

# MAXIM

## MAX1709 Evaluation Kit

**Evaluates: MAX1709**

### General Description

The MAX1709 evaluation kit (EV kit) is a step-up DC-DC switching regulator for 1- to 3-cell battery inputs as well as 2.5V or 3.3V regulated supply inputs. The EV kit accepts a positive input between 0.7V and  $V_{OUT}$  and converts it to a higher, pin-selectable output voltage.

Efficiency is up to 87% with output load currents to 4A. This EV kit operates at a fixed 600kHz PWM frequency, allowing the use of a small inductor.

A movable jumper on the EV kit selects either a 3.3V or 5V output voltage. Additional pads on the board accommodate the resistors for output adjustment. This EV kit uses surface-mount components and is fully assembled and tested for quick evaluation.

### Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2	2	150 $\mu$ F, 6.3V low-ESR capacitors Sanyo 6TPB150M or Panasonic EEFUE0J151R
C4, C5	2	150 $\mu$ F, 6.3V, 15m $\Omega$ low-ESR capacitors Panasonic EEFUE0J151R
C6	0	Not installed
C7	1	0.22 $\mu$ F ceramic capacitor (1206)
C8	1	1 $\mu$ F, 16V ceramic capacitor (1206) Taiyo Yuden EMK316BJ105KL TDK C3216X7R1C105M
C9, C10, C12	3	0.1 $\mu$ F ceramic capacitors (1206)
D1	1	10A Schottky diode (DPAK) Central Semiconductor CSHD10-45L ON Semiconductor (Motorola) MBRD1035CTL or STM-Microelectronics STPS8L30B
JU1, JU2, JU3	3	2-pin headers
L1	1	1 $\mu$ H, 10A power inductor Coilcraft DO3316P-102HC or Coiltronics UP2B-1R0
R1, R2, R3	0	Not installed
R4	1	2 $\Omega$ $\pm$ 5% resistor (1206)
R5–R8	4	1M $\Omega$ $\pm$ 5% resistors (1206)
U1	1	MAX1709EUI 28-pin TSSOP-EP
None	3	Shunts
None	1	MAX1709 PC board
None	1	MAX1709EV kit data sheet
None	1	MAX1709 data sheet

### Features

- ◆ 0.7V to  $V_{OUT}$  Input Voltage Range
- ◆ Pin-Selectable 3.3V or 5V Output Voltage (5V as Shipped)
- ◆ Adjustable Output Voltage (2.5V to 5.5V, External Divider)
- ◆ Up to 4A Output Current
- ◆ 600kHz PWM Operation
- ◆ Internal 10A MOSFET Switch
- ◆ 4 $\mu$ A IC Shutdown Current
- ◆ Surface-Mount Components
- ◆ Fully Assembled and Tested

### Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX1709EVKIT	0°C to +70°C	28-Pin TSSOP-EP*

\*Exposed pad.

### Component Suppliers

SUPPLIER	PHONE	FAX
Central Semiconductor	516-435-1110	516-435-1824
Coilcraft	708-639-6400	708-639-1469
Coiltronics	561-241-7876	561-241-9339
Dale-Vishay	402-564-3131	402-563-6418
ON Semiconductor (Motorola)	602-303-5454	602-994-6430
Panasonic	714-373-7939	714-373-7183
Sanyo	619-661-6835	619-661-1055
STM-Microelectronics	617-259-0300	617-259-9442
Sumida	847-956-0666	847-956-0702
Taiyo Yuden	408-573-4150	408-573-4159

**Note:** Please indicate that you are using the MAX1709 when contacting these component suppliers.



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## Quick Start Reference

The MAX1709 EV kit is fully assembled and tested. Follow these steps to verify board operation. **Do not turn on the power supply until all connections are completed:**

- 1) Connect a voltmeter to the VOUT pad.
- 2) Connect a 3V supply to the VIN pad. Connect ground to the GND pad.
- 3) Remove all the shunts from JU1, JU2, and JU3. Turn on the power supply and verify that the output voltage is 5V. Refer to the MAX1709 data sheet for output load during startup.
- 4) For other output voltages, refer to the *Setting the Output Voltage* section in the MAX1709 data sheet for instructions on selecting feedback resistors R1 and R2.

## Detailed Description

The MAX1709 EV kit provides a pin-selectable 3.3V or 5V output from a 0.7V to V<sub>OUT</sub> input voltage. The output voltage can also be adjusted with external resistors for voltages between 2.5V and 5.5V.

The MAX1709 includes an internal MOSFET switch with a typical peak current limit of 10A and can deliver loads up to 4A. Connecting an external resistor from SS/LIM to GND (R3) can also reduce the current limit. Connecting a capacitor from SS/LIM to GND (C10) sets the soft-start rate.

