

Evaluation Board Report

24V 36W AC-DC power supply

| Design Specs | Value | Unit |
|----------------|---|------|
| Input Voltage | 85-265 | VAC |
| Output Voltage | 24 | VDC |
| Output Current | 1.5 | A |
| Isolation | YES | |
| MPS IC | HFC0100HS | |
| Application | <ul style="list-style-type: none"> • Battery charger: cellular phone, digital camera, video camera, etc • Standby power supply: TV, Desk top PC, Audio system, etc • SMPS: printer, DVD, VCR, CD player, STBs, Adapter | |

| | |
|-----------------|------------------------------------|
| Document Number | EBXXX |
| Author | Application Engineering Department |
| Date | Nov, 2014 |
| Revision | 1.0 |

Design Summary

EVHFC0100HS-00A evaluation board provides a reference design for a universal offline power supply with 24V, 1.5A output. It contains the complete specification of the power supply, a detailed circuit diagram, the entire bill of materials required to build the power supply, drawing of the power inductors and transformers, and test data of the most important performance.

DESCRIPTION

The HFC0100 is a peak current mode controller with Green Mode Operation. Its high efficiency feature over the entire line and load range meets the stringent world-wide energy efficiency requirements.

The HFC0100 integrated with a high voltage current source, its valley detector ensures minimum Drain-Source voltage switching (Quasi-Resonant operation). When the output power falls below a given level, the controller enters the burst mode.

The HFC0100 provides various protections, such as Thermal Shutdown (TSD), Vcc Under Voltage Lockout (UVLO), Over Load Protection (OLP), Over Voltage Protection (OVP) and so on.

The HFC0100 is available in the 8-pin SOIC8 package.

ELECTRICAL SPECIFICATION

| Parameter | Symbol | Value | Units |
|----------------|------------------|--------|-------|
| Supply Voltage | V _{IN} | 85~265 | VAC |
| Output Voltage | V _{OUT} | 24 | V |
| Output Current | I _{OUT} | 1.5 | A |

FEATURES

- Universal Main Input Voltage (85~265VAC)
- Quasi-Resonant Operation
- Valley Switching for high efficiency and EMI
- Burst Mode for low standby consumption
- Internal High Voltage Current Source
- High level of integration, allows a very low number external component count
- Maximum Frequency Limited
- Internal Soft Start
- Internal 250nS Leading Edge Blanking
- Thermal shutdown
- Vcc UVLO with Hysteresis
- Over Voltage Protection
- Over Load Protection.

APPLICATIONS

- Battery charger: cellular phone, digital camera, video camera, etc
- Standby power supply: TV, Desk top PC, Audio system, etc
- SMPS: Inc jet printer, DVD, VCR, CD player, STBs, Adapter for NB

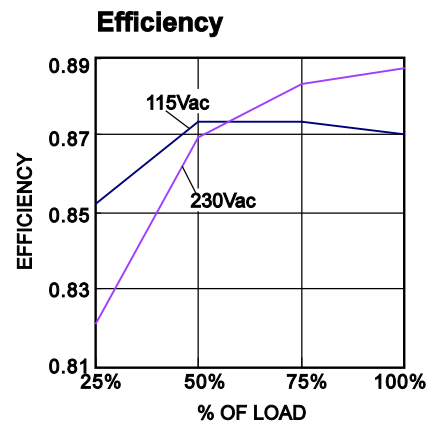
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EVHFC0100HS-00A EVALUATION BOARD

