

Description

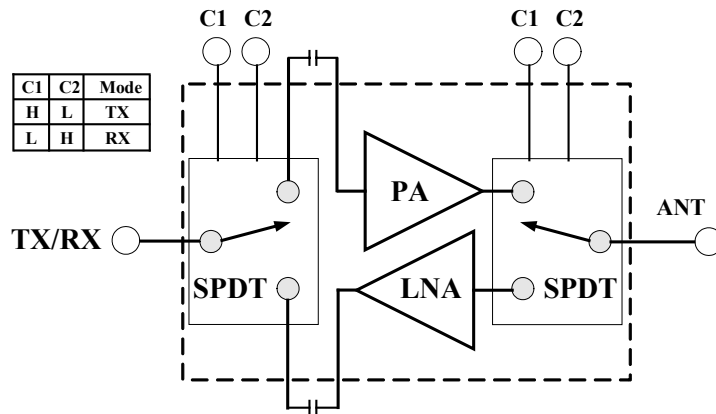
The MCP05 contains a power amplifier (PA), a low noise amplifier (LNA), and two SPDT switch. It is a 20-pins IC by 4×4mm²-QFN package. RF input and output impedance of MCP05 are 50Ω matched. Therefore, precious real estate of circuit board is saved when MCP05 is used. Besides, there is one more precious advantage of MCP05. MCP03 and MCP05 are pin-to-pin compatible. Compared with MCP05, MCP03's maximum output power is 5dB higher but consumes around 50mA more of current. When longer communication range is critical in a different wireless communication market, the MCP05 in the original circuit board could be replaced by MCP03 directly without modification of the original PCB. However, if this feature is desired, please layout the PCB based on MCP03's data sheet. With the use of MCP05, it will offer convenience, flexibility and cost saving.

Features

- RF input power of PA is adjustable for maximum linear performance of PA.
- 12.8dBm P1dB and 15.5dB gain for transmitting RF signal.
- 2.2dB NF and 11.5dB gain for receiving RF signal.
- All PA, LNA and SPDT switch contained in a 20 pins 4×4mm²-QFN package.
- Adjustable turn-on voltage levels.

Applications

- Bluetooth.
- 2.4 GHz ISM band application.
- Wireless phone.
- ZigBee.



Absolute Maximum Ratings

DC Supply Voltage	6V
Total DC Supply Current	40 mA
RF Input Power	5 dBm
VSWR of Output Load	10:1
Operating Ambient Temperature	-40 °C to 85 °C
Storage Temperature	-60 °C to 150 °C
Maximum Junction Temperature (T _j max) °C	150 °C

Maxi-AMP INC (民瑞科技股份有限公司) Innovation Incubation Center, Rm.3A19, No.1, Sec. 1, Syuecheng Rd.,
Dashu Township, Kaohsiung County, 840, Taiwan, R.O.C. . www.maxiamp.com

Maxi-AMP incorporation reserves the right of changing the specifications without any prior notice.

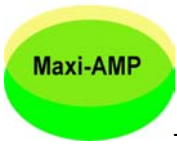
This device is ESD sensitive.

TEL : 0983001600, 0922305109, 0932698745, (07)343-1110

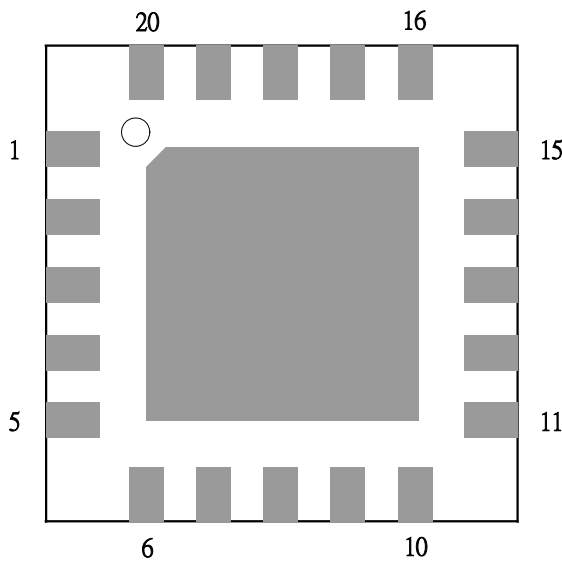
FAX : (07)657-9714 , Taiwan, R.O.C.

