**MMB NETWORKS**

CSB04PA1x

Featuring industry-leading size, power efficiency, and RF performance, the CSB04PA1x family of modules make effective use of MMB's RapidConnect software solutions to reduce development time and cost.

RapidConnect firmware is a fully-featured application that comes standard and pre-loaded on all modules. This allows the module to be configured via a simple serial interface to quickly integrate Zigbee, Thread or Bluetooth Low Energy (BLE) into connected products. This allows product teams to focus on the unique features of your products while providing a robust, field-proven IoT platform that can evolve with future standards.
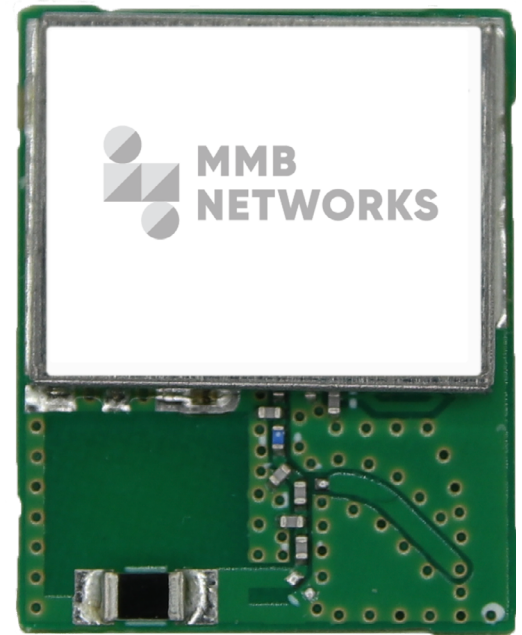
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Reduce development roadblocks, get to mvp faster,and get to market with less investment and risk.

No RF expertise required. Our pre-certified module means you focus more on your product – not on protocol standards or connectivity.

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Gain complete control over the customizable application layer and get better performance and product ratings in the field.

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Reduce your Zigbee, Bluetooth, and Thread learning curve with multi-protocol support and guaranteed interoperability.

Our flexible solution comes with easy integrations into any cloud provider — allowing you to add new features in legacy products, bridge wireless protocols, and create always on connectivity.

Learn more at **mmbnetworks.com**

CONTENTS:

1. General Information

Note that some of the specifications refer to either the "EFR32MG13" chip or the "Module". Specifications cited as EFR32 are taken from the EFR32MG13 datasheet (this should also be noted where referred to). Module means measurements taken with our production module.

2. Processor and Memory

RAM (kB)	On-Chip Flash (kB)
64	512

3. Module Pinout

Module Pad	Function	EFR32 Pin Name (number)	Usage	ADC Capable
1	2.4GHz antenna line out	2G4RF_IOP (12)		
2	Module Ground			
3	EFR32 GPIO, Port D #13	PD13 (14)	SPI1_MOSI[1]	Yes
4	EFR32 GPIO, Port D #14	PD13 (15)	SPI1_MISO[1]	Yes
5	EFR32 GPIO, Port D #15	PD13 (16)	SPI1_SCLK[1]	Yes
6	EFR32 GPIO, Port A #1	PA1 (18)	UART1_RX	Yes
7	EFR32 GPIO, Port A #0	PA0 (17)	UART1_TX	Yes
8	Digital I/O Power Supply	IOVDD (30)		
9	EFR32 GPIO, Port B #11	PB11 (19)	SPI1_nCS[1]	Yes
10	EFR32 GPIO, Port B #12	PB12 (20)	PTI_DATA	Yes
11	Module Ground			
12	Module Ground			
13	Module Ground			
14	EFR32 GPIO, Port B #13	PB13 (21)	PTI_FRAME	Yes

Module Pad	Function	EFR32 Pin Name (number)	Usage	ADC Capable
15	EFR32 GPIO, Port B #14	PB14 (23)	LFXTAL_N[2]	Yes
16	EFR32 GPIO, Port B #15	PB15 (24)	LFXTAL_P[2]	Yes
17	Module Ground		GND	
18	Module Main Power		VAEM	
19	Module Ground			
20	EFR32 GPIO, Port C #10	PC10 (31)		Yes
21	EFR32 GPIO, Port C #11	PC11 (32)		Yes
22	Module Ground			
23	Reset input, active low	RESETn (8)	RESET_N	
24	EFR32 GPIO, Port F #0	PF0 (1)	SW_CLK	Yes
25	EFR32 GPIO, Port F #1	PF1 (2)	SW_DIO	Yes
26	EFR32 GPIO, Port F #2	PF2 (3)	SW_O	Yes
27	Module Ground			
28	RFGND1			
29	RFGND2			

1. Optional. - Used for external SPI flash connection., 2. Optional - Used for external low-frequency crystal connection.

3.1 | Debug and Programming Interface

In order to access the EFR32 for programming and debug purposes, it is recommended that the designer incorporate Silcon Labs 10-pin Mini Simplicity connector.

The following table shows a pin mapping between the Silicon Labs 10-pin Mini Simplicity connector and the module, and the graphic to the right displays the layout of the Mini Simplicity connector.

