components.
- The frequency shift is defined as the change in oscillator frequency when the supply voltage varies from  $V_P = 9$  to 8.1 V and from  $V_P = 9$  to 9.9 V.
- The frequency drift is defined as the change in oscillator frequency when the ambient temperature varies from  $T_{amb} = 25$  to 0  $^\circ\text{C}$  and from  $T_{amb} = 25$  to 50  $^\circ\text{C}$ .
- Switch on drift is defined as the change in oscillator frequency between 5 s and 15 min after switch on.
- SRF: spurious signal on LO with respect to LO output signal:
  - RF level = 120  $\text{dB}\mu\text{V}$  at  $f_{RF} < 180\text{ MHz}$
  - RF level = 107.5  $\text{dB}\mu\text{V}$  at  $f_{RF} = 180$  to 225 MHz
  - RF level = 97  $\text{dB}\mu\text{V}$  at  $f_{RF} = 225$  to 860 MHz.

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TDA5636B; TDA5637B



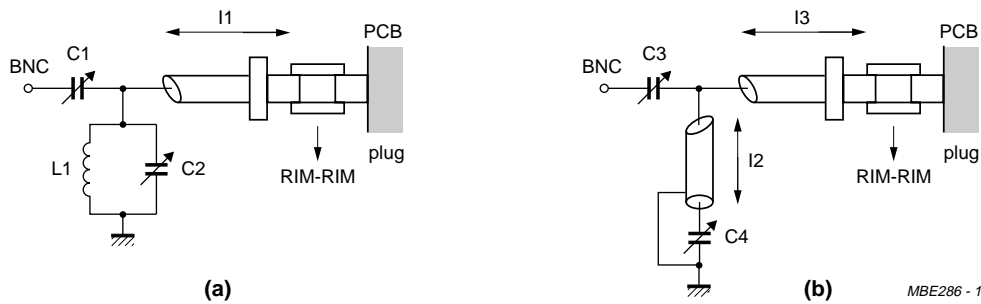
$$Z_i (AIN) \gg 50 \Omega \Rightarrow V_i = 2 \times V_{meas}$$

$$V_i = V_{meas} + 6 \text{ dB}$$

$$V_o = V'_{meas} \times \left( \frac{50 + 27}{50} \right) + 15.4 \text{ dB (transformer ratio } N1/N2 = 5 \text{ and transformer loss)}$$

$$G_v = 20 \log \frac{V_o}{V_i}$$

Fig.4 Band A gain measurement.



(a) For  $f_{RF} = 50 \text{ MHz}$ :

mixer A frequency response measured = 57 MHz, loss = 0 dB

image suppression = 16 dB

C1 = 9 pF

C2 = 15 pF

L1 = 7 turns (diameter = 5.5 mm, wire diameter = 0.5 mm)

l1 = semi rigid cable (RIM): 5 cm long

(semi rigid cable (RIM); 33 dB/100 m; 50  $\Omega$ ; 96 pF/m).

(b) For  $f_{RF} = 150 \text{ MHz}$ :

mixer A frequency response measured = 150.3 MHz, loss = 1.3 dB

image suppression = 13 dB

C3 = 5 pF

C4 = 25 pF

l2 = semi rigid cable (RIM): 30 cm long

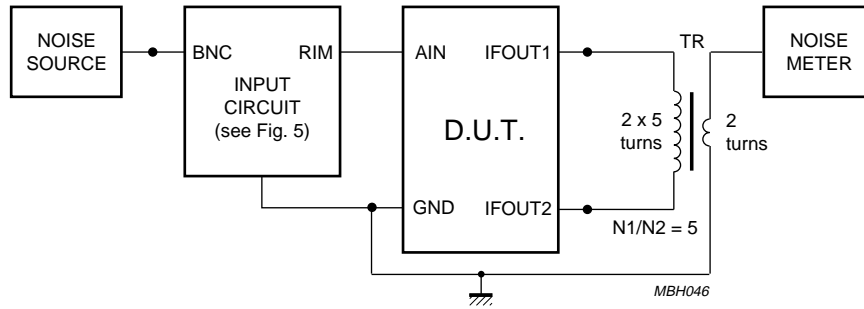
l3 = semi rigid cable (RIM): 5 cm long

(semi rigid cable (RIM); 33 dB/100 m; 50  $\Omega$ ; 96 pF/m).

Fig.5 Input circuit for optimum noise figure in band A.

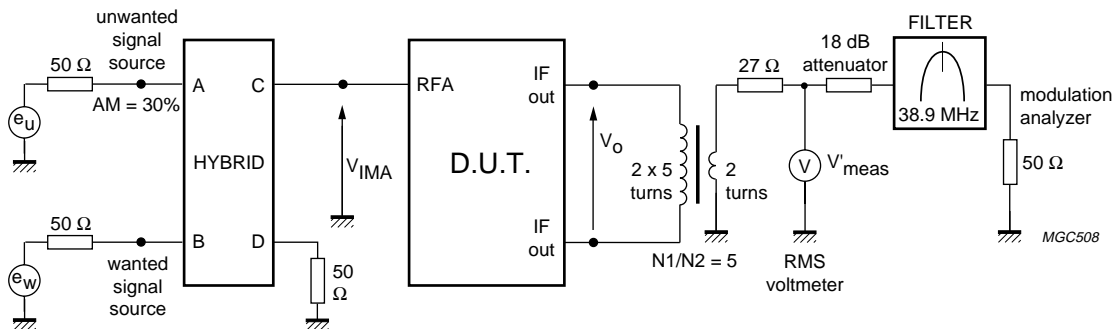
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(1)  $NF = NF_{meas} - \text{loss (input circuit) dB}$ .

Fig.6 Noise figure measurement in band A.



$$V'_{meas} = V_o \times \left( \frac{50 + 27}{50} \right) - 15.4 \text{ dB (transformer ratio } \frac{N1}{N2} = 5 \text{ and transformer loss).}$$

Wanted output signal at  $f_{RFW} = 180 \text{ MHz}$ :  $V_{ow} = 104 \text{ dB}\mu\text{V}$ .

