BM026
Bluetooth Low Energy Module
Datasheet

Version 1.3

Issued date: Aug 21, 2019

TABLE OF CONTENTS

Revision History

Revision	Date	Description
V1.0	2018/07/01	Initial release
V1.1	2018/10/08	Added ADC PIN
V1.2	2019/03/16	Modify spec
V1.3	2019/08/21	Added Certification information

1. BNC BLE Module

BM026
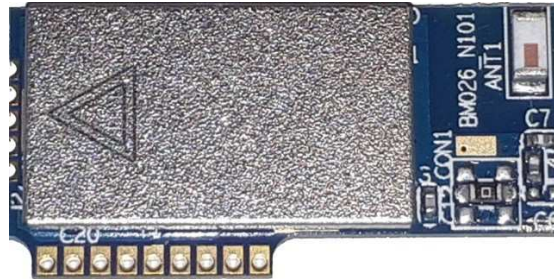
1.1 Introduction

BM026 Bluetooth® module is a Telink's 32Bit MCU SoC Bluetooth low energy products for the Bluetooth Smart market. BM026 increases application code and data space for greater application development flexibility. It is slim and light so the designers can have better flexibilities for the product shapes.

The BM026 Bluetooth module compatible with Bluetooth standard and supports BLE specification up to version 4.2.It supports profiles for health and fitness sensors, watches, i-Beacon, It's Also support BLE Mesh protocol for Smart Lighting ,Mesh Gateway ,IoT system leave network topology application . It integrates BLE/15.4 2.4G RF Baseband controller, antenna, The BM026P PA Version It integrates a high-efficiency PA IC ,It with 20dBm RF Output Power for Long-distance applications. And it also provides UART /i2C/SPI interface, programmable I/O,ADC etc.

1.2 Feature

Specification

Module Name	BM026
Chips ID	TLSR8269 F512ET32
Wireless Protocol	BLE up to version 4.2
Transceiver Type	1TX x 1RX
Data Rate	1 Mbps and 2 Mbps LE Enhancement FIPD Version
Operating Frequency	2402MHz~2480MHz
Antenna	Onboard Chips Antenna
Transmission Range	>70M (open side)

RF Output Power	+7 dBm,
Power Consumption	TX: 30~35mA / RX: 20
Interface Port	USB ,5 x PWM ,or 1 x I2C,1 x UART,5x GPIO, total 7 GPIOs for Option Pin define
Processor	Embedded 32 Bit MCU with clock Up to 48Mhz
Memory	Build-in 512KB Program Flash ,16KB SRAM
Security	Hardware AES-128 Encryption
Firmware Upgrade	OTA (Over the Air) or SWS wire Port
Power Supply	DC 1.9V~3.6V
Operating Environment	-40 ~ +85°C(VT to +125°C) , 0~95% RH
Dimensions	27(L) x 13.5(W) x 2.5(H) mm(PCB 1.0mm)
Environmental standard	RoHS-compliant and 100% lead (Pb)-free.

2. Ordering Information

BM026<u>**XXX**</u>**-**<u>**X**</u>** S S**

Software Ttpe:

