General Description

The MAX20010 evaluation kit (EV kit) demonstrates the MAX20010 automotive single 6A step-down converter. The EV kit operates over an input range of 3V to 5.5V, with the output set for 1V and up to 6A load.

Features

- Differential Remote-Voltage Sensing
- 3V to 5.5V Input Supply Range
- I²C-Controlled 0.5V to 1.5875V Output Voltage Range
- 2.2MHz Operation
- ±2% Output-Voltage Accuracy
- Power-Good Output
- Current-Mode, Forced-PWM, and Skip Operation
- Proven PCB Layout
- Fully Assembled and Tested

Quick Start

Recommended Equipment

- MAX20010 EV kit
- 6V, 3A DC power supply
- Electronic load capable of 6A
- Digital voltmeter (DVM)

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

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on supplies until all connections are completed**.

1) Set the power supply to 5V. Disable the power supply.
2) Verify that jumper JU2 has a shunt across pins 1-2 and jumpers JU1 and JU3 are open.
3) Connect the power supply between the PVDD and nearest PGND test points.
4) Connect the electronic load between the SD0 and nearest PGND test points.
5) Connect the DVM between the SD0 and nearest PGND test points.
6) Turn on the power supply.
7) Enable the electronic load.
8) Verify that the voltage at the SDO output pad is approximately 1V. Disable the power supply.

Detailed Description of Hardware

Enable (EN)

Place a shunt across pins 1-2 on jumper JU2 for normal operation. To place the device into shutdown mode, place the shunt across pins 2-3 on JU2. See Table 1 for jumper settings.

Table 1. EN Configuration (JU1)

SHUNT POSITION	DESCRIPTION
Pins 1-2*	Connects the EN pin to the voltage at PVDD for normal operation
Pins 2-3	Connects the EN pin to ground to enter shutdown mode

**Default position.*

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Synchronization Input/Output (SYNC)

The EV kit features a SYNC connection that allows for synchronization input or output. The function is set by the SO[1:0] bit, as defined in the MAX20010C/MAX20010D IC data sheet. Jumper JU3 connects a pullup resistor to PVDD. See Table 2 for bit description.

I²C Slave Address (ADDR)

The EV kit provides jumper JU1 to set the ADDR register. Pulldown resistor R4 is used to set ADDR = 0. If ADDR = 1 is desired, then set a shunt across pins 1-2 on jumper JU1. Refer to Table 1 in the MAX20010C/MAX20010D IC data sheet for more details on I²C slave address.

Power-Good Output ($\overline{PGOOD}$)

The EV kit provides a PGOOD test point to monitor the status of the device output. PGOOD asserts low when V_{SDO} exceeds the PG_OV and PG_UV thresholds. PG_is deasserted after a UV/OV propagation delay if the output voltage is outside the PG_UV/OV thresholds.

Table 2. SYNC Settings

BIT	BIT DESCRIPTION
SO[1:0]	**SYNC I/O Select** 00 – Master: Input, rising edge starts cycle 01 – Master: Input, falling edge starts cycle 10 – Master: Output, falling edge starts cycle 11 – Unused

Output Voltage

Output voltage is adjustable by changing the VID registers. Refer to Table 9 in the MAX20010C/MAX20010D IC data sheet. When increasing the output voltage, be aware of the preset maximum allowed voltage. The maximum can be adjusted with the VIDMAX register. Refer to Table 4 in the MAX20010C/MAX20010D IC data sheet.

PCB Layout Recommendations

Careful PCB layout is critical to performance. Place the input capacitor (C5) next to the IC (see Figure 2). Route the sensing signals (RS_) away from the high-speed switching nodes.