We measure the level of the unwanted signal  $V_{ou}$  causing 0.3% AM modulation in the wanted output signal;  $f_{RFU} = 185.5 \text{ MHz}$ .

$$V_{ou} = V'_{meas} \times \left( \frac{50 + 27}{50} \right) + 15.4 \text{ dB.}$$

The cross modulation measurements are done at these frequencies:

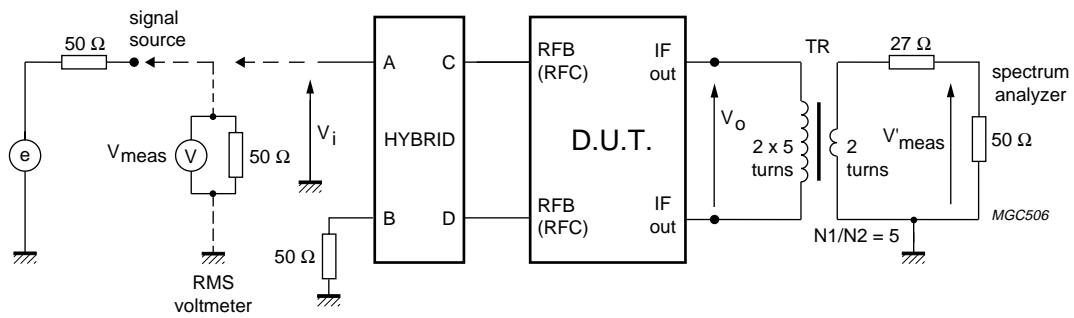
- $f_{RFW} = 50.0 \text{ MHz}$ ;  $f_{RFU} = 55.5 \text{ MHz}$ ;  $f_{osc} = 88.9 \text{ MHz}$
- $f_{RFW} = 180.0 \text{ MHz}$ ;  $f_{RFU} = 185.5 \text{ MHz}$ ;  $f_{osc} = 218.9 \text{ MHz}$ .

Filter characteristics:  $f_c = 38.9 \text{ MHz}$ ,  $f_{-3\text{dB}} = 1.2 \text{ MHz}$ ,  $f_{-30\text{dB}} = 2.64 \text{ MHz}$ .

Fig.7 Cross modulation measurement in band A.

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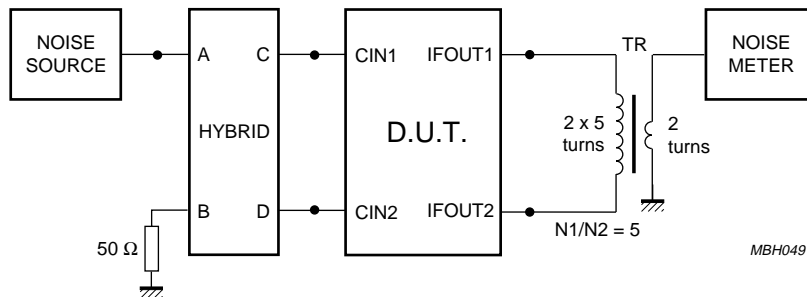


$$V_i = V_{meas}; V_o = V'_{meas} \times \left( \frac{50 + 27}{50} \right) + 15.4 \text{ dB (transformer ratio } \frac{N1}{N2} \text{ and transformer loss).}$$

$$\text{Voltage gain for band B and C} = 20 \log \frac{V_o}{V_i} + \text{loss}_{(\text{hybrid})}$$

loss<sub>(hybrid)</sub> = 1 dB.

Fig.8 Gain measurement in bands B and C.