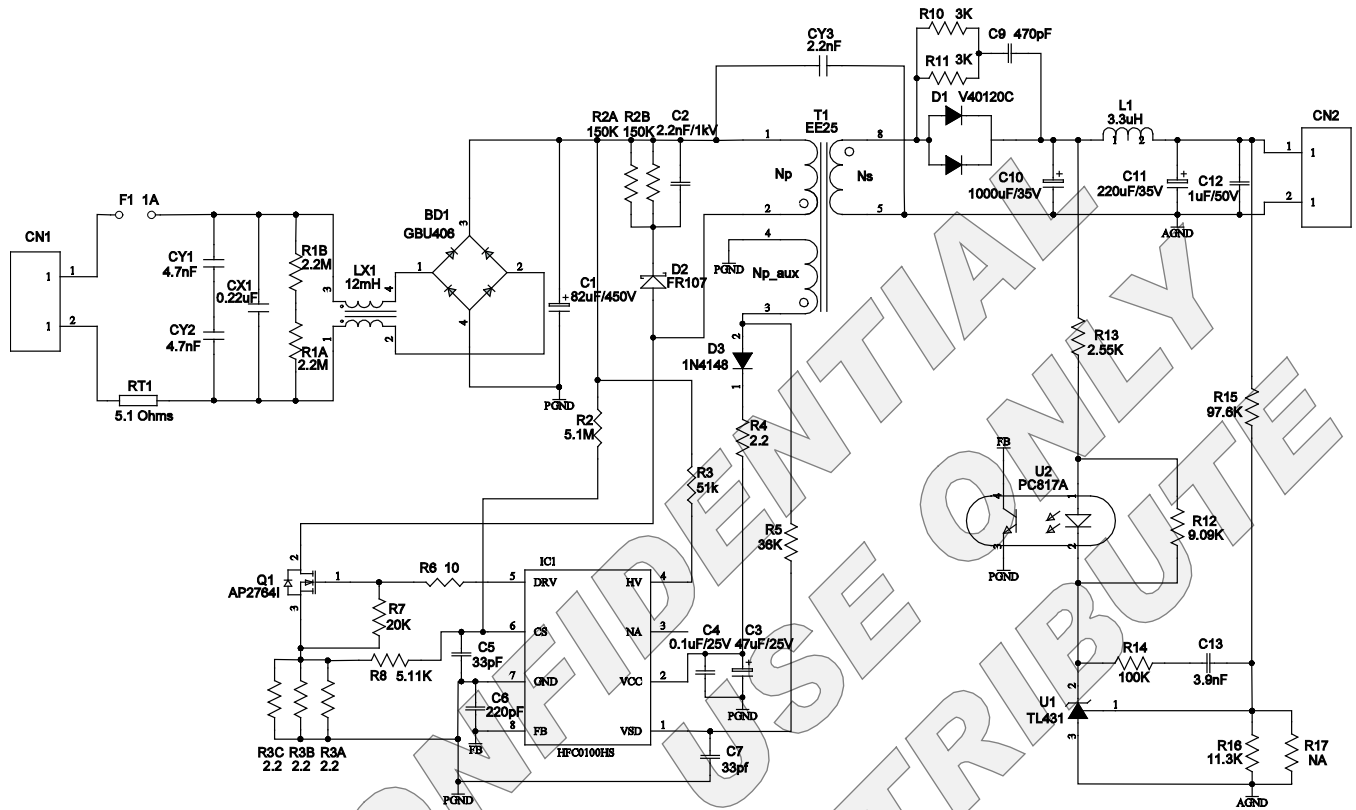


(L x W x H) 12.7cm x 5.4cm x 3.5cm

| Board Number | MPS IC Number |
|-----------------|---------------|
| EVHFC0100HS-00A | HFC0100HS |



No Load Consumption: <140mW @265Vac

EVALUATION BOARD SCHEMATIC

EVHFC0100HS-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Part Number |
|-----|-------|--------|------------------------------|--------------|--------------|--------------------|
| 1 | BD1 | GBU406 | Bridge Rectifier, 4A/600V | Through Hole | Diodes | GBU406 |
| 1 | C1 | 82µF | Electrolytic Capacitor, 450V | DIP | JiangHai | CD266-450V82 |
| 1 | C10 | 1000µF | Electrolytic Capacitor, 35V | DIP | Panasonic | 1000uF/35V |
| 1 | C11 | 220µF | Electrolytic Capacitor, 35V | DIP | JiangHai | CD287-35V220 |
| 1 | C12 | 1µF | Ceramic Cap, 50V, X7R | 1206 | Murata | GRM21BR71H105KA12L |
| 1 | C13 | 3.9nF | Ceramic Cap, 50V, X7R | 0603 | Murata | GRM188R71H392KA01D |
| 1 | C2 | 2.2nF | Film Cap, 1000V | DIP | | |
| 1 | C3 | 47µF | Electrolytic Capacitor, 25V | DIP | JiangHai | CD28L-25V47 |
| 1 | C4 | 0.1µF | Ceramic Cap, 50V, X7R | 0603 | Murata | GRM188R71H104KA93D |
| 2 | C5,C7 | 33pF | Ceramic Cap, 50V, C0G | 0603 | Murata | GRM1885C1H330JA01 |
| 1 | C6 | 220pF | Ceramic Cap, 50V, X7R | 0603 | Murata | GRM188R71H221KA01D |

