



## DESCRIPTION

PT2240B is encoder utilizing CMOS Technology specially designed for remote control applications. It has  $2^{20}$  Address. It can support up to 4 Data Bits and is housed in 8 pin SOP package. It encodes address and data codes into a coded waveform suitable for RF modulation. The pin assignments and application circuit are optimized for easy PCB Layout and cost saving advantage. Furthermore, PT2240B's intrinsic feature of being able to support 4 data bits considerably reduces inventory pressures.

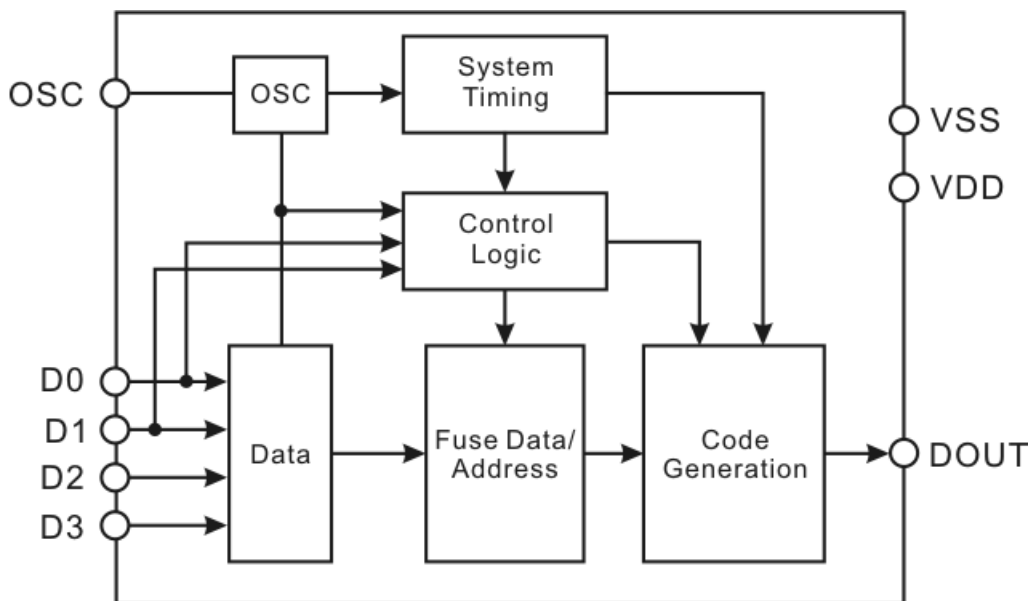
## FEATURES

- CMOS technology
- Low power consumption
- Least external components
- High noise immunity
- Single resistor oscillator
- Operating voltage: 1.8~15V
- 4 Data pins
- $2^{20}$  address codes
- Available in SOP package
- Reduction of inventory pressures

## APPLICATIONS

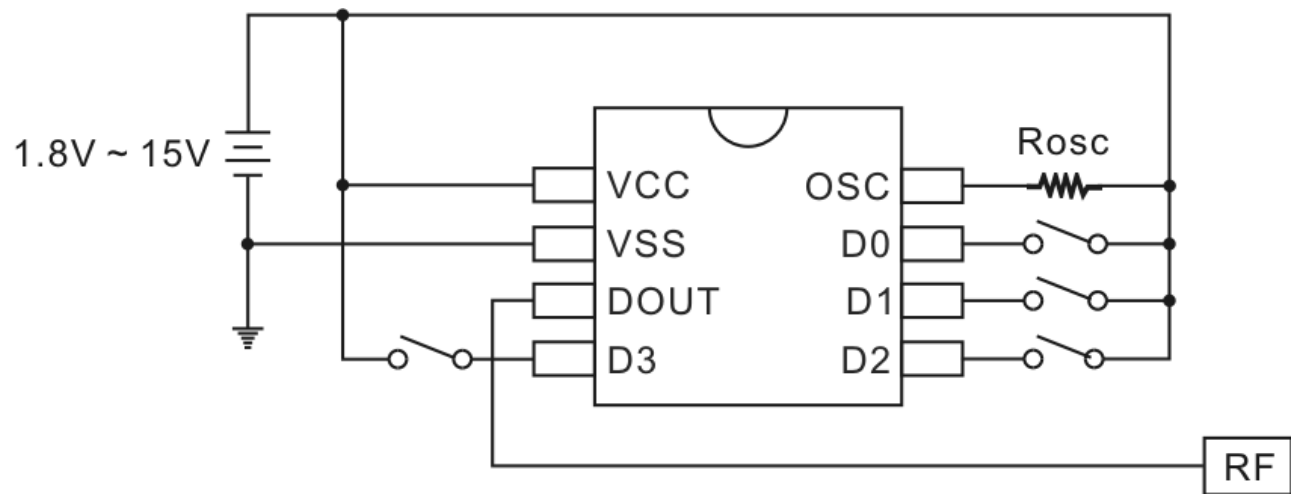
- Burglar alarm system
- Car security system
- Car/Garage door controller
- Home/Office security system
- Personal alarm system

