

ASSP

CMOS

FRONT-END LSI

MB54501

■ DESCRIPTION

The Fujitsu MB54501 includes a low-noise amplifier and a mixer, which are used for front end of mobile telecommunication systems.

Using Fujitsu's advanced technology, MB54501 achieves an Icc of 6.0mA (typ.).

■ FEATURES

	Amplifier	Mixer
• Supply voltage	3V (typ.)	3V (typ.)
• Current consumption	3mA (typ.)	3mA (typ.)
• Input frequency	1.1GHz (max.)	1.1GHz (max.)
• Gain	14dB (typ.) ^{*1}	15dB (typ.) ^{*2}
• Noise figure	2.2dB (typ.) ^{*1}	5dB (SSB, typ.) ^{*2}
• 1dB compression point	-1dBm (typ.) ^{*1}	
• Input return loss	8dB (typ.) ^{*1}	
• Output return loss	10dB (typ.) ^{*1}	

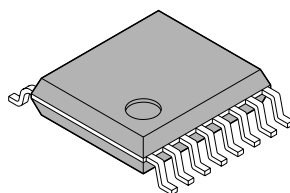
*1: Measured by the circuit of "measurement circuit example".
(fin = 878MHz)

*2: Measured by the circuit of "measurement circuit example".
(IF = 90MHz)

- 16-pin Plastic Shrink Small Outline Package (Suffix: -PFV)