EVHFC0100HS-00A BILL OF MATERIALS (continued)

| Qty | Ref | Value | Description | Package | Manufacturer | Part Number |
|-----|----------------------------|-----------|-----------------------------|-----------------|--------------------|-------------------|
| 1 | C9 | 470pF | Film Cap, 1000V | DIP | | |
| 2 | CN1, CN2 | | CONNECTOR-2PINS | Through Hole | | |
| 1 | CX1 | 0.22μF | Film CAP, 275V, X2 | DIP | Vishay | BFC33920224 |
| 2 | CY1, CY2 | 4.7nF | Film CAP, 300V, Y2 | DIP | Vishay | VY2472M49Y5US63V7 |
| 1 | CY3 | 2.2nF | Film CAP, 500V, Y1 | DIP | Vishay | VY1222M47Y5UQ63V0 |
| 1 | D1 | V40120C | Schottky Diode, 40A/120V | TO220A B | | |
| 1 | D2 | FR107 | Diode, 1A/1000V | DO-41 | | FR107 |
| 1 | D3 | 1N4148 | Diode, 0.15A/75V | SOD-123 | Diodes | 1N4148 |
| 1 | F1 | 1A | Fuse, 250V | AXIAL | Cooper Bussmann | SS-5-1A |
| 1 | IC1 | HFC0100HS | QR controller | SOIC8 | MPS | HFC0100HS |
| 1 | L1 | 3.3μH | Inductor, 3A | DIP | | |
| 1 | LX1 | 12mH | Common filter | DIP | | |
| 1 | Q1 | AP2764I-A | MOSFET, 650V | TO220 | APEC | AP2764I-A |
| 2 | R10, R11 | 3kΩ | Film Res., 1% | 1206 | Yageo | RC1206FR-073KL |
| 1 | R12 | 9.09kΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-073K09L |
| 1 | R13 | 2.55kΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-072K55L |
| 1 | R14 | 100kΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-07100KL |
| 1 | R15 | 97.6kΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-0797K6L |
| 1 | R16 | 11.3kΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-0711K3L |
| 1 | R17 | | Don't Stuff | 0603 | | |
| 2 | R1A, R1B | 2.2MΩ | Film Res., 1% | 1206 | Royalohm | 1206J0225T5E |
| 2 | R2A, R2B | 150kΩ | Res. 1W | AXIAL | | |
| 1 | R3 | 51kΩ | Res.0.25W | AXIAL | | |
| 4 | R3A, R3B, R3C, R4 | 2.2Ω | Film Res., 1% | 1206 | Royalohm | 1206F220KT5E |
| 1 | R5 | 36kΩ | Film Res., 1% | 1206 | | 1206F3602T5E |
| 1 | R6 | 10Ω | Film Res., 5% | AXIAL | | |
| 1 | R7 | 20kΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-0720KL |
| 1 | R8 | 5.11kΩ | Film Res., 1% | 0603 | Yageo | RC0603FR-075K11L |
| 1 | R2 | 5.1MΩ | Film Res., 5% | 1206 | Yageo | RI1206L515JT |
| 1 | RT1 | 5.1Ω | NTC | Through Hole | Murata | NTPAA5R1LDNB0 |
| 1 | T1 | 84:14:8 | Transformer, EF25 | Through Hole | | EF25 |
| 1 | U1 | TL431K | Shunt Regulator | SOT-23 | UNISONIC | TL431K |
| 1 | U2 | PC817A | Photocouple | DIP | YiGuang | PC817A |

