19-4647; Rev 0; 5/09

MAX17083 Evaluation Kit

Evaluates: MAX17083

General Description

The MAX17083 evaluation kit (EV kit) is a fully assembled and tested PCB that demonstrates the typical 5A application circuit of the MAX17083. The MAX17083 is a DC-DC converter that steps down the system's 3.3V or 5V input supply for low-voltage, low-power applications.

The MAX17083 EV kit provides a 1.1V output voltage from a 2.4V to 5.5V input range. It delivers up to 5A output current while achieving greater than 90% efficiency. Programmed through jumper JU4, the EV kit operates at 1MHz switching frequency and has superior line- and load-transient response. The EV kit also allows the evaluation of other adjustable output voltages from 0.75V to 2.7V, by varying the SET pin and changing resistors R3 and R4.

Features

- **2.4V to 5.5V Input Range**
- **Configured for 1.1V Output Voltage**
- **Adjustable Output-Voltage Range (0.75V to 2.7V)**
- **5A Output Current**
- **90% Efficiency (V_{IN} = 3.3V, V_{OUT} = 1.1V at 2A)**
- **1MHz Switching Frequency**
- **Pin-Selectable Four-Level Switching Frequency (500kHz, 750kHz, 1MHz, and 1.5MHz)**
- **Enable Input**
- **Power-Good Output Indicator (POK)**
- **Low-Profile Surface-Mount Components**
- **Lead(Pb)-Free and RoHS Compliant**
- **Fully Assembled and Tested**

Ordering Information

PART	TYPE
MAX17083EVKIT+	EV Kit

+Denotes lead(Pb)-free and RoHS compliant.

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2	2	10µF ±10%, 10V X5R ceramic capacitors (0805) Murata GRM21BR61A106K TDK C2012X5R0J106M
C3, C5	2	1µF ±10%, 6.3V X7R ceramic capacitors (0402) Murata GRM155R61A105K TDK C1005X5R0J105M
C4, C6	2	0.1µF ±10%, 16V X7R ceramic capacitors (0402) TDK C1005X5R1C104K Murata GRM155R71C104K
C7	1	Not installed, POSCAP (D Case)
C8	0	0.1µF ±10%, 50V X7R ceramic capacitor (1206) Murata GRM319R71H104K TDK C3216X7R1H104K
C9	0	Not installed, ceramic capacitor (0402)
C20	1	220µF, 6mΩ, 2V ESR POSCAP (D Case) SANYO 2TPF220M6 Panasonic EEFSD0E221R (7mΩ, 2.5V)
D1	1	Green surface-mount LED (0805)
EN, POK	2	Test points
JU1, JU2	2	2-pin headers
JU3, JU4	2	4-pin headers
L1	1	1.0µH, 6.8A, 14.2mΩ inductor (5.8mm x 6.2mm x 3.0mm) TOKO FDV0530-1R0M NEC TOKIN MPLC0525L1R0
R1	1	100kΩ ±5% resistor (0603)
R2	1	1kΩ ±5% resistor (0603)
R3	1	0Ω resistor (0402)
R4, R9	0	Not installed, resistors (0402); R4 is open; R9 is short (PCB trace)
U1	1	5A step-down regulator (24 TQFN) Maxim MAX17083ETG+
—	4	Shunts
—	1	PCB: MAX17083 EVALUATION KIT+

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Component Suppliers

SUPPLIER	PHONE	WEBSITE
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
NEC TOKIN America, Inc.	408-324-1790	www.nec-tokinamerica.com
Panasonic Corp.	800-344-2112	www.panasonic.com
SANYO Electric Co., Ltd.	619-661-6835	www.sanyodevice.com
TDK Corp.	847-803-6100	www.component.tdk.com
TOKO America, Inc.	847-297-0070	www.tokoam.com

Note: *Indicate that you are using the MAX17083 when contacting these component suppliers.*

Quick Start

Recommended Equipment

- 2.4V to 5.5V DC power supply (VIN)
- 5V DC power supply (VCC)
- Dummy load capable of sinking 5A
- Digital multimeter (DMM)
- 100MHz dual-trace oscilloscope

Procedure

The MAX17083 EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on the power supply until all connections are completed.**

1) Ensure that the circuit is connected correctly to the supplies and dummy load prior to applying any power.
2) Verify that shunts are not installed across JU1 and JU4 (1MHz).
3) Verify that a shunt is installed across JU2 (enabled).
4) Verify that a shunt is installed across JU3, pins 1-2 (V_{OUT} = 1.1V).
5) Enable the power supplies (VIN and VCC).
6) Observe the 1.1V output with the DMM and/or oscilloscope. Look at the LX switching node while varying the load current.

