# PT4223
## 1-5W Primary Side CC Regulator

## GENERAL DESCRIPTION

The PT4223 is primary side constant current regulator, which is designed for high performance and cost-effective LED lighting applications. With Powtech's proprietary constant current compensation technique accurate output current regulation is achieved without the need of a secondary feedback circuitry. Integrated primary inductance compensation circuitry provides accurate constant current operation despite variations in primary inductance. Excellent EMI performance is achieved with frequency jittering function together with soft driving control at totem pole gate drive output.

The device integrates a high voltage power switch, an oscillator, a current sense circuit, CC control circuit. It also features a complete set of integrated protection functions to protect against all fault conditions including output open/short circuit, line under-voltage, and over temperature shut down.

The PT4223 is available in an SOP-8package.

## FEATURES

- CC Without Secondary Feedback
- Integrates 600V Power Switch
- Inductance Compensation
- Low Startup Current (<10uA)
- Adjustable Primary Side Current limit
- VCC/FB Over Voltage Protection
- VCC/FB UVLO
- Feedback Loop Open Circuit Protection
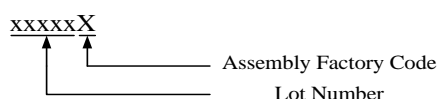- Over Temperature Protection
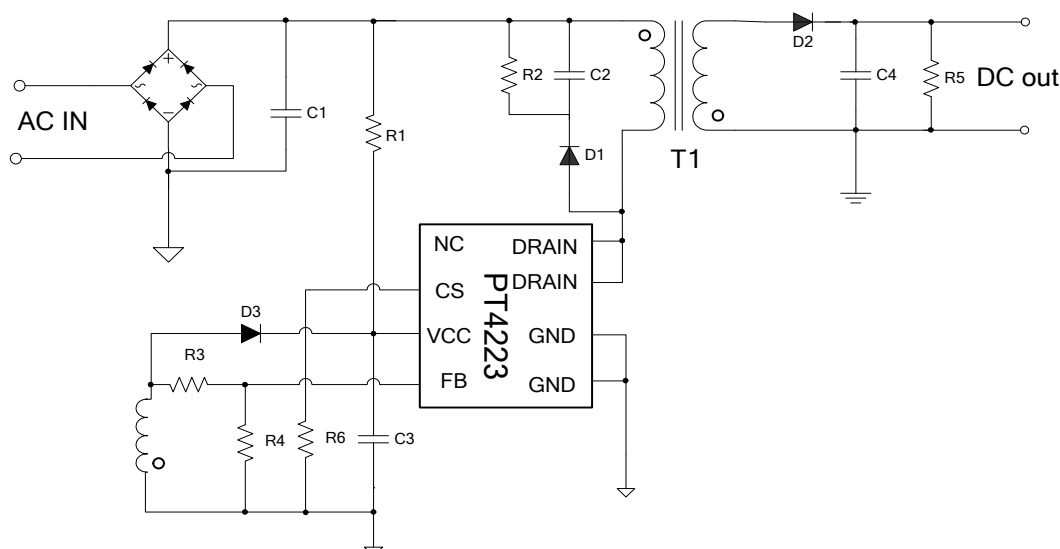
## APPLICATIONS

- Sub 5W LED lighting applications

## ORDERING INFORMATION

| PACKAGE | TEMPERATURE RANGE | ORDERING PART NUMBER | TRANSPORT MEDIA | MARKING |
|---|---|---|---|---|
| SOP-8，Pb free | -40℃ to 85℃ | PT4223ESOH | 2500/Tape and Reel | PT4223 xxxxxX |