Silicon Labs Simplicity Studio Port Pin	Module Pad
1	8 (Digital I/O Power Supply)
2	17 (Module Ground)
3	23 (Reset input, active low)
4	6 (EFR32 GPIO, Port A #1)
5	7 (EFR32 GPIO, Port A #0)
6	26 (EFR32 GPIO, Port F #2)
7	25 (EFR32 GPIO, Port F #1)
8	24 (EFR32 GPIO, Port F #0)
9	14 (EFR32 GPIO, Port B #13)
10	10 (EFR32 GPIO, Port B #12)

VAEM	1	2	GND
RST	3	4	VCOM_RX
VCOM_TX	5	6	SWO
SWDIO	7	8	SWCLK
PTI_FRAME	9	10	PTI_DATA

4. Electrical Specifications

4.1 | Absolute Maximum Ratings

Parameter	Minimum	Maximum	Units
Supply Voltage (VCC)	0	3.6	V
Voltage on any GPIO	-0.3	VCC + 0.3	V
Ambient Operating Temperature (standard version)	-40	85	°C
Storage Temperature	-50	150	°C

4.2 | Recommended Operating Conditions

Parameter	Minimum	Typical	Maximum	Units
Supply Voltage (VCC)	2.0	3.3	3.6	V
Temperature Range	-40		85	°C

4.3 | DC Electrical Characteristics

Parameter	Test Condition	Min	Typical	Max	Units
TX Current	At 25 °C, VCC = 3.3v, normal mode, 19 dBm		138	156	mA
	At 25 °C, VCC = 3.3v, normal mode, 10 dBm		48	57	mA
RX Current	At 25 °C, VCC = 3.3v, normal mode, 2.4 GHz, CPU running		13.7	16	mA
Deep Sleep Current	At 25 °C, VCC = 3.3v, shutdown mode. Full RAM retention and RTCC running from LFXO (EM2 mode)		2.1	3	µA

4.3.1 | Typical Transmit Performance Curve (Supply Current vs. Tx Power)
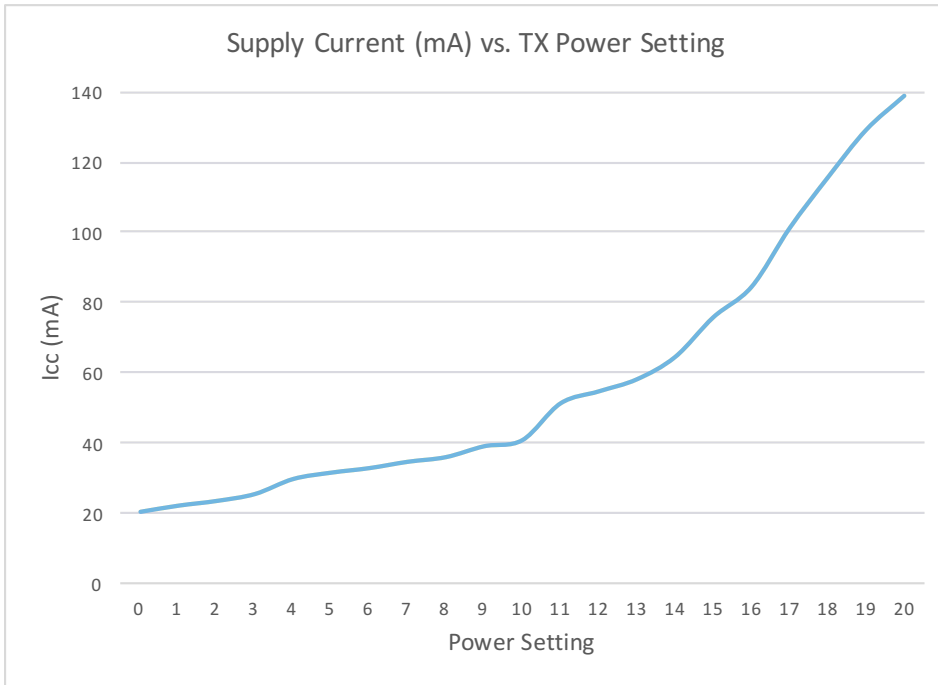
Note: The graph above is for the PA10 variant. For the PA11 module, the maximum output power is limited to 10.5dBm

5. RF Specifications

5.1 | Receive Specifications

Note: The Typical number indicates one standard deviation above the mean, measured at room temperature (25°C). The Min and Max numbers were measured over process corners at room temperature.

Parameter	Test Condition	Min	Typical	Max	Units
Frequency range		2400		2483.5	MHz
Sensitivity - Zigbee and Thread	1% PER, 20 byte packet defined by IEEE 802.15.4-2003		-102.7	-100	dBm
Sensitivity - Bluetooth Low Energy	0.1% BER. Signal is reference signal[1], bit rate=1Mbps		-94	-86	dBm
	0.1% BER. Signal is reference signal[1], bit rate=2Mbps		-91	-86	dBm

Notes:

1. Reference signal is BLE 2GFSK, Modulation index = 0.5, BT = 0.5, payload = 37 bytes PRBS9, frequency accuracy better than 1 ppm.