Detailed Description of Hardware

Jumper Settings

Several jumper settings in the following tables illustrate some features of the MAX17083 EV kit.

VCC Bias Supply

The MAX17083 EV kit can be configured to operate from a single DC power supply through configuration of jumper JU1. When a shunt is installed across JU1, VCC is powered from the VIN input through R9. When a shunt is not installed, the user must provide an additional power supply at the VCC pad. Table 1 lists the selectable jumper options.

Enable Input

The MAX17083 EV kit features a 2-pin jumper (JU2) that selects the shutdown control input. Table 2 lists the selectable jumper options.

Table 1. Jumper JU1 Functions

JUMPER POSITION	VCC PIN	VIN/VCC RANGE
Installed	Connected to VIN through R9	VIN = 4.5 to 5.5V; VCC = VIN
Not installed*	User-provided power at VCC and PGND pads	VIN = 2.4 to 5.5V; VCC = 4.5 to 5.5V

**Default position.*

Table 2. Jumper JU2 Functions

JUMPER POSITION	EN PIN	REGULATOR OUTPUT
Installed*	Connected to VCC	Enabled
Not installed	Pulled low through R1	Disabled

**Default position.*

FB Threshold Selection

Jumper JU3 selects one of the four preset feedback voltage levels. The EV kit's feedback regulation voltage is set according to Table 3.

Switching Frequency Selection (FREQ)

The MAX17083 EV kit features a 4-pin jumper (JU4) that selects PWM-mode switching frequency. Switching-frequency selection is set according to Table 4. Refer to the MAX17083 IC data sheet for different external components when operating at different switching frequencies.

Setting V_{OUT} with a Resistive Voltage-Divider at FB

The MAX17083 produces an adjustable 0.75V to 2.7V output voltage by connecting FB to a resistive divider. To obtain an output voltage other than 1.1V, replace R3 and install resistor R4 with values according to the following equation:

$$V_{OUT} = V_{FB}\left(1 + \frac{R3}{R4}\right)$$

where V_{FB} = 0.75V. Note that jumper JU3 must be set to pins 1-4 (SET = GND) for V_{FB} = 0.75V. Component changes are required for output voltages greater than 2V. Refer to the MAX17083 IC data sheet for more information.

Table 3. Jumper JU3 Functions

JUMPER POSITION	SET PIN	FB REGULATION VOLTAGE (V)
1-2*	REF	1.1
1-3	VCC	1.8
1-4	GND	0.75
Not installed	OPEN	1.5

**Default position.*

Table 4. Jumper JU4 Functions

JUMPER POSITION	FREQ PIN	FREQUENCY
1-2	REF	750kHz
1-3	VCC	1.5MHz
1-4	GND	500kHz
Not installed*	Open	1MHz

