

MB54501

FRONT-END UP/DOWN CONVERTER

INTRODUCTION

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 I_{cc} of 6.0mA (typ.).

ELECTRICAL CHARACTERISTICS

	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".
($f_{in} = 878\text{MHz}$)

*2 : Measured by the circuit of "measurement circuit example".
($f_{IF} = 90\text{MHz}$)

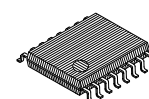
PACKAGE

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

ABSOLUTE MAXIMUM RATINGS

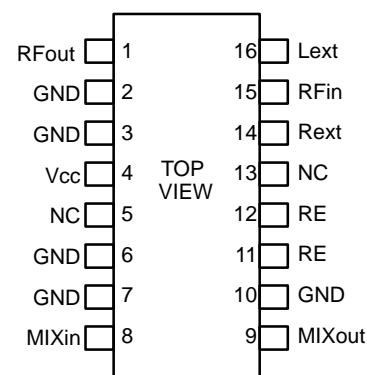
Parameters	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.5 to 7.0	V
Output Voltage	V_o	-0.5 to $V_{CC}+0.5$	V
Output Current	I_o	0 to 10	mA
Storage Temperature	T_{STG}	-55 to +125	°C

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.



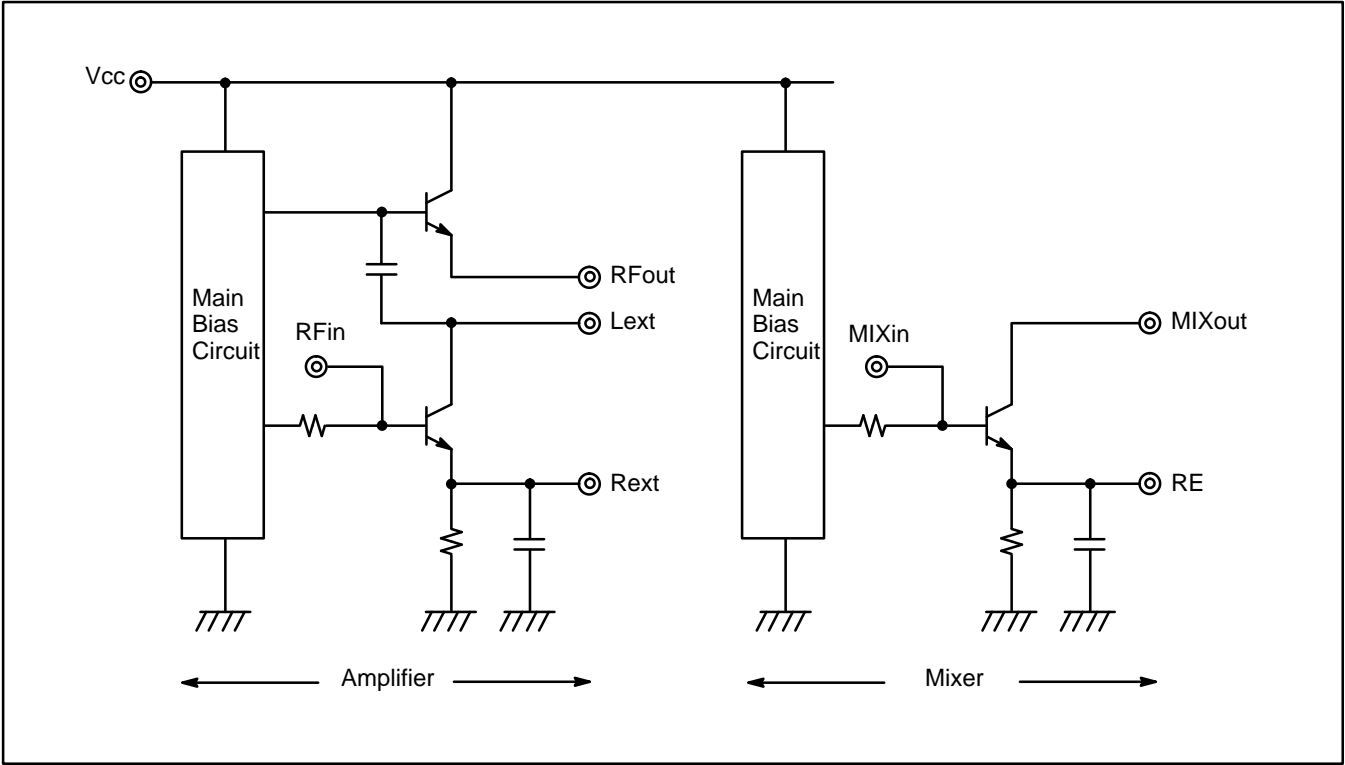
**PLASTIC PACKAGE
FP-16P-M05**

PIN ASSIGNMENT



This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

EQUIVALENT CIRCUIT



PIN DESCRIPTIONS

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

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	R _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	R _L IN		–	8	–	dB
Output Return Loss	R _L 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.

