

## 2-GHz Mixer

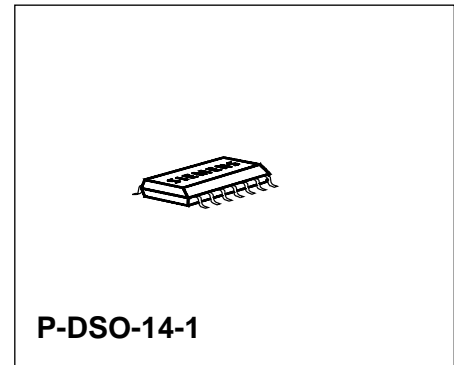
TDA 6130-5X4

### Preliminary Data

Bipolar IC

#### Features

- A wide range of supply voltage
- Few external components
- High conversion transconductance
- Wide range of input signal.

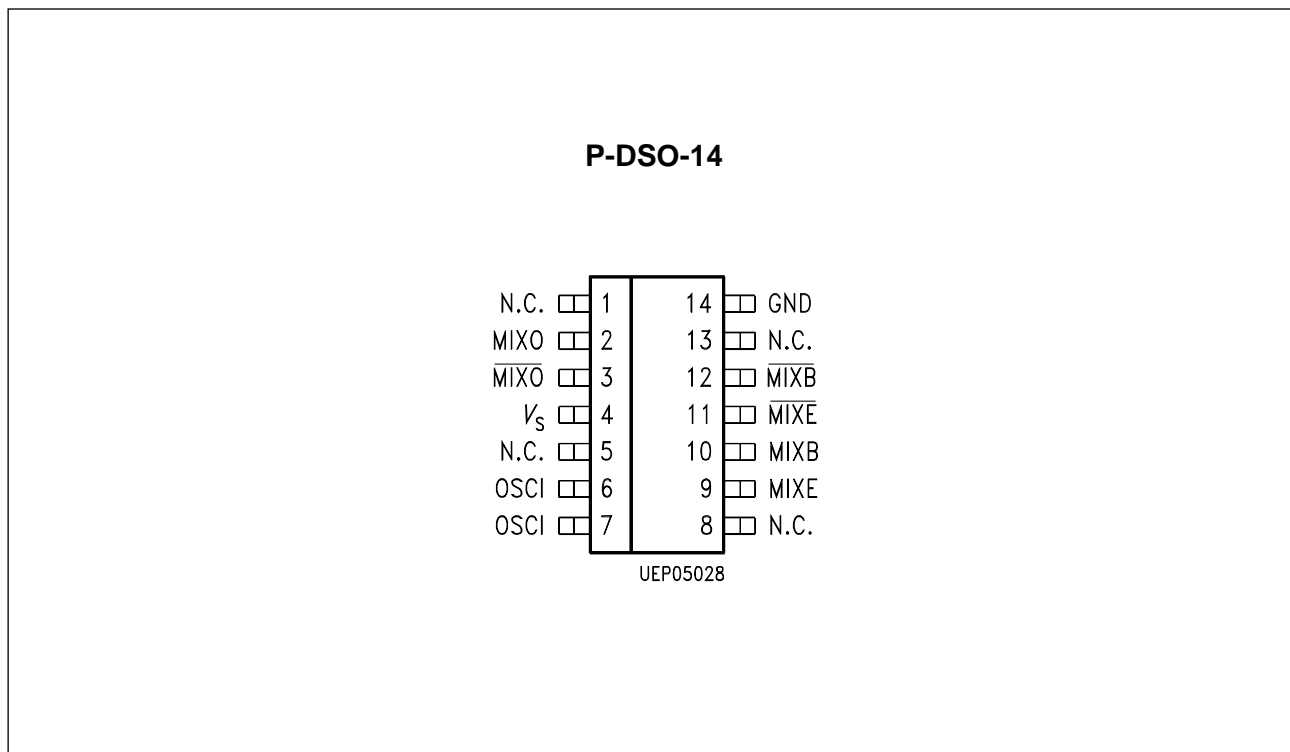


Type	Ordering Code	Package
TDA 6130-5X4	Q67000-A5176	P-DSO-14-1

The TDA 6130-5X4 is a symmetrical mixer like the components **S 042 P\*** and **TBB 042 G\*** but for frequencies up to 2 GHz. It can be driven by an external source or by the build-in oscillator.

