

## 2-GHz-Mixer

PMB 2330

### Preliminary Data

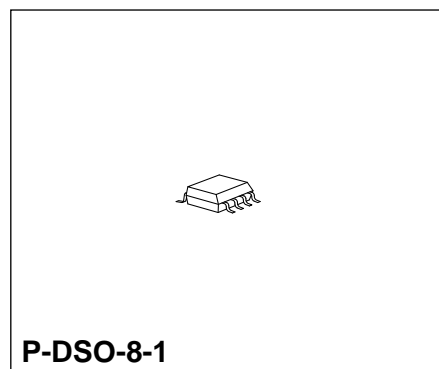
Bipolar IC

#### Features

- Few external components
- Low noise
- Low spurious signal content
- High conversion transconductance
- Very highly isolated RF, IF and LO ports
- Good suppression of input signals at output
- Wide range of supply voltage

#### Applications

- Cellular radio mixer
- Cordless telephone mixer
- UHF transceivers
- RF data links
- HF/VHF/UHF frequency conversion



Type	Version	Ordering Code	Package
PMB 2330	V1.1	Q67000-A6045	P-DSO-8-1 (SMD)
PMB 2330T	V1.2	Q67000-A6103	P-DSO-8-1 (SMD)

The PMB 2330 is a low power, monolithic, double balanced mixer similar to S 042 P and TBB 042 G for frequencies up to 2 GHz.

#### Circuit Description

The pins RF (7) and  $\overline{\text{RF}}$  (8) are low resistance inputs of the base coupled difference stage.

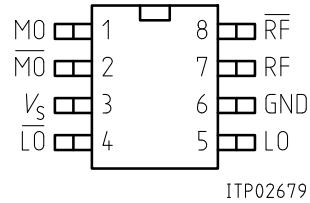
The resistor of at least 200  $\Omega$  may be connected between pins 7 and 6 (ground) and between 8 and 6 to increase the currents (max. 4 mA per pin) and thus the conversion transductance.

The pins  $\overline{\text{LO}}$  (4) and LO (5) are the local oscillator inputs of the mixer.

The connections to the mixer inputs may be symmetrical or asymmetrical coupled, capacitive or inductive coupled.

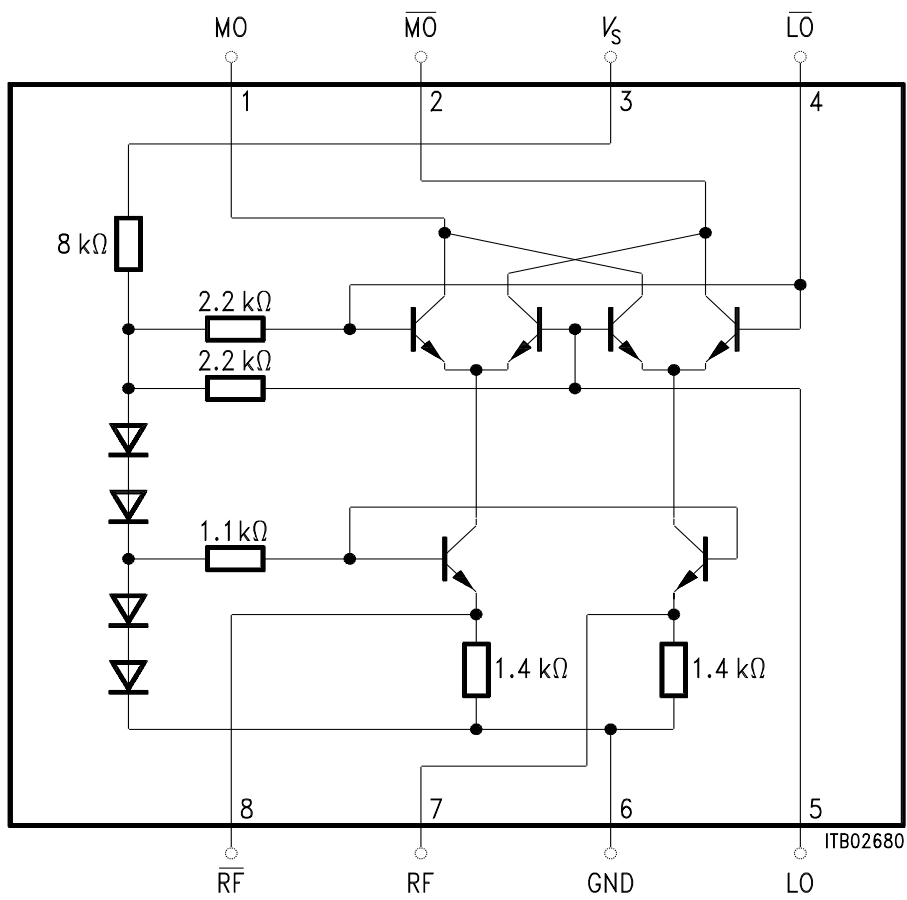
The mixer outputs MO (1) and  $\overline{\text{MO}}$  (2) are high impedance open-collector outputs for frequencies up to 2 GHz.

