

MAXIM

MAX1830 Evaluation Kit

General Description

The MAX1830 evaluation kit (EV kit) provides a 1.8V output from a 3V to 5.5V input voltage source. It delivers up to 3A output current with a 94% (max) efficiency. The MAX1830 EV kit includes the MAX1830 step-down switching regulator with an internal synchronous rectifier to increase efficiency and reduce the number of external components. The resistor-programmable fixed-off-time, current-mode architecture allows an optimum response to load and line transients. This EV kit, as configured, operates at approximately 550kHz from 3.3V inputs and 770kHz from 5V inputs.

The MAX1830 EV kit can be configured to produce a preset output voltage of 1.5V, 1.8V, 2.5V, or is feedback adjustable from 1.1V to V_{IN} .

This EV kit can also be used to evaluate the MAX1831 with preset output voltages of 1.5V, 2.5V, and 3.3V, or adjustable output voltage from 1.1V to V_{IN} .

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	22 μ F, 6.3V ceramic capacitor (1210) TDK C3225X5R0J226M
C2	1	2.2 μ F, 10V ceramic capacitor (0805) TDK C2012X5R1A225M or Taiyo Yuden LMK212BJ225MG
C3	1	470pF ceramic capacitor (0603)
C4	1	1 μ F, 10V ceramic capacitor (0805) TDK C2012X5R1A105M or Taiyo Yuden LMK212BJ105MG
C5	1	120 μ F, 4V, SP capacitor Panasonic EEFUD0G121R
D1	1	Schottky diode (not installed)
L1	1	1.5 μ H inductor Sumida CDRH6D28-4762T064
R1	1	10 Ω \pm 5% resistor (0603)
R2	1	1M Ω \pm 5% resistor (0603)
R3	1	84.5k Ω \pm 1% resistor (0805)
R4	1	Not installed (0805)
R5	1	Not installed (0805)
U1	1	MAX1830EEE (16-pin QSOP)
JU1	1	2-pin header
JU2	1	4-pin header
JU3	0	Not installed (shorted with PC board trace)
None	2	Shunts

Features

- ◆ Delivering 3A Output Current
94% Efficiency
- ◆ Synchronous Rectifier Improves Efficiency
- ◆ Output Voltage Preset to 1.8V
- ◆ 1.5V, 1.8V, or 2.5V Selectable
1.1V to V_{IN} Adjustable
- ◆ 3V to 5.5V Input Voltage Range
- ◆ No External Schottky Diode Required
- ◆ Less than 1 μ A (typ) IC Shutdown Current
- ◆ Surface-Mount Construction
- ◆ Fully Assembled and Tested

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX1830EVKIT	0°C to +70°C	16 QSOP

Component Suppliers

SUPPLIER	PHONE	FAX
Panasonic	201-392-7522	201-392-4441
Sumida	847-956-0666	847-956-0702
Taiyo Yuden	408-573-4150	408-573-4159
TDK	847-803-6100	847-803-6296

Note: Please indicate that you are using the MAX1830 when contacting these component suppliers.

Quick Start

The MAX1830 EV kit is a fully assembled and tested surface-mount board. Follow the steps below for proper board operation. **Do not turn on the power supply until all connections are completed:**

- 1) Connect a voltmeter and load (if any) from VOUT to GND.
- 2) Verify that there is a shunt on JU1 (shutdown disabled).
- 3) Verify that the JU2 shunt is connected across pins 1 and 4 to set the output to 1.8V.
- 4) Connect a 3V to 5.5V supply to the pads marked VIN and GND (supply off).
- 5) Turn on the power supply and verify that the output voltage is 1.8V.
- 6) See the *Output Voltage Selection* section to modify the board for a different output voltage.

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Detailed Description

The MAX1830 EV kit can be configured to produce a preset output voltage of 1.5V, 1.8V, 2.5V, or is feedback adjustable from 1.1V to V_{IN} . As configured, the kit is preset for 1.8V. It operates from an input voltage range of 3V to 5.5V and delivers up to 3A of output current.

Jumper Selection

Jumper JU1 controls the MAX1830's shutdown function. Table 1 lists the jumper options.

Output Voltage Selection

The output voltage can be modified from the preset 1.8V output voltage two different ways. The first way is to change the output voltage to one of the other preset output voltages (1.5V or 2.5V). This is done by changing the jumper JU2 setting (Table 2). The second way is to add feedback resistors (R4 and R5) and connect FBSEL to GND, which allows an adjustable output voltage of 1.1V to V_{IN} .

Note: Adjustable operation may require replacement of C5 with output capacitor rated for higher voltage.

