

# DATA SHEET



## **BGA2022** MMIC mixer

Product specification  
Supersedes data of 2000 Jun 06

2000 Dec 04

# MMIC mixer

# BGA2022

### FEATURES

- Large frequency range:
  - Cellular band (900 MHz)
  - PCS band (1900 MHz)
  - WLAN band (2.4 GHz)
- High isolation
- High linearity
- High conversion gain.

### APPLICATIONS

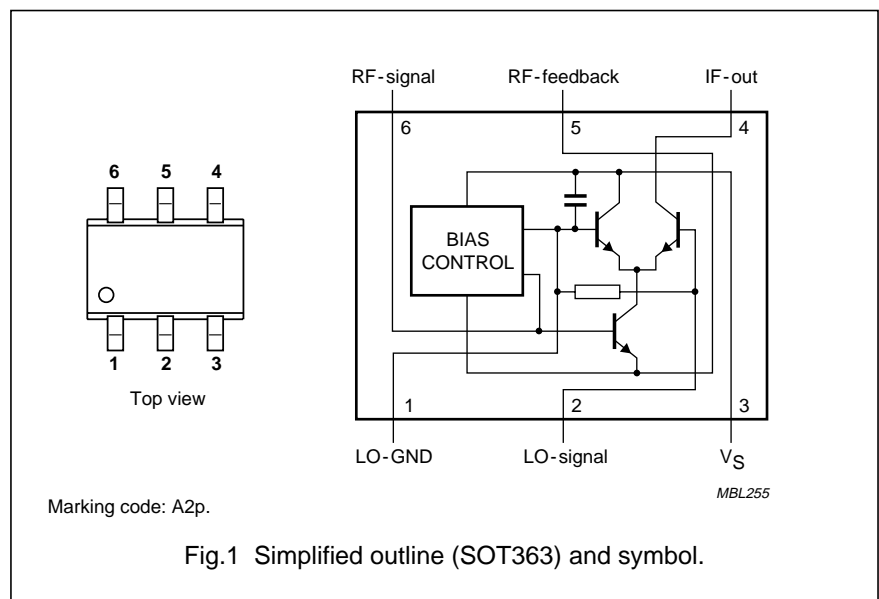
Receiver side of wireless systems that require high conversion gain and high linearity at low supply current, such as CDMA.

### DESCRIPTION

Silicon double poly MMIC mixer in a 6-lead SOT363 plastic package.

### PINNING

PIN	DESCRIPTION
1	LO - GND
2	LO - signal
3	V <sub>S</sub>
4	IF - out
5	RF - feedback
6	RF - signal



### QUICK REFERENCE DATA

V<sub>S</sub> = 2.8 V; I<sub>S</sub> = 6 mA; P<sub>LO</sub> = 0 dBm; f<sub>RF</sub> = 1800 MHz; f<sub>LO</sub> = 2080 MHz; f<sub>IF</sub> = 280 MHz.

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
G <sub>conv</sub>	conversion gain	4	6	8	dB
NF	noise figure (DSB)	–	12	–	dB
IP <sub>3</sub>	output third order intercept point	–	7	–	dBm

### CAUTION

This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_S$	supply voltage		–	4	V
$I_S$	supply current		–	10	mA
$P_{LO}$	oscillator power	note 1	–	10	dBm
$P_{RF}$	RF power	note 1	–	10	dBm
$P_{tot}$	total power dissipation	$T_s \leq 100\text{ °C}$ ; note 2	–	40	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C

**Notes**

- LO and RF signals always AC coupled; 50  $\Omega$  source; no external DC voltage supplied to pins 1, 2 and 6.
- $T_s$  is the temperature at the soldering point of the ground tab.