■ PACKAGE

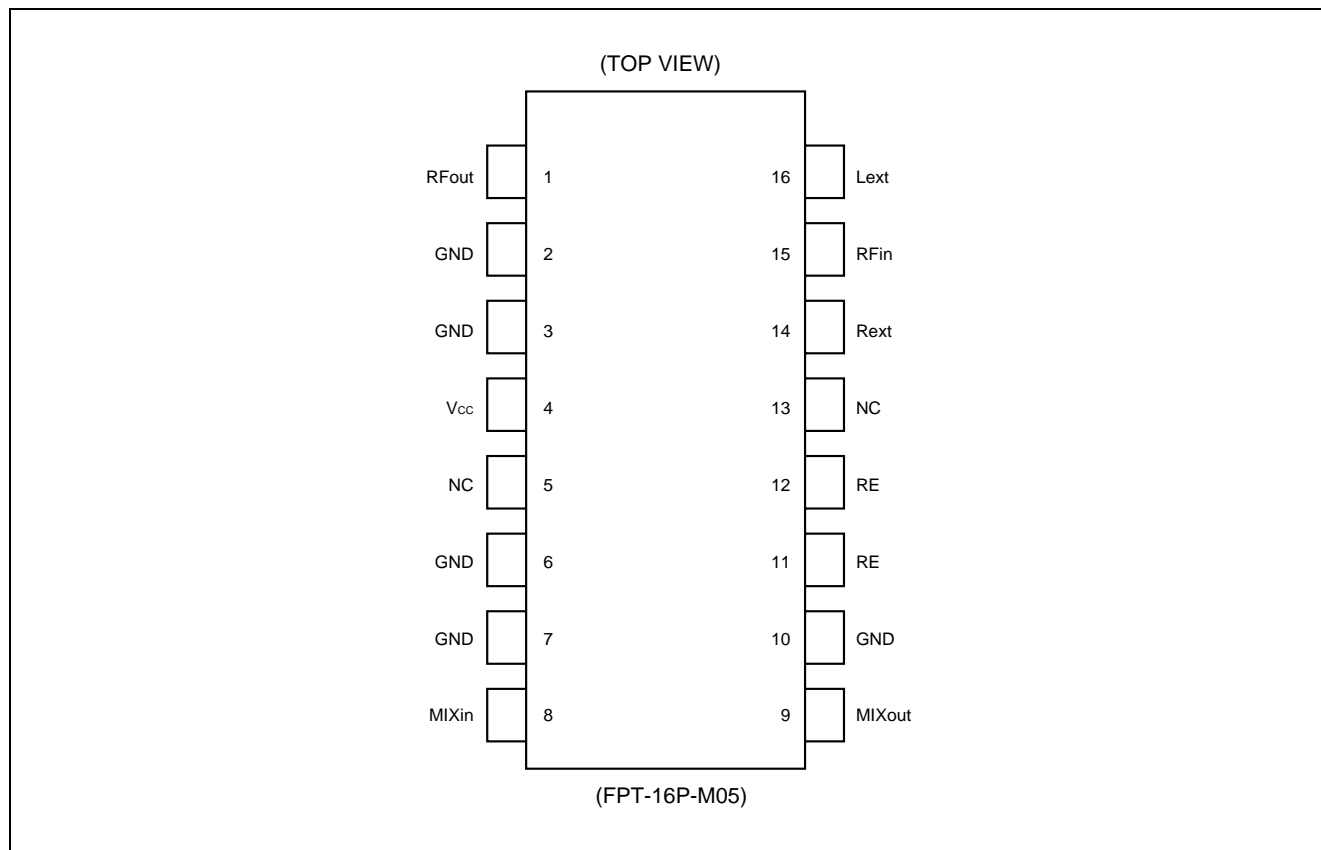
16-pin Plastic SSOP



(FPT-16P-M05)

