19-1436; Rev 1; 9/99

MAXIM

MAX1623 Evaluation Kit

Evaluates: MAX1623

General Description

The MAX1623 evaluation kit (EV kit) provides a preset 3.3V output voltage from a +4.5V to +5.5V input source. It delivers up to 3A output current with greater than 90% efficiency.

The MAX1623 is a step-down switching regulator with synchronous rectification that includes two low-on-resistance 0.1Ω (max), 3A MOSFET power switches. It features a resistor-programmable fixed off-time as well as current-mode operation for superior load- and line-transient response.

The MAX1623 EV kit can also be used to evaluate other output voltages besides 3.3V by changing R_{TOFF} and the feedback resistors R1 and R2 located on the bottom of the board.

Features

- **+4.5V to +5.5V Input Voltage Range**
- **Output Voltage**
  3.3V Preset
  1.1V to 3.8V Adjustable (optional resistor-divider)
- **Guaranteed 3A Output Current**
- **94% Efficiency (V_{IN} = 5V, V_{OUT} = 3.3V at I_{OUT} = 2A)**
- **Internal 3A, 0.1Ω (max) MOSFET Switches**
- **Up to 350kHz Switching Frequency**
- **Thermal Shutdown at T_j = +145°C**
- **Surface-Mount Construction**
- **Fully Assembled and Tested**

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	220µF, 10V, low-ESR tantalum cap Sprague 593D227X0010E2W or AVX TPSE227M010R0100
C2	1	330µF, 10V, low-ESR tantalum cap Kemet T510X337M010AS
C3	1	470pF ceramic capacitor
C4	1	0.47µF ceramic capacitor
C5	1	4.7µF, 16V tantalum capacitor Sprague 595D475X0016A2B
C6, C7	0	Not installed
C8	1	4.7µF, 10V X5R ceramic capacitor Taiyo Yuden LMK316BJ475ML
L1	1	4.7µH power inductor Sumida CDRH125-4R4 or Coiltronics UP2-4R7
R_{TOFF}	1	110kΩ, 1% resistor
R1, R2	0	Not installed
R3	1	10Ω, 5% resistor
U1	1	MAX1623EAP (SSOP-20)
None	2	Shunts
JU1, JU2	2	3-pin headers
None	1	MAX1623 PC board
None	1	MAX1623 data sheet

Ordering Information

PART	TEMP. RANGE	IC PACKAGE
MAX1623EVKIT	0°C to +70°C	20 SSOP

Component Suppliers

SUPPLIER	PHONE	FAX
AVX	803-946-0690	803-626-3123
Coiltronics	561-241-7876	561-241-9339
Dale-Vishay	402-564-3131	402-563-6418
Kemet	408-986-0424	408-986-1442
Motorola	602-303-5454	602-994-6430
Sprague	603-224-1961	603-224-1430
Sumida	708-956-0666	708-956-0702
Taiyo Yuden	408-573-4150	408-573-4159

Note: *Please indicate that you are using the MAX1623 when contacting these component suppliers.*

Quick Start

The MAX1623 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 5V, 3A supply to the VIN pad. Connect ground to the GND pad.
2) Connect a voltmeter and load, if any, to the VOUT pad.
3) Verify that the shunt is across JU1 pins 2 and 3 for normal operation.
4) Turn on the power supply to the board. Verify that the output voltage is 3.3V.
5) To select other output voltages, refer to the *Setting the Output Voltage* section in the MAX1623 data sheet for instructions on selecting feedback resistors R1 and R2.

Detailed Description

The MAX1623 EV kit provides a preset 3.3V output from a +4.5V to +5.5V input voltage. It delivers up to 3A of output current.

Table 1. Jumper JU1 Functions (Shutdown Mode)

SHUNT LOCATION	$\overline{SHDN}$ PIN	MAX1623 OUTPUT
2 & 3	Connected to VIN	MAX1623 enabled, V_{OUT} = 3.3V
1 & 2	Connected to GND	Shutdown mode, V_{OUT} = 0

