

## MAX20075/MAX20076 Evaluation Kits

### General Description

The MAX20075 and MAX20076 evaluation kits (EV kit) provide a proven design to evaluate the MAX20075/MAX20076/MAX25276 2.1MHz high-voltage mini-buck converters in a 12-pin TDFN package. All components are rated for the automotive temperature range. Various test points and jumpers are included for evaluation.

The EV kit comes with a MAX2007\_DATCA/V+ installed, but can also be used to evaluate all other MAX20075/MAX20076/MAX25276 variants with minimal U1 component changes.

### Benefits and Features

- 3.5V to 36V Input Supply Range
- 5V or 3.3V Fixed Output Voltage, or Adjustable Between 1V and 10V
- Delivers Up to 0.6A/1.2A Output Current
- Frequency-Synchronization Input
- Enable Input
- Voltage-Monitoring PGOOD Output
- Proven PCB Layout
- Fully Assembled and Tested

### Quick Start

#### Required Equipment

- MAX20075 or MAX20076 EV kit
- 3.5V to 36V, 2A power supply
- Voltmeter
- Electronic load

**Ordering Information** appears at end of data sheet.

## Evaluate: MAX20075/MAX20075D/ MAX20076/MAX20076D/MAX20076E/ MAX25276/MAX25276D

### Procedure

The EV kit is fully assembled and tested, follow the steps below to activate the board. **Caution: Do not turn on the power supply until all connections are completed.**

- 1) Verify that all jumpers are in their default positions, as shown in [Table 1](#).
- 2) Connect the positive and negative terminals of the power supply to the SUP and GND test pads, respectively.
- 3) Connect the positive terminal of the voltmeter to OUT, and the negative terminal to GND2.
- 4) Set the power supply to 14V and 2A current limit. Turn on the power supply.
- 5) With the PU and LED jumpers shorted, the green LED should light up. The voltmeter should display an output voltage of 5V.

### Additional Evaluation

- 6) Connect the positive and negative terminals of an electronic load to OUT and GND, respectively.
- 7) Set the electronic load to 100mA or use an equivalent resistive load. The resistive load is calculated based on 5V output and should be approximately 50Ω. If using a resistor load, make sure it can handle 0.5W.
- 8) Turn on the power supply and electronic load. Verify that OUT is 5V.

**Table 1. Default Jumper Settings**

| JUMPER  | SHUNT POSITION | FUNCTION  |
|---------|----------------|---|
| EN      | Middle-ON      | Buck controller enabled                                       |
| SPS     | Middle-OFF     | Spread spectrum disabled                                      |
| PU, LED | Installed      | PGOOD pulls up to V <sub>BIAS</sub> when OUT is in regulation |
| SYNC    | Middle-FPWM    | Forced-PWM mode   |

## MAX20075/MAX20076 Evaluation Kits

### Detailed Description

The MAX20075 and MAX20076 EV kits provide a proven layout for the MAX20075/MAX20075D/MAX20076/MAX20076D/MAX20076E/MAX25276/MAX25276D 2.1MHz synchronous buck regulator. The device accepts input voltages as high as 36V and delivers up to 0.6A and 1.2A. The EV kits can handle an input-supply transient up to 42V. Various test points are included for evaluation.

### Switching Frequency/ External Synchronization

The devices can operate in two modes: forced-PWM or skip. Skip mode has better efficiency for light-load conditions. When SYNC is pulled low, the device operates in skip mode for light loads and in PWM mode for larger loads. When SYNC is pulled high, the device is forced to operate in PWM across all load conditions.

SYNC can be used to synchronize with other supplies if a clock source is present. The device is forced to operate in PWM when SYNC is connected to a clock source.

### Buck Output Monitoring (PGOOD)

The EV kits provide a power-good output test point (PGOOD) to monitor the status of the buck output (OUT). PGOOD is low impedance when the output voltage is in regulation. PGOOD is high impedance when the output voltage drops below 6.5% (typ) of its nominal regulated voltage.

To obtain a logic signal, pull up PGOOD to  $V_{BIAS}$  by installing shunts on jumpers PU and LED.

## Evaluate: MAX20075/MAX20075D/ MAX20076/MAX20076D/MAX20076E/ MAX25276/MAX25276D

### Evaluating the Other Variants

The devices are available in fixed 5V, 3.3V, and 5.147V outputs. The EV kits come installed with the 5V output version. The other parts can be swapped with the 5V part without changing other components.

