

# Lighting Connectivity Module (LCM) Version 4 (LCM4)



Highly integrated 802.11b/g/n Wi-Fi module

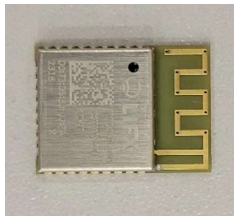
LCM3

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## Features

1. Wi-Fi 1x1 802.11ax/b/g/n, WPA3-R2 **Personal and Enterprise (Without Fast BSS Transition)** authentication
2. Multi-country certified turnkey solution
3. Integrated antenna
4. IPv4 and IPv6 support
5. OTA Firmware Upgrades
6. 100% Production Tested
7. Low Power Consumption
8. Receive sensitivity to -98dBm [802.11b, 1Mbps]
9. 105°C temperature rating available
10. 3.0 ~ 3.6V Supply Range
11. Simple Design-In
12. Minimal external components
13. Small **13.2×18\*0.8mm [2.3mm w/ shield can] 26-pad** package
14. Standard PCBA process compatible

Photo:



## Description

The LCM4 is a fully integrated 802.11b/g/n embedded module, specifically aimed at the IoT and Lighting market.

Operating from a 3.0 ~ 3.6V supply range [SoC inside could support 3.0-3.6V], the LCM allows simple integration into existing products.

Fully qualified firmware and software are provided, enabling simple design-in.

The module is available with a temperature rating of -30~+105°C, enabling a wide range of lighting applications.

The module is FCC, IC, CE and ROHS certified.



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## Absolute Maximum Ratings

Supply voltage ( $V_{DD}$ )	3.0V-3.6V
Current consumption ( $I_{VDD}$ )	354mA
Input low voltage ( $V_{IL}$ )	-0.3V - 0.25x $V_{DD}$
Input high voltage ( $V_{IH}$ )	0.75x $V_{DD}$ - $V_{DD}$ + 0.3V
Maximum output drive capability ( $I_D$ )	40mA

<b>Operating Temperature Range</b>	-30°C to 105°C
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Note: All the specifications in this chapter have been tested under the following general condition: VDD = 3.3V, Ta = 25°C, unless otherwise specified.