Component List

DESIGNATION	QTY	DESCRIPTION
C1–C3	3	47µF ±10%, 6.3V X7R ceramic capacitors (1210) Murata GCM32ER70J476K
C4	0	Not installed, ceramic capacitors
C5	1	10µF ±10%, 16V X7R ceramic capacitor (1206) TDK C3216X7R1C106K
C6	1	4.7µF ±10%, 16V X7R ceramic capacitor (0805) Murata GCM21BR71C475K
C7	1	68µF ±20%, 10V, aluminum electrolytic capacitor Murata ECASD61A686M015K00
C8	1	1µF ±10%, 50V X7R ceramic capacitor (0805) TDK C2012X7R1H105K
J1	1	20-pin (2 x 10) right-angle receptacle, 0.1in
JU1, JU2	2	3-pin headers, 2.54mm
JU3	1	2-pin header, 2.54mm
L1	1	0.22µH inductor Coilcraft XAL4020-221ME
R1	1	0Ω ±1% resistor (0402)
R2	1	100Ω ±1% resistor (0402)
R3, R6–R9	5	1kΩ ±1% resistors (0402)
R4	1	100kΩ ±1% resistor (0402)
R5	1	10kΩ ±5% resistor (0402)
R10	1	100Ω ±5% resistor (0402)
U1	1	Automotive step-down converter (20 TQFN-EP*) Maxim MAX20010DATPN/V+
—	1	0.25in U-shaped wire loop, 20G plated solid copper
—	1	Shunts
—	1	PCB: MAX20010 EVALUATION KIT

