### 240 - 960 MHz FLASH Based OOK Transmitting Wireless MCU

### **MCU** Features

- PIC16 compatible instruction set
- Up to 16 MHz clock operating frequency
- 2T or 4T instruction cycle
- 8-layer hardware stack x 11 bit
- 2 k x 14 b rewritable program storage space (16 bytes/page)
- 256 x 8 b data EEPROM (16 bytes/page)
- 128 x 8 b SRAM
- Support of online debug
- Support of ICSP programming
- Support of data EEPROM programming in application
- 8 general IOs
- One Timer 0 with 8-bit prescaler
- One Timer 2 with 8-bit prescaler
- WDT with 7-bit prescaler (the overflow frequency is about 16 2048 ms)
- Support of power up delay counter PWRT
- Support of low power mode SLEEP
- Multiple wakeup sources: INT, port change interrupt,
   WDT, data EEPROM write operation completion, etc.
- Built-in high speed 16 MHz RC oscillator
- Built-in low speed 32 kHz RC oscillator
- Port change interrupt: RA0 RA7
- Program space protection

## **Description**

Embedded with 8-bit RISC core, the CMT2189B is an OOK based transmitting wireless MCU with low power and low cost, applying to 240 - 960 MHz band wireless applications. Empowered by a 2 k x 14 b rewritable program space, a high-efficiency and ultra-low power transmitter, along with the supports of up to 8 general-purpose IOs, online debug, and ultra-low power sleep mode, the chip is ideal for a variety of consumer remote control applications. With an operating temperature range of - 40  $\sim$  85  $^{\circ}{\rm C}$  and a power supply voltage of 2.0  $\sim$  3.6 V, it consumes only a current of 17.5 mA while delivering +13 dBm power at 433.92 MHz. The CMT2189B co-working with CMOSTEK's NextGenRF $^{\rm TM}$  series receivers offers an ideal solution for ultra-low power RF applications..

### **RF Features**

■ Frequency range: 240 - 960 MHz

Modulation mode: OOKData rate: 1.0 - 40.0 kbpsOutput power: + 13 dBm

 Operating current: 17.5 mA @+13dBm, 433.92 MHz with continuous 1 transmitting

## **System Features**

■ Supply voltage: 2.0 ~ 3.6 V

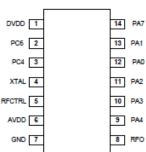
■ Operating temperature: -4 0 ~ + 85 °C

SOP14 packaging

## **Application**

- Wireless weather forecasting system
- Wireless lighting control system
- Consumer remote control.





**CMT2189B PIN Arrangement** 

# **Typical Application**

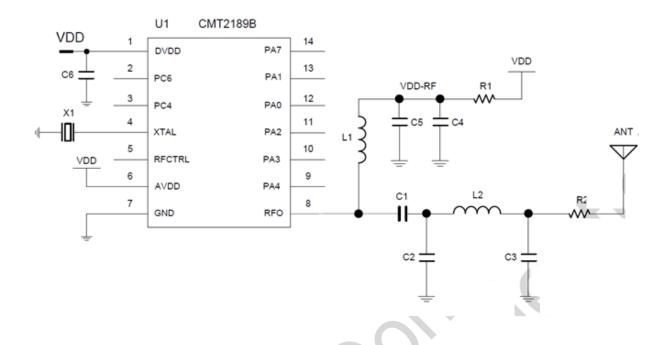


Figure 1. CMT2189B typical Application Schematic (low cost matching network)

Table 1. Typical Application BOM (low cost matching network)

