

General Description

The BDE-MB13P1 is a low power, multi-band Sub-1 GHz with PA and 2.4 GHz wireless module series that provides a series of variants for users, including different MCU cores, different memory size, different antenna options and external SPI flash options. Please refer to Table 1-1 for variant details.

The module series supports Thread, Zigbee®, Bluetooth® 5.2 low Energy, IEEE 802.15.4g, IPv6-enabled smart objects (6LoWPAN), mioty, Wi-SUN, Amazon Sidewalk, proprietary systems including TI 15.4-Stack (Sub-1GHz and 2.4GHz). The module is based on an Arm® Cortex® M33 main processor and optimized for low-power wireless communication and advanced sensing in building security systems, HVAC, smart meters, medical, wired networking, portable electronics, home theater & entertainment markets and connected peripherals markets.

The device supports industry standard frequency bands (868MHz, 915MHz, 2440MHz) to meet the industrial needs. The module has an efficient built-in PA that supports +20 dBm TX at 69 mA current consumption, In RX it has -121 dBm sensitivity in SimpleLink™ long-range mode.

The module has a low standby current of 0.98 µA and full RAM retention. Consistent with many customers’ 10 to 15 years or longer life cycle requirements. BDE-MB13P1 integrates all required system-level hardware components including clocks, passives and low-cost PCB design.

Table 1-1. Module Variants

Model Number	Orderable Part Number	Chipset	Flash (KB)	SRA M (KB)	Antenna on Sub-1G	Antenna on 2.4G	On-Board SPI Nor Flash Support	Operating Temperature (°C)
BDE-MB13 P1	BDE-MB1354P101UA32	CC1354 P10	1024	288	U.FL Connector	PCB Trace Antenna	32Mbit	-40 ~ 85
	BDE-MB1354P101NA32				ANT Pin	PCB Trace Antenna		
	BDE-MB1354P101UU32				U.FL Connector	U.FL Connector		
	BDE-MB1354P101NU32				ANT Pin	U.FL Connector		
	BDE-MB1354P101UN32				U.FL Connector	ANT Pin		
	BDE-MB1354P101NN32				ANT Pin	ANT Pin		
	BDE-MB1354P101UA0				U.FL Connector	PCB Trace Antenna	Not Included	
	BDE-MB1354P101NA0				ANT Pin	PCB Trace Antenna		
	BDE-MB1354P101UU0				U.FL Connector	U.FL Connector		
	BDE-MB1354P101NU0				ANT Pin	U.FL Connector		
	BDE-MB1354P101UN0				U.FL Connector	ANT Pin		
	BDE-MB1354P101NN0				ANT Pin	ANT Pin		
	BDE-MB1354P101UA32-IN				U.FL Connector	PCB Trace Antenna	32Mbit	
	BDE-MB1354P101NA32-IN				ANT Pin	PCB Trace Antenna		
	BDE-MB1354P101UU32-IN				U.FL Connector	U.FL Connector		
	BDE-MB1354P101NU32-IN				ANT Pin	U.FL Connector		
	BDE-MB1354P101UN32-IN				U.FL Connector	ANT Pin		
	BDE-MB1354P101NN32-IN				ANT Pin	ANT Pin		
	BDE-MB1354P101UA0-IN				U.FL Connector	PCB Trace Antenna	Not Included	
	BDE-MB1354P101NA0-IN				ANT Pin	PCB Trace Antenna		
	BDE-MB1354P101UU0-IN				U.FL Connector	U.FL Connector		
	BDE-MB1354P101NU0-IN				ANT Pin	U.FL Connector		
	BDE-MB1354P101UN0-IN				U.FL Connector	ANT Pin		
	BDE-MB1354P101NN0-IN				ANT Pin	ANT Pin		
	BDE-MB1352P71UA32	CC1352 P7	704	144	U.FL Connector	PCB Trace Antenna	32Mbit	-40 ~ 85
	BDE-MB1352P71NA32				ANT Pin	PCB Trace Antenna		
	BDE-MB1352P71UU32				U.FL Connector	U.FL Connector		