Other Output Voltages

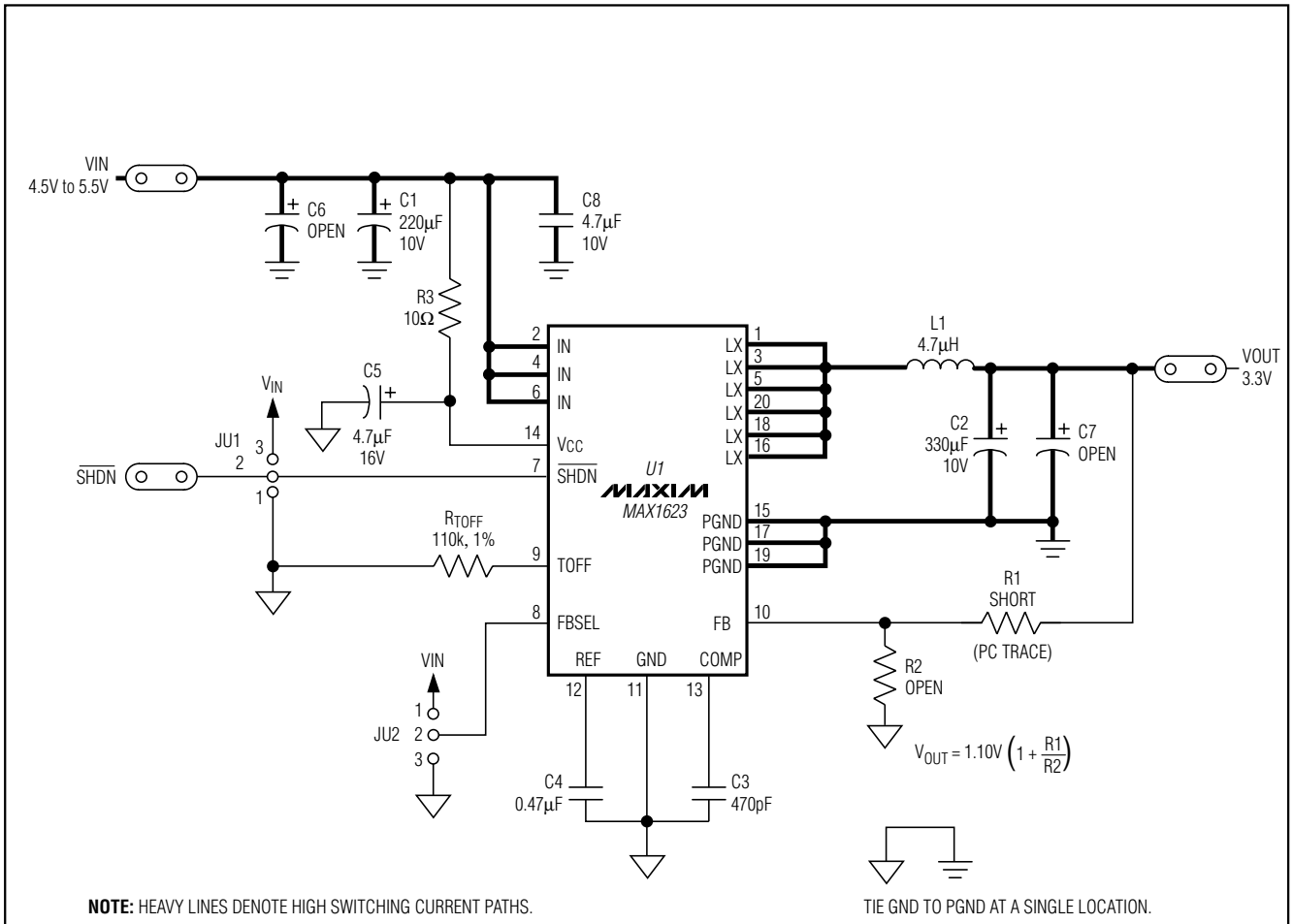
The MAX1623 EV kit is preset for a 3.3V output voltage. However, the output voltage may also be adjusted by an external voltage divider formed by R1 and R2 (located on the bottom of the board). In addition, R_{TOFF} must be changed to obtain the desired switching frequency (see *Switching Frequency and Programming the Off-Time* in the MAX1623 data sheet). The only other modifications required are to cut the trace across R1 and remove the shunt from JU2. Refer to the *Setting the Output Voltage* and *Output Filter Capacitor* sections in the MAX1623 data sheet for instructions on selecting feedback resistors R1 and R2 and output capacitor values.

PC Board Thermal Resistance

Junction to ambient thermal resistance greatly depends on the amount of copper area immediately surrounding the IC's leads. This EV kit has 0.85 $in.^2$ of copper area and has a measured thermal resistance of 45°C/W.

Table 2. Jumper JU2 Functions (FB Selection)

SHUNT LOCATION	FBSEL PIN	MAX1623 OUTPUT
1 & 2	Connected to VIN	V_{OUT} = 2.5V
Not installed	Floating	V_{OUT} = 3.3V
2 & 3	Connected to GND	Adjustable mode



SHUNT LOCATION	FBSEL PIN	MAX1623 OUTPUT	RTOFF (kΩ) (for 300kHz)
JU2 pins 1, 2	Connected to VIN	2.5V	180
JU2 Not installed (default)	**Floating**	**3.3V**	**110**
JU2 pins 2, 3	Connected to GND	Adjustable output. Cut trace between R1 pads. Refer to MAX1623 data sheet for R1 and R2 values.	270

