

# CCM-PFC

ICE2PCS02

ICE2PCS02G

Standalone Power Factor  
Correction (PFC) Controller in  
Continuous Conduction Mode  
(CCM) with Input Brown-Out  
Protection

**Power Management & Supply**



Never stop thinking.

### Standalone Power Factor Correction (PFC) Controller in Continuous Conduction Mode (CCM) with Input Brown-Out Protection

#### Product Highlights

- Leadfree DIP and DSO Package
- Wide Input Range
- Direct sensing, Input Brown-Out Detection
- Optimized for applications which require fast Startup
- Output Power Controllable by External Sense Resistor
- Fast Output Dynamic Response during Load Jumps
- Trimmed, internal fixed Switching Frequency (65kHz)

#### Features

- Ease of Use with Few External Components
- Supports Wide Input Range
- Average Current Control
- External Current and Voltage Loop Compensation for Greater User Flexibility
- Trimmed internal fixed Switching Frequency (65kHz±5% at 25°C)
- Direct sensing, Input Brown-Out Detection with Hysteresis
- Short Startup(SoftStart) duration
- Max Duty Cycle of 95% (at 25°C)
- Trimmed Internal Reference Voltage (3V±2% at 25°C)
- VCC Under-Voltage Lockout
- Cycle by Cycle Peak Current Limiting
- Output Over-Voltage Protection
- Open Loop Detection
- Soft Overcurrent Protection
- Enhanced Dynamic Response

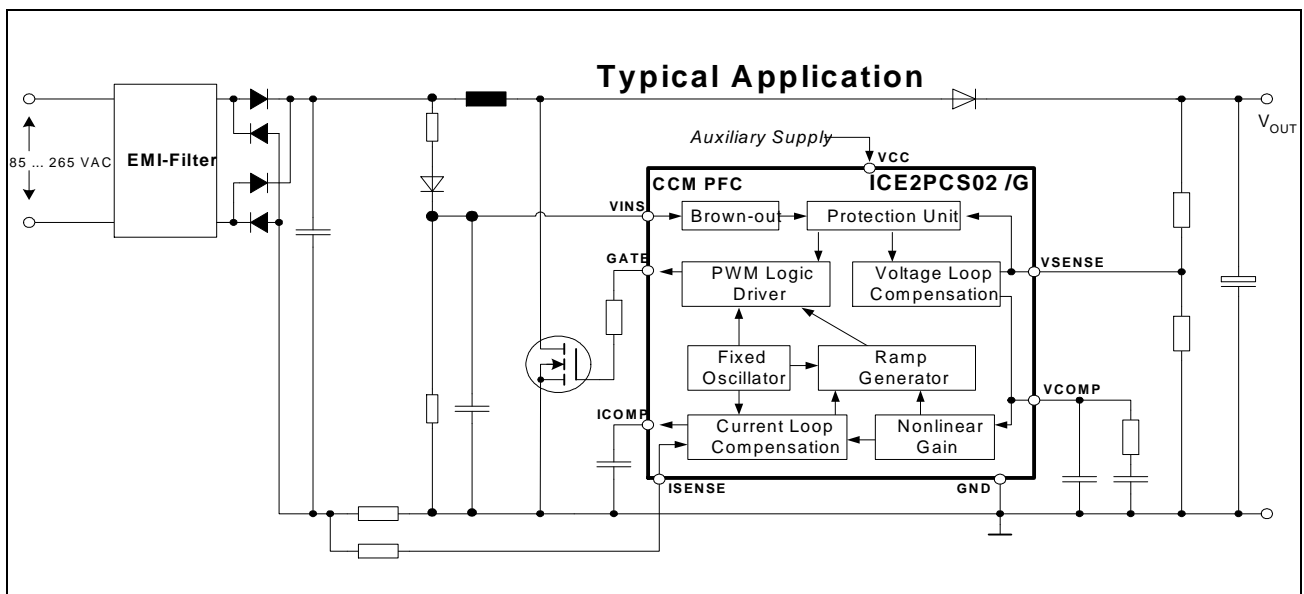
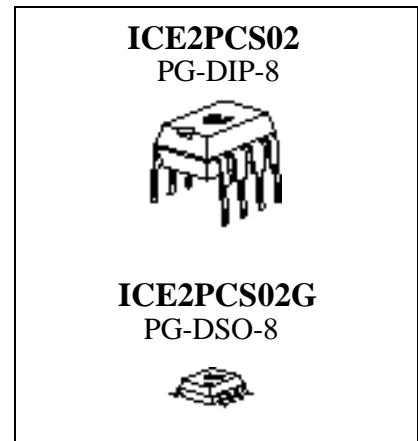
- Fulfills Class D Requirements of IEC 1000-3-2