## Pin Configuration (top view)



## Pin Definitions and Functions

Pin No.	Symbol	Function
1	MO	Mixer output
2	$\overline{\text{MO}}$	Mixer output
3	$V_S$	Supply voltage
4	$\overline{\text{LO}}$	Oscillator input
5	LO	Oscillator input
6	GND	Ground
7	RF	Mixer input
8	$\overline{\text{RF}}$	Mixer input



Block Diagram

## Electrical Characteristics

### Absolute Maximum Ratings

$T_A = -40$  to  $85$  °C

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	typ.		
Supply voltage	$V_S$	0	8	V	
Mixer output	$V_{1,2}$	1	8	V	open collector
Oscillator input	$V_{4,5}$	0	2.5	V	
Mixer input	$V_{7,8}$	0.8	3.5	V	
Junction temperature	$T_j$		150	°C	
Storage temperature	$T_{stg}$	-40	125	°C	
Thermal resistance	$R_{th SA}$		185	K/W	

All pins have no additional internal ESD protection circuitry

### Operational Range

Within the operational range the IC operates as described in the circuit description.

Supply voltage	$V_S$	3	7	V	
Input frequency range	$f_i$	10	2000	MHz	
Ambient temperature in operation	$T_A$	-40	85	°C	

## Characteristics

$V_S = 5\text{ V} \pm 10\%$ ;  $T_A = 25\text{ °C}$

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Current consumption	$I_{MO} + I_{\overline{MO}} + I_{VS}$		1.6		mA	
Output current	$I_{MO} = I_{\overline{MO}}$		0.54		mA	
Output current difference	$ I_{MO} - I_{\overline{MO}} $			60	$\mu\text{A}$	
Break down voltage	$V_{MO, \overline{MO}}$		13		V	$I_{MO, \overline{MO}} = 8\text{ mA}$

## Signal Input RF/ $\overline{\text{RF}}$

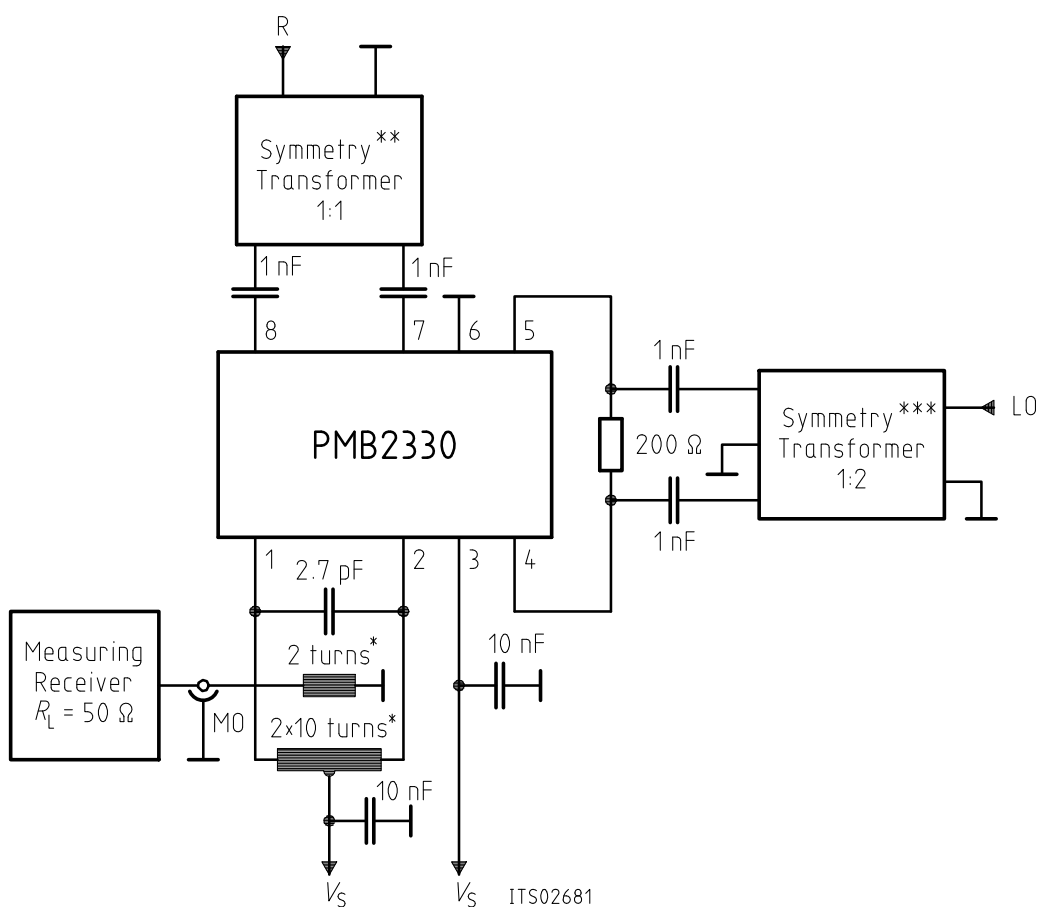
Input resistance	$R_{RF}$		100		$\Omega$	
Input inductance	$L_{RF}$		10		nH	in series to $R_{RF}$
Input level	$P_{RF}$			0	dBm	
Input Intercept point	$P_{IPI}$		- 5		dBm	referred to input
Input frequency	$f_{RF}$	0		2.0	GHz	
Noise figure						according to test circuit
$f_{RF} = 100\text{ MHz}, f_{LO} = 145\text{ MHz}$	$N$		6		dB	
$f_{RF} = 1\text{ GHz}, f_{LO} = 1.045\text{ GHz}$	$N$		8		dB	

