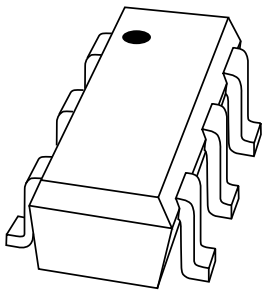
DATA SHEET



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

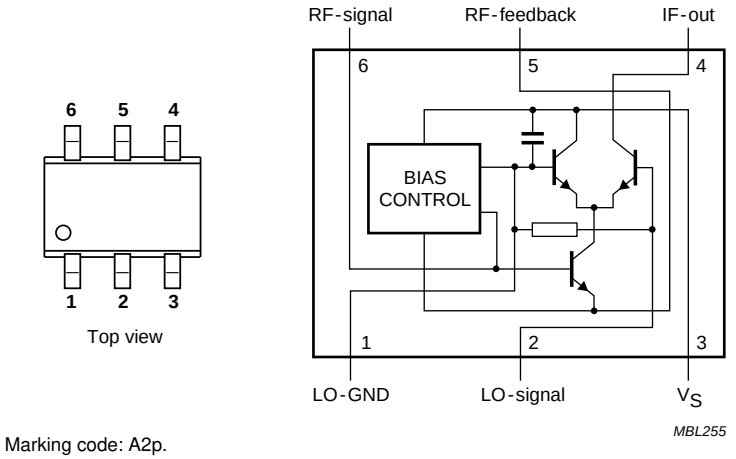
Receiver side of wireless systems that require high conversion gain and high linearity at low supply current, such as CDMA.

DESCRIPTION

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

PINNING

PIN	DESCRIPTION
1	LO - GND
2	LO - signal
3	V_S
4	IF - out
5	RF - feedback
6	RF - signal



Marking code: A2p.

Fig.1 Simplified outline (SOT363) and symbol.

QUICK REFERENCE DATA

V_S = 2.8 V; I_S = 6 mA; P_{LO} = 0 dBm; f_{RF} = 1800 MHz; f_{LO} = 2080 MHz; f_{IF} = 280 MHz.

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
G_{conv}	conversion gain	4	6	8	dB
NF	noise figure (DSB)	–	12	–	dB
IP_3	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.

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	$T_s \leq 100$ °C; note 2	–	40	mW
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature		–	150	°C

Notes

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

THERMAL CHARACTERISTICS

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

CHARACTERISTICS

V_S = 2.8 V; I_S = 6 mA; T_j = 25 °C; unless otherwise specified.

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

APPLICATION INFORMATION

See application note number AN00059.

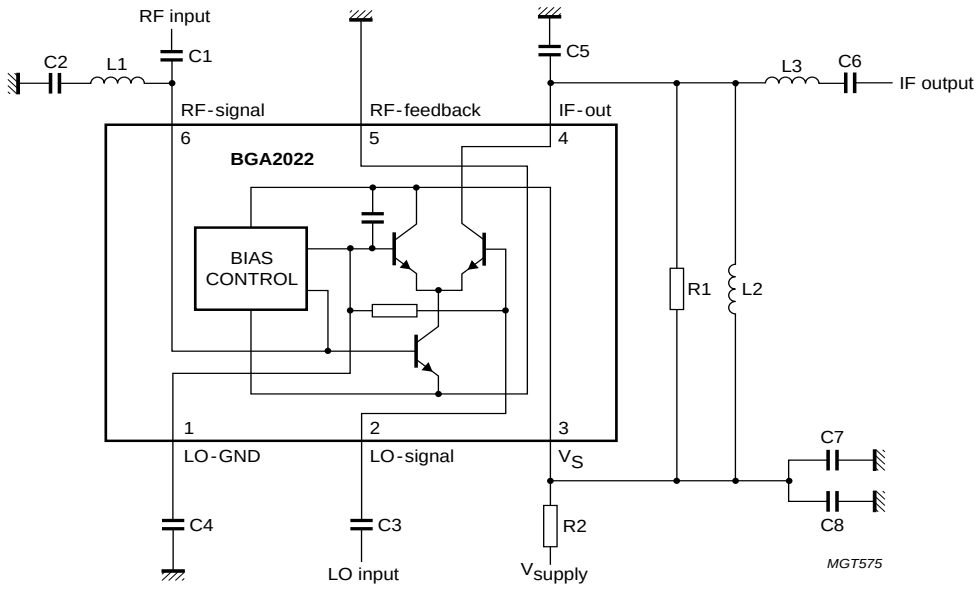
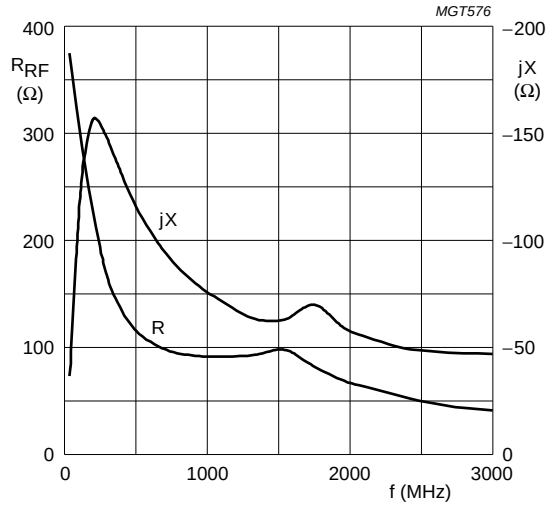


