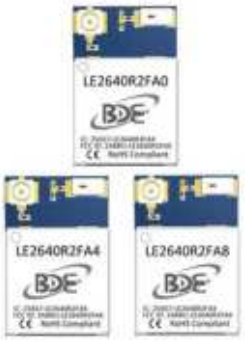
General Description



LE2640R2FA is a Bluetooth 5.1 single-mode compliant Bluetooth low energy module targeted at low power sensors and PC/Phone accessories.
LE2640R2FA0/LE2640R2FA4/LE2640R2FA8 corresponds to three flash modules of different sizes.
LE2640R2FA highly integrates Bluetooth Low Energy radio, stack, profiles and applications in a SoC, without the need of using an external MCU. The module also offers flexible hardware interfaces and a sensor controller for the sensor application.

It enables ultra-low power connectivity and data transfer for the applications that are sensitive to power consumption, size and cost.

Key Features

- Bluetooth 5.1 single-mode compliant
- Support master and slave modes, 8 simultaneous connections in master mode
- Integrated Bluetooth Low Energy stack, no external MCU needed
- RF performance
  - TX power: -21dBm to 5dBm
  - RX sensitivity: up to -97dBm
- Communication range: 250 meters (LOS) – Long Range Mode
- Ultra low power ARM Cortex-M3 microcontroller core
- Antenna: Chip antenna or U.FL connector
- Size: 16.9 mm x 11 mm x 1.5 mm (Without Shielding)
  16.9 mm x 11 mm x 2.1 mm (With Shielding)
- Ultra low power consumption:
  - Shutdown: 100nA (Wake up on external events)
  - Standby: 1.5uA (RTC running and RAM/CPU retention)

Applications

- Medical devices
- Sports and fitness equipment
- Home electronics

- Mobile and PC accessories
- Industry automation

Device Family

There are different flavors in LE2640R2 series with two chip selections of CC2640R2F and CC2640R2L from Taxes Instruments. CC2640R2F provides a sensor controller while CC2640R2L doesn't. Also this series provides different choices for external flash on module, no external flash, 4Mbit external flash or 8Mbit external flash. There are antenna version and no-antenna version.
In antenna version, there is chip antenna or U.FL connector for external antenna. No-antenna version will have more compact dimension which is 11.6mm x 11mm x 2.1mm.