## Local Oscillator Input LO/ $\overline{\text{LO}}$

Input resistance	$R_{LO\text{ diff}}$		3.8		k $\Omega$	$f_{LO} = 100\text{ MHz}$
	$R_{LO\text{ diff}}$		0.6		k $\Omega$	$f_{LO} = 1\text{ GHz}$
Input capacitance	$C_{LO\text{ diff}}$		1.5		pF	parallel to $R_{LO\text{ diff}}$
Input level	$P_{LO}$	- 10		10	dBm	$f_{LO} = 100\text{ MHz}$
	$P_{LO}$	- 5		10	dBm	$f_{LO} = 1\text{ GHz}$
Input frequency	$f_{LO}$			2.0	GHz	

## Mixer Output MO/ $\overline{\text{MO}}$

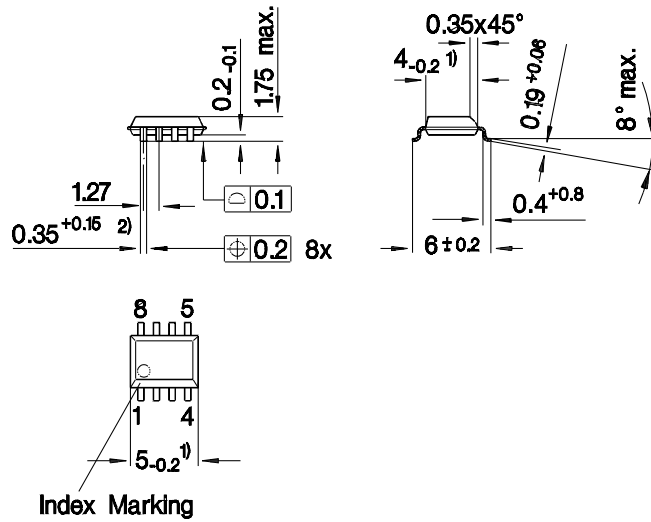
Output resistance	$R_{MO\text{ diff}}$		7.0		k $\Omega$	$f_{MO} = 100\text{ MHz}$
	$R_{MO\text{ diff}}$		0.6		k $\Omega$	$f_{MO} = 1\text{ GHz}$
Output capacitance	$C_{MO\text{ diff}}$		1.5		pF	parallel to $R_{MO\text{ diff}}$
Power gain	$V_P$		10		dB	
	$V_P$		10		dB	
Intermediate frequency	$f_{IF}$			2.0	GHz	



- \* Kit Vogt 5171100002  
Cul 0.08
- \*\* Balance to unbalance balun 1:1  
00553100 Fa. NEOSID
- \*\*\* Balance to unbalance balun 1:2  
00553110 Fa. NEOSID

## Test Circuit

**Plastic Package, P-DSO-8-1 (SMD)**  
 (Plastic Dual Small Outline)



- 1) Does not include plastic or metal protrusion of 0.15 max. per side
- 2) Does not include dambar protrusion

GPS05121

**Sorts of Packing**

Package outlines for tubes, trays etc. are contained in our Data Book "Package Information"

SMD = Surface Mounted Device

Dimensions in mm