

ABRIDGED DATA SHEET

MAX20078 Evaluation Kit

Evaluates: MAX20078

General Description

The MAX20078 evaluation kit (EV kit) provides a proven design to evaluate the MAX20078 synchronous buck controller for high-power, high-brightness (HB) LED drivers. The EV kit is set up as a buck LED driver and operates from a 4.5V to 65V DC supply voltage. The EV kit is configured to deliver up to 2A to one string of LEDs. The total voltage of the string can vary from 3V to 55V. The anode of the LED string should be connected to the LED+ terminal and the cathode of the LED string connected to PGND.

Features

- 4.5V to 65V Input Voltage
- Drives 1 to 16 LEDs
- 0A to 2A LED Current
- Demonstrates UVLO, Output Short Protection, and Overload
- Demonstrates Current-Limit and Thermal-Shutdown Features
- Proven PCB Layout and Thermal Design
- Fully Assembled and Tested

Quick Start

Required Equipment

- MAX20078 EV kit
- 5V to 65V, 4A DC power supply
- Two digital voltmeters (DVM1, DVM2)
- Series-connected HB LED string rated to no less than 2.5A
- Current probe to measure the HB LED current
- Potentiometer
- Small flat-blade screwdriver to turn the potentiometer wiper-adjustment pin

Procedure

The 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 complete.**

- 1) Verify that all jumpers (J1, JU1–JU4) are in their default positions, as shown in [Table 1](#).
- 2) Connect the HB LED string anode to the LED+ PCB pad and the cathode to the PGND PCB pad.
- 3) Connect DVM1 across the LED+ and PGND PCB pads.
- 4) Connect DVM2 across the REFI and AGND test points.
- 5) Connect the power supply to the VIN PCB pad and the power supply's ground to the PGND PCB pad.
- 6) Clip the current probe across the wire connecting the HB LED string to the EV kit.
- 7) Turn on the power supply and set to a voltage greater than the maximum HB LED string voltage, but less than the 65V maximum input voltage.
- 8) Use the screwdriver to turn the potentiometer until DVM2 reads 1.2V.
- 9) Measure the HB LED current using the current probe and verify that current is 2A.
- 10) Verify DVM1 shows the expected LED string voltage.
- 11) Use the screwdriver to turn the potentiometer until DVM2 reads 0.7V.
- 12) Measure the HB LED current using the current probe and verify that current is 1A.

Ordering Information appears at end of data sheet.

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Pulse-Dimming Input (DIM)

The EV kit demonstrates the PWM dimming feature of the buck controller. Install a shunt across pins 1-2 on JU3; JU3 pins 2-3 should be open. Connect a PWM signal to the PWM PCB pad. Vary the duty cycle to increase or decrease the intensity of the HB LED string. The DIM input of the device has a 2V (max) rising threshold and a 0.8V (min) falling threshold, and is compatible with 3.3V and 5V logic-level signals. The DIM input is pulled up to V_{CC} through the external 10k Ω resistor on the EV kit when JU3 is installed across pins 1-2. The DIM input can also be pulled up to V_{IN} by moving the jumper on JU3 to pins 2-3 (see [Table 1](#) for jumper descriptions).

Fault Indicator

The EV kit demonstrates the fault-protection features of the buck controller, which offer shorted-LED, open-LED, and overtemperature protection. The \overline{FLT} output is an open-drain, active-low fault indicator. Refer to the \overline{FLT} *Flag* section in the MAX20078 IC data sheet for more information.

Current Monitor Output

The EV kit also demonstrates the current-monitor output feature of the buck controller. Refer to the *Current Monitor* section in the MAX20078 IC data sheet for more information.

External V_{CC} input

The EV kit demonstrates operation of the buck controller with an external V_{CC} input. In this case, the internal LDO is not used. Move the shunt to pins 1-2 on J1 (the IN and V_{CC} pins of the buck controller are shorted together). Apply an external power supply between 4.6V and 5.5V on the VCC PCB pad to allow switching of the device.

HUD Applications

The EV kit can also be tested for HUD applications. Remove capacitor C17 and any pulsating signals on the DIM PCB pad and install a shunt across pins 1-2 on JU2. The output capacitor is now reduced to 0.1 μ F. The LEDs can be turned on and off extremely fast by applying the PWM signal on the HUD_PWM PCB pad instead of the DIM PCB pad. The jumper on JU3 should be placed across pins 2-3. The DIM input of the device can be synchronized to the leading edge of the HUD_PWM signal by installing a jumper across pins 1-2 on JU4 (see [Table 1](#) for jumper descriptions).

Ordering Information

PART	TYPE
MAX20078EVKIT#	EV Kit

#Denotes RoHS compliant.