Revision History

Version	Contents	Date	Note
V0.3	1. Format change 2. Add mechanical data, packing data, quality units	08/07/25	
V1.0	1. Add Mechanical Units 2. Add Quality Units	08/08/26	
V1.1	1. Typing error revised, Si4701 revised to Si4703 (P.6)	08/09/02	

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(1) Introduction

The LOCOSYS TMC-1009 RDS tiny module is designed to allow easy integration of TMC (Traffic Message Channel) functionality in customer portable devices or mobile navigation systems. TMC-1009 can receive and decode the TMC information efficiently and output the data with AdvanceTMC protocol which is NMEA-like ASCII message and downward compatible with OpenTMC v2.0.

1.1 Features

- Tiny module size for easy integration: 10mm x 9mm (0.39 x 0.35 in).
- Worldwide FM band support (76–108 MHz).
- Support European Radio Data System (RDS) and the US Radio Broadcast Data System (RBDS).
- Customized protocol to fit any applications.
- NO any extended fees have to pay.
- SMD type.

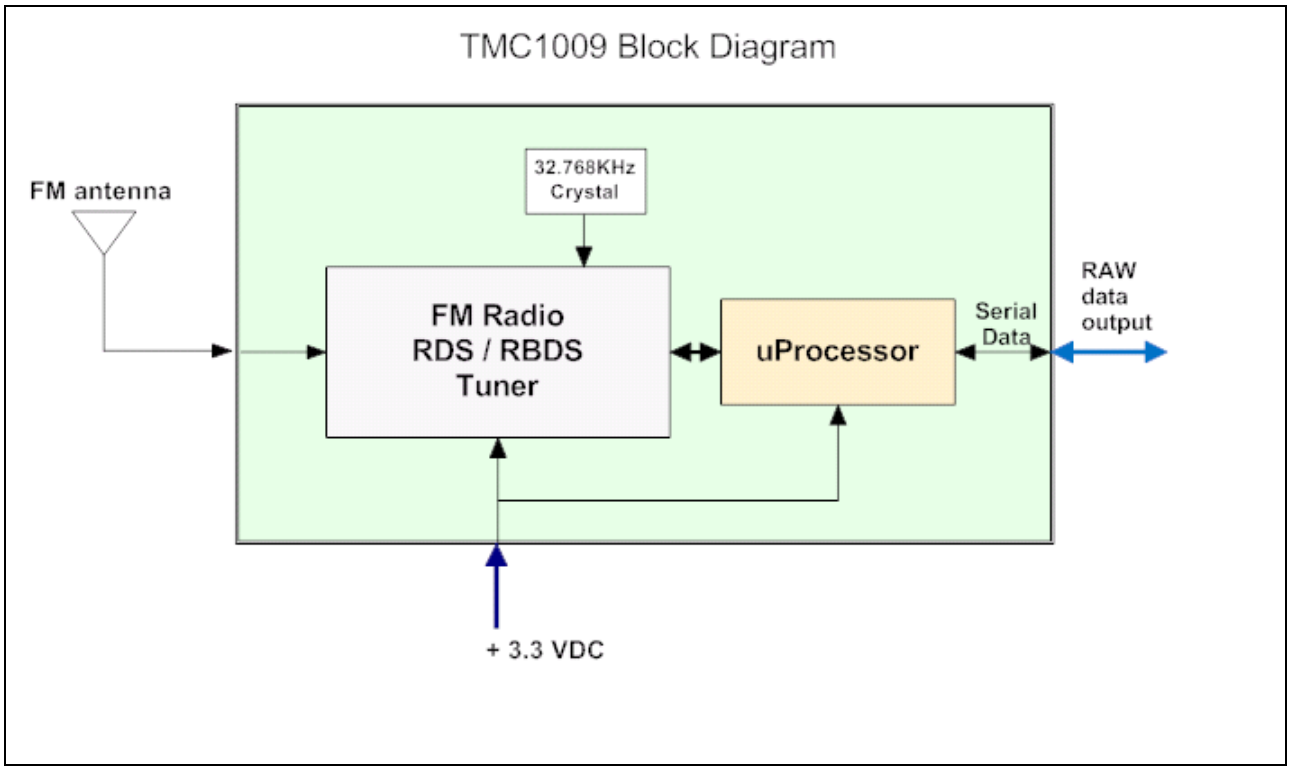
1.2 Data Interface

- CMOS level serial port.
- Baud Rate: 38400 bps.
- Data / Power / RF through 12 surface mount pads.