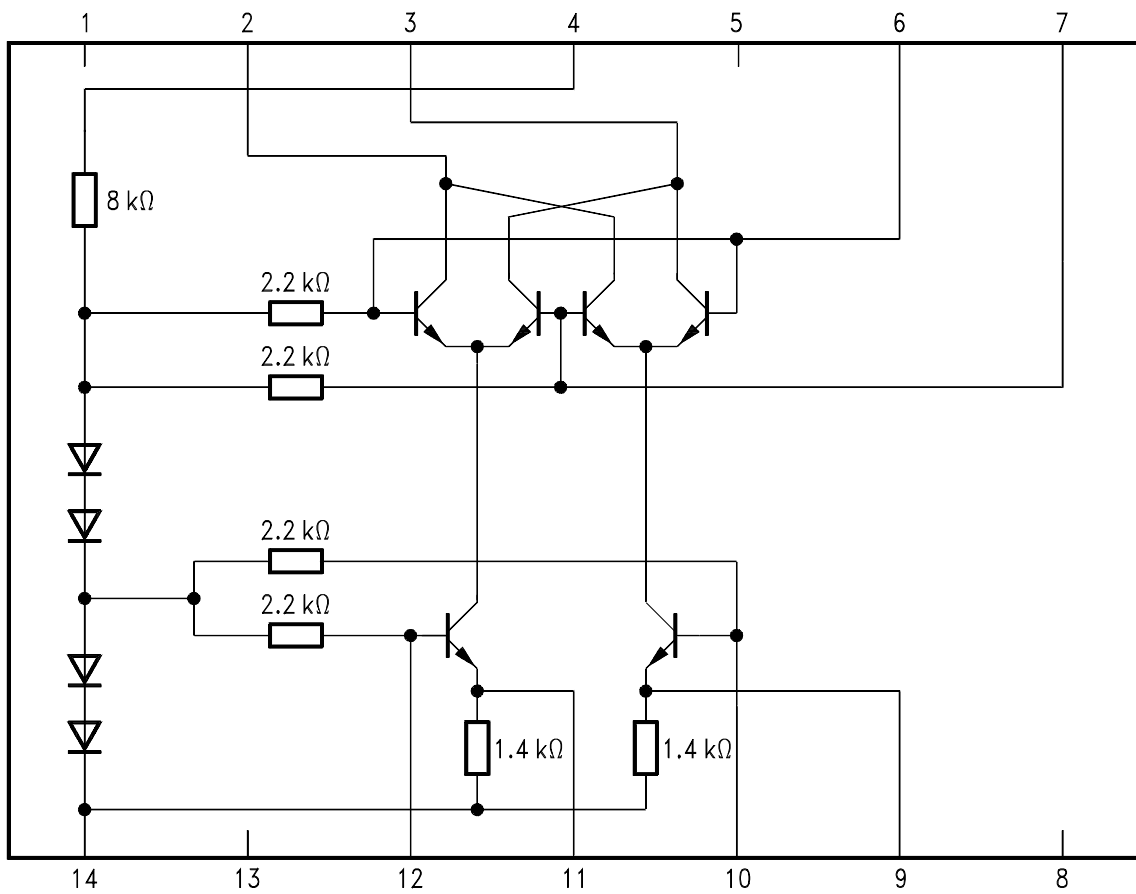
\* already cancelled

## Pin Configuration (top view)



## Pin Definitions and Functions

Pin No.	Symbol	Function
1	N.C.	N.C.
2	MIXO	Mixer output
3	$\overline{\text{MIXO}}$	Mixer output
4	$V_s$	Supply voltage
5	N.C.	N.C.
6	OSCI	Oscillator input
7	OSCI	Oscillator input
8	N.C.	N.C.
9	MIXE	Mixer input emitter
10	MIXB	Mixer input base
11	$\overline{\text{MIXE}}$	Mixer input emitter
12	$\overline{\text{MIXB}}$	Mixer input base
13	N.C.	N.C.
14	GND	Ground



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**Block Diagram**

## Circuit Description

The pins 1, 5, 8, 13 should be connected to pin 14 (ground) to reach optimal HF features. A galvanic connection between pins 6 and 7 and 10 and 12 through coupling windings is recommended.

A resistor of at least  $220\ \Omega$  may be connected between pins 9 and 14 (ground) and between 11 and 14 to increase the currents and thus the conversion transconductance.

Pins 9 and 11 may be connected through any impedance. In case of a direct connection between pin 9 and 11, the resistance from this pin to 14 may be at least  $100\ \Omega$ . Depending on the layout, a capacitor may be required between pins 6 and 7 to prevent oscillations in the UHF band.

