

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 0Ω values to create a direct feedback connection from the VOUT_ nodes to the OUTS_ pins.

The MAX20029D may also be evaluated by replacing the installed IC and configuring the feedback path as needed.

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