Fig.2 Application diagram.

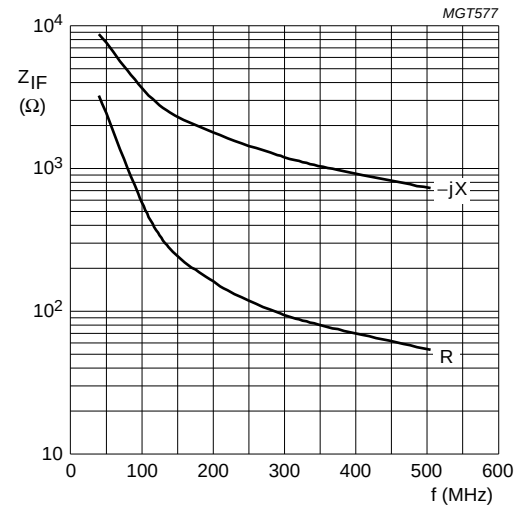
List of components (see Fig.2)

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



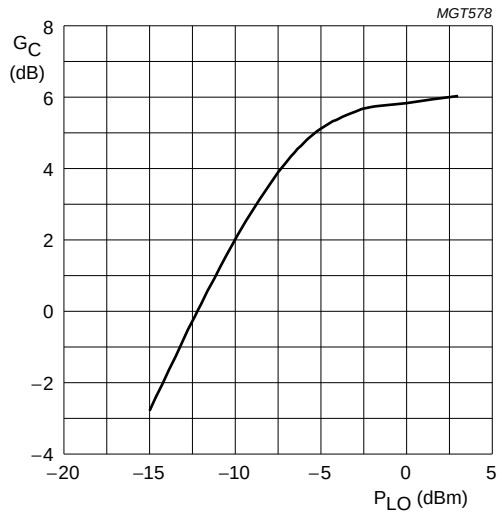
$Z_S = Z_L = 50\ \Omega$; $V_S = 2.8$ V; $P_{RF} = 25$ dBm; $T_{amb} = 25$ °C.

Fig.3 RF input impedance as a function of frequency; typical values.



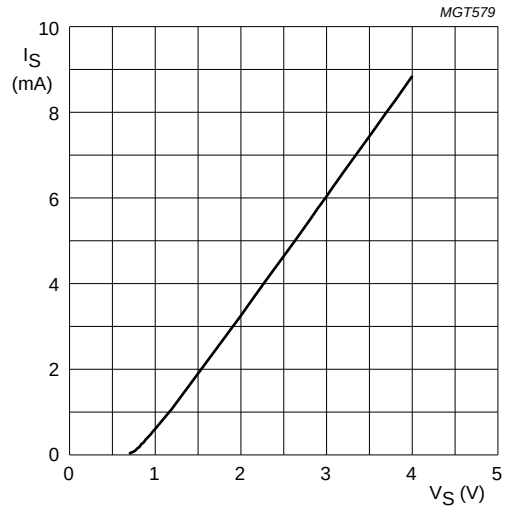
$Z_S = Z_L = 50\ \Omega$; AC coupled; no signal; $T_{amb} = 25$ °C.

