
3V to 80V, 7A, Power-Limiter with Surge, UV, Reverse Polarity, Loss of Ground Protection, and Power Limit

General Description

The MAX17617AEVKIT# evaluation kit (EV kit) features the MAX17617A electronic fuse (eFuse) set up for 5V to 28V operation with a 2A auto-retry current limit. A 3.3V buck regulator provides a voltage for pull-ups and logic to run indicator LEDs on the board. The board also includes an additional external N-channel field-effect transistor (FET) for reverse conduction protection.

Features and Benefits

- 3V to 80V Input Range
 - 3V to 75V if Reverse Protection FET is used
- 3% Accurate Current Monitoring
- Programmable Current Limit Response
- Reverse Voltage/Current Protection
- Loss of GND Protection
- 6% Accurate Power Limiting (Input or Output)
- -40°C to +125°C Operation
- 23-Lead, 4.5mm x 5.75mm, FC2QFN Package

Design files for this circuit board are available at www.analog.com.

[Ordering Information](#) appears at end of data sheet.

Quick Start

Configuration Diagram

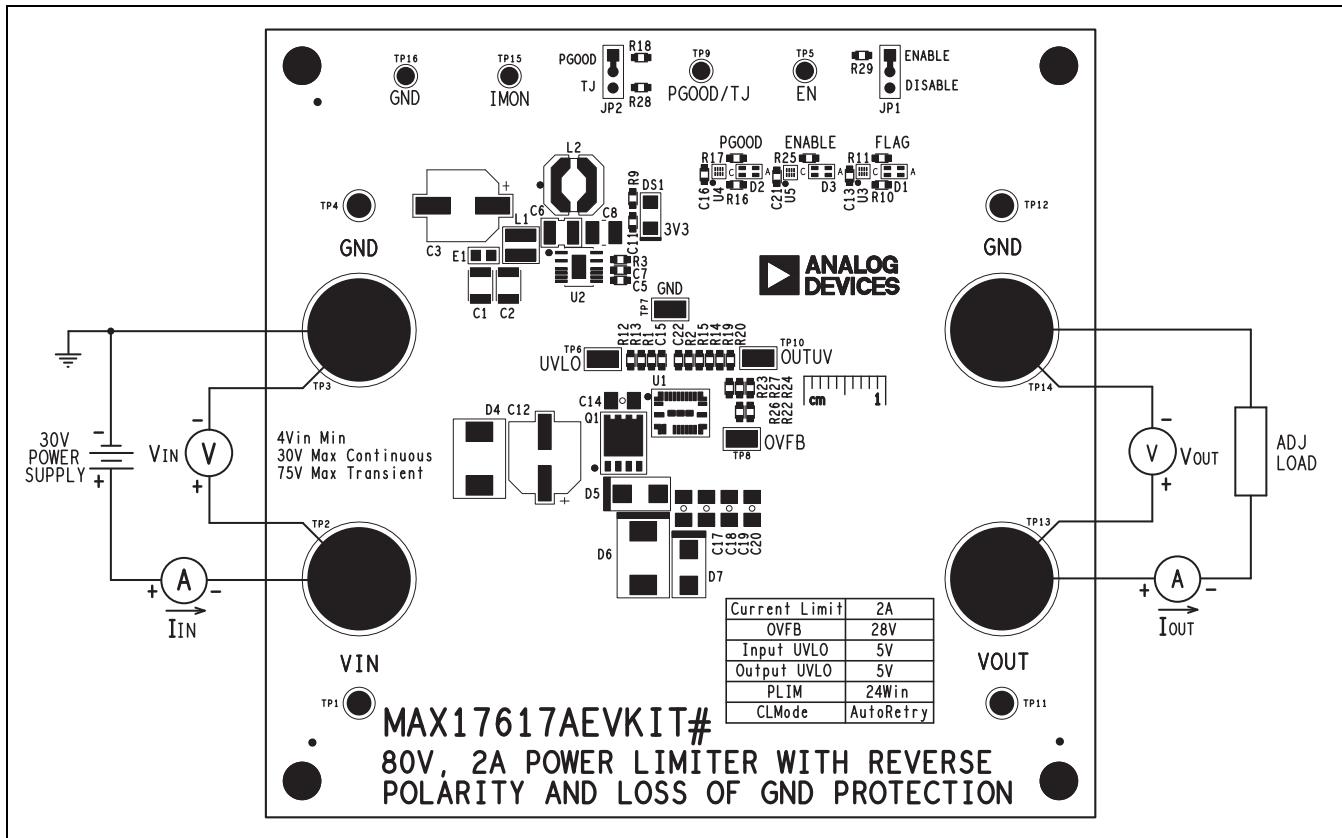


Figure 1. MAX17617A EV Kit Board Connections

Required Equipment

- 30V DC Power Supply with 2A minimum capability
- Adjustable Load (0A–3A)
- Digital multimeters (DMMs)

Procedure

The EV kit is fully assembled and tested. Use the following steps to verify the board operations.

