19-0036; Rev 0; 6/92

EVALUATION KIT

MAXIM

MAX752 Evaluation Kit

General Description

The MAX732/733/752 evaluation kit (EV kit) facilitates easy assembly and evaluation of Maxim's high-efficiency +12V, +15V, and adjustable step-up current-mode DC-DC converters.

The EV kit includes all needed components (unassembled) and a printed circuit board. When completed, the EV kit is a working DC-DC step-up converter with adjustable output voltage up to 200mA.

The MAX732/733/752 use current-mode pulse-width modulation (PWM) controllers to provide precise output regulation and low subharmonic noise. Typical no-load supply current is 2mA.

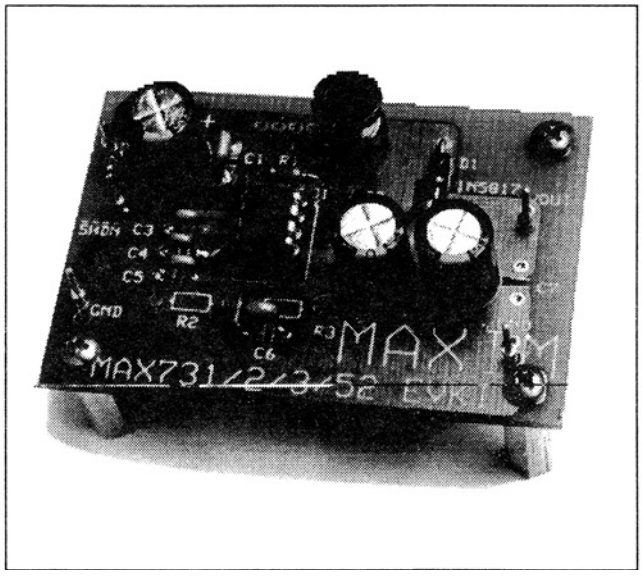
These devices feature cycle-by-cycle current limiting, overcurrent limiting, external shutdown, and programmable soft-start protection.

The EV kit components are suitable for through-hole mounting to make construction and evaluation easy.

Features

- **Load Currents Guaranteed to 200mA with No External MOSFET**
- **Step Up from a 2V Input**
- **170kHz High-Frequency Current-Mode PWM**
- **82% to 95% Typical Efficiencies at Full Load**
- **Overcurrent and Soft-Start Protection**
- **Shutdown Capability**

EV Kit



Ordering Information

PART	TEMP. RANGE	BOARD TYPE
MAX752EVKIT-DIP	0°C to +70°C	Plastic DIP-Through Hole

The MAX752 EV kit can also be used to evaluate the MAX732/MAX733, which are +12V and +15V step-up current-mode PWM regulators, respectively. Order a free sample of the MAX732/MAX733 by calling Maxim toll free (1-800-998-8800), by faxing a request (408) 737-7194, or by returning a sample card that is inside every *Power-Supply Design Guide* and *1992 New Releases Data Book*.

Terminal Descriptions

TERMINAL NAME	FUNCTION
V_{IN}	Positive Input. Connect to positive terminal of input voltage power supply.
$\overline{SHDN}$	$\overline{SHUTDOWN}$ – active low. Ground to power down, ties to V_{IN} for normal operation. Output power FET is held off when SHDN is low.
GND	Circuit Ground. Connect to negative terminal of input voltage supply. This is also the output voltage negative terminal.
V_{OUT}	Positive Output. Connect to load.

Operating Principle

These high-efficiency switch-mode regulators use a current-mode pulse-width modulation (PWM) controller as a simple boost regulator to convert an unregulated 2V (MAX752) or 4V (MAX732/731) DC voltage to a higher output. The current-mode PWM architecture provides cycle-by-cycle current limiting and excellent load-transient response. For detailed description, see the MAX732/MAX733 and MAX731/MAX752 data sheets.

For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

MAX752 Evaluation Kit

Component List

DESIGNATION	QTY	DESCRIPTION	SOURCE
IC1	1	MAX752CPA	Maxim
None	1	Printed circuit board	Maxim
C1, C4, C7	2	0.1µF ceramic capacitors	
C2, C8, C9	3	150µF, 25V electrolytic capacitors, MAXC001	Maxim
C3	1	0.01µF ceramic capacitor	
C6	1	0.15µF ceramic capacitor	
D1	1	Shottky diode 1N5817	Motorola
R1	1	1/4W, 5% 10kΩ resistor	
C5	1	2200pf ceramic capacitor	
J1	1	Jumper, solid	
L1	1	47µH inductor	Sumida RCH-110-470k Coilcraft PCH-27-473 Wilco ITS470
R2*	1	1/4W, 1%, 7.50kΩ resistor	
R3*	1	1/4W, 1%, 47.5kΩ resistor	

*Note: To evaluate MAX732/MAX733, omit R2 and R3.