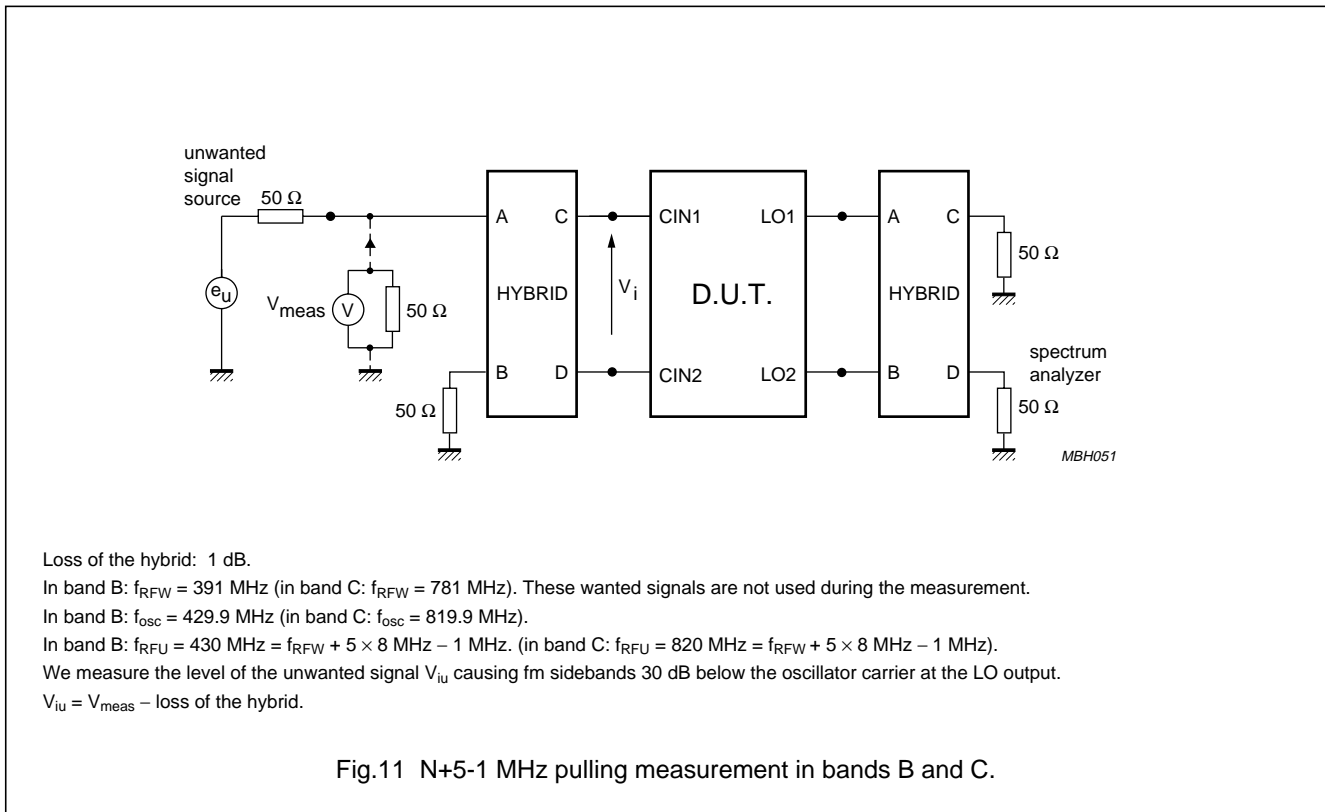
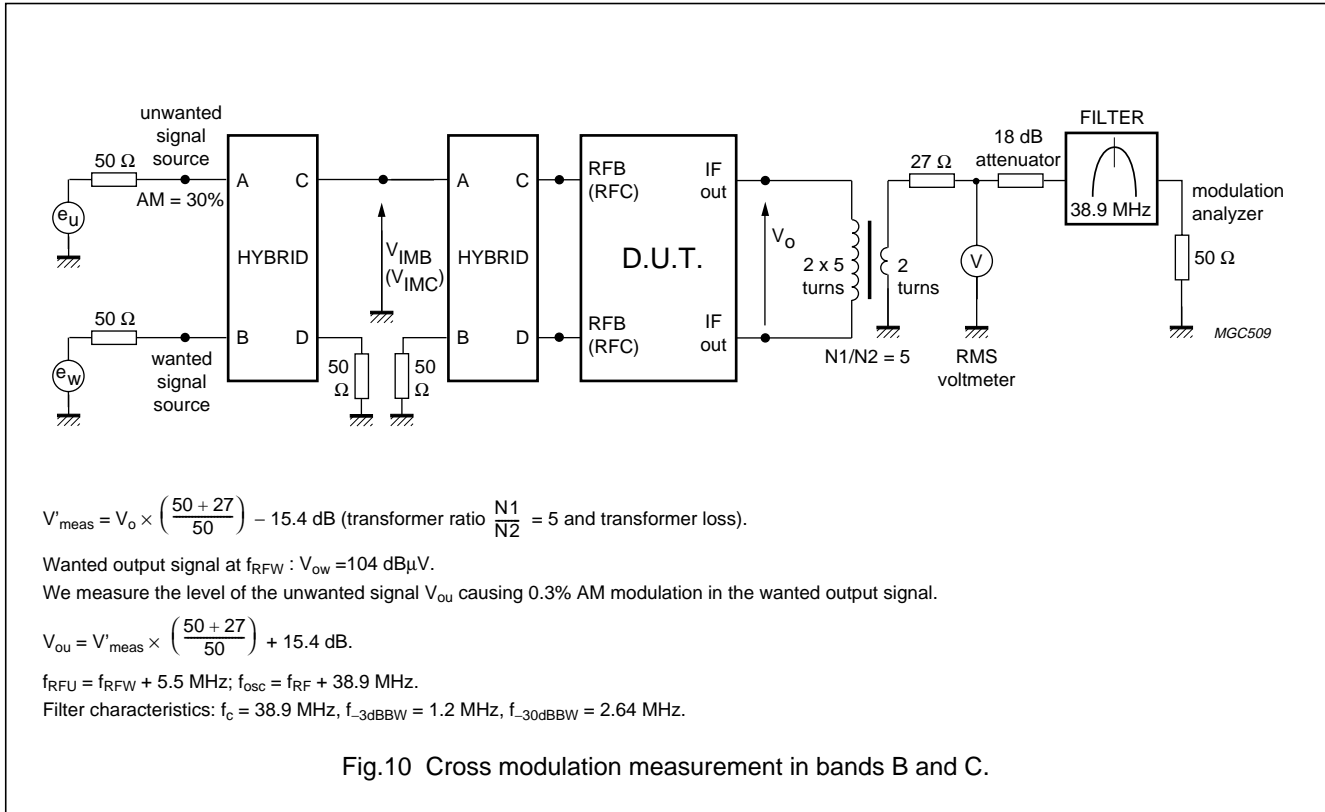


Loss of the hybrid: 1 dB.  
 NF = NF<sub>meas</sub> - loss of the hybrid.

Fig.9 Noise figure measurement in bands B and C.

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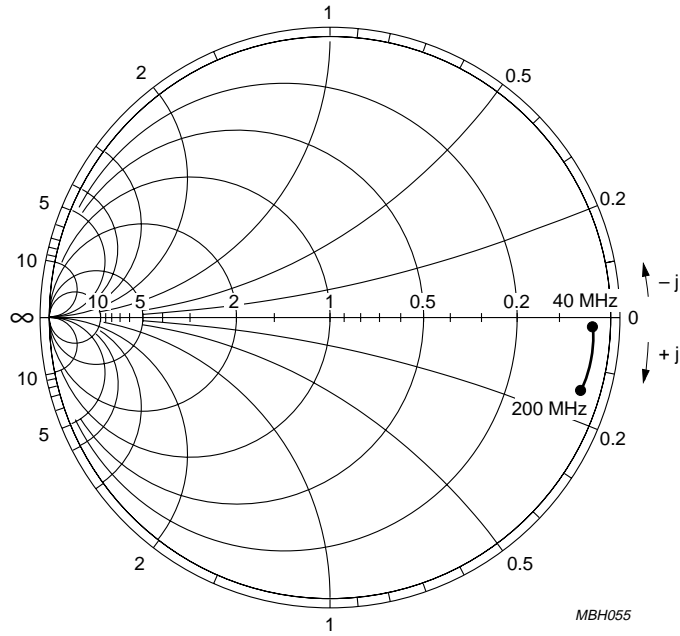


Fig.12 Input admittance ( $S_{11}$ ) of the band A mixer input (40 to 200 MHz);  $Y_o = 20 \text{ mS}$ .

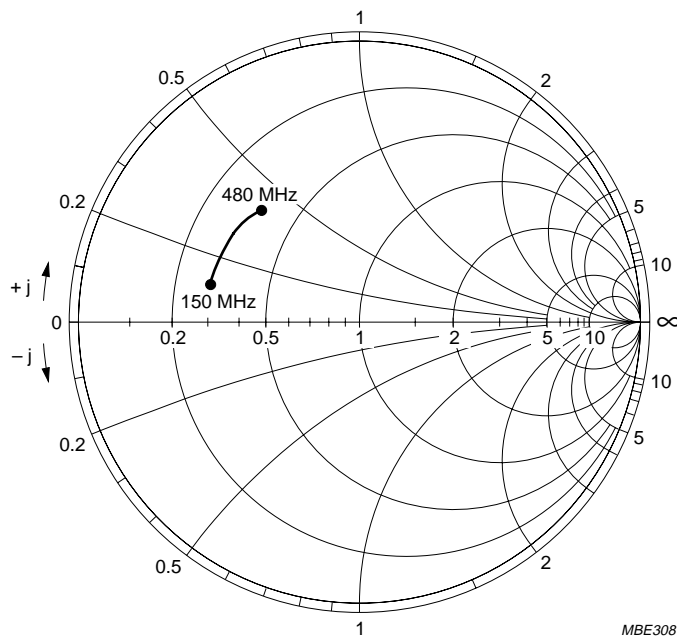


Fig.13 Input impedance ( $S_{11}$ ) of the band B mixer input (150 to 480 MHz);  $Z_o = 100 \Omega$ .

