Revision History

Rev.	History	Issue Date	Remark
0.1	Initial issue: **TM2505V01**	Sep, 2017	Preliminary
0.1	Add 3D IC drawing	May 21,2018	

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General Description

TM2502 is a high power out GFSK RFM operating in the world wide ISM frequency band at 5.15~5.85 MHz Burst mode transmission and up to 4Mbps air data rate make them suitable for applications requiring ultra low power consumption. The embedded packet processing engines enable their full operation with a very simple MCU as a radio system. Auto re-transmission and auto acknowledge give reliable link without any MCU interference.

TM2502 operates in TDD mode, either as a transmitter or as a receiver. The RF channel frequency determines the center of the channel used by TM2502. The frequency is set by the RF_CH register in register bank 0 according to the following formula: F0=5150+RF_CH (MHz). The resolution of the RF channel frequency is 1MHz. A transmitter and a receiver must be programmed with the same RF channel frequency to be able to communicate with each other. The output power of TM2502 is set by the RF_PWR bits in the RF_SETUP register.

Demodulation is done with embedded data slicer and bit recovery logic. The air data rate can be programmed to 4Mbps by RF_DR register. A transmitter and a receiver must be programmed with the same setting. In the following chapters, all registers are in register bank 0 except with explicit claim.

Features

- 5150~5850 MHz ISM band operation
- Support 4 Mbps air data rate
- Programmable output power (-23dBm to 23dBm)
- Low power consumption
- Tolerate +/- 20ppm 16 MHz crystal
- Variable payload length from 1 to 32bytes
- Automatic packet processing
- 6 data pipes for 1:6 star networks
- 3V~3.6V power supply
- 4-pin SPI interface with max 8 MHz clock rate

Applications

- Wireless PC peripherals
- Wireless mice and keyboards
- Wireless gamepads
- Wireless audio
- VOIP and wireless headsets
- Remote controls
- Consumer electronics
- Home automation
- Toys
- Personal health and entertainment