	BDE-MB1352P71NU32				ANT Pin	U.FL Connector		
	BDE-MB1352P71UN32				U.FL Connector	ANT Pin		
	BDE-MB1352P71NN32				ANT Pin	ANT Pin		
	BDE-MB1352P71UA0				U.FL Connector	PCB Trace Antenna	Not Included	
	BDE-MB1352P71NA0				ANT Pin	PCB Trace Antenna		
	BDE-MB1352P71UU0				U.FL Connector	U.FL Connector		
	BDE-MB1352P71NU0				ANT Pin	U.FL Connector		
	BDE-MB1352P71UN0				U.FL Connector	ANT Pin		
	BDE-MB1352P71NN0				ANT Pin	ANT Pin		
	BDE-MB1352P71UA32-IN				U.FL Connector	PCB Trace Antenna	32Mbit	
	BDE-MB1352P71NA32-IN				ANT Pin	PCB Trace Antenna		
	BDE-MB1352P71UU32-IN				U.FL Connector	U.FL Connector		
	BDE-MB1352P71NU32-IN				ANT Pin	U.FL Connector		
	BDE-MB1352P71UN32-IN				U.FL Connector	ANT Pin		
	BDE-MB1352P71NN32-IN				ANT Pin	ANT Pin		
	BDE-MB1352P71UA0-IN				U.FL Connector	PCB Trace Antenna	Not Included	
	BDE-MB1352P71NA0-IN				ANT Pin	PCB Trace Antenna		
	BDE-MB1352P71UU0-IN				U.FL Connector	U.FL Connector		
	BDE-MB1352P71NU0-IN				ANT Pin	U.FL Connector		
	BDE-MB1352P71UN0-IN				U.FL Connector	ANT Pin		
	BDE-MB1352P71NN0-IN				ANT Pin	ANT Pin		
	BDE-MB1352P1UA32	CC1352 P	352	80	U.FL Connector	PCB Trace Antenna	32Mbit	
	BDE-MB1352P1NA32				ANT Pin	PCB Trace Antenna		
	BDE-MB1352P1UU32				U.FL Connector	U.FL Connector		
	BDE-MB1352P1NU32				ANT Pin	U.FL Connector		
	BDE-MB1352P1UN32				U.FL Connector	ANT Pin		
	BDE-MB1352P1NN32				ANT Pin	ANT Pin		
	BDE-MB1352P1UA0				U.FL Connector	PCB Trace Antenna	Not Included	
	BDE-MB1352P1NA0				ANT Pin	PCB Trace Antenna		
	BDE-MB1352P1UU0				U.FL Connector	U.FL Connector		

	BDE-MB1352P1NU0				ANT Pin	U.FL Connector		
	BDE-MB1352P1UN0				U.FL Connector	ANT Pin		
	BDE-MB1352P1NN0				ANT Pin	ANT Pin		
	BDE-MB1352P1UA32-IN				U.FL Connector	PCB Trace Antenna	32Mbit	-40 ~ 105
	BDE-MB1352P1NA32-IN				ANT Pin	PCB Trace Antenna		
	BDE-MB1352P1UU32-IN				U.FL Connector	U.FL Connector		
	BDE-MB1352P1NU32-IN				ANT Pin	U.FL Connector		
	BDE-MB1352P1UN32-IN				U.FL Connector	ANT Pin		
	BDE-MB1352P1NN32-IN				ANT Pin	ANT Pin		
	BDE-MB1352P1UA0-IN				U.FL Connector	PCB Trace Antenna	Not Included	
	BDE-MB1352P1NA0-IN				ANT Pin	PCB Trace Antenna		
	BDE-MB1352P1UU0-IN				U.FL Connector	U.FL Connector		
	BDE-MB1352P1NU0-IN				ANT Pin	U.FL Connector		
	BDE-MB1352P1UN0-IN				U.FL Connector	ANT Pin		
	BDE-MB1352P1NN0-IN				ANT Pin	ANT Pin		

Key Features

- Wireless microcontroller
 - Powerful 48-MHz Arm® Cortex®-M33 (CC1354P10) or Cortex®-M4F (CC1352P7) or Cortex®-M4F (CC1352P)
 - 1024kB (CC1354P10) or 704kB (CC1352P7) or 352kB (CC1352P) flash program memory
 - 8kB of Cache SRAM
 - 288kB (CC1354P10) or 144kB (CC1352P7) or 80kB (CC1352P) of ultra-low leakage SRAM
 - Dual-band Sub-1GHz and 2.4GHz operation
 - Dynamic multiprotocol manager (DNM) driver
 - Programmable radio includes support for 2-(G)FSK, 4-(G)FSK, MSK, OOK, BLE, IEEE 802.15.4 PHY and MAC
 - Supports over-the-air upgrade (OTA)
- Ultra-Low power sensor controller
 - Autonomous MCU with 4kB of SRAM
 - Sample, store, and process sensor data
 - Fast wake-up for low-power operation
- Software defined peripherals; capacitive touch, flow meter, LCD
- Low power consumption
 - MCU consumption:
 - ✧ 3.4 mA active mode, CoreMark®
 - ✧ 71 µA/MHz running CoreMark
 - ✧ 0.98 µA standby mode, RTC, 256KB RAM
 - ✧ 0.17 µA shutdown mode, wake-up on pin
 - Ultra Low-power sensor controller consumption:
 - ✧ 30 µA in 2 MHz mode
 - ✧ 809 µA in 24 MHz mode
 - Radio Consumption:
 - ✧ 69 mA TX at +20 dBm at 915 MHz
- Wireless protocol support
 - Thread, Zigbee®, Matter
 - Bluetooth®5.2 Low Energy
 - Wi-SUN®
 - mioty®
 - Amazon Sidewalk
 - Wireless M-Bus

