

### DESCRIPTION

The EV8714-LE-00A is used for demonstrating the performance of MPS's MP8714. MP8714 is a highly integrated and high frequency synchronous step-down switch-mode converter. It is optimized to support up to 10A load current over an input supply range from 4.5V to 17V with excellent load and line regulation.

Current-Mode operation provides fast transient response and eases loop stabilization.

EN/SYNC supports external clock synchronization, and an open-drain power good pin(PG) indicates when the output voltage is in the nominal range.

Full protection features include over voltage, hiccup over-current protection and thermal shut down.

The MP8714 is available in QFN-14(3mmx4mm) package.

### ELECTRICAL SPECIFICATION

| Parameter      | Symbol    | Value   | Units |
|----------------|-----------|---------|-------|
| Input Voltage  | $V_{IN}$  | 4.5– 17 | V     |
| Output Voltage | $V_{OUT}$ | 1       | V     |
| Output Current | $I_{OUT}$ | 10      | A     |

### FEATURES

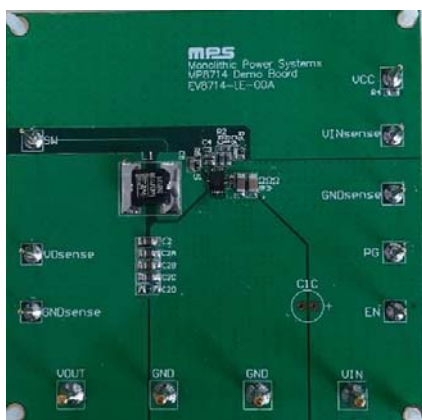
- Wide 4.5V-to-17V Operating Input Range
- 10A continues Output Current
- 26mΩ High-side, 11mΩ Low-Side  $R_{DS(ON)}$  for Internal Power MOSFETS
- 200kHz-2MHz Synchronized External Clock
- Programmable Soft-Start(SS) Time
- Open-Drain Power Good(PG) Indicator
- Output Over-Voltage Protection (OVP)
- Thermal Shutdown
- Available in a Small QFN-14(3mmx4mm) Package

### APPLICATIONS

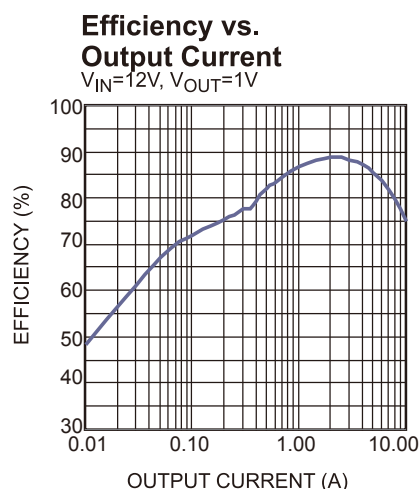
- Flat-Panel Televisions and Monitors
- Set-Top Boxes
- Distributed Power Systems

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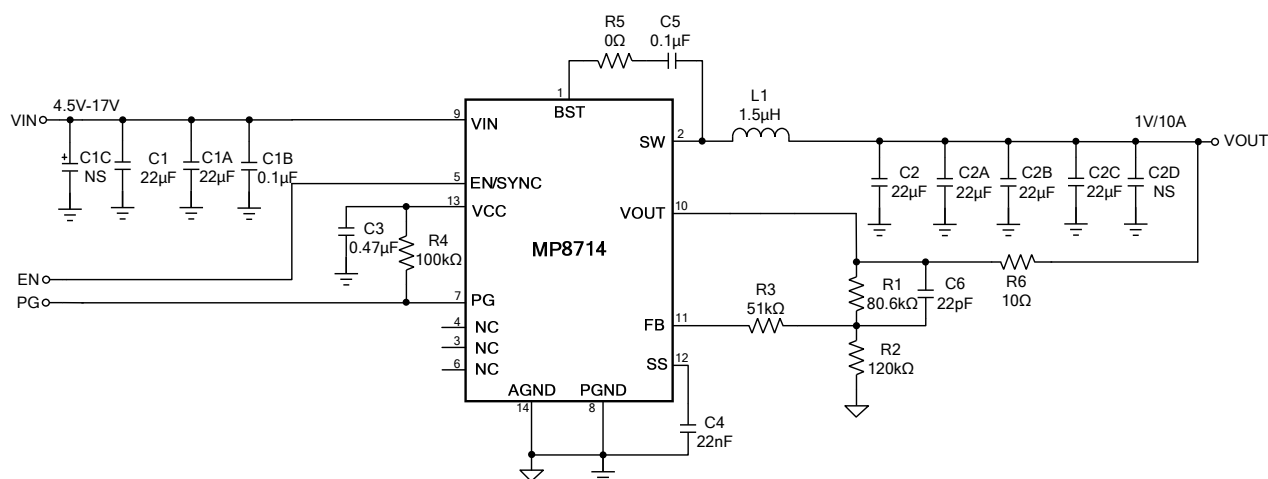
### EV8714-LE-00A EVALUATION BOARD