MB54501

■ PIN ASSIGNMENT

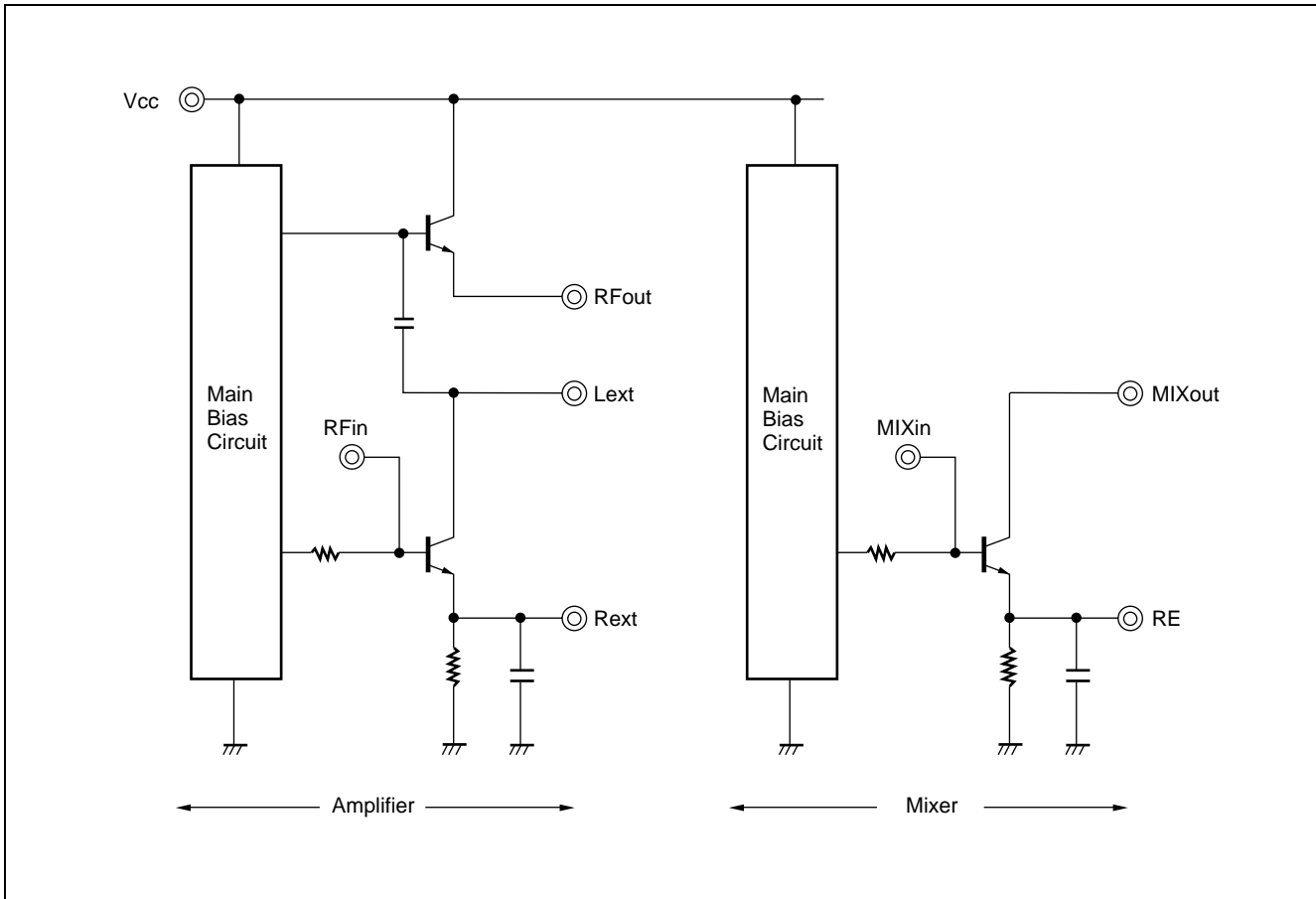


■ ABSOLUTE MAXIMUM RATINGS

Parameters	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.5 to 7.0	V
Output Voltage	V_O	-0.5 to $V_{CC} + 0.5$	V
Output Current	I_O	0 to 10	mA
Storage Temperature	T_{STG}	-55 to +125	°C

Note: Permanent device damage may occur if the above Absolute Maximum Ratings are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

■ EQUIVALENT CIRCUIT



■ PIN DESCRIPTION

Pin No.	Pin Name	Description	Pin No.	Pin Name	Description
1	RFout	Amplifier output	9	MIXout	Mixer output
2	GND	Ground	10	GND	Ground
3	GND	Ground	11	RE	Emitter of a transistor for mixer
4	Vcc	Power supply	12		
5	NC	No connection	13	NC	No connection
6	GND	Ground	14	Rext	Emitter of a transistor for amplifier
7	GND	Ground	15	RFin	Amplifier input
8	MIXin	Mixer input	16	Lext	Amplifier load connection

MB54501

■ RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Supply Voltage	V_{CC}	2.7	3.0	5.5	V
Input Voltage	V_I	GND	–	V_{CC}	V
Operating Temperature	T_a	–40	–	+85	°C

Notes: To protect against damage by electrostatic discharge, note the following handling precautions:

- Store and transport devices in conductive containers.
- Use properly grounded workstations, tools, and equipment.
- Turn off power before inserting or removing this device into or from a socket.
- Protect leads with conductive sheet, when transporting a board mounted device.

■ ELECTRICAL CHARACTERISTICS

AMPLIFIER

(V_{CC} = +3.0V, T_a = 25°C)

Parameter	Symbol	Conditions	Target Value			Unit
			Min.	Typ.	Max.	
Supply Voltage	V _{CC}	—	2.7	3.0	5.5	V
Supply Current	I _{CC}	—	—	3.0	—	mA
Operating Frequency	f _{in}	—	—	878	1100	MHz
Gain	Gain	—	—	14	—	dB
Noise Figure	NF	—	—	2.2	—	dB
1dB Compression Point	P _{1dB}	Output	—	-1	—	dBm
Input Return Loss	RL _{IN}	—	—	8	—	dB
Output Return Loss	RL _{OUT}	—	—	10	—	dB

Remark: Electrical characteristics depend on external circuits (elements) or status of mounting.
The above characteristics are measured by the test circuit in the next page.

