

Description

The CMM-9209 module is a miniaturised long range 2.4GHz transceiver module based on EM Micro-electronic's RF transceiver EM9209. The module is highly optimized for long-range wireless application requiring ultra low power consumption and short time-to-market. It offers a plug and play solution for any EM9209 application without any additional hardware nor RF layout. Built in with a PCB strip antenna, this small sized, low cost module provides an ideal solution to wireless 2.4GHz license-free application worldwide.

The EM9209 is a low-voltage 2.4GHz transceiver IC with built-in link-layer logic permitting proprietary wireless links in the license-free 2.400 ... 2.4835 GHz ISM band. This solution is ideal for battery operated wireless applications such as wireless sensors and control, toys, human interface devices, security and metering networks.

1.1 Features

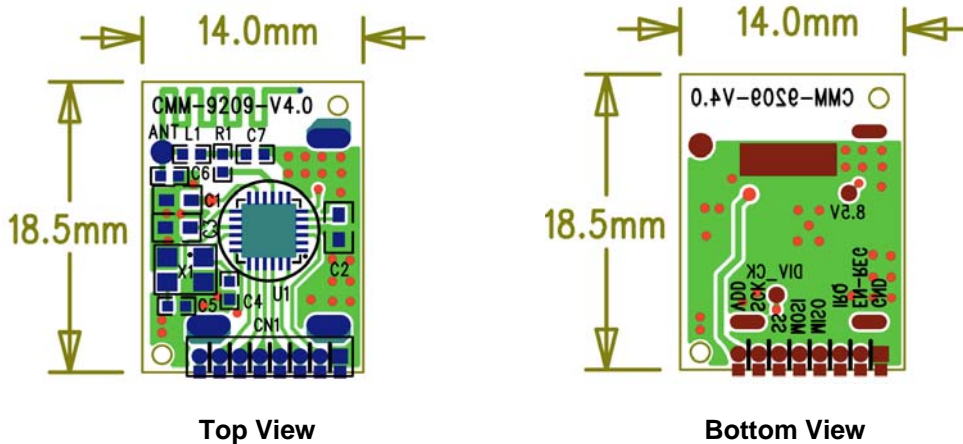
- Fully integrated 2.4 GHz transceiver (Chip on Board)
- Operating voltage 1.9V ~ 3.6V
- Mini-sized (18.5mm x 14mm)
- Programmable RF output level (-10 dBm to +10 dBm) via software control
- Low current consumption
(1uA at power down mode, 8.2 mA RX (high sensitivity mode), 11.2 mA in TX mode (-1 dBm))
- No Tuning necessary
- Programmable data rate (3kbps, 6 kbps, 12 kbps)
- Reaches max 500m in open space line of sight
- FSK modulation
- SPI interface to host controller

1.2 Module Dimension & Pin Assignments

Pin Number	Pin Name	Pin Description
1	GND	Ground Connection
2	EN_REG	Master Chip Enable Signal
3	IRQ	Interrupt Output for external host Controller
4	MISO	SPI Data Output
5	MOSI	SPI Data Input
6	SS	SPI Slave Select(Active High)
7	SCK	SPI Clock Input
8	VDD	Positive Power Supply

CMM-9209-V4.0 Long Range 2.4GHz Transceiver Module

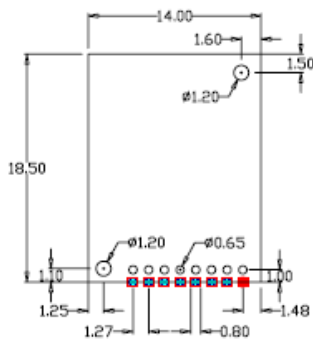
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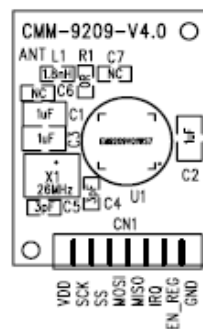
*** Connection pin pitch : 1.27mm

CMM-9209-V4.0/4.0P Module Thickness (excluding pin header connectors, excluding shielding) = 2.1mm max.
CMM-9209-V4.0F/4.0X Module Thickness (excluding pin header connectors, including shielding) = 3.3mm max.