#### Description

The ICE2PCS02/G is a 8-pin wide input range controller IC for active power factor correction converters. It is designed for converters in boost topology, and requires few external components. Its power supply is recommended to be provided by an external auxiliary supply which will switch on and off the IC.

The IC operates in the CCM with average current control, and in DCM only under light load condition. The switching frequency is trimmed and fixed internally at 65kHz. Both current and voltage loop compensations are done externally to allow full user control.

There are various protection features incorporated to ensure safe system operation conditions. The internal reference is trimmed (3V±2%) to ensure precise protection and output control level.



Type	Package
ICE2PCS02	PG-DIP-8
ICE2PCS02G	PG-DSO-8

# 1 Pin Configuration and Functionality

## 1.1 Pin Configuration

Pin	Symbol	Function
1	GND	IC Ground
2	ICOMP	Current Loop Compensation
3	ISENSE	Current Sense Input
4	VINS	Brown-out Sense Input
5	VCOMP	Voltage Loop Compensation
6	VSENSE	V <sub>OUT</sub> Sense (Feedback) Input
7	VCC	IC Supply Voltage
8	GATE	Gate Drive Output

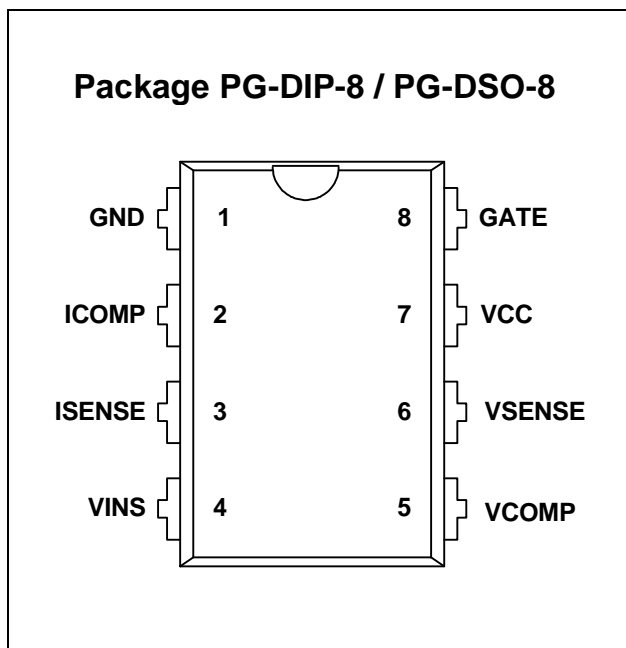


Figure 1 Pin Configuration (top view)

## 1.2 Pin Functionality

### GND (Ground)

The ground potential of the IC.

### ICOMP (Current Loop Compensation)

Low pass filter and compensation of the current control loop. The capacitor which is connected at this pin integrates the output current of OTA2 and averages the current sense signal.

### ISENSE (Current Sense Input)

The ISENSE Pin senses the voltage drop at the external sense resistor (R1). This is the input signal for the average current regulation in the current loop. It is also fed to the peak current limitation block.

During power up time, high inrush currents cause high negative voltage drop at R1, driving currents out of pin 3 which could be beyond the absolute maximum ratings. Therefore a series resistor (R2) of around 220Ω is recommended in order to limit this current into the IC.

### VINS (Brown-out Sense Input)

This VINS pin senses a filtered input voltage divider and detects for the input voltage Brown-out condition. A Brown-out condition of VINS<0.71V, shuts down the IC. The IC turns on at VINS>1.5V.

### VSENSE (Voltage Sense/Feedback)

The output bus voltage is sensed at this pin via a resistive divider. The reference voltage for this pin is 3V.

### VCOMP (Voltage Loop Compensation)

This pin provides the compensation of the output voltage loop with a compensation network to ground (see Figure 2).

