Product summary

**BMD-34 series**

Stand-alone Bluetooth 5 low energy modules

**Full Bluetooth 5, Thread, and Zigbee (IEEE 802.15.4) solution**
- Powerful, ultra-efficient 64 MHz 32-bit Arm® Cortex®-M4 with FPU, 1 MB Flash, and 256 kB RAM
- Bluetooth 5 long range support (Coded PHY)
- USB 2.0 and Built-in DC-DC converter for direct USB / Li-Ion power
- Hardware cryptographic unit for secure boot and over-the-air updates
- Optional PA/LNA for extreme range

**Product description**

The BMD-34 series are advanced, highly flexible, ultra-low-power multiprotocol modules that enable concurrent Bluetooth 5, Thread and Zigbee (IEEE 802.15.4) connectivity for portable, extremely low power embedded systems, offering the greatest radio range and coverage. With an Arm® Cortex®-M4 with FPU, integrated 2.4 GHz transceiver, an extended range of interfaces and embedded hardware cryptographic engine, the BMD-34 modules provide a complete RF solution allowing faster time to market with reduced development costs and advanced security capabilities. Providing full use of the Nordic nRF52840’s capabilities and peripherals, the BMD-34 can power the most demanding applications, all while simplifying designs and reducing BOM costs.

The BMD-34 is an ideal solution for designs that require Bluetooth 5 features or 802.15.4 based networking for Thread and Zigbee. The Bluetooth 5 long range feature provides extended range, and the optional PA/LNA boost the link budget even further, bringing range and coverage to the maximum. Built in USB and 5.5 V compatible DC-DC supply reduces design complexity and BOM cost, while expanding possible applications. The modules are certified for Europe, US, Canada, and Australia/New Zealand, including antenna alternatives for either internal PCB antenna, or a U.FL antenna connector for external antenna. BMD-34 designs are footprint compatible with a range of other BMD-modules, thus providing flexibility for tiered product lineups.

**Grade**
- Automotive
- Professional
- Standard

**Radio**
- Chip inside: nRF52840
- Bluetooth qualification: v5.0, v5.0, v5.0
- Bluetooth low energy: • • •
- Thread / Zigbee: • • •
- Bluetooth output power EIRP [dBm]: 7, 10, 18
- Max range [meters]: 500, 750, 1000
- NFC: • • •
- Antenna type (see footnotes): pcb, U.FL, U.FL

**Application software**
- Open CPU for embedded applications: • • •

**Interfaces**
- UART: • • •
- SPI: • • •
- I2C: • • •
- I2S: • • •
- USB: • • •
- PDM and PWM: • • •
- GPIO pins: 48, 48, 44
- AD converters [number of bits]: 12, 12, 12

**Features**
- MCU (see footnotes): M4F, M4F, M4F
- RAM [kB]: 256, 256, 256
- Flash [kB]: 1024, 1024, 1024
- Simultaneous GATT server and client: 1.4, 1.4, 1.4
- Maximum Bluetooth connections: 20, 20, 20
- Secure boot: • • •
- Bluetooth mesh: • • •
- FOTA: • • •

 pcb = Internal PCB antenna
 U.FL = U.FL antenna connector
 M4F = 64 MHz Arm® Cortex®-M4 with FPU

* = Feature enabled by HW. The actual support depends on the open CPU application SW.
BMD-34 series

**Features**

- **Bluetooth**: v5.0 (Bluetooth low energy)
- **NFC**: NFC-A tag support
- **Range**
  - BMD-340: 500 m
  - BMD-341: 750 m
  - BMD-345: 1000 m
- **Max. radiated output power (EIRP)**
  - BMD-340: 7 dBm
  - BMD-341: 10 dBm
  - BMD-345: 18 dBm
- **Conducted sensitivity (Bluetooth mode)**
  - BMD-340, -341: –96 dBm (1 Mbit/s)
    - –103 dBm (125 Kbit/s)
  - BMD-345: –102 dBm (1 Mbit/s)
    - –107 dBm (125 kbit/s)
- **Bluetooth address**: Unique public Bluetooth address provided (in flash, on label)
- **Bluetooth operating modes**
  - Simultaneous central and peripheral roles
  - LE 2M PHY (2 Mbps)
  - LE 1M PHY (1 Mbps)
  - Coded PHY 500 kbps (long range)
  - Coded PHY 125 kbps (long range)
  - Advertising Extensions
  - LE Data Length Extension
  - Channel Selection Algorithm #2
- **Antenna**
  - BMD-340: Integrated PCB antenna
  - BMD-341, -345: U.FL antenna connector
- **Development environment**
  - Nordic SDK (including Bluetooth Mesh, HomeKit®, AirFuel®, IoT)
  - Customers develop and embed their own application on top of the Bluetooth stack in the BMD-34 modules (open CPU concept)
- **Security**
  - Arm® TrustZone® CryptoCell™ cryptographic unit
  - Secure boot
  - Secure Simple Pairing
  - 128-bit AES encryption
  - Bluetooth low energy secure connections