**Default position.*

MAX17083 Evaluation Kit

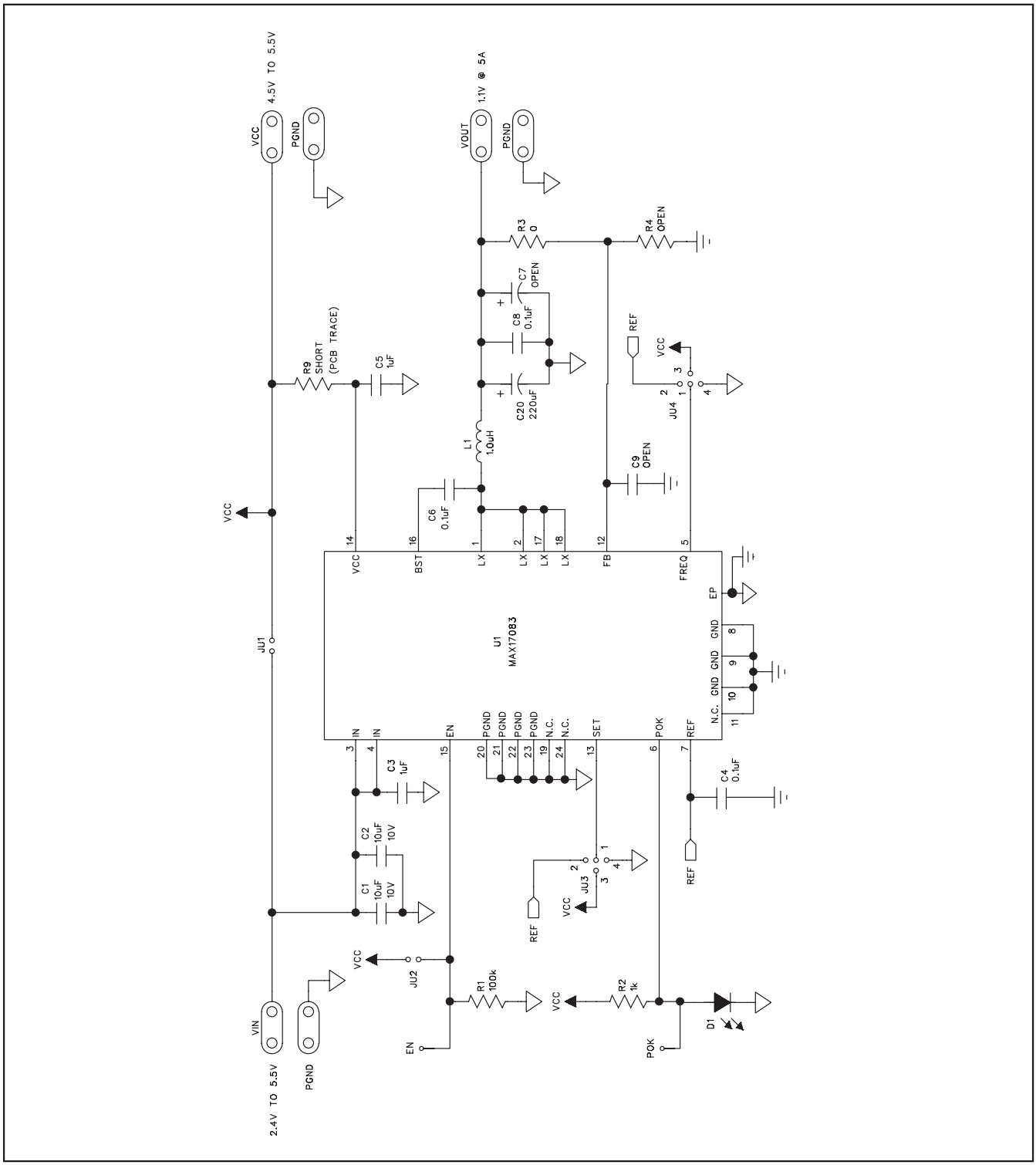

Figure 1. MAX17083 EV Kit Schematic

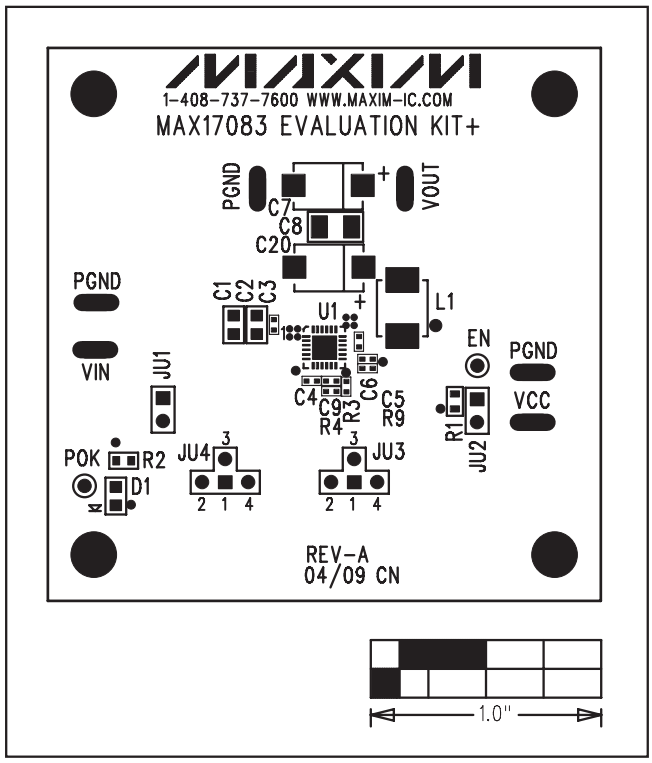

Figure 2. MAX17083 EV Kit Component Placement Guide—Component Side