### VCC (Power Supply)

The VCC pin is the positive supply of the IC and should be connected to an external auxiliary supply. The operating range is between 11V and 25V. The turn-on threshold is at 11.8V and under voltage occurs at 11V. There is no internal clamp for a limitation of the power supply.

### GATE

The GATE pin is the output of the internal driver stage, which has a capability of 1.5A instantaneous source and 2.0A instantaneous sink current.

Its gate drive voltage is internally clamped at 15.0V (typically).

## 2 Representative Block diagram

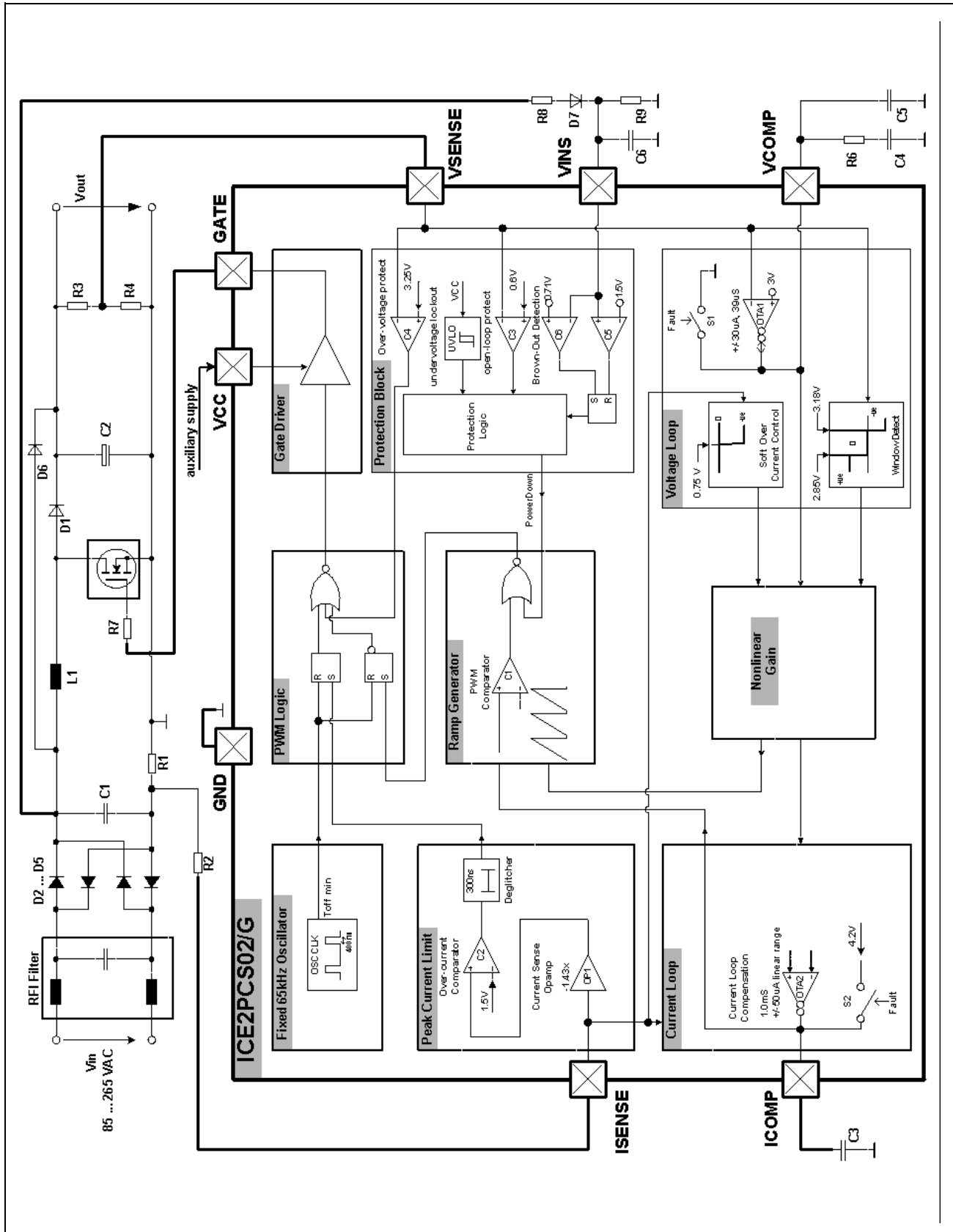


Figure 2 Representative Block diagram