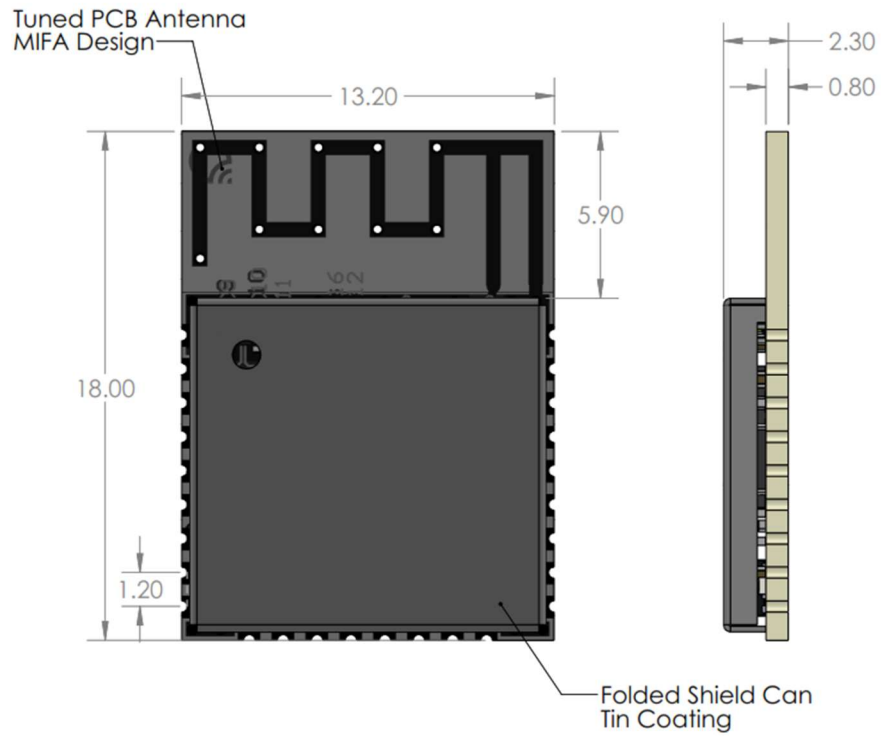
## WiFi Radio Characteristics

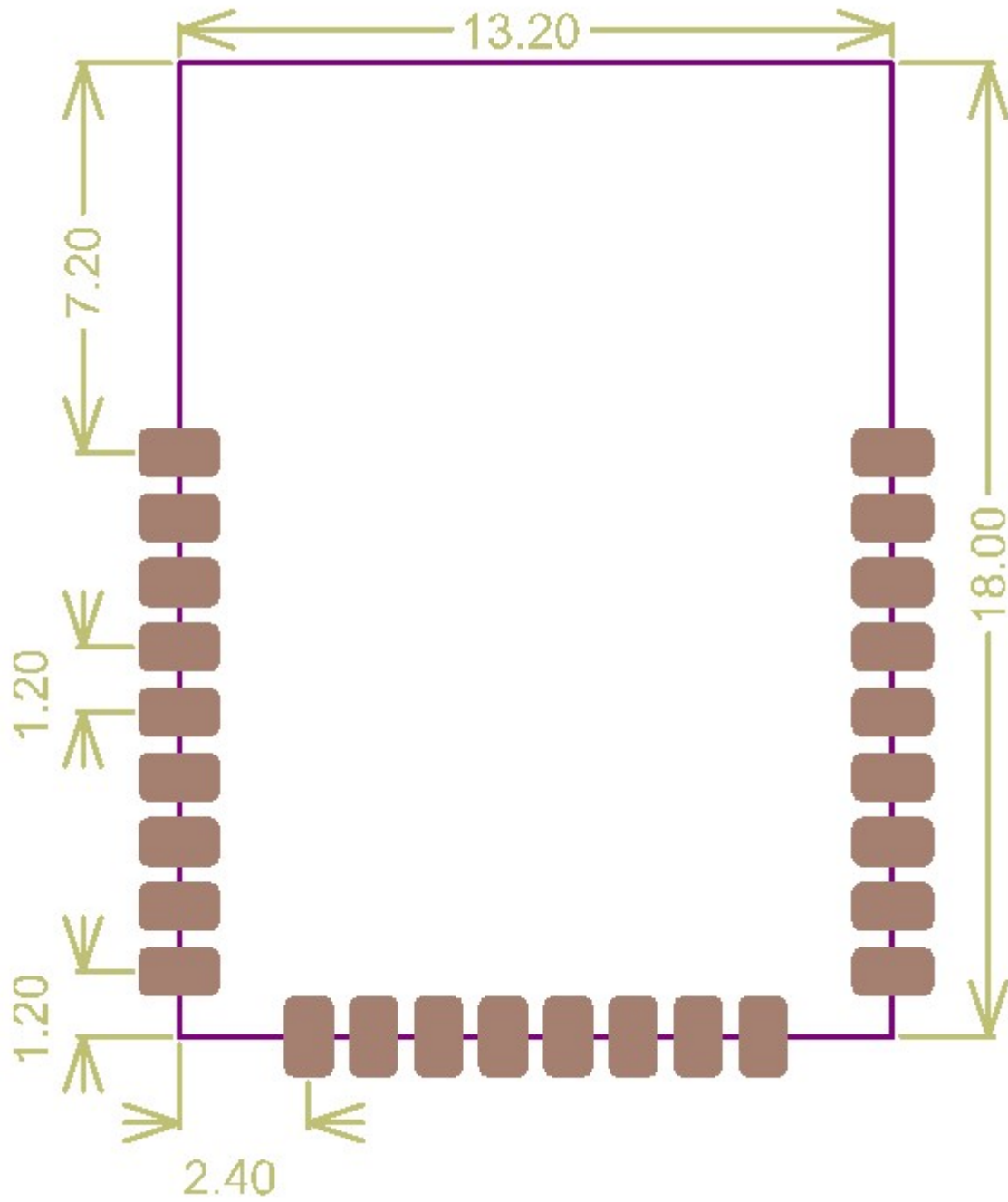
Parameter	Operation Mode	Specification	Unit	
RF Frequency Range	802.11b/g/n	2412-2484	GHz	
Conducted Transmit Power(typical)	802.11b	21.5	dBm	
Receiver Sensitivity(typical)	802.11b	1Mbps	-98	dBm
		11Mbps	-89	
	802.11g	6Mbps	-93	
		54Mbps	-76	
	802.11n	MCS0	-93	
MCS7		-74		