1.3 Physical Dimensions

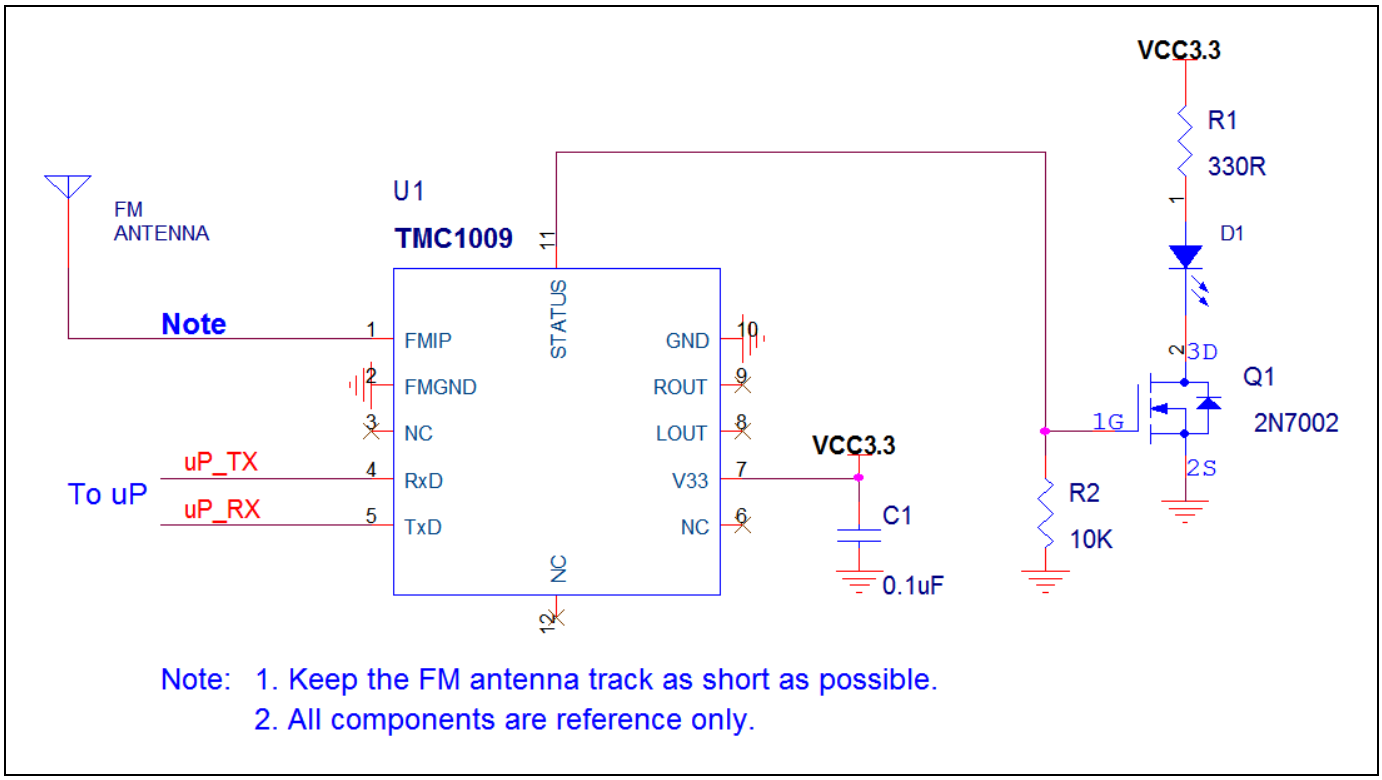
- length: 10.0 mm ± 0.2 mm
- width: 9.0 mm ± 0.2 mm
- thickness: 2.6 mm (max)
- weight: 2.0 g (max)

1.4 Block Diagram



1.5 Applications

- Cellular handsets
- Personal navigation device
- Automotive navigation



Note: 1. Keep the FM antenna track as short as possible.
2. All components are reference only.

1.6 FM Radio Tuner

1. FM radio tuner	
Chip	Silicon Laboratories Si4703
Frequency	87.5~108 MHz (US/Europe, Default)

2. AdvanceTMC protocol messages

AdvanceTMC messages LOCOSYS AdvanceTMC protocol is a NMEA-like ASCII message for easy integration into GPS receivers or other NMEA based devices. Besides, it is downward compatible with OpenTMC v2.0. Some examples of often used commands are listed below. For more detail, please refer to the document of AdvanceTMC.

