

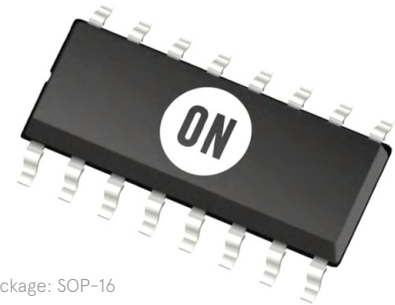
LLC Resonant Converter Design using FAN7688

The FAN7688 is an advanced Pulse Frequency Modulated (PFM) controller for LLC resonant converters with Synchronous Rectification (SR) that offers best in class efficiency for isolated DC/DC converters. It employs a current mode control technique based on a charge control, where the triangular waveform from the oscillator is combined with the integrated switch current information to determine the switching frequency.

This provides a better control-to-output transfer function of the power stage simplifying the feedback loop design while allowing true input power limit capability. Closed-loop soft-start prevents saturation of the error amplifier and allows monotonic rising of the output voltage regardless of load condition. A dual edge tracking adaptive dead time control minimizes the body diode conduction time thus maximizing efficiency.

PRODUCT FEATURES

- Advanced PFM with a charge current control
- Adaptive Synchronous Rectification Control w/ dual edge tracking
- NON ZVS prevention (NZP) by compensation cutback (frequency shift)
- Hybrid control : PFM + PWM improves light load efficiency
- Closed loop soft-start with for monotonic output voltage at startup
- Wide operating frequency (39kHz ~ 690kHz)
- Programmable dead time for Primary Side Switches and SR switches
- Protection Functions with auto-restart for OCP; OSP; OLP; OTP

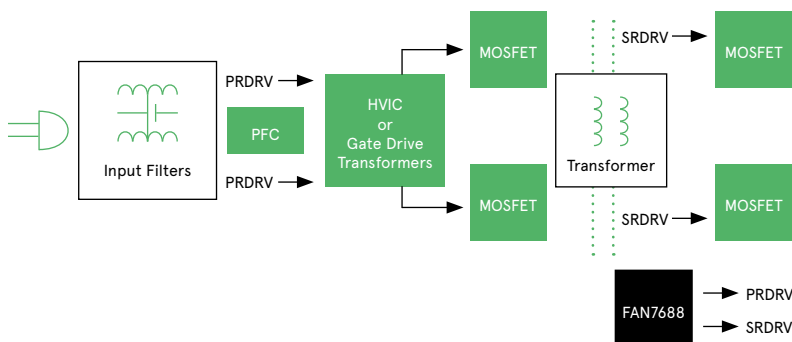


Package: SOP-16

APPLICATIONS

- Desktop ATX, Desktop-Derived Server, Blade Server and Telecom Power Supplies
- Intelligent 100 W-2 kW + Off-Line Power Supplies
- High Efficiency Isolated DC-DC Converters
- Large Screen Display Power
- Industrial Power