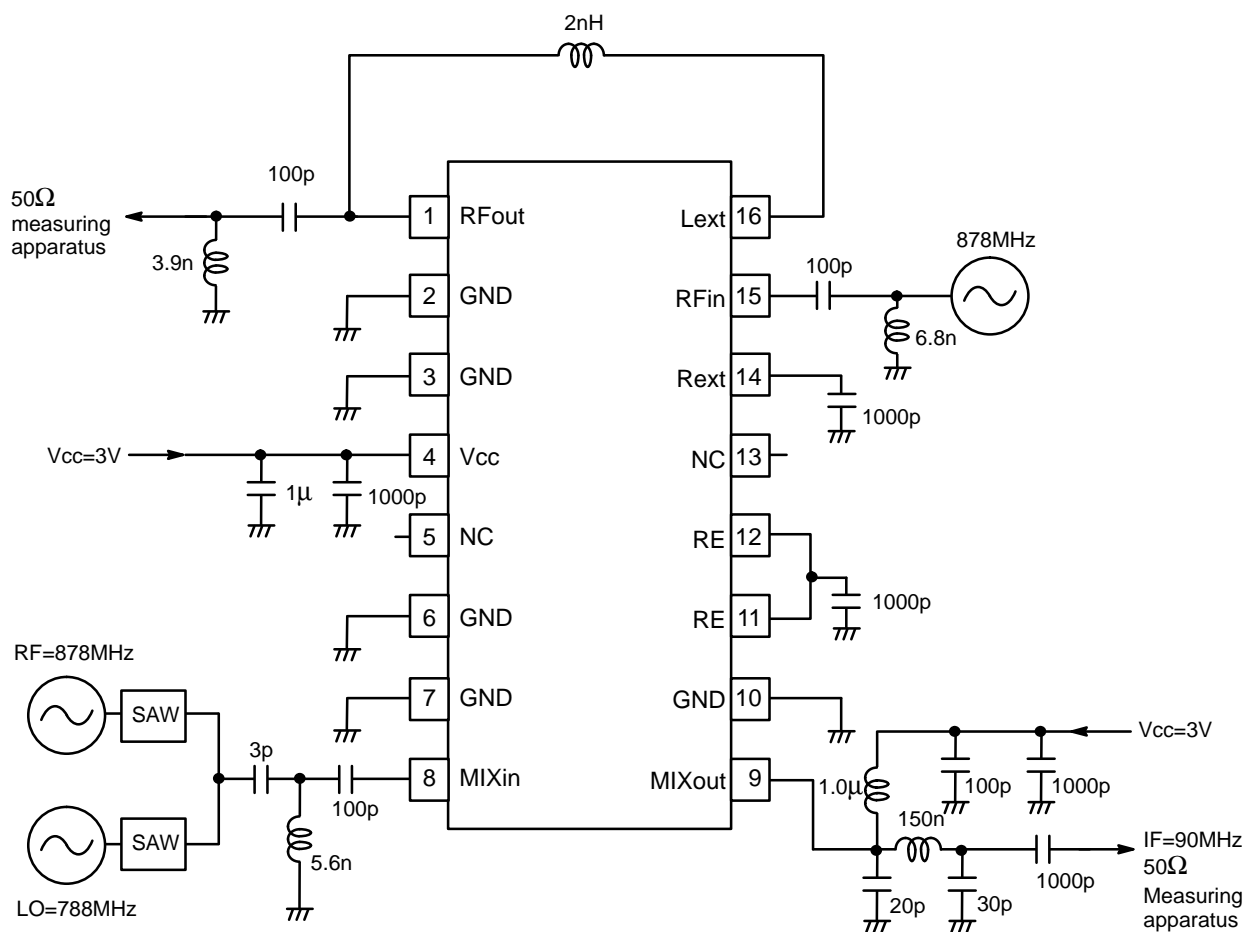
MIXER

(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	MIX _{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	–	dB