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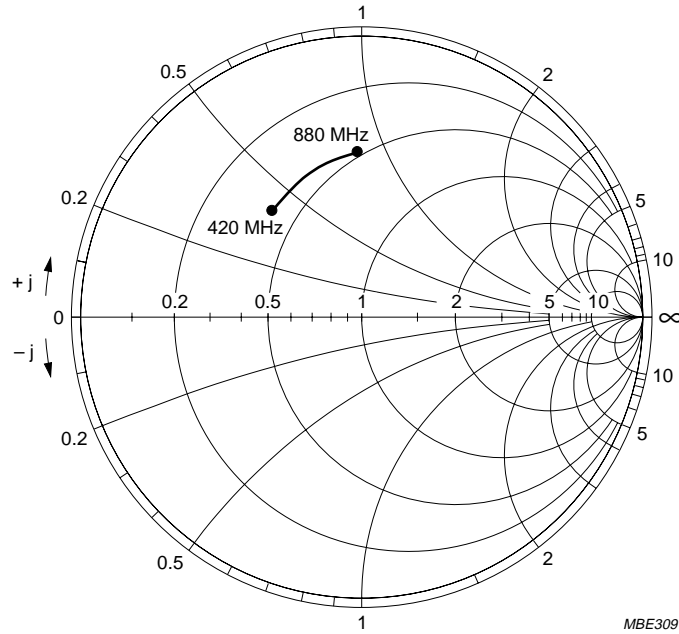


Fig.14 Input impedance ( $S_{11}$ ) of the band C mixer input (420 to 880 MHz);  $Z_0 = 100 \Omega$ .

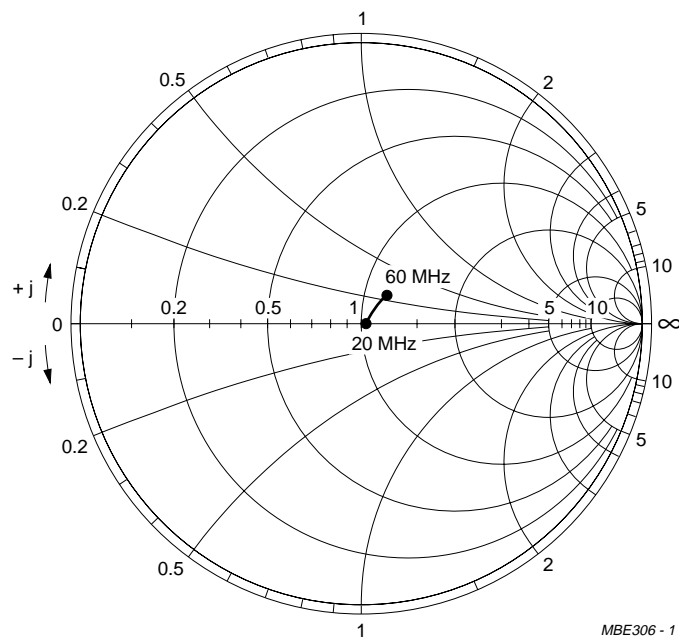


Fig.15 Output impedance ( $S_{22}$ ) of the IF amplifier (20 to 60 MHz);  $Z_0 = 100 \Omega$ .



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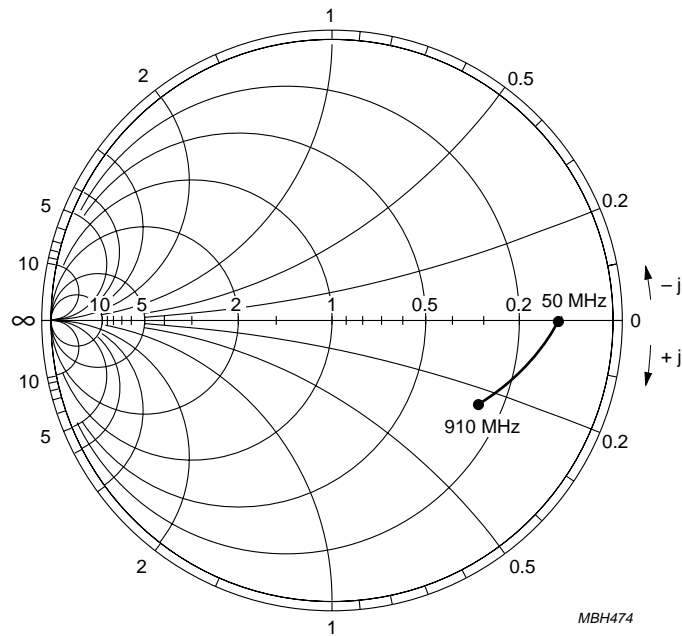


Fig.16 Output admittance ( $S_{22}$ ) of the LO amplifier (50 to 910 MHz);  $Y_o = 20 \text{ mS}$ .

