

## High Performance Digital Power Factor Correction Controller with Intelligent Standby Mode for AC/DC Power Supplies

### 1 Description

The iW2206-01 is a high-performance boost controller for AC/DC power supplies that need power factor correction. The device operates in transition mode and can support up to 150W of output power, features an intelligent standby mode to minimize quiescent power loss and is offered in a tiny SOT23-6 package.

The iW2206-01 tightly regulates the output DC bus voltage across AC line and load conditions. The advanced digital control eliminates the need for external loop compensation while maintaining excellent stability across all operating conditions.

The iW2206-01 can be set in standby mode by pulling VFB pin to GND. This minimize the power loss of system standby without need of cutting off  $V_{CC}$ . The iW2206-01 can recover from sleep mode within 200 $\mu$ s after releasing the VFB pin to ensure fast  $V_{BUS}$  regulation for 2<sup>nd</sup> stage converter and the output DC bus voltage level is user-configurable to support either “following AC input voltage” or “fixed” for different application needs.

The iW2206-01 also features various protections such as output over-voltage, over-power, AC over-voltage, AC under-voltage, current-sense-resistor short, over-current, loop-open and over-temperature protection. This ensures robust and reliable system performance.

### 2 Features

- Universal AC input voltage range  $85V_{AC} \sim 265V_{AC}$
- Supports up to 150W output power
- Smart standby mode minimizes quiescent power draw to < 150mW and saves BOM cost (stand-alone operation)
  - » System level standby power (see figure 3.2) even lower with iW2206-01 disabled
- Advanced digital control loop achieves best transient and optimizes bulk capacitance requirement
- Accurate over-power protection, <  $\pm 10\%$  across full AC range
- AC line and load regulation <  $\pm 3\%$
- Fast PFC ready time < 0.2s
- Space-saving SOT23-6 package eases PCB layout
- Configurable output DC bus voltage
- Wide operating supply voltage ( $V_{VCC}$ ) range from 8.0V to 20V
- Comprehensive protection features
  - » Output over-voltage protection
  - » AC over-voltage protection
  - » AC under-voltage protection (Brown-out)
  - » Cycle-by-cycle peak current limit
  - » Loop-open protection
  - » Current-sense-resistor short protection
  - » Over-temperature protection

### 3 Applications

- Two-stage adapters
- AC/DC power supplies

# iW2206-01

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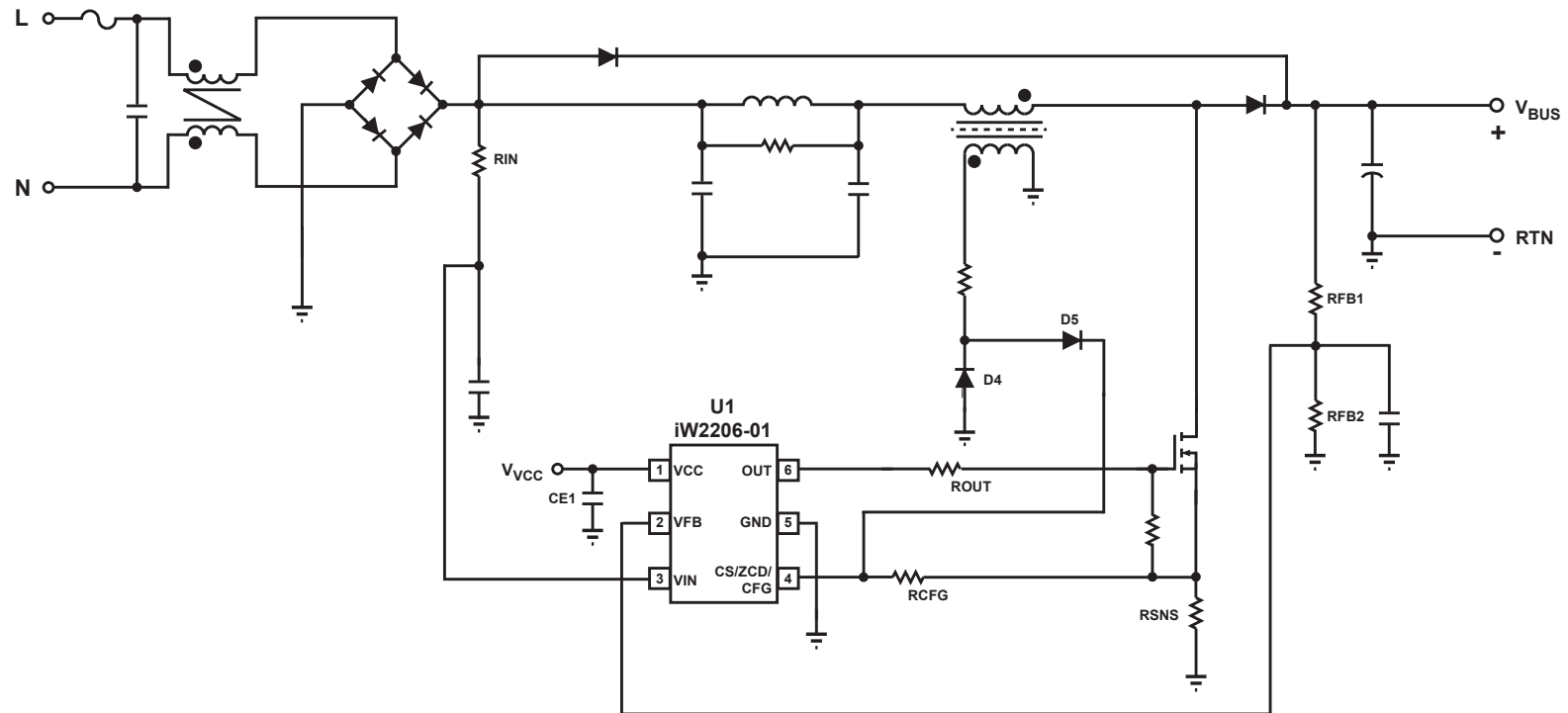