Caution: Do not turn on the power until all connections are completed.

1. Verify that all jumpers are in their default positions.
2. Set the DC power supply to 12V and connect it between V_{IN} and GND. Verify that PGOOD, ENABLE, and FLAG LEDs are all green.
3. Check OV Surge Protection by gradually increasing the DC power supply to 29V and verify approximately 28 V_{OUT} regulation.
4. Gradually decrease the DC power supply voltage and verify that V_{OUT} returns to approximately V_{IN} to approximately 28 V_{IN} and lower.
5. Set the DC power supply voltage to 10V and slowly increase the adjustable load current. At approximately 2A, verify V_{OUT} drops significantly and both PGOOD and FLAG LEDs turn red.
6. Reduce adjustable load current, and verify V_{OUT} returns close to V_{IN} and both PGOOD and FLAG LEDs turn green.

Table 1. Jumper Connection Guide

JUMPER	DEFAULT CONNECTION	FEATURE
JP1	ENABLE	Enable or Disable MAX17617A
JP2	PGOOD	Select between PGOOD and TJ

Detailed Description of Hardware

The MAX17617AEVKIT# EV kit can be configured to evaluate user-defined input undervoltage lockout (UVLO), output UV sensing, and surge protection thresholds using resistor-dividers. The overcurrent (OC) threshold is determined by an external resistor connected from the SET1 pin to GND. OC response is set by the resistance value of R14 (connected between ISTART/CLMODE pin to GND). Refer to the [MAX17617A data sheet](#) to configure other OC responses. The EV kit is configured for auto-retry. JP2 allows the user to select pin 20 between operating as PGOOD or monitoring the die temperature (TJ). A resistor divider connected to PLIM sets the Power Limit. Use R23 for input power limiting or use R27 for output power limiting. The EV kit is populated for a 24W input power limit.

Input Power Supply

The EV kit is powered by a 5V to 30V power supply connected between V_{IN} and GND. The EV kit features a 77.4 V_C TVS at the input terminals, which limits the surge voltages and enhances protection.

Power Supply for Logic Pins

A 3.3V Buck Regulator provides a 3.3V rail to connect the PG pin to a pull-up resistor. The 3.3V Rail also supplies power for logic chips to operate LED indicators.

Enable

The MAX17617A internally pulls up to 1.5V when left floating. Use Jumper JP1 to connect the EN pin to either a pull-up resistor in the EN position or to GND in the DISABLE position.

Table 2. EN (JP1) Settings

JUMPER	SHUNT POSITION	SWITCH STATUS
JP1	ENABLE*	ON
	DISABLE	OFF

*Default Position

PGOOD/TJ pin 20

MAX17617A pin 20 (PGOOD/TJ) can be configured to either operate as an open-drain power good indicator or monitor die temperature. The PGOOD position connects pin 20 through a 100k Ω resistor to the 3.3V rail. The TJ position connects pin 20 through a 10k Ω resistor to GND. Connecting pin 20 to GND with a 10k Ω to 20k Ω will monitor the internal die temperature. TJ provides 652mV at 25°C and 854mV at +125°C, with a temperature slope of 2mV/°C. Refer to the [MAX17617A data sheet](#) for more details.

Table 3. PGOOD/TJ (JP2) Settings

JUMPER	SHUNT POSITION	SWITCH STATUS
JP2	PGOOD*	PGOOD indicator
	TJ	Die Temperature

*Default Position

Undervoltage Lockout Threshold (UVLO)

Input undervoltage lockout is set using a voltage divider (R12 and R13) connected to the UVLO pin. Output undervoltage sensing is set using a voltage divider (R19 and R20) connected to the OUTUV pin. The EV kit is set for approximately 5V input UVLO and 5V output UV sensing. Refer to the [MAX17617A data sheet](#) for more details.

Overvoltage Surge Protection

The overvoltage surge protection threshold is set using a voltage divider (R21 and R22). The EV kit OV Surge Protection is set for approximately 28V. Refer to the [MAX17617A data sheet](#) for more details.

Current-Limit Threshold

The MAX17617AEVKIT# EV kit connects SETI to GND through a 7.32kΩ resistor (R1). The EV kit is set for approximately 2A current limit. Use the following equation to calculate R_{SETI} for a different current-limit threshold.

$$R_{SETI} k\Omega = \frac{14910}{I_{LIM} (mA)}$$

Where I_{LIM} is the desired current limit in mA. Refer to the [MAX17617A data sheet](#) for more details.