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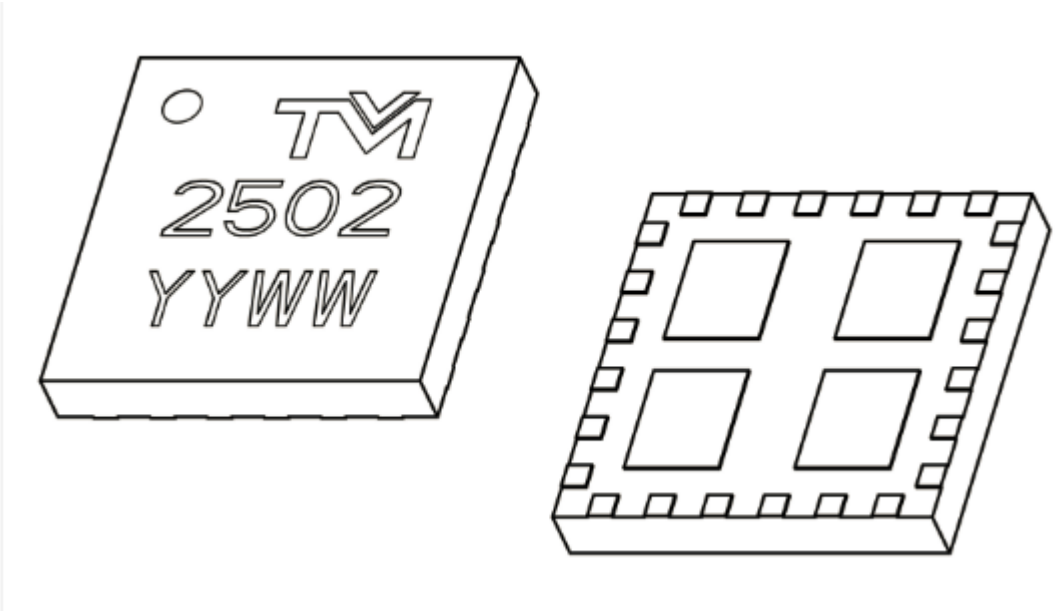
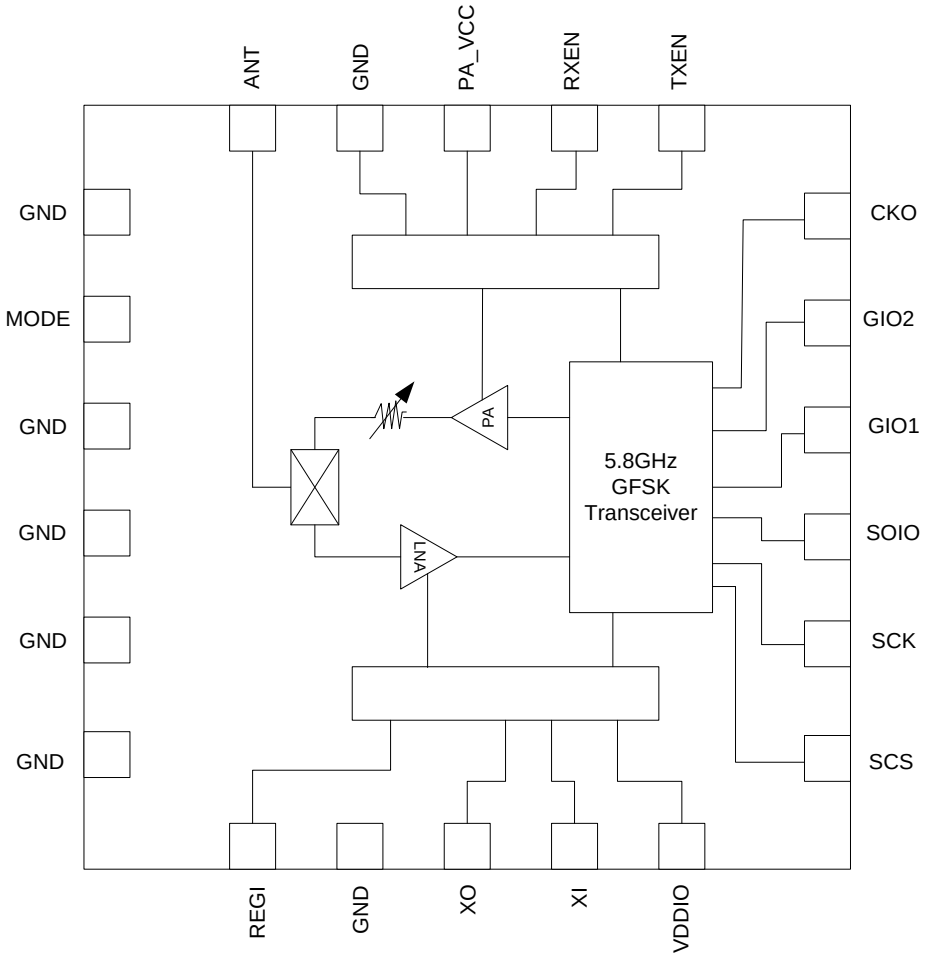
IC photo



Function Block Diagram



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TXEN	RXEN	MODE	Mode of operation
1	0	0	Low current Tx mode
1	0	1	High linearity Tx mode
0	0	0	LNA bypass Rx mode
0	1	x	Low noise figure Rx mode
1	1	X	Not supported

Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
VDD Supply Voltage	+6	V
IDD	450	mA
Operating Temperature	-20 to +85	℃
Storage temperature	-50 to 150	℃

Notes:

1. Operation of this device in excess of any maximum rating as specified above may cause permanent damage to the device.
2. Caution! ESD Sensitive Device.

