EV3120-J-00A

1.2A, 1.1MHz Synchronous Boost Converter Evaluation Board

DESCRIPTION

The EV3120-J-00A is a Boost converter evaluation board for the MP3120DJ, a synchronous, 1.1MHz fixed frequency, current mode step-up converter with output to input disconnect.

It can startup from an input voltage as low as 0.85V and provides inrush current limiting as well as output short circuit protection.

The output voltage also can be regulated when V_{IN}>V_{OUT}, and the P-channel MOS is no longer act as a low impedance switch.

The EV3120-J-00A regulates the output voltage up to 3.3V from single cell AA battery without the uses of an external Schottky diode.

The MP3120DJ is offered in a TSOT23-6 package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	0.85-5	V
Output Voltage	V_{OUT}	3.3	V

FEATURES

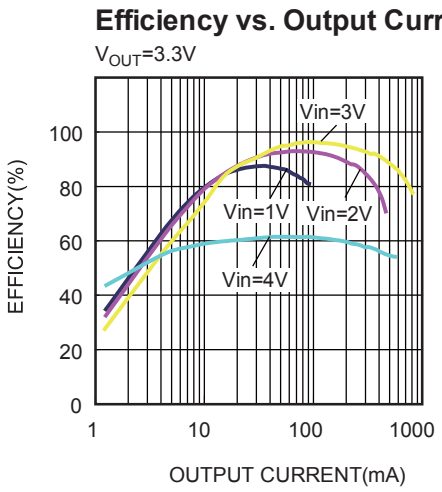
- Up to 96% Efficiency
- True Output Load Disconnect
- Inrush Current Limiting and Internal Soft-Start
- Low Voltage Start-Up: 0.85V
- Internal Synchronous Rectifier
- Current Mode Control with Internal Compensation
- Short-Circuit Protection
- 1.1MHz Fixed Frequency Switching
- Input Range: 0.85V to 5V
- Output Range: 2.5V to 5V
- Tiny External Components
- Small 6-lead ThinSOT Package

APPLICATION

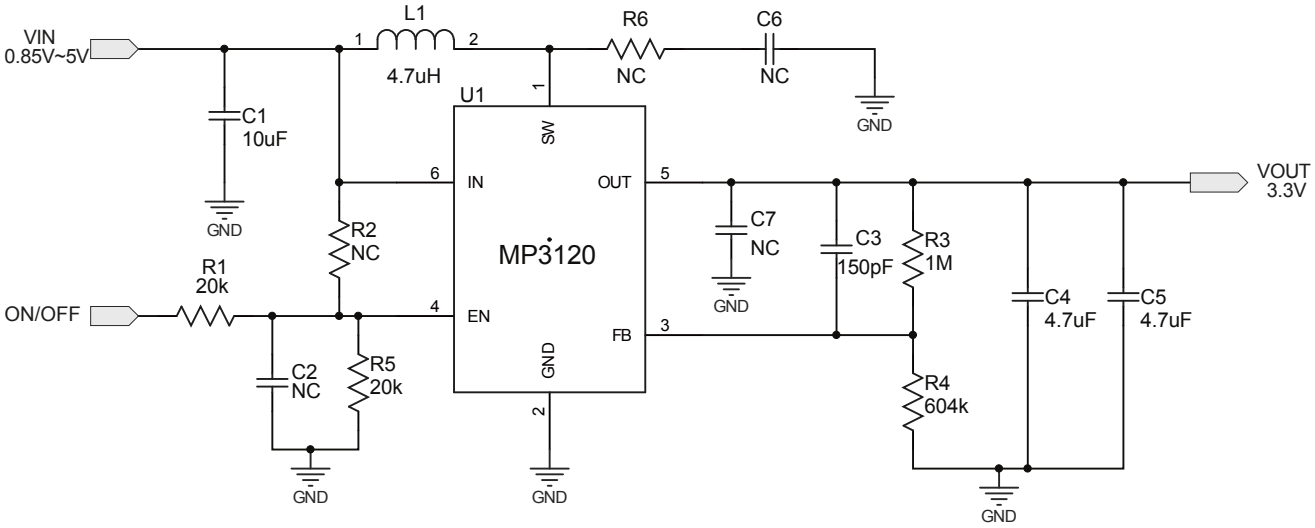
- Single-cell, Two-cell and Three-cell Alkaline, NiCd or NiMH or single-cell Li Battery Consumer Products
- MP3 Players
- Wireless Mouse
- Audio Recorders

