

MAXIM

MAX1917 Evaluation Kit

General Description

The MAX1917 evaluation kit (EV kit) demonstrates the MAX1917's standard 7A application circuit. This DC-DC converter provides a complete power-management solution for DDR memory. This EV kit is a fully assembled and tested circuit board. The MAX1917 EV kit generates a regulated voltage for VTT and VTTR that is half the voltage at the DDR input. The input voltage range is 2.5V to 14V. The circuit is configured to deliver 7A of output current. The DC-DC converter uses buck topology with synchronous rectification to achieve low output voltage with greater than 90% efficiency. The converter output is capable of sourcing and sinking current. Sink capabilities at low voltage arise from the use of a synchronous rectifier, which allows the inductor current to reverse. The EV kit operates at 550kHz switching frequency and has superior load-transient response that meets JEDEC specifications for DDR memory.

Features

- ◆ Automatically Sets VTT and VTTR to 1/2 V_{DDR}
- ◆ ±1% Output Voltage Accuracy
- ◆ 2.5V to 14V Input Voltage Range
- ◆ 7A Output Current Capability
- ◆ Sourcing and Sinking Current
- ◆ 550kHz Switching Frequency
- ◆ 16-Pin QSOP Package
- ◆ Low-Profile Components
- ◆ Fully Assembled and Tested

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX1917EVKIT	0°C to +70°C	16 QSOP

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2, C3	3	10µF, 25V X5R ceramic capacitors (1812) Taiyo Yuden TMK432BJ106KM or TDK C4532X5R1E106M
C4, C5	0	Not installed, E case
C6–C9	4	270µF, 2V, 15mΩ low-ESR specialty polymer capacitors, E case Panasonic EEFUE0E271R
C10, C11	2	10µF, 6.3V X5R ceramic capacitors (1206) Taiyo Yuden JMK212BJ106MG or TDK C3216X5R0J106M
C12	1	0.47µF, 25V X5R ceramic capacitor (1206) Taiyo Yuden TMK316BJ474ML
C13, C14	2	0.47µF, 6.3V X5R ceramic capacitors (0603) Taiyo Yuden JMK107BJ474MA
C15	1	4.7µF, 6.3V X5R ceramic capacitor (0805) Taiyo Yuden JMK212BJ475MG
C16, C17	2	1µF, 6.3V X5R ceramic capacitors (0603) Taiyo Yuden JMK107BJ105MA
D1	1	100mA Schottky diode Central Semiconductor CMPSH-3
J1	1	Scope probe connector Berg Electronics 33JR135-1
JU1	1	3-pin header

DESIGNATION	QTY	DESCRIPTION
JU2, JU3	2	2-pin headers
JU4	1	Not installed
L1	1	0.8µH, 16A power inductor Sumida CDEP105L-0R8
N1, N2	2	N-channel MOSFETs (8-pin SO) International Rectifier IRF7811W
Q1	1	N-channel MOSFET (SOT23) Central Semiconductor 2N7002
Q2	0	Not installed, complementary P-N MOSFETs (SC-89) Siliconix Si1029X
R1, R5, R7	0	Not installed (0805)
R2	1	5.1kΩ ±5% resistor (0805)
R3	1	100kΩ ±5% resistor (0805)
R4	1	0.002Ω ±1%, 1W resistor (2512) Panasonic ERJM1WTF2M0U
R6	1	10kΩ ±5% resistor (0805)
R8	0	Not installed (short PC trace) (0805)
R9	1	20Ω ±5% resistor (0805)
U1	1	MAX1917EEE (16-pin QSOP)
None	3	Shunts
None	4	Rubber bumpers 3M SJ-5007 Mouser 517-SJ-5007BK or equivalent
None	1	MAX1917 PC board
None	1	MAX1917 data sheet
None	1	MAX1917 EV kit data sheet

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Component Suppliers

SUPPLIER	PHONE	FAX	WEBSITE
Central Semiconductor	516-435-1110	516-435-1824	www.centrasemi.com
International Rectifier	310-322-3331	310-322-3332	www.irf.com
Panasonic	714-373-7334	714-373-7323	www.panasonic.com
Taiyo Yuden	408-573-4150	408-573-4159	www.t-yuden.com
TDK	847-390-4373	847-390-4428	www.component.tdk.com

Note: Please indicate that you are using the MAX1917 when contacting these component suppliers.