5.2 | Transmit Specifications

5.2.1 | FCC Power Table

Parameter	Test Condition	Min	Typical	Max	Units
802.15.4 output power at highest power setting, general limit[1]	CSB04PA10[2]	18	19.2		dBm
	CSB04PA11[2]	8.6	10.2		dBm
802.15.4 Channel 26 output power	CSB04PA10-CHP	13.6	14.9		dBm
	CSB04PA11-CHP	8.8	10.1		dBm
	CSB04PA1X-RFC[3]	5.8	7.6		dBm
BLE output power at highest power setting in connected mode, general limit[1,4]	CSB04PA10[2]	18	19.2		dBm
	CSB04PA11[2]	8.6	10.2		dBm
BLE output power at highest power setting in advertising mode	CSB04PA10-CHP	18	19.2		dBm
	CSB04PA10-RFC	13.2	14.7		dBm
	CSB04PA11[2]	8.6	10.2		dBm

5.2.2 | CE Power Table

Parameter	Test Condition	Min	Typical	Max	Units
802.15.4 output power at highest power setting, general limit[1]	CSB04PA11-CHP[3]	9	10.3		dBm
	CSB04PA11-RFC[3]	5.2	6.8		dBm
BLE output power at highest power setting in connected mode, general limit[1]	CSB04PA11[2]	8.6	10.2		dBm
BLE output power at highest power setting in advertising mode	CSB04PA11-CHP[3]	6.5	8.1		dBm
	CSB04PA11-RFC[3]	2.8	4.3		dBm

Notes:

1. RF Channel 26 operates at reduced power level as required for regulatory compliance. See Section 11 for more information.
2. Antenna configuration (e.g. "CHP" for chip antenna or "RFC" for RF connector) is specified where necessary. If antenna configuration is not specified, then the value applies to both configurations.
3. Test conditions specifying "CSB04PA1X" include CSB04PA10 and CSB04PA11 variants.
4. BLE channels 33, 34, 35, and 36 operate with additional rate-dependent power backoff to comply with FCC limits. The maximum power backoff is 11.2 dB for channel 36 at 2Mbps.

Output Power (dBm) vs. TX Power Setting
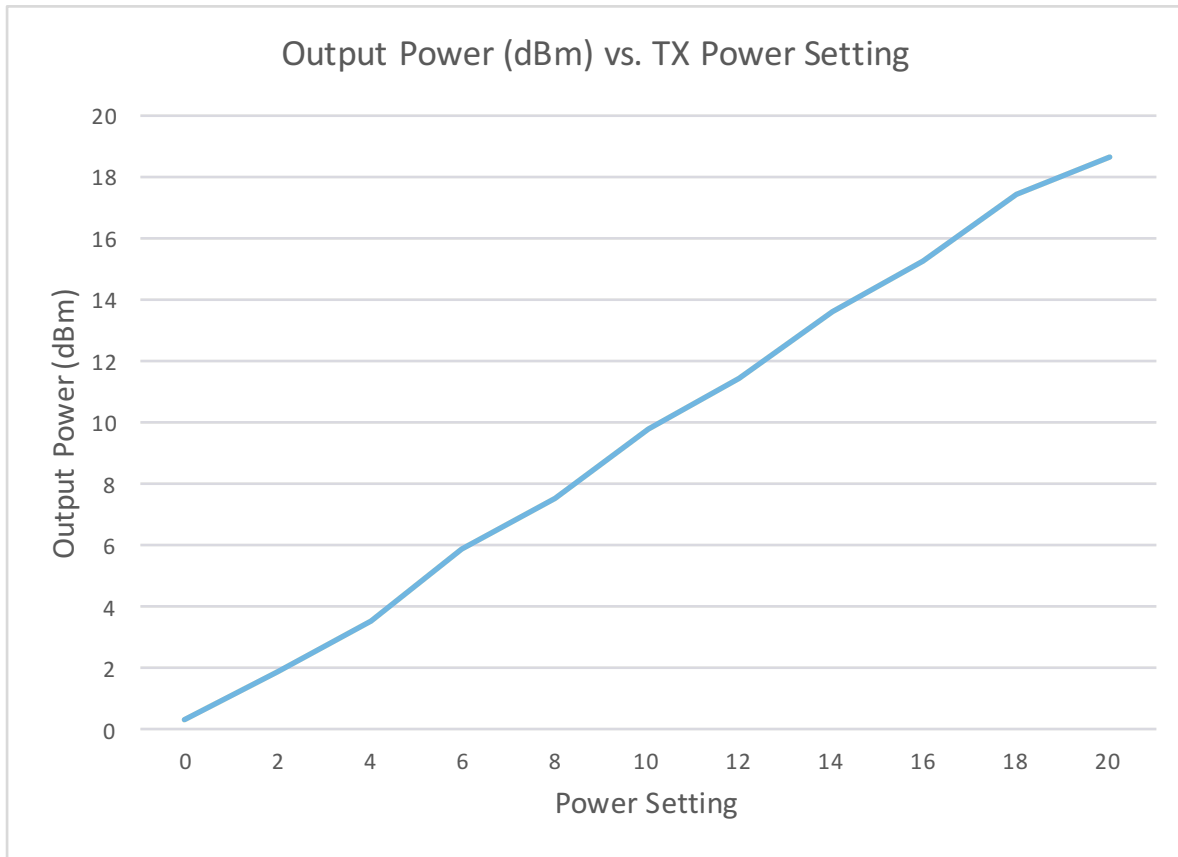
Note: The graph above is for the PA10 variant. For the PA11 module, the maximum output power is limited to 10.5 dBm.

