

# 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.) <sup>*1</sup>	15dB (typ.) <sup>*2</sup>
• Noise figure	2.2dB (typ.) <sup>*1</sup>	5dB (SSB, typ.) <sup>*2</sup>
• 1dB compression point	-1dBm (typ.) <sup>*1</sup>	
• Input return loss	8dB (typ.) <sup>*1</sup>	
• Output return loss	10dB (typ.) <sup>*1</sup>	

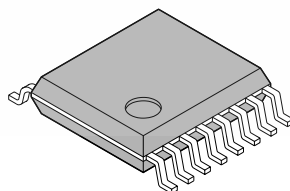
\*1: Measured by the circuit of "measurement circuit example".  
(fin = 878MHz)

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

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

## PACKAGE

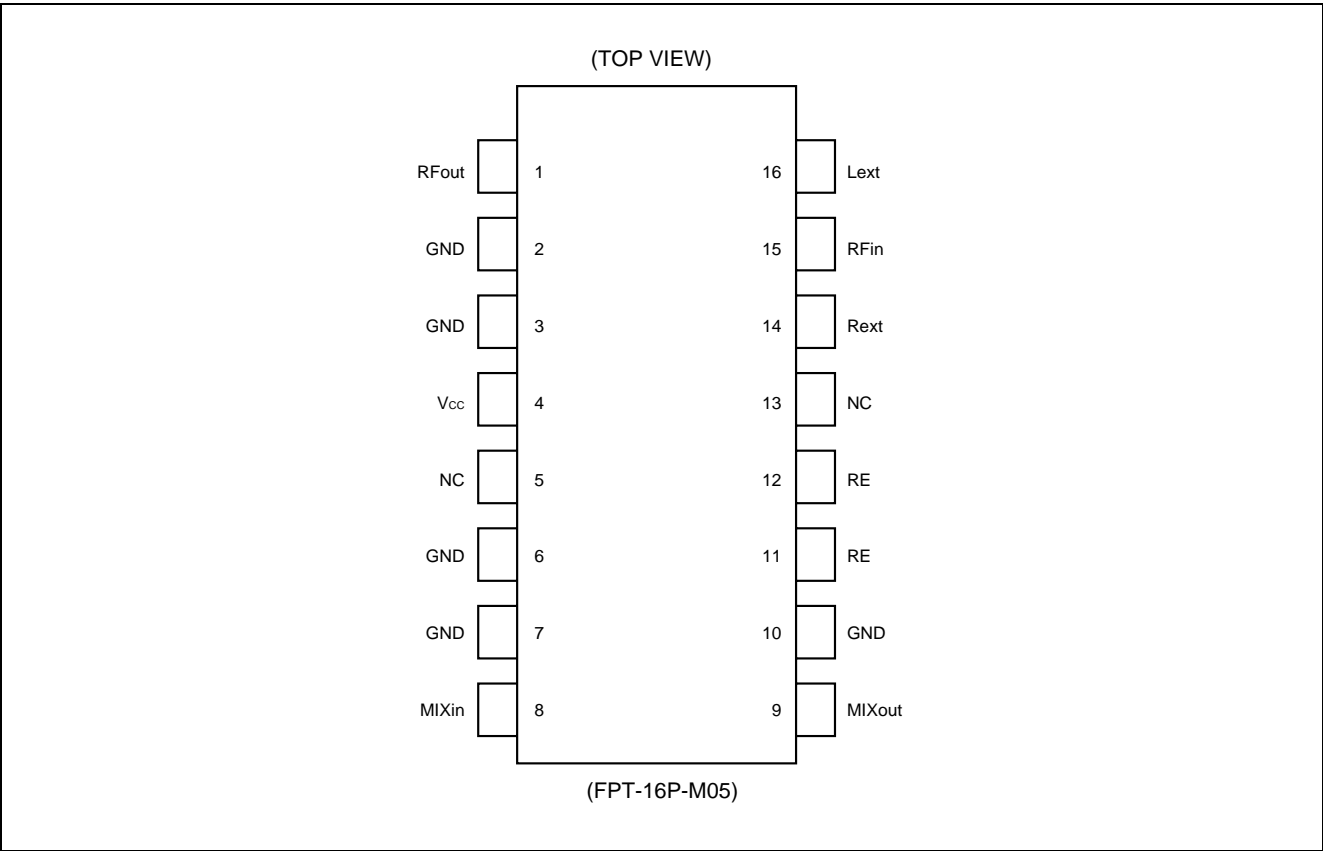
16-pin Plastic SSOP



(FPT-16P-M05)

