Summary

Wireless communications technologies have been commonplace in the home and industry for many years. Recently, consumer, appliance, industrial and metering, applications have driven a new demand for a standardized, low power, low data rate, wireless technology that supports remote sensor and command/control applications. The IEEE 802.15.4 standard was developed to address this need.

The MRF24J40MA is a 2.4 GHz IEEE 802.15.4™ transceiver module developed specifically for Microchip PIC® microcontroller customers. This new transceiver module eliminates the complicated radio frequency and antenna design challenges and is compatible with hundreds of PIC microcontrollers. The MRF24J40MA is FCC, ETSI and IC certified which eliminates risk, cost and enables quick time-to-market. Connect via a simple 4-wire SPI interface and the system is wirelessly enabled.

Features

- IEEE 802.15.4™ compliant RF transceiver module
- Small Size: 0.7” x 1.1” (17.8 mm x 27.9 mm), surface mountable
- Integrated crystal, internal voltage regulator, matching circuitry and PCB antenna
- Easy integration into final product – minimize product development, quicker time to market
- Radio regulation certification for United States (FCC), Canada (IC) and Europe (ETSI)
- Compatible with Microchip microcontroller families (PIC16F, PIC18F, PIC24F/H, dsPIC33 and PIC32)
- Up to 400 meters range (outdoor, line-of-sight)

RF/Analog Features

- ISM band 2.4 GHz operation
- -94 dBm Rx sensitivity
- +0 dBm Tx output power
- Integrated low phase noise VCO, frequency synthesizer and PLL loop filter
- Digital VCO and filter calibration
- High receiver and RSSI dynamic range

MAC/Baseband Features

- Hardware CSMA-CA mechanism, automatic ACK response and FCS check
- Independent beacon, transmit and GTS FIFO
- Hardware security engine (AES-128) with CTR, CCM and CBC-MAC modes
- Supports all CCA modes and RSSI/LQI
- Automatic packet retransmit capability
- Supports in-line or stand-alone modes for both encryption and decryption
- Choice of license free wireless protocol stacks:
  - ZigBee – Mesh/Star networks and interoperability
  - MiWi™ – Mesh/Star networks
  - MiWi P2P – Star and P2P networks

MRF24J40MA 2.4 GHz 802.15.4™/ZigBee® Transceiver Module

Taking the RF Out of Wireless
Additional Information

- Wireless Design Center: [www.microchip.com/wireless](http://www.microchip.com/wireless)
- DS70329, MRF24J40MA Data Sheet
- AN1066, MiWi™ Wireless Networking Protocol Stack
- AN1192, MRF24J40 Radio Driver
- AN1204, Microchip MiWi P2P Wireless Protocol
- AN1232, Microchip ZigBee 2006 Residential Stack Protocol

Sample/Purchasing Information

- Online Sampling: [sample.microchip.com](http://sample.microchip.com)
- Online Purchasing: [www.microchipdirect.com](http://www.microchipdirect.com)

### 802.15.4/ZigBee® Transceivers

<table>
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<tr>
<td>MRF24J40</td>
<td>n/a</td>
<td>2.4 GHz</td>
<td>-95 dBm</td>
<td>0 dBm</td>
<td>18 ma</td>
<td>22 ma</td>
<td>4 wire SPI</td>
<td>yes</td>
<td>AES-128</td>
<td>External</td>
<td>2.4V-3.6V</td>
<td>6x6 QFN</td>
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<td>18 ma</td>
<td>23 ma</td>
<td>4 wire SPI</td>
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<td>AES-128</td>
<td>PCB</td>
<td>2.4V-3.6V</td>
<td>PCB Module</td>
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<td>–</td>
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<td>Chip</td>
<td>2.4V-3.6V</td>
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<td>20 dBm</td>
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<td>External</td>
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<td>PCB Module</td>
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*Contact Microchip Sales for availability.

### Development Tools from Microchip

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<th>Part Number</th>
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<tr>
<td>DM163027-5</td>
<td>PICDEM™ Z MRF24J40MA 2.4 GHz Demo Kit</td>
<td>802.15.4/ZigBee Starter Kit</td>
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<td>DM183023</td>
<td>ZENA™ Network Analyzer</td>
<td>802.15.4/ZigBee Sniffer and Network Analyzer</td>
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<td>AC163027-4</td>
<td>PICDEM™ Z MRF24J40 2.4 GHz Daughter Card</td>
<td>802.15.4/ ZigBee RF Board for the PICDEM Z and Explorer Development Kits</td>
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<td>AC163028</td>
<td>MRF24J40MA PICDEM™ Z 2.4 GHz RF Board</td>
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<td>AC164134</td>
<td>MRF24J40MA PICtail™ Plus 2.4 GHz RF Card</td>
<td>802.15.4/ZigBee RF Board for the Explorer 16 Development Kit – Uses FCC Certified MRF24J40MA Module</td>
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Visit our web site for additional product information and to locate your local sales office.

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