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APPLICATION INFORMATION

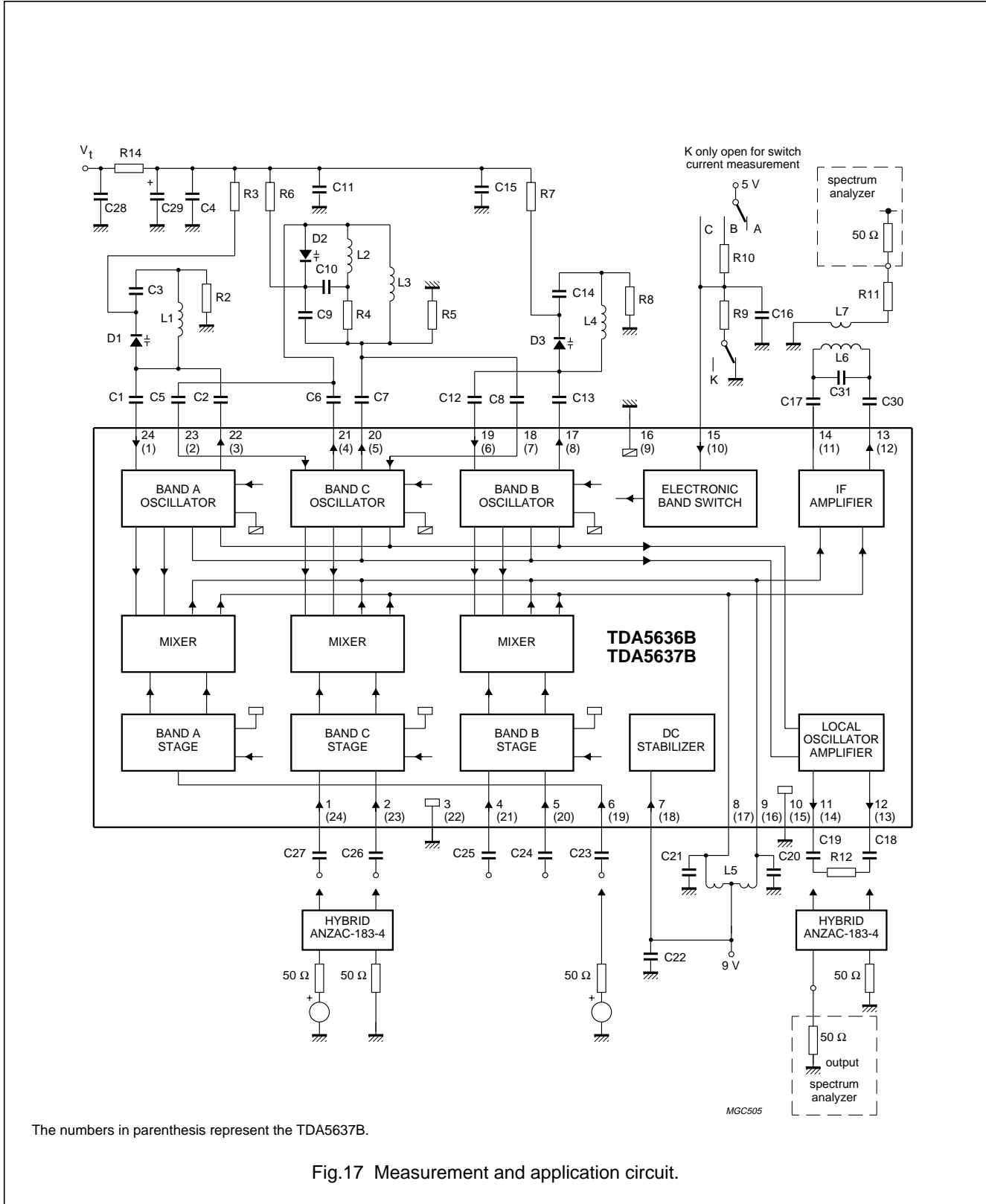


Fig.17 Measurement and application circuit.

# 9 V VHF hyperband and UHF mixer/oscillator for TV and VCR 3-band tuners

TDA5636B; TDA5637B

## Application diagram component values (see Fig.17)

**Table 1** Capacitors  
(all SMD and NP0 except C5 to C9 and C29)

NUMBER	VALUE
C1	2 pF
C2	2 pF
C3	82 pF
C4	2.2 nF
C5	1 pF (N750)
C6	1 pF (N750)
C7	1 pF (N750)
C8	1 pF (N750)
C9	6 pF (N470)
C10	100 pF
C11	2.2 nF
C12	2 pF
C13	4 pF
C14	150 pF
C15	2.2 nF
C16	1.2 nF
C17	1 nF
C18	1 nF
C19	1 nF
C20	18 pF
C21	18 pF
C22	1 nF
C23	1 nF
C24	1 nF
C25	1 nF
C26	1 nF
C27	1 nF
C28	2.2 nF
C29	1 $\mu$ F (electrolytic)
C30	1 nF
C31	18 pF

**Table 2** Resistors (all SMD)

NUMBER	VALUE
R2	22 $\Omega$
R3	47 k $\Omega$
R4	2.2 k $\Omega$
R5	22 k $\Omega$
R6	47 k $\Omega$
R7	47 k $\Omega$
R8	12 $\Omega$
R9	15 k $\Omega$
R10	33 k $\Omega$
R11	27 $\Omega$
R12	100 $\Omega$
R14	47 k $\Omega$

**Table 3** Diodes, coils and transformers

NUMBER	VALUE
<b>Diodes</b>	
D1	BB132
D2	BB134
D3	BB146
<b>Coils<sup>(1)</sup></b>	
L1	8 turns ( $\varnothing$ 3 mm)
L2	2 turns ( $\varnothing$ 2.5 mm)
L3	3 turns ( $\varnothing$ 2.5 mm)
L4	2 turns ( $\varnothing$ 4 mm)
<b>Transformers<sup>(2)</sup></b>	
L5	2 $\times$ 6 turns
L6	2 $\times$ 5 turns
L7	2 turns

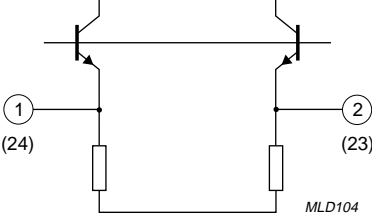
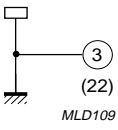
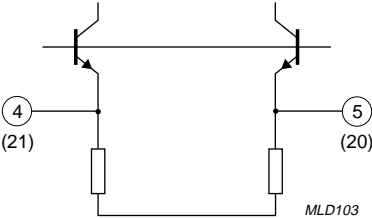
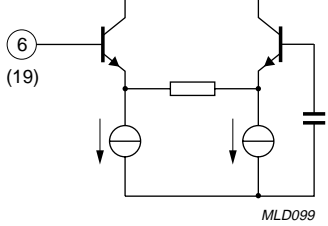

### Notes

1. Wire size for L1 to L4 is 0.4 mm.
2. Coil type: TOKO 7kN; material: 113kN, screw core 03-0093, pot core 04-0026.

9 V VHF hyperband and UHF mixer/oscillator  
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INTERNAL PIN CONFIGURATION

SYMBOL	PIN		DESCRIPTION <sup>(1)</sup>	AVERAGE DC VOLTAGE <sup>(2)</sup> IN (V)		
	TDA5636B	TDA5637B		BAND A	BAND B	BAND C
CIN1	1	24		0	0	2.2
CIN2	2	23		0	0	2.2
RFGND	3	22		0	0	0
BIN1	4	21		0	2.2	0
BIN2	5	20		0	2.2	0
AIN	6	19		2.2	1.2	1.2
V <sub>P</sub>	7	18	supply voltage	9.0	9.0	9.0
MIXOUT1	8	17		9.0	9.0	9.0
MIXOUT2	9	16		9.0	9.0	9.0