# 6. Functional Specifications

6.1 | Serial Ports

Refer to the EFR32MG13 data sheet for functionality and associated GPIO pinouts.

Note: The module pinout table in section 3 of this document provides a cross reference between the MMB module pins and the EFR32 GPIO.

Note 2: The RapidConnect firmware supports UART communication with a baud rate of 115.2kbps. However, MMB can modify this configuration as necessary through a Non-Recurring Engineering engagement.

7. Mechanical Specifications

## 7.1 | Module Physical Dimensions and Host PCB Antenna Keep-out
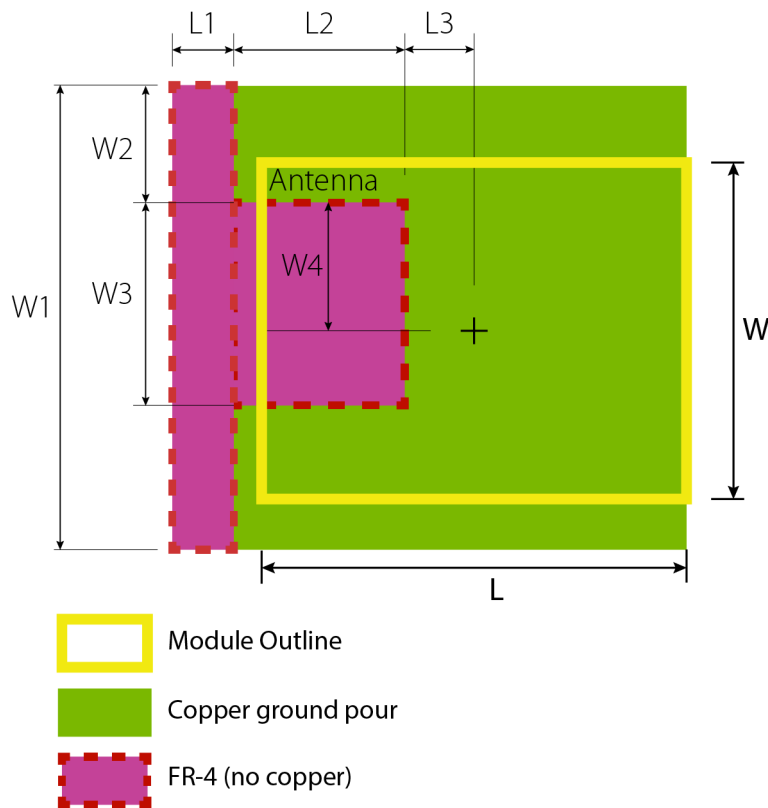
Symbol	Description	Distance
L	Length of the module	15.88 mm
W	Width of the module	12.60 mm
H	Height of the module	2.88 mm
L1	Second keep-out length	2.27 mm
L2	First keep-out length	6.43mm
L3	Length from module centre to edge of first keep-out	2.65 mm
W1	Second keep-out width	17.41mm
W2	Distance from edge of first keep-out to edge of second keep-out	4.41mm
W3	First keep-out width	7.62mm
W4	Width from module centre to edge of first keep-out	5.4 mm

Note: These antenna keep-out recommendations apply to CSB04PA1x-CHP products only. Copper keep-out regions apply to all PCB layers. CSB04PA1x-RFC have identical dimensions but do not require an antenna keep-out.

7.2 | Recommended Land Pattern (Surface Mount)