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Specification Summary

Parameter	Min.	Typical	Max.	Unit
General Parameters				
Operating Frequency Range	5.15		5.85	GHz
Supply Voltage	3	3.3	3.6	V
Operation		TDD		
Current Consumption				
Rx Mode		40+14		mA
Tx Mode 23dBm		585	620	mA
Operating Temperature	-20		+85	℃
Transmitter				
Tx Output Power	21	23		dBm
Tx Pout Flatness		+/-1		dB
Receiver				
1 E-3 BER sensitivity (4Mbps)		-86		dBm
Frequency Deviation	450	600		KHz

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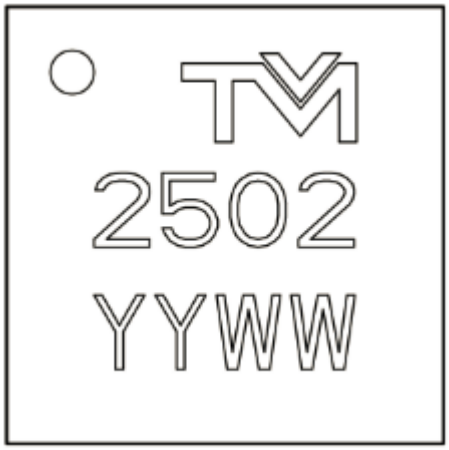
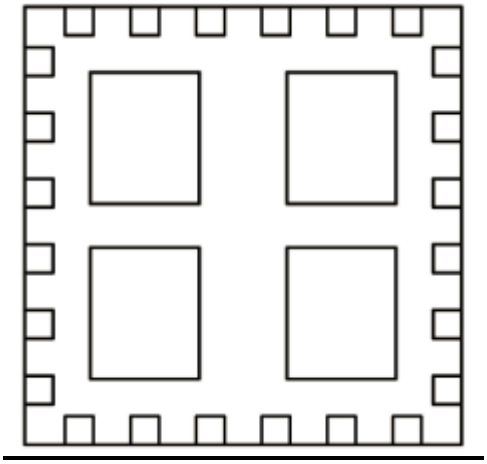
Pin Configuration



Top View



Bottom View

Functional Pin Description

Name	Pin#	I/O	Description
GND	1,3,4,5,6,8,21	G	Ground
MODE	2	I	CMOS Input to Control High Linearity/Low Current Mode
REGI	7	I	Regulator input
XO	9	O	Crystal oscillator output.
XI	10	I	Crystal oscillator input.
VDDIO	11	I	VDD_IO supply voltage input
SCS	12	I	SPI chip select input.
SCK	13	I	SPI clock input.
SDIO	14	I/O	SPI data IO.
GIO1	15	I/O	Multi-function IO 1.
GIO2	16	I/O	Multi-function IO 2.
CKO	17	O	Multi-function clock output
TXEN	18	I	CMOS Input to Set TX Antenna SW and Enable the PA
RXEN	19	I	CMOS Input to Set RX Antenna SW and Enable the LNA
PA_VCC	20	I	DC Supply Voltage
ANT	22	I/O	RF Signal from the PA or RF Signal to the LNA; DC Shorted to GND

