Digital Totem Pole PFC Controller with I2C & UART Interfaces

FEATURES
Highly flexible digital controlled Totem Pole PFC controller (TPPFC)
High flexibility digital PWM
• PWM frequency range from 20 kHz to 200 kHz
• PWM soft start during AC line cross zero
• Switching frequency spread spectrum for improved EMI
High performance control loop
• 25 MHz sigma-delta ADC for line voltage and current sense, 12.5 MHz sigma-delta ADC for output voltage
• Enhanced dynamic loop response
• Input voltage feedforward to avoid reverse current during AC drop
• Support HVDC input
Multi-mode operation
• Continuous Conduction Mode (CCM) in heavy load conditions
• Discontinuous Conduction Mode (DCM) in light load conditions
• Burst mode in the zero load conditions
Advanced control functions
• True RMS power metering
• Inrush current control with programming relay delay
• Two channels X-capacitor discharge during shutdown
Extensive fault protections
• Fast over-voltage protection
• Bulk under-voltage protection and over-voltage protection
• External NTC thermal protection
• Cycle-by-cycle current limit
• Average switching current protection
• Built-in 1 kBit MTP to store custom configurations
Low power consumption
I2C and UART interfaces
Programming via easy-to-use Graphical User Interface (GUI)
Available in QFN-24L packages
-40°C to 125°C operating temperature

APPLICATIONS
Cloud/Server Power Supplies
High Performance Computing
5G/Telecom Power Supplies
Industrial Power Supplies
Ultra–High Density (UHD) Power Supplies
Merchant Power

GENERAL DESCRIPTION
The HP1010 is a highly flexible digital Power Factor Correction (PFC) controller designed to drive the totem pole PFC power stage.

A fast-switching leg driven at the PWM switching frequency and a second leg that runs at the AC line frequency make up the totem pole PFC. This design allows for a considerable increase in efficiency and power density by removing the diode bridge that is present at the input of a traditional PFC circuit.

The HP1010 offers precise input voltage, current, and power measurement at rms. Through the I2C and UART interfaces, this information can be communicated to microcontroller.

The HP1010 operate from a single 3.3 V supply. The devices are available in 4 mm x 4 mm QFN-24L package that is specified over an ambient temperature range of -40°C to +125°C.

Device Information

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>PACKAGE</th>
<th>BODY SIZE</th>
</tr>
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<tbody>
<tr>
<td>HP1010</td>
<td>QFN-24L</td>
<td>4 mm x 4 mm</td>
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Figure 1. Typical Application Circuit