The resistors can be calculated according to the following equation:

$$R4 = (V_{OUT} \times R5 / 1.1V) - R5$$

Select R5 between 10k Ω and 25k Ω .

The inductor provided in the MAX1830 EV kit is optimized for a 3V to 5.5V input voltage range and a 1.8V/3A output voltage. If the output needs to be changed to another output voltage, refer to the MAX1830 data sheet for the recommended inductor value for your application.

Table 1. Jumper JU1 Function

SHUNT LOCATION	$\overline{\text{SHDN}}$ PIN	MAX1830 OUTPUT
Open	Logic low: 1M Ω pull-down resistor	Output voltage disabled
Closed (Default)	Connected to V_{IN}	Output voltage enabled

Table 2. Output Voltage Configuration

OUTPUT VOLTAGE (V)	JU2	JU3
1.5	Not installed (FBSEL = OPEN)	Installed (preset output voltage)
1.8* (MAX1830) 3.3* (MAX1831)	Connect 1 and 4 (FBSEL = REF)	Installed (preset output voltage)
2.5	Connect 1 and 2 (FBSEL = V_{CC})	Installed (preset output voltage)
Adjustable	Connect 1 and 3 (FBSEL = GND)	Not installed (JU3 PC board trace must be cut) (output voltage set by R4 and R5)

*Default setting.

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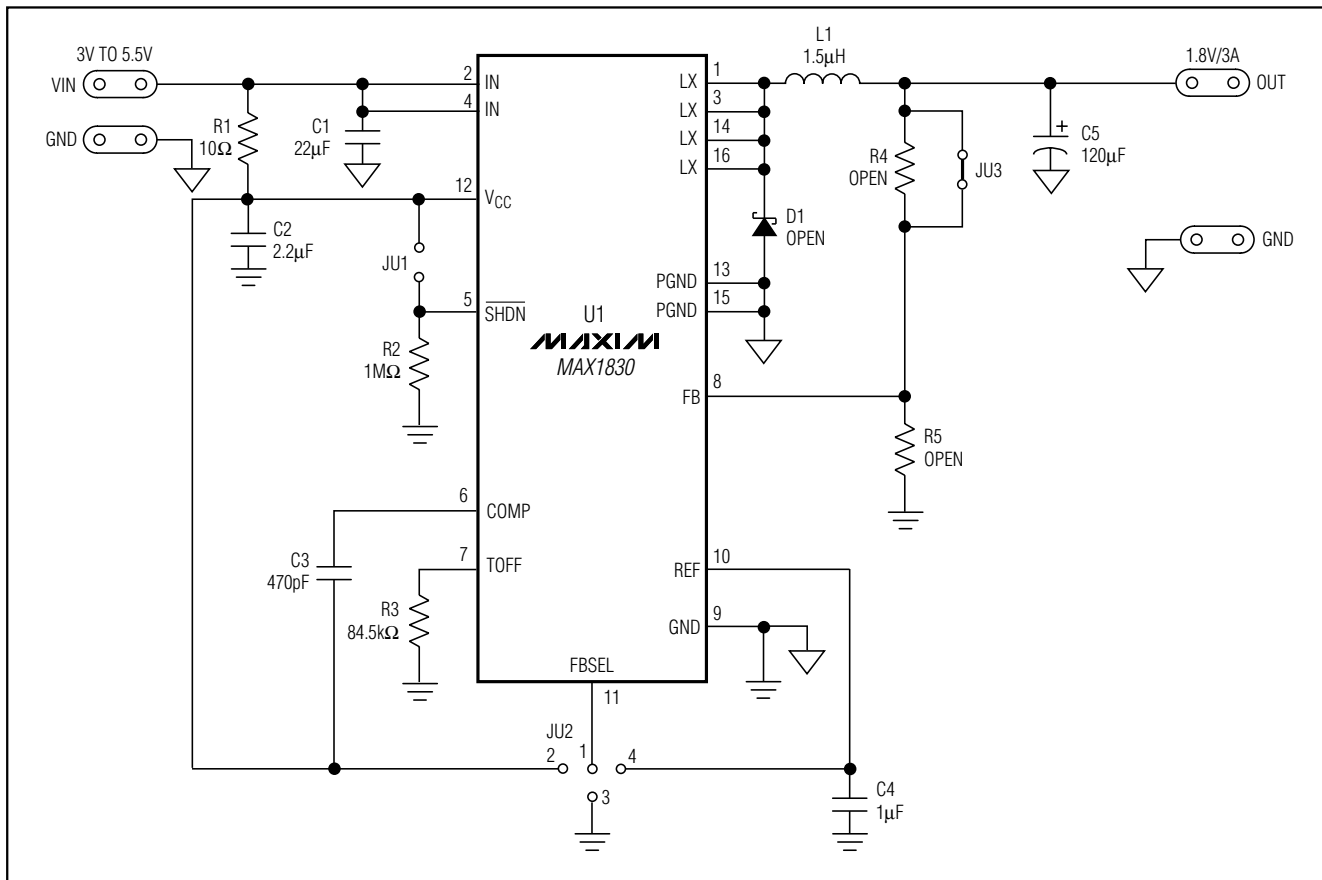