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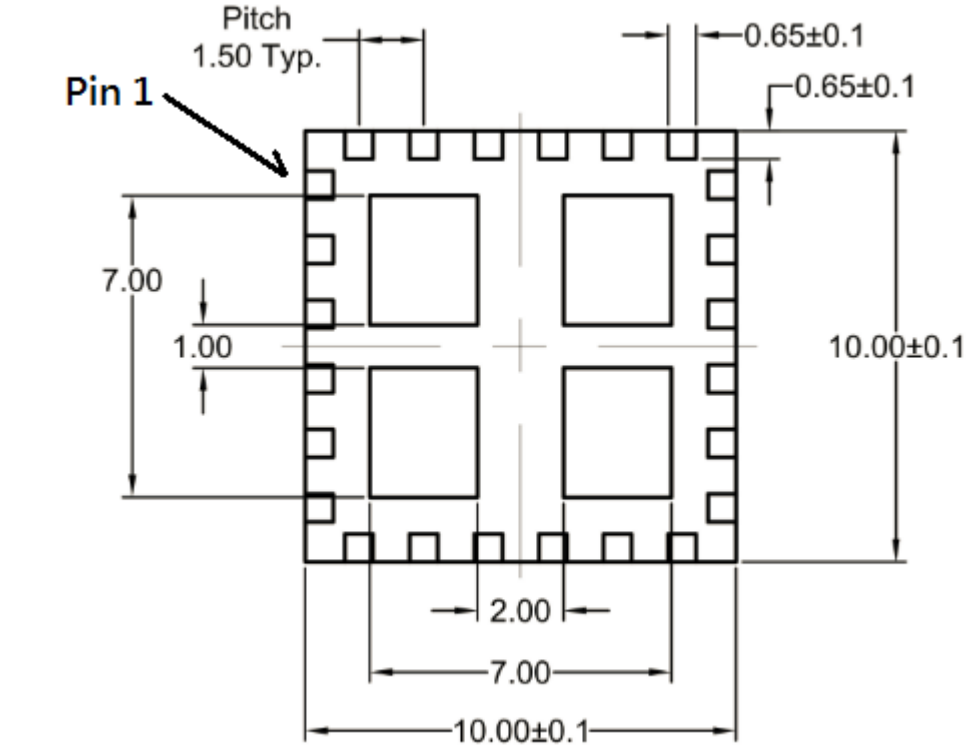
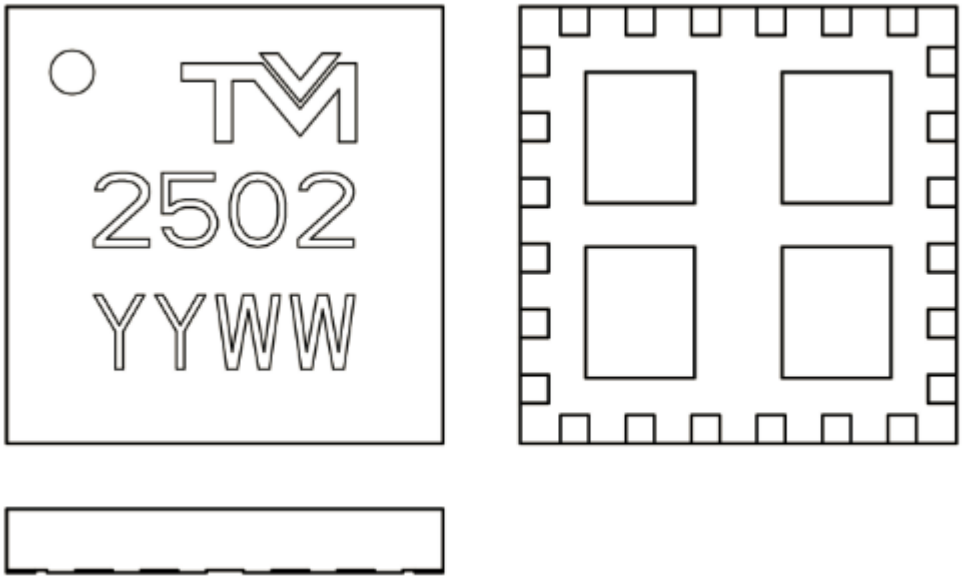
Drawing & Dimension





