



The Future of Analog IC Technology®

# MP4020

## Primary Side Control Offline LED Controller With PFC and TRIAC Dimming

PRELIMINARY SPECIFICATIONS SUBJECT TO CHANGE

MPS CONFIDENTIAL AND PROPRIETARY INFORMATION- 3CEMS USE ONLY

### DESCRIPTION

The MP4020 is a primary-side-control offline LED lighting controller which can achieve high power factor and accurate LED current for an isolate lighting application in a single stage converter. The proprietary real current control method can control the LED current accurately from the primary side information. It can simplify the LED lighting system design significantly and increase the efficiency by removing the secondary feedback components and the current sense resistor.

The MP4020 integrates power factor correction function and works in boundary conduction mode for reducing the power losses.

The extremely low start up current and the quiescent current can reduce the power consumption thus lead to an excellent efficiency performance.

The multi-protection function of MP4020 can greatly enhance the system reliability. The MP4020 features LED over-voltage protection, over-current protection, VCC UVLO and over-temperature protection.

The MP4020 is available in small 8-pin SOIC and PDIP packages.

### FEATURES

- Real Current Control Without Secondary-feedback Circuit
- High Power Factor
- Boundary Conduction Mode Operation
- Ultra-low (10uA) Start Up Current
- Low (1mA) Quiescent Current
- Input UVLO
- Cycle-by-cycle Current Limiting
- Over-voltage Protection
- Over-current Protection
- Over-temperature Protection
- Available in 8 Pin SOIC and PDIP Packages

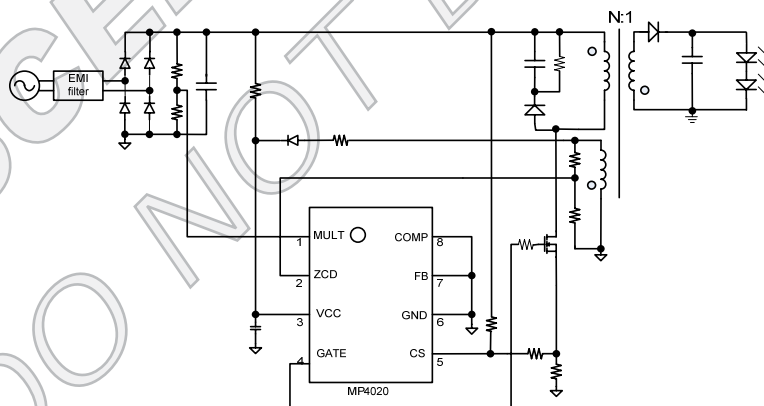
### APPLICATIONS

- Solid State Lighting
- Industrial and Commercial Lighting
- Residential Lighting

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The MP4020 is under patent pending.

### TYPICAL APPLICATION

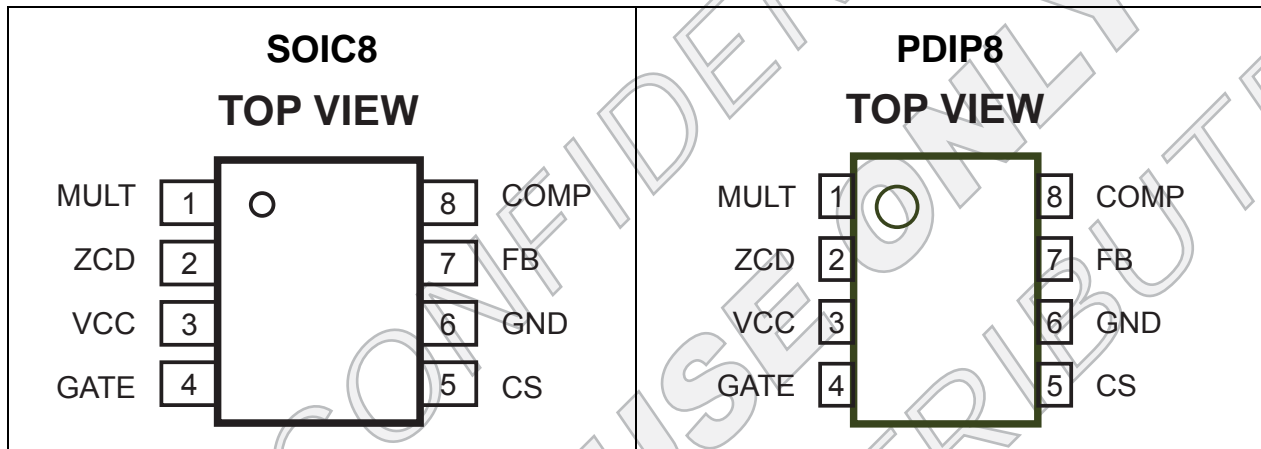


**ORDERING INFORMATION**

| Part Number* | Package | Top Marking | Free Air Temperature (T <sub>A</sub> ) |
|--------------|---------|-------------|--|
| MP4020DS     | SOIC8   |             | -40°C to +85°C                         |
| MP4020DP     | PDIP8   |             | -40°C to +85°C                         |

\*For Tape & Reel, add suffix -Z (e.g. MP4020DX-Z).  
 For RoHS Compliant Packaging, add suffix -LF (e.g. MP4020DX-LF-Z)

**PACKAGE REFERENCE**



**ABSOLUTE MAXIMUM RATINGS <sup>(1)</sup>**

|  |                 |
|--|-----------------|
| Input Voltage V <sub>CC</sub> .....                                  | -0.3V to +30V   |
| Analog Inputs and Outputs .....                                      | -0.3V to 8V     |
| ZCD Pin Maximum Current .....  | -50mA~10mA      |
| Max. Gate Current .....  | ± 1.2A          |
| Continuous Power Dissipation (T <sub>A</sub> = +25°C) <sup>(2)</sup> | TBDW            |
| Junction Temperature .....   | 150°C           |
| Lead Temperature .....   | 260°C           |
| Storage Temperature .....  | -65°C to +150°C |

**Recommended Operating Conditions <sup>(3)</sup>**

|   |                 |
|---|-----------------|
| Supply Voltage V <sub>CC</sub> .....          | 10.3V to 23V    |
| Operating Junct. Temp (T <sub>J</sub> ) ..... | -40°C to +125°C |

**Thermal Resistance <sup>(4)</sup> θ<sub>JA</sub> θ<sub>JC</sub>**

|             |     |     |      |
|-------------|-----|-----|------|
| SOIC8 ..... | TBD | TBD | °C/W |
| PDIP8 ..... | TBD | TBD | °C/W |

**Notes:**

- Exceeding these ratings may damage the device.
- The maximum allowable power dissipation is a function of the maximum junction temperature T<sub>J</sub>(MAX), the junction-to-ambient thermal resistance θ<sub>JA</sub>, and the ambient temperature T<sub>A</sub>. The maximum allowable continuous power dissipation at any ambient temperature is calculated by P<sub>D</sub>(MAX)=(T<sub>J</sub>(MAX)-T<sub>A</sub>)/ θ<sub>JA</sub>. Exceeding the maximum allowable power dissipation will cause excessive die temperature, and the regulator will go into thermal shutdown. Internal thermal shutdown circuitry protects the device from permanent damage.
- The device is not guaranteed to function outside of its operation conditions.
- Measured on JESD51-7 4-layer board.