Half-Bridge Resonant Controller

ICE1HS01G
PG-DSO-8

Product Highlights

- **Minimum number of external components**
- **High accuracy oscillator**
- **Two-level over current protection**
- **Over load/open loop protection**
- **Mains undervoltage protection with adjustable hysteresis**
- **Adjustable blanking time for over load protection and restart**

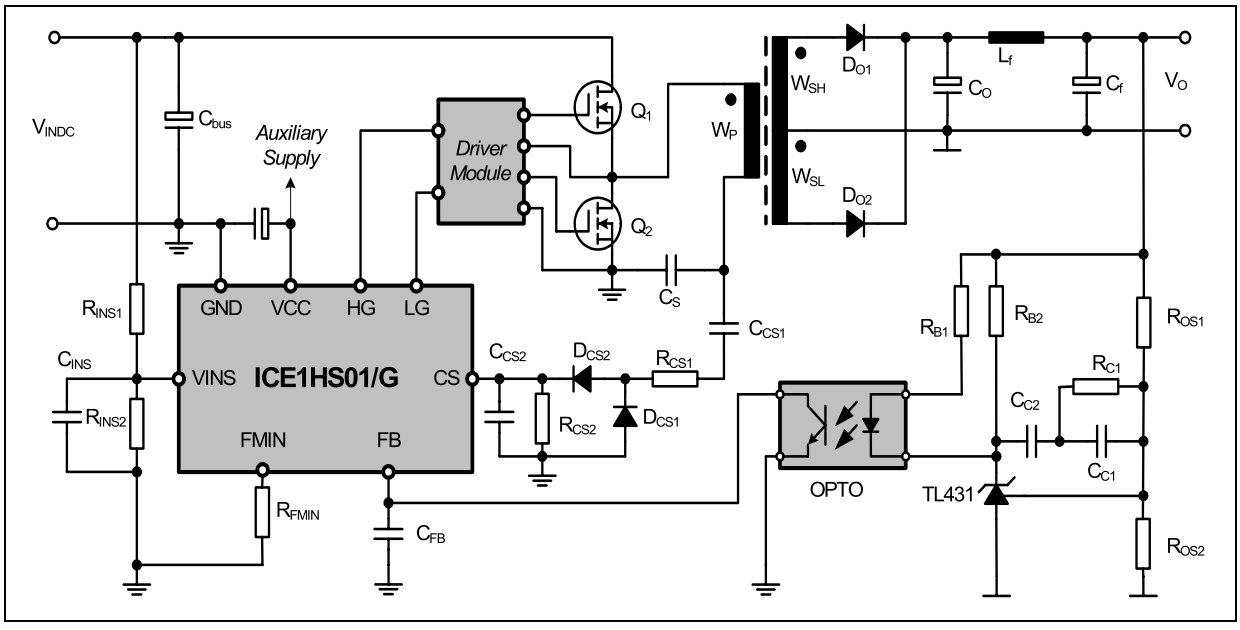
Features

- DSO8 package
- Maximum 600kHz switching frequency
- Adjustable minimum switching frequency with high accuracy
- 50% duty cycle
- Mains input under votlage protection with adjustable hysteresis
- Two levels of overcurrent protection: frequency shift and latch off
- Open-loop/over load protection with extended blanking time
- Built-in digital and nonlinear softstart
- Adjustable restart time during fault protection period

Applications

- LCD/PDP TV
- AC-DC adapter
- Audio SMPS

Typical Application Circuit



Type	Package
ICE1HS01G	PG-DSO-8

1 Pin Configuration and Functionality

1.1 Pin configuration with PG-DSO-8

Pin	Symbol	Function
1	FMIN	Minimum switching frequency
2	CS	Current sense
3	FB	Feedback voltage
4	VINS	Input voltage sense
5	GND	IC ground
6	LG	Low side gate drive
7	HG	High side gate drive
8	VCC	IC power supply

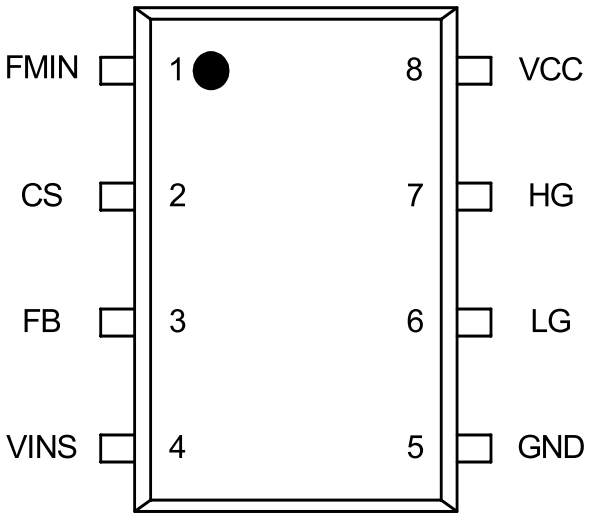


Figure 1 Pin configuration with PG-DSO-8

1.2 Pin Functionality

FMIN (minimum switching frequency)

An external resistor is connected between this pin and the ground. The voltage of this pin is constant during operation and thus the resistance determines the current flowing out of this pin. The minimum switching frequency is determined by this current. The maximum switching frequency and the switching frequency during soft start are also related to the current flowing out of FMIN pin.