MCP05_r1, Preliminary data sheet, March/2011

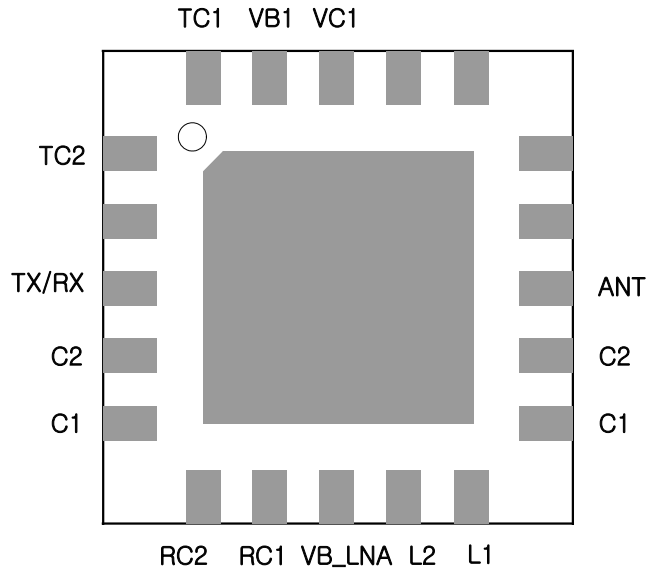
Page1/5



Pin Assignment

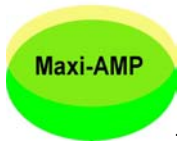


Top View



Top View

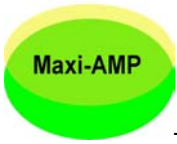
Pin No.	Name	Function
1	TC2	Connection pin for DC-blocking capacitor or attenuator.
3	TX/RX	RF power I/O port for transceiver.
4	C2	Digital control voltage input of switch.
5	C1	Digital control voltage input of switch.
6	RC2	Connection pin for DC-blocking capacitor.
7	RC1	Bias-voltage input for the collector of LNA.
8	VB_LNA	Bias-voltage input for the base of LNA
9	L2	Connection pin for inductor used for NF match.
10	L1	Connection pin for inductor used for NF match.
11	C1	Digital control voltage input of switch.
12	C2	Digital control voltage input of switch.
13	ANT	Connection pin to antenna
18	VC1	Bias-voltage input for the 1 st -stage's collector of PA
19	VB1	Bias-voltage input for the 1 st -stage's base of PA
20	TC1	Connection pin for DC-blocking capacitor or attenuator.



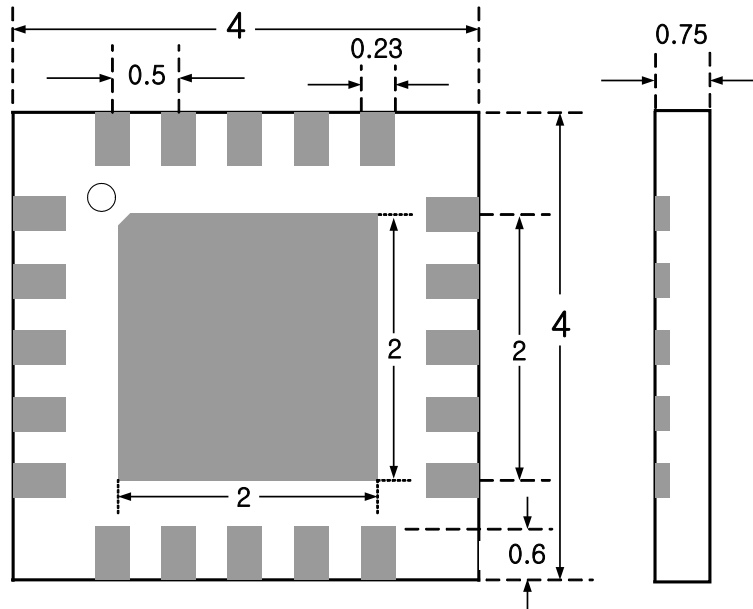
Electrical Characteristics (Temperature=25°C)