| Board Number  | MPS IC Number |
|---------------|---------------|
| EV8714-LE-00A | MP8714GLE     |



# EVALUATION BOARD SCHEMATIC



# EV8714-LE-00A BILL OF MATERIALS

| Qty | RefDes            | Value   | Description                 | Package     | Manufacturer | Manufacturer P/N   |
|-----|-------------------|---------|-----------------------------|-------------|--------------|--------------------|
| 1   | R1                | 80.6k   | Film Res,1%                 | 0603        | ROYAL        | RC0603FR-0780K6L   |
| 1   | R2                | 120k    | Film Res,1%                 | 0603        | ROYAL        | RL0603FR-07120KL   |
| 1   | R3                | 51k     | Film Res,1%                 | 0603        | ROYAL        | RL0603FR-0751KL    |
| 1   | R4                | 100k    | Film Res,1%                 | 0603        | ROYAL        | RL0603FR-07100KL   |
| 1   | R5                | 0Ω      | Film Res,1%                 | 0402        | RALEC        | RTT020000FTP       |
| 1   | R6                | 10 Ω    | Film Res,1%                 | 0603        | ROYAL        | RL0603FR-0710RL    |
| 2   | C1B, C5           | 0.1μF   | Ceramic Cap,25V,X7R         | 0603        | muRata       | GRM188R71E104KA01D |
| 2   | C1A, C1           | 22μF    | Ceramic Cap,25V,X5R         | 1206        | muRata       | GRM31CR61E226KE15L |
| 4   | C2, C2A, C2B, C2C | 22μF    | Ceramic Cap, 25V,X5R        | 0805        | muRata       | GRM21BR61E226ME44L |
| 2   | C2D, C1C          | NS      |                             |             |              |                    |
| 1   | C3                | 0.47 μF | Ceramic Cap,16V,X7R         | 0603        | muRata       | GRM188R71C474KA88D |
| 1   | C4                | 22nF    | Ceramic Cap,16V,X7R         | 0603        | muRata       | GRM188R71C223KA01D |
| 1   | C6                | 22pF    | Ceramic Cap,50V,C0G         | 0603        | muRata       | GRM1885C1H220JA01D |
| 1   | L1                | 1.5μH   | IR=11A,Isat=14A, DCR=6.6m Ω | SMD         | Wurth        | 744 311 150        |
| 1   | U1                | MP8714  | Step-Down Converter         | QFN14 (3*4) | MPS          | MP8714GLE          |

## EV8714-LE-00A

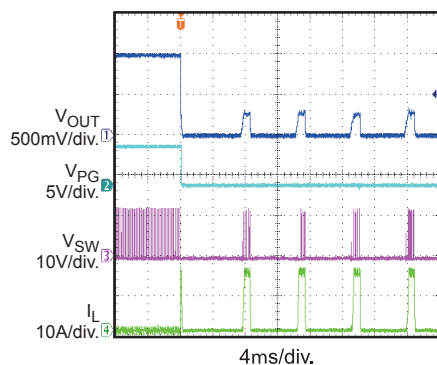
### EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

$V_{IN} = 12V$ ,  $V_{OUT} = 1V$ ,  $L = 1.5\mu H$ ,  $T_A = 25^\circ C$ , unless otherwise noted.