Hardware Type:
E = External RF Pin out Version
C = Onboard Chips Antenna Version

P9E = TLSR8269 Topr -40~85°C With PA Versions
P9V = TLSR8269 Topr -40~125°C With PA Versions
N9E = TLSR8269 Topr -40~85°C Versions
N9V = TLSR8269 Topr -40~125°C Versions
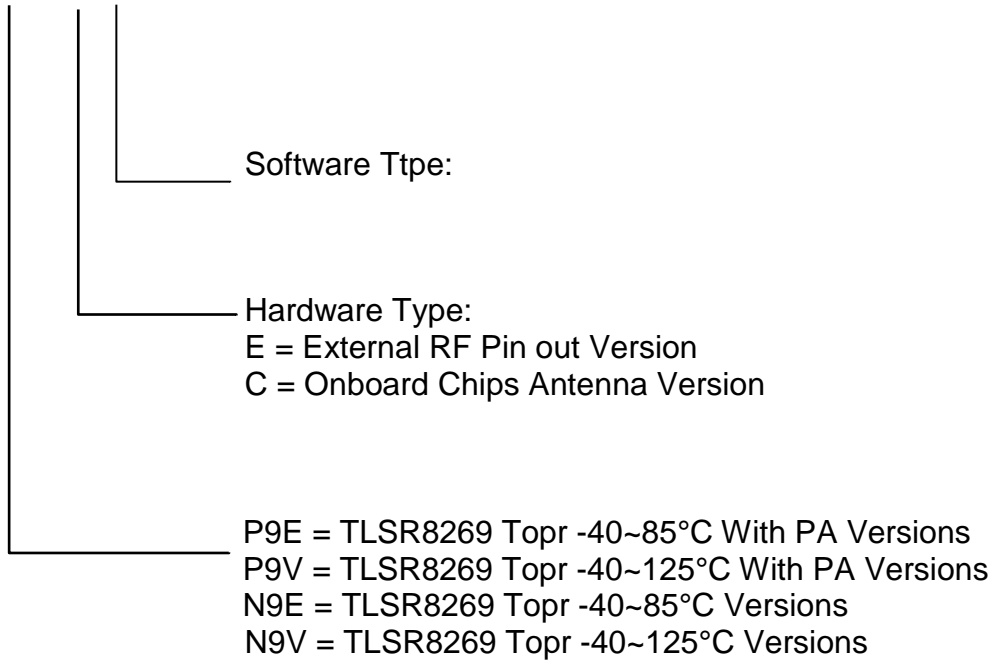
3. Pin Configurations

3.1 Pin Assignments

BM026 Pin -Out
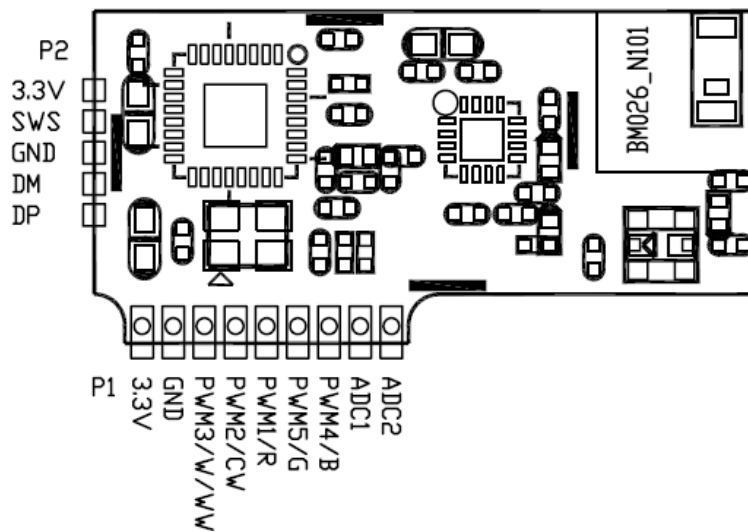
3.2 Pin Description

P1 Pin Define

Pin No	Pin name	Type	Description
1	3.3V	Power	Power Source
2	GND	GND	Ground
3	PWM3/C3	I/O	PWM3,GPIO_PC3,UART_RX
4	PWM2/C2	I/O	PWM2,GPIO_PC2,UART_TX
5	PWM1/A3	I/O	PWM1,GPIO_PA3(PB7), I2C_SCK(by soft)
6	PWM5/B6	I/O	PWM5,GPIO_PB6, I2C_SDA(by soft)
7	PWM4/B4	I/O	PWM4,GPIO_PB4
8	ADC1/B1	I/O	ADC1,GPIO_PB1
9	ADC2/B5	I/O	ADC1,GPIO_PB5

PA Version Control Pin Define

Pin No	Pin name	Type	Description
1	TX_EN/D2	O	PA IC TX Enable, GPIO_PD2
2	RX_EN/C5	O	PA IC RX Enable, GPIO_PC5

Mesh Lighting Application Table

Pin	Application	LED Lighting								
	Product type	Single	CW /WW	RGB	RGBW	RGB/ WW_CW				
	Type Code	01	02	03	04	05				
1	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V				
2	GND	GND	GND	GND	GND	GND				
3	PWM3/C3	Lum	WW		WW	WW				
4	PWM2/C2	On/Off Rly hi Act	CW			CW				
5	PWM1/A3			R	R	R				
6	PWM5/B6			G	G	G				
7	PWM4/B4	On/Off DI_Lo Act		B	B	B				
8	ADC1/B1	i-Detc	i-Detc	i-Detc	i-Detc	i-Detc				
9	ADC2/B5	V-Detc	V-Detc	V-Detc	V-Detc	V-Detc				

