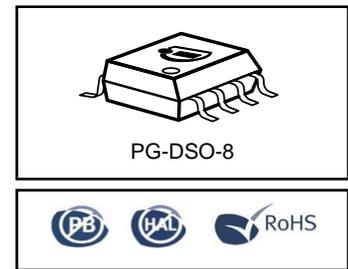


Off-Line SMPS Quasi-Resonant PWM Controller with integrated 500V startup cell in DSO8

Product Highlights

- Active burst mode for low standby power
- Quasi resonant operation
- Digital frequency reduction for better overall system efficiency
- Integrated 500V startup cell
- Pb-free lead plating, halogen free mold compound, RoHS compliant



Features

- Quasi resonant operation till very low load
- Active burst mode operation at light/no load for low standby input power (< 100mW)
- Digital frequency reduction with decreasing load
- Startup cell for VCC pre-charging with constant current
- Built-in digital soft-start
- Foldback correction and cycle-by-cycle peak current limitation
- Auto restart mode for VCC Over-voltage protection, VCC Under-voltage protection and open loop/over-load protection
- Latch-off mode for adjustable output over-voltage protection and short-winding protection

Description

ICE2QS03G is a quasi-resonant PWM controller optimized for off-line switch power supply. The digital frequency reduction with decreasing load enables a quasi-resonant operation till very low load. As a result, the overall system efficiency is significantly improved compared to other conventional solutions. The active burst mode operation enables ultra-low power consumption at standby mode with small and controllable output voltage ripple. Based on the BiCMOS technology, the product has a wide operation range (up to 25V) of IC power supply and lower power consumption. The numerous protection functions give a full protection of the power supply system in failure situations. All of these make the ICE2QS03G an outstanding controller for quasi-resonant flyback converter in the market.

Applications

- Adapter/Charger,
- LCD monitor, DVD R/W, DVD Combo, Blue-ray/DVD player, Set-top box,
- Auxiliary power supply for CRT TV, LCD TV, PC, Server, Printer, TV, Home theater/Audio System, etc.