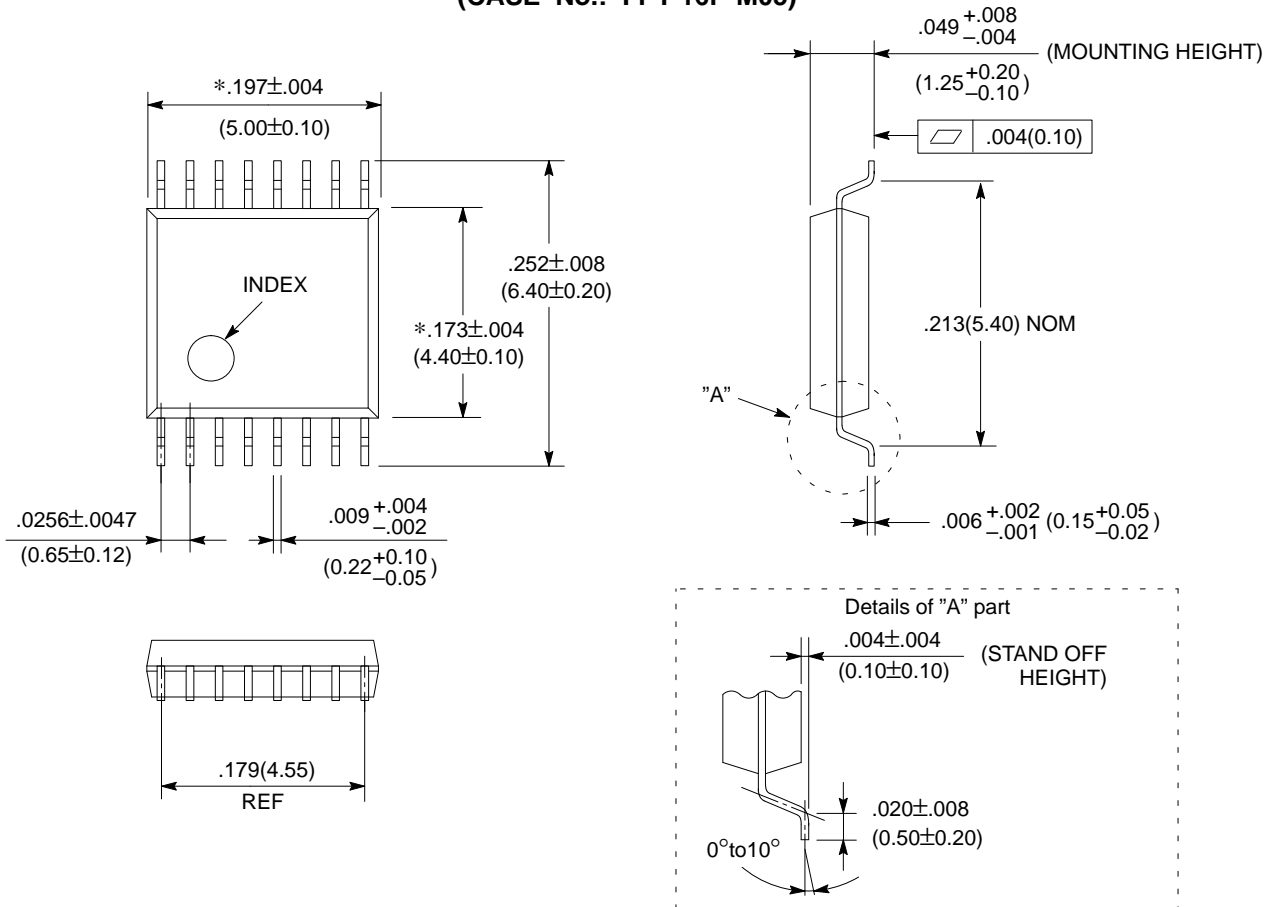
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The above characteristics are measured by the test circuit in the next page.

MEASUREMENT CIRCUIT (EXAMPLE)



PACKAGE DIMENSIONS

16-LEAD PLASTIC FLAT PACKAGE (CASE No.: FPT-16P-M05)



*:This dimension does not include resin protrusion.

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Dimensions in
inches (millimeters)

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Circuit diagrams utilizing Fujitsu products are included as a means of illustrating typical semiconductor applications. Complete information sufficient for construction purposes is not necessarily given.

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FUJITSU LIMITED

For further information please contact:

Japan

FUJITSU LIMITED
Electronic Devices
International Operations Department
KAWASAKI PLANT, 1015 Kamikodanaka,
Nakahara-ku, Kawasaki-shi,
Kanagawa 211, Japan
Tel: (044) 754-3753
FAX: (044) 754-3332

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) 432-9044/9045

Europe

FUJITSU MIKROELEKTRONIK GmbH
Am Siebenstein 6-10,
63303 Dreieich-Buchschlag,
Germany
Tel: (06103) 690-0
FAX: (06103) 690-122

Asia Pacific

FUJITSU MICROELECTRONICS ASIA PTE LIMITED
No.51 Bras Basah Road,
Plaza By The Park,
#06-04 to #06-07
Singapore 0718
Tel: 336-1600
FAX: 336-1609