The diagram below shows the recommended dimensions and arrangement of the pads for the module. The PCB upon which the module will be mounted should not include any non-ground traces or vias on the top layer directly under the module. All copper features other than the module mounting pads, including ground vias, should be tented or covered with soldermask to avoid coming in contact with the module's traces and producing unexpected behavior. If it is absolutely necessary to include traces and/or vias under the module due to space constraints, then a customer can elect to do so at their own risk. MMB can provide a Hardware Designer Package to show the module's footprint and drill locations, which must not line up with the daughtercard's drill locations.
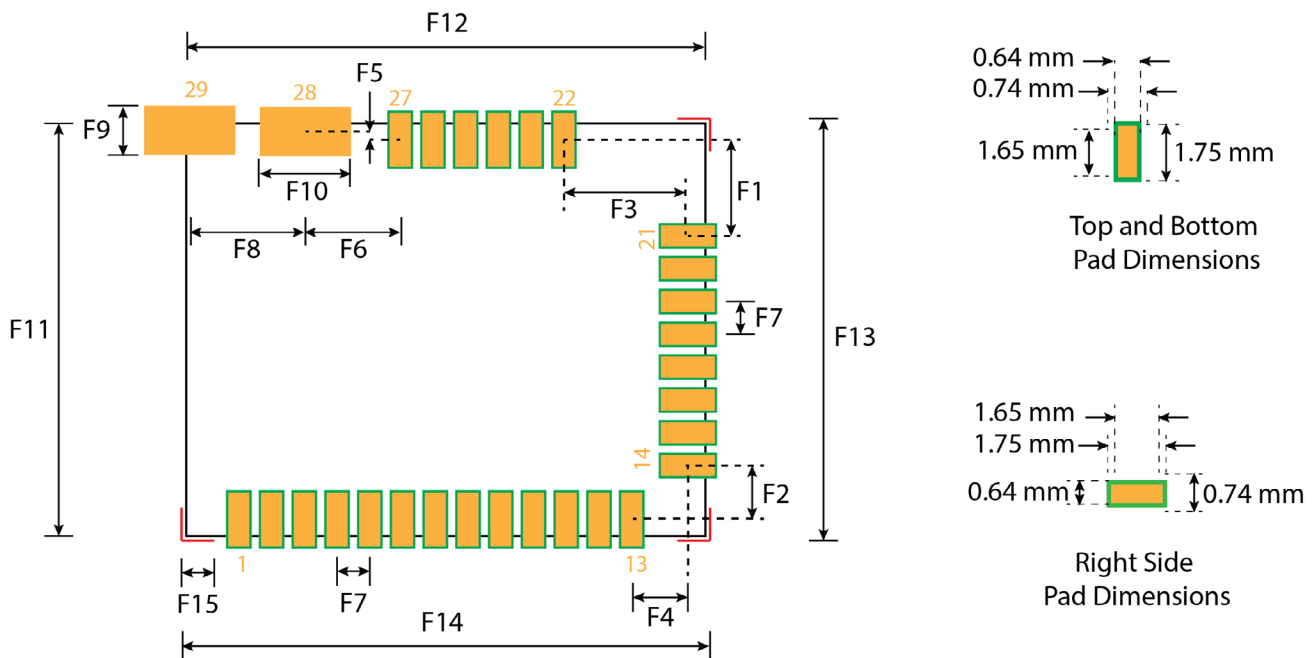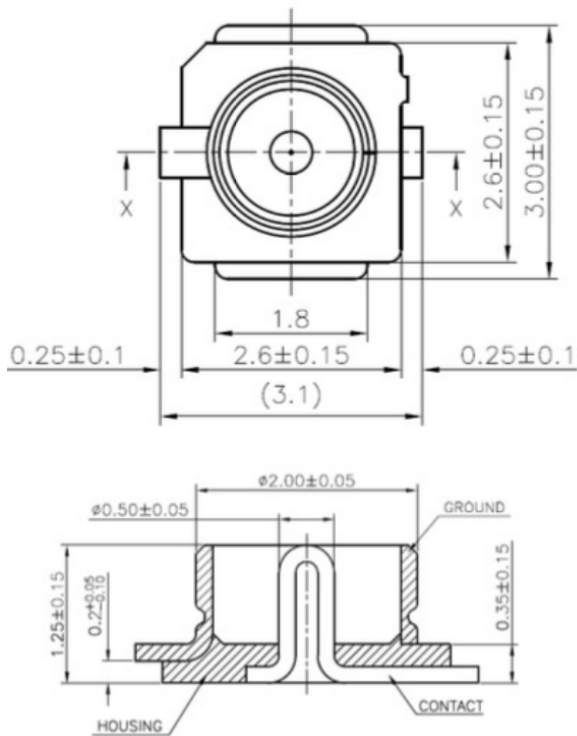

Note: Green box is the size of the top metal layer. Orange is the opening in the soldermask layer.

Symbol	Description	Distance
F1	Distance pad centre to pad centre (vertical: pad 21 to 22)	2.93 mm
F2	Distance pad centre to pad centre (vertical: pad 13 to 14)	1.67 mm
F3	Distance pad centre to pad centre (horizontal: pad 21 to 22)	3.77 mm
F4	Distance pad centre to pad centre (horizontal: pad 13 to 14)	1.69 mm
F5	Distance pad centre to RFGND centre (vertical: pad 27 to 28)	0.26 mm
F6	Distance pad centre to RFGND centre (horizontal: pad 27 to 28)	2.90mm
F7	Pitch (pad to pad)	1.02 mm
F8	Pitch (RFGND pad to RFGND pad)	3.52mm
F9	RFGND pad metal and soldermask width	1.47mm

Symbol	Description	Distance
F10	RFGND pad metal and soldermask length	2.78mm
F11	Module width	12.60 mm
F12	Module length	15.88 mm
F13	Width between silkscreen corners	12.90 mm
F14	Length between silkscreen corners	16.18 mm
F15	Size of silkscreen corner line	1 mm

7.3 | RF Connector Dimensions

The diagram below shows the dimensions for the RF connector. This connector appears on the -RFC variants only.