Quick Start

The following equipment is needed:

- 2.5V to 14V power supply (VIN), battery, or notebook AC adapter
- DC-bias power supply (V+), 5.5V to 14V at 100mA
- Dummy load capable of sourcing/sinking 7A
- Digital multimeter (DMM)
- 100MHz dual-trace oscilloscope

The MAX1917 EV kit is a fully assembled and tested surface-mount board. Follow the steps below to verify board operation. **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 the shunts are across JU1 pins 2 and 3, JU2, and JU3, and not JU4.
- 3) Apply external reference to the DDR pad.
- 4) Turn on power supplies and observe the output with the DMM and/or oscilloscope. Look at the LX switching node and MOSFET gate-drive signals while varying the load current.

Detailed Description

The MAX1917 EV kit provides a complete power-management solution for DDR memory. The EV kit is a synchronous, buck-switching, DC-DC converter that generates half the voltage at the DDR input pad for VTT and VTTR. The synchronous rectification mode ensures balanced sourcing and sinking current capability up to 7A. The EV kit operates at 550kHz switching frequency and has superior line- and load-transient response.

Jumper Settings

Tables 1-4 show jumper settings.

Table 1. Jumper JU1 Functions (POK)

SHUNT LOCATION	POK PIN
1 and 2	Connected to VLOGIC through pullup resistor R3
2 and 3	Connected to VL through pullup resistor R3

Table 2. Jumper JU2 Functions (Switching-Frequency Selection)

JU2	FSEL PIN	FREQUENCY (kHz)
Not Installed	Floating	300
Installed	Connected to GND	550 (as shipped)

Table 3. Jumper JU3 Functions (Fixed/Adjustable Current-Limit Selection)

SHUNT LOCATION	ILIM PIN	CURRENT-LIMIT THRESHOLD
ON	Connected to VL.	100mV (default)
OFF	Connected to GND through resistor R1 (not provided). Refer to the <i>Overcurrent Protection</i> section in the MAX1917 data sheet for information on selecting R1.	Adjustable current limit

Table 4. Jumper JU4 Functions (V+)

SHUNT LOCATION	V+ PIN	V+ VOLTAGE RANGE (V)
ON	Connected to VL	4.5 to 5.5
OFF	Not connected to VL	5.5 to 14