Sumida USA	(708) 956-0666	FAX (708) 956-0702
Sumida Japan	03-3607-5111	FAX 03-3607-5428
Coilcraft USA	(708) 639-6400	FAX (708) 639-1469
Coilcraft Taiwan	8862-268-2146	FAX 8862-268-2092
Wilco	(317) 293-9300	FAX (317) 293-9462

Assembly Instructions

CAUTION: Observe the following safety measures.

1. Do not apply power until all components are installed.
2. Do not solder or work on circuit while power is applied.
3. Never apply more than the maximum supply voltage to V_{IN}.

The EV kit is shipped unassembled. You will need the following tools for assembly:

1. Long-nose pliers
2. Wire cutters
3. 30W soldering iron and rosin-core solder
4. Hook-up wire (#18-22AWG) for the input and output connections

CAUTION: Using a high-wattage soldering iron or acid-core solder may damage the board and components.

Install the components as shown in Figure 1 and solder them in place. Observe polarity on the capacitors, diode, and IC. Keep all leads short. Inspect the completed board for cleanliness, shorts, and solder splashes.

A socket may be added for IC1, but it may degrade performance with high load currents. In general, sockets are not recommended.

The printed circuit board accommodates a variety of inductors. When installing the inductor, make sure one end is connected on the trace leading to V_{IN}. Connect the other inductor terminal to the same trace as diode D1.

Only one of the jumpers must be installed; install J1 for the MAX732/733/752.

When using the kit with the MAX732 or MAX733, omit R2 and R3.

Examine the board for parts inserted incorrectly before applying power. Verify that the electrolytic capacitors' positive terminal aligns with the plus (+) sign on the printed circuit board. The cathode band on D1 must be as indicated on the board legend.

Testing

When testing, use an adjustable bench power supply as a source (V_{IN}). Start with no load, then add a resistive load before connecting to the actual circuit. This procedure minimizes the chances of damaging the device and ensures that accurate data is collected in an orderly manner.

The bench power supply should have 3A to 6A capability, and its current limiting should be set to prevent interaction with the EV kit's peak currents.

The 7.5k Ω and 47.5kΩ values of R2 and R3 set the output voltage to 9.0V. The input voltage range is 2V to V_{OUT} (4.5V to 9.0V with these resistors). The maximum output current is 200mA.

Shutdown

The DC-DC converters operate only if $\overline{SHDN}$ is connected to V_{IN}. Even with $\overline{SHDN}$ grounded, however, there is a DC path from V_{IN} to V_{OUT}, and V_{OUT} will be one diode drop lower than V_{IN}. This is due to the basic topography of step-up converters, and would be the case even with IC1 removed from the circuit. Some current (V_{IN}/10k) also flows from V_{IN} to $\overline{SHDN}$, due to R1.

Internal Reference

The +1.23V bandgap reference supplies up to 100µA at VREF. A 0.01µF bypass capacitor from VREF to GND is recommended for the MAX732/MAX733.

V+ Bypass

Bypass V+ with capacitor C1 close to the IC's V+ and GND pins. This is especially important when generating high voltages (>13V) and high currents (>100mA) because large load-current transients produce large voltages ($L\frac{di}{dt}$). To snub these voltages, place bypass capacitors close to the device pins.