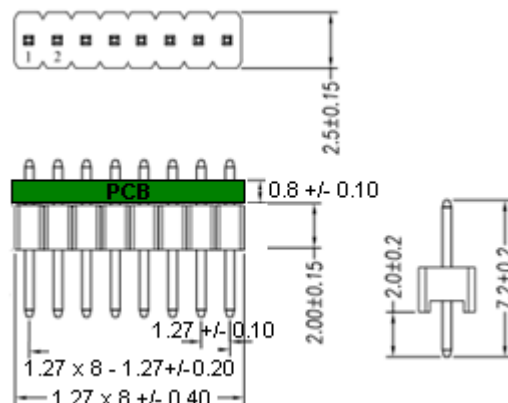
Module Dimensions



Pin Definition



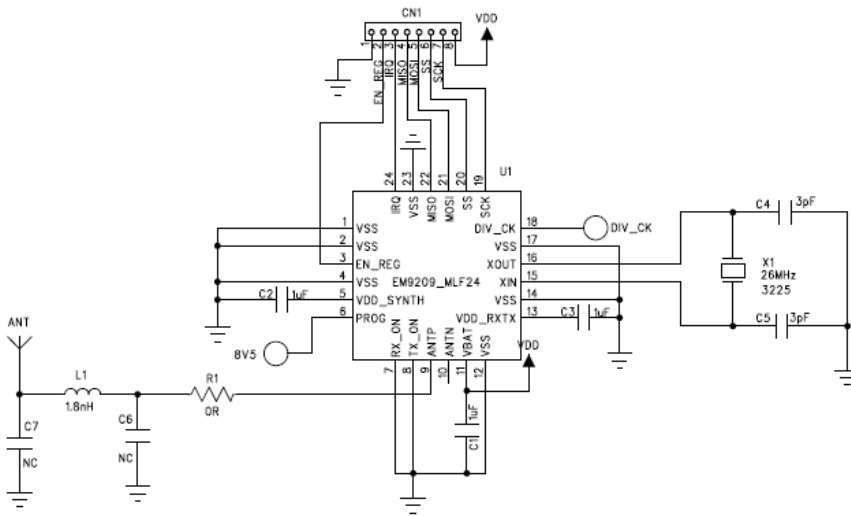
Pin Connection Dimension (applicable only for CMM-9209-V4.0P/4.0X)



CMM-9209-V4.0 Long Range 2.4GHz Transceiver Module



1.3 Module Reference Circuit diagram



1.4 Module Electrical Specifications

Specification	CMM-9209-V4.0/4.0P/4.0F/4.0X																												
Voltae Range	1.9V to 3.6V																												
Frequency Range	2.400 to 2.480 GHz																												
Modulation	FSK																												
On-air data rate configurable	3 kbps, 6 kbps, 12 kbps																												
Maximum Allowable Data bytes in payload per transmission	Data rate (Kbps)	Preamble (byte)	Address (byte)	header (byte)	Payload (byte)																								
	3	2	3	1	8																								
	6	2	3	1	31																								
	12	2	3	1	31																								
Current Consumption (Vcc = 2.5V)																													
- RX mode	8.2mA (High sensitivity mode)																												
- TX mode	varies according to output power (see below)																												
- Standby mode	140 uA (typ.)																												
- Power-down mode	1uA																												
Programmable output power vs TX current consumption	<table border="1"> <thead> <tr> <th>Output Power [dBm]</th> <th>PA Power efficiency [%]</th> <th>DC total Current Consumption [mA]</th> </tr> </thead> <tbody> <tr> <td>+10</td> <td>27.3</td> <td>36.3</td> </tr> <tr> <td>+9.3</td> <td>29.7</td> <td>29.5</td> </tr> <tr> <td>+6.6</td> <td>24.2</td> <td>20,7</td> </tr> <tr> <td>+2.7</td> <td>15.8</td> <td>14.4</td> </tr> <tr> <td>-1.1</td> <td>9.4</td> <td>11.2</td> </tr> <tr> <td>-3.1</td> <td>7</td> <td>10.2</td> </tr> <tr> <td>-10.4</td> <td>1.9</td> <td>8.1</td> </tr> </tbody> </table>					Output Power [dBm]	PA Power efficiency [%]	DC total Current Consumption [mA]	+10	27.3	36.3	+9.3	29.7	29.5	+6.6	24.2	20,7	+2.7	15.8	14.4	-1.1	9.4	11.2	-3.1	7	10.2	-10.4	1.9	8.1
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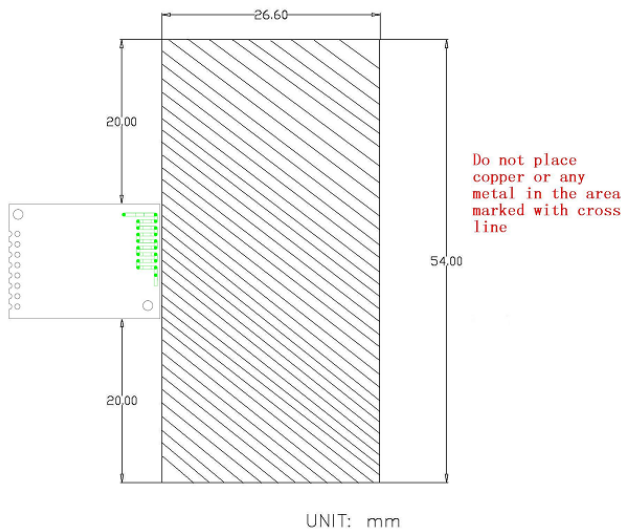
CMM-9209-V4.0 Long Range 2.4GHz Transceiver Module



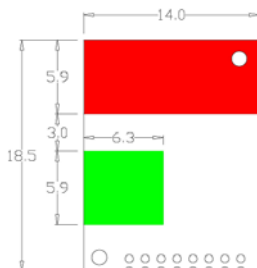
Module Sensitivity	
RF setup time (Standby <-> TX/RX)	Max 200 us

1.5 Layout Recommendations

Around module:



Under Module:



- : Clearance area (no routing, components or copper plane)
- : Ground plane recommended

CMM-9209-V4.0

Long Range 2.4GHz Transceiver Module

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2. Ordering information

Module Part Number	Module Assembly process type	Pin Headers on Module	Shield on Module	Qualification Cert.	Packaging
CMM-9209-V4.0	Hand soldering	X	X	FCC, CE pre-scan passed	In Trays
CMM-9209-V4.0F	SMT + reflow	X	√	FCC, CE Pending	Tape & Reel
CMM-9209-V4.0P	Plug-in	√	X	FCC, CE pre-scan passed	In Trays
CMM-9209-V4.0X	Plug-in	√	√	FCC, CE Pending	In Trays

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