DESCRIPTION
EVM3632S-PQ-00A evaluation board is based on MPS’S MPM3632S. The MPM3632S is a synchronous rectified, step-down Mini-Module regulator with built-in power MOSFETs, inductor and two capacitors. It offers a very compact solution with only input and output capacitors to achieve a 3A continuous output current with excellent load and line regulation over a wide input supply range. The MPM3632S operates in fixed 2.2MHz switching frequency with Constant-On-Time control which provides fast load transient response.

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

MPM3632S eliminates design and manufacturing risks while dramatically improving time to market.

The MPM3632S is available in a space-saving LGA10 (3mmx3mmx1.45mm) package.

ELECTRICAL SPECIFICATION (1)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>V_IN</td>
<td>12</td>
<td>V</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>V_OUT</td>
<td>3.3</td>
<td>V</td>
</tr>
<tr>
<td>Output Current</td>
<td>I_OUT</td>
<td>3</td>
<td>A</td>
</tr>
</tbody>
</table>

Notes:
1) For different Input/output voltage specs and different output capacitor/inductor may need change the application circuit parameters.

FEATURES
- Complete Switch Mode Power Supply
- Wide 4V-to-18V Operation Input Range
- 36mΩ/18mΩ Low R_DS(ON) Internal Power MOSFETs
- 0.5% Accuracy Output Voltage
- 3A Continuous Output Current
- 2.2MHz Switching Frequency
- Forced CCM Mode
- Power Good Indicator
- 500μA Low Quiescent Current
- Hiccup OCP Protection
- Programmable Soft Start (Metal option)
- Output Over Voltage Protection
- Fast Transient Response
- Available in LGA3x3x1.45mm Package

APPLICATIONS
- Sever Systems
- Medical and Imaging Equipment
- Distributed Power Systems

All MPS parts are lead-free, halogen free, and adhere to the RoHS directive. For MPS green status, please visit MPS website under Quality Assurance.

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EVALUATION BOARD SCHEMATIC

EVM3632S-PQ-00A BILL OF MATERIALS

<table>
<thead>
<tr>
<th>Qty</th>
<th>RefDes</th>
<th>Value</th>
<th>Description</th>
<th>Package</th>
<th>Manufacturer</th>
<th>Manufacturer_P/N</th>
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<tbody>
<tr>
<td>2</td>
<td>C1,C1A</td>
<td>10μF</td>
<td>Ceramic Cap,25V,X5R</td>
<td>0805</td>
<td>muRata</td>
<td>GRM21BR61E106KA73L</td>
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<td>22μF</td>
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<td>C3</td>
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<td>Ceramic Cap,16V,X5R</td>
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<td>1</td>
<td>R1</td>
<td>40.2kΩ</td>
<td>Film Res,1%,0402,40K2</td>
<td>0402</td>
<td>Yageo</td>
<td>RC0402FR-0740K2L</td>
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<tr>
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<td>13kΩ</td>
<td>Film Res,1%,0402,13K</td>
<td>0402</td>
<td>Yageo</td>
<td>RC0402FR-0713KL</td>
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<td>Thick Film Res., 1%</td>
<td>0402</td>
<td>Yageo</td>
<td>RC0402FR-07100KL</td>
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<tr>
<td>1</td>
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<td>Yageo</td>
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<td>Synchronous Step-Down Convert</td>
<td>NS</td>
<td>MPS</td>
<td>MPM3632SGPQ</td>
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</tbody>
</table>
EVB TEST RESULTS

$V_{IN} = 12V$, $V_{OUT} = 3.3V$, $T_A = +25^\circ C$, unless otherwise noted.

**Efficiency vs. Load Current**

- $V_{OUT} = 5V$
- $V_{OUT} = 3.3V$

**Load Regulation vs. Load Current**

- $V_{OUT} = 3.3V$

**Line Regulation vs. Input Voltage**

- $V_{IN} = 12V$, $V_{OUT} = 3.3V$

**Temperature Rise vs. Load Current**

- $V_{IN} = 12V$
EVB TEST RESULTS (continued)

$V_{IN} = 12V$, $V_{OUT} = 3.3V$, $T_A = +25^\circ C$, unless otherwise noted.

**Vo Ripple**

$I_{OUT} = 0A$

![Vo Ripple $I_{OUT} = 0A$](image)

$I_{OUT} = 3A$

![Vo Ripple $I_{OUT} = 3A$](image)

**VIN Start-Up Through Input Voltage**

$I_{OUT} = 0A$

![VIN Start-Up Through Input Voltage $I_{OUT} = 0A$](image)

$I_{OUT} = 3A$

![VIN Start-Up Through Input Voltage $I_{OUT} = 3A$](image)

**Shutdown Through Input Voltage**

$I_{OUT} = 0A$

![Shutdown Through Input Voltage $I_{OUT} = 0A$](image)

$I_{OUT} = 3A$

![Shutdown Through Input Voltage $I_{OUT} = 3A$](image)
EVB TEST RESULTS (continued)

V_{IN} = 12V, V_{OUT} = 3.3V, T_{A} = +25°C, unless otherwise noted.

**Start-Up Through Enable**

I_{OUT} = 0A

![Graph 1](image1.png)

1ms/div.

I_{OUT} = 3A

![Graph 2](image2.png)

1ms/div.

**Shutdown Through Enable**

I_{OUT} = 0A

![Graph 3](image3.png)

1s/div.

I_{OUT} = 3A

![Graph 4](image4.png)

1ms/div.

**Short Circuit Entry**

I_{OUT} = 0A

![Graph 5](image5.png)

10ms/div.

I_{OUT} = 3A

![Graph 6](image6.png)

10ms/div.
EVB TEST RESULTS (continued)

V\textsubscript{IN} = 12V, V\textsubscript{OUT} = 3.3V, T\textsubscript{A} = +25°C, unless otherwise noted.

**Short Circuit Recovery**

- **I\textsubscript{OUT} = 0A**

**Short Circuit Recovery**

- **I\textsubscript{OUT} = 3A**

**Short Circuit Steady State**

**Transient Response**

- **I\textsubscript{OUT} = 1.5A-3A, 800mA/\mu s**
PRINTED CIRCUIT BOARD LAYOUT

Figure 1: Top Silk Layer

Figure 2: Top Layer

Figure 3: Bottom Layer

Figure 4: Inner1 Layer
Figure 5: Inner 2 Layer
QUICK START GUIDE

1. Preset Power Supply to 12V.
2. Turn Power Supply off.
3. Connect Power Supply terminals to:
   a. Positive (+): VIN
   b. Negative (−): GND
4. Connect Load to:
   a. Positive (+): VOUT
   b. Negative (−): GND
5. Turn Power Supply on after making connections. The board will automatically start up.
6. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.2V to turn on the regulator, or less than 1V to turn it off.