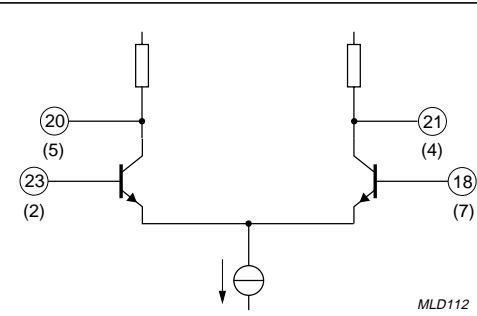
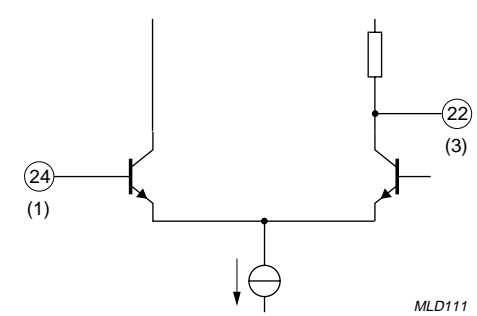
9 V VHF hyperband and UHF mixer/oscillator  
for TV and VCR 3-band tuners

TDA5636B; TDA5637B

SYMBOL	PIN		DESCRIPTION <sup>(1)</sup>	AVERAGE DC VOLTAGE <sup>(2)</sup> IN (V)		
	TDA5636B	TDA5637B		BAND A	BAND B	BAND C
GND1	10	15	<p>MLD106</p>	0	0	0
GND2	16	9		0	0	0
LOOUT1	11	14	<p>MLD110</p>	5.6	5.6	5.6
LOOUT2	12	13		5.6	5.6	5.6
IFOUT1	13	12	<p>MLD108</p>	4.4	4.4	4.4
IFOUT2	14	11		4.4	4.4	4.4
BS	15	10	<p>MLD105</p>	V <sub>SW(A)</sub>	V <sub>SW(B)</sub>	V <sub>SW(C)</sub>
BOSCOC	17	8	<p>MLD113</p>	5.8	3.4	5.8
BOSCIB	19	6		1.2	2.3	1.2

9 V VHF hyperband and UHF mixer/oscillator  
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TDA5636B; TDA5637B

SYMBOL	PIN		DESCRIPTION <sup>(1)</sup>	AVERAGE DC VOLTAGE <sup>(2)</sup> IN (V)		
	TDA5636B	TDA5637B		BAND A	BAND B	BAND C
COSCIB1	18	7		1.4	1.4	2.3
COSCOC1	20	5		5.8	5.8	4.2
COSCOC2	21	4		5.8	5.8	4.2
COSCIB2	23	2		1.4	1.4	2.3
AOSCOC	22	3		3.8	5.8	5.8
AOSCIB	24	1		2.1	1.0	1.0

Notes

1. The pin numbers in parenthesis represent the TDA5637B.
2. Average DC voltage measured in circuit of Fig.17.

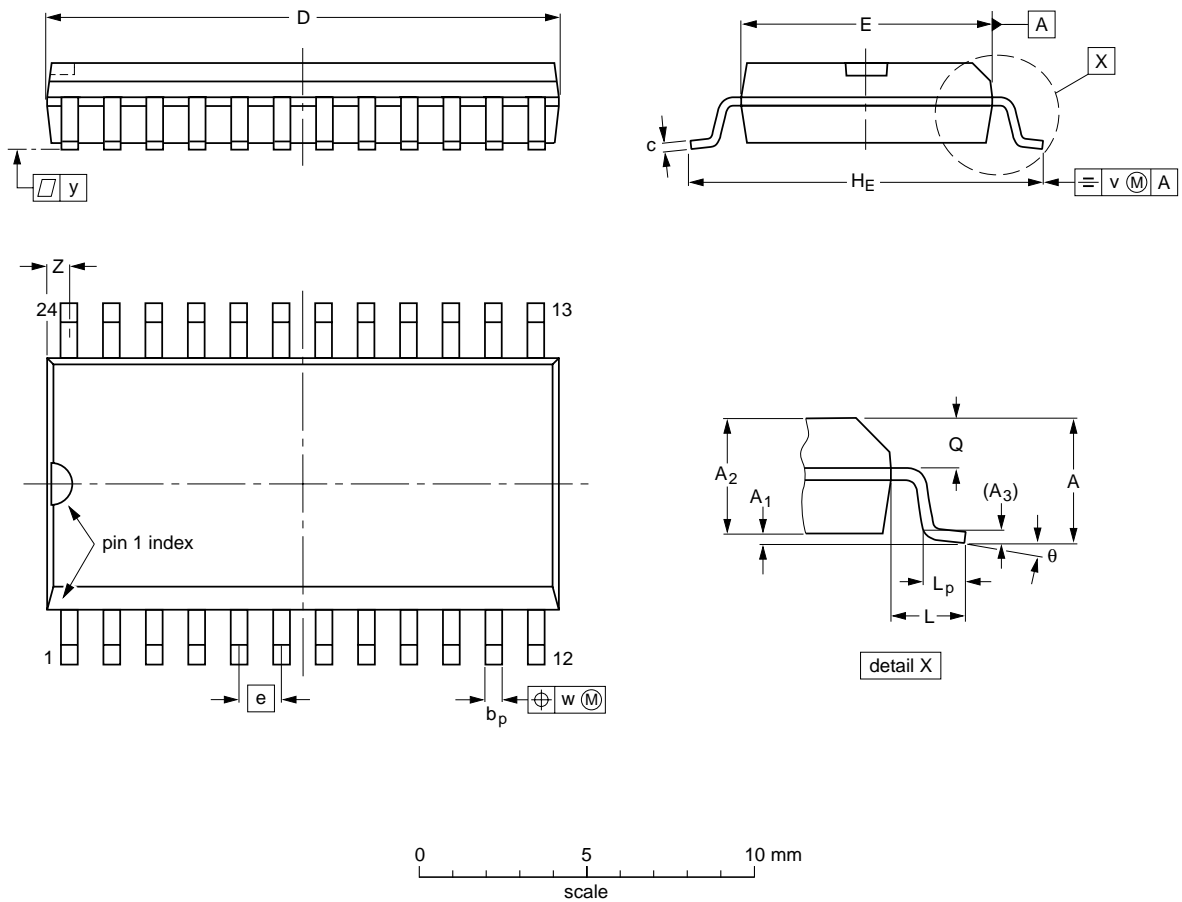
9 V VHF hyperband and UHF mixer/oscillator for TV and VCR 3-band