Figure 1. MAX1623 EV Kit Schematic

MAX1623 Evaluation Kit

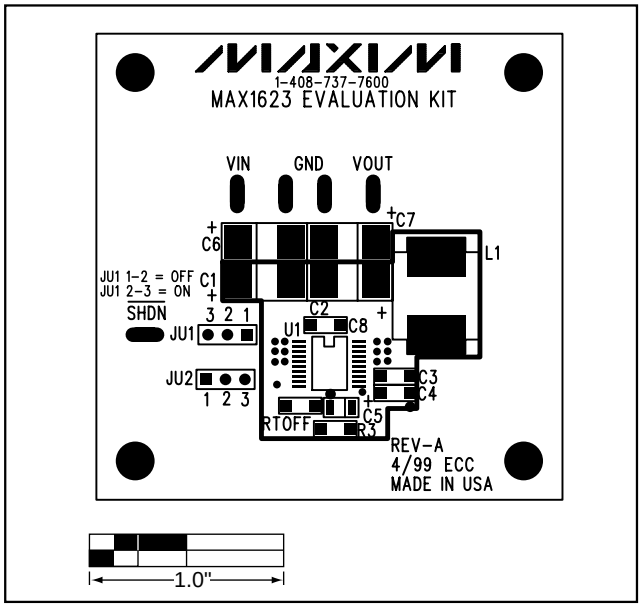


Figure 2. MAX1623 EV Kit Component Placement Guide—Component Side

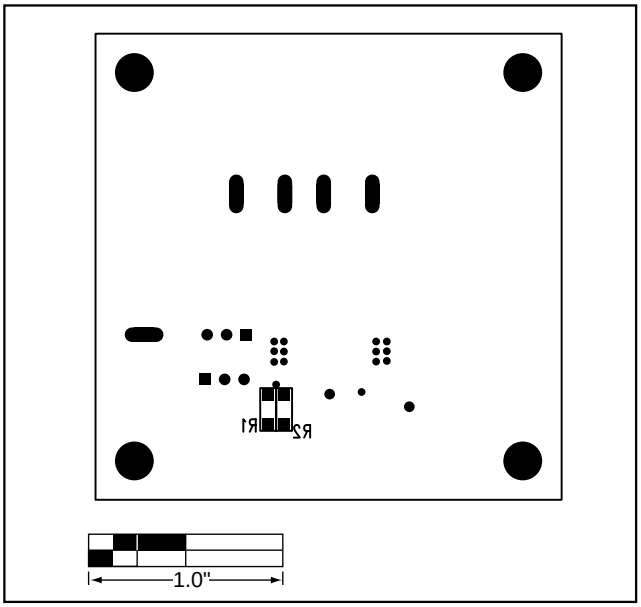


Figure 3. MAX1623 EV Kit Component Placement Guide—Solder Side

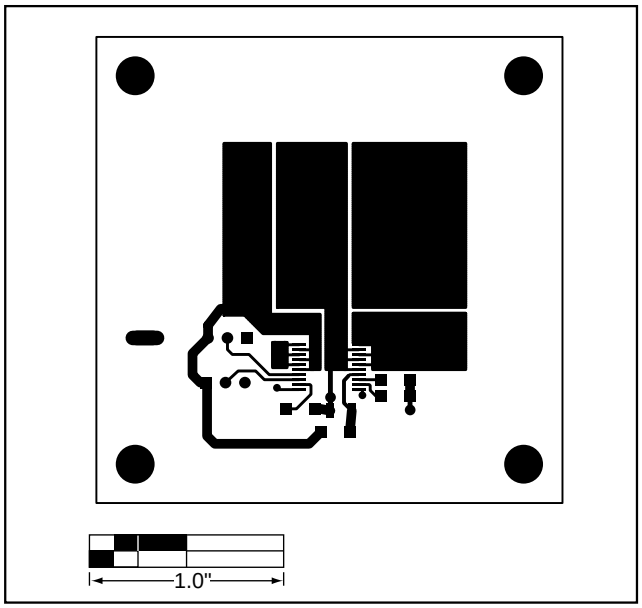


Figure 4. MAX1623 EV Kit PC Board Layout—Component Side

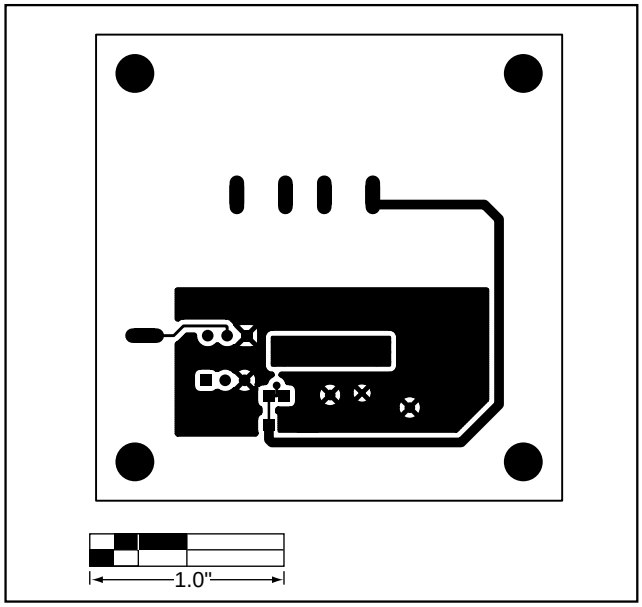


Figure 5. MAX1623 EV Kit PC Board Layout—Solder Side