- SimpleLink™ TI 15.4-stack (Sub- 1 GHz)
- Proprietary systems
- High performance radio
 - -121 dBm for 2.5 kbps long-range mode
 - -110 dBm at 50 kbps, 802.15.4, 868 MHz
 - -104 dBm for Bluetooth® Low Energy 125kbps
 - -105 dBm for IEEE 802.15.4-2006 2.4GHz OQPSK
- Regulatory compliance (On-going)
 - FCC
 - IC
 - CE-RED
- MCU peripherals
 - Most digital peripherals can be routed to any GPIO
 - Four 32-bit or eight 16-bit general-purpose timers
 - 12-bit SAR ADC, 200 ksps, 8 channels
 - 8-bit DAC
 - Two Comparators
 - Programmable current source
 - Four UART, four SPI, two I²C, I²S
 - Real-time clock (RTC)
 - Integrated temperature and battery monitor
- Security enablers
 - Supports secure boot
 - Supports secure key storage and device ID
 - Arm TrustZone for trusted execution environment
 - AES 128- and 256-bit cryptographic accelerator
 - Public key accelerator
 - SHA2 accelerator (full suite up to SHA-512)
 - True random number generator (TRNG)
 - Secure debug lock
 - Software anti-rollback protection
- Operating range
 - On-chip buck DC/DC converter
 - 1.8-V to 3.8-V single supply voltage
 - -40 to +85°C
 - -40 to +105°C (-IN variants)
- Antenna:
 - ANT pin or U.FL connector for Sub-1G band
 - PCB trace antenna, U.FL connector or ANT pin for 2.4G band
- Package
 - Dimension: 26 mm x 19 mm x 2.15 mm
 - LCC-42 (30 GPIOs)
 - RoHS-compliant package

Applications

- 315, 433, 470 to 510, 868, 902 to 928, and 2400 to 2480 MHz ISM and SRD systems with down to 4 kHz of receive bandwidth
- Building automation
 - Building security systems – motion detector, electronic smart lock, door and window sensor, garage door system, gateway
 - HVAC – thermostat, wireless environmental sensor, HVAC system controller, gateway
 - Fire safety system – smoke and heat detector, fire alarm control panel (FACP)
 - Video surveillance – IP network camera
 - Elevators and escalators – elevator main control panel for elevators and escalators
- Grid infrastructure
 - Smart meters –water meter, gas meter, electricity meter, and heat cost allocator
 - Grid communications – wireless communications – Long-range sensor applications
 - Other alternative energy – energy harvesting, solar inverters
- Industrial transport – asset tracking
- Factory automation and control
- Medical
- Electronic point of sale (EPOS) – Electronic Shelf Label (ESL)
- Personal Electronics
 - Connected peripherals – consumer wireless module
 - Home theater & entertainment – smart speakers, set-top box
 - Gaming
 - Wearables (non-medical)
- Wireless Modules
 - Wireless third party modules
 - Wireless communications modules

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1. References

- [1] CC1354P10 resources: <https://www.ti.com/product/CC1354P10>
- [2] CC1352P7 resources: <https://www.ti.com/product/CC1352P7>
- [3] CC1352P resources: <https://www.ti.com/product/CC1352P>

2. Block Diagram

The module, as seen in Figure 2-1, comprises of:

- 48-MHz XTAL
- 32.768-kHz XTAL
- Power inductors and capacitors
- Pull-up resistor
- Passive balun filter
- Decoupling capacitors
- Matching circuit
- U.FL connector (optional)
- 32Mbit SPI flash memory (optional)

