

## General Description

The MAX20029B EV kit is a fully assembled and tested PCB that demonstrates the capabilities of the MAX20029B power-management IC (PMIC), which comprises four low-voltage step-down converters. The IC operates at a 3V to 5.5V input supply voltage, regulates to a 1V to 4V voltage range, and delivers up to 3A of current, while OUT3 and OUT4 deliver up to 1.5A. The converters are high-frequency switchers, operating at 2.2MHz. The high switching frequency allows for reduced component values and sizes, including a single ceramic output capacitor on each rail. All channels have independent undervoltage/overvoltage comparators at both input and output, current limiting, and fault-flag outputs. The EV kit ships fully assembled and tested, ready for immediate evaluation of the IC.

## Benefits and Features

- 3.0V to 5.5V Input Voltage Range
- 1.0V to 4.0V Output Voltages Range
  - Resistive Dividers Used to Set Appropriate Output Voltage
- High Switching Frequency of 2.2MHz
  - Two Channels Operate 180° Out-of-Phase
- Individual Enable and Reset Connections Available
- Loop Measurements Ready on All Channels
- Overtemperature and Short-Circuit Protection
- Proven PCB Layout
- Fully Assembled and Tested

## Quick Start

### Required Equipment

- MAX20029B EV kit
- 5V, 3A power supply
- Appropriate resistive loads (depending on selected output voltage and current capability), or electronic loads for each of the outputs
- Voltmeter

### Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation:

- 1) Connect a 5V power supply to VSUP (J1) and PGND (J2). Activate the supply.
- 2) Verify that PG1–PG4 are at logic-low levels (J14, J34, and J44).
- 3) Populate jumpers (J13, J33, and J43) to activate all/selected outputs.
- 4) Measure the voltages on the enabled outputs.
- 5) Connect appropriate loads to all/selected outputs
- 6) Verify that the output voltages remain within specification.
- 7) Verify that PG1–PG4 are at logic-high levels.

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

## Detailed Description of Hardware

### EV Kit Interface

The large connectors, VSUP (J1) and PGND (J2), are the main input supply points. Connect a 5V power supply across these pins. Outputs OUTS1–OUTS4 have large connectors for the output and GND nodes (labeled VOUT1–VOUT4, respectively). Each channel has independent enable and power-good test points. Installing jumpers at the dual headers marked EN1–EN4 activates the respective channel; the power-good signal for that channel can be accessed through the PG1–PG4 pins. Additional GND test points (J4–J7) are provided for ease of measurement.

### Evaluating IC Capabilities

The IC installed on the board is a MAX20029BATIA/V+. It has its three outputs set through resistor-dividers on the board at  $V_{OUT1} = 1.2V$ ,  $V_{OUT3} = 1.8V$ , and  $V_{OUT4} = 3.3V$ , with 3A current limit on  $V_{OUT1}$ , and 1.5A current limit on the remaining two.

If the user wants to test a version of the chip with internally fixed output voltages, they can remove the appropriate resistors (R12, R32, R42), and replace the existing resistors (R11, R31, and R41) with 0 $\Omega$  values to create a direct feedback connection from the VOUT\_ nodes to the OUTS\_ pins.

An external square wave can be applied to the SYNC pin (J3) to cause the IC to switch at a different frequency. Maxim suggests using a 50% duty cycle for the square wave. The supported switching frequency ( $f_{SW}$ ) range is from 1.7MHz up to 2.5MHz.

Three-pin headers J10, J30, and J40 are provided for ease-of-loop measurements (for each of the regulators).