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Evaluates: MAX1917

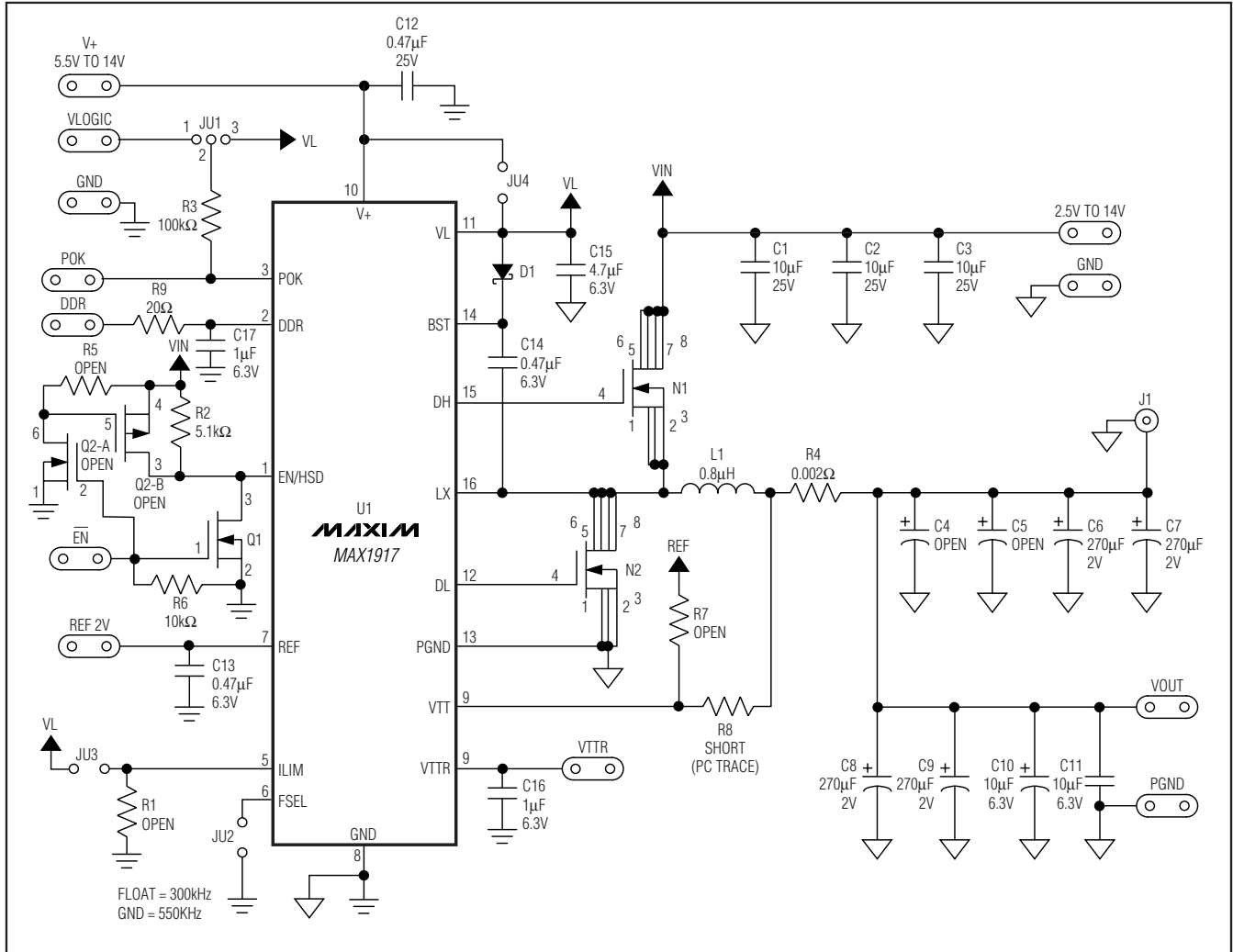


Figure 1. MAX1917 EV Kit Schematic

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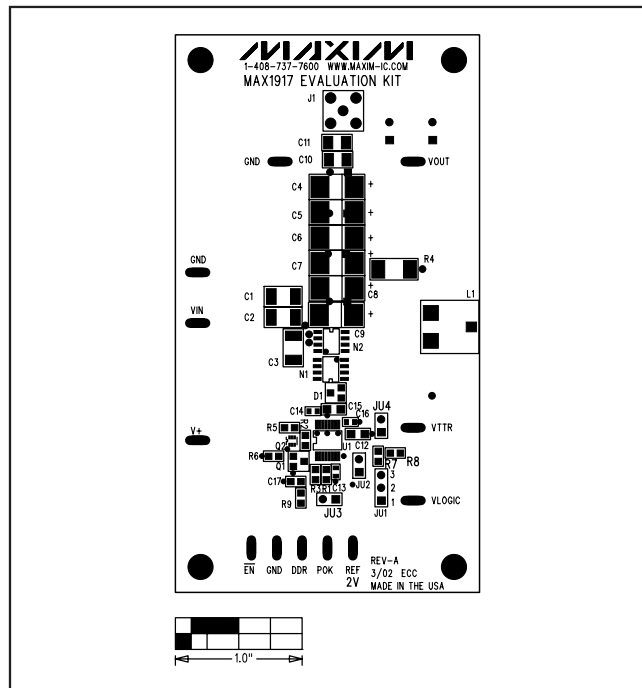