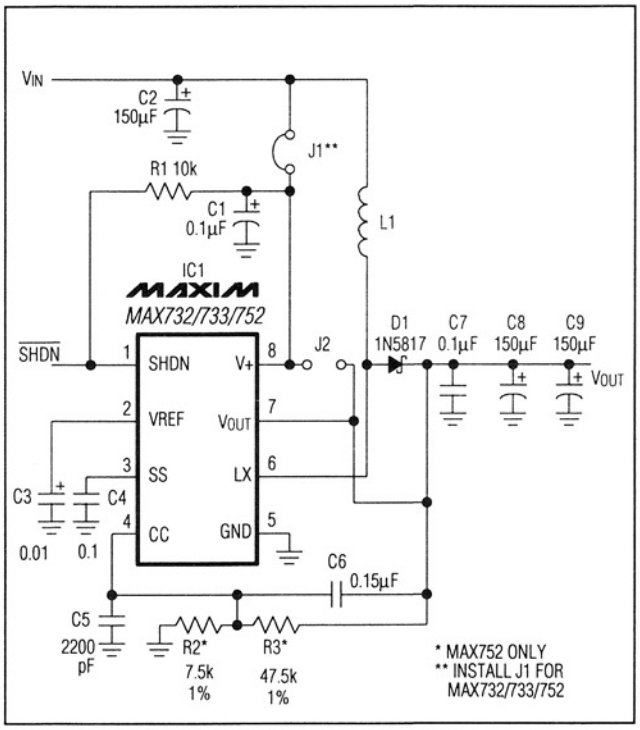


Figure 1a. EV Kit Schematic

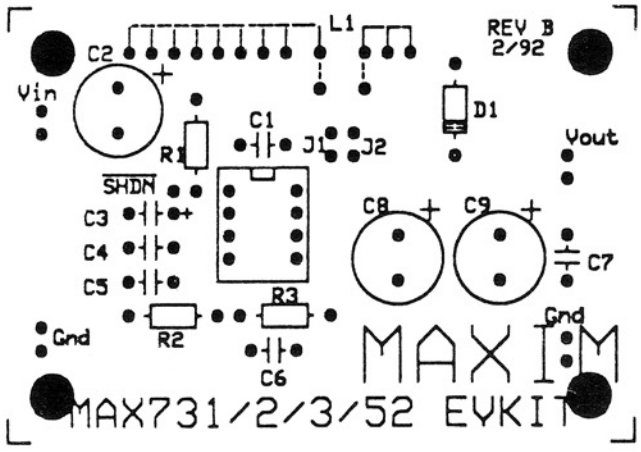


Figure 1b. DIP PC Layout, Through-Hole Placement (1X Scale)

MAX752 Output Adjustment

The MAX752 EV kit output voltage is set by two resistors, R2 and R3 (Figures 1 and 2), which form a voltage divider between the output and the error-amplifier input (CC) pin. The voltage at the junction of R2 and R3 is the 1.23V bandgap reference voltage. Since the error-amplifier input is CMOS, its high input impedance will not load the voltage divider. Keep R2 around 7.5kΩ. Significantly different values (>50%) might require altering compensation capacitance values. R3 is given by the formula:

$$R3 = \frac{(V_{OUT})(R2)}{1.23} - R2$$

Capacitors C5 and C6 furnish loop compensation.

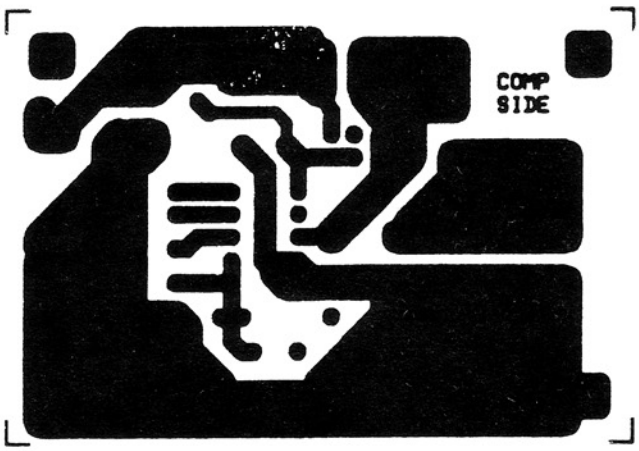


Figure 1c. DIP PC Layout, Component Side (1X Scale)

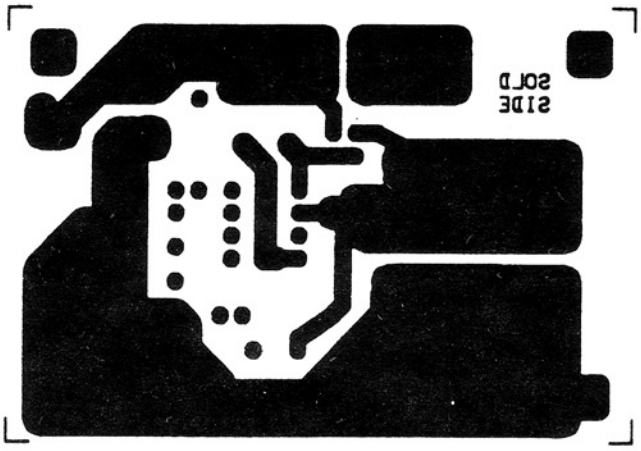


Figure 1d. DIP PC Layout, Solder Side (1X Scale)

MAX752 Evaluation Kit

Maxim cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim product. No circuit patent licenses are implied. Maxim reserves the right to change the circuitry and specifications without notice at any time.

© 1992 Maxim Integrated Products Printed USA MAXIM is a registered trademark of Maxim Integrated Products.