TDA5636B; TDA5637B

PACKAGE OUTLINES

SO24: plastic small outline package; 24 leads; body width 7.5 mm

SOT137-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	Z <sup>(1)</sup>	θ
mm	2.65	0.30 0.10	2.45 2.25	0.25	0.49 0.36	0.32 0.23	15.6 15.2	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8° 0°
inches	0.10	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.61 0.60	0.30 0.29	0.050	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

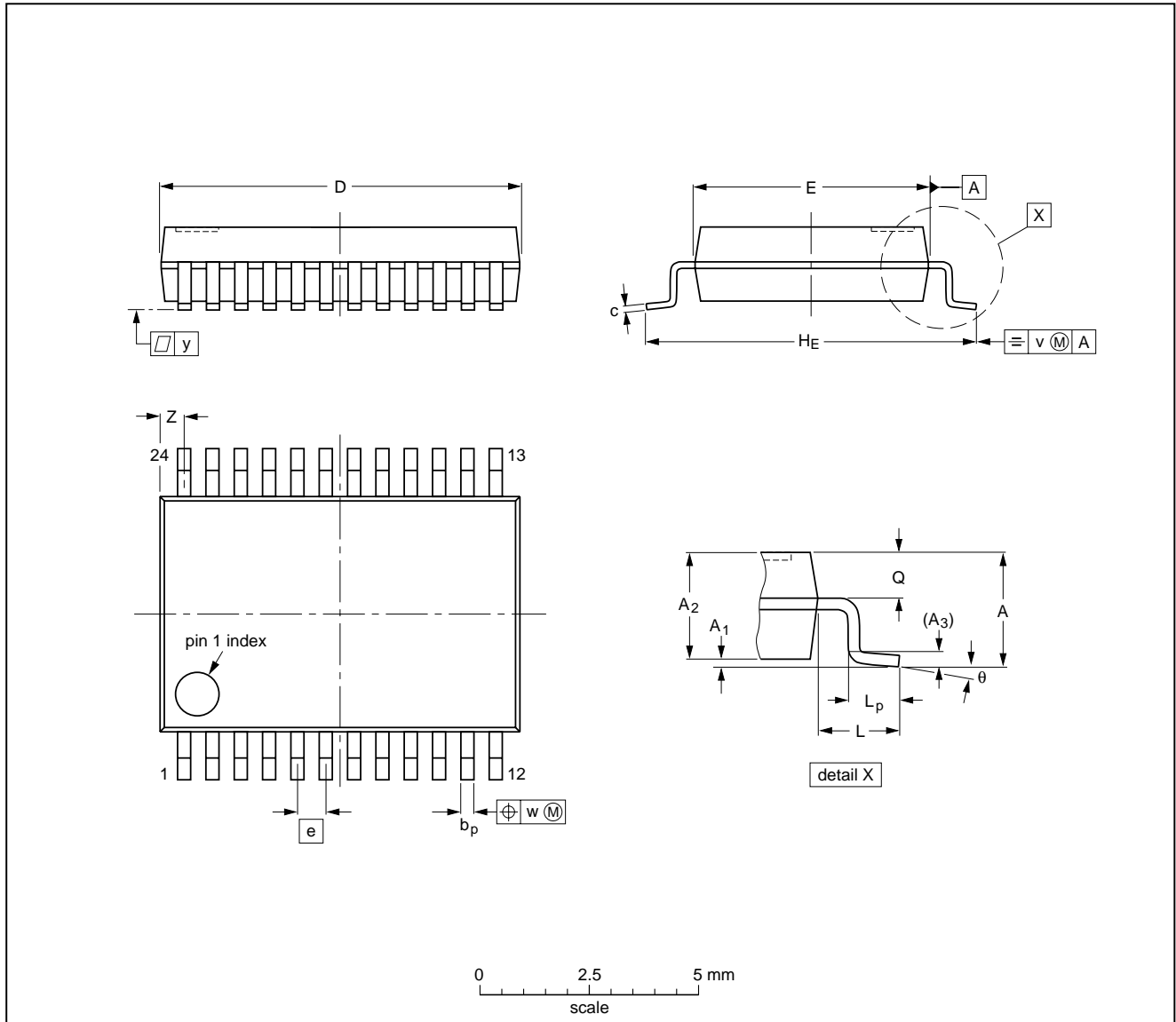
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT137-1	075E05	MS-013AD				95-01-24 97-05-22

9 V VHF hyperband and UHF mixer/oscillator  
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SSOP24: plastic shrink small outline package; 24 leads; body width 5.3 mm

SOT340-1



**DIMENSIONS (mm are the original dimensions)**

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	Z <sup>(1)</sup>	θ
mm	2.0	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	8.4 8.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	0.8 0.4	8° 0°

**Note**

1. Plastic or metal protrusions of 0.20 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT340-1		MO-150AG			93-09-08 95-02-04



## 9 V VHF hyperband and UHF mixer/oscillator for TV and VCR 3-band tuners

TDA5636B; TDA5637B

### SOLDERING

#### Introduction

There is no soldering method that is ideal for all IC packages. Wave soldering is often preferred when through-hole and surface mounted components are mixed on one printed-circuit board. However, wave soldering is not always suitable for surface mounted ICs, or for printed-circuits with high population densities. In these situations reflow soldering is often used.

This text gives a very brief insight to a complex technology. A more in-depth account of soldering ICs can be found in our "IC Package Databook" (order code 9398 652 90011).

#### Reflow soldering

Reflow soldering techniques are suitable for all SO and SSOP packages.

Reflow soldering requires solder paste (a suspension of fine solder particles, flux and binding agent) to be applied to the printed-circuit board by screen printing, stencilling or pressure-syringe dispensing before package placement.

Several techniques exist for reflowing; for example, thermal conduction by heated belt. Dwell times vary between 50 and 300 seconds depending on heating method. Typical reflow temperatures range from 215 to 250 °C.

Preheating is necessary to dry the paste and evaporate the binding agent. Preheating duration: 45 minutes at 45 °C.

#### Wave soldering

##### SO

Wave soldering techniques can be used for all SO packages if the following conditions are observed:

- A double-wave (a turbulent wave with high upward pressure followed by a smooth laminar wave) soldering technique should be used.
- The longitudinal axis of the package footprint must be parallel to the solder flow.
- The package footprint must incorporate solder thieves at the downstream end.