The EV kit operates at a 600kHz switching frequency and allows the use of a small inductor value. The switching frequency can also be synchronized to an external clock ranging from 350kHz to 1MHz.

## Jumper Selection

Three jumpers on the PC board allow user selection of several configurations. Table 1 lists the jumpers and their functions.

**Table 1. Jumper Functions**

JUMPER	SHUNT LOCATION	PIN CONNECTION	MAX1709 OPERATION
JU1	Not installed	$\overline{ONB}$ connected to GND	MAX1709 is enabled if ONA = VOUT.
	Installed	$\overline{ONB}$ connected to VOUT	MAX1709 is disabled if ONA = GND.
JU2	Not installed	ONA connected to GND	MAX1709 is disabled if $\overline{ONB}$ = VOUT.
	Installed	ONA connected to VOUT	MAX1709 is enabled if $\overline{ONB}$ = GND.
JU3	Installed	$\overline{3.3/5}$ connected to VOUT	VOUT is set to 5V. FB pin must be connected to ground (R2 = short).
		$\overline{3.3/5}$ connected to GND	VOUT is set to 3.3V. FB pin must be connected to ground (R2 = short).
		$\overline{3.3/5}$ connected to GND and resistors R1, R2 are installed	VOUT = adjustable between 2.5V to 5.5V. Refer to the <i>Setting the Output Voltage</i> section in the MAX1709 data sheet for instructions on selecting feedback resistors R1 and R2. Also cut PC trace shorting R2.

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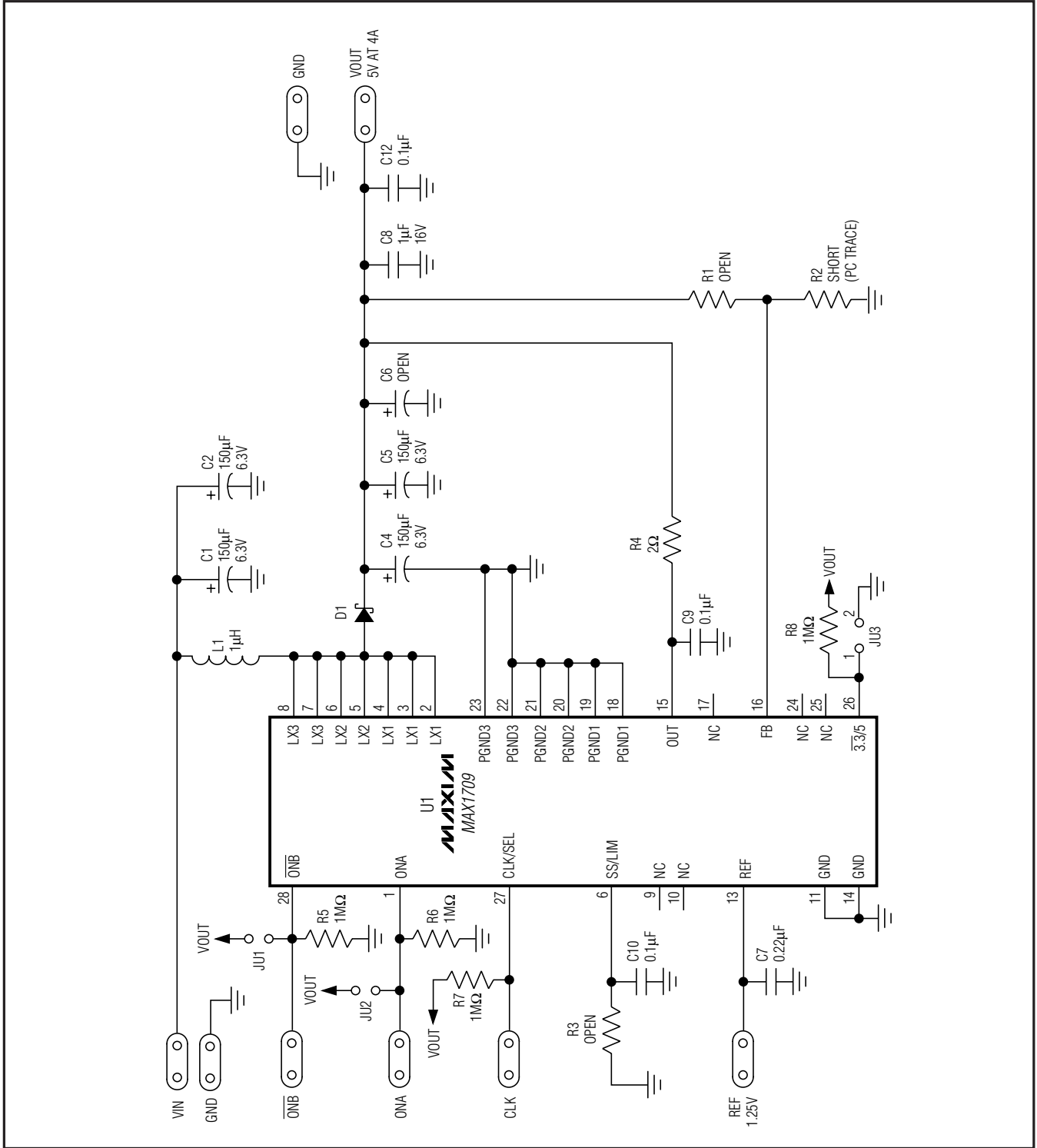