### Setting the Output Voltage in Buck Converters

To externally adjust the output voltage (OUT) between 3V and 10V, remove R1 and install a 0Ω resistor on R4. Place appropriate resistors in positions R5 and R6 according to the following equation:

$$R5 = R6 \left[ \left( \frac{V_{OUT}}{V_{FB}} \right) - 1 \right]$$

where  $V_{FB} = 1V$  (typ).

Use an external resistor-divider with the MAX2007\_ATCC for output voltages between 1V and 3V.

### Ordering Information

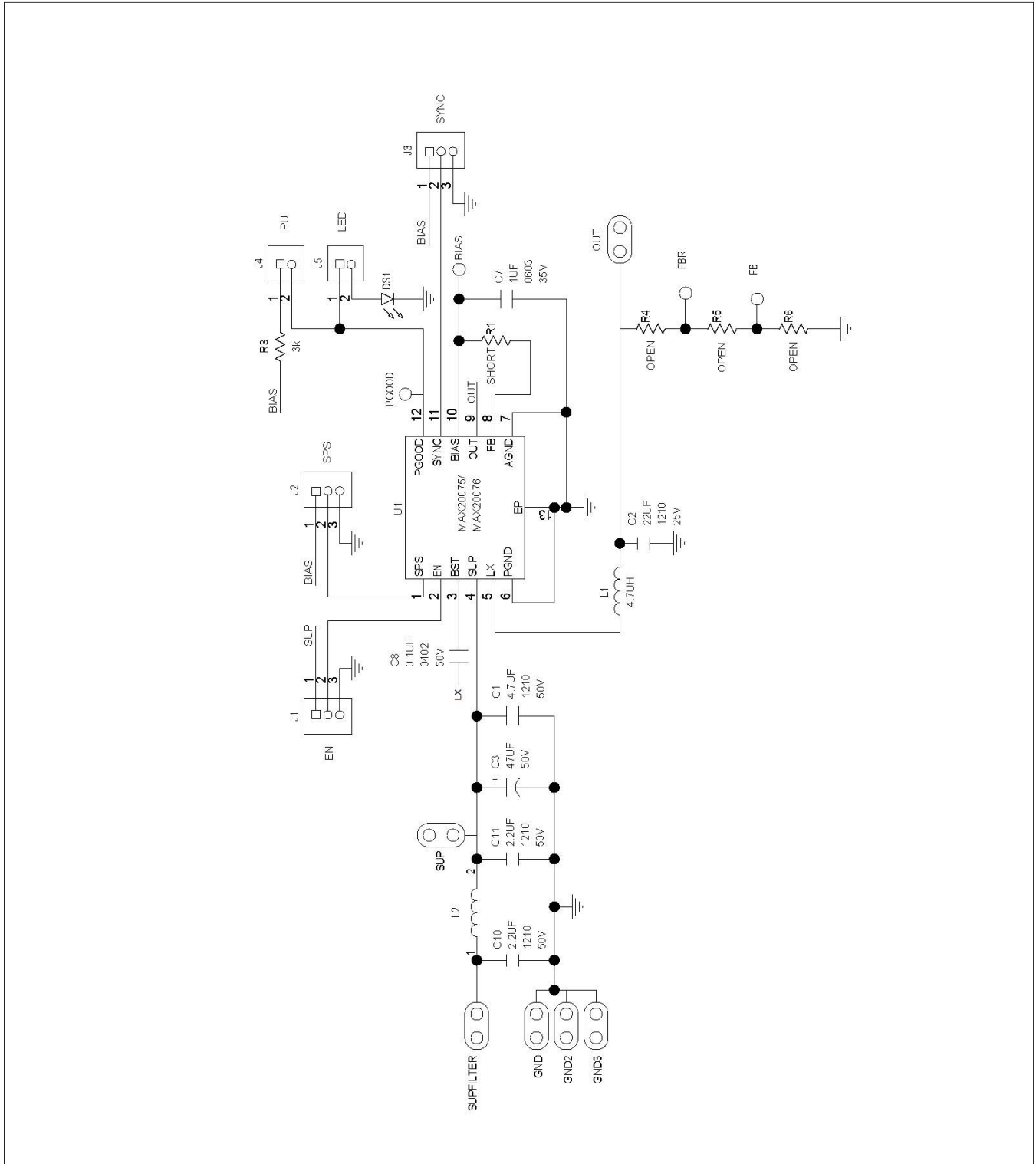
| PART           | TYPE   |
|----------------|--------|
| MAX20075EVKIT# | EV Kit |
| MAX20076EVKIT# | EV Kit |

#Denotes RoHS compliant.