Figure 3.1 : iW2206-01 PFC Boost Typical Application Circuit.

# iW2206-01

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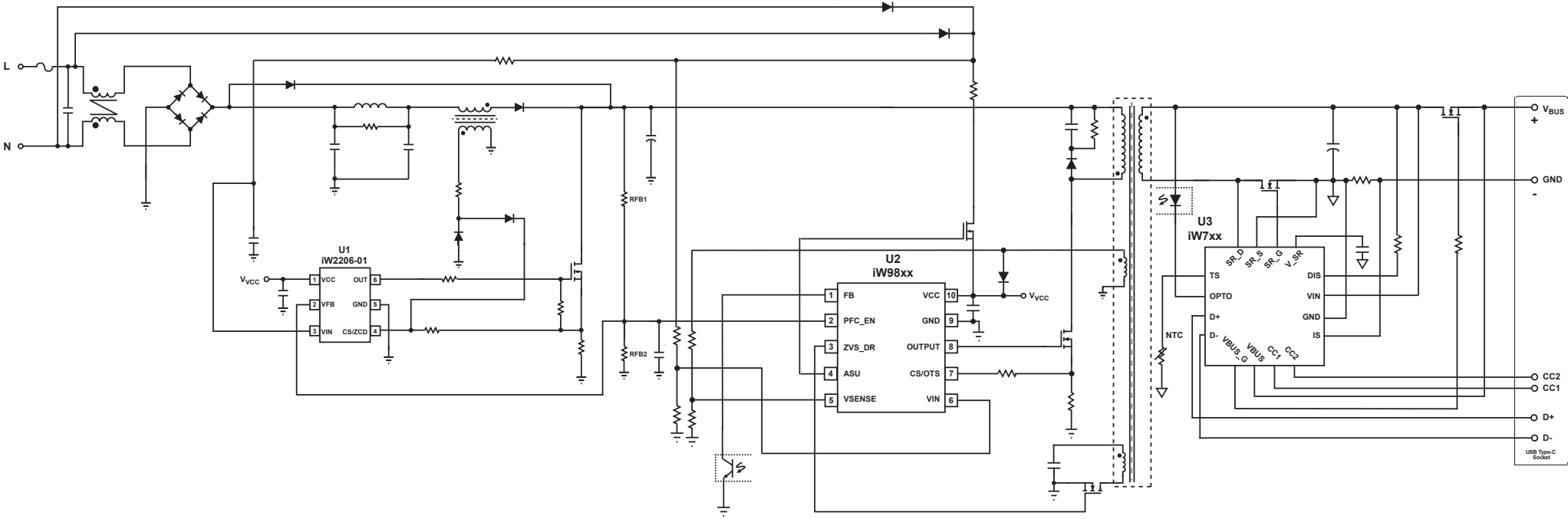


Figure 3.2 : iW2206-01 PFC Boost with USB PD Charging Circuit (iW98xx as Primary-Side Controller and iW7xx as Synchronous Rectification and Protocol Interface Controller).

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### 4 Pinout Description

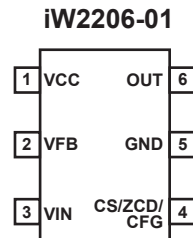


Figure 4.1 : 6-Lead SOT23 Package

Pin Number	Pin Name	Type	Pin Description
1	VCC	Power Input	IC power supply.
2	VFB	Analog Input	Output DC bus voltage sense.
3	VIN	Analog Input	Input AC line voltage sense.
4	CS/ZCD/CFG	Analog Input	Power MOSFET current sense, inductor reset sense and configuration.
5	GND	Ground	Ground reference.
6	OUTPUT	Analog Output	Power MOSFET gate drive.