# MB54501

## ■ PIN ASSIGNMENT

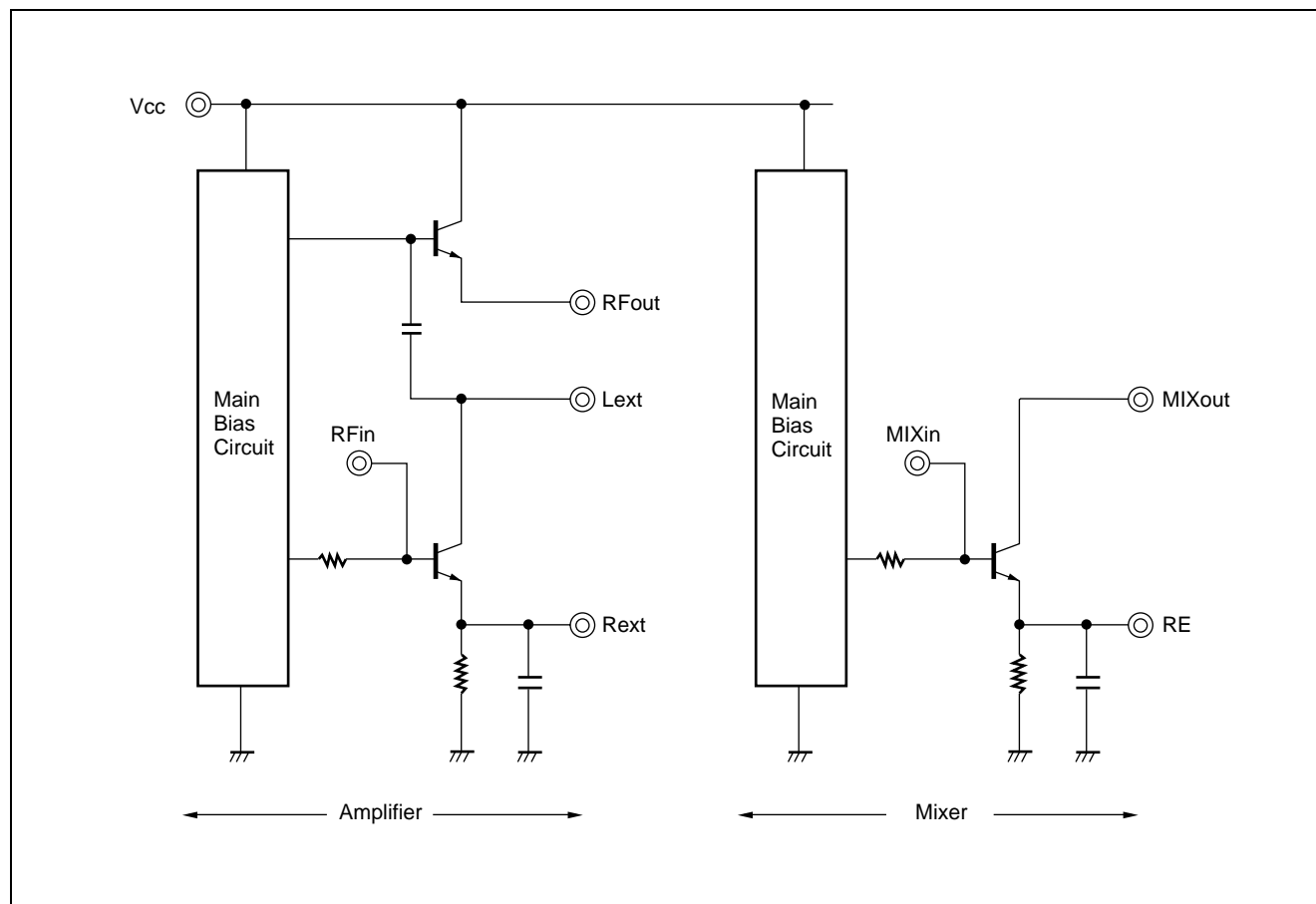


## ■ ABSOLUTE MAXIMUM RATINGS

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<sub>CC</sub> = +3.0V, T<sub>a</sub> = 25°C)