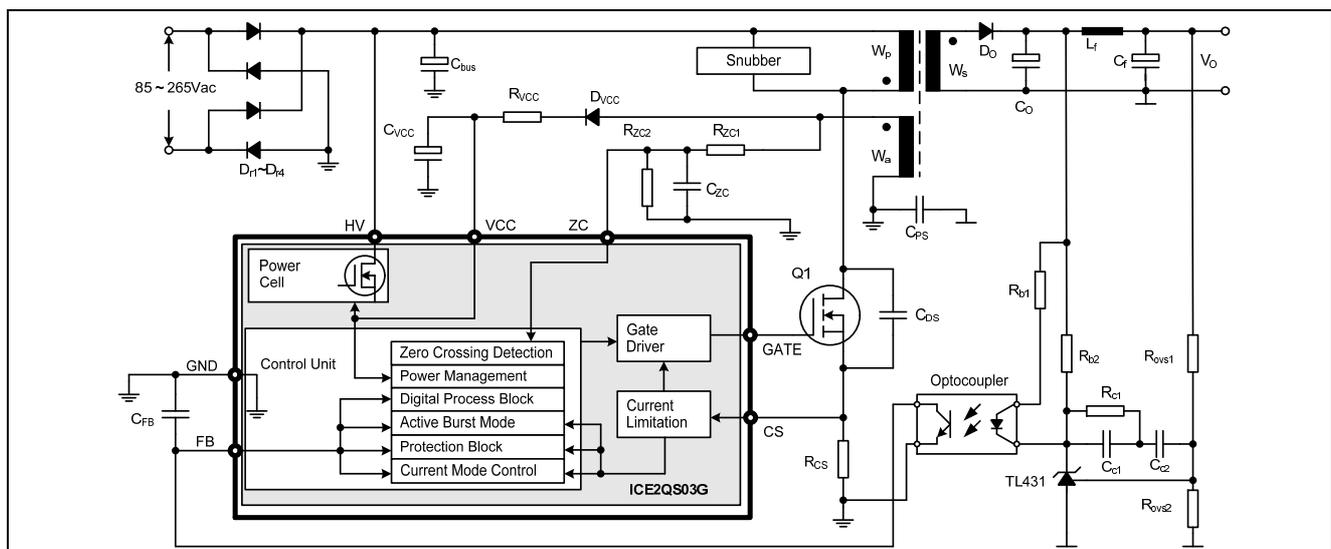


Figure 1 Typical Application

Type	Package	Marking
ICE2QS03G	PG-DSO-8	2QS03G

1 Pin Configuration and Functionality

1.1 Pin Configuration with PG-DSO-8

Table 1 Pin configuration

Pin	Symbol	Function
1	ZC	Zero Crossing
2	FB	Feedback
3	CS	Current Sense
4	GATE	Gate Drive Output
5	HV	High Voltage input
6	N.C.	Not Connected
7	VCC	Controller Supply Voltage
8	GND	Controller Ground

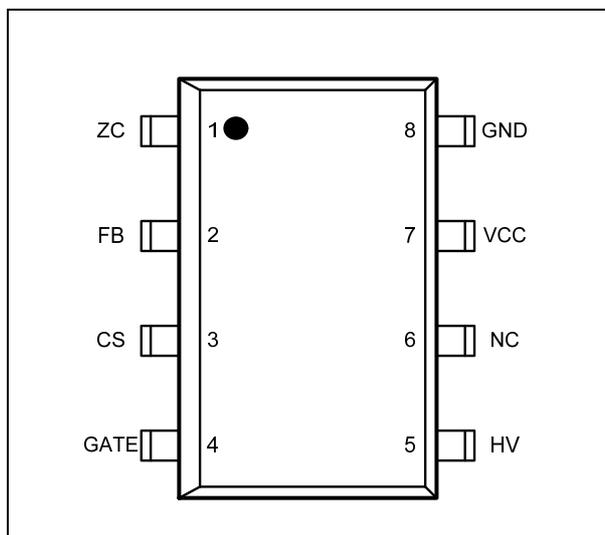


Figure 2 Pin configuration PG-DSO-8 (top view)

1.2 Pin Functionality

ZC (Zero Crossing)

At this pin, the voltage from the auxiliary winding after a time delay circuit is applied. Internally, this pin is connected to the zero-crossing detector for switch-on determination. Additionally, the output overvoltage detection is realized by comparing the voltage V_{zc} with an internal preset threshold.

FB (Feedback)

Normally an external capacitor is connected to this pin for a smooth voltage V_{FB} . Internally this pin is connected to the PWM signal generator block for switch-off determination (together with the current sensing signal), to the digital signal processing block for the frequency reduction with decreasing load during normal operation, and to the Active Burst Mode controller block for entering Active Burst Mode operation determination and burst ratio control during Active Burst Mode operation. Additionally, the open-loop / over-load protection is implemented by monitoring the voltage at this pin.

CS (Current Sense)

This pin is connected to the shunt resistor for the primary current sensing externally and to the PWM signal generator block for switch-off determination (together with the feedback voltage) internally. Moreover, short-winding protection is realized by monitoring the voltage V_{cs} during on-time of the main power switch.

GATE (Gate Drive Output)

This output signal drives the external main power switch, which is a power MOSFET in most case.

HV (High Voltage)

The pin HV is connected to the bus voltage externally and to the startup cell internally. The current through this pin pre-charges the VCC capacitor with constant current once the supply bus voltage is applied.

VCC (Power supply)

VCC pin is the positive supply of the IC. The operating range is between V_{VCCoff} and V_{VCCOVp} .

GND (Ground)

This is the common ground of the controller.