P2 Pin Define

Pin No	Pin name	Type	Description
1	3.3V	Power	Power Source

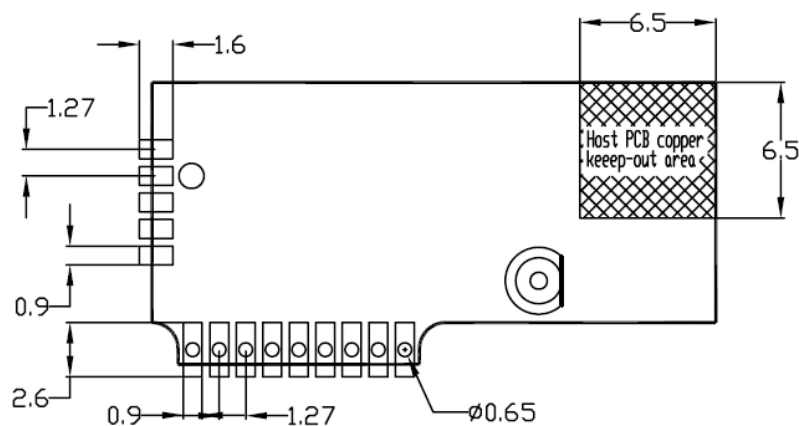| 2	SWS	I/O	GPIO_PB0,PWM2,Single Wire Slave
3	GND	GND	Ground
4	DM	I/O	GPIO_PE2,USB Date Minus
5	DP	I/O	GPIO_PE3,USB Date Positive

4. Outline Drawing

4.1 Board Dimensions (Unit: mm)
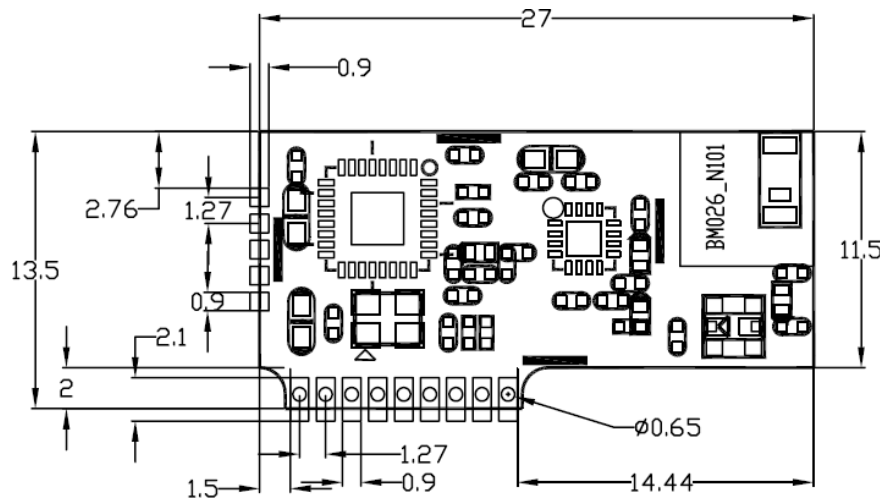
Note:
 ＊The P1 Slot All of Pin have 0.65mm hole design, It can use 1x9 1.27mm pith pin header parts to connection host board

5. Host PCB Footprint (Unit: mm)

Note:
 ＊When Use the BM026 Module to design product. Please Layout BM026 in the upper right corner of the Host PCB, So as to ensure a good antenna efficiency.
 ＊Demarcation specifies the "Host PCB copper keep-out area"
 ＊The 6.5mm x 6.5mm area specifies copper keep-out component layer

6. Electrical Characteristics

Absolute Maximum Ratings :

Symbol	Parameters	Maximum rating	Unit
VDD	Power Supply Voltage	-0.3 to 3.9	V
Tstr	Storage Temperature	-65 to +150	°C
Tsld	Soldering Temperature	260	°C
VESD	ESD protection (HBM)	2000	V