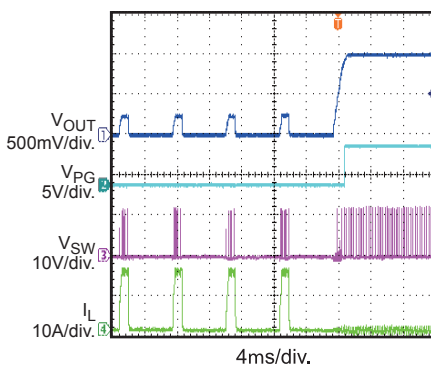
**Short Entry**

$I_{OUT} = 0A$



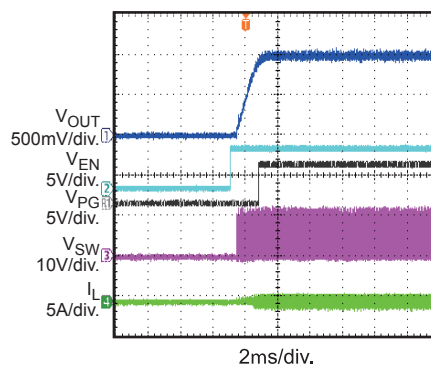
**Short Recovery**

$I_{OUT} = 0A$



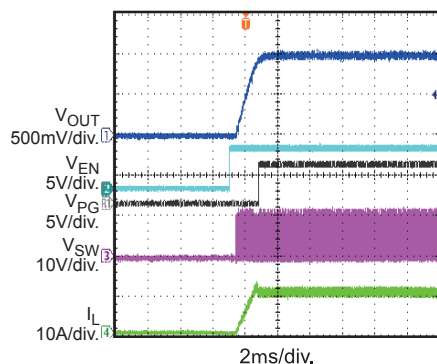
**Start-Up through Enable**

$I_{OUT} = 0A$



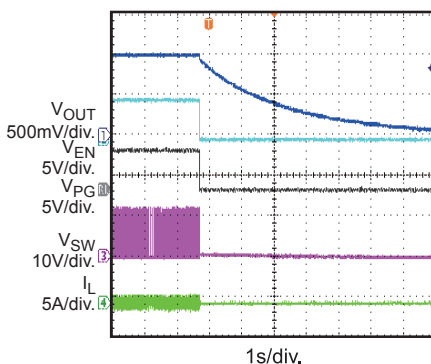
**Start-Up through Enable**

$I_{OUT} = 10A$



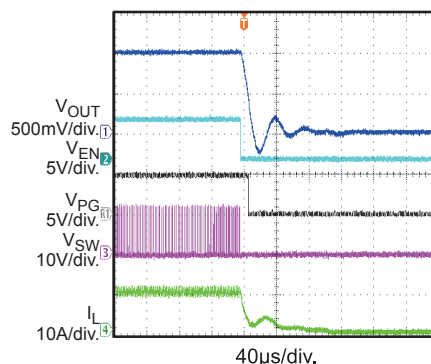
**Shutdown through Enable**

$I_{OUT} = 0A$



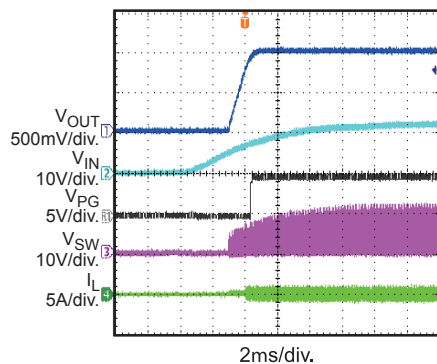
**Shutdown through Enable**

$I_{OUT} = 10A$



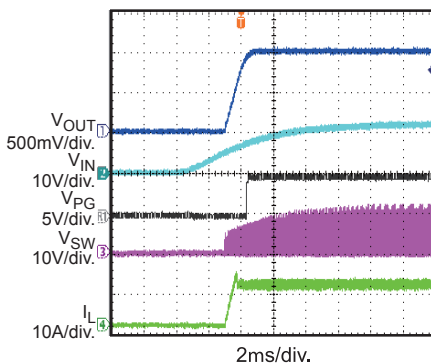
**Start-Up through Input Voltage**

$I_{OUT} = 0A$



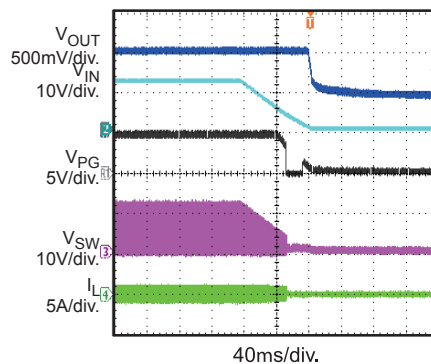
**Start-Up through Input Voltage**

$I_{OUT} = 10A$



**Shutdown through Input Voltage**

$I_{OUT} = 0A$



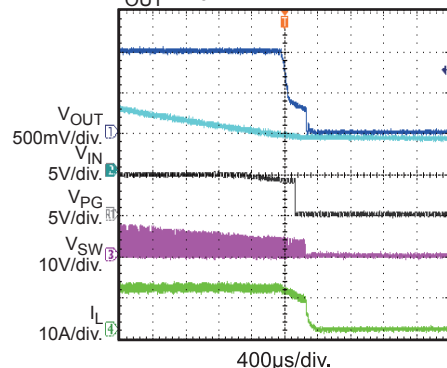
## EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

$V_{IN} = 12V$ ,  $V_{OUT} = 1V$ ,  $L = 1.5\mu H$ ,  $T_A = 25^\circ C$ , unless otherwise

