



The Future of Analog IC Technology™

# EV2104DJ-00A

## 600mA Synchronous Buck Step-Down Converter

### DESCRIPTION

The EV2104 evaluation board is designed for low dropout step down converter applications. It implements the MP2104 1.7MHz Fixed Frequency, Current Mode, PWM step-down converter. The device integrates a main switch and a synchronous rectifier for high efficiency without an external Schottky diode. It is ideal for powering portable equipments that runs from a single cell Lithium-Ion (Li+) Battery. It can supply 600mA of load current from a 2.5V to 6V input voltage. The output voltage can be regulated as low as 0.6V. In 100% Duty Cycle Dropout operation, it works with minimum input voltage as low as output voltage.

### ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage Range	$V_{IN}$	2.5 – 6.0	V
Output Voltage	$V_{OUT}$	1.8	V
Load Max	$I_{OUT}$	600	mA

### FEATURES

- High Efficiency: Up to 95%
- 600mA Available Load Current
- 2.5V to 6V Input Voltage Range
- Output Voltage as Low as 0.6V
- 100% Duty Cycle in Dropout
- Short Circuit Protection
- Thermal Fault Protection
- <math>0.1\mu A</math> Shutdown Current
- Programmable Enable Control

### APPLICATIONS

- Cellular and Smart Phones
- Microprocessors/DSP Core Supplies
- PDAs
- MP3 Players
- Digital Still and Video Cameras
- Portable Instruments

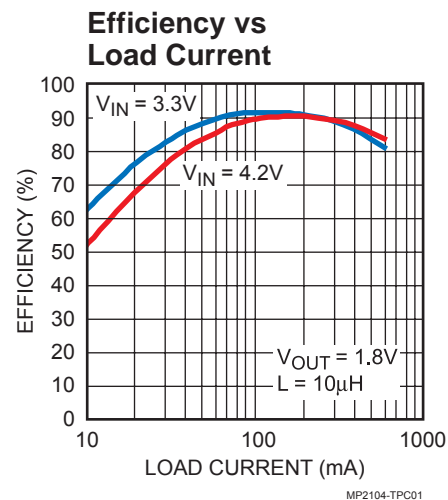
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## EV2104DJ-00A EVALUATION BOARD

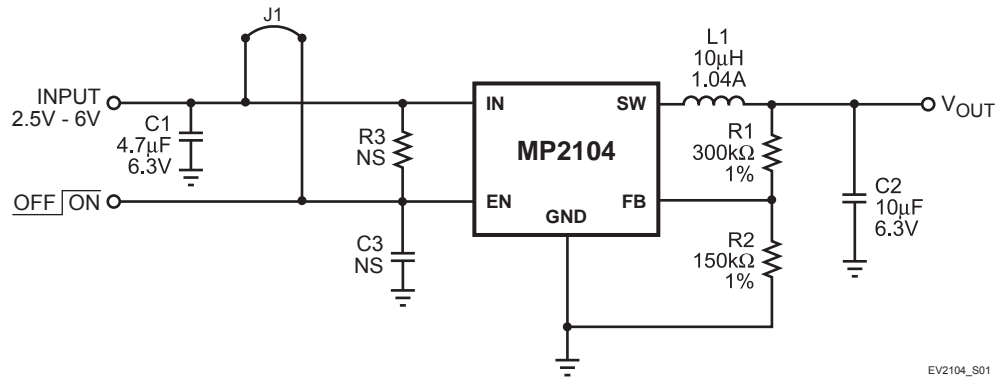


Dimensions (2.0"X x 2.0"Y x 0.5"Z)