MIXER

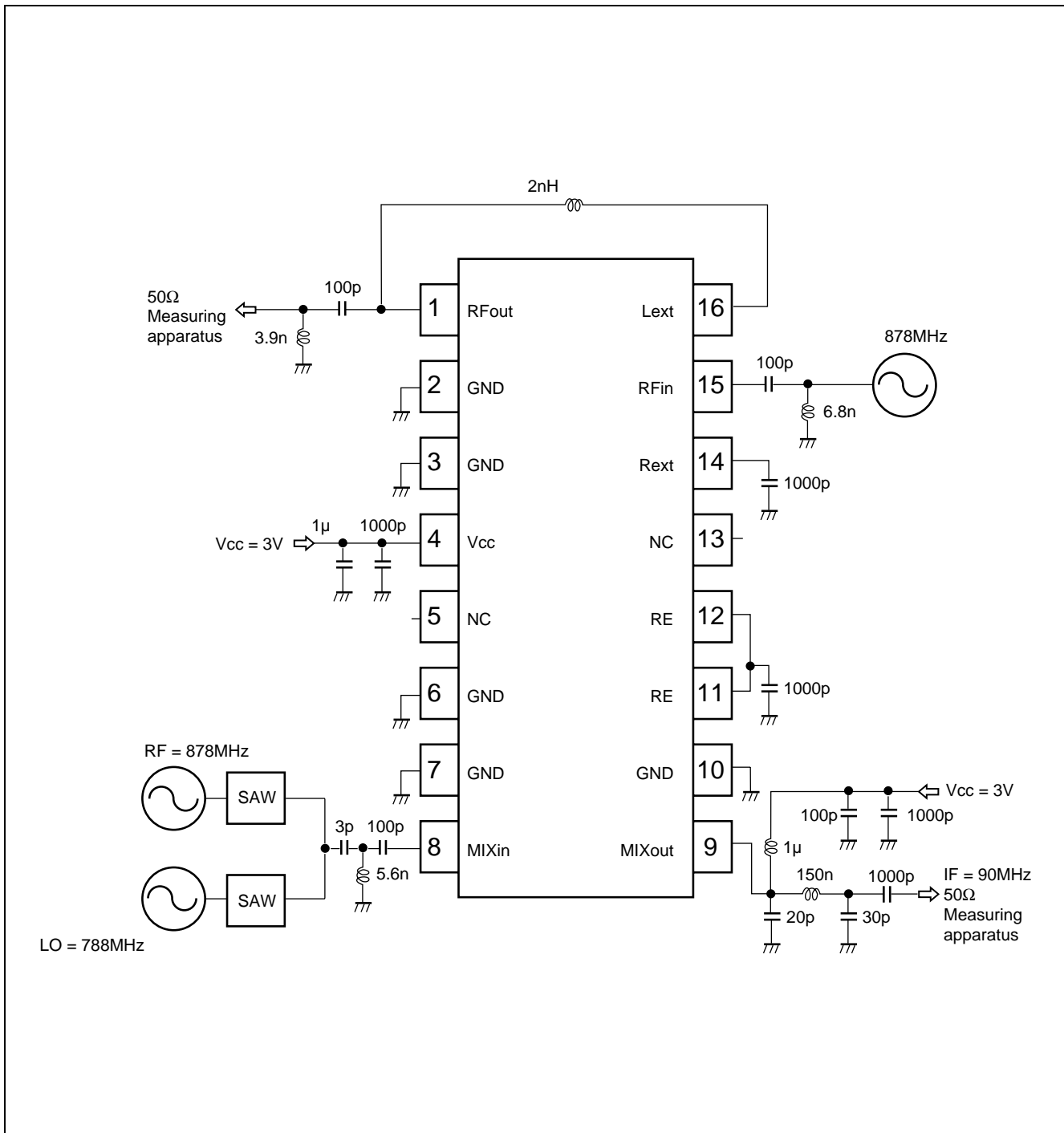
(V_{CC} = +3.0V, T_a = 25°C)

Parameter	Symbol	Conditions	Target Value			Unit
			Min.	Typ.	Max.	
Supply Voltage	V _{CC}	—	2.7	3.0	5.5	V
Current Consumption	I _{CC}	—	—	3.0	—	mA
Operating Frequency	f _{in}	—	—	878	1100	MHz
Gain	S ₂₁	Amplifier characteristics	—	9	—	dB
Conversion Gain	G _C	Mixer characteristics IF = 90MHz	—	15	—	dB
Noise Figure	NF		SSB	—	5	—

Remark: Electrical characteristics depend on external circuits (elements) or status of mounting.
The above characteristics are measured by the test circuit in the next page.