### MAX20075/MAX20076 EV Kit Bill of Materials

| DESIGNATION   | QTY | DESCRIPTION   |
|---------------|-----|---|
| C1            | 1   | 4.7uF ±10%, 50V X7R ceramic capacitors (1210)<br>TDK CGA6P3X7R1H475K250AB           |
| C2            | 1   | 22uF ±10%, 25V X7R ceramic capacitor (1210)<br>Murata GRM32ER71E226KE15L            |
| C3            | 1   | 47uF, 50V aluminum electrolytic capacitor (8.3mm x 8.3mm)<br>Panasonic EEE-FK1H470P |
| C7            | 1   | 1uF ±10%, 35V X7R ceramic capacitor (0603)<br>TDK CGA3E1X7R1V105K080AC              |
| C8            | 1   | 0.1uF ±10% 50V X7R ceramic capacitor (0402)<br>TDK CGA2B3X7R1H104K                  |
| C10, C11      | 2   | 2.2uF ±10% 50V X7R ceramic capacitor (1210)<br>TDK CGA6M3X7R1H225K200AB             |
| DS1           | 1   | Green LED (0603)<br>Lite-On Electronics LTST-C191KGKT                               |
| EN, SPS, SYNC | 3   | 3-pin headers   |
| L1            | 1   | 4.7uH Power Inductor (R=52.2mOhms, I=2A, 4mm x 4mm)<br>Coilcraft XFL4020-472ME      |
| L2            | 1   | 1A Ferrite Bead (1206)<br>Würth 742792141   |
| PU, LED       | 2   | 2-pin headers   |
| R1            | 1   | 0Ω resistor (0603)  |
| R3            | 4   | 3kΩ ±5% resistor (0603)   |
| —             | 5   | Shunts  |
| U1            | 1   | Automotive Mini-Buck (12-pin TDFN)<br>Maxim MAX20075DATCA/V+ or MAX20076DATCA/V+    |
| —             | 1   | PCB: MAX20075/76 Evaluation Kit   |