7.4 | Label Drawings

MMB NETWORKS
MODEL:CSB04PA10-CHP
FCC ID:XFF-CSB04PA1X
IC:8365A-CSB04PA1X

MMB NETWORKS CE
MODEL:CSB04PA10-CHP
FCC ID:XFF-CSB04PA1X
IC:8365A-CSB04PA1X

MMB NETWORKS
MODEL:CSB04PA10-RFC
FCC ID:XFF-CSB04PA1X
IC:8365A-CSB04PA1X

MMB NETWORKS CE
MODEL:CSB04PA10-RFC
FCC ID:XFF-CSB04PA1X
IC:8365A-CSB04PA1X
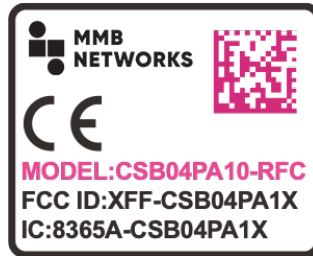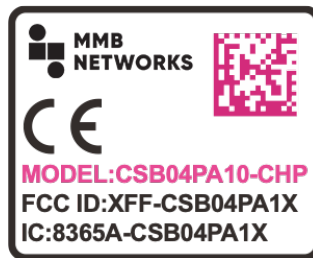
8. Serial Flash Compatibility

To minimize cost and maximize flexibility, the CSB04PA1x module does not include serial flash memory. If you would like to support OTA Firmware Upgrades for your device, it will be necessary to add serial flash.

8.1 | Connection Diagram
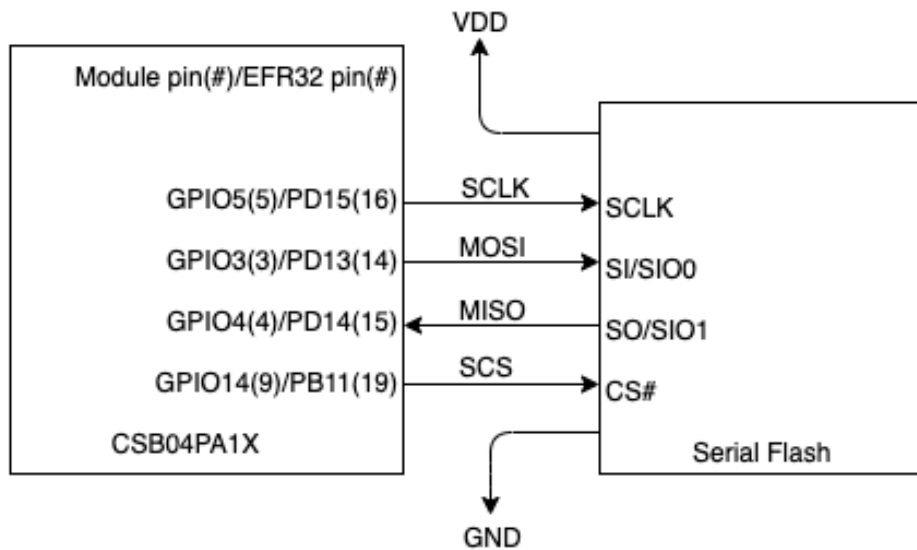
8.2 | Supported Parts

Vendor	MPN	Size	VCC	Package	Comment
Macronix	MX25R1635FBDIL0	16MBIT	1.65 - 3.6 V	3-2-3 12-BALL WLCSP	
Macronix	MX25R1635FZUIL0	16MBIT	1.65 - 3.6 V	8-USON (2x3mm)	
Macronix	MX25R1635FM1IL0	16MBIT	1.65 - 3.6 V	8-SOP (150mil)	
WINBOND	W25Q16JVSSIQ	16MBIT	2.7 - 3.6 V	8-SOIC (208mil)	Not suitable for direct battery-powered applications

9. LFXO Crystal

If the CSB04PA1x module will be used for Bluetooth communication in a battery-powered device, MMB recommends the addition of an external LFXO crystal to enable operation in various sleep modes.

9.1 | Connection Diagram
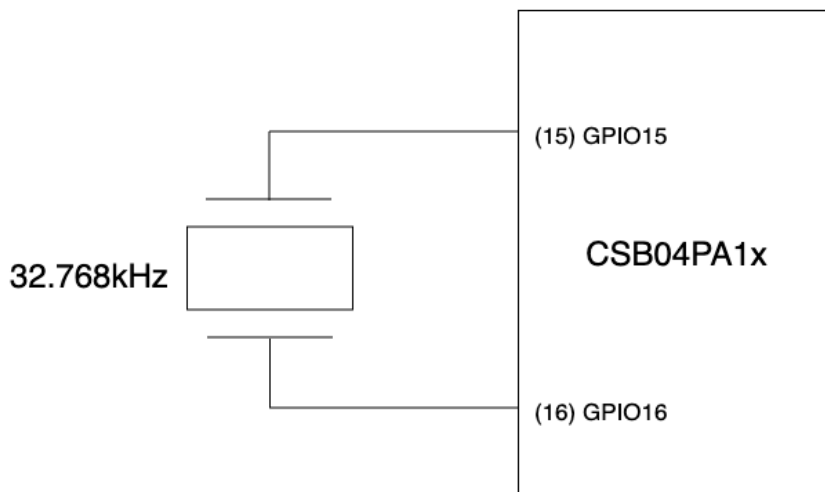
9.2 | Supported Parts

The following external crystal part numbers are compatible with the CSB04PA1x module

Mfg. Part Number	Vendor	Load Cap	Package
CM2012H32768DZFT	Citizen Finedevice Co.	12.5 pF	2.0 x 1.2 mm
TFE202P32K7680R	CTS	12.5 pF	2.0 x 1.2 mm
FX135A-327	Fox Electronics	12.5 pF	3.2 x 1.5 mm
G83270021	Diodes Inc.	12.5 pF	3.2 x 1.5 mm
ECS-.327-12.5-34B-TR	ECS Inc.	12.5 pF	3.2 x 1.5 mm

9.3 | Other Supported Parts

Other external crystals may be supported if their specifications match the ones shown in the table below.