Current-Limit Type Select

The three modes of current limit are continuous, auto-retry, and latch-off. Program the mode by using R14. Different values of resistors select both the current limit type as well as the startup inrush control level. Refer to the [MAX17617A data sheet](#) for more details.

Power Limit

A resistor divider connected to PLIM sets the power limit. Use R23 for input power limiting or use R27 for output power limiting. The EV kit is populated for a 24W input power limit. The power limit feature is disabled by connecting the PLIM pin to GND. Refer to the [MAX17617A data sheet](#) for more details.

Input Capacitance

The MAX17617AEVKIT# EV kit demonstrates a simple possible solution for protection circuitry. C12 and C14 placeholders allow additional input capacitance to be easily added to help with sudden transients.

Output Clamping Diodes

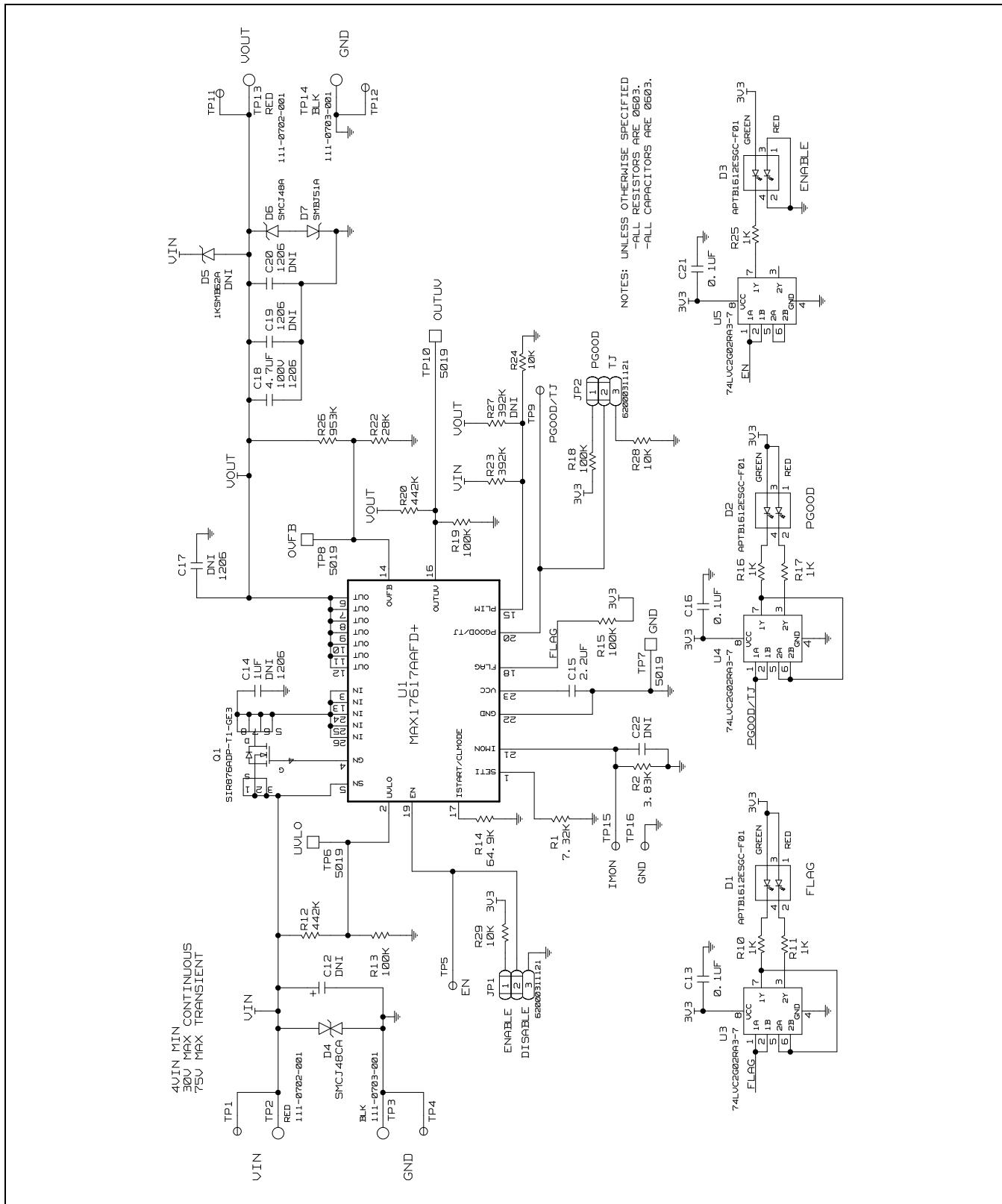
D6 and D7 provide output clamping for both positive and negative transients from events like hot plugging. Clamping rating for some diodes can be imprecise, and consideration for negative transients should keep $V_{IN} - V_{OUT}$ less than 80V. If reverse conduction protection is not required, D5 can be installed to clamp positive voltage transients back to V_{IN} .

