

Features

- CMOS Metal-Gate Process Technology
- Operating voltage: 1.2V~4.5V
- Low standby current: 1 μ A Typ. at 3V
- Built-in oscillator (F_{OSC}: 32KHz)
- ON/OFF control function for the HT2013H, HT2013M, HT2013L
- 1/8 duty cycle output
- Directly driving an LED
- Minimum external components
- TO-92 package (only for the HT2012H, HT2014M, HT2014L)
- Flash rate options:
 - HT2013H → about 4Hz
 - HT2012H → about 4Hz (No ON/OFF control function)
 - HT2013M → about 2Hz
 - HT2014M → about 2Hz (No ON/OFF control function)
 - HT2013L → about 1Hz
 - HT2014L → about 1Hz (No ON/OFF control function)

General Description

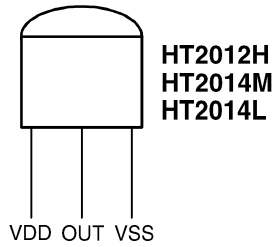
The HT201XX series is a low cost, low power CMOS LSI chip designed for lamp and LED flash drivers. It can be operated without any external components, thus suitable for applica-

tions on flashing badges, gift cards, flashing earrings, and other products that require flashing lights.

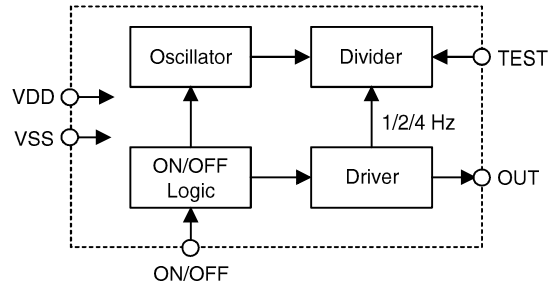
Selection Table

| Part No. | Flash Rate | ON/OFF Control | | Package | |
|----------|------------|----------------|----|---------|------|
| | | Yes | No | TO-92 | Dice |
| HT2013H | 4Hz | √ | | | √ |
| HT2012H | 4Hz | | √ | √ | √ |
| HT2013M | 2Hz | √ | | | √ |
| HT2014M | 2Hz | | √ | √ | √ |
| HT2013L | 1Hz | √ | | | √ |
| HT2014L | 1Hz | | √ | √ | √ |

Pin Assignment

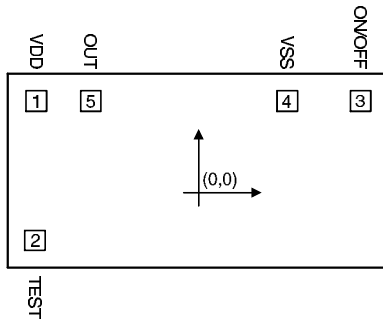


Block Diagram



Pad Coordinates

Unit: mil



| Pad No. | X | Y |
|---------|--------|--------|
| 1 | -23.9 | 13.5 |
| 2 | -24.13 | -7.055 |
| 3 | 23.89 | 13.5 |
| 4 | 13.09 | 13.5 |
| 5 | -15.89 | 13.5 |

Chip size: $60 \times 38 \text{ (mil)}^2$

*The IC substrate should be connected to VDD in PCB layout artwork.

Pad Description

| Pad No. | Pad Name | I/O | Internal Connection | Description |
|---------|----------|-----|---------------------|-----------------------------------|
| 1 | VDD | — | — | Power supply (positive) |
| 2 | TEST | — | — | For IC test only |
| 3 | ON/OFF | I | CMOS Pull-High | Lamp/LED flash ON/OFF control pad |
| 4 | VSS | — | — | Power supply (ground) |
| 5 | OUT | O | NMOS Open Drain | Lamp/LED flash output |

Absolute Maximum Ratings

Supply Voltage -0.3V to 5.5V

Storage Temperature..... -50°C to 125°C

Input Voltage..... $V_{SS}-0.3V$ to $V_{DD}+0.3V$

Operating Temperature..... -20°C to 75°C

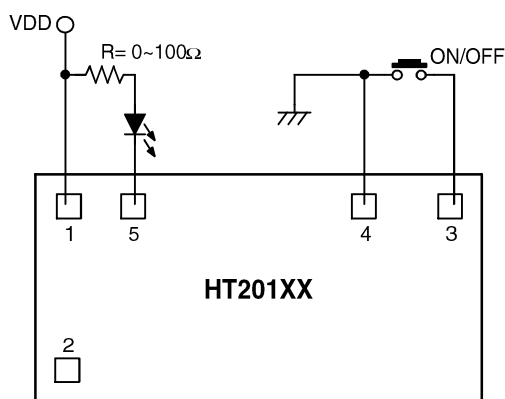
Electrical Characteristics

(Ta=25°C)

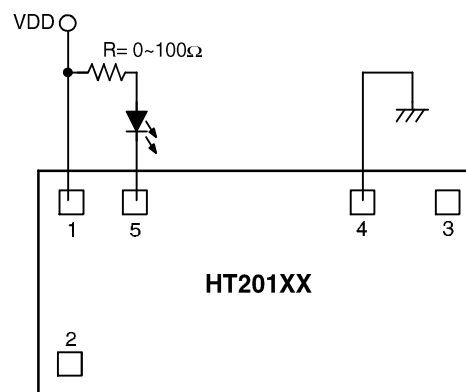
| Symbol | Parameter | Test Condition | | Min. | Typ. | Max. | Units |
|--------|----------------------|----------------|-----------|------|------|------|-------|
| | | VDD | Condition | | | | |
| VDD | Operating Voltage | — | — | 1.2 | 3 | 4.5 | V |
| ISTB | Standby Current | 3V | — | — | 1 | 2 | μA |
| IDD | Operating Current | 3V | No load | — | 200 | 500 | μA |
| IOL | OUT Pad Sink Current | 1.5V | VOL=0.15V | 5 | 12 | — | mA |
| | | 3V | VOL=0.3V | 10 | 30 | — | mA |
| FOSC | System Frequency | 3V | — | — | 32K | — | Hz |

Application Circuit

Chip form with ON/OFF control



Chip form without ON/OFF control



*The IC substrate should be connected to VDD in PCB layout artwork.

Package form application