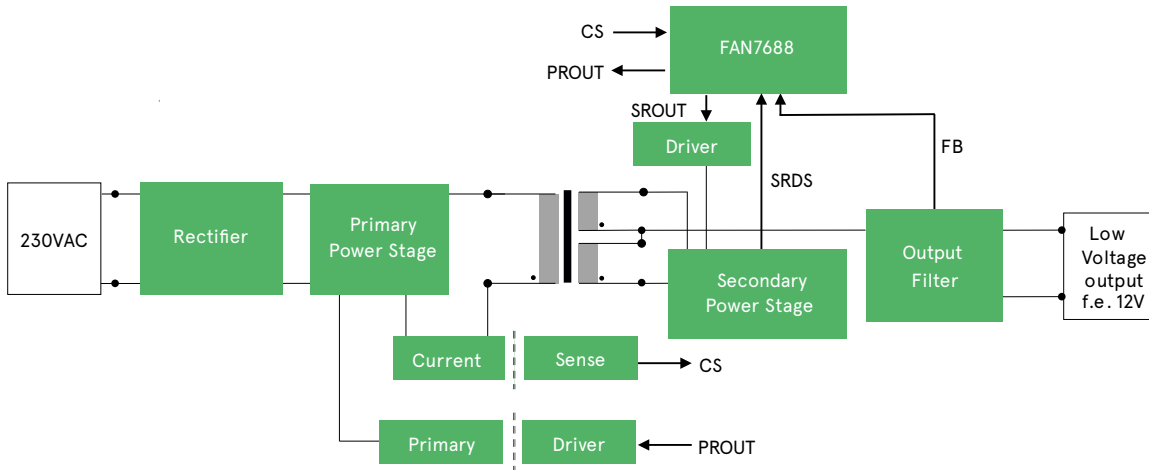
BLOCK DIAGRAM



Application note available:

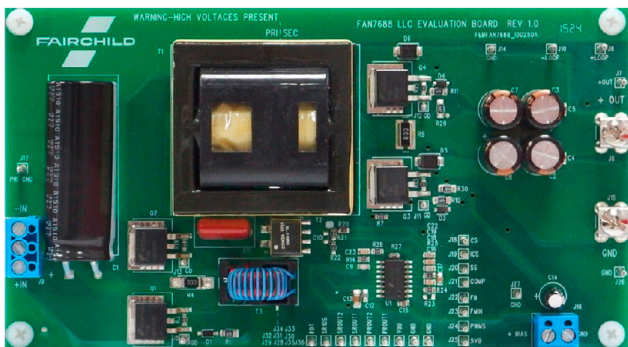
avnet-silica.com/on-an-6104-applicationnote

ON Semiconductor – Your one stop shop for power semiconductors provides leading solutions for LLC SR converters



Function	ON Semiconductor product	Part Number(s)
LLC controller	FAN7688	
Bridge Rectifier	DFB series	DFB20100, DFB2560
PFC Diode	Stealth II Rectifier	FFP30S60S, FFPO8S60SN
Isolated Current Sense	Optocoupler Sense OPAMP	FODM8801C (High Temp), FODM1008 NCS210, NCS199
Isolated Primary Driver	OPAMP Optocoupler Gate Driver	NCS210, NCS199 FOD8316, FOD8320, FOD8342
Driver	FAN3225C	
PFC Controller	NCP16xx	
Primary power FET	SuperFET III 650V	FCH023N65S3, FCP067N65S3, FCB199N65S3
Secondary power FET	T8 – 40V T8 – 60V PTNG – 80V PTNG – 100V	NTMFS5H400NL, NTMFS5H409NL NTMFS5H600NL FDMS2D5N08C, FDMC007N08LC FDMS86180, FDMC86184

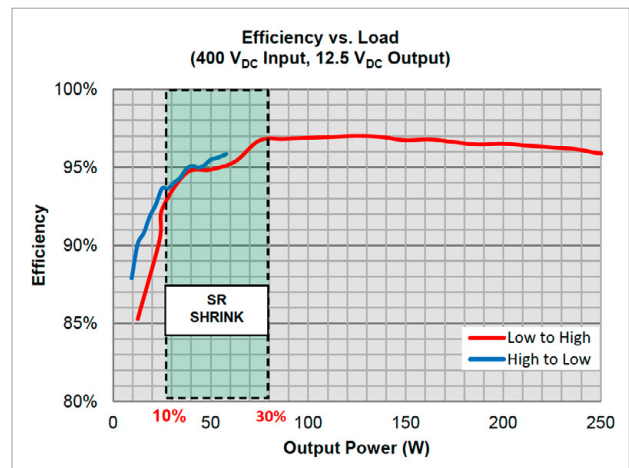
Development Board available - LLCHB 250W 400V to 12.5V Converter / Ordering code FEBFAN7688_I00250A



Top View, 163 mm x 89 mm



Side View, Cross Section, 30 mm



Efficiency vs. Load



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