CS(current sense)

The current sense signal is fed to this pin. Inside the IC, two comparators are provided. If the voltage on CS pin is higher than the first threshold, IC will increase the switching frequency to limit the maximum output power of the converter. If the voltage on this pin exceeds the second threshold, IC will be latched off immediately.

FB (feedback)

This pin is connected to the collector of the opto-coupler. Internally, during normal operation, this pin is connected to reference voltage source with a pull-up resistor(R_{FB}). The IC uses the voltage on this pin to adjust the switching frequency within the range of maximum and minimum frequency set by FMIN pin. If FB voltage is higher than V_{FBH} for a certain fixed blanking time, an extended timer will be started. If over load/open loop protection exists longer than the extended blanking time, IC will enter auto-restart mode. An off timer starts from the instant IC stops switching till IC starts another soft start. This off time is determined by the resistors and capacitor connected to VINS pin.

VINS (mains input voltage sense)

The mains input voltage is fed to this pin via a resistive voltage divider. If the voltage on VINS pin is higher than the threshold V_{INSON}, IC will start to operate with softstart when VCC increases beyond turn on threshold. During operation, if the voltage on this pin falls below the threshold V_{INSON}, IC will stop switching until the voltage on this pin increases again.

When IC goes into over load protection mode, IC will stop switching and try to restart after a period of time. This period can be adjusted by connectting different capacitors between this pin and ground.

GND (ground)

IC common ground.

LG (low side gate drive)

Low side power MOSFET driver.

HG (high-side gate drive)

Up side power MOSFET driver.

VCC (IC power supply)

Supply voltage of the IC.

2 Representative Block Diagram

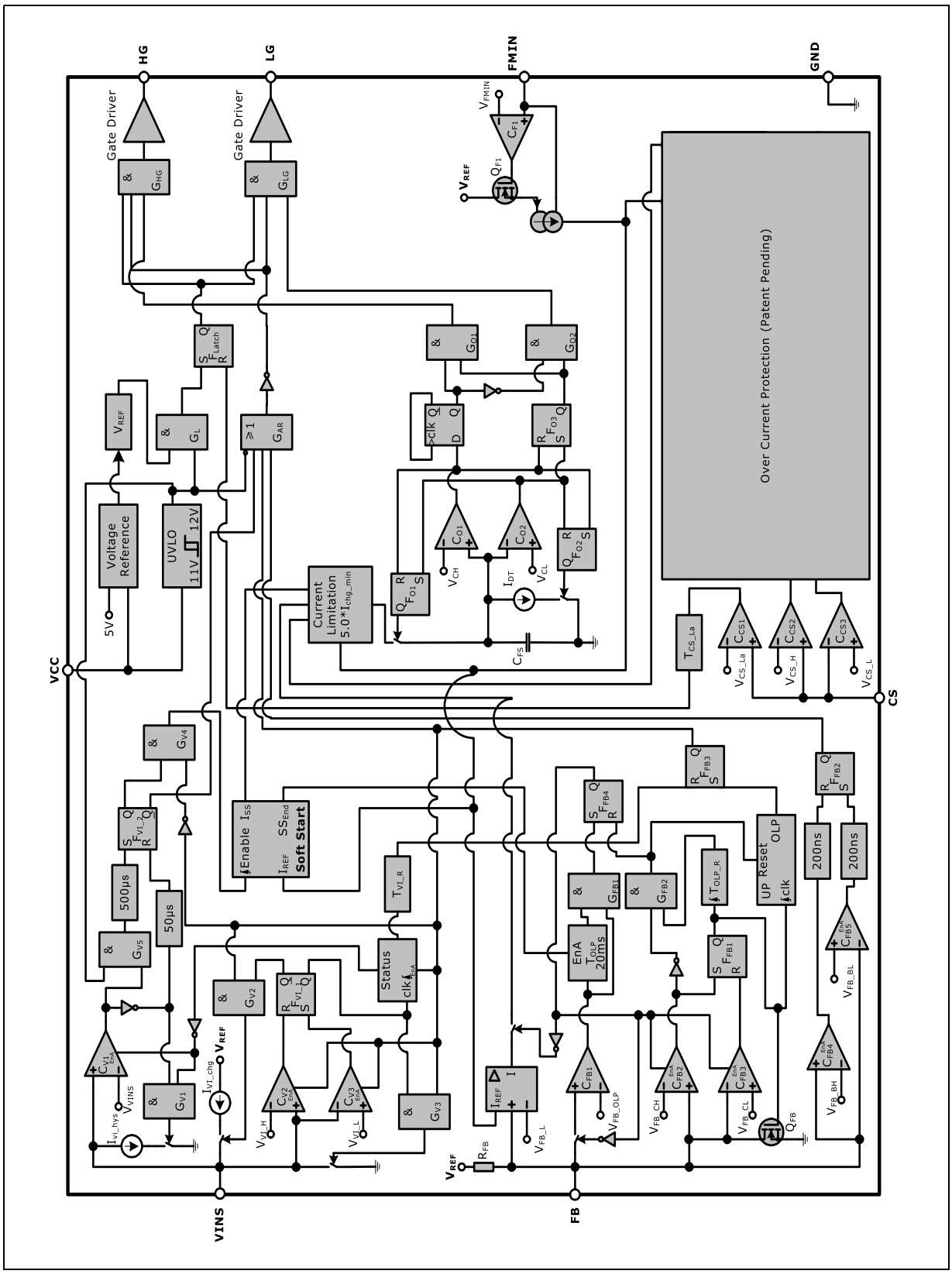


Figure 2 Representative Block Diagram