EV3120-J-00A EVALUATION BOARD

Board Number	MPS IC Number
EV3120-J-00A	MP3120DJ



EVALUATION BOARD SCHEMATIC



EV3120-J-00A BILL OF MATERIALS

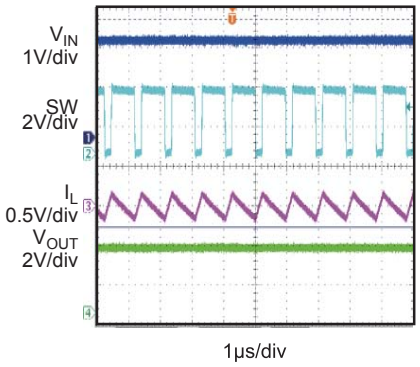
Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	U1	MP3120	Boost converter	TSOT23-6	MPS	MP3120DJ
1	L1	4.7μH	R_{DC}=19.5mΩ, 7A inductor,	SMD	Wurth	744311470
1	C1	10μF	Ceramic Capacitor,25V,X7R	1206	TDK	C3216X7R1E106K
1	C2	NC				
1	C3	150pF	Ceramic Capacitor,50V,X7R	0603	TDK	C1608X7R1C151K
2	C4,C5	4.7μF	Ceramic Capacitor,16V,X7R	1206	TDK	C3216X7R1C475K
2	C6,C7	NC				
2	R1, R5	20k	Resistor 5%	0603	Yageo	RC0603JR-0720KL
2	R2,R6	NC				
1	R3	1M	Resistor 1%	0603	Yageo	RC0603FR-071ML
1	R4	604k	Resistor 1%	0603	Yageo	RC0603FR-07604KL

TEST RESULT

C1=10μF, C2=C3=4.7μF, L1=4.7μH, T_A=25°C, unless otherwise noted.

