# EV20045DN-00A
## Low Noise, 1A, Linear Regulator EV Board

**The Future of Analog IC Technology**®

## DESCRIPTION

The EV20045DN-00A evaluation board demonstrates the performance of MP20045, a low noise and low dropout linear regulator. It operates from a 2.5V to 5.5V input voltage and the output voltage can be set externally which ranges from 1.5V to 5V.

The EV20045DN-00A can supply up to 1A of load current, and features current limiting, over temperature protection and power-good status.

An internal PMOS pass element is used to allow a low 110uA ground current, marking the MP20045 suitable for battery-power devices.

## ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Input Voltage | $V_{IN}$ | 3.5 – 5.5 | V |
| Output Voltage | $V_{OUT}$ | 3 | V |
| Load Current | $I_{OUT}$ | 1 | A |

## FEATURES

- Up to 1A Output Current
- Low 140mV Dropout at 1A
- Adjustable Output
- 56dB PSRR at 1kHz
- 13µVRMS Low Noise Output
- Open Drain Power-Good Status Output
- Very Fast Transient Responses
- Current Limit and Thermal Protection

## APPLICATIONS

- Notebook Computers
- Cordless Telephones
- Cellular Phones
- Modems
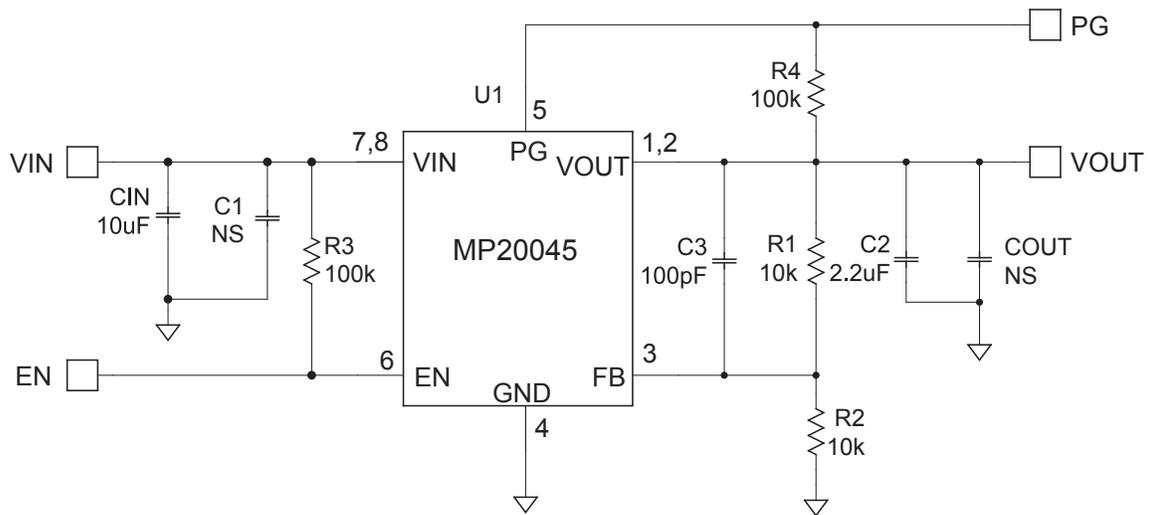- Hand-Held Instruments
- PDA and Palmtop Computers

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## EV20045DN-00A EVALUATION BOARD



**(L x W x H) 2.5" x 2.5" x 0.4"**
**(6.35cm x 6.35cm x 1.1cm)**

| Board Number | MPS IC Number |
|---|---|
| EV20045DN-00A | MP20045DN |

## EVALUATION BOARD SCHEMATIC



## EV20045DN-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Part Number |
|-----|-----|-------|-------------|---------|--------------|-------------|
| 1 | CIN | 10uF | Ceramic Capacitor,X7R,16V | 1210 | TDK | C3225X7R1C106M |
| 1 | C2 | 2.2uF | Ceramic Capacitor,X7R,16V | 0805 | TDK | C2012X7R1C225K |
| 1 | C3 | 100pF | Ceramic Capacitor,C0G,50V | 0603 | TDK | C1608C0G1H101J |
| 0 | C1,COUT | NS | | | | |
| 2 | R1, R2 | 10kΩ | Film Res, 1% | 0603 | Any | |
| 2 | R3, R4 | 100kΩ | Film Res, 5% | 0603 | Any | |
| 1 | U1 | | LDO Regulator | SOIC8E | MPS | MP20045DN |