**EP = Exposed pad.*
/V denotes an automotive qualified part

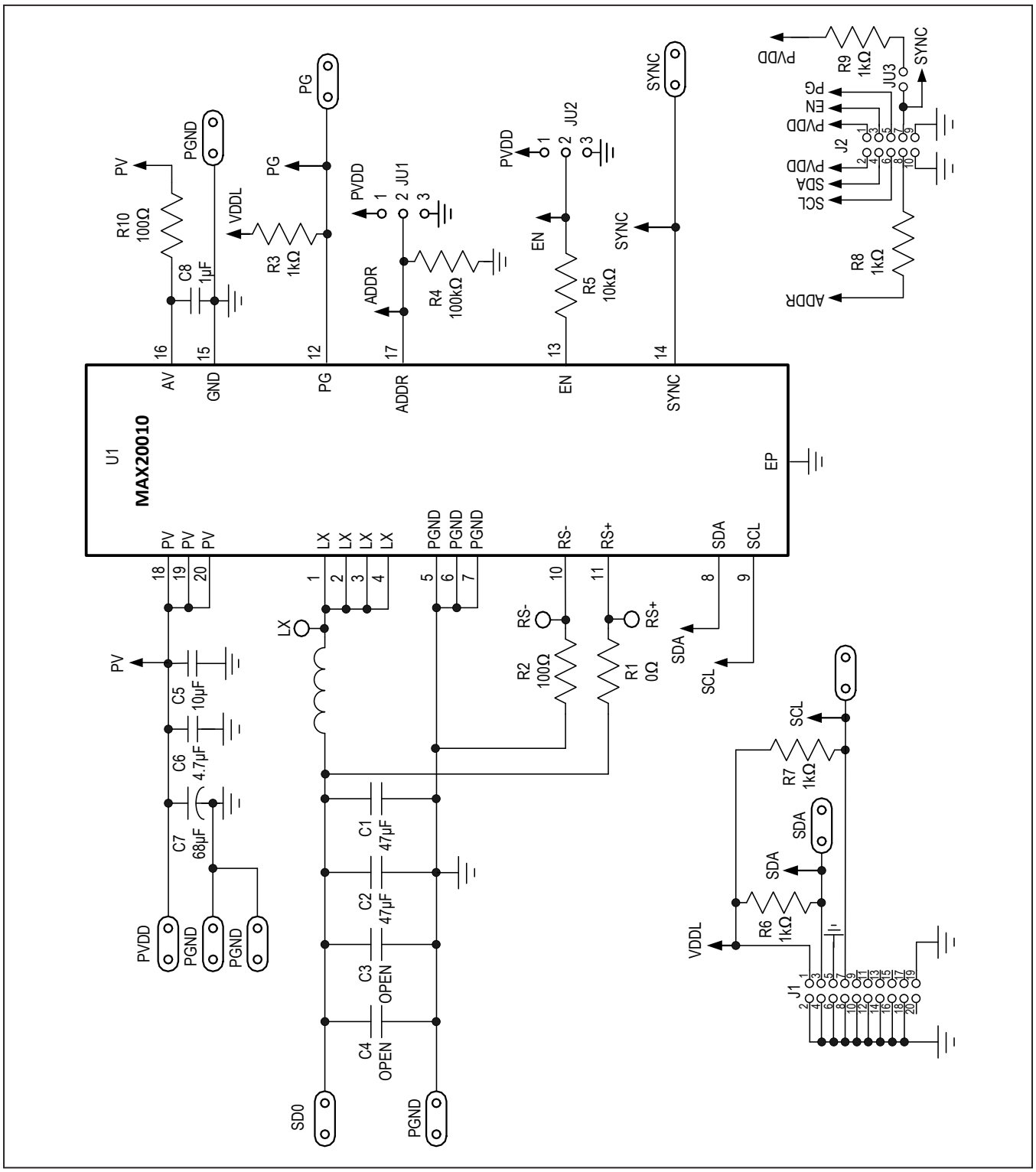


Figure 1. MAX20010 EV Kit Schematic

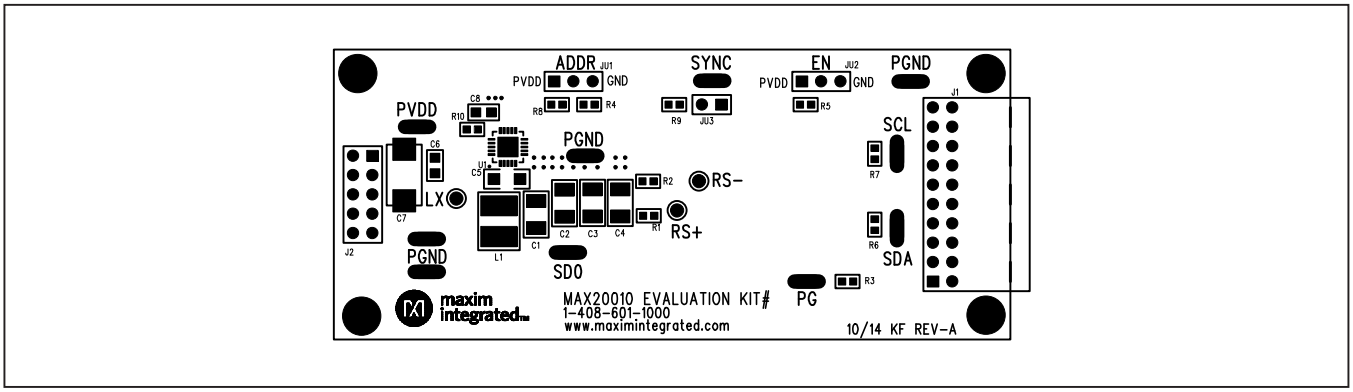


Figure 2. MAX20010 EV Kit Component Placement Guide—Component Side

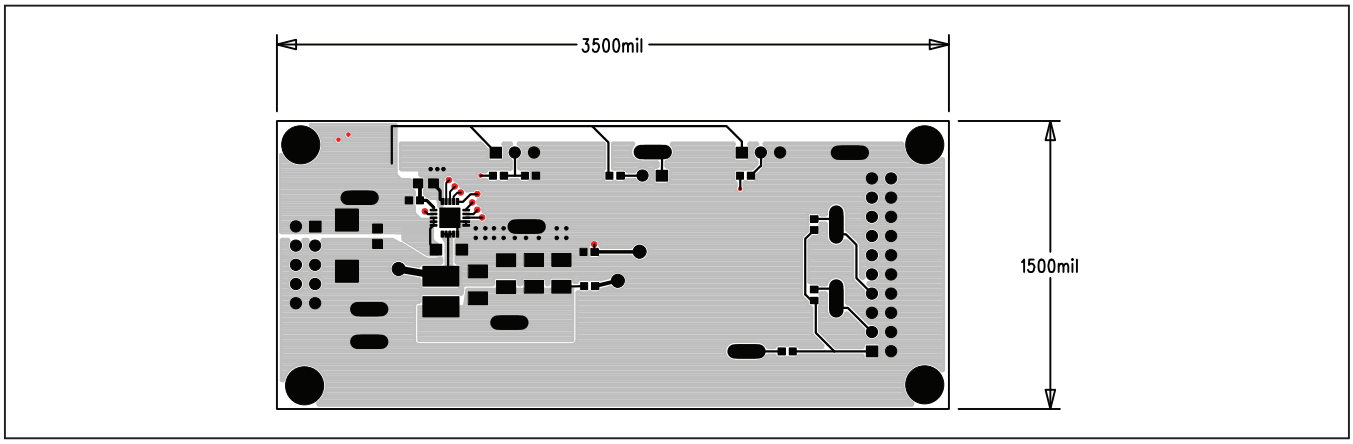


Figure 3. MAX20010 EV Kit PCB Layout—Component Side

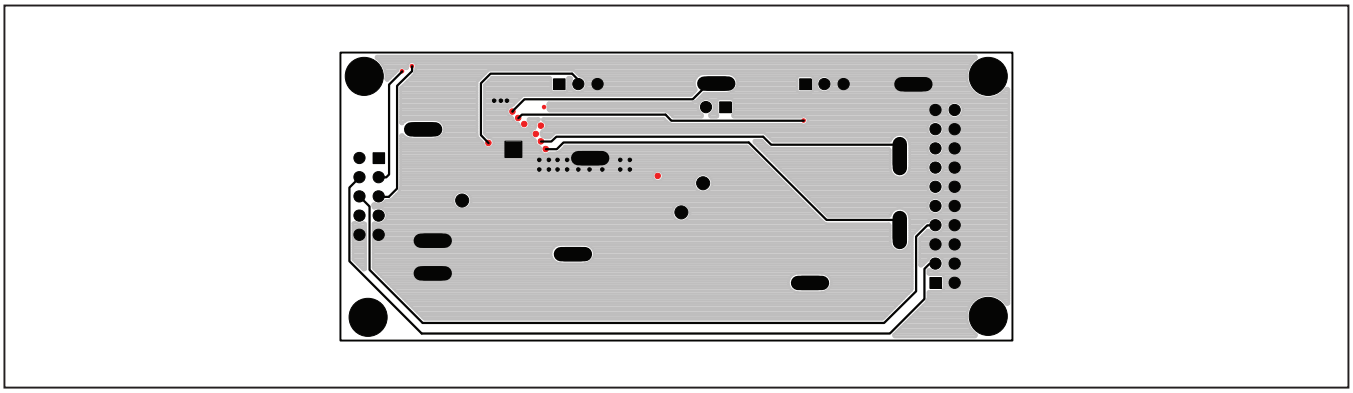


Figure 4. MAX20010 EV Kit PCB Layout—Layer 2

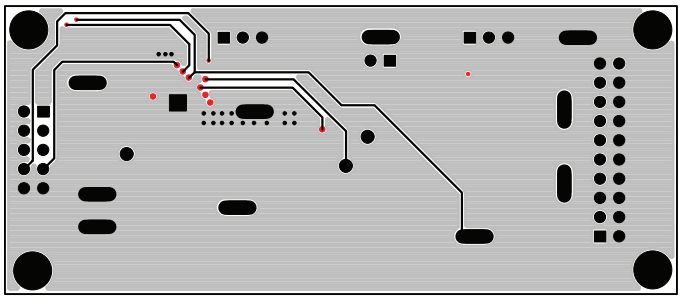


Figure 5. MAX20010 EV Kit PCB Layout—Layer 3

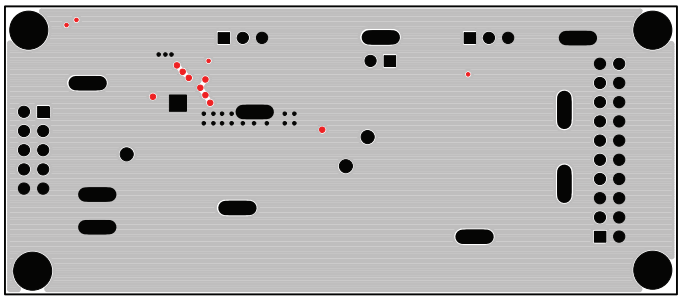


Figure 6. MAX20010 EV Kit PCB Layout—Solder Side

Ordering Information

PART	TYPE
MAX20010EVKIT#	EV Kit

#Denotes RoHS compliant.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	4/15	Initial release	—
1	6/15	Updated Figure 1	3
2	11/17	Updated the *Component List* (C1, C2, C3, C4, and U1)	2
3	3/19	Updated references to MAX20010 to indicate that EV kit evaluates MAX20010C and MAX20010D	1–5
4	5/19	Updated *General Description* and *Quick Start*	1

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