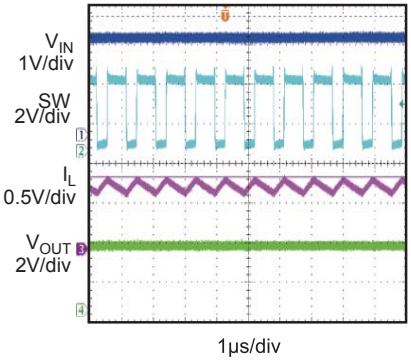
Steady Waveform

V_{IN}=2.5V, V_{OUT}=3.3V, I_{OUT}=0mA



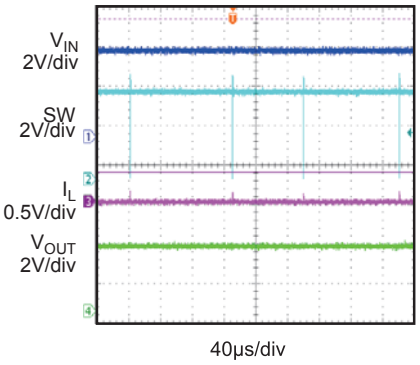
Steady Waveform

V_{IN}=2.5V, V_{OUT}=3.3V, I_{OUT}=500mA



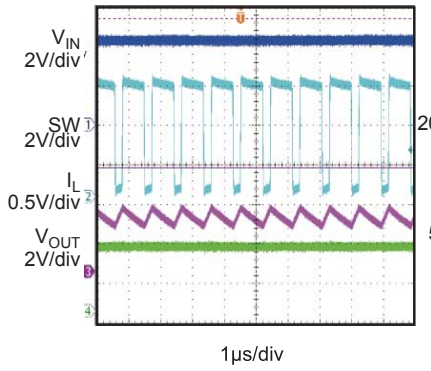
Steady Waveform

V_{IN}=4.4V, V_{OUT}=3.3V, I_{OUT}=0mA



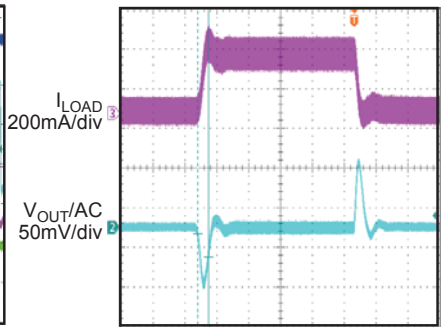
Steady Waveform

V_{IN}=4.4V, V_{OUT}=3.3V, I_{OUT}=500mA



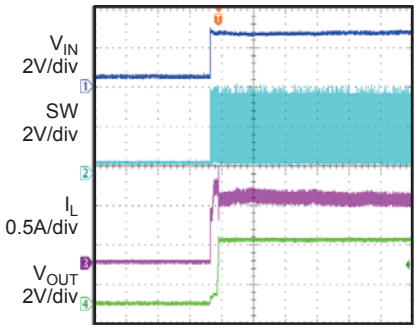
Load Transient Waveform

V_{IN}=2.5V,V_{OUT}=3.3V,
I_{OUT}=0mA to 200mA



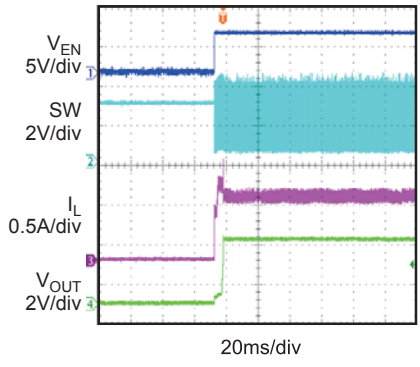
VIN Startup

V_{IN}=2.5V,V_{OUT}=3.3V,I_{OUT}=500mA



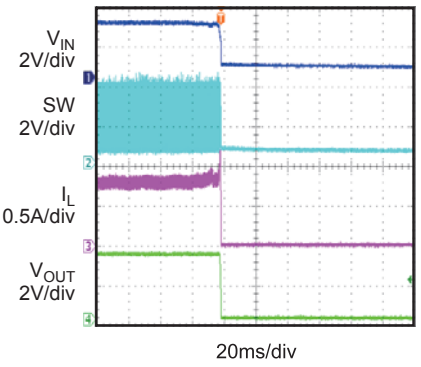
EN Startup

V_{IN}=2.5V,V_{OUT}=3.3V,I_{OUT}=500mA



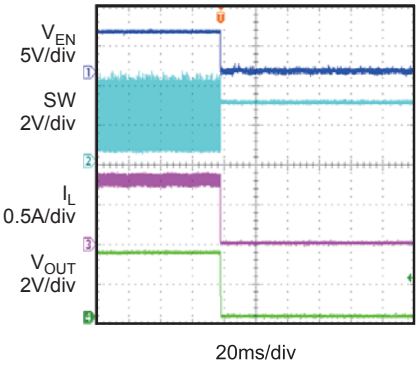
VIN Shut down

V_{IN}=2.5V,V_{OUT}=3.3V,I_{OUT}=500mA



EN Shut down

V_{IN}=2.5V,V_{OUT}=3.3V,I_{OUT}=500mA

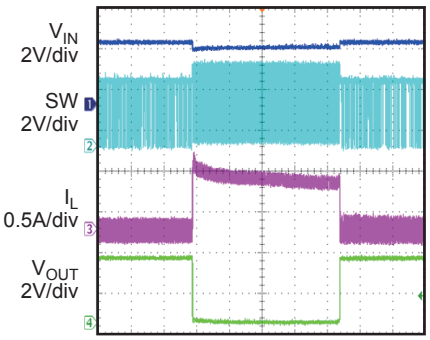


TEST RESULT

C1=10μF, C2=C3=4.7μF, L1=4.7μH, T_A=25°C, unless otherwise noted.