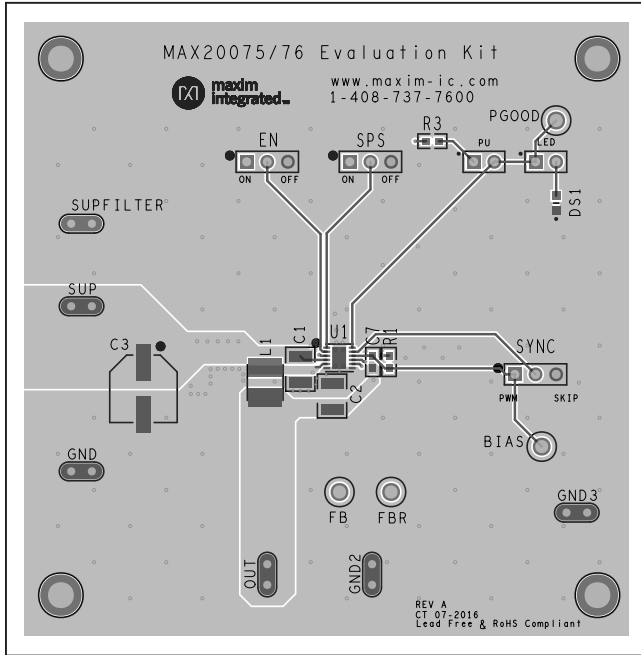
MAX20075/MAX20076 EV Kit Schematic



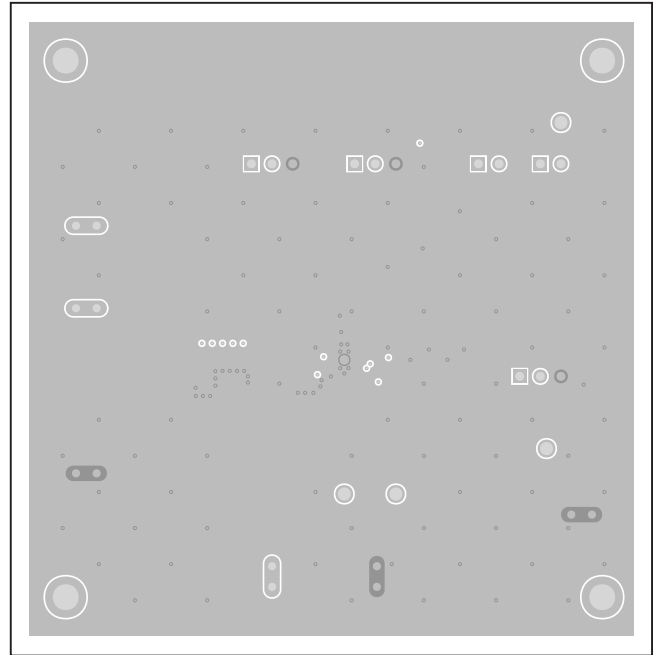
# MAX20075/MAX20076 Evaluation Kits

# Evaluate: MAX20075/MAX20075D/ MAX20076/MAX20076D/MAX20076E/ MAX25276/MAX25276D

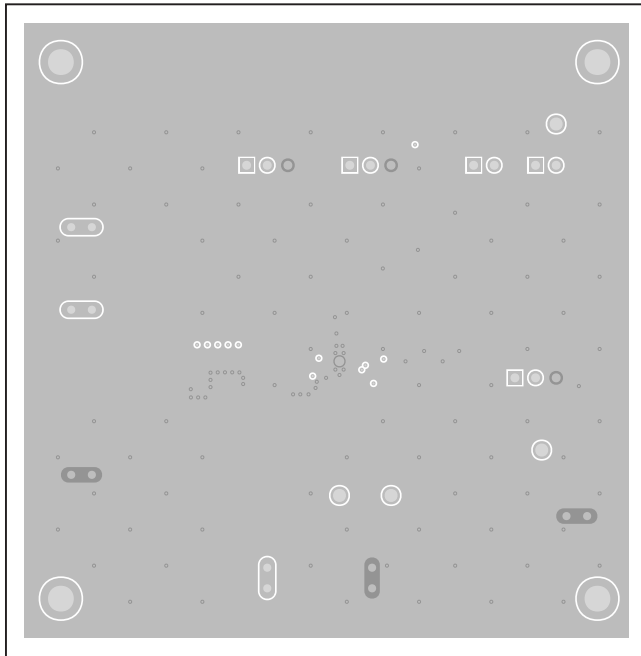
## MAX20075/MAX20076 EV Kit PCB Layouts



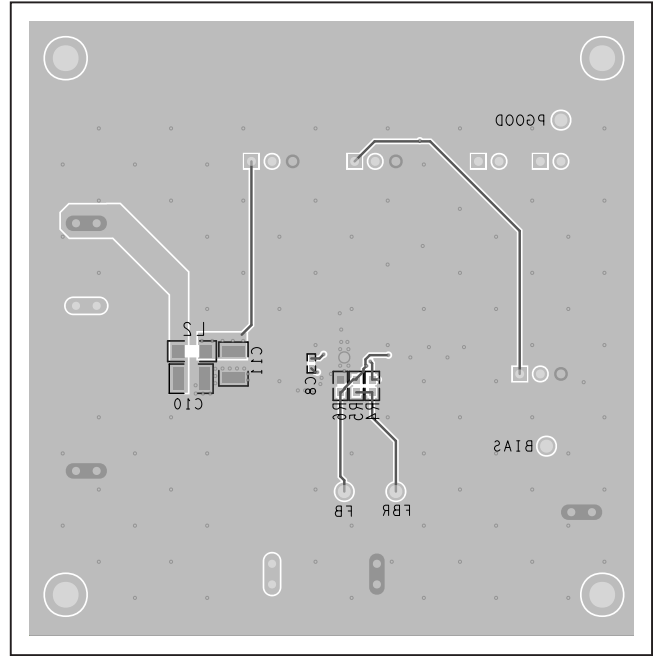
MAX20075/76 EV Kit Component Placement Guide—Top



MAX20075/76 EV Kit PCB Layout—Internal Layer 3



MAX20075/76 EV Kit PCB Layout—Internal Layer 2



MAX20075/76 EV Kit Component Placement Guide—Bottom

MAX20075/MAX20076  
Evaluation Kits

Evaluate: MAX20075/MAX20075D/  
MAX20076/MAX20076D/MAX20076E/  
MAX25276/MAX25276D

## Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION   | PAGES CHANGED |
|-----------------|---------------|---|---------------|
| 0               | 1/17          | Initial release   | —             |
| 1               | 2/19          | Updated to add MAX25276   | 1-5           |
| 2               | 10/19         | Updated to add MAX20075D/MAX20076D/MAX25276D to parts evaluated | 1-5           |
| 3               | 2/20          | Added MAX20076E   | 1-5           |

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