MB54501

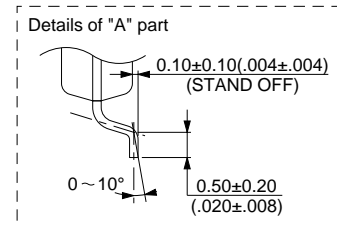
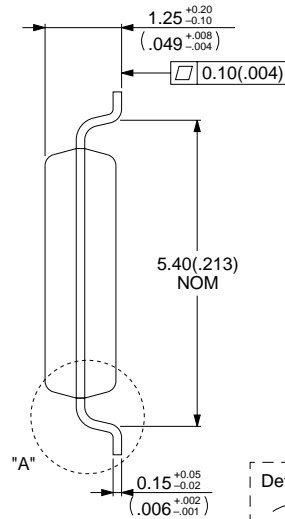
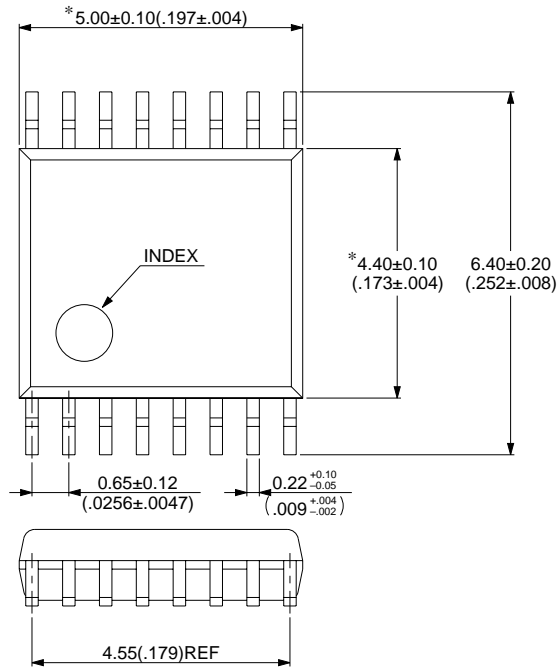
MEASUREMENT CIRCUIT (EXAMPLE)



■ PACKAGE DIMENSIONS

16pins, Plastic SSOP
(FPT-16P-M05)

*: This dimension does not include resin protrusion.



Dimensions in mm (inches).

FUJITSU LIMITED

For further information please contact:

Japan

FUJITSU LIMITED
Corporate Global Business Support Division
Electronic Devices
KAWASAKI PLANT, 4-1-1, Kamikodanaka
Nakahara-ku, Kawasaki-shi
Kanagawa 211-8588, Japan
Tel: (044) 754-3763
Fax: (044) 754-3329

<http://www.fujitsu.co.jp/>

North and South America

FUJITSU MICROELECTRONICS, INC.
Semiconductor Division
3545 North First Street
San Jose, CA 95134-1804, USA
Tel: (408) 922-9000
Fax: (408) 922-9179

Customer Response Center
Mon. - Fri.: 7 am - 5 pm (PST)
Tel: (800) 866-8608
Fax: (408) 922-9179

<http://www.fujitsumicro.com/>

Europe

FUJITSU MIKROELEKTRONIK GmbH
Am Siebenstein 6-10
D-63303 Dreieich-Buchsschlag
Germany
Tel: (06103) 690-0
Fax: (06103) 690-122

<http://www.fujitsu-edc.com/>

Asia Pacific

FUJITSU MICROELECTRONICS ASIA PTE LTD
#05-08, 151 Lorong Chuan
New Tech Park
Singapore 556741
Tel: (65) 281-0770
Fax: (65) 281-0220

<http://www.fmap.com.sg/>

F9803

© FUJITSU LIMITED Printed in Japan

All Rights Reserved.

The contents of this document are subject to change without notice. Customers are advised to consult with FUJITSU sales representatives before ordering.

The information and circuit diagrams in this document presented as examples of semiconductor device applications, and are not intended to be incorporated in devices for actual use. Also, FUJITSU is unable to assume responsibility for infringement of any patent rights or other rights of third parties arising from the use of this information or circuit diagrams.

FUJITSU semiconductor devices are intended for use in standard applications (computers, office automation and other office equipment, industrial, communications, and measurement equipment, personal or household devices, etc.).

CAUTION:

Customers considering the use of our products in special applications where failure or abnormal operation may directly affect human lives or cause physical injury or property damage, or where extremely high levels of reliability are demanded (such as aerospace systems, atomic energy controls, sea floor repeaters, vehicle operating controls, medical devices for life support, etc.) are requested to consult with FUJITSU sales representatives before such use. The company will not be responsible for damages arising from such use without prior approval.

Any semiconductor devices have inherently a certain rate of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.

If any products described in this document represent goods or technologies subject to certain restrictions on export under the Foreign Exchange and Foreign Trade Control Law of Japan, the prior authorization by Japanese government should be required for export of those products from Japan.