Operating Conditions

	Min.	Typ.	Max.	Unit
Supply Voltage VDD	1.9	3.3	3.6	V
I/O Supply Voltage		3.3+/-10%		V
Temperature Range (ET Versions)	-40	-	85	ºC
Temperature Range (VT Versions)	-40	-	105	ºC

DC Electrical Characteristics

	Min.	Max.	Unit
V_{IL} Input Voltage Low	VSS	0.3VDD	V
V_{IH} Input Voltage High	0.7VDD	VDD	V
V_{OL} Output Voltage Low, (IO is 4~16mA)	VSS	0.3	V
V_{OH} Output Voltage High, (IO is 4~16mA)	VDD	VDD-0.3	V

USB Electrical Characteristics
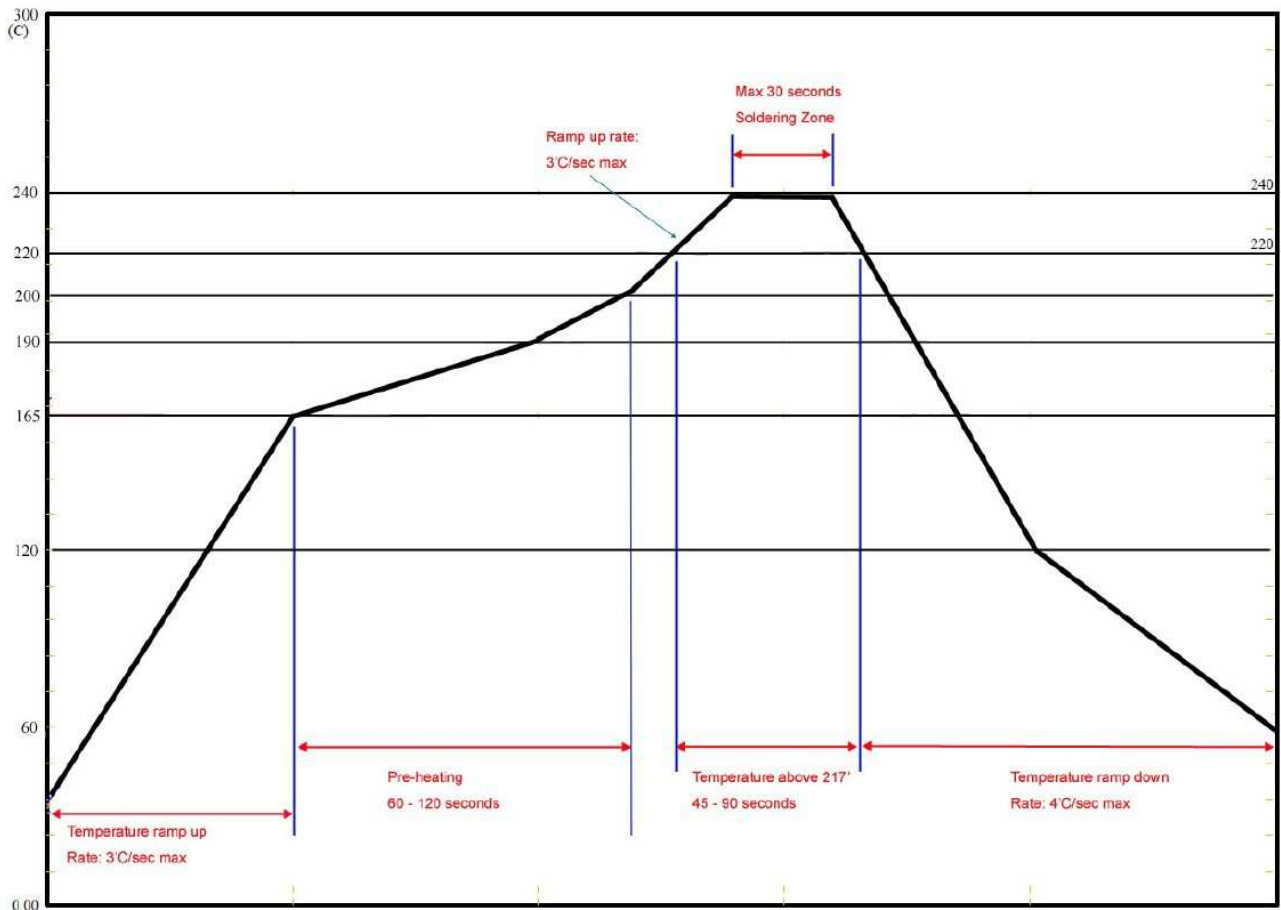
	Min.	Max.	Unit
USB Output Signal Cross-over Voltage Vcrs	1.7	2.0	V