### Ordering Information

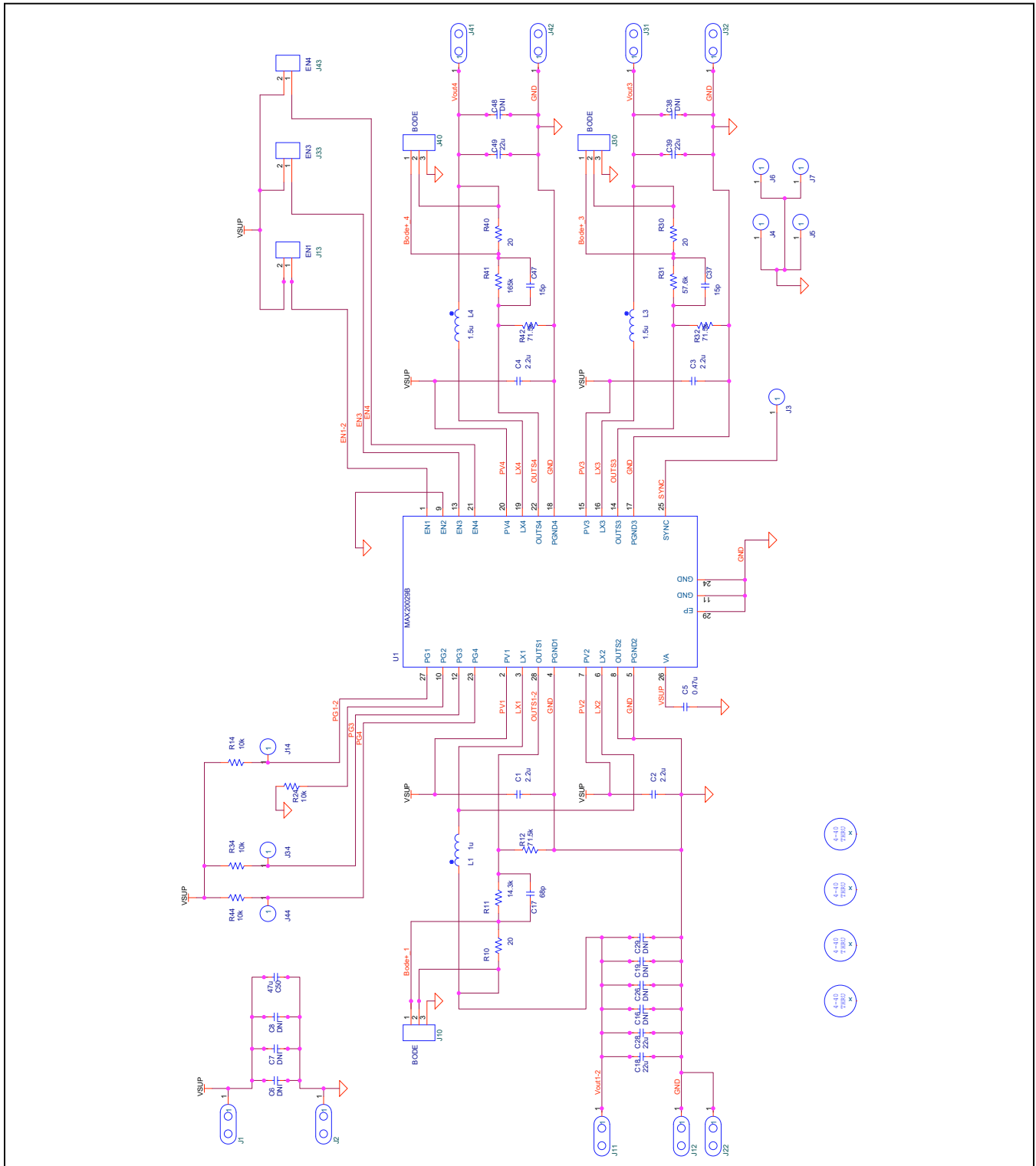
PART	TYPE
MAX20029BEVKIT#	EV Kit

#Denotes RoHS compliant.