Note:

xxxxxX
— Assembly Factory Code
— Lot Number

## TYPICAL APPLICATION CIRCUIT

## PIN ASSIGNMENT

```
      ┌─────────────┐
 1  ──┤ NC ○   DRAIN ├── 8
 2  ──┤ CS  P   DRAIN ├── 7
 3  ──┤ VCC T4       ├── 6
      │     2   GND  │
 4  ──┤ FB  2   GND  ├── 5
      │     3       │
      └─────────────┘
         SOP8
```
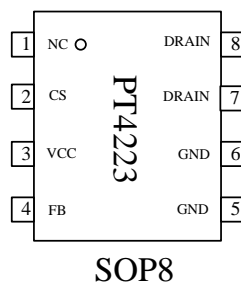
## PIN DESCRIPTIONS

| PIN No. SOP8 | PIN NAMES | DESCRIPTION |
|---|---|---|
| 1 | NC | Not connected |
| 2 | CS | Primary Side Current Sense Input |
| 3 | VCC | Power supply, the device is supplied by an auxiliary winding. |
| 4 | FB | Feedback Winding Voltage Sense Input |
| 5,6 | GND | Ground |
| 7,8 | DRAIN | Internal power switch output, drive primary winding |

## ABSOLUTE MAXIMUM RATINGS (note1)

| SYM | PARAMETER | VALUE | UNIT |
|---|---|---|---|
| VCC | VCC pin Voltage | -0.3~35 | V |
| $V_{FB}$, $V_{CS}$ | FB，CS pin Input Voltage | -0.3~5 | V |
| $V_{DRAIN}$ | DRAIN pin Voltage | -0.3~600 | V |
| Topt | Operating Junction Temp. Range | -40 to 150 | ℃ |
| Tstg | Storage Temp. Range | -55 to 150 | ℃ |
| ESD | HBM | 2000 | V |
| RΘJA | SOP-7 | 120 | ℃/W |

**Note 1:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Recommended Operating Range indicates conditions for which the device is functional, but do not guarantee specific performance limits. Electrical Characteristics state DC and AC electrical specifications under particular test conditions which guarantee specific performance limits. This assumes that the device is within the Operating Range. Specifications are not guaranteed for parameters where no limit is given, however, the typical value is a good indication of device performance.

## RECOMMENDED OPERATING RANGE

| SYM | PARAMETER | VALUE | UNIT |
|---|---|---|---|
| VCC | VCC pin Operating Voltage | 9.5~26 | V |
| $T_A$ | Operating Ambient Temperature | -20~85 | ℃ |

## ELECTRICAL CHARACTERISTICS

($T_A$=25℃, VCC=16V，unless specified otherwise)

| SYMBOL | PARAMETER | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **SUPPLY VOLTAGE (VCC)** | | | | | | |
| $I_{START}$ | Start up current | VCC=13.0V | | 1 | 10 | uA |
| $V_{VCC\_ON}$ | VCC turn on threshold | VCC Rising | 13.5 | 15 | 16.5 | V |
| $V_{VCC\_OFF}$ | VCC minimum operating voltage | VCC Falling | 8.0 | 9.0 | 10.0 | V |
| $V_{VCC\_Clamp}$ | VCC Clamp Voltage | Icc=10mA | | 33 | | V |
| $V_{VCC\_OVP}$ | VCC Over Voltage Protection Threshold | | 26 | 27.5 | 29 | V |
| $I_{VCCQ}$ | VCC Supply Current | No switching | | 350 | 700 | uA |
| **FEED BACK VOLTAGE SENSE PIN (FB)** | | | | | | |
| $V_{FBMAX}$ | FB Over Voltage Protection | | 2.4 | 2.5 | 2.6 | V |
| $V_{FBMIN}$ | FB Minimum Voltage | | | 0.8 | | V |
| $I_{FB\_OPEN}$ | FB Open Loop Current | | | -85 | | uA |
| **CURRENT SENSE INPUT PIN (CS)** | | | | | | |
| VCS | Current Limit Threshold | Ifb=0 | 490 | 500 | 510 | mV |
| $T_{LEB}$ | Current sense Leading Edge Blanking Time | | | 250 | | nS |
| **Driver output（DRAIN）** | | | | | | |
| $R_{DS(ON)}$ | On state resistance | $V_{CC}$=16V | | 8 | 15 | Ω |
| $I_{DS}$ | Off state leak current | $V_{CC}$=0, $V_{DS}$=600V | | | 1 | uA |
| $BV_{DS}$ | DRAIN breakdown voltage | $V_{CC}$=0，$I_{DRAIN}$=250uA | 600 | | | V |
| **PROTECTION** | | | | | | |
| $T_{SD}$ | Thermal Shut Down Threshold | | | 150 | | ℃ |