## BLOCK DIAGRAM

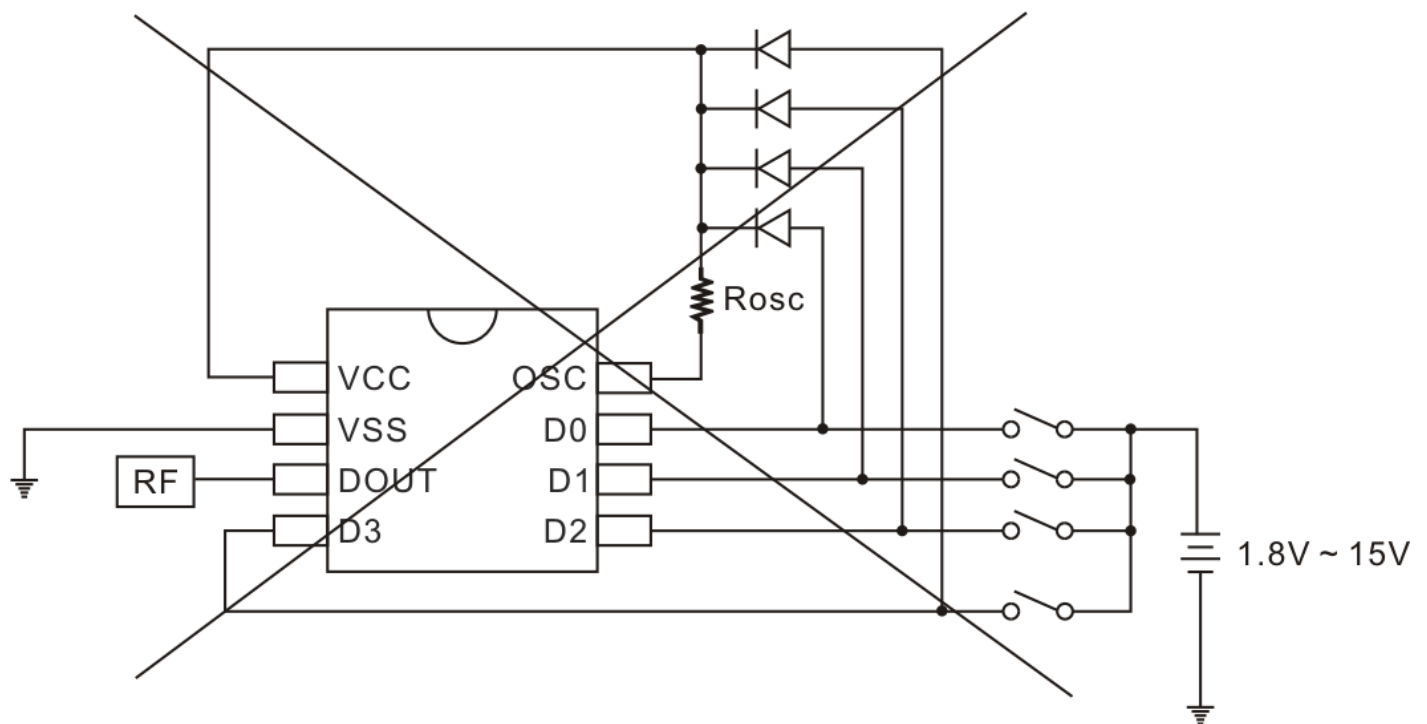


## APPLICATION CIRCUIT

### 8 PINS



### POWER FAILURE CIRCUIT



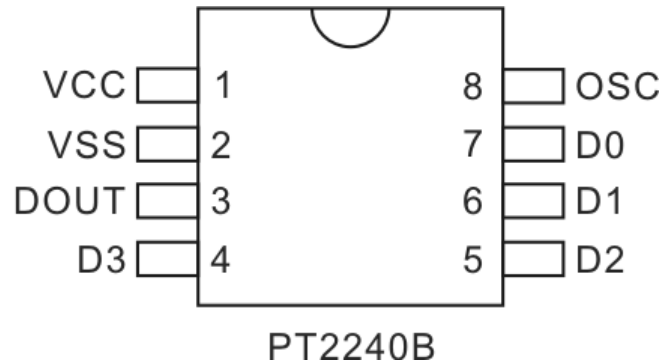
Warning: Be cautious to use this circuit which will cause the IC shutdown or even damaged.



## ORDER INFORMATION

| Valid Part Number | Package Type        | Top Code  |
|-------------------|---------------------|-----------|
| PT2240B-S         | 8 Pins, SOP, 150mil | PT2240B-S |

## PIN CONFIGURATION



## PIN DESCRIPTION

| Pin Name       | I/O | Description                     | Pin No.    |
|----------------|-----|---------------------------------|------------|
| VDD            | -   | Positive power supply           | 1          |
| VSS            | -   | Negative power supply           | 2          |
| DOUT           | O   | Data output pin<br>Normal="Low" | 3          |
| D0, D1, D2, D3 | I   | Data pin                        | 7, 6, 5, 4 |
| OSC            | I   | Oscillator pin                  | 8          |

## FUNCTION DESCRIPTION

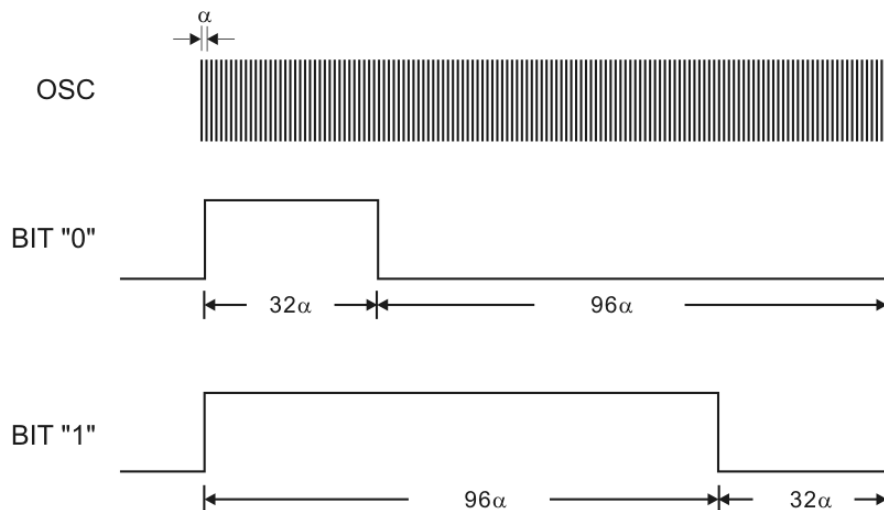