**Interaces and peripherals**

<table>
<thead>
<tr>
<th>Interface</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UART</td>
<td>2 blocks. 1200 baud to 1 M baud, parity, CTS and RTS support</td>
</tr>
<tr>
<td>SPI Master</td>
<td>4 blocks. 125 kHz to 8 MHz clock rates</td>
</tr>
<tr>
<td>SPI Slave</td>
<td>3 blocks. 125 kHz to 8 MHz clock rates</td>
</tr>
<tr>
<td>QSPI Master</td>
<td>1 block. Max 32 MHz. XIP support</td>
</tr>
<tr>
<td>TWI (I2C) Master</td>
<td>2 blocks. 100 kHz to 400 kHz clock rates</td>
</tr>
<tr>
<td>TWI (I2C) Slave</td>
<td>2 blocks. 100 kHz to 400 kHz clock rates</td>
</tr>
<tr>
<td>NFC</td>
<td>NFC-A, 13.56 MHz, 106 kbps, wake-on-field</td>
</tr>
<tr>
<td>PDM</td>
<td>1 block. 2 microphones (left/right) 16 kHz sample rate, 16-bit</td>
</tr>
<tr>
<td>I2S</td>
<td>1 block. Master and slave, bidirectional</td>
</tr>
<tr>
<td>ADC</td>
<td>8-ch, 12-bit @ 200 kspss</td>
</tr>
<tr>
<td>PWM</td>
<td>4 blocks, 4 channels each</td>
</tr>
<tr>
<td>LP Comparator</td>
<td>8-ch, VCC, int and ext ref, 15 levels</td>
</tr>
<tr>
<td>GP Comparator</td>
<td>8-ch, VCC and internal ref, 64 levels</td>
</tr>
<tr>
<td>Temp. Sensor</td>
<td>Internal, –40 °C to 85 °C, +/-4 °C, 0.25 °C resolution</td>
</tr>
<tr>
<td>GPIO</td>
<td>BMD-340, -341: 48; BMD-345: 44</td>
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<tr>
<td></td>
<td>Input High: 0.7 x VCC; Input Low: 0.3 x VCC; 13 KΩ pull-up/pull-down</td>
</tr>
<tr>
<td>Timers</td>
<td>5 x 32-bit and 3 x 24-bit RTC with 12-bit prescaler, watchdog</td>
</tr>
<tr>
<td>USB peripheral</td>
<td>1 block. USB 2.0 full speed, 12 Mbps. 2 control, 14 bulk/interrupt endpoints</td>
</tr>
</tbody>
</table>

* Not all simultaneously

**Further information**

For contact information, see www.u-blox.com/contact-us.
For more product details and ordering information, see the product data sheet.

**Package**

- **Dimensions**
  - BMD-340, -341: 10.2 × 15.0 × 1.9 mm
  - BMD-345: 10.2 × 15.0 × 2.0 mm
- **Weight**: < 1.0 g
- **Mounting**: Machine mountable
  - Solder pins

**Environmental data, quality & reliability**

- **Operating temperature**: –40 °C to +85 °C
- **Storage temperature**: –40 °C to +125 °C
- **Humidity**: RH 5 – 90% non-condensing
- **RoHS**: RoHS 3 compliant

**Electrical data**

- **Power supply**
  - BMD-340, -341: 1.7 VDC to 5.5 VDC
  - BMD-345: 2.0 VDC to 3.6 VDC
- **Power consumption in Bluetooth low energy mode for**
  - TX only @ max TX power: 14.8 mA @ 3 V
  - Off, no RAM retention: 0.4 μA @ 3 V
  - On, no RAM retention: 0.97 μA @ 3 V
- **Power consumption in Bluetooth low energy mode for**
  - TX only @ max TX power: 51 mA @ 3 V
  - Off, no RAM retention: 0.7 μA @ 3 V
  - On, no RAM retention: 1.3 μA @ 3 V

**Certifications and approvals**

- **Type approvals**
  - Europe (ETSI RED); US (FCC/CFR 47 part 15 unlicensed modular transmitter approval);
  - Canada (ISED RSS); Australia and New Zealand (RCM);
  - Japan (MIC) - only for BMD-340
- **Health and safety**: EN 62479, EN 62368-1
- **Bluetooth qualification**: v5.0 (Bluetooth low energy), Bluetooth RF PHY

**Support products**

- BMD-340-Eval: Evaluation kit for BMD-340 with open CPU and internal PCB antenna
- BMD-341-Eval: Evaluation kit for BMD-341 with open CPU and U.FL antenna connector
- BMD-345-Eval: Evaluation kit for BMD-345 with open CPU, PA/LNA, and U.FL antenna connector

**Product variants**

- BMD-340 With internal PCB antenna, open CPU
- BMD-341 With U.FL antenna connector, open CPU
- BMD-345 With U.FL antenna connector, PA/LNA, open CPU

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