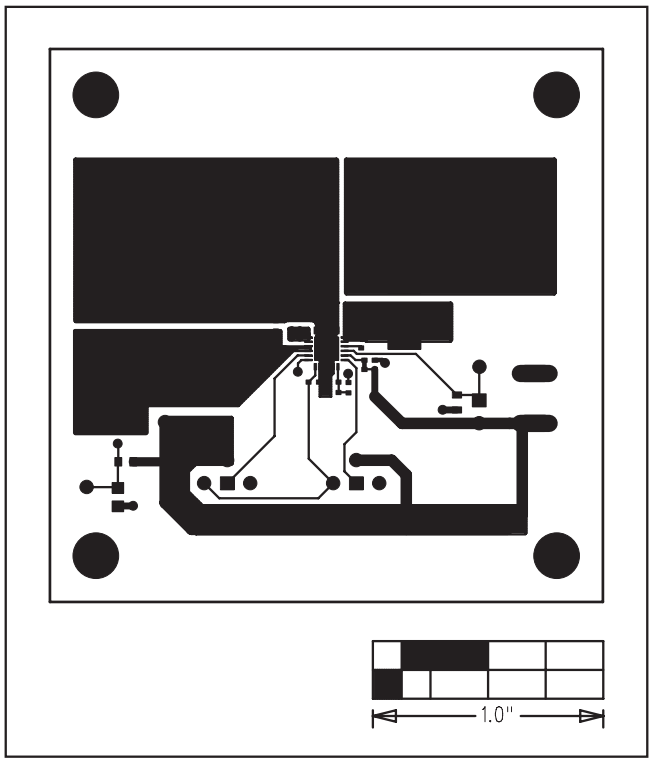

Figure 3. MAX17083 EV Kit PCB Layout—Component Side

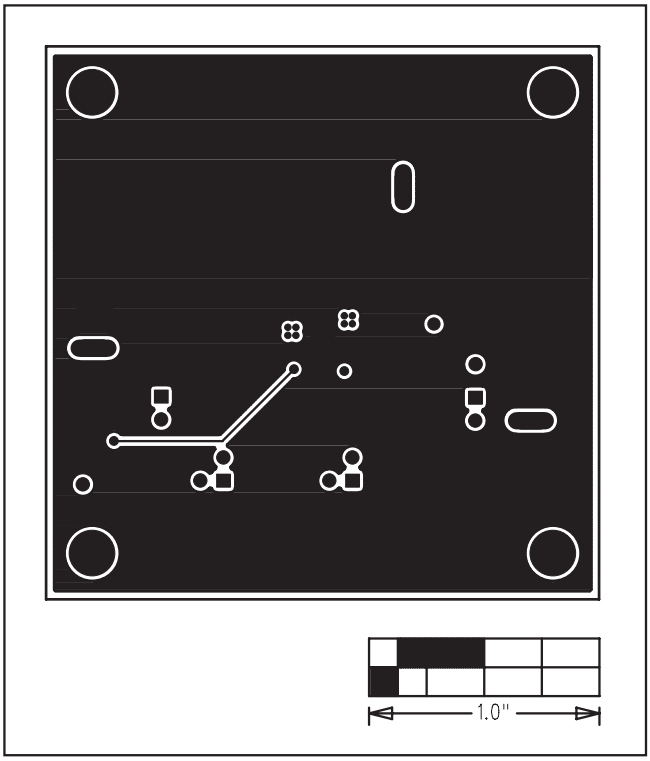

Figure 4. MAX17083 EV Kit PCB Layout—PGND Layer 2

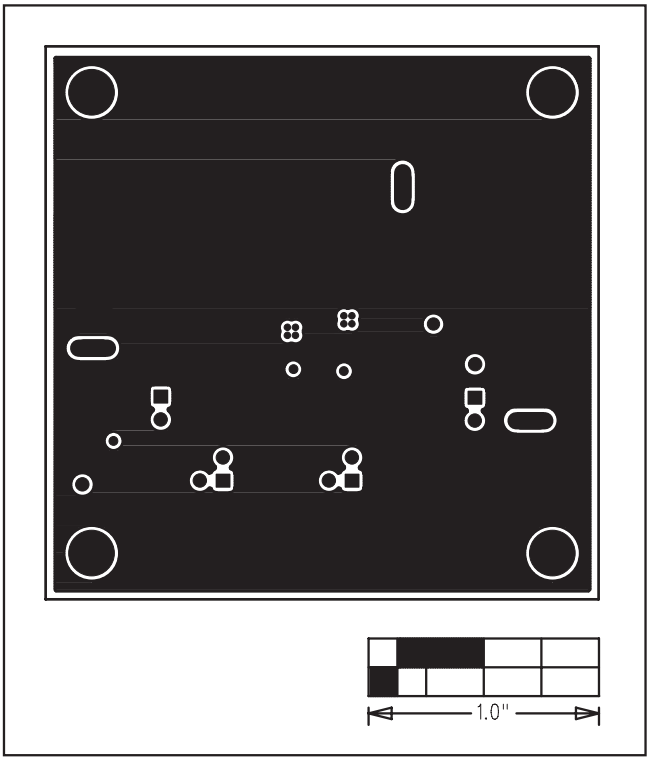

Figure 5. MAX17083 EV Kit PCB Layout—PGND Layer 3