Table 0-1. LE2640R2 Device Family

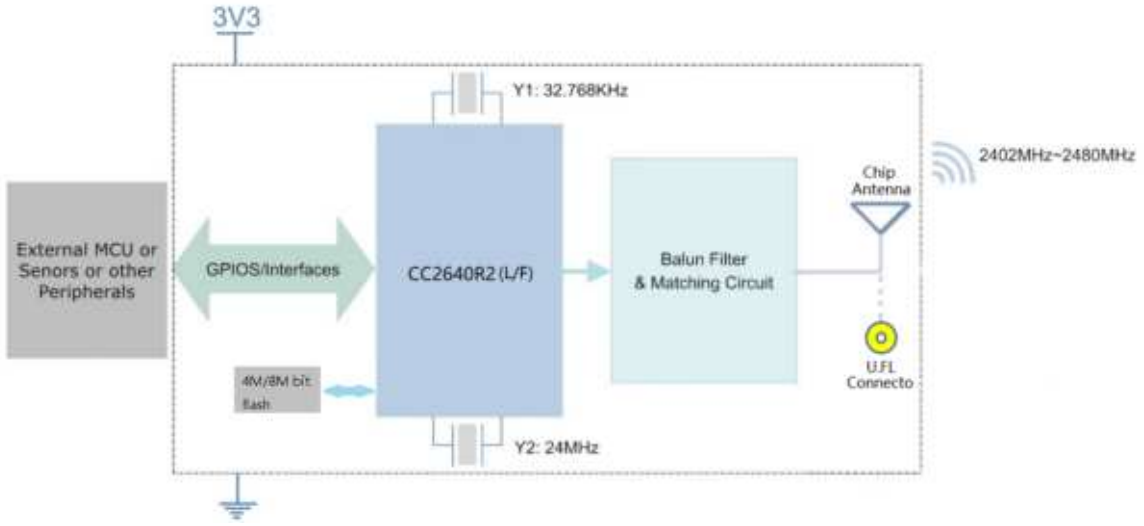
Part Number	Chipset	Description	Size (mm)	Package
LE2640R2FA0	CC2640R2F	Without external flash, with chip antenna	16.9×11×2.1	SMD-25
LE2640R2FA4	CC2640R2F	With 4Mbit external flash, with chip antenna	16.9×11×2.1	SMD-25
LE2640R2FA8	CC2640R2F	With 8Mbit external flash, with chip antenna	16.9×11×2.1	SMD-25
LE2640R2FAU0	CC2640R2F	Without external flash, with U.FL connector for external antenna	16.9×11×2.1	SMD-25
LE2640R2FAU4	CC2640R2F	With 4Mbit external flash, with U.FL connector for external antenna	16.9×11×2.1	SMD-25
LE2640R2FAU8	CC2640R2F	With 8Mbit external flash, with U.FL connector for external antenna	16.9×11×2.1	SMD-25
LE2640R2FN0	CC2640R2F	Without external flash, without antenna	11.6×11×2.1	SMD-25
LE2640R2F4	CC2640R2F	With 4Mbit external flash, without antenna	11.6×11×2.1	SMD-25
LE2640R2FN8	CC2640R2F	With 8Mbit external flash, without antenna	11.6×11×2.1	SMD-25
LE2640R2LA0	CC2640R2L	Without external flash, with chip antenna	16.9×11×2.1	SMD-25
LE2640R2LA4	CC2640R2L	With 4Mbit external flash, with chip antenna	16.9×11×2.1	SMD-25
LE2640R2LA8	CC2640R2L	With 8Mbit external flash, with chip antenna	16.9×11×2.1	SMD-25
LE2640R2LAU0	CC2640R2L	Without external flash, with U.FL connector for external antenna	16.9×11×2.1	SMD-25
LE2640R2LAU4	CC2640R2L	With 4Mbit external flash, with U.FL connector for external antenna	16.9×11×2.1	SMD-25
LE2640R2LAU8	CC2640R2L	With 8Mbit external flash, with U.FL connector for external antenna	16.9×11×2.1	SMD-25
LE2640R2LN0	CC2640R2L	Without external flash, without antenna	11.6×11×2.1	SMD-25
LE2640R2LN4	CC2640R2L	With 4Mbit external flash, without antenna	11.6×11×2.1	SMD-25
LE2640R2LN8	CC2640R2L	With 8Mbit external flash, without antenna	11.6×11×2.1	SMD-25

Contents

General Description 1
Key Features....1
Applications 1
Device Family 2
Contents....3
1. References....4
2. Block Diagram 5
3. Pinout....6
3.1 Pin Attributes 6
4. Electrical Characteristics 8
4.1 Absolute maximum rating....8
4.2 Recommended operating conditions....8
5. PCB Layout Guidelines 9
6.1 Dimensions....10
6.2 PCB Footprint 10
7. Typical Solder Reflow Profile....11
8. Package Information 11
9. Revision History 12

1. References

[1] CC2640R2F resources: https://www.ti.com/product/CC2640R2F
[2] CC2640R2L resources: https://www.ti.com/product/CC2640R2L



2. Block Diagram

Figure 2-1. LE2640R2FA/LE2640R2LA Module Block Diagram

3. Pinout

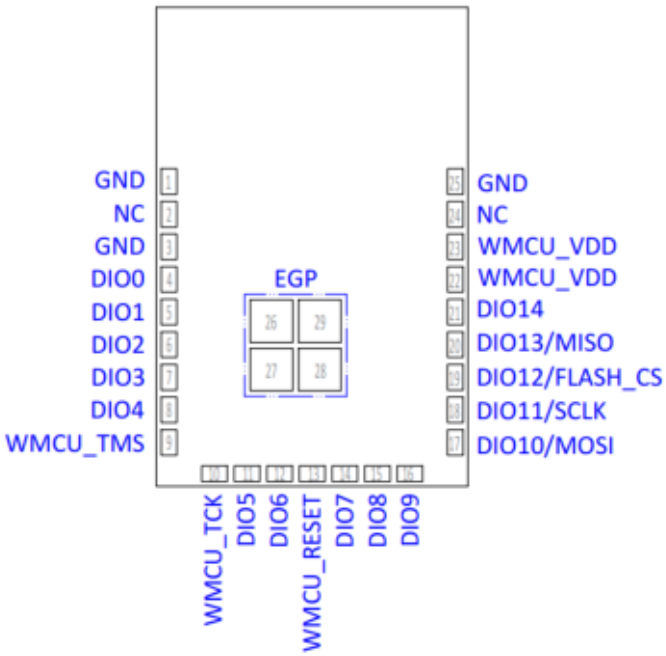


Figure 3-1. Pin Diagram (Top View)