## Absolute Maximum Ratings

$T_A = 0$  to  $70$  °C

Parameter	Symbol	Limit Values		Unit	Test Condition
		min.	max.		
Supply voltage	$V_4$	0	8	V	
Mixer output	$V_{2,3}$	1	8	V	Open collector
Oscillator input	$V_{6,7}$	0	2.5	V	
Mixer input emitter	$V_{9,11}$	0.8	3.5		
Mixer input base	$V_{10,12}$	0	$V_4 - 1.5$	V	
Junction temperature	$T_j$		125	°C	
Storage temperature	$T_{stg}$	- 40	150	°C	
Thermal resistance	$R_{th SA}$		125	K/W	

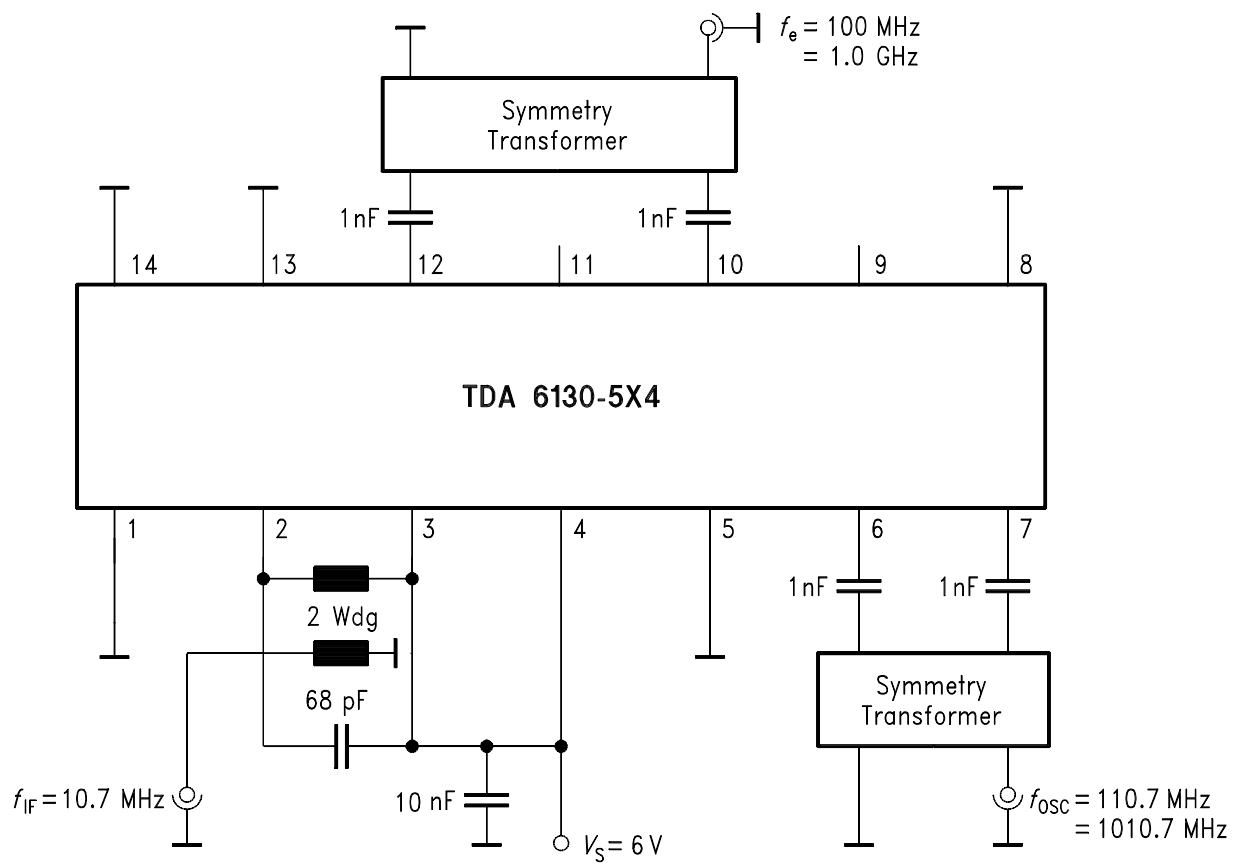
## Operating Range

Supply voltage	$V_S$	4	7	V	
Input frequency range	$f_{15}$		2000	MHz	
Ambient temperature in operation	$T_A$	0	70	°C	