##### SSOP

Wave soldering is **not** recommended for SSOP packages. This is because of the likelihood of solder bridging due to closely-spaced leads and the possibility of incomplete solder penetration in multi-lead devices.

**If wave soldering cannot be avoided, the following conditions must be observed:**

- **A double-wave (a turbulent wave with high upward pressure followed by a smooth laminar wave) soldering technique should be used.**
- **The longitudinal axis of the package footprint must be parallel to the solder flow and must incorporate solder thieves at the downstream end.**

**Even with these conditions, only consider wave soldering SSOP packages that have a body width of 4.4 mm, that is SSOP16 (SOT369-1) or SSOP20 (SOT266-1).**

#### METHOD (SO AND SSOP)

During placement and before soldering, the package must be fixed with a droplet of adhesive. The adhesive can be applied by screen printing, pin transfer or syringe dispensing. The package can be soldered after the adhesive is cured.

Maximum permissible solder temperature is 260 °C, and maximum duration of package immersion in solder is 10 seconds, if cooled to less than 150 °C within 6 seconds. Typical dwell time is 4 seconds at 250 °C.

A mildly-activated flux will eliminate the need for removal of corrosive residues in most applications.

#### Repairing soldered joints

Fix the component by first soldering two diagonally-opposite end leads. Use only a low voltage soldering iron (less than 24 V) applied to the flat part of the lead. Contact time must be limited to 10 seconds at up to 300 °C. When using a dedicated tool, all other leads can be soldered in one operation within 2 to 5 seconds between 270 and 320 °C.

## 9 V VHF hyperband and UHF mixer/oscillator for TV and VCR 3-band

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### DEFINITIONS

<b>Data sheet status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
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9 V VHF hyperband and UHF  
mixer/oscillator for TV and VCR 3-band

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TDA5636B; TDA5637B

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# Philips Semiconductors – a worldwide company

**Argentina:** see South America

**Australia:** 34 Waterloo Road, NORTH RYDE, NSW 2113,  
Tel. +61 2 9805 4455, Fax. +61 2 9805 4466

**Austria:** Computerstr. 6, A-1101 WIEN, P.O. Box 213,  
Tel. +43 1 60 101, Fax. +43 1 60 101 1210

**Belarus:** Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,  
220050 MINSK, Tel. +375 172 200 733, Fax. +375 172 200 773

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**China/Hong Kong:** 501 Hong Kong Industrial Technology Centre,  
72 Tat Chee Avenue, Kowloon Tong, HONG KONG,  
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**Colombia:** see South America

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**Denmark:** Prags Boulevard 80, PB 1919, DK-2300 COPENHAGEN S,  
Tel. +45 32 88 2636, Fax. +45 31 57 1949

**Finland:** Sinikalliontie 3, FIN-02630 ESPOO,  
Tel. +358 9 615800, Fax. +358 9 61580/xxx

**France:** 4 Rue du Port-aux-Vins, BP317, 92156 SURESNES Cedex,  
Tel. +33 1 40 99 6161, Fax. +33 1 40 99 6427

**Germany:** Hammerbrookstraße 69, D-20097 HAMBURG,  
Tel. +49 40 23 53 60, Fax. +49 40 23 536 300

**Greece:** No. 15, 25th March Street, GR 17778 TAVROS/ATHENS,  
Tel. +30 1 4894 339/239, Fax. +30 1 4814 240

**Hungary:** see Austria

**India:** Philips INDIA Ltd, Shivsagar Estate, A Block, Dr. Annie Besant Rd.  
Worli, MUMBAI 400 018, Tel. +91 22 4938 541, Fax. +91 22 4938 722

**Indonesia:** see Singapore

**Ireland:** Newstead, Clonskeagh, DUBLIN 14,  
Tel. +353 1 7640 000, Fax. +353 1 7640 200

**Israel:** RAPAC Electronics, 7 Kehilat Saloniki St, TEL AVIV 61180,  
Tel. +972 3 645 0444, Fax. +972 3 649 1007

**Italy:** PHILIPS SEMICONDUCTORS, Piazza IV Novembre 3,  
20124 MILANO, Tel. +39 2 6752 2531, Fax. +39 2 6752 2557

**Japan:** Philips Bldg 13-37, Kohnan 2-chome, Minato-ku, TOKYO 108,  
Tel. +81 3 3740 5130, Fax. +81 3 3740 5077

**Korea:** Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,  
Tel. +82 2 709 1412, Fax. +82 2 709 1415

**Malaysia:** No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR,  
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**Mexico:** 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905,  
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**Middle East:** see Italy

**Netherlands:** Postbus 90050, 5600 PB EINDHOVEN, Bldg. VB,  
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**New Zealand:** 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,  
Tel. +64 9 849 4160, Fax. +64 9 849 7811

**Norway:** Box 1, Manglerud 0612, OSLO,  
Tel. +47 22 74 8000, Fax. +47 22 74 8341

**Philippines:** Philips Semiconductors Philippines Inc.,  
106 Valero St. Salcedo Village, P.O. Box 2108 MCC, MAKATI,  
Metro MANILA, Tel. +63 2 816 6380, Fax. +63 2 817 3474

**Poland:** Ul. Lukiska 10, PL 04-123 WARSZAWA,  
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**Slovakia:** see Austria

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**South America:** Rua do Rocio 220, 5th floor, Suite 51,  
04552-903 São Paulo, SÃO PAULO - SP, Brazil,  
Tel. +55 11 821 2333, Fax. +55 11 829 1849

**Spain:** Balmes 22, 08007 BARCELONA,  
Tel. +34 3 301 6312, Fax. +34 3 301 4107

**Sweden:** Kottbygatan 7, Akalla, S-16485 STOCKHOLM,  
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**Taiwan:** PHILIPS TAIWAN Ltd., 23-30F, 66,  
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Tel. +66 2 745 4090, Fax. +66 2 398 0793

**Turkey:** Talatpasa Cad. No. 5, 80640 GÜLTEPE/ISTANBUL,  
Tel. +90 212 279 2770, Fax. +90 212 282 6707

**Ukraine:** PHILIPS UKRAINE, 4 Patrice Lumumba str., Building B, Floor 7,  
252042 KIEV, Tel. +380 44 264 2776, Fax. +380 44 268 0461

**United Kingdom:** Philips Semiconductors Ltd., 276 Bath Road, Hayes,  
MIDDLESEX UB3 5BX, Tel. +44 181 730 5000, Fax. +44 181 754 8421

**United States:** 811 East Arques Avenue, SUNNYVALE, CA 94088-3409,  
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