

# DATA SHEET



## **BGA2022** MMIC mixer

Objective specification  
Supersedes data of 1999 Feb 25

1999 Jul 23

# 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. Trade-off between gain and intermodulation is determined by one external inductor.

## DESCRIPTION

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

## PINNING

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

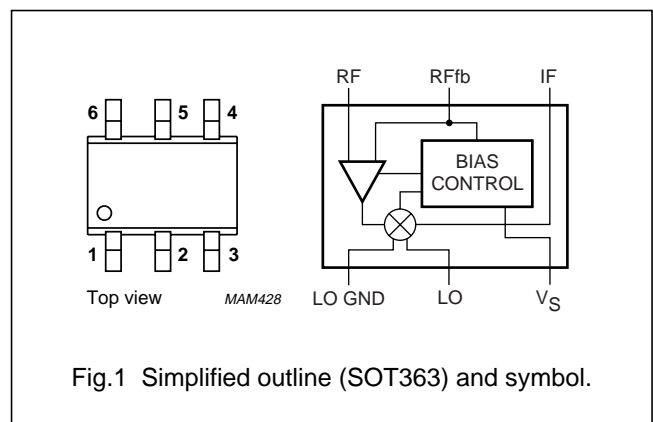


Fig.1 Simplified outline (SOT363) and symbol.

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V <sub>S</sub>	supply voltage		2.7	2.8	2.85	V
I <sub>S</sub>	supply current		–	6	–	mA
G <sub>conv</sub>	conversion gain	f <sub>RF</sub> = 900 MHz	–	6	–	dB
NF	noise figure	f <sub>RF</sub> = 900 MHz	–	9	–	dB
IP <sub>3</sub>	input third order intercept point	f <sub>RF</sub> = 900 MHz	–	6	–	dBm
	LO – RF isolation	f <sub>RF</sub> = 900 MHz	–	30	–	dB

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**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>S</sub>	supply voltage		–	4	V
I <sub>S</sub>	supply current		–	20	mA
P <sub>LO</sub>	oscillator power	note 1	–	tbf	dBm
P <sub>RF</sub>	RF power	note 1	–	tbf	dBm
P <sub>tot</sub>	total power dissipation	T <sub>s</sub> ≤ tbf °C; note 2	–	60	mW
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C

**Notes**

- LO and RF signals always AC coupled; no external DC voltage supplied to pin 1, 2 and 6.
- T<sub>s</sub> is the temperature at the soldering point of the ground tab.

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th j-s</sub>	thermal resistance from junction to solder point	T <sub>s</sub> ≤ tbf °C; P <sub>tot</sub> = 17 mW; note 1	tbf	K/W

**Note**

- T<sub>s</sub> is the temperature at the soldering point of the ground tab.

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**CHARACTERISTICS**

$f_{RF} = 900 \text{ MHz}$ ;  $f_{LO} = 983 \text{ MHz}$ ;  $f_{IF} = 83 \text{ MHz}$ ;  $V_S = 2.8 \text{ V}$ ;  $P_{LO} = 0 \text{ dBm}$ ;  $T_j = 25 \text{ }^\circ\text{C}$ ; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$f_{LO}$	local oscillator frequency		0.5	–	2.5	GHz
$f_{RF}$	signal frequency	external matching	0.5	–	2.5	GHz
$f_{IF}$	intermediate frequency		10	–	400	MHz
$V_S$	supply voltage		2.7	2.8	2.85	V
$I_S$	supply current		–	6	–	mA
$G_{\text{conv(p)}}$	power conversion gain	900 MHz	–	6	–	dB
		1900 MHz	–	6	–	dB
		2.4 GHz	–	6	–	dB
NF	noise figure	DSB; 900 MHz	–	9	–	dB
		DSB; 1900 MHz	–	9	–	dB
		DSB; 2.4 GHz	–	9	–	dB
IP <sub>3</sub>	intercept point third order intermodulation	900 MHz; $\Delta f_{RF} = 100 \text{ kHz}$	–	6	–	dBm
		1900 MHz; $\Delta f_{RF} = 100 \text{ kHz}$	–	6	–	dBm
		2.4 GHz; $\Delta f_{RF} = 100 \text{ kHz}$	–	6	–	dBm
	RF – LO isolation		–	–26	–	dB
	LO – RF isolation		–	–30	–	dB
	LO – IF isolation		–	–20	–	dB
	RF – IF isolation		–	–29	–	dB
VSWR <sub>LO</sub>	voltage standing wave ratio on LO input		–	1.5	2	
Z <sub>IF</sub>	IF output impedance	open collector	–	tbf	–	k $\Omega$