Board Number	MPS IC Number
EV2104DJ-00A	MP2104DJ



## EVALUATION BOARD SCHEMATIC

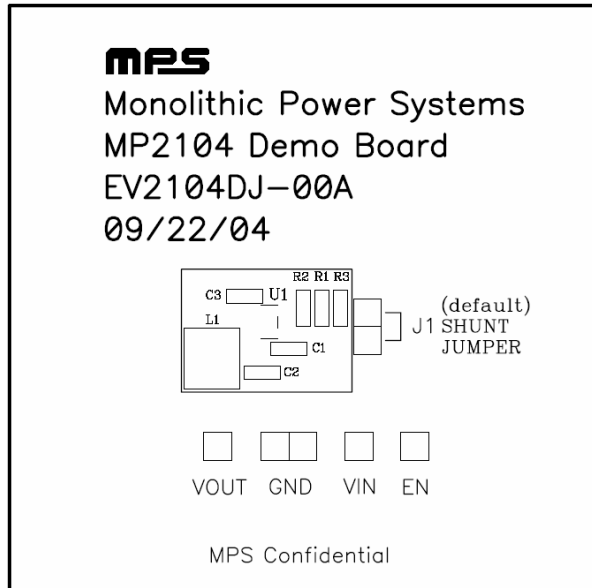


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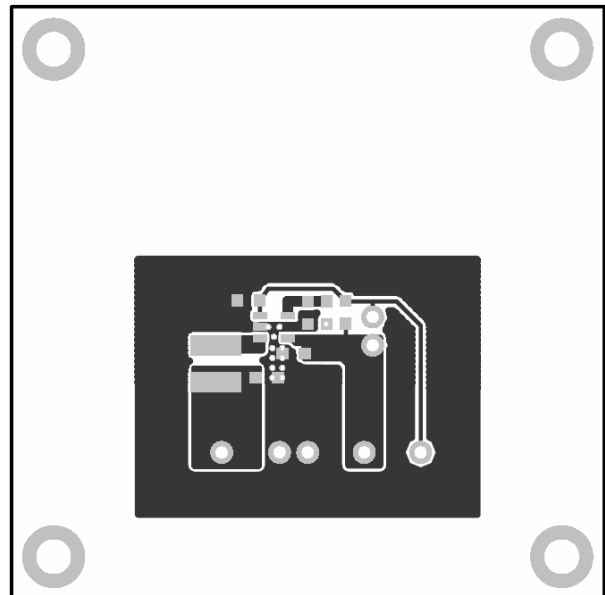
## EV2104DJ-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	4.7µF	Ceramic Capacitor, 6.3V, X5R	SM0805	AVX	08056D475KAT2A
1	C2	10µF	Ceramic Capacitor, 6.3V, X5R	SM0805	AVX	08056D106KAT2A
1	C3		Do Not Stuff			
1	J1		Jumper			
1	L1	10µH	1.04A	SMD	Sumida	CR43-100
1	R1	300kΩ	Resistor, 1%	SM0805	Yageo	9C08052A3003FKHFT
1	R2	150kΩ	Resistor, 1%	SM0805	Panasonic	ERJ-6ENF1503V
1	R3		Do Not Stuff			
1	U1		DC-DC Converter	SOT23-5	MPS	MP2104DJ

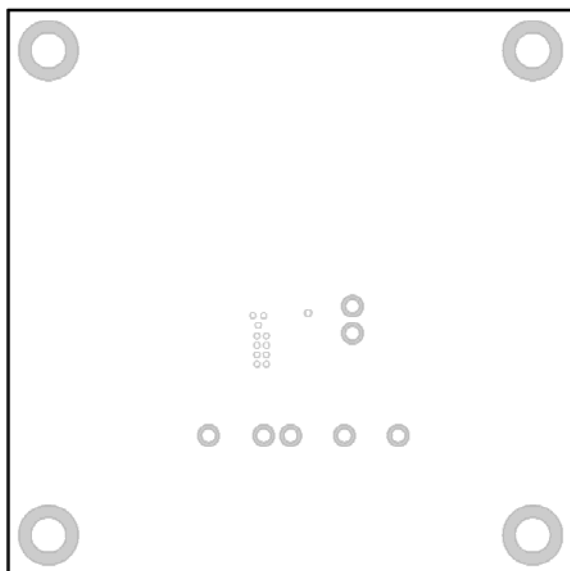
**PRINTED CIRCUIT BOARD LAYOUT**



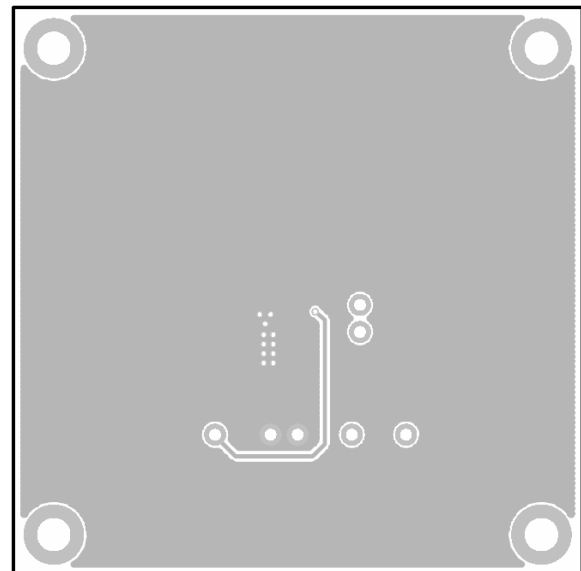
**Figure 1—Top Silk Layer**



**Figure 2—Top Layer**



**Figure 3—Bottom Silk Layer**



**Figure 4—Bottom Layer**

## QUICK START GUIDE (ADJUSTABLE OUTPUT)

The default output voltage of this board is set to 1.8V.

The board layout accommodates most commonly used inductors and output capacitors.

1. Attach the positive and negative ends of the load to the V<sub>OUT</sub> and GND pins, respectively.
2. Attach the Input Voltage ( $2.5V \leq V_{IN} \leq 6V$ ) and Input Ground to the VIN and GND pins, respectively.
3. To enable the MP2104 apply a voltage,  $1.5V \leq V_{EN} \leq 6V$ , to the EN pin. To disable the MP2104 apply a voltage,  $V_{EN} < 0.3V$ , to the EN pin. The default setting for the jumper J1 on the board connects V<sub>IN</sub> to the EN pin. In this configuration, the part will operate without applying any external voltage to the EN pin.
4. The Output Voltage V<sub>OUT</sub> can be changed by varying R2. Calculate the new value by formula:

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

Where V<sub>FB</sub> = 0.6V and R1 = 300kΩ.

Example:

For V<sub>OUT</sub> = 2.5V:

$$R2 = \frac{300k\Omega}{\left(\frac{2.5V}{0.6V}\right) - 1} = 150k\Omega$$

Therefore, use a 150kΩ standard 1% value.

## QUICK START GUIDE (MODIFICATION FOR FIXED OUTPUT)

For modifying the EV2104DJ-00A to accommodate a fixed output voltage version of the MP2104:

1. Verify that a fixed output version of the MP2104 chip is on the evaluation board. Refer to MP2104 datasheet for fixed voltage package codes.
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 V<sub>OUT</sub> and GND pins, respectively.
5. Attach the Input Voltage ( $2.5V \leq V_{IN} \leq 6V$ ) and Input Ground to the VIN and GND pins, respectively.
6. To enable the MP2104 apply a voltage,  $1.5V \leq V_{EN} \leq 6V$ , to the EN pin. To disable the MP2104 apply a voltage,  $V_{EN} < 0.3V$ , to the EN pin. The default setting for the jumper J1 on the board connects V<sub>IN</sub> to the EN pin. In this configuration, the part will operate without applying any external voltage to the EN pin.

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