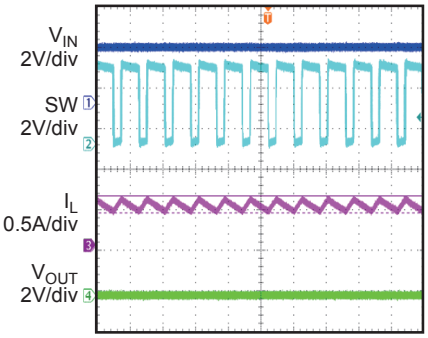
Short Circuit and Recovery

V_{IN}=3V



Short Circuit Steady Waveform

V_{IN}=3V



PRINTED CIRCUIT BOARD LAYOUT

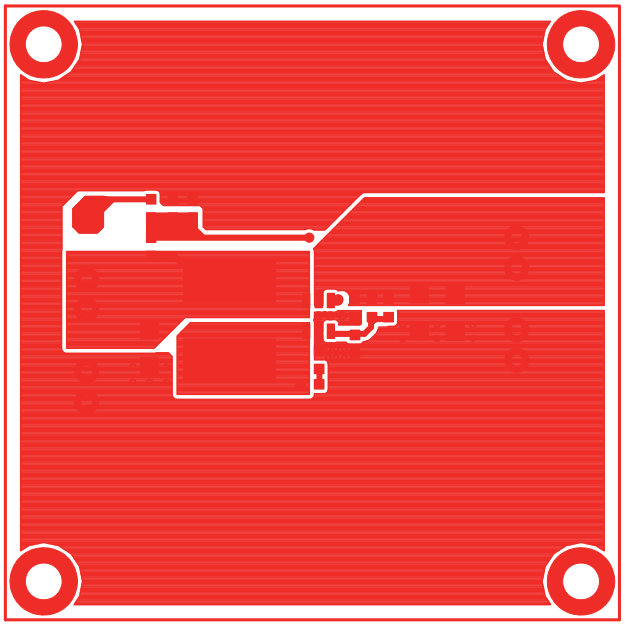


Figure1-Top layer

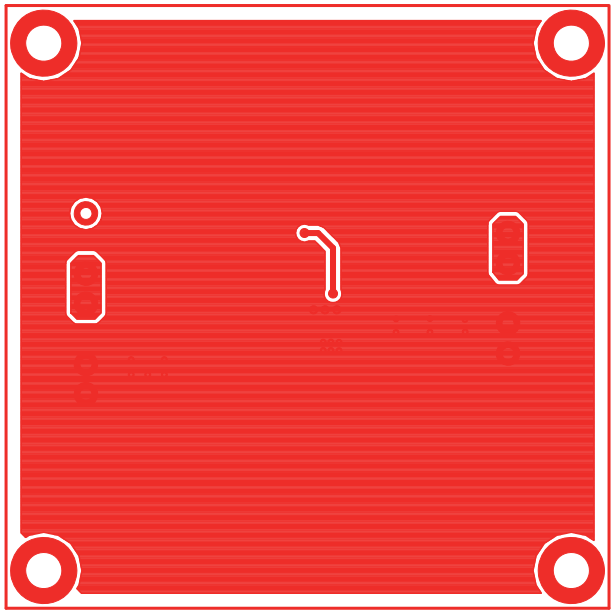


Figure2-Bottom Layer

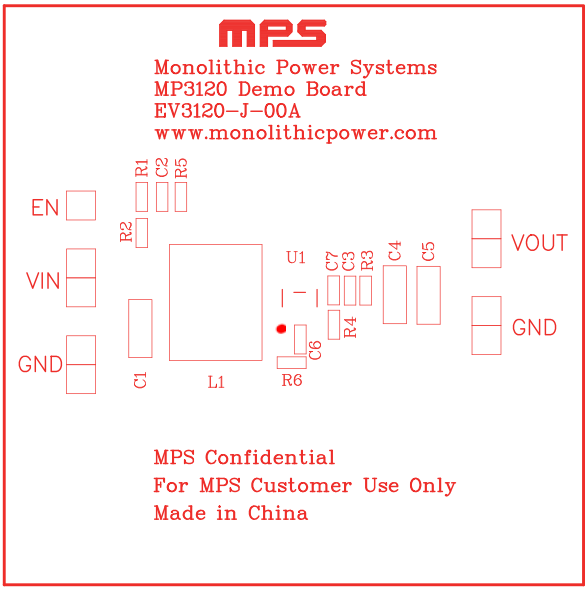


Figure3-Top Silk Layer

QUICK START GUIDE

The output voltage of this board is set to 3.3V. The board layout accommodates most commonly used inductors and output capacitors.

1. Preset power supply to 0.85V≤V_{IN}≤5V;
2. Turn off the power supply;
3. Connect power supply terminals to
   Positive (+): VIN
   Negative (-): GND
4. Connect Load to:
   Positive (+): OUT
   Negative (-): GND
5. Connect the EN to 5V power supply
   Positive (+): EN
   Negative (-): GND
6. Turn on the power supply.
7. The V_{OUT} of the EVB is set to 3.3V. If other output voltage is needed, adjust V_{OUT} with the formula:

$$V_{OUT} = V_{FB} \times \frac{R3 + R4}{R4}$$

Where V_{FB}=1.21V.