PRINTED CIRCUIT BOARD LAYOUT

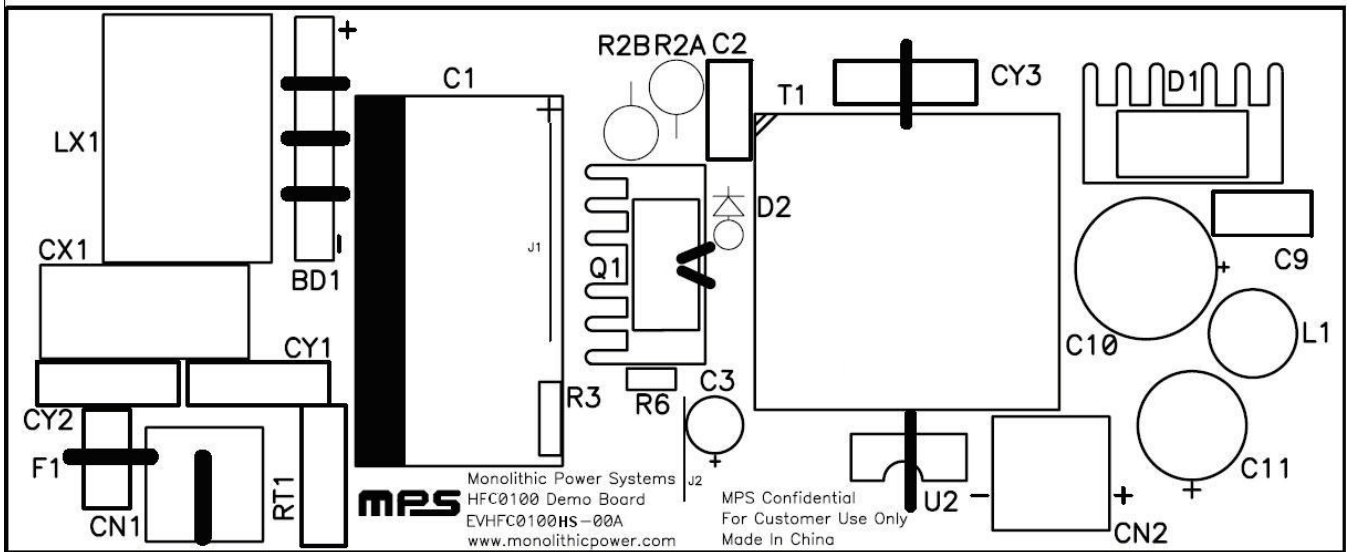


Figure 1 — Top Silk Layer

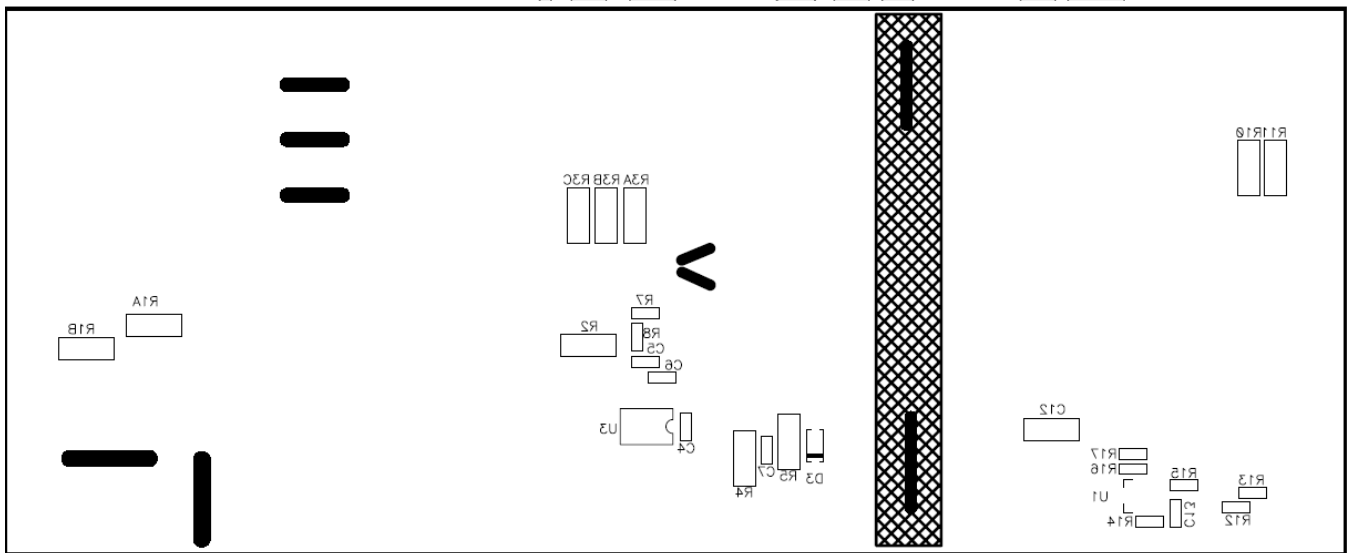


Figure 2 — Bottom Silk Layer

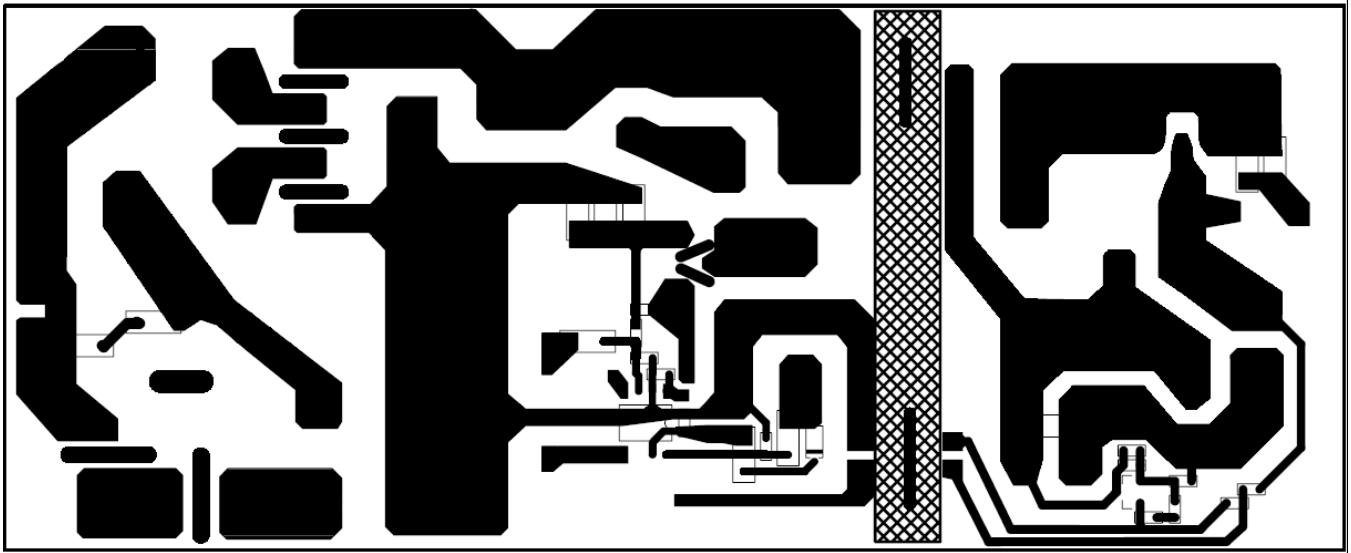


Figure 3 — Bottom Layer

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QUICK START GUIDE

1. Connect the positive and negative terminals of the load to CN2 port,
2. Connect the Line and Neutral terminals of the power supply output to CN1 port.
3. Turn the power supply on, the board automatically starts up.

Contact Information

To request this evaluation board, please refer to your local sales offices which can be found from:

<http://www.monolithicpower.com/Company/Contact-Us>

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