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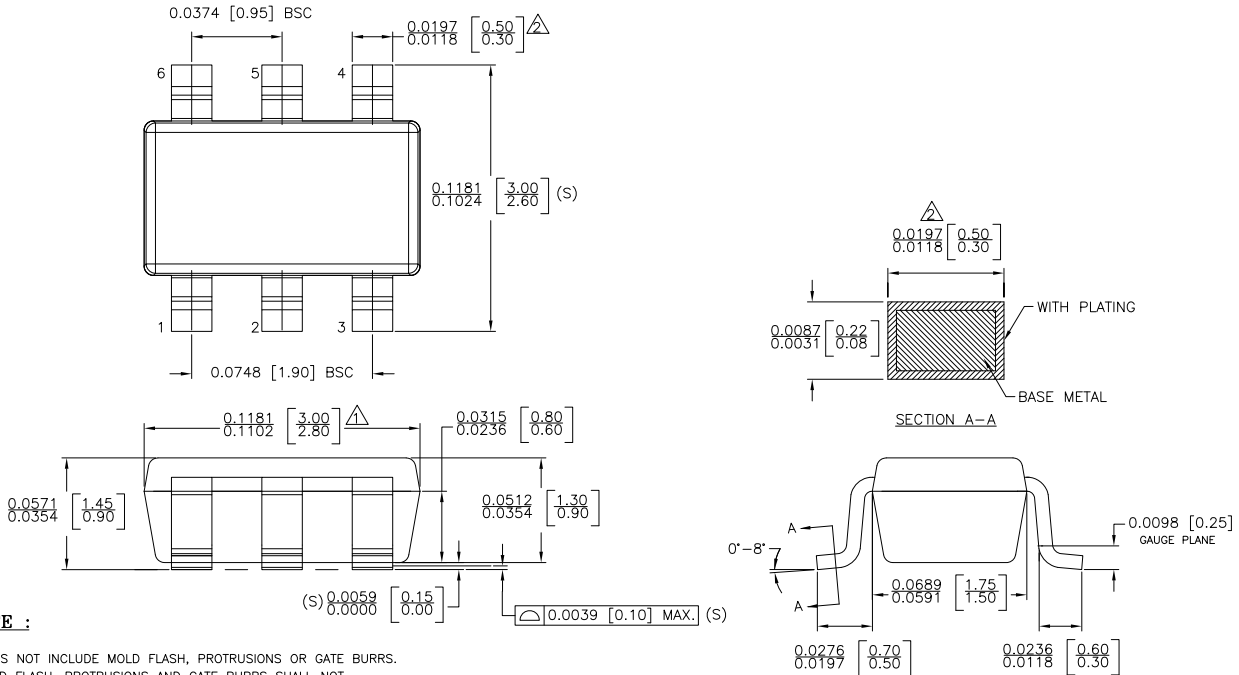
### 5 Absolute Maximum Ratings

Absolute maximum ratings are the parameter values or ranges which can cause permanent damage if exceeded. For maximum safe operating conditions, refer to Electrical Characteristics in Section 6.

Parameter	Symbol	Value	Units
DC supply voltage range (pin 1, $I_{VCC} = 20\text{mA max}$ )	$V_{VCC}$	-0.3 to 22.0	V
Continuous DC supply current at VCC pin ( $V_{VCC} = 15\text{V}$ )	$I_{VCC}$	20	mA
$V_{VIN}$ (pin 3)		-0.3 to 20.0	V
OUTPUT (pin 6)		-0.3 to 20.0	V
$V_{VFB}$ (pin 2, $I_{FB} \leq 10\text{mA}$ )		-0.7 to 5.0	V
CS/ZCD/CFG input (pin 4)		-0.3 to 5.0	V
Maximum junction temperature	$T_{JMAX}$	150	°C
Operating junction temperature	$T_{JOPT}$	-40 to 150	°C
Storage temperature	$T_{STG}$	-65 to 150	°C
Thermal resistance junction-to-ambient	$\theta_{JA}$	190	°C/W
ESD rating per JEDEC JS-001-2017		±2,000	V
Latch-up test per JESD78E		±100	mA

**High Performance Digital Power Factor Correction Controller with Intelligent Standby Mode for AC/DC Power Supplies**

**6 Physical Dimensions**



**NOTE :**

- △ DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED 0.127 MM PER SIDE.
- △ DOES NOT INCLUDE INTER-LEAD FLASH OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSIONS SHALL NOT EXCEED 0.127 MM PER SIDE.
- 3. DIE IS FACING UP FOR MOLD. DIE IS FACING DOWN FOR TRIM/FORM.
- 4. THIS PART IS COMPLIANT WITH EIAJ SPECIFICATION SC74A AND JEDEC SPECIFICATION MO-178AB.
- 5. LEAD SPAN/STAND OFF HEIGHT/COPLANARITY ARE CONSIDERED AS SPECIAL CHARACTERISTIC(S).
- 6. CONTROLLING DIMENSIONS IN INCHES. [mm]

STATUS: RELEASED	SCALE: DO NOT SCALE	
TERMINAL FINISH: 100% Sn or NiPdAu (PPF)		
TITLE: 6 SOT23 PACKAGE OUTLINE		
REV: A	REVISION NOTE: NEW DRAWING	DATE: 02-MAR-2015

**7 Ordering Information**

Part Number	Description	Package	Description
iW2206-01	Power factor correction controller optimized for gate driver with bipolar PNP pull down	SOT-23	Tape & Reel <sup>1</sup>

Note 1: Tape & Reel packing quantity is 3,000/reel. Minimum packing quantity is 3,000.

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