PT2240B encodes the address code and data set at D0 ~ D3 and A0 ~ A19 into a special waveform and outputs it to the DOUT. This waveform is fed to the RF modulator for transmission.

### CODE BITS

A Code Bit is the basic component of the encoded waveform, and can be classified as either an (Address/Data) Bit or a SYNC (Synchronous) Bit.

### ADDRESS/DATA BIT WAVEFORM

An Address/Data Bit can be designated as either Bit "0" or "1" if it is in High or Low State respectively. One bit waveform consists of one pulse cycle and each pulse cycle has 128 oscillating time periods. For further details, please refer to the diagram below:

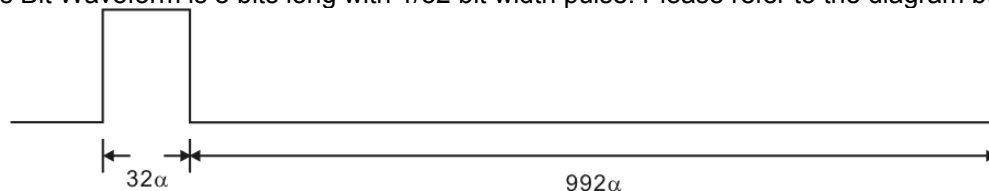


where the oscillating time period,  $\alpha = 1/f$  and ( $f$  is the oscillation frequency)

As you can see in the diagram above, Bit "0" consist of a "High" Pulse for  $32\alpha$  (where  $\alpha$ =oscillating time period) then changes to "LOW" Pulse for  $96\alpha$ . Likewise, for Bit "1", the "High" Pulse for  $96\alpha$  is followed by "Low" Pulse for  $32\alpha$ .