3.1 Pin Attributes

Table 3-1. Pin Description

Pin Number	Pin Name	Definitions
1	GND	Power Ground
2	NC	Not Connected
3	GND	Power Ground
4	DIO0	GPIO
5	DIO1	GPIO
6	DIO2	GPIO, high-drive capability
7	DIO3	GPIO, high-drive capability
8	DIO4	GPIO, high-drive capability
9	WMCU_TMS	JTAG TMSC, high-drive capability
10	WMCU_TCK	JTAG TCKC
11	DIO5	GPIO, High drive capability, JTAG_TDO
12	DIO6	GPIO, High drive capability, JTAG_TDI
13	WMCU_RESET	Reset, Active-low, with internal 100kΩ pullup resistance
14	DIO7	GPIO, Analog
15	DIO8	GPIO, Analog
16	DIO9	GPIO, Analog
17	DIO10/MOSI	GPIO, Analog. Used as external serial flash programming: SPI data out
18	DIO11/SCLK	GPIO, Analog. Used as external serial flash programming: SPI clock
19	DIO12/FLASH_CS	GPIO, Analog. Used as external serial flash programming: SPI chip select (active low)
20	DIO13/MISO	GPIO, Analog. Used as external serial flash programming: SPI data in

21	DIO14	GPIO, Analog
22	WMCU_VDD	1.8-V to 3.8-V power supply
23	WMCU_VDD	1.8-V to 3.8-V power supply
24	NC	Not Connected
25	GND	Power Ground
26~29	EGP	Ground – Exposed ground pad

4. Electrical Characteristics

4.1 Absolute maximum rating

Rating	Min	Typ	Max	Unit
Storage Temperature	-40	-	125	℃
VDDS	-0.3	-	4.1	V
Other Digital Terminals	-0.2	-	VDDS+0.3≤4.1	V

4.2 Recommended operating conditions

Rating	Min	Typ	Max	Unit
Operating Temperature	-40	-	85	℃
VDDS	1.8	3.3	3.8	V

5. PCB Layout Guidelines

Use the following guidelines to lay out the BLEM203(F/L/LF) device:

- The module must be placed close to the edge of the PCB.
- Leaving 5.6 mm copper clearance on all PCB layers underneath the antenna area, as shown in Figure 5-1 and Figure 5-2.
- Using a generous amount of ground vias to stitch together the ground planes on different layers. Several ground vias should be placed close to the exposed ground pads of the module.
- No external decoupling is required.
- The reset line should have an external pullup resistor unless the line is actively driven. Placement of this component is not critical.
- Leaving a clearance in the top-side copper plane underneath the RF test pads.

