PE4201 PFC

Application Note
Value Proposition

SERMA PRODUCTIVITY ENGINEERING

General

The PE4201 is a wide input range PFC controller IC for active power factor correction converters. The IC operates in CRM (Critical conduction Mode) with voltage mode PWM (Pulse Width Modulation) control, and in DCM (Discontinuous Conduction Mode) under light load condition.

Using PE's solution for power factor correction, manufactures of switched mode power supplies (SMPS) are able to realize power supplies that are smaller, more cost effective and safer than before.

Motivation

The trend of further increasing functionality of electronic devices and equipment is set forth with higher speed. Developers of switched mode power supplies (SMPS) are faced with requirements for system miniaturization, while concurrently the technical capabilities and power consumption of the equipment is increasing. With its new Power Factor Correction (PFC) product family, PE addresses the special requirements of the SMPS industry for:

- efficiency of switched mode power supply with PFC
- minimized heat development
- reduced total system cost
- product safety

Advantages of PE innovations over competition products

Productivity Engineering offers the PE4201, an wide input range analog PFC controller featuring CRMode with voltage controlled PWM and DCMode at light load condition. Compared to competition products, the PE4201 offers features and parameters, which allow the most cost efficient solution for switched mode power supply manufactures and set a high value on product safety. The advantages of the PE4201 in detail:

- ✓ broad operating voltage: 7..25V
  - ➢ *easier to handle from system perspective*
  - ➢ *saving of discrete components (diodes, capacitors)*

- ✓ large StartUp/LockOut hysteresis: 11..16V
  - ➢ *need smaller capacity on VDD*

- ✓ lowest power consumption in
  start-up-phase : 2µA
  stand-by-phase : <100µA
  active-operation-phase : 250µA
  - ➢ *non of comparable products presents such outstanding data*
  - ➢ *reduced thermal power loss*
  - ➢ *smaller housing options*
  - ➢ *no need for extra power supply (PFC IC) in stand-by*

- ✓ most precise reference: 2.47 .. 2.51V
  - ➢ *best-in-class accuracy (<1%)*

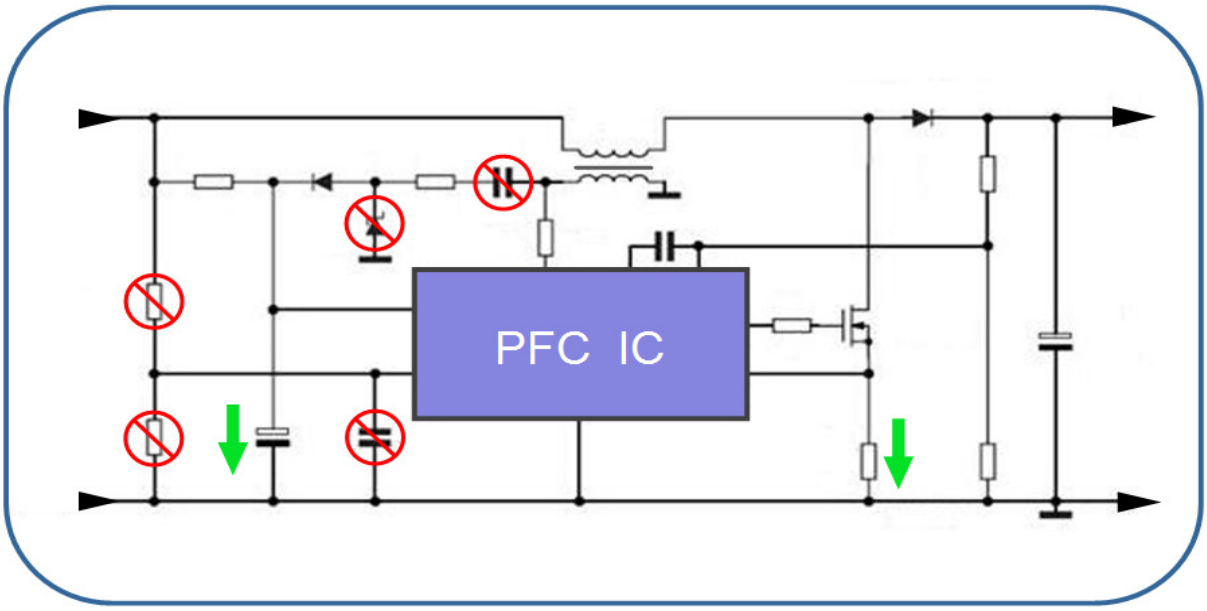
- ✓ best overcurrent level detection: 0.24V
  - ➢ *smallest power loss over sense resistor*
  - ➢ *reduced thermal power loss*
  - ➢ *cost-effective external components*

- ✓ implemented mains voltage capture
  - ➢ *no need for external voltage divider*

Conclusion

By using PEs chip solution for power factor correction (PE4201), customers benefits from different advantages:

- Saving of external components reduces cost of the system bill-of-material
- Less power consumption allow for a smaller form factor and reduces the measures for equipment cooling, which translates into cost savings again
- Highest precision and best-in-class power loss numbers generate a competitive advantage
- No need for extra power supply (PFC IC) in stand-by mode saves system cost
- A second voltage reference addresses safety requirements and prevent the system from total breakdown



Schematic of a typical PFC application and saving potential by using a PE4201

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