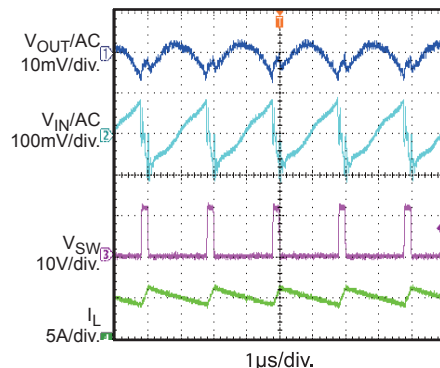
### Shutdown through Input Voltage

$I_{OUT} = 10A$



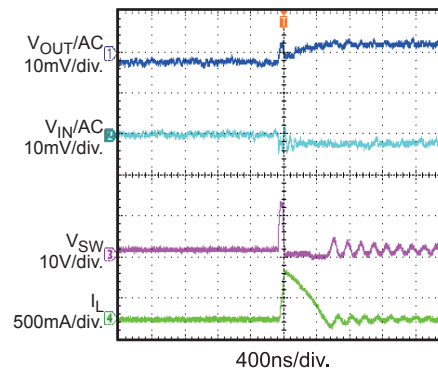
### Input/Output Ripple

$I_{OUT} = 10A$



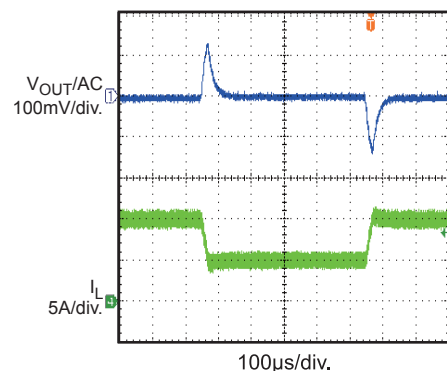
### Input/Output Ripple

$I_{OUT} = 0A$ , PFM



### Load Transient Response

$I_{OUT} = 5A$  to  $10A$



## PRINTED CIRCUIT BOARD LAYER

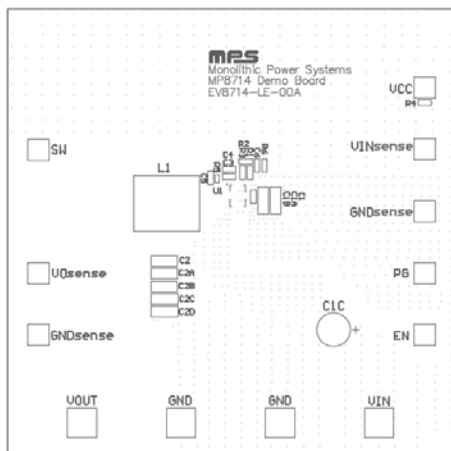


Figure 1: Top Silk Layer

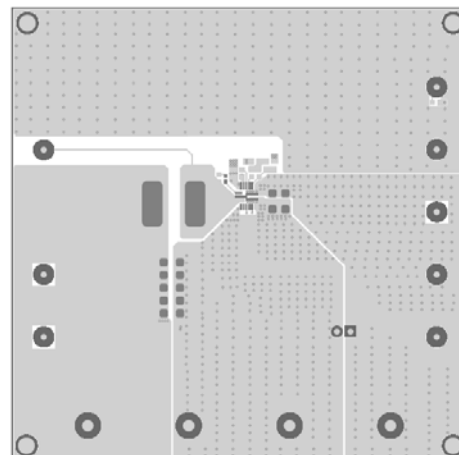


Figure 2: Top Layer

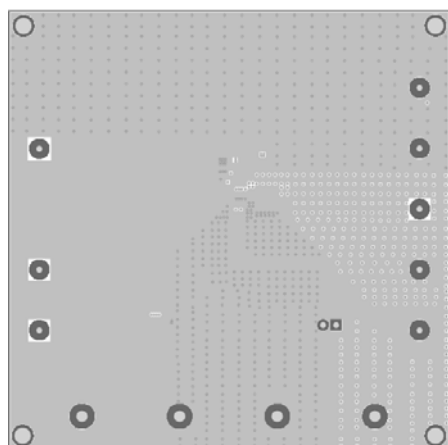


Figure 3: Inner 1 Layer

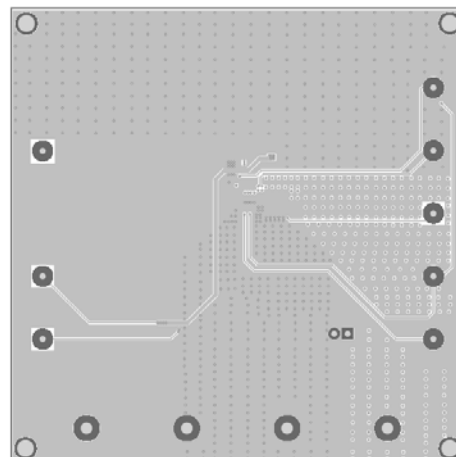


Figure 4: Inner 2 Layer

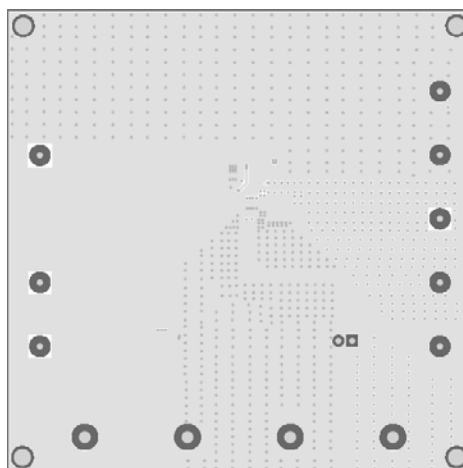


Figure 5: Bottom Layer

## QUICK START GUIDE

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Preset the power supply output between 4.5V and 17V, and then turn off the power supply.
3. Connect the positive and negative terminals of the power supply output to the VIN and GND pins, respectively.
4. Turn the power supply on. The board will automatically start up.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.5V to turn on the regulator, or less than 1.03V to turn it off.

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