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to solder point	375	K/W

**CHARACTERISTICS**

$V_S = 2.8\text{ V}$ ;  $I_S = 6\text{ mA}$ ;  $T_j = 25\text{ °C}$ ; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_S$	supply current	$V_S = 2.8\text{ V}$	4	6	8	mA
$G_{conv(p)}$	power conversion gain 880 MHz 1800 MHz 1950 MHz 2450 MHz	$P_{RF} = -25\text{ dBm}$ ; $P_{LO} = 0\text{ dBm}$	– 4 – –	5 6 5 6	– 8 – –	dB dB dB dB
NF	noise figure 880 MHz 1800 MHz 1950 MHz 2450 MHz	DSB	– – – –	9 12 9 9	– – – –	dB dB dB dB
$IP_3$	intercept point third order input 880 MHz 1800 MHz 1950 MHz 2450 MHz	output referred	– – – –	4 7 7 10	– – – –	dBm dBm dBm dBm
$VSWR_{LO}$	return losses at LO port	$P_{LO} = 0\text{ dBm}$ ; $f = 0\text{ to }3\text{ GHz}$	–	–	2:1	

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APPLICATION INFORMATION

See application note number AN00059.

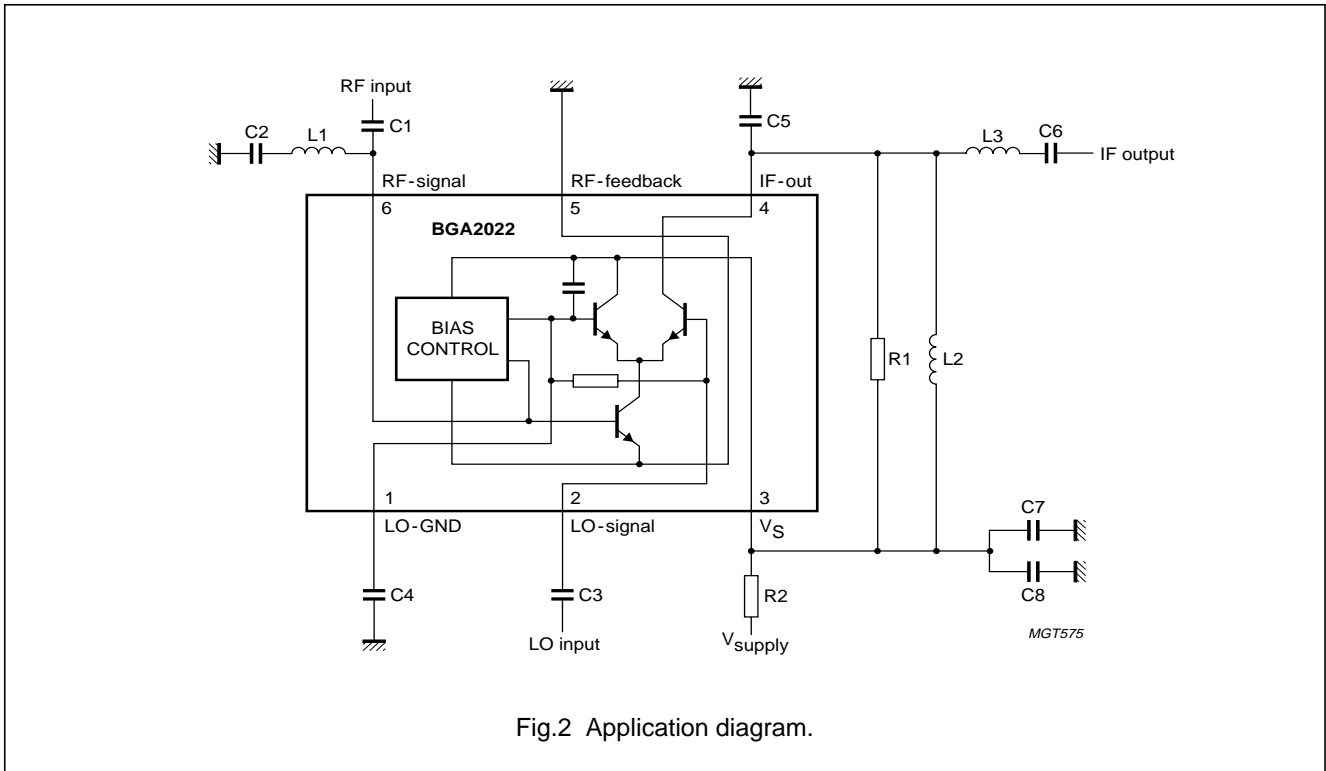


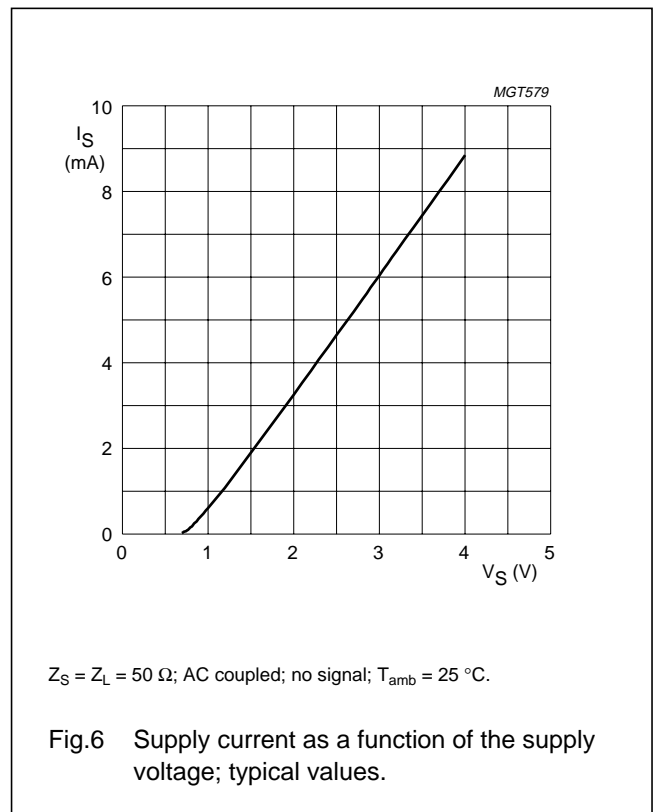
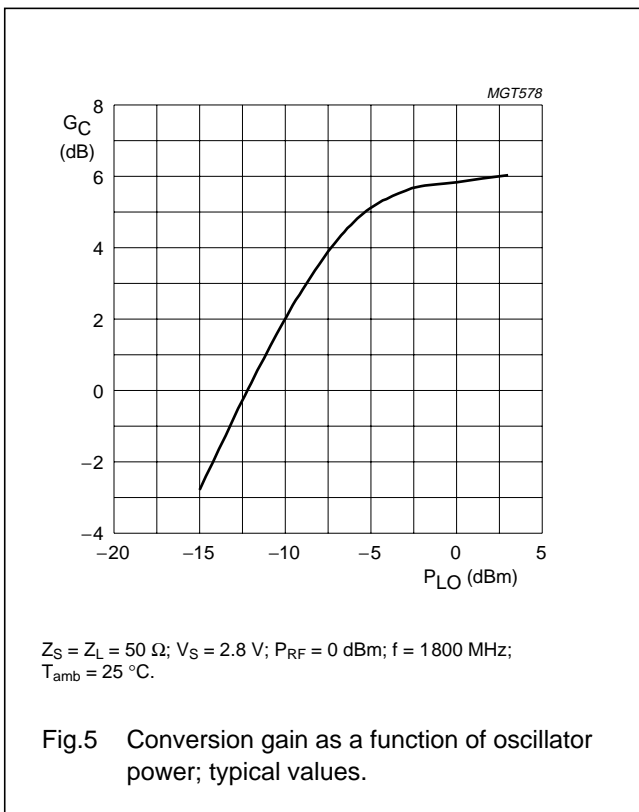
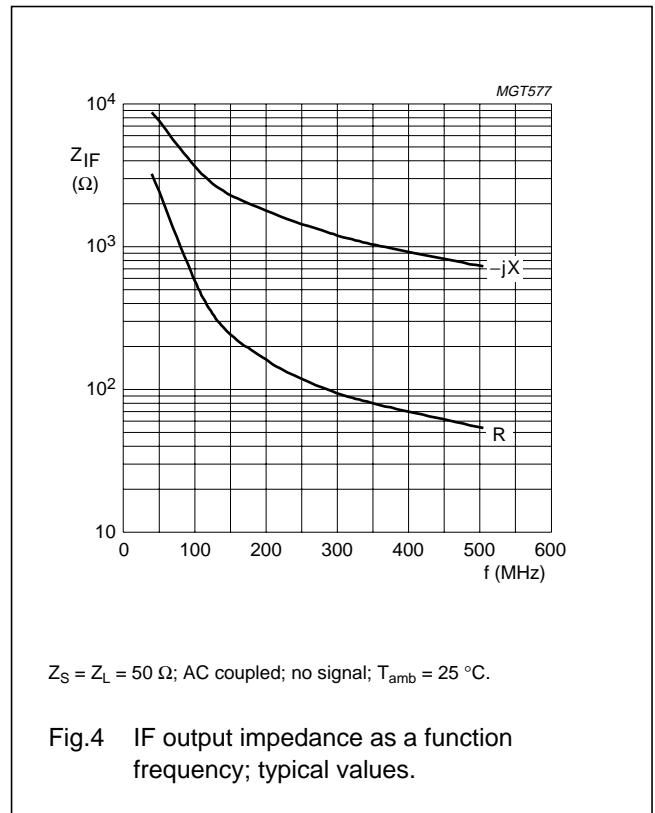
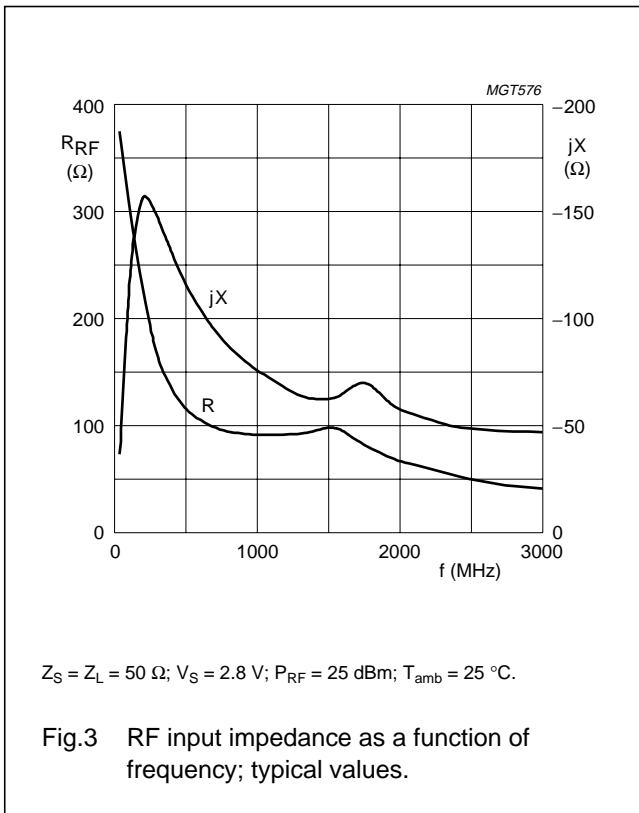
Fig.2 Application diagram.