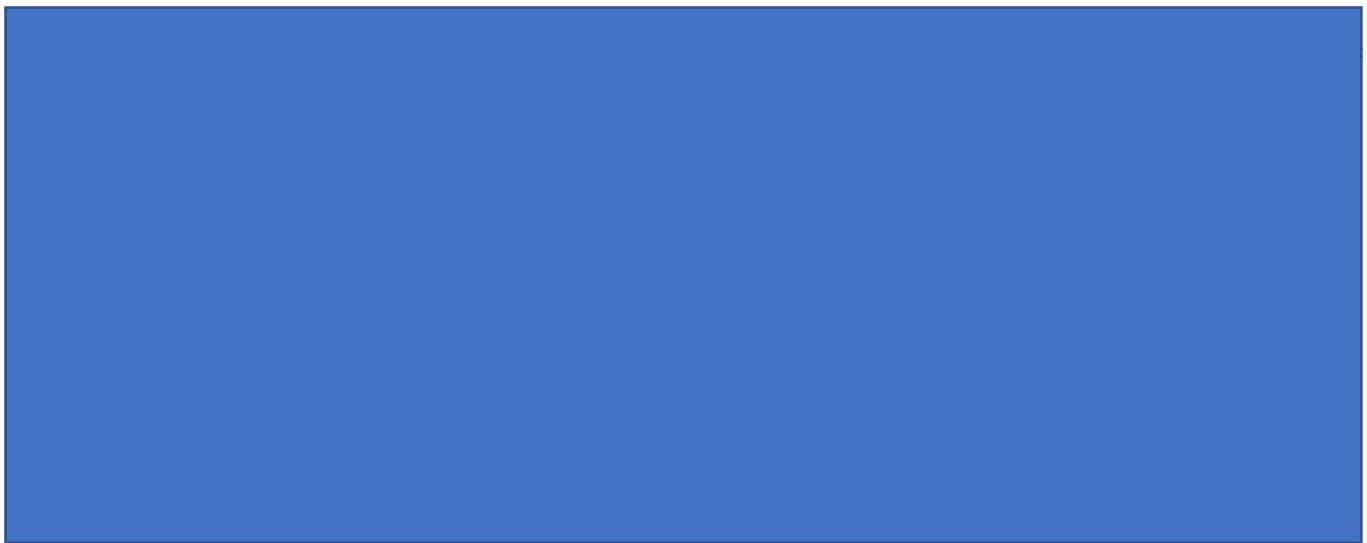
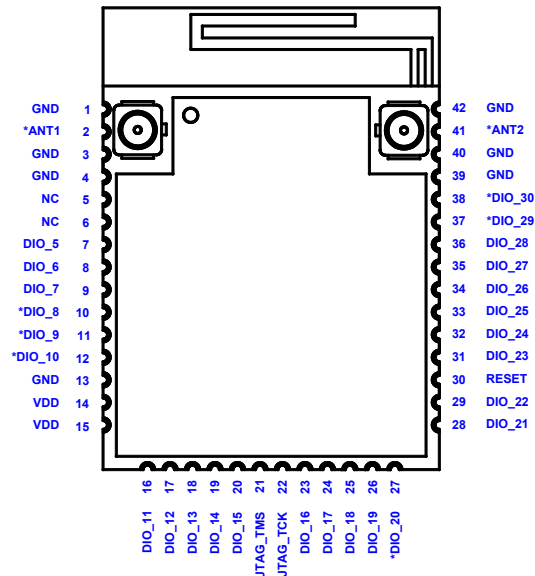


Figure 2-1. BDE-MB13P1 Module Block Diagram

3. Terminal Configuration and Functions

3.1. Pin Diagram



Notes:

- DIO_8, DIO_9, DIO_10 and DIO_20 are assigned to the on-module SPI flash, therefore, please leave those four pins NC if the SPI flash versions are selected;
- Pin 2 and Pin 41 is for connecting external antenna for ANT pin variants, leave this pin NC. (Pin 2 is for Sub-1GHz and Pin 41 is for 2.4 GHz).

Figure 3-1. Pin Diagram (Top View)

3.2. Pin Attributes and Pin Multiplexing

Table 3-1 describes the definitions of the pins of the module. Pin number of the chip is also stated here, because the VQFN pin is referred to in the software design kit (SDK).

Table 3-1. Pin Description ⁽¹⁾

Module Pin #	Pin Name	Type	Description
1	GND	Ground	Power ground
2	ANT1	RF	Antenna port for Sub-1GHz
3	GND	Ground	Power ground
4	GND	Ground	Power ground
5	NC	-	No connect
6	NC	-	No connect
7	DIO_5	I/O	GPIO, high-drive capability
8	DIO_6	I/O	GPIO, high-drive capability
9	DIO_7	I/O	GPIO, high-drive capability
10	DIO_8	I/O	GPIO, assigned as SPI_MISO of on-module SPI flash in BDE-MB1354P101XX32
11	DIO_9	I/O	GPIO, assigned as SPI_MOSI of on-module SPI flash in BDE-MB1354P101XX32
12	DIO_10	I/O	GPIO, assigned as SPI_SCLK of on-module SPI flash in BDE-MB1354P101XX32
13	GND	Ground	Power ground
14	VDD	Power	Power supply
15	VDD	Power	Power supply
16	DIO_11	I/O	GPIO
17	DIO_12	I/O	GPIO
18	DIO_13	I/O	GPIO

Module Pin #	Pin Name	Type	Description
19	DIO_14	I/O	GPIO
20	DIO_15	I/O	GPIO
21	JTAG_TMSC	I/O	JTAG TMS, high-drive capability
22	JTAG_TCKC	I	JTAG TCK
23	DIO_16	I/O	GPIO, JTAG_TDO, high-drive capability
24	DIO_17	I/O	GPIO, JTAG_TDI, high-drive capability
25	DIO_18	I/O	GPIO
26	DIO_19	I/O	GPIO
27	DIO_20	I/O	GPIO, assigned as SPI_CS of on-module SPI flash in BDE-MB1354P101XX32
28	DIO_21	I/O	GPIO
29	DIO_22	I/O	GPIO
30	RESET	I	Reset, active low, 100K ohm internal pull-up resistor
31	DIO_23	I/O	GPIO, analog capability
32	DIO_24	I/O	GPIO, analog capability
33	DIO_25	I/O	GPIO, analog capability
34	DIO_26	I/O	GPIO, analog capability
35	DIO_27	I/O	GPIO, analog capability
36	DIO_28	I/O	GPIO, analog capability
37	DIO_29	I/O	GPIO, analog capability, assigned as RF switch control pin, leave NC
38	DIO_30	I/O	GPIO, analog capability, assigned as RF switch control pin, leave NC
39	GND	Ground	Power ground
40	GND	Ground	Power ground
41	ANT2	RF	Antenna port for 2.4 GHz
42	GND	Ground	Power ground