- Set frequency to 92.1 MHz and lock

  $PLTCM, H2,9210
- Search up for next TMC channel

  $PLTCM,+
- Search down for next TMC channel

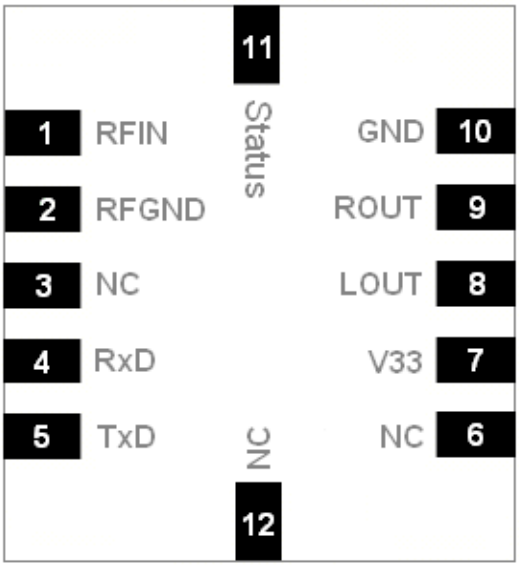
  $PLTCM,-
- Turn on audio output

  $PLTCM, VOL,15
- Turn off audio output

  $PLTCM,VOL,0

(2) Electronics Units

2.1 Interface Pin Function



Pin	SYMBOL	Description
1	RFIN	RF input
2	RFGND	RF Ground
3	NC	No Connection
4	RxD	CMOS level asynchronous data input
5	TxD	CMOS level asynchronous data output
6	NC	No Connection
7	V33	3.3 VDC input
8	LOUT	Left channel audio output
9	ROUT	Right channel audio output
10	GND	Ground
11	Status	TMC Status LED (This pin will go to high 100ms per second when receive TMC datum)
12	NC	No Connection (For further manufacturing use)

2.2 Absolute Maximum Rating

Parameter	Symbol	Ratings	Units
Input Voltage	V_{CC}	-0.3 ~ 3.6	DCV

2.3 Temperature Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Operating Temperature	Topr	-20		+85	℃
Storage Temperature	Tstg	-30		+85	℃

2.4 Electrical Characteristics

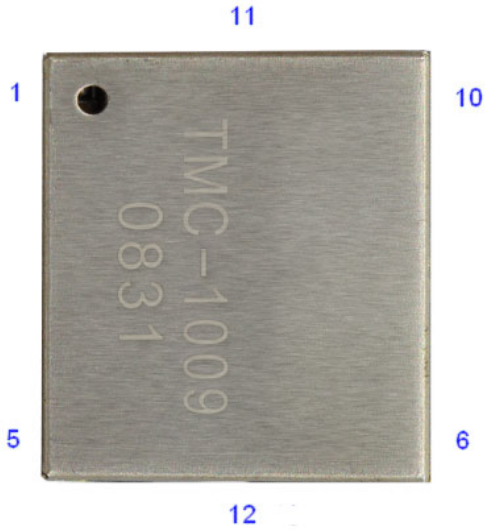
Parameter		Symbol	Conditions	Min.	Typ.	Max	Units
Supply Voltage		V_{CC}		3.0	3.3	3.6	DCV
Supply Current		I_{SS}	V_{CC}=3.3V		24		mA
Output Logic	High	V_{OH}		0.8*V_{CC}		V_{CC}	V
	Low	V_{OL}				0.2* V_{CC}	V
Input Logic	High	V_{IH}		0.7*V_{CC}			V
	Low	V_{IL}				0.3* V_{CC}	V