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

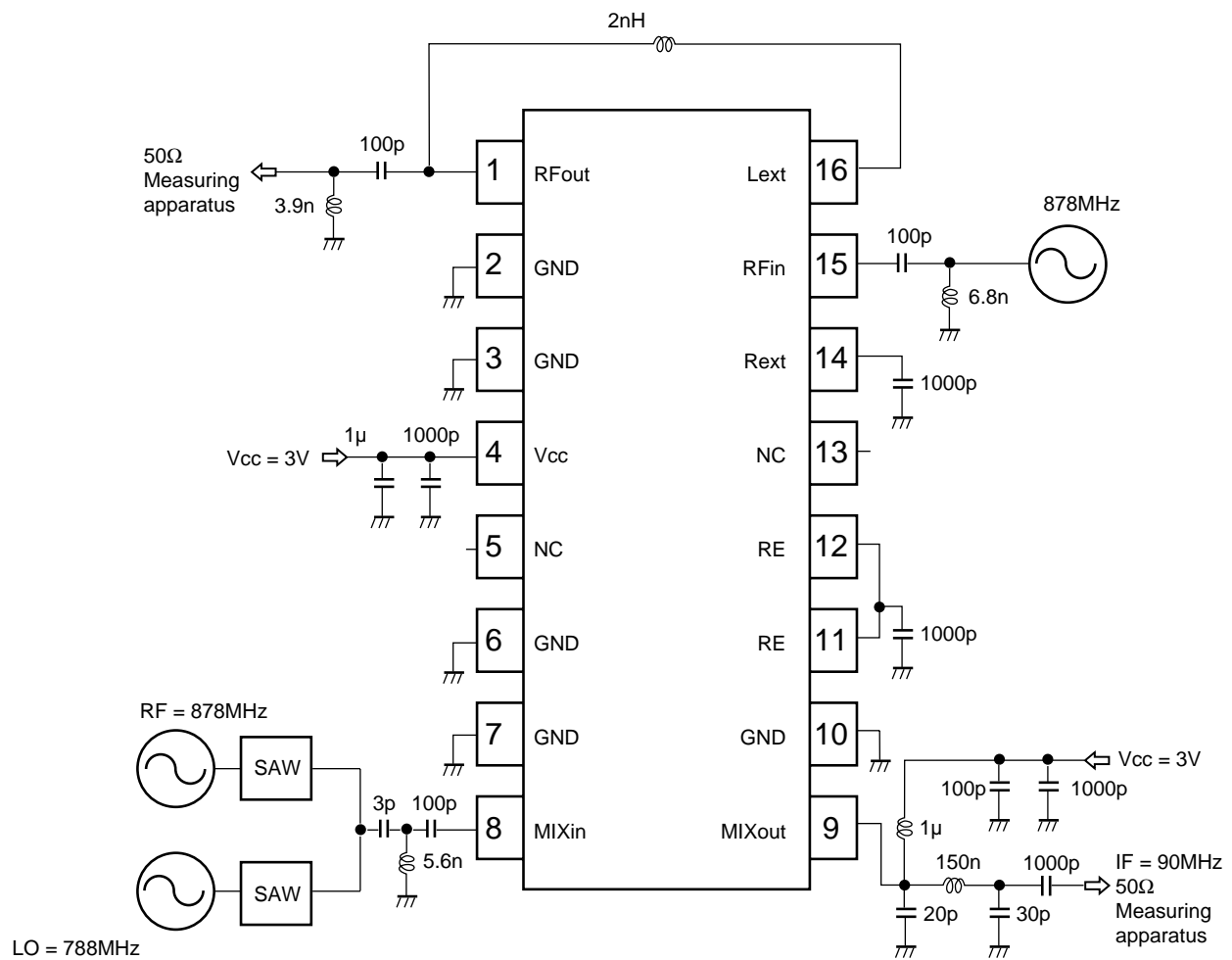
(V<sub>CC</sub> = +3.0V, T<sub>a</sub> = 25°C)

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

# MB54501

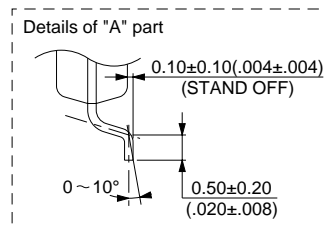
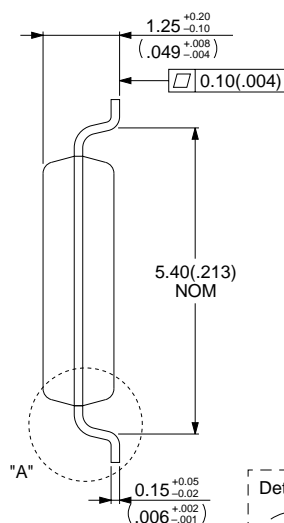
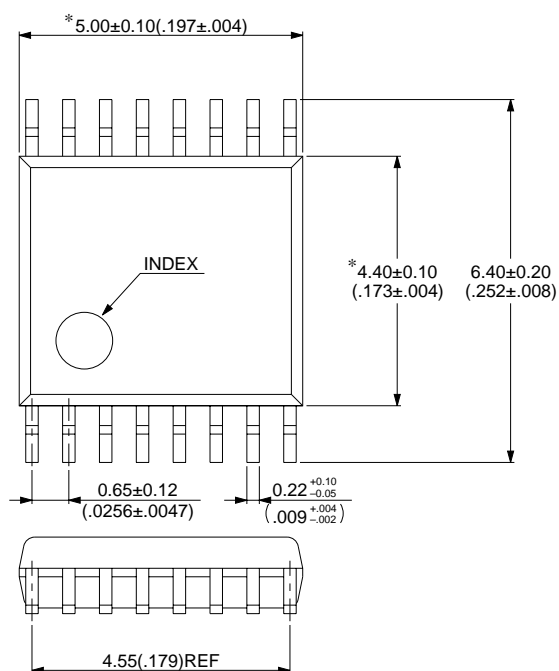
## ■ MEASUREMENT CIRCUIT (EXAMPLE)



## ■ PACKAGE DIMENSIONS

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

\*: This dimension does not include resin protrusion.



Dimensions in mm (inches).

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