4. Specifications

4.1. Absolute Maximum Ratings

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, so functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification are not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

PARAMETER	MIN	MAX	UNIT	Notes
VDD	-0.3	4.1	V	
Voltage on any digital pins	-0.3	VDD+0.3≤4.1	V	
Voltage on ADC input	-0.3	VDDS	V	Voltage scaling enabled
	-0.3	1.49	V	Voltage scaling disabled, internal reference
	-0.3	VDD/2.9	V	Voltage scaling disabled, VDD as reference
Storage temperature	-40	125	°C	

4.2. Recommended Operating Conditions

PARAMETER	MIN	TYP	MAX	UNIT	NOTE
VDD	1.8	3.3	3.8	V	
	2.3	3.3	3.8	V	SPI flash variants
Operating temperature	-40	-	85	°C	
	-40	-	105	°C	-IN variants
Rising supply voltage slew rate	0		100	mV/μs	
Falling supply voltage slew rate	0		20	mV/μs	

5. Mechanical Specifications

5.1. Dimensions

The following pages include mechanical, footprint drawings, and marking information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document.

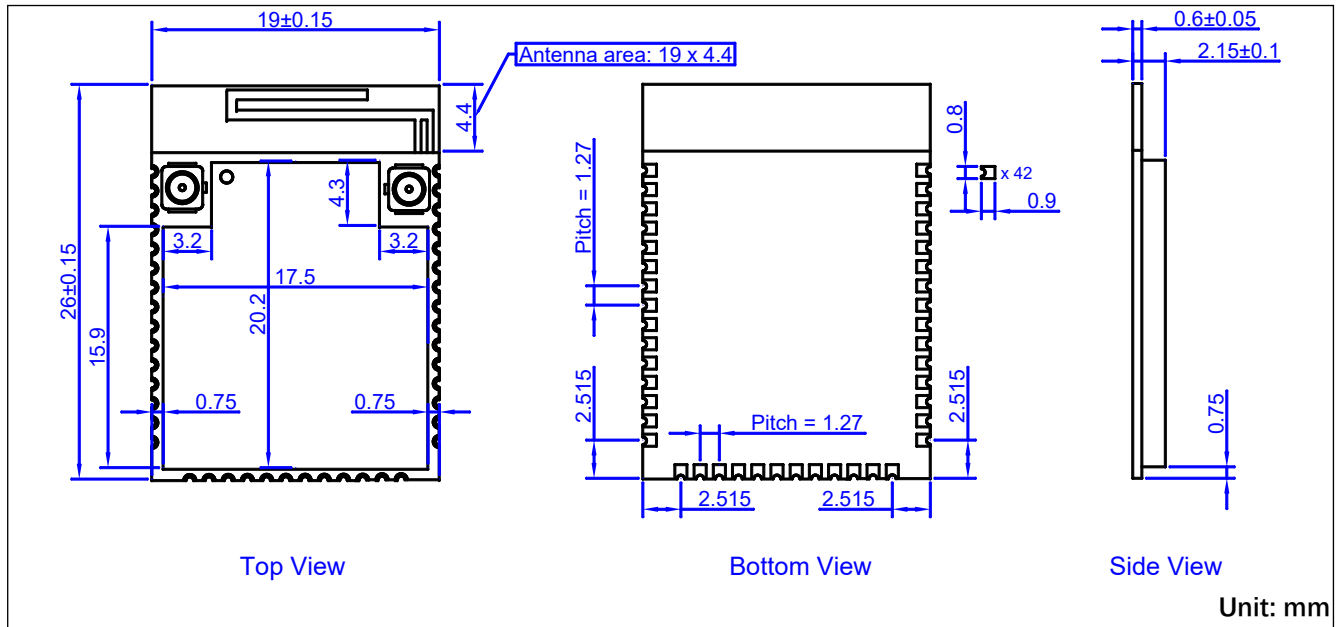


Fig 5-1. Mechanical Drawing

5.2. PCB Footprint

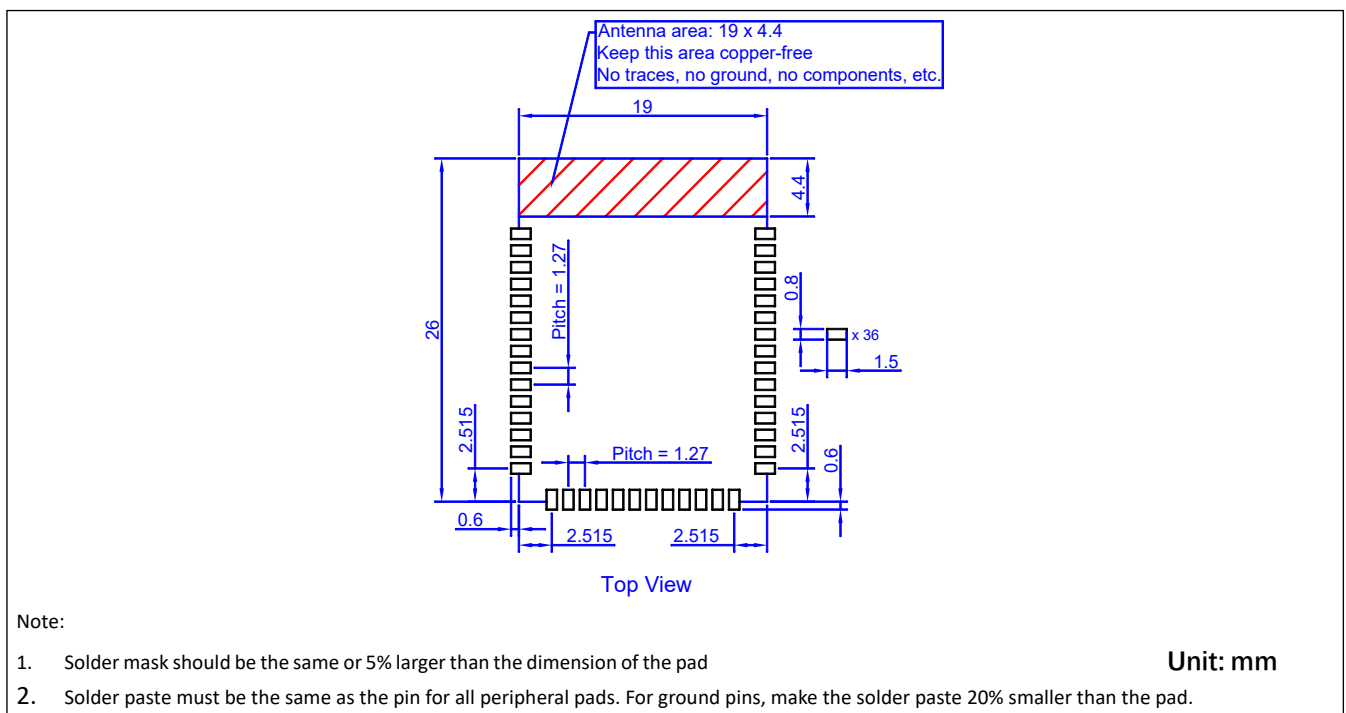


Fig 5-2. Module Footprint Top View

6. Typical Reflow Profile

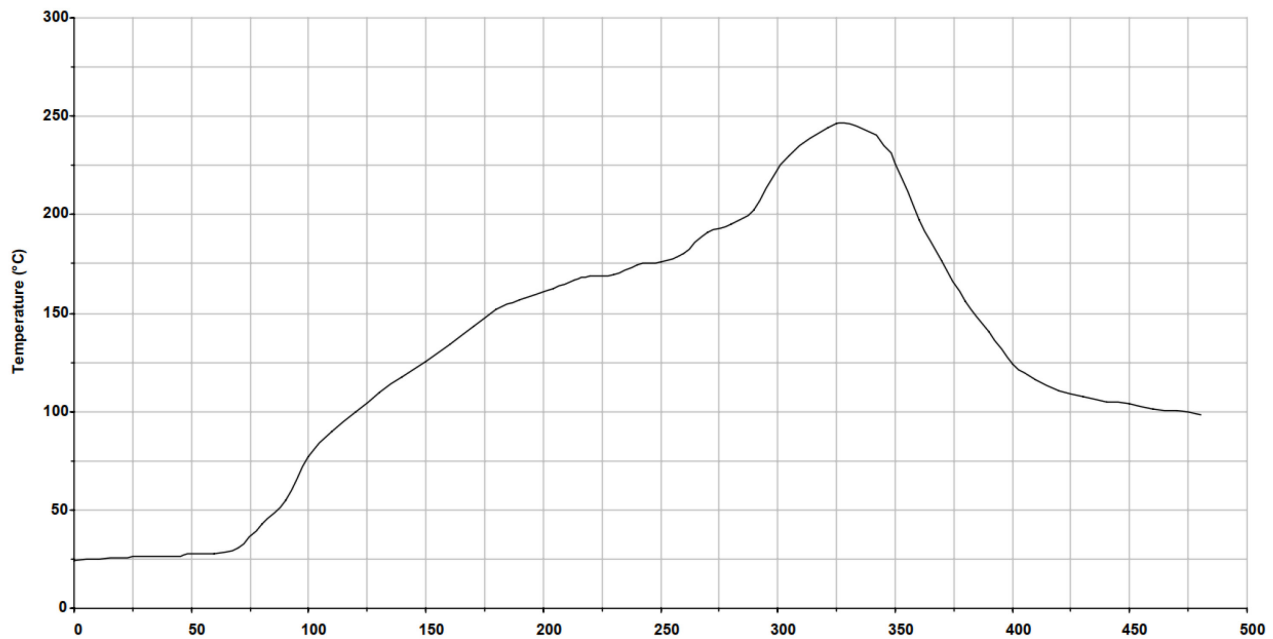


Figure 6-1. Typical Reflow Profile

Key features of the profile:

- Initial ramp = 1-2.5°C/sec to 175°C ±25°C equilibrium
- Equilibrium time = 60 to 180 seconds
- Ramp to maximum temperature (245°C) = 3°C/sec max.
- Time above liquidus temperature (217°C): 45-90 seconds
- Device absolute maximum reflow temperature: 260°C

7. Certification

7.1. Regulatory Compliance

The module is certified for FCC, IC/ISED and ETSI/CE as listed in below table. More regions can be cover by request.

Table 7-1. Certification Information

Regulatory Body / Region	ID	MPN
FCC (USA)	2ABRU-MB13P1	BDE-MB1354P101UA32
IC/ISED (Canada)	25657-MB13P1	BDE-MB1354P101NA32
ETSI/CE (Europe)	NA	BDE-MB1354P101UU32
		BDE-MB1354P101NU32
		BDE-MB1354P101UN32
		BDE-MB1354P101NN32
		BDE-MB1354P101UA0
		BDE-MB1354P101NA0
		BDE-MB1354P101UU0
		BDE-MB1354P101NU0
		BDE-MB1354P101UN0
		BDE-MB1354P101NN0
		BDE-MB1354P101UA32-IN
		BDE-MB1354P101NA32-IN
		BDE-MB1354P101UU32-IN
		BDE-MB1354P101NU32-IN
		BDE-MB1354P101UN32-IN
		BDE-MB1354P101NN32-IN
		BDE-MB1354P101UA0-IN
		BDE-MB1354P101NA0-IN
		BDE-MB1354P101UU0-IN
		BDE-MB1354P101NU0-IN
		BDE-MB1354P101UN0-IN
		BDE-MB1354P101NN0-IN
		BDE-MB1352P71UA32
		BDE-MB1352P71NA32
		BDE-MB1352P71UU32
		BDE-MB1352P71NU32
		BDE-MB1352P71UN32
		BDE-MB1352P71NN32
		BDE-MB1352P71UA0
		BDE-MB1352P71NA0
		BDE-MB1352P71UU0
		BDE-MB1352P71NU0

Regulatory Body / Region	ID	MPN
		BDE-MB1352P71UN0 BDE-MB1352P71NN0 BDE-MB1352P71UA32-IN BDE-MB1352P71NA32-IN BDE-MB1352P71UU32-IN BDE-MB1352P71NU32-IN BDE-MB1352P71UN32-IN BDE-MB1352P71NN32-IN BDE-MB1352P71UA0-IN BDE-MB1352P71NA0-IN BDE-MB1352P71UU0-IN BDE-MB1352P71NU0-IN BDE-MB1352P71UN0-IN BDE-MB1352P71NN0-IN BDE-MB1352P1UA32 BDE-MB1352P1NA32 BDE-MB1352P1UU32 BDE-MB1352P1NU32 BDE-MB1352P1UN32 BDE-MB1352P1NN32 BDE-MB1352P1UA0 BDE-MB1352P1NA0 BDE-MB1352P1UU0 BDE-MB1352P1NU0 BDE-MB1352P1UN0 BDE-MB1352P1NN0 BDE-MB1352P1UA32-IN BDE-MB1352P1NA32-IN BDE-MB1352P1UU32-IN BDE-MB1352P1NU32-IN BDE-MB1352P1UN32-IN BDE-MB1352P1NN32-IN BDE-MB1352P1UA0-IN BDE-MB1352P1NA0-IN BDE-MB1352P1UU0-IN BDE-MB1352P1NU0-IN BDE-MB1352P1UN0-IN BDE-MB1352P1NN0-IN

7.2. Antenna

Table 7-2. Certified Antenna List

Manufacturer	Manufacturer Part Number	Antenna Type	Frequency Range (MHz)	Gain (dBi)	Note
BDE	BDE-ANT-MB13	PCB trace antenna	2400 - 2450	0.8	Integrated
BDE	BDE-W89-20713-HRP	Whip antenna	863 - 930	3.8	External
BDE	BDE-W25-19513-HRP	Whip antenna	2400 - 2500	3.0	External

7.3. FCC Compliance

7.3.1. FCC Statement

This device complies 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.