Figure 2. MAX1917EV Kit Component Placement Guide—Component Side

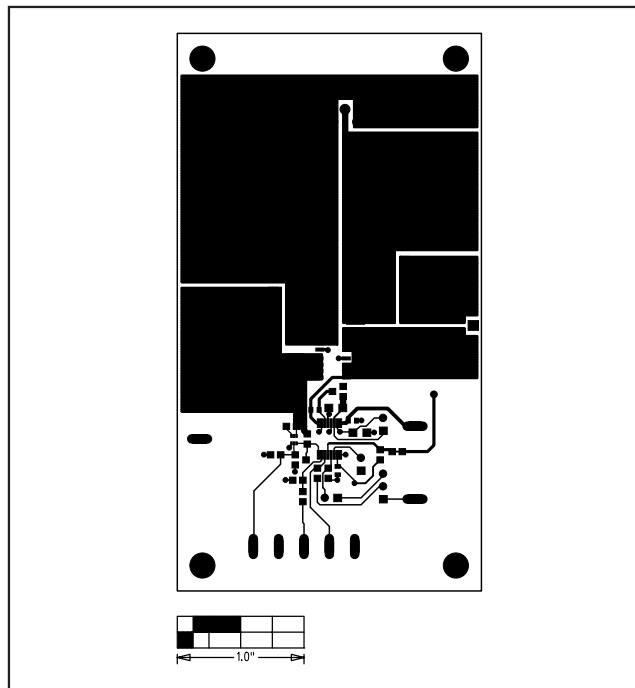


Figure 3. MAX1917 EV Kit PC Board Layout—Component Side

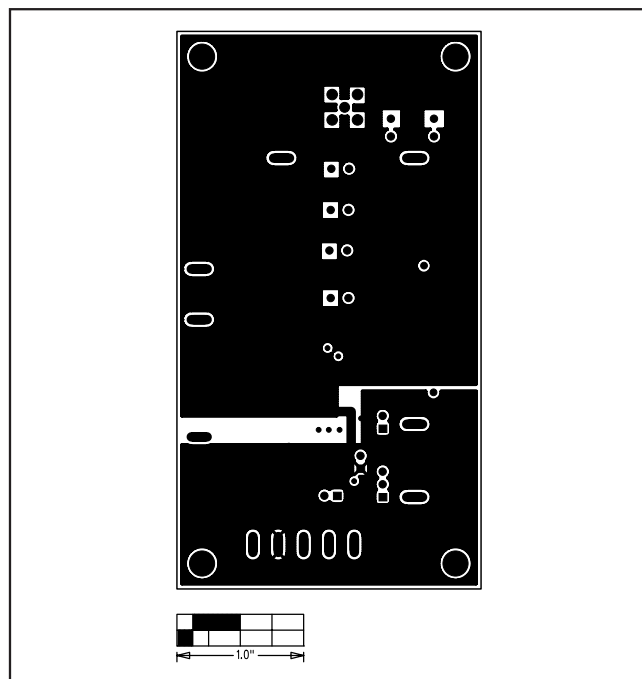


Figure 4. MAX1917 EV Kit PC Board Layout—Ground Plane

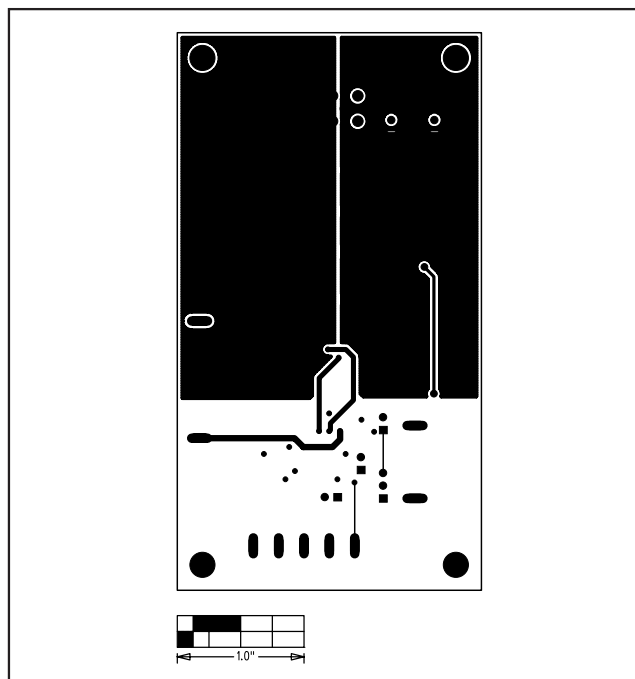


Figure 5. MAX1917 EV Kit PC Board Layout—Solder Side

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