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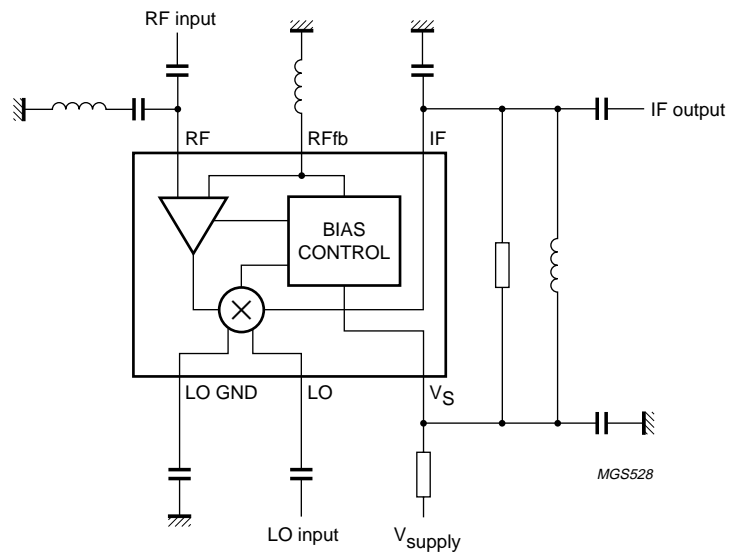


Fig.2 Application diagram (values tbf).

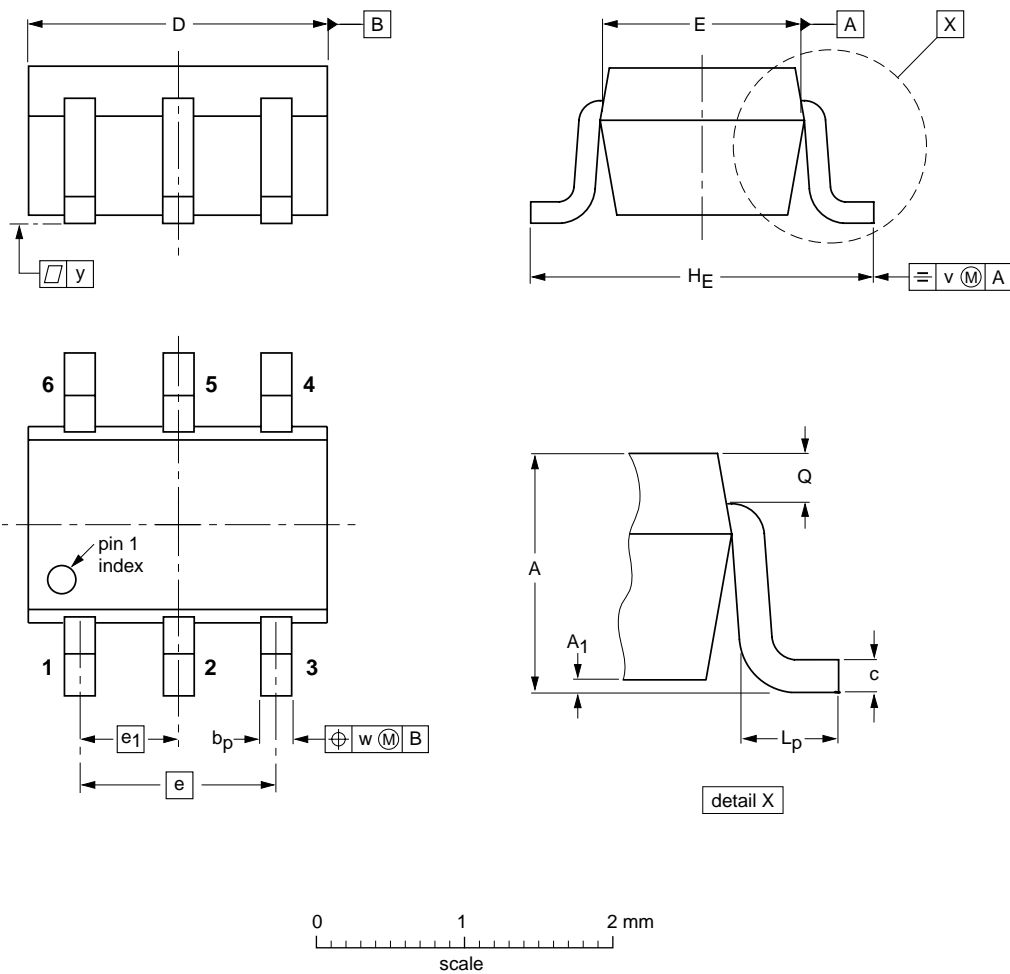
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PACKAGE OUTLINE

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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**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>	
Where application information is given, it is advisory and does not form part of the specification.	

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Printed in The Netherlands

125006/04/pp8

Date of release: 1999 Jul 23

Document order number: 9397 750 06135

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