List of components (see Fig.2)

COMPONENT	APPLICATION BOARD			
	880 MHz (IF = 80 MHz)	1800 MHz (IF = 280 MHz)	1950 MHz (IF = 80 MHz)	2450 MHz (IF = 280 MHz)
R1	1.2 kΩ	2.7 kΩ	2.2 kΩ	3.3 kΩ
R2	22 Ω	22 Ω	22 Ω	18 Ω
C1	12 pF	1.2 pF	1.5 pF	1.0 pF
C2	390 pF	5.6 pF	1.5 nF	82 pF
C3, C4	39 pF	6.8 pF	6.8 pF	2.7 pF
C5	27 pF	2 pF	15 pF	2.2 pF
C6	100 pF	100 pF	10 pF	100 pF
C7	22 nF	22 nF	22 nF	22 nF
C8	56 pF	8.2 pF	10 pF	6.8 pF
L1	10 nH	2.7 nH	2.7 nH	1.8 nH
L2	220 nH	110 nH	150 nH	220 nH
L3	470 nH	120 nH	–	120 nH

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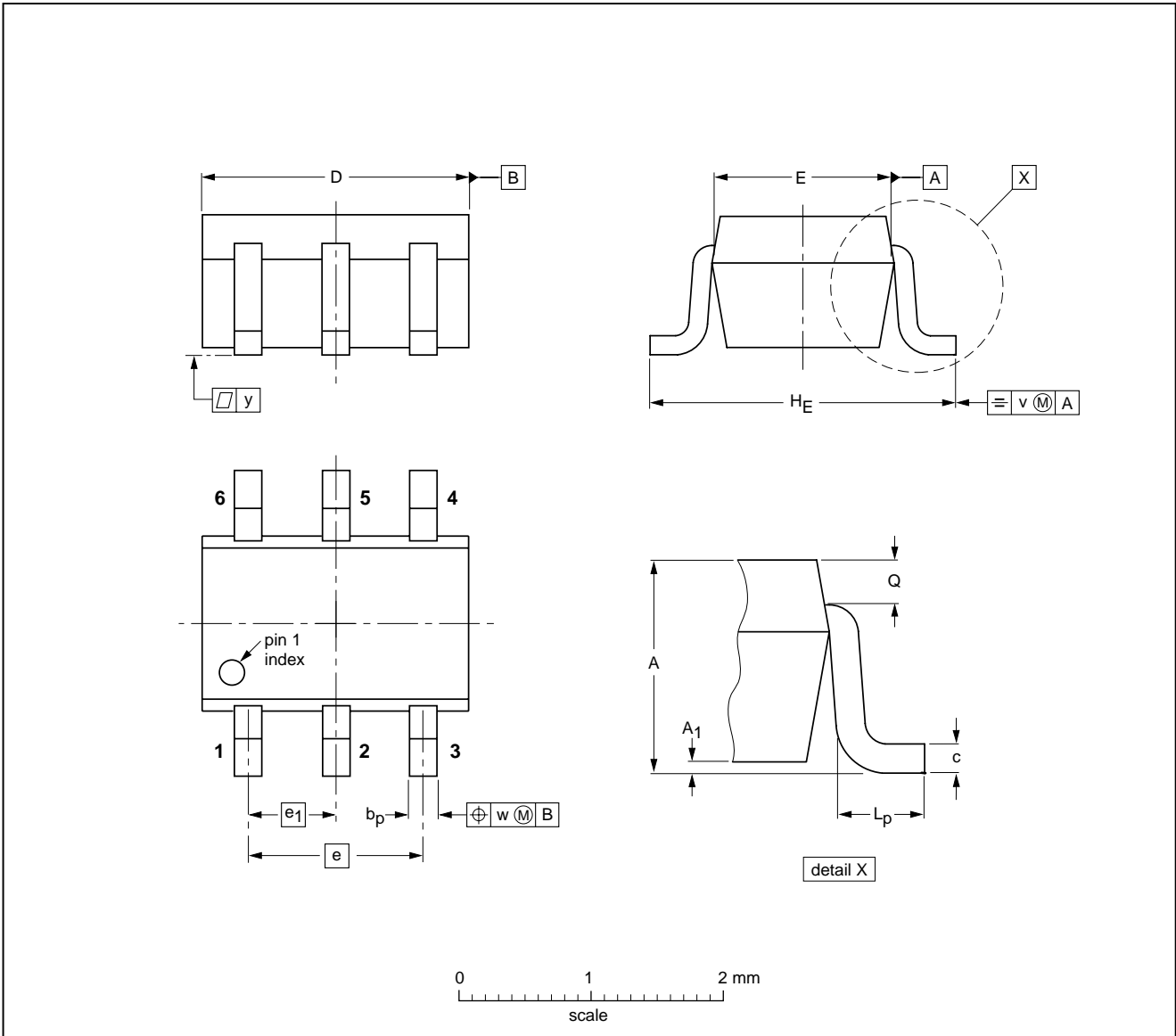
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PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT363



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT363			SC-88			97-02-28

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## DATA SHEET STATUS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS <sup>(1)</sup>
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

## Note

1. Please consult the most recently issued data sheet before initiating or completing a design.

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**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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.

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