2.5 RF Receiver Characteristics

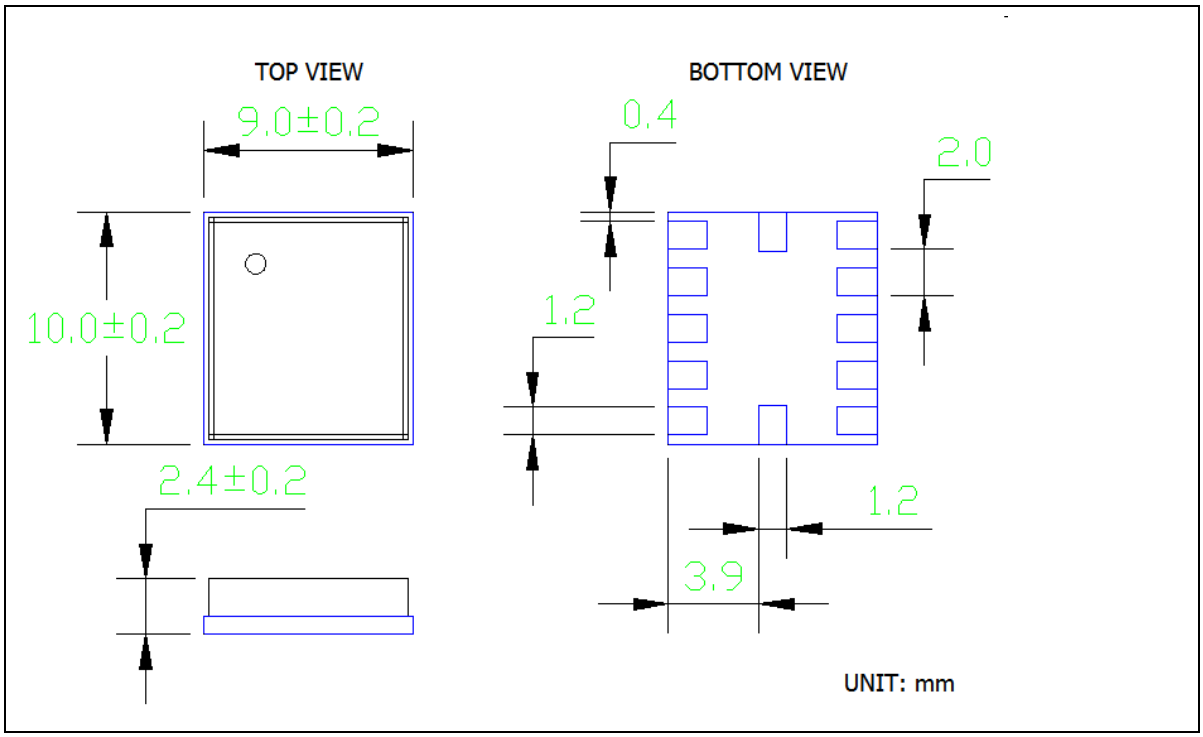
Patameter	Symbol	Conditions	Min.	Typ.	Max	Units
Input Frequency	f_{RF}		76		108	MHz
RDS Sensitivity		Δf=2kHz, RDS block rate<5%		24		dBμVEMF
Audio Output Voltage		Δf=22.5kHz	72	82	90	mV_{RMS}

(3) Mechanical Units

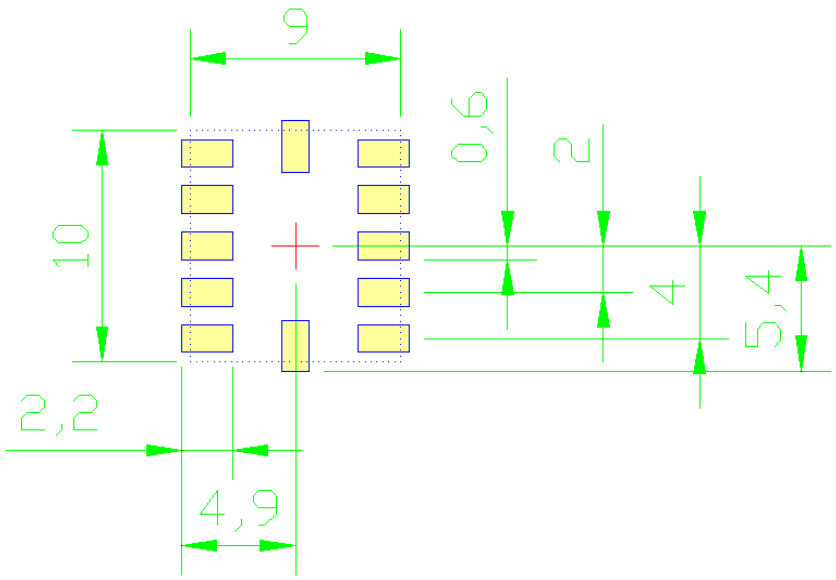
3.1 Appearance



3.2 Outline Dimensions



3.3 Recommended Land Pattern Dimensions



Unit: mm

3.4 Packing Method

1. Packaging Material (per carton)

No.	Item	Model	Dimensions	Unit Weight(Kg)	Quantity
1	Module	TMC-1009	10*9*2.4		3,000
2	Real				3
3	Product Box	290900410028	36*34*4(cm)		3
4	Carton	290900410024	40*36*32(cm)		1
5	Package Bag	291900780001			
6	Total Weight				

2. Packing Specification and Quantity

(1) Module quantity per real: 1,000

(2) Module quantity per box: quantity per real 1,000 x quantity of real 1 = 1,000

(3) Total module quantity in a carton: quantity per box 1,000 x quantity of boxes 3 = 3,000

3. Label Specification

(1) Box Label

(4) Quality Units

4.1 Inspection Criterion

RDS Signal Generator Output signal strength=24 dBuV TMC1009's RSSI should be larger than 17 dBuV.