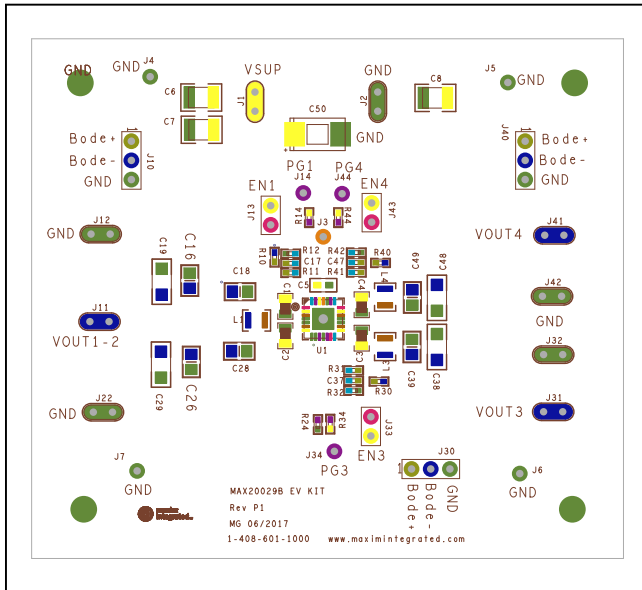
## MAX20029B EV Kit Bill of Materials

REFERENCE DESIGNATORS	QTY.	DESCRIPTION	MFG. PART NO.
C1, C2, C3, C4	4	Capacitor, 2.2 $\mu$ F, 25V, ceramic, X7R, 0805	Murata GRM21BR71E225KA73
C5	1	Capacitor, 0.47 $\mu$ F, 16V, ceramic, X7R, 0603	Murata GCM188R71C474KA55D
C6, C7	7	Capacitor, 22 $\mu$ F, 10V, ceramic, X7R, 1210	Murata GCM32ER71A226ME12L
C8, C16, C19, C26, C29, C38, C48	7	not populated	—
C17	1	Capacitor, 68pF, 50V, ceramic, C0G/NP0, 0402	Murata GCM1555C1H680JA16D
C18, C28, C39, C49	4	Capacitor, 22 $\mu$ F, 10V, ceramic, X7T, 0805	Murata GRM21BD71A226ME44
C37	1	Capacitor, 15pF, 50V, ceramic, C0G/NP0, 0402	Murata GCM1555C1H150JA16D
C47	1	Capacitor, 15pF, 50V, ceramic, C0G/NP0, 0402	Murata GCM1555C1H150JA16D
C50	2	Capacitor, 220 $\mu$ F, Tant Poly, 6.3V, 2917	Panasonic 6TPF220M5L
L1	1	inductor, 1 $\mu$ H, thin film, 2.5mm x 2.0mm	TDK TFM252012ALMA1R0MTAA
L3, L4	2	inductor, 1.5 $\mu$ H, thin film, 2.5mm x 2.0mm	TDK TFM252012ALMA1R5MTAA
R10, R30, R40	4	Resistor, 20 Ohms, 1%, 0402	RC0402FR-0720RL or similar
R11	1	Resistor, 14.3 kOhm, 1%, 0402	ERJ-2RKF1432X or similar
R12, R32, R42	3	Resistor, 71.5 kOhm, 1%, 0402	ERJ-2RKF7152X or similar
R14, R24, R34, R44	4	Resistor, 10 kOhm, 1%, 0402	RC0402FR-0710KL or similar
R31	1	Resistor, 57.6 kOhm, 1%, 0402	ERJ-2RKF5762X or similar
R41	1	Resistor, 165 kOhm, 1%, 0402	ERJ-2RKF1653X or similar
U1	1	MAX20029B PMIC, quad output, step-down, low voltage	MAX20029BATIA/V+
—	1	PCB: MAX20029B EV KIT	MAX20029BEVKIT#