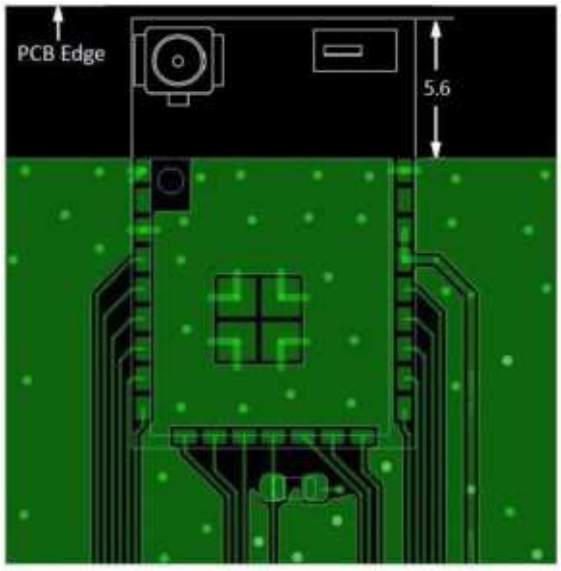


Figure 5-1. Top Layer

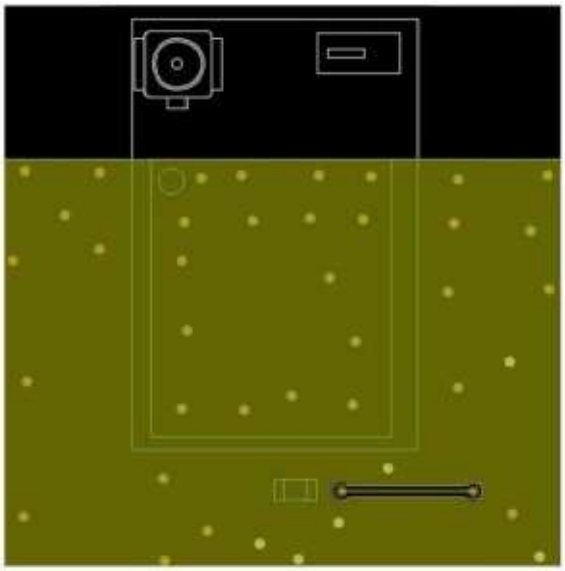


Figure 5-2. Bottom Layer

6. Mechanical Specifications

6.1 Dimensions

The module dimensions are presented in the following figure.

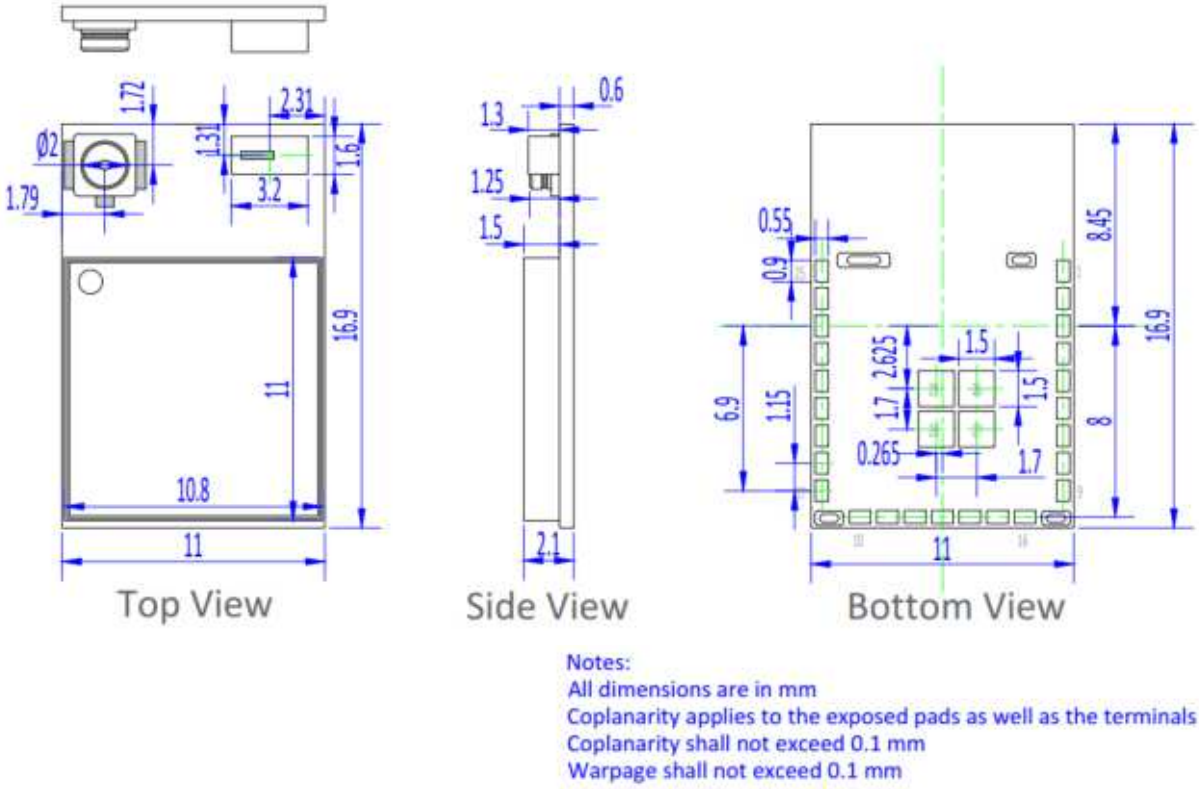


Figure 6-1. Mechanical Drawing

6.2 PCB Footprint

The footprint for the PCB is presented in the following figure:
Note: All dimensions are in mm.