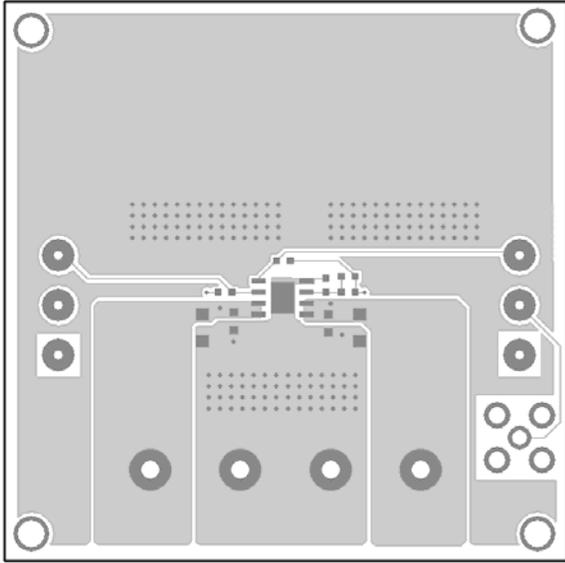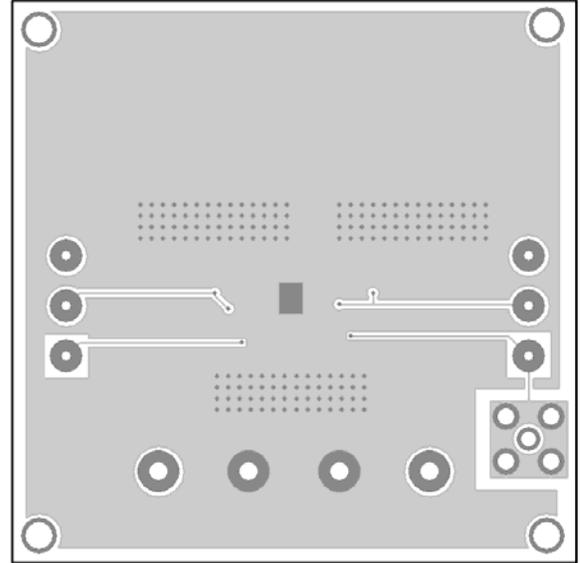## PRINTED CIRCUIT BOARD LAYOUT



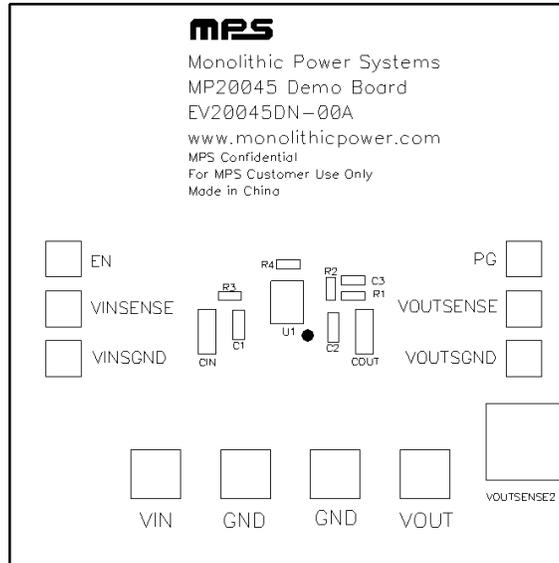**Figure 1—Top Layer**



**Figure 2—Bottom Layer**



**Figure 3—Top Silk Layer**

## QUICK START GUIDE (ADJUSTABLE OUTPUT)

The output voltage of this board is set externally which ranges from 1.5V to 5V by operating from +2.5V to +5.5V input as the figure 4. The default output voltage of this board is set to 3.0V.