Parameter	Symbol	Min	Typ	Max	Unit
Crystal Frequency	F	----	32.768		kHz
Frequency Tolerance	FT	-20		+20	ppm
Equivalent series resistance (ESR)	ESR	----		70	kΩ
Load capacitance[1]	CL		12.5		pF

10. Soldering Temperature Time Profile for reflow soldering (Lead-free solder)
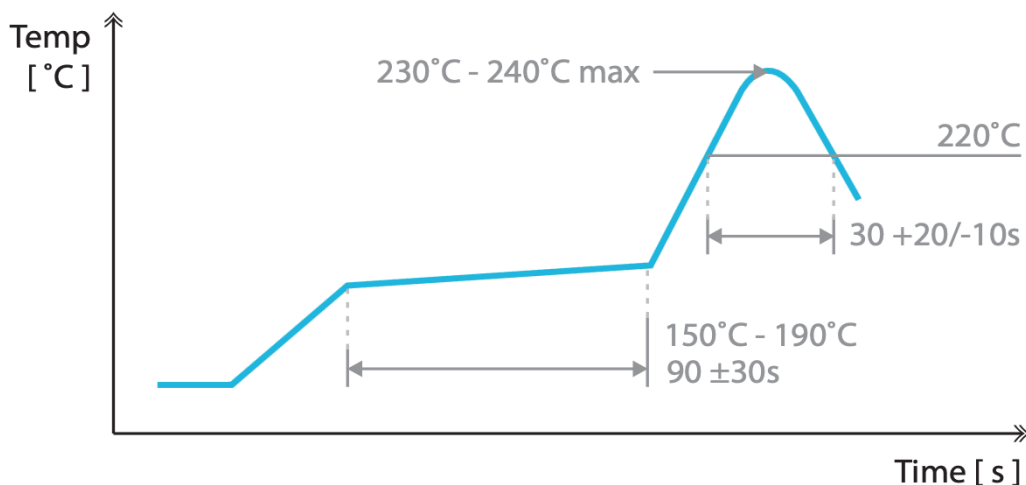
Maximum reflow cycles: 2

Opposite-side reflow is prohibited due to the module weight.

You must not place the module on the bottom / underside of your PCB and re-flow.

11. Regulatory Approvals

11.1 | Federal Communications Commission (FCC - US)

Note: this section applies to CSB04PA10-CHP and CSB04PA10-RFC devices only.

11.1.1 | Approved Antennae

For the CSB04PA10-CHP modules using the onboard chip antenna, the approved 802.15.4 power level settings are 19.2 dBm for channels 11-25 and 15 dBm for channel 26. The approved BLE power level settings are 19.2dBm for both connected and advertising modes. The onboard chip antenna is Inpaq ACA-2012-A1-CC-S with a gain of 1.72dBi and 50Ω impedance.

For the CSB04PA10-RFC modules using the approved external antenna, the approved 802.15.4 power level settings are 19.2 dBm for channels 11-25 and 8 dBm for channel 26. The approved BLE power level settings are 19.2dBm for connected mode and 15dBm for advertising modes. The CSB04PA1x-RFC devices have been approved with the following external FCC approved antennas: Mag Layers EDA-1713-2G4C1-A2, and Bondale G-RA0K13200284-SZ478 with a gain of 5dBi and nominal impedance of 50Ω.

11.1.2 | FCC Notice

The CSB04PA1x-CHP and CSB04PA1x-RFC devices comply with Part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

To comply with FCC RF Exposure requirements, users of this device must ensure that the module be installed and/or configured to operate with a separation distance of 20cm or more from all persons.

Usage of Channel 26 at full power will result in non-compliance to FCC standards. MMB recommends avoiding use of channel 26 and if necessary only use with a reduced power setting. For further details please contact MMB.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

11.1.3 | Modular Approval

The CSB04PA1x-CHP and CSB04PA1x-RFC devices meet the requirements for modular transmitter approval as detailed in the FCC public notice DA 00-1407.

It should be noted that:

"While the applicant for a device into which an authorized module is installed is not required to obtain a new authorization for the module, this does not preclude the possibility that some other form of authorization or testing may be required for the device (e.g., a WLAN into which an authorized module is installed must still be authorized as a PC peripheral, subject to the appropriate equipment authorization)."
– FCC Public Notice DA 00-1407

Caution:
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note:
This module is intended for an OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated. Additional testing and certification may be necessary when multiple modules are used.

A 20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for a population/uncontrolled environment can be satisfied. Further RF exposure shall be re-evaluated to the scenario of portable, and collocated use.

User Manual Of The End Product:
In the user manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied.

The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.11.1.4 | Labeling Requirements
The user of this device is responsible for meeting the FCC labeling requirements. A clearly visible label on the exterior enclosure of an incorporating device must list the MMB Research Inc. FCC ID "XFF-CSB04PA1X" and the FCC Notice above (section 9.1.1).