Fig.4 IF output impedance as a function frequency; typical values.



$Z_S = Z_L = 50\ \Omega$; $V_S = 2.8$ V; $P_{RF} = 0$ dBm; f = 1800 MHz; $T_{amb} = 25$ °C.

Fig.5 Conversion gain as a function of oscillator power; typical values.

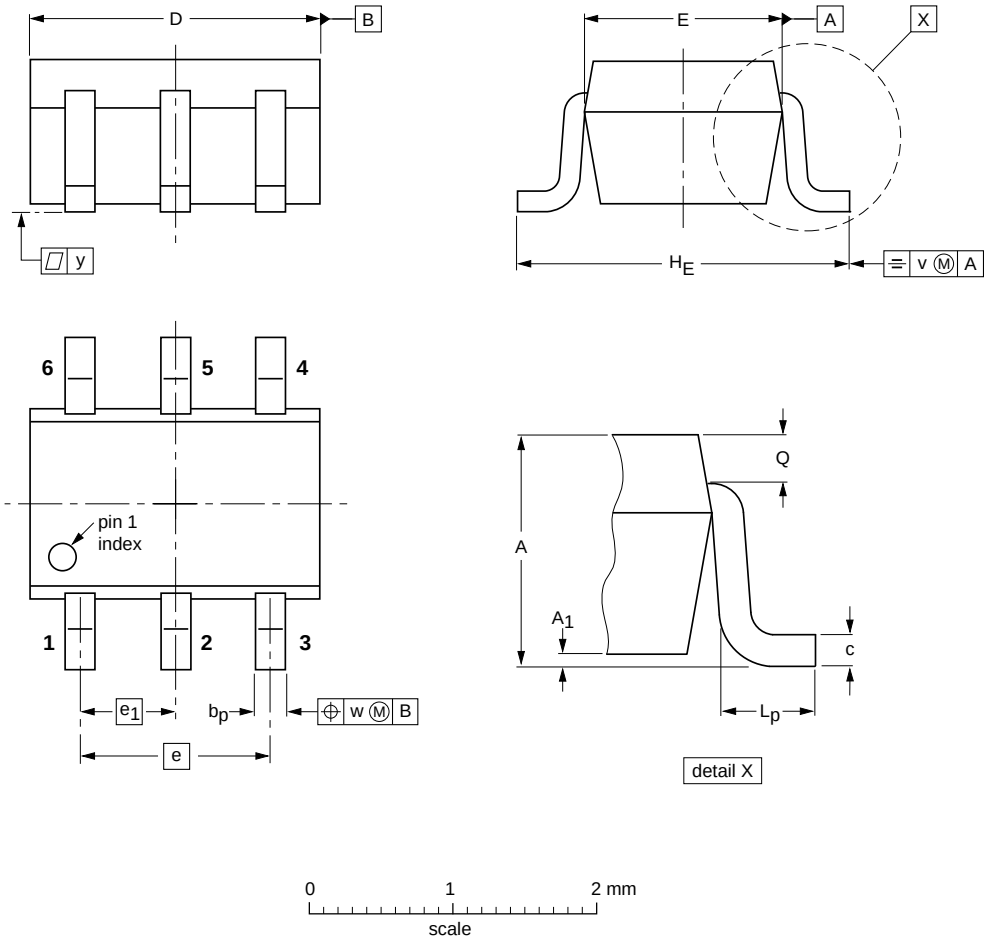


$Z_S = Z_L = 50\ \Omega$; AC coupled; no signal; $T_{amb} = 25$ °C.

Fig.6 Supply current as a function of the supply voltage; typical values.

PACKAGE OUTLINE

Plastic surface-mounted package; 6 leads **SOT363**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	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	JEITA			
SOT363			SC-88			~~04-11-08~~ 06-03-16

DATA SHEET STATUS

DOCUMENT STATUS[1]	PRODUCT STATUS[2]	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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