Current Consumption

(VDD = 3.3V, TA = 25°C, unless otherwise specified)

	Min.	Avg.	Max.	Unit
TX Current (Continuous Tx 0dbm)		15		mA
RX Current (Continuous Rx Reception)		12		mA
TX Current (with PA Tx 20dbm)		180~210		mA
RX Current (With PA Rx Reception)		30		mA
Suspend Mode Current		0.6		mA

7. Recommended Temperature Reflow Profile

Manual Soldering Conditions: 360'C, 5 seconds, 3 times max

Maximum number of reflow cycles: 2
Opposite side reflow is prohibited due to the module's weight. (i.e. you must not place the module on the
bottom / underside of your PCB and reflow).

7.1 Hand Soldering

Hand soldering is possible. When using a soldering iron, follow IPC recommendations (reference document IPC-7711).

7.2 Rework

The module can be unsoldered from the host board. Use of a hot air rework tool should be programmable and the solder joint and module should not exceed the maximum peak reflow temperature of 250°C.

If temperature ramps exceed the reflow temperature profile, module and component damage may occur due to thermal shock. Avoid overheating. Never attempt a rework on the module itself, (e.g. replacing individual components).

7.3 Cleaning

In general, cleaning the populated modules is strongly discouraged. Residuals under the module cannot be easily removed with any cleaning process. Use of "No Clean" soldering paste is strongly recommended, as it does not require cleaning after the soldering process.

8. Application Notes

8.1 Flash Use

The BM026 Module has been calibrated by RF before leaving the factory , That has various ID and parameter information of the BM026 module need to be retained, Please don't use the "EraseF" button to erase the All Flash of the BM025 module

8.2 Mounting

BM026 has two sets of soldering pads, which allow it to be mounted both in horizontal and vertical position. In some application, such as LED drivers, there are large components which could affect the antenna performance greatly if the module is mounted at the bottom of the device horizontally on the main PCB. Also, horizontally mounted module has much larger footprint compared to vertically mounted module.

For such cases the module can be mounted in vertical position, either by soldering it to a 1x9 1.27 mm pitch 1-row pin header, or by soldering the module directly into a routed slot on the main PCB.

When mounted in horizontal position there will have to be two keep-out areas; one for the antenna area and one for the unused pads used for vertical assembly.

9. Compliance information

Compliance Information			
Radio	USA	FCC Part 15 Subpart C	
	FCC ID (BM026):	2AUGR-BTM002	
	Bluetooth (BQB)	Bluetooth Product Listing	
	Declaration ID (DID)	Not Ready	
	Model Number:	BM026P9E-C SS BM026P9V-C SS	
Environmental	RoHS	RoHS compilant	
	REACH	REACH compilant	

9.1 Federal Communications Commission (FCC) Statement

Compliance 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.

Warning

Any Changes or modifications not expressly approved by Halco Lighting could void the user's authority to operate the equipment.

FCC Interference Statement

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 interfer-ence 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 meas- ures:

- 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.

It is the host manufacturer's responsibility to ensure continued compliance with FCC requirements once the module has been installed in to the host product.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This device is intended only for OEM integrators under the following conditions:

In accordance with FCC Part 15C and RSS-210, this module is   listed as a Modular Transmitter device.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The antenna of this transmitter must not be co-located or operating in conjunction with any other antenna or transmitters within a host device, except   in accordance with FCC multitransmitter product approval procedures.

End Product Labeling

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: [2AUGR-BTM002]" or "Contains FCC ID: [2AUGR-BTM002]." Any similar wording that expresses the same meaning may be used. Additionally, there must be the following sentence on the device, unless it is too small to carry it:
"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."

Manual Information To the End User

The following statements should be inside the user manual of the final products that contains this module:

Changes or modifications not expressly approved by the party responsible for compliance

could void the user's authority to operate the equipment.