Parameter	Symbol	Description	Min.	Typical	Max.	Units
Frequency Range	Freq		2.4	2.45	2.5	GHz
DC Supply Voltage	V _{CC}			3.3		V
Collector's DC Supply Current (PA)	I _{PA_C}			16		mA
Collector's DC Supply Current (LNA)	I _{LNA_C}			7		mA
Base's DC Supply Current (PA)	I _{PA_B}				0.3	mA
Base's DC Supply Current (LNA)	I _{LNB_B}				0.1	mA
Input Voltage of C1	V _{C1}	'1' ranges from 2.2V to V _{CC} '0' ranges 0V to 0.2V.	0		V _{CC}	V
Input Voltage of C2	V _{C2}	'1' ranges from 2.2V to V _{CC} '0' ranges 0V to 0.2V.	0		V _{CC}	V
PA's Small-Signal Power Gain	G _{PA}	V _{C1} ='1', V _{C2} ='0' Including 1dB loss by switches		15.5		dB
LNA's Small-Signal Power Gain	G _{LNA}	V _{C1} ='0', V _{C2} ='1' Including 1dB loss by switches		11.5		dB
Gain Flatness (PA)				0.55		dB
Gain Flatness (LNA)				0.5		dB
Noise Figure of LNA	NF	Including 0.5dB loss by switch		2.2		dB
P1dB (PA)	P1dB_P	Including 0.5dB loss by switch		12.8		dBm
P1dB (LNA)	P1dB_L			1.5		dBm
2 nd Harmonics (PA)	2fo	12.5dBm RF power at pin ANT		-42		dBc
3 rd Harmonics (PA)	3fo	12.5dBm RF power at pin ANT		-51		dBc
VSWR of PA's Output	S ₂₂ _{ANT}	Small-signal, V _{C1} ='1', V _{C2} ='0'		1.8		
VSWR of PA's Input	S ₁₁ _{TX}	Small-signal, V _{C1} ='1', V _{C2} ='0'		1.1		
VSWR of LNA's Input	S ₁₁ _{ANT}	Small-signal, V _{C1} ='0', V _{C2} ='1'		2.4		
VSWR of LNA's Output	S ₂₂ _{RX}	Small-signal, V _{C1} ='0', V _{C2} ='1'		1.8		
Isolation		12.5dBm RF power at pin ANT V _{C1} ='1', V _{C2} ='0', from pin ANT to pin RX		-37		dB

* If not specified, all data are measured at 2.45 GHz.

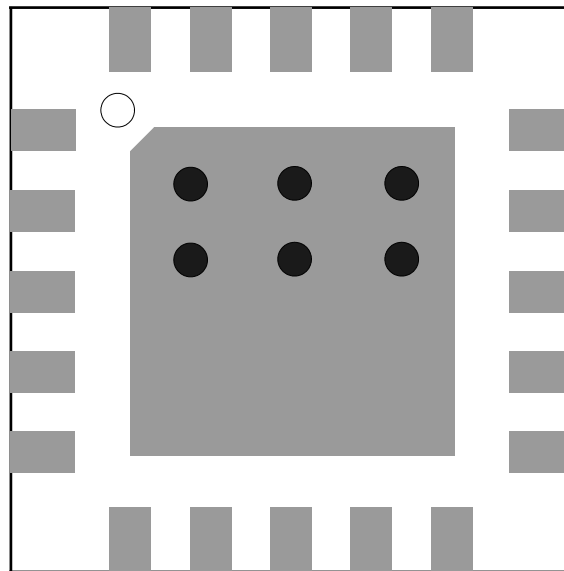


Dimensions of Package

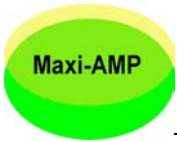


Dimension in mm (Top View)