## System Specification

<b>CPU</b>	Two 32-bit RISC CPUs with max 160 MHz internal clock frequency
<b>eFuse</b>	1 Kbit eFuse
<b>Flash Size</b>	4Mb (In-package)
<b>EEPROM</b>	128 Kbits
<b>SRAM</b>	528 KB
<b>ROM</b>	320 KB for booting and core functions

# Mechanical Specification



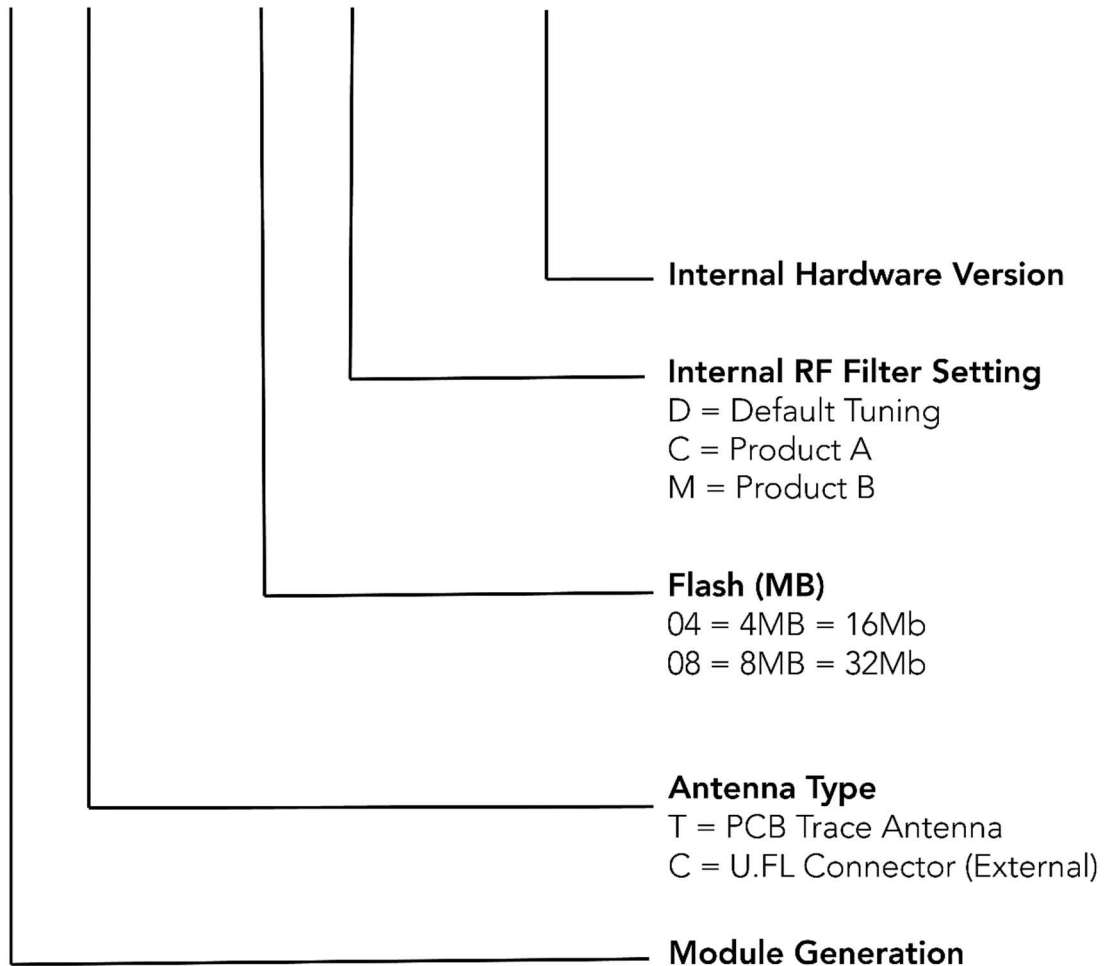


## Design Guidelines

1. The LCM4 driver circuit should be able to handle 100mA average current and up to 700mA surge current for around 2us during data transmission.
2. Test points are needed for GND (Pin1), +VDD (Pin2), CHIP\_UP (Pin3), GPIO8 (Pin12), GPIO9(PIN13), U\_Tx (Pin18) and U\_Rx (Pin19), to do debugging and programming.
3. Make sure the whole PSU you designed consumes no more than 80mW when no module and load is connected, this is to pass Title20 standby power requirement, which is  $\leq 200\text{mW}$ .

## Part Number and Ordering Information

# LCM 4 T - 04 D - 01A



Ordering Code	Antenna	Flash Size
LCM4-04D-01A	Trace	4MB

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## History

Version	Description	Date
1.0	Initial public release version	June 2023



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.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user's authority to operate the equipment.

NOTE: 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 or more 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.

The device has been evaluated to meet general RF exposure requirement, The device can be used in portable exposure condition without restriction. Federal Communication Commission (FCC) Radiation Exposure Statement Power is so low that no RF exposure calculation is needed.

#### Federal Communication Commission (FCC) Radiation Exposure Statement

When using the product, maintain a distance of 20cm from the body to ensure compliance with RF exposure requirements.

This device is intended only for OEM integrators under the following conditions: 1. The antenna must be installed such that 20 cm is maintained between the antenna and users. 2. The transmitter module may not be co-located with any other transmitter or antenna. As long as the two conditions above are met, additional transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required for the installed module.

Important Note: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Federal Communications Commission of the U.S. Government (FCC) and the Canadian Government authorizations are no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator shall be responsible for re-evaluating the end-product (including the transmitter) and obtaining a separate FCC authorization in the U.S. and Canada.