4.2 Precaution in Use of TMC-1009

1. Handling of Module

It is ESD sensitive device so please handle it with ESD protection at static control area.

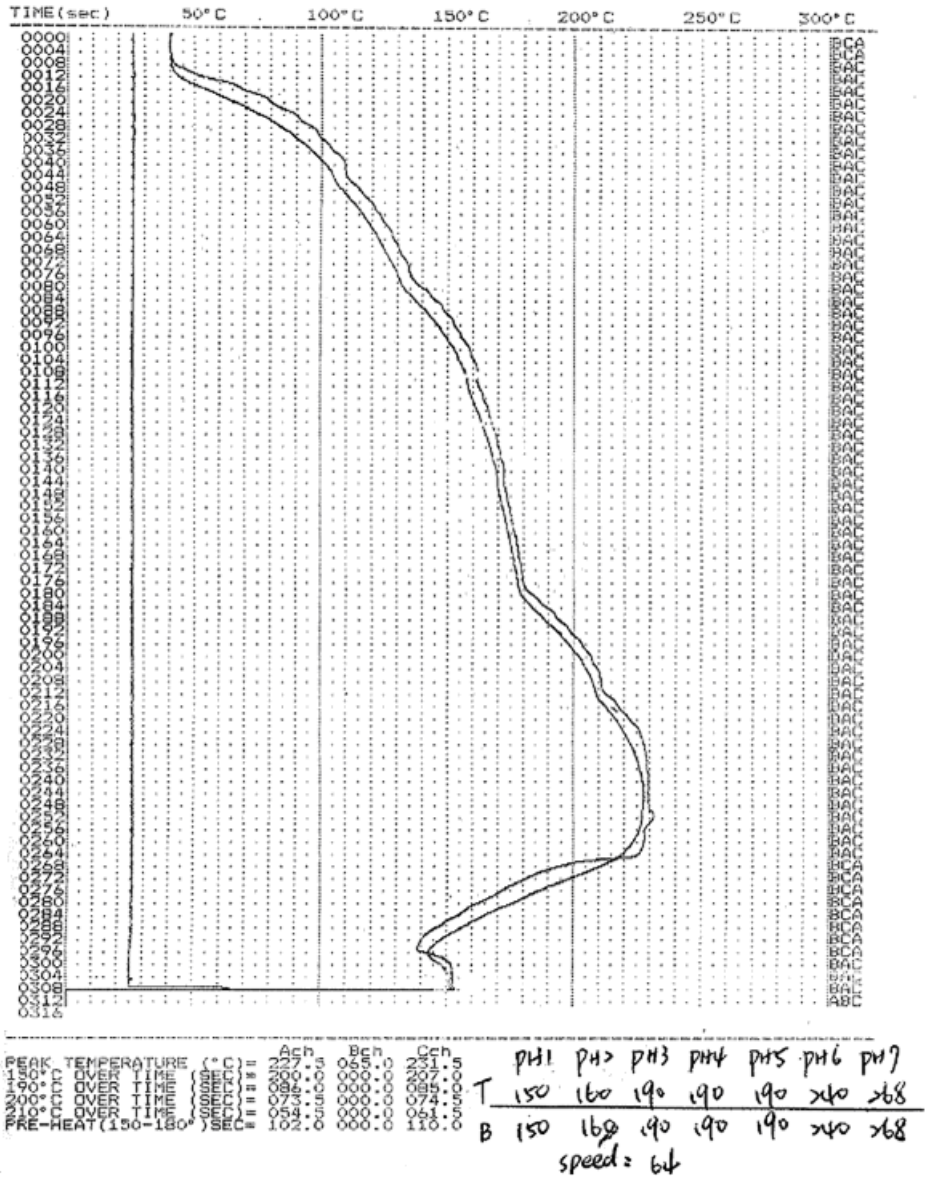
2. Storage

The module belongs to moisture sensitive device. Please storage it at humidity control area.

3. Soldering

The module belongs to RoHS device. The maximum of reflow temperature, real on top of PCB, does not over 240 Celsius.

4. Recommended soldering reflow profile



Note:

- The TMC-1009 should be soldered on the topside of the motherboard, please prevent from falling down while head-over soldering.