### SYNCHRONOUS (SYNC.) BIT WAVEFORM

The Synchronous Bit Waveform is 8 bits long with 1/32 bit width pulse. Please refer to the diagram below:





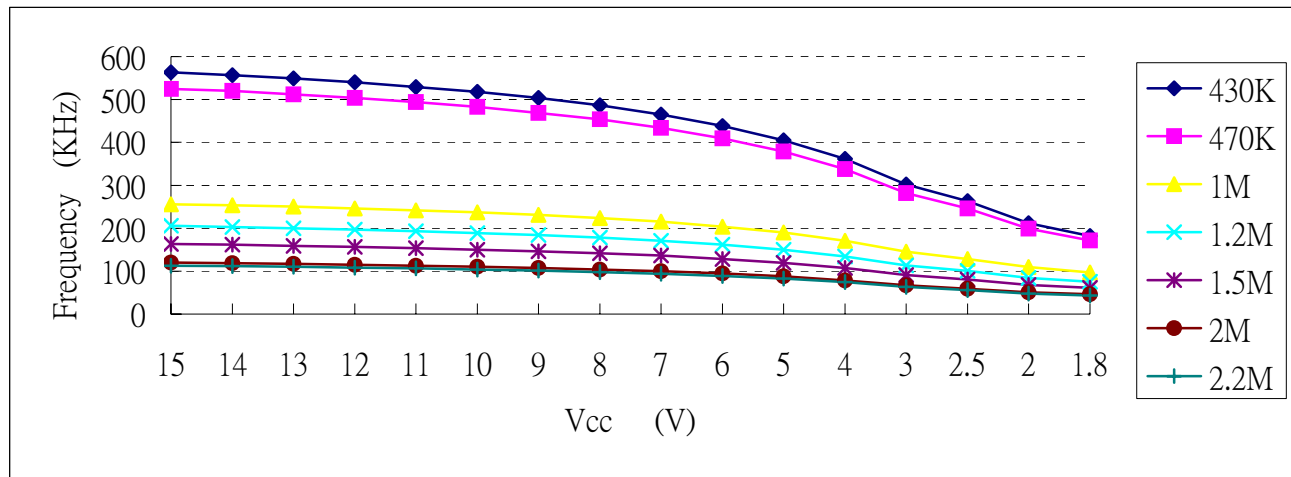
## CODE WORD

A group of Code Bits is called a Code Word. A Code Word consists of 20 Address/4 Data Bits followed by one Sync Bit. Please refer to the diagram below:

|    |    |    |    |       |     |     |     |     |    |    |    |    |           |
|----|----|----|----|-------|-----|-----|-----|-----|----|----|----|----|-----------|
| A0 | A1 | A2 | A3 | ..... | A16 | A17 | A18 | A19 | D3 | D2 | D1 | D0 | Sync. bit |
|----|----|----|----|-------|-----|-----|-----|-----|----|----|----|----|-----------|

## SINGLE RESISTOR OSCILLATOR

The built-in oscillator circuit of PT2240B allows a precision oscillator to be constructed by connecting an external resistor (Rosc) to the OSC Pin. The typical oscillator frequency with various resistor values for PT2240B is given below:





## ABSOLUTE MAXIMUM RATINGS

| Parameter             | Symbol | Condition                            | Rating            | Unit |
|-----------------------|--------|--------------------------------------|-------------------|------|
| Operating voltage     | VDD    |                                      | -0.3 ~ 15         | V    |
| Input voltage         | VIN    | VDD=12V<br>All outputs not connected | VSS-0.3 ~ VDD+0.3 | V    |
| Operating temperature | Topr   | VDD=12V                              | -40 ~ +85         | °C   |
| Storage temperature   | Tstg   |                                      | -65 ~ +150        | °C   |