Figure 1. MAX1830 EV Kit Schematic

Evaluates: MAX1830/MAX1831

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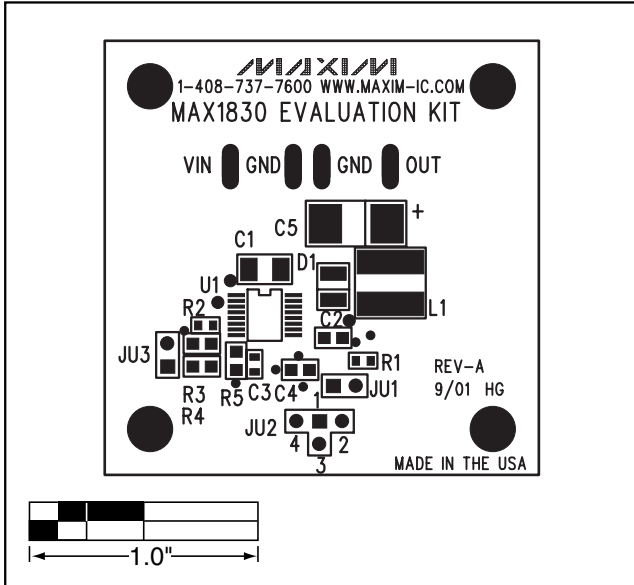


Figure 2. MAX1830 Component Placement Guide—Component Side

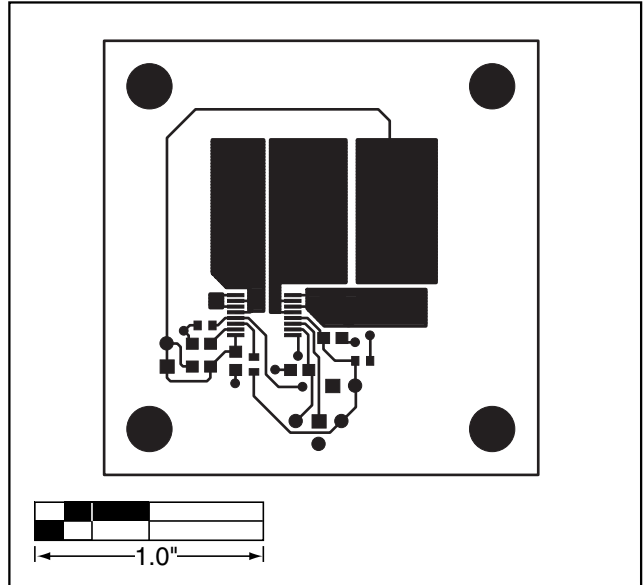


Figure 3. MAX1830 EV Kit PC Board Layout—Component Side

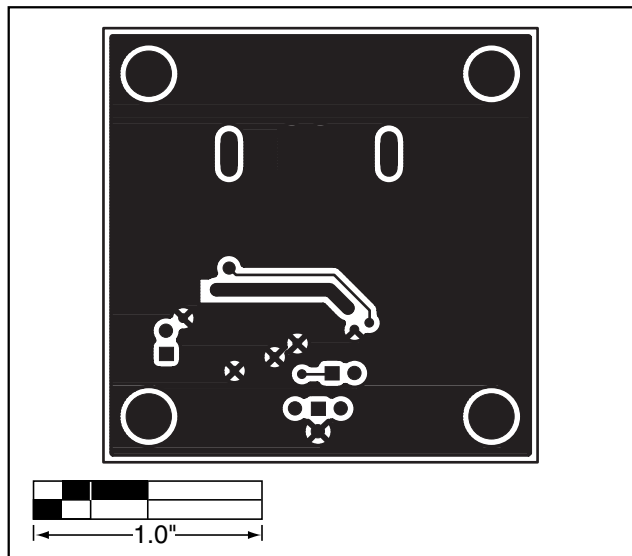


Figure 4. MAX1830 EV Kit PC Board Layout—Solder Side

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