

Description

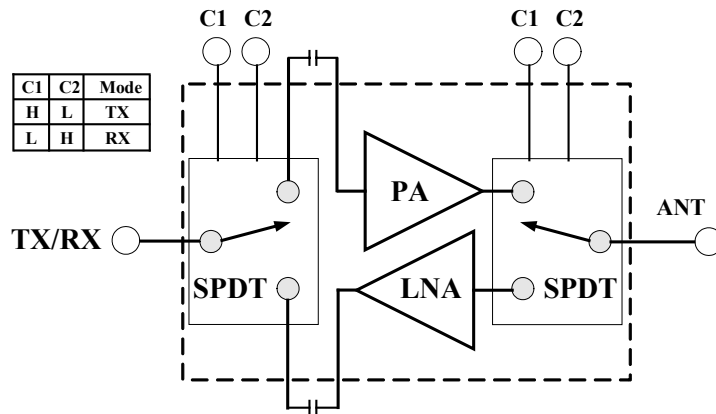
The MCP03 contains a power amplifier (PA), a low noise amplifier (LNA), and two SPDT switch. It is a 20-pins IC by 4×4mm²-QFN package. RF input and output impedance of MCP03 are 50Ω matched. Therefore, precious real estate of circuit board is saved when MCP03 is used. Besides, there is one more precious advantage of MCP03. 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 low consumption current is critical in a different wireless communication market, the MCP03 in the original circuit board can be replaced by MCP05 directly without modification of the original PCB. With the use of MCP03, it will offer convenience, flexibility and cost saving.

Features

- RF input power of PA is adjustable for maximum linear performance of PA.
- 19.1dBm P1dB and 22dB gain for transmitting RF signal.
- 2.6dB NF and 12dB 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	160 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

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

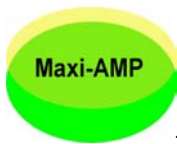
This device is ESD sensitive.

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

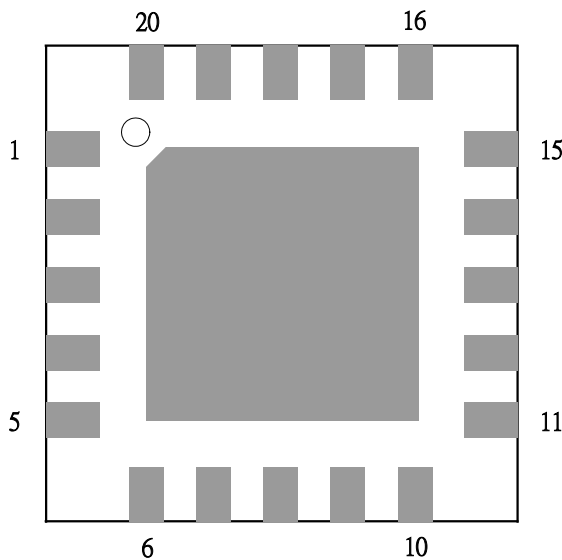
FAX : (07)657-9714 , Taiwan, R.O.C.

MCP03_r3, Preliminary data sheet, March/2010

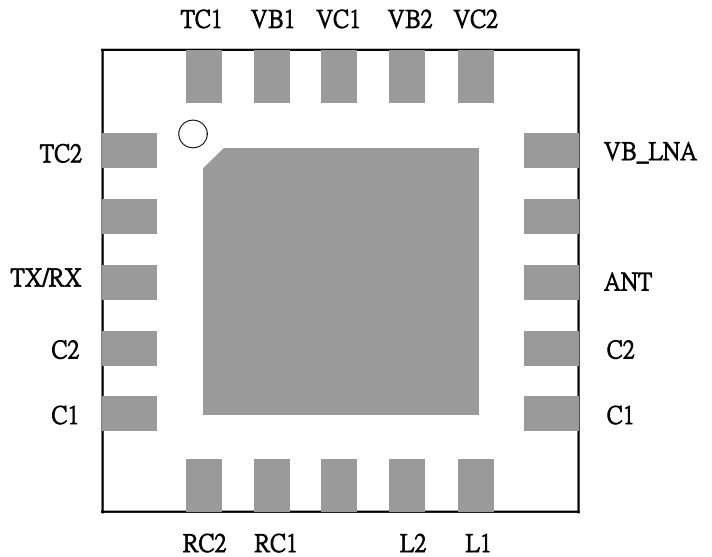
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Pin Assignment

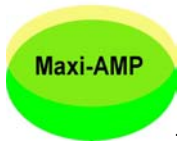


Top View



Top View

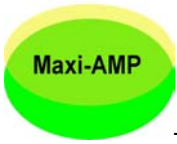
Pin No.	Name	Function
1	TC2	Connection pin for DC-blocking capacitor or attenuator.
3	TX/RX	RF power I/O port for transceiver.
4	C2	Digital control voltage input of switch.
5	C1	Digital control voltage input of switch.
6	RC2	Connection pin for DC-blocking capacitor.
7	RC1	Bias-voltage input for the collector of LNA.
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
15	VB_LNA	Bias-voltage input for the base of LNA
16	VC2	Bias-voltage input for the 2 nd -stage's collector of PA
17	VB2	Bias-voltage input for the 2 nd -stage's base of PA
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.