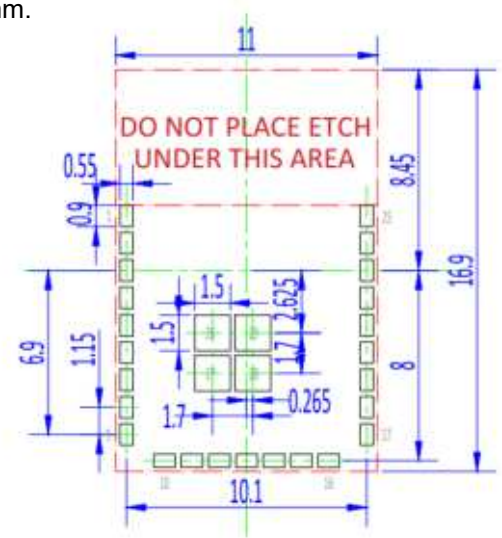


Figure 6-2. Module Footprint Top View

7. Typical Solder Reflow Profile

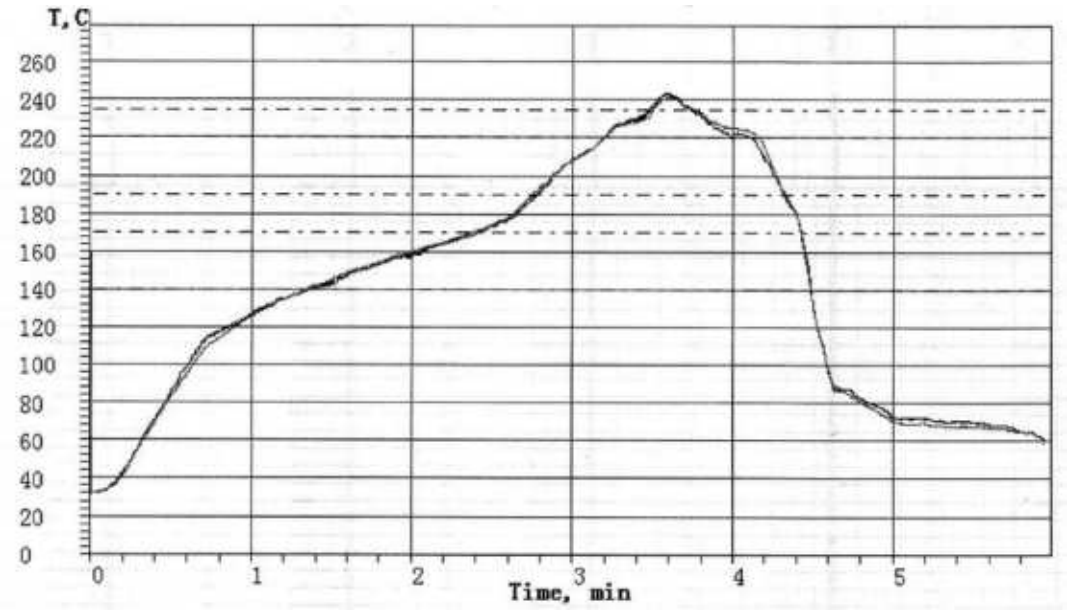


Figure 7-1. Typical Solder Reflow Profile

8. Package Information



Figure 8-1. Package information

9. Revision History

Revision	Date	Description
V1.0	3-Jun-2021	Initial Release

Contacts

BDE Technology Inc.

USA: 67 E Madison St, # 1603A, Chicago, IL 60603, US
Tel: +1-312-379-9589
Website: http://www.bdecomm.com Email: info@bdecomm.com

China: B2-403, 162 Science Avenue, Huangpu District, Guangzhou 510663, China
Tel: +86-20-28065335
Website: http://www.bdecomm.com Email: sales@bdecomm.comm