Ordering Information

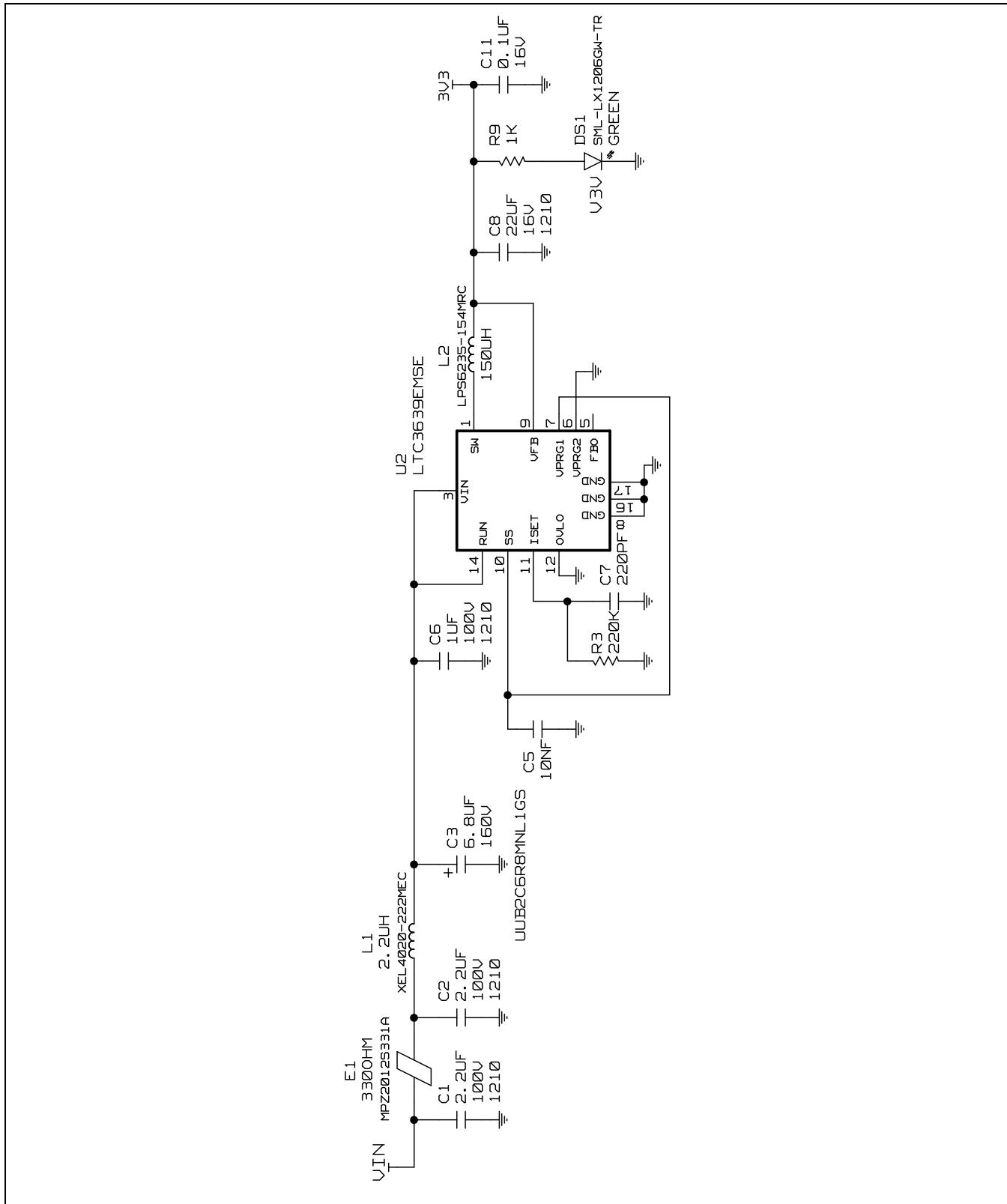
PART	TYPE
MAX17617AEVKIT#	EV kit

#Denotes RoHS-compliant.

MAX17617AEVKIT# EV kit Schematic



MAX17617AEVKIT# EV kit Schematic (continued)



Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	09/24	Initial release	—

Notes

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