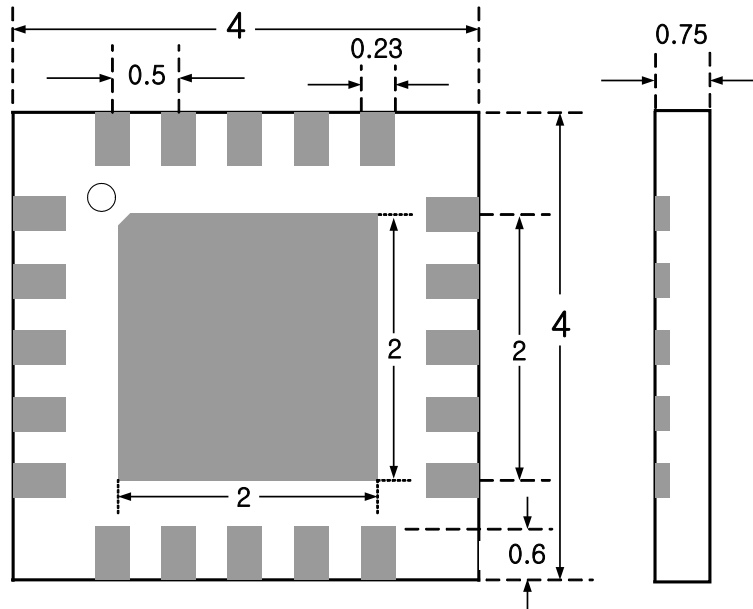
Electrical Characteristics (Temperature=25°C)

Parameter	Symbol	Description	Min.	Typical	Max.	Units
Frequency Range	Freq		2.4	2.45	2.5	GHz
DC Supply Voltage	V _{CC}		2.0	3.3	3.6	V
Collector's Supply Current (PA)	I _{PA_C}	Total collector currents		65		mA
Collector's DC Supply Current (LNA)	I _{LNA_C}			7		mA
Base's DC Supply Current (PA)	I _{PA_B}				1	mA
Base's DC Supply Current (LNA)	I _{LNB_B}				0.1	mA
Input Voltage of C1	C1	'1' ranges from 2.2V to V _{CC} '0' ranges from 0V to 0.2V.	0		V _{CC}	V
Input Voltage of C2	C2	'1' ranges from 2.2V to V _{CC} '0' ranges from 0V to 0.2V.	0		V _{CC}	V
PA's Small-Signal Power Gain	G _{PA}	C1='1', C2='0' Including 1dB loss by switch		22		dB
LNA's Small-Signal Power Gain	G _{LNA}	C1='0', C2='1' Including 1dB loss by switch		12		dB
Gain Flatness (PA)				1.2		dB
Gain Flatness (LNA)				1		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		19.1		dBm
P1dB (LNA)	P1dB _L			2.6		dBm
2 nd Harmonics (PA)	2fo	18dBm RF power at pin ANT		-60		dBc
3 rd Harmonics (PA)	3fo	18dBm RF power at pin ANT		-60		dBc
Input Return Loss of PA	S11 _{TX/RX}	Small-signal, C1='1', C2='0'		-19		dB
Input Return Loss of LNA	S11 _{ANT}	Small-signal, C1='0', C2='1'		-10		dB
Output Return Loss of LNA	S22 _{TX/RX}	Small-signal, C1='0', C2='1'		-12		dB

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

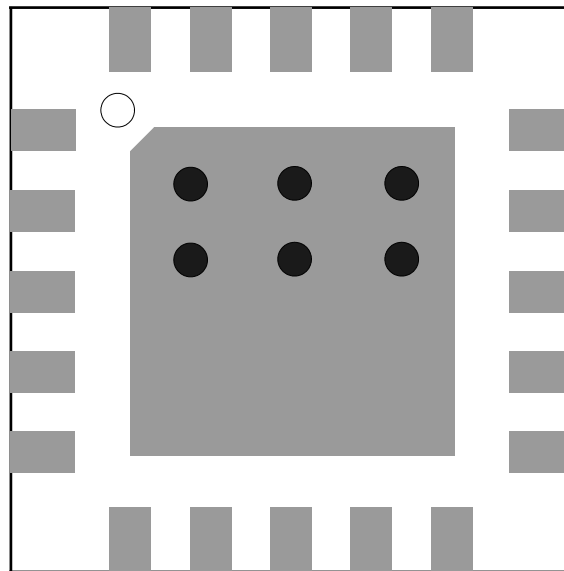


Dimensions of Package

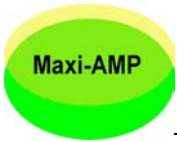


Dimension in mm (Top View)