The board layout accommodates most commonly used resistors and capacitors.

1. Attach the positive and negative ends of the load to the VOUT and GND pins, respectively.

2. Attach the Input Voltage (3.5V ≤ $V_{IN}$ ≤ 5.5V) and Input Ground to the VIN and GND pins, respectively.

3. To enable the MP20045, apply a voltage, 1.5V ≤ $V_{EN}$ ≤ 5.5V, to the EN pin. To disable the MP20045, apply a voltage, $V_{EN}$ < 0.4V, to the EN pin. The EN pin can be connected to $V_{IN}$ with a 100kΩ resistor for automatic startup.

4. The Output Voltage $V_{OUT}$ can be changed by varying R2. Calculate the new value by formula:

$$R2 = \frac{R1}{(\frac{V_{OUT}}{V_{FB}}) - 1}$$

Where $V_{FB}$ = 1.5V and R1 = 10kΩ.

Example:

For $V_{OUT}$ = 3.0V:

$$R2 = \frac{10kΩ}{(\frac{3.0}{1.5}) - 1} = 10kΩ$$

Therefore, use a 10kΩ standard 1% value.



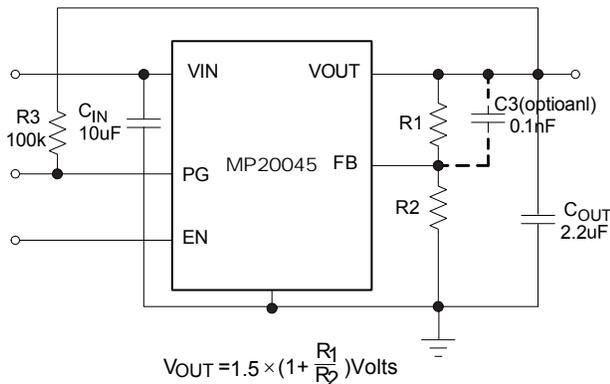$$V_{OUT} = 1.5 \times (1 + \frac{R1}{R2}) \text{Volts}$$
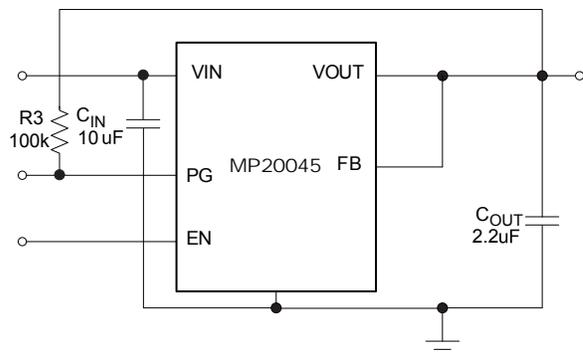
**Figure 4—Adjustable Version**



**Figure 5—Fixed Version**

**QUICK START GUIDE (MODIFICATION FOR FIXED OUTPUT)**

For modifying the EV20045DN-00A to accommodate a fixed output voltage version of the MP20045 as the figure 5:

1. Carefully remove the IC(U1) and replace it with the corresponding fixed output version of the MP20045 chip.

2. Remove both R1 and R2.

3. Short R1 while leaving R2 open.

4. Attach the positive and negative ends of the load to the VOUT and GND pins, respectively.

5. Attach the Input Voltage (3.5V ≤ $V_{IN}$ ≤ 5.5V) and Input Ground to the VIN and GND pins, respectively.

6. To enable the MP20045, apply a voltage, 1.5V ≤ $V_{EN}$ ≤ 5.5V, to the EN pin. To disable the MP20045, apply a voltage, $V_{EN}$ < 0.4V, to the EN pin. The EN pin can be connected to $V_{IN}$ with a 100kΩ resistor for automatic startup.

Please refer to the datasheet for the detailed information of the different output voltage option of MP20045.