OEM Integrators - End Product Labeling Considerations: This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains, FCC ID: SYW-LCM4". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

OEM Integrators - End Product Manual Provided to the End User: The OEM integrator shall not provide information to the end user regarding how to install or remove this RF module in end product user manual. The end user manual must include all required regulatory information and warnings as outlined in this document.

Appropriate measurements (e.g. 15 B compliance) and if applicable additional equipment authorizations (e.g. SDoC) of the host product to be addressed by the integrator/manufacturer.

This module is only FCC authorized for the specific rule parts 15.247, 15.407 listed on the grant, and the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host product as being Part 15 Subpart B compliant.

IC statements:

This device complies with Industry Canada license-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.

Cet appareil est conforme avec Industrie Canada RSS exemptes de licence standard(s).

Son fonctionnement est soumis aux deux conditions suivantes:

(1) cet appareil ne peut pas provoquer d'interférences, et

(2) cet appareil doit accepter toute interférence, y compris celles pouvant causer un mauvais fonctionnement de l'appareil.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Radiation Exposure Statement:

This equipment complies with IC 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.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

The LCM4 module has been labelled with its own IC number. If the IC number is not visible when the module is installed inside another device, the outside of the finished product into which the module is installed must display a label referring to the enclosed module. This exterior label can use wording as follows:

Contains transmitter module IC : 20416-LCM4

or

Contains IC : 20416-LCM4

Les exigences d'étiquetage de l'hôte dans le manuel de l'utilisateur doivent indiquer ou un libellé similaire exprimant la même signification comme suit :

"Le module LCM4 a été étiqueté avec son propre numéro IC. Si le numéro IC n'est pas visible lorsque le module est installé à l'intérieur d'un autre appareil, l'extérieur du produit fini dans lequel le module est installé doit afficher une étiquette faisant référence au module fourni. Cette étiquette extérieure peut être libellée comme suit:

Contient le module émetteur IC : 20416-LCM4

ou

Contient IC : 20416-LCM4