Label	Description	Component Value @ 315 MHz	Component Value @ 433.92 MHz	Unit	Supplier
U1	CMT2189B, 240-960 MHz FLASH	_	_	-	CMOSTEK
01	based OOK transmitting wireless MCU				CINCOTER
X1	± 20 ppm, SMD32 * 25 mm, crystal	26.25	26.2982	MHz	EPSON
L1	± 10%, 0603 multilayer chip inductor	220	180	nH	Sunlord LQG18
L2	± 10%, 0603 multilayer chip inductor	33	27	nΗ	Sunlord LQG18
C1	± 0.25 pF, 0603 NP0, 50 V	82	68	pF	-
C2	± 0.25 pF, 0603 NP0, 50 V	2	NC	pF	
C3	± 0.25 pF, 0603 NP0, 50 V	NC	2.2	pF	
C4	± 20%, 0603, NP0, 50 V 470		70	pF	-
C5	± 20%, 0603, X7R, 25 V	0.1		uF	-
C6	± 20%, 0603, X7R, 25 V	0.1		uF	-
R1	-	10		Ω	-
R2	-	10		Ω	-

Table 2. CMT2189B Pin Description

Pin#	Pin Name	I/O	Description	
1	DVDD	I	2 - 3.6 V digital power supply input pin.	
2, 3	PC6, PC4	Ю	Port C I/O.	
4	XTAL	ı	Crystal input pin, connecting the crystal (with the corresponding frequency value and load capacitance of 15 pF) to GND.	
5	RFCTRL	lO	RF serial port function with internal pull-up resistor. Pull down the pin through PC port or PA port to enable the function.	
6	AVDD		2 - 3.6 V analog power supply input pin.	
7	GND	- 1	Chip ground.	
8	RFO	0	RF output pin.	
9-11	PA4- PA2	Ю	GPIO with IOC and WPU. It can configure pull-up resistor.	
40	PA0	Ю	GPIO with IOC and WPU. It can configure pull-up resistor.	
12	ICSPLCK	I	Clock signal for debug and programming series port (F <sub>max</sub> = 6 MHz).	
12	PA1	Ю	GPIO with IOC and WPU. It can configure pull-up resistor.	
13	ICSPDAT	I	Data signal for debug and programming series port (F <sub>max</sub> = 6 MHz).	
14	PA7	Ю	GPIO with IOC and WPU. It can configure pull-up resistor.	

#### Notes:

- 1. MCU programming interface: ICSPLCK, ICSPDAT, VDD-MCU and GND.
- 2. IOC = Interrupt On Change. WPU = Weak Pull Up.

## **Packaging Information**

The packaging information of the CMT2189B is shown in the below figure.

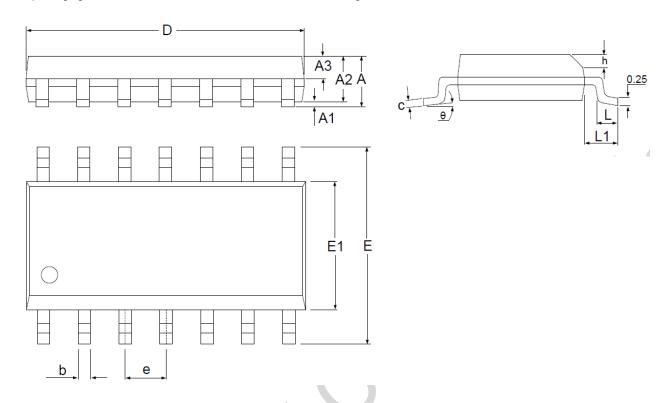


Figure 2. SOP14 Packaging

Table 3. SOP14 Packaging Scale

	Scale (mm)					
Symbol	Min.	Тур.	Min.			
A	-	-	1.75			
A1	0.05	-	0.225			
A2	1.30	1.40	1.50			
A3	0.60	0.65	0.70			
b	0.39	-	0.48			
С	0.21	-	0.26			
D	8.45	8.65	8.85			
E	5.80	6.00	6.20			
E1	3.70	3.90	4.10			
е	1.27 BSC					
h	0.25	-	0.50			
L	0.50	-	0.80			
L1	1.05 BSC					
θ	0	-	8°			

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