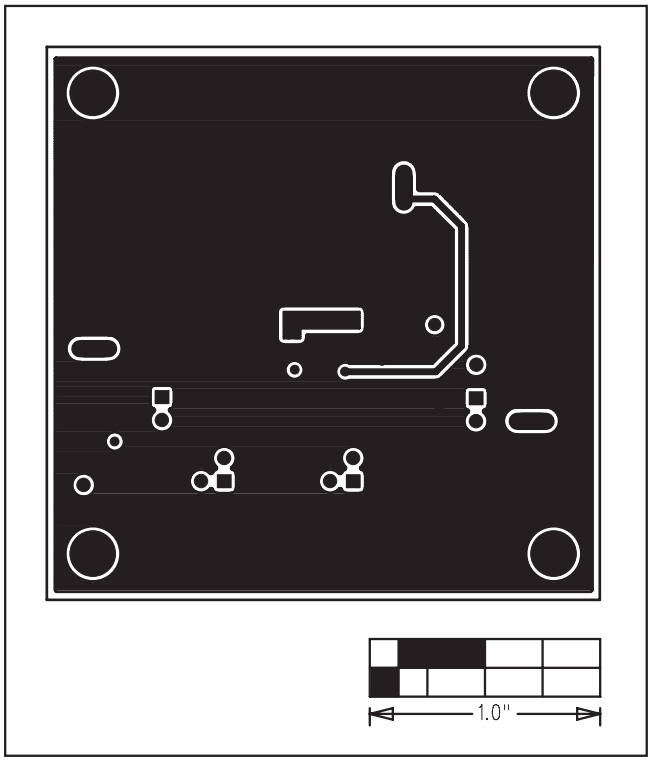

Figure 6. MAX17083 EV Kit PCB Layout—Solder Side

Mouser Electronics

Authorized Distributor

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Analog Devices Inc.:

MAX17083EVKIT+