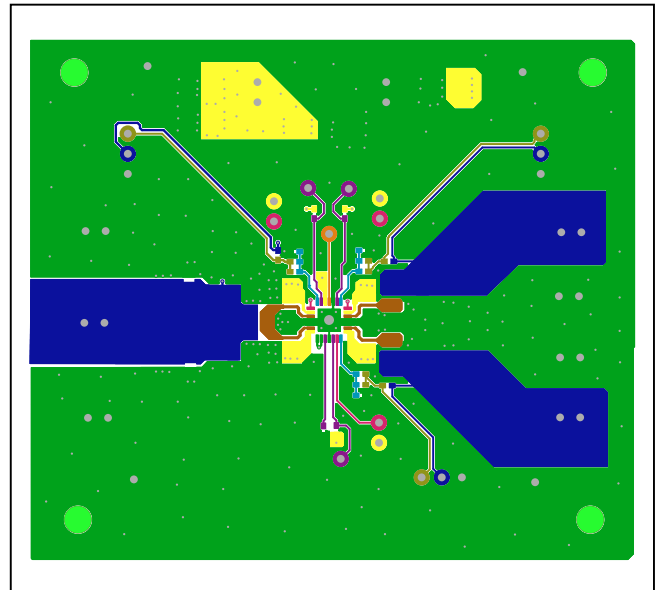
MAX20029B EV Kit Schematic



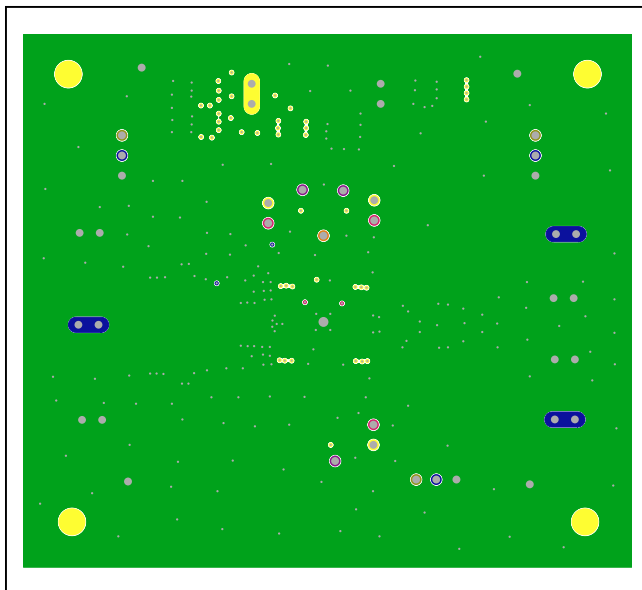
MAX20029B EV Kit PCB Layouts



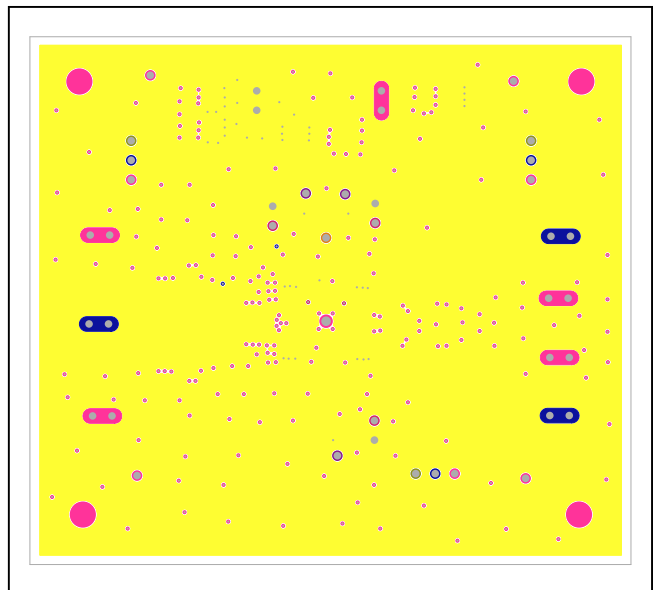
MAX20029B EV Kit Component Placement Guide—Top Assembly



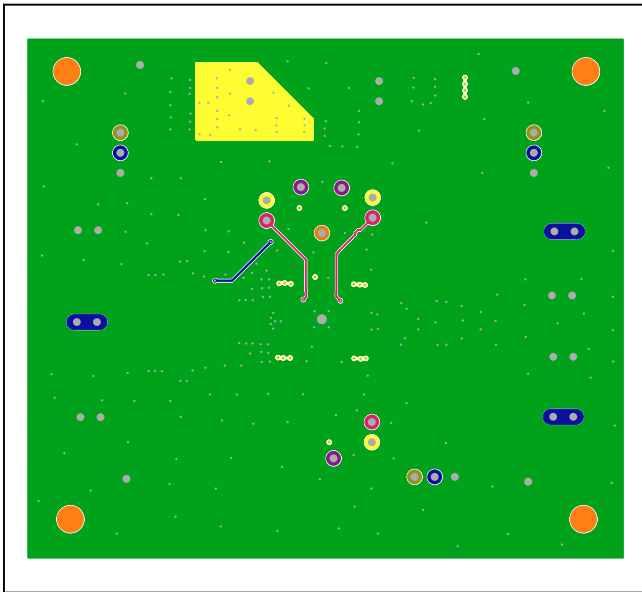
MAX20029B EV Kit PCB Layout—Top Layer



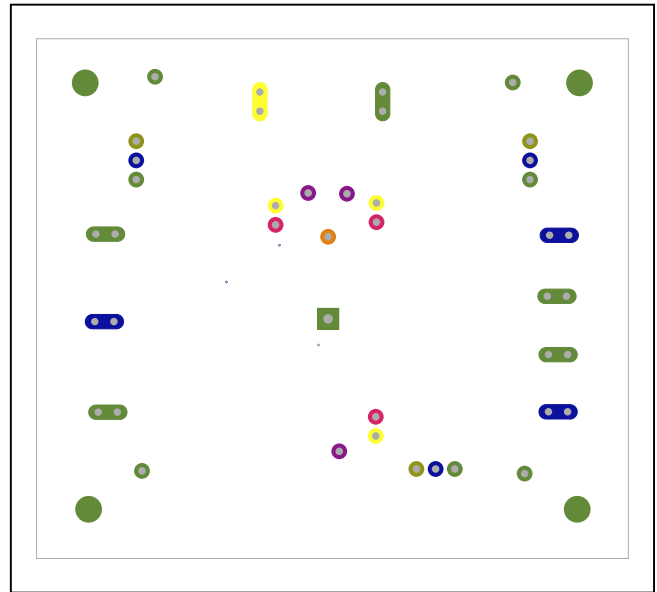
MAX20029B EV Kit PCB Layout—Inner Layer 1



MAX20029B EV Kit PCB Layout—Inner Layer 2



MAX20029B EV Kit PCB Layout—Bottom Layer



MAX20029B EV Kit Component Placement Guide—Bottom Assembly

### Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	12/17	Initial release	—

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