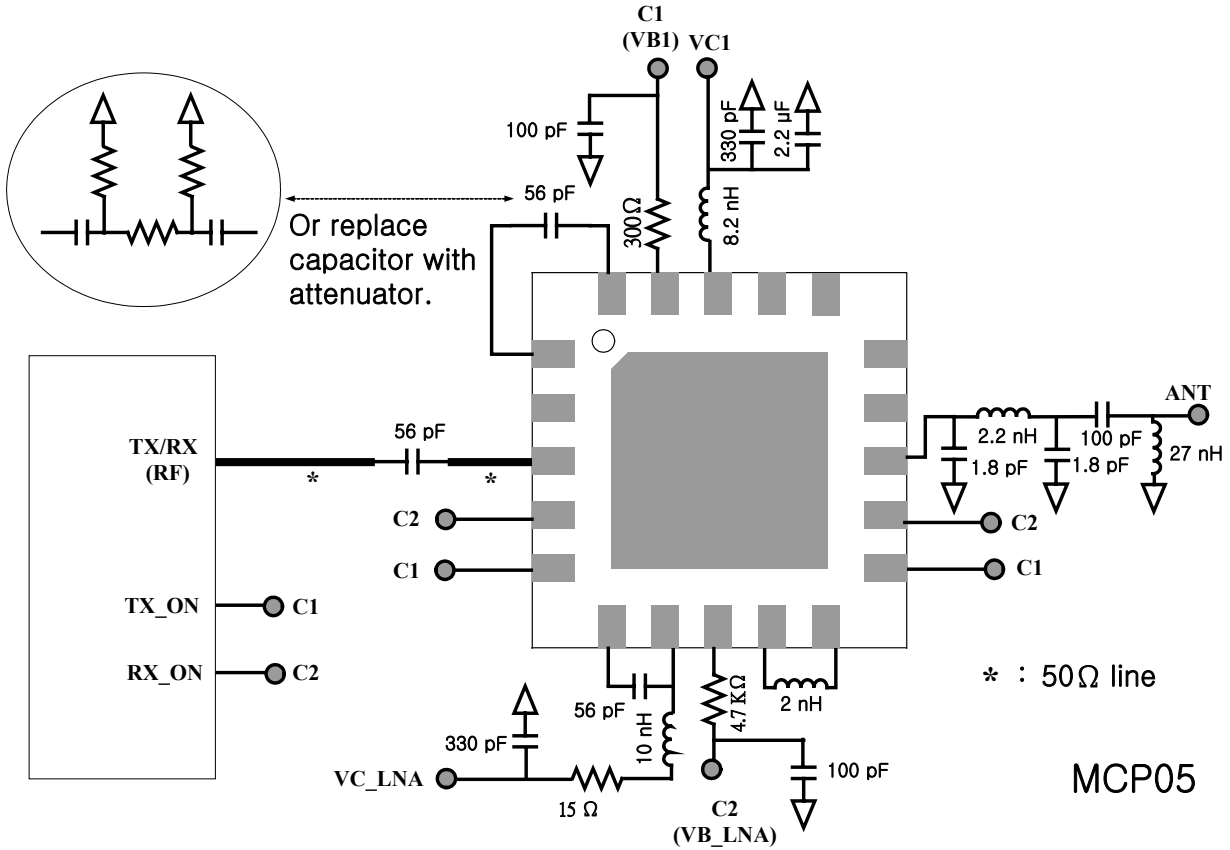
Land Pattern



(Top View)



Application Circuit



On the above application circuit, ports VC1 and VC_LNA are connected to fixed bias, such as 3.3V. Ports C1, C2, VB_LNA, and VB1 are used as on/off control as well as bias control for PA and LNA. Usually, C1, and VB1 are connected to TX_ON, C2 and VB_LNA are connected to RX_ON. Both TX_ON and RX_ON are digital control signals that are provided by transceiver or base-band chip. When TX_ON outputs “high”, it indicates the system is in the transmitting mode. When RX_ON outputs “high”, it indicates the system is in the receiving mode. Resistors 300Ω and 4.7KΩ are for TX_ON and RX_ON that are operated at 3.3V. Their values need to be changed if different voltage level of TX_ON and RX_ON (such as 3.1V) are used. You may contact us for proper resistor’s values.

MCP03 and MCP05 are pin-to-pin compatible. If direct replacement of MCP05 by MCP03 is desired, please layout the PCB based on MCP03’s data sheet.

** No liability is assumed by Maxi-AMP Incorporation for use any information contained in this document, or for infringement of any patent rights of a third party, which may result from such use.

Maxi-AMP INC (民瑞科技股份有限公司) Innovation Incubation Center, Rm.3A19, No.1, Sec. 1, Syuecheng Rd., Dashu Township, Kaohsiung County, 840, Taiwan, R.O.C. www.maxiamp.com

Maxi-AMP incorporation reserves the right of changing the specifications without any prior notice.

This device is ESD sensitive.

TEL : 0983001600, 0922305109, 0932698745, (07)343-1110

FAX : (07)657-9714 , Taiwan, R.O.C.

MCP05_r1, Preliminary data sheet, March/2011

Page5/5