## DC ELECTRICAL CHARACTERISTICS

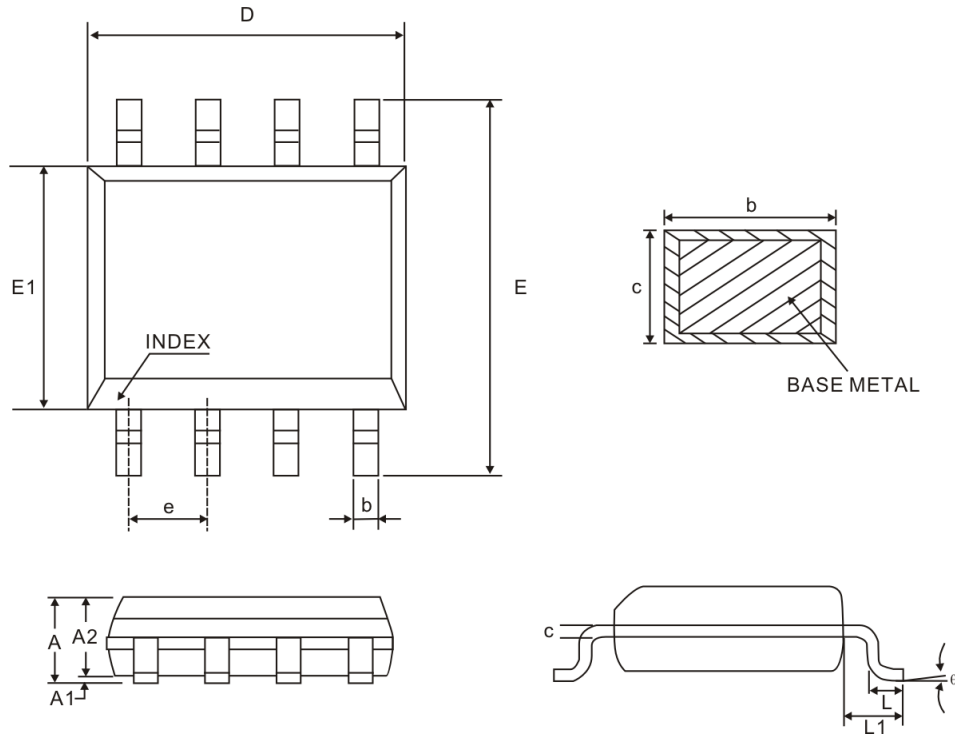
(Unless otherwise specified, Ta=25°C, VDD=12V)

| Parameter           | Symbol | Condition                                     | Min. | Typ. | Max. | Unit |
|---------------------|--------|-----------------------------------------------|------|------|------|------|
| Operating voltage   | VDD    |                                               | 1.8  | 12   | 15   | V    |
| Stand-by current    | ISB    | OSC connected to "Low"<br>other pins floating | -    | -    | 1    | μA   |
| Operating current   | IOP    | Connect one data pin to "high"                | -*   | -    | 5    | mA   |
| DOUT output current | IOH    | VDD=12V, VOH=5V                               | 30   | 25   | -    | mA   |
|                     |        | VDD=9V, VOH=4.5V                              | 12   | 15   | -    |      |
|                     |        | VDD=3V, VOH=1.5V                              | 1.2  | 1.4  | -    |      |



## PACKAGE INFORMATION

8 PINS, SOP, 150MIL



| Symbol | Millimeter |      |      |
|--------|------------|------|------|
|        | Min.       | Nom. | Max. |
| A      | 1.35       | 1.60 | 1.75 |
| A1     | 0.10       | 0.15 | 0.25 |
| A2     | 1.25       | 1.40 | 1.65 |
| b      | 0.33       | -    | 0.51 |
| c      | 0.17       | -    | 0.25 |
| D      | 4.80       | 4.90 | 5.00 |
| E      | 5.80       | 6.00 | 6.20 |
| E1     | 3.80       | 3.90 | 4.00 |
| e      | 1.27BSC    |      |      |
| L      | 0.40       | 0.60 | 1.27 |
| L1     | 1.04REF    |      |      |
| θ      | 0°         | -    | 8°   |

Notes:

1. Refer to JEDEC MS-012AA
2. All dimensions are in millimeter



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