2 Representative Block Diagram

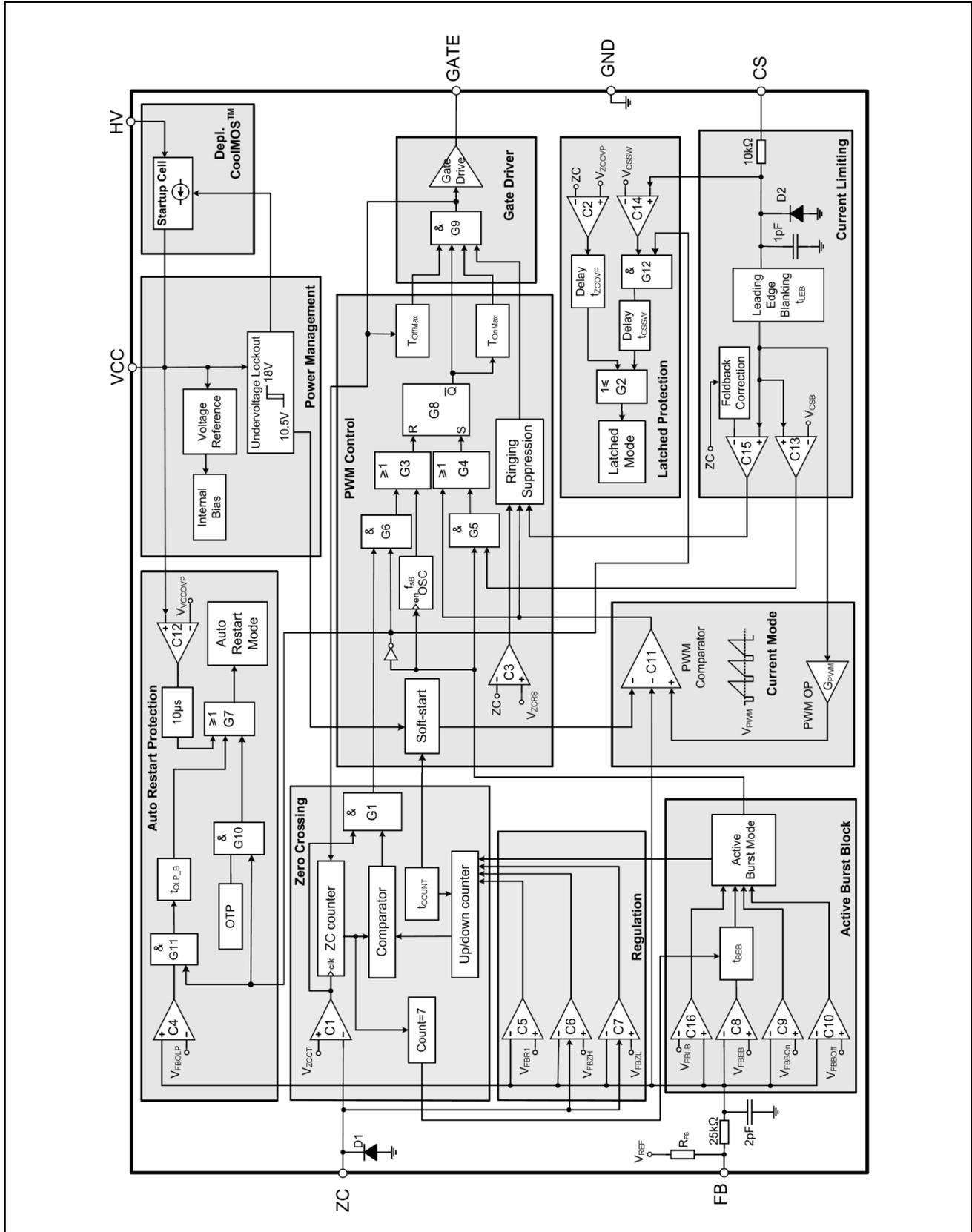


Figure 3 Representative Block Diagram