Figure 1. MAX1709 EV Kit Schematic

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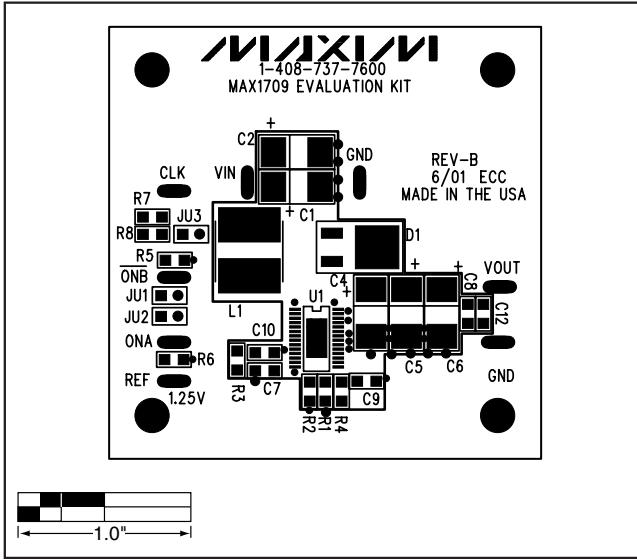


Figure 2. MAX1709 EV Kit Component Placement Guide—Component Side

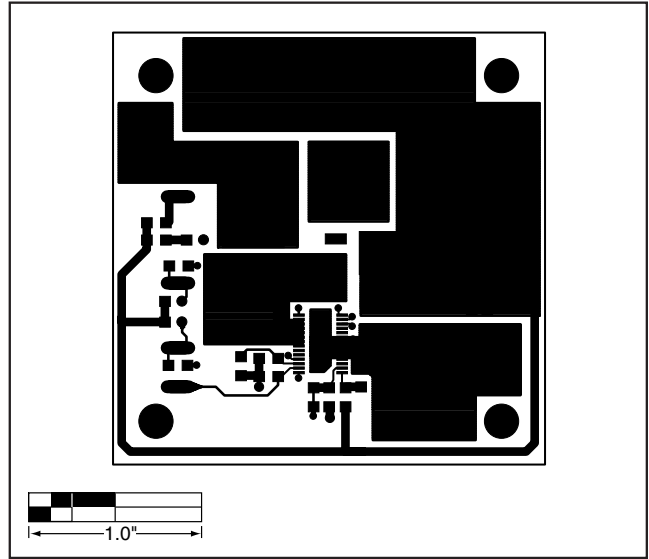


Figure 3. MAX1709 EV Kit PC Board Layout—Component Side

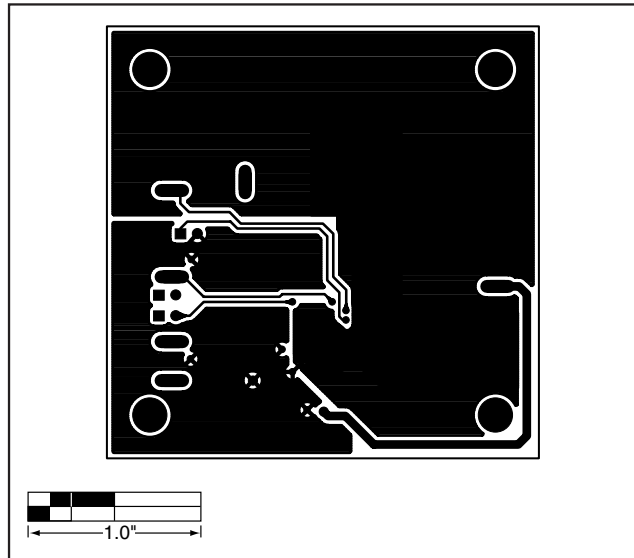


Figure 4. MAX1709 EV Kit PC Board Layout—Solder Side

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