7.3.2. FCC Caution

Any changes or modifications to this unit not expressly approved by BDE for compliance could void the user's authority to operate the equipment. The integrator will be responsible to satisfy SAR/RF Exposure requirements, when the module integrated into the host device.

7.3.3. Integration Instructions

List of applicable FCC rules

FCC Part 15.247

Specific operational use conditions

This transmitter/module and its antenna(s) must not be co-located or operating in conjunction with any transmitter. This information also extends to the host manufacturer's instruction manual.

Limited module procedures

Not applicable

Trace antenna designs

Not applicable

RF exposure considerations

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This compliance to FCC radiation exposure limits for an uncontrolled environment, and minimum of 20cm separation between antenna and body. The host product manufacturer would provide the above information to end users in their end-product manuals.

Antennas

Refer to Table 7-2

Label and compliance information

The end product must carry a physical label or shall use e-labeling followed KDB784748D01 and KDB784748 stating "Contains Transmitter Module FCC ID: 2ABRU-MB13P1".

Information on test modes and additional testing requirements

Contact BDE for more information.

Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed when contains digital circuitry.

(OEM) Integrator has to assure compliance of the entire end-product that includes the module. For 15 B (§15.107 and if applicable §15.109) compliance, the host manufacturer is required to show compliance with 15 while the module is installed and operating.

Furthermore, the module should be transmitting and the evaluation should confirm that the module's intentional emissions (15C) are compliant (fundamental / out-of-band). Finally, the integrator has to apply the appropriate equipment authorization (e.g. Verification) for the new host device per definition in §15.101. Integrator is reminded to assure that these installation instructions will not be made available to the end-user of the final host device.

7.4. IC/ISED Compliance

7.4.1. IC Statement

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(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.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

7.4.2. IC Caution

Any changes or modifications to this unit not expressly approved by BDE for compliance could void the user's authority to operate the equipment. The integrator will be responsible to satisfy SAR/RF Exposure requirements, when the module integrated into the host device.

7.4.3. Integration Instructions

Label and compliance information

The final host device, into which this RF module is integrated has to be labeled with an auxiliary label stating the IC of the RF module, such as "Contains transmitter module IC: 25657-MB13P1".

Informations sur l'étiquette et la conformité

Le périphérique hôte final, dans lequel ce module RF est intégré "doit être étiqueté avec une étiquette auxiliaire indiquant le CI du module RF, tel que "Contient le module émetteur IC: 25657-MB13P1".

Radio Frequency Exposure Statement for IC

The device has been evaluated to meet general RF exposure requirements. The device can be used in mobile exposure conditions. The min separation distance is 20cm.

Déclaration d'exposition aux radiofréquences pour IC

L'appareil a été évalué pour répondre aux exigences générales en matière d'exposition aux RF. L'appareil peut être utilisé dans des conditions d'exposition mobiles. La distance de séparation minimale est de 20 cm. (TBD)

This radio transmitter [IC: 25657-MB13P1] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed in Table 6, 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.

Cet émetteur radio [IC: 25657-MB13P1] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous, avec le gain maximal admissible indiqué. Les types d'antenne non inclus dans cette liste qui ont un gain supérieur au gain maximum indiqué pour tout type répertorié sont strictement interdits pour une utilisation avec cet appareil.

7.5. ETSI/CE Compliance

The module is certified with required EU radio and EMC directives. See Table 7-1 for detailed standards the module complies with, or refer to UK Declaration of Conformity.

8. Ordering Information

Part Number	Core Chip	Size (mm)	Operation Temperature	Shipping Form	MOQ
BDE-MB1354P101NN32	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NU32	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NA32	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UN32	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UU32	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UA32	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NN0	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NU0	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NA0	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UN0	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UU0	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UA0	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NN32-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NU32-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NA32-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UN32-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UU32-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UA32-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NN0-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NU0-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101NA0-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UN0-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UU0-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1354P101UA0-IN	CC1354P106TORGZ	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NN32	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NU32	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NA32	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UN32	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UU32	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UA32	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NN0	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NU0	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NA0	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UN0	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UU0	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UA0	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NN32-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NU32-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NA32-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UN32-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UU32-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UA32-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NN0-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NU0-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71NA0-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UN0-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UU0-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P71UA0-IN	CC1352P74TORGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NN32	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NU32	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NA32	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K

Part Number	Core Chip	Size (mm)	Operation Temperature	Shipping Form	MOQ
BDE-MB1352P1UN32	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UU32	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UA32	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NN0	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NU0	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NA0	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UN0	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UU0	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UA0	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NN32-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NU32-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NA32-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UN32-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UU32-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UA32-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NN0-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NU0-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1NA0-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UN0-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UU0-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K
BDE-MB1352P1UA0-IN	CC1352P1F3RGZR	26 × 19 × 2.15	-40 to +85°C	Tape & Reel	1K

9. Revision History

Revision	Date	Description
V1.0	8-June-2023	Initial release

You can find the latest documentation from this [Link](#).

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