### Characteristics

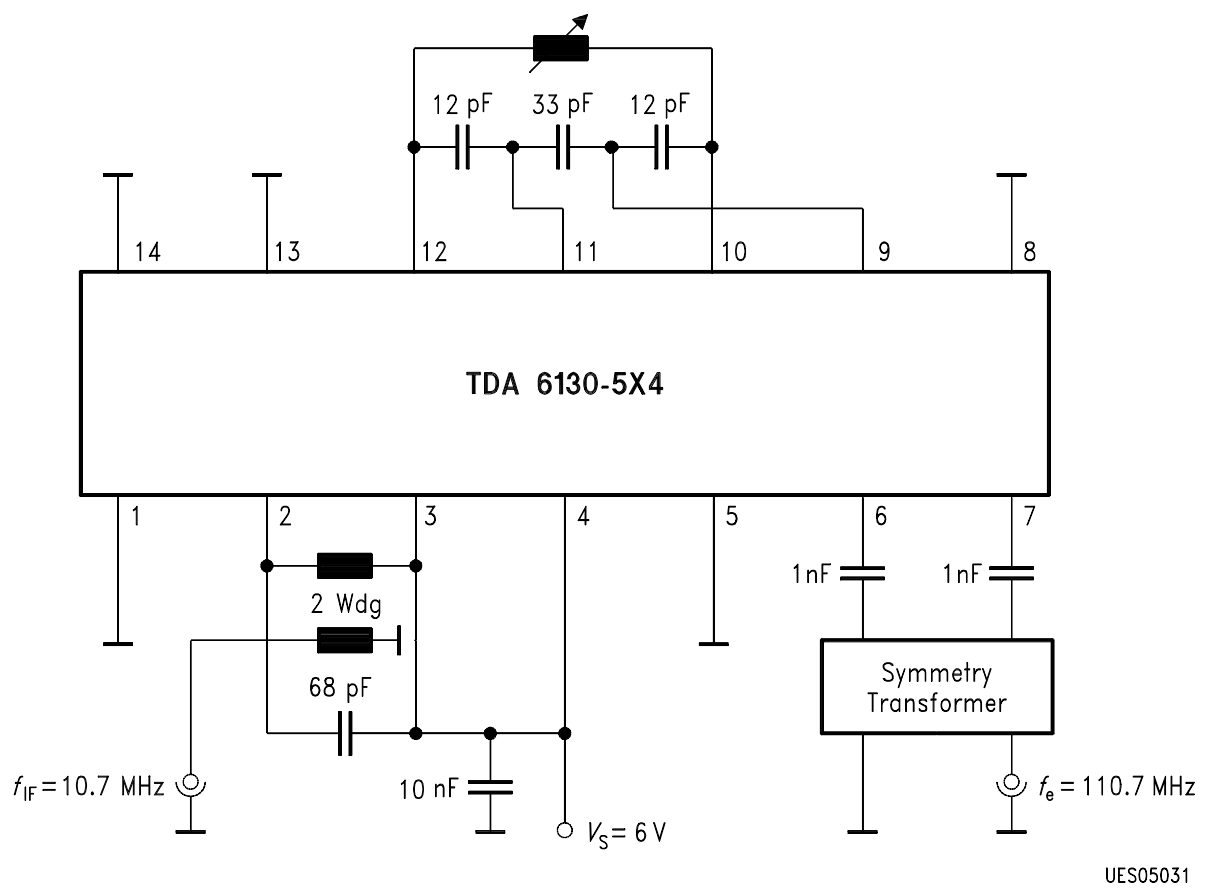
$T_A = 25\text{ °C}$ ;  $V_S = 6\text{ V} \pm 10\%$  (test circuit 1)

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Current consumption	$I_S = I_2 + I_3 + I_4$	1.1	1.6	2.1	mA	
Output-current	$I_2 = I_3$	0.35	0.54	0.75	mA	
Output-current difference	$I_2 - I_3$	3	10	60	$\mu\text{A}$	
Supply current	$I_4$	0.2	0.4	0.6	mA	
Power gain	$V_P$					
$f_e = 100\text{ MHz}$ , $f_{\text{OSC}} = 110,7\text{ MHz}$		13	16	19	dB	
$f_e = 1\text{ GHz}$ , $f_{\text{OSC}} = 1,1\text{ GHz}$		13	16	19	dB	
Break down voltage	$V_{2,3}$		18		V	
$I_{2,3} = 10\text{ mA}$ ; $V_{6,7} = 0$						
Noise figure	$NF$	6	7	10	dB	DSB
Mixer output impedance	$R$ $C$		7.0 0.6 1.5		k $\Omega$ k $\Omega$ pF	$f_{\text{MO}} = 100\text{ MHz}$ $f_{\text{MO}} = 1\text{ GHz}$



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**Test Circuit 1**



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Application Circuit