The exterior label should use the wording "Contains" or "Contains Transmitter Module". For example:

Contains FCC ID: XFF-CSB04PA1X

or

Contains Transmitter Module FCC ID: XFF-CSB04PA1X

Any similar wording that expresses the same meaning may be used. If the labelling area is smaller than the palm of the hand, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

11.1.4 | Label of the end product

The final end product must be labeled in a visible area with the following "Contains TX FCC ID: XFF-CSB04PA1X".

If the labelling area is larger than the palm of the hand, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

11.2 | Industry Canada (IC)

Note: this section applies to CSB04PA10-CHP and CSB04PA10-RFC devices only.

11.2.1 | Approved Antennae

This radio transmitter IC: 8365A-CSB04PA1X has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna Type	Manufacturer	Model	Maximum Gain (dBi)	Nominal Impedance (Ω)
Integral Chip Antenna	Inpaq	ACA-2012-A1-CC-S	1.72	50
Dipole Antenna	Mag-Layers Scientific-Technics Co. Ltd.	EDA-1713-2G4C1-A2	5	50
Dipole Antenna	Bondale	G-RA0K13200284-SZ478	5	50

For the CSB04PA10-CHP modules using the onboard chip antenna, the approved 802.15.4 power level settings are 19.2 dBm for channels 11-25 and 15 dBm for channel 26. The approved BLE power level settings are 19.2dBm for both connected and advertising modes.

For the CSB04PA10-RFC modules using the approved external antenna, the approved 802.15.4 power level settings are 19.2 dBm for channels 11-25 and 8 dBm for channel 26. The approved BLE power level settings are 19.2dBm for connected mode and 15dBm for advertising modes. 11.2.2 | IC Notice

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

11.2.2 | Labeling Requirements

The host device shall be properly labelled to identify the modules within the host device. The Industry Canada certification label of a module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the Industry Canada certification number of the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as follows:

Contains transmitter module IC: 8365A-CSB04PA1X

Contient le émetteur radio IC: 8365A-CSB04PA1X

11.2.3 | Additional Notice

This module is intended for an OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated. Additional testing and certification may be necessary when multiple modules are used.

A 20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for a population/uncontrolled environment can be satisfied. Further RF exposure shall be re-evaluated to the scenario of portable, and collocated use.

11.3 | RoHS Compliance

The CSB04PA1X devices do not contain any substances in excess of the maximum concentration allowed by Directive 2002/95/EC. The module is RoHS compliant.

11.4 | FCC & IC Compliance

In the event that conditions as described in the manual cannot be met, then the FCC and ISED authorizations are no longer considered valid and the FCC ID and IC certification number cannot be used on the final product. In these circumstances, the integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC and ISED authorization.

11.5 | ETSI (EU) - Compliance

11.5.1 RF Output Power Settings:

For the CSB04PA11-CHP modules using the onboard chip antenna, the approved 802.15.4 power level settings are 10.6 dBm for all channels. The approved BLE power level settings are: 10.3 dBm for all connected channels and 8.1 dBm for all advertising channels.

For the CSB04PA11-RFC modules using the approved external antennas, the approved 802.15.4 power level settings are 6.6 dBm for all channels. The approved BLE power level settings are: 10.3 dBm for all connected channels and 4.4 dBm for all advertising channels.

11.5.2 ETSI Approval:

Provided that the above TX Power settings are used, the CSB04PA11 module is compliant with the following EU standards:

- EN 300 328 v2.1.1
- EN 301 489-1 v2.1.1
- EN 301 489-17 v3.1.1
- EN 62368-1:2014

12. Revision History

Revision	Date	Comments
1.2	2019/12/23	Updated the RX Current max rating.
1.1	2019/08/23	Rebranded material.
1.0	2019/05/02	Replaced Antenna keep out and Land Pattern diagrams, first full release.
0.4	2019/04/14	Inserted CE regulatory statements; inserted Serial Flash Compatibility as Section 8; inserted LFXO Crystal documentatinon as section 9.
0.3	2018/07/30	Added section 9 for regulatory statements for FCC & IC, Updated 5.2 to include BLE transmit specifications.
0.2	2018/05/xx	Added BLE5.0 support, other minor typos.
0.1	2018/05/07	Initial draft.

13. Ordering Information

Hardware SKU	Regulatory Approvals	RF Output Option	Status
CSB04PA10-CHP-N	FCC/IC	Chip Antenna	In Production
CSB04PA10-PIN-X	N/A[1]	Module Pad 1	In Production
CSB04PA10-RFC-N	FCC/IC	RF Connector	In Production
CSB04PA11-CHP-D	FCC/IC, CE	Chip Antenna	In Production
CSB04PA11-PIN-X	N/A[1]	Module Pad 1	In Production
CSB04PA11-RFC-D	FCC/IC, CE	RF Connector	In Production

Notes:

1. The PIN variant of the module has no regulatory approvals. Host manufacturers who decide to use this variant are responsible for full certification of the product.

The above table provides the HW SKU which forms the first part of the complete part number. The complete part number takes the format: CSB04PA1x-yyy-r-zzz. Where r is the regulatory region (E=Europe, N=North America, D=Dual), and zzz represents a three digit programming code.

Contact your local MMB sales representative to determine the correct programming code for your application.

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