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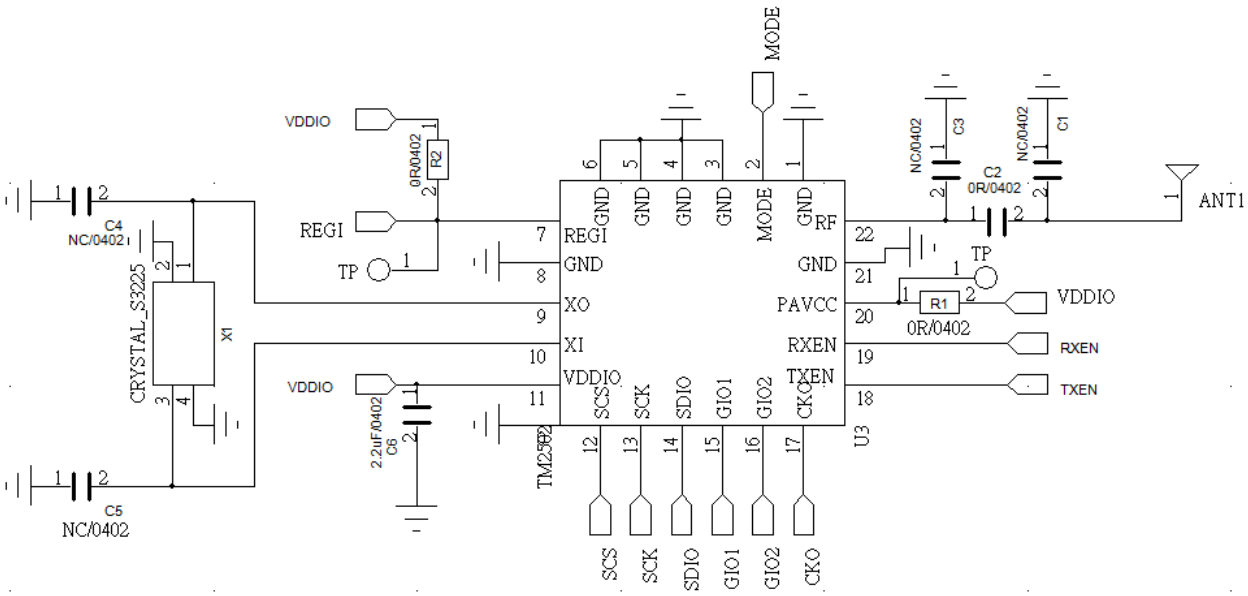
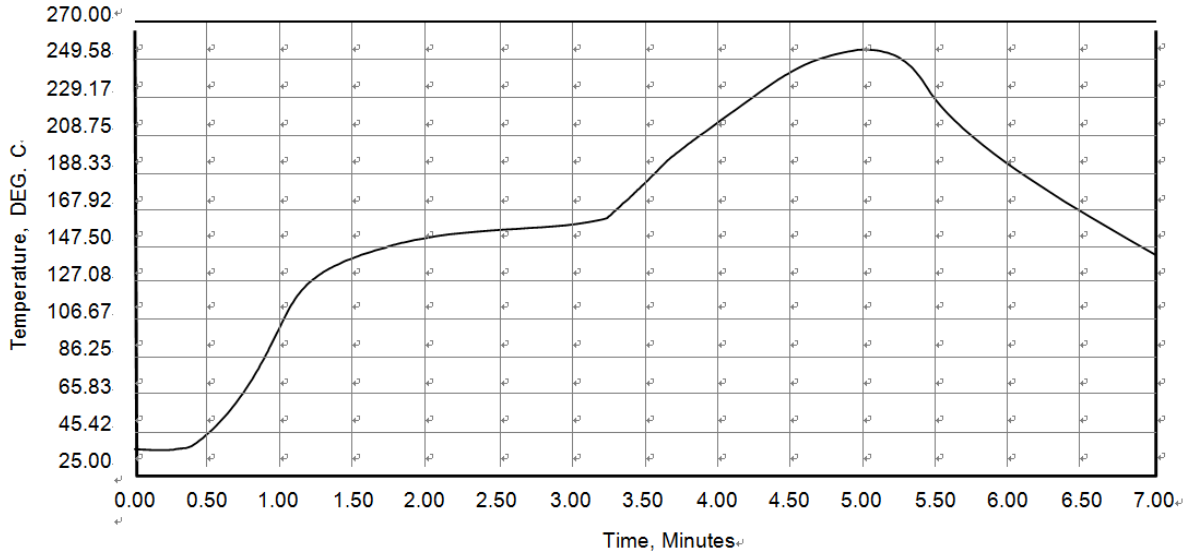
Application Circuit



SMT Reflow Profile



Tape and Reel Drawing

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