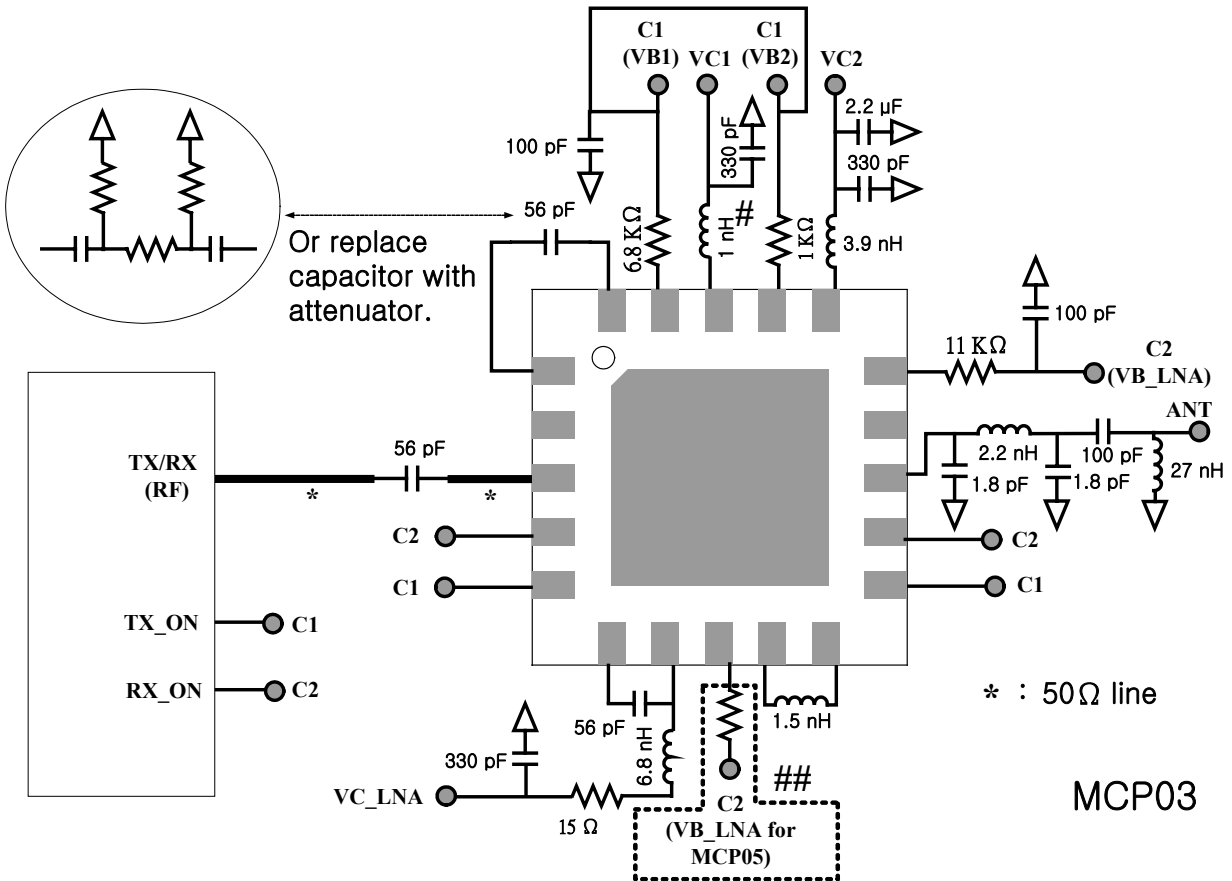
Land Pattern



(Top View)



Application Circuit



The connection length from the edge of 330 pF to the edge of pin-18 must be less than 150mil.

Must be used in layout of MCP03 if feature of pin-to-pin compatible with MCP05 is desired.

On the above application circuit, ports VC1, VC2, and VC_LNA are connected to fixed bias, such as 3.3V. Ports C1, C2, VB_LNA, VB1 and VB2 are used as on/off control as well as bias control for PA and LNA. Usually, C1, VB1, and VB2 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 1KΩ, 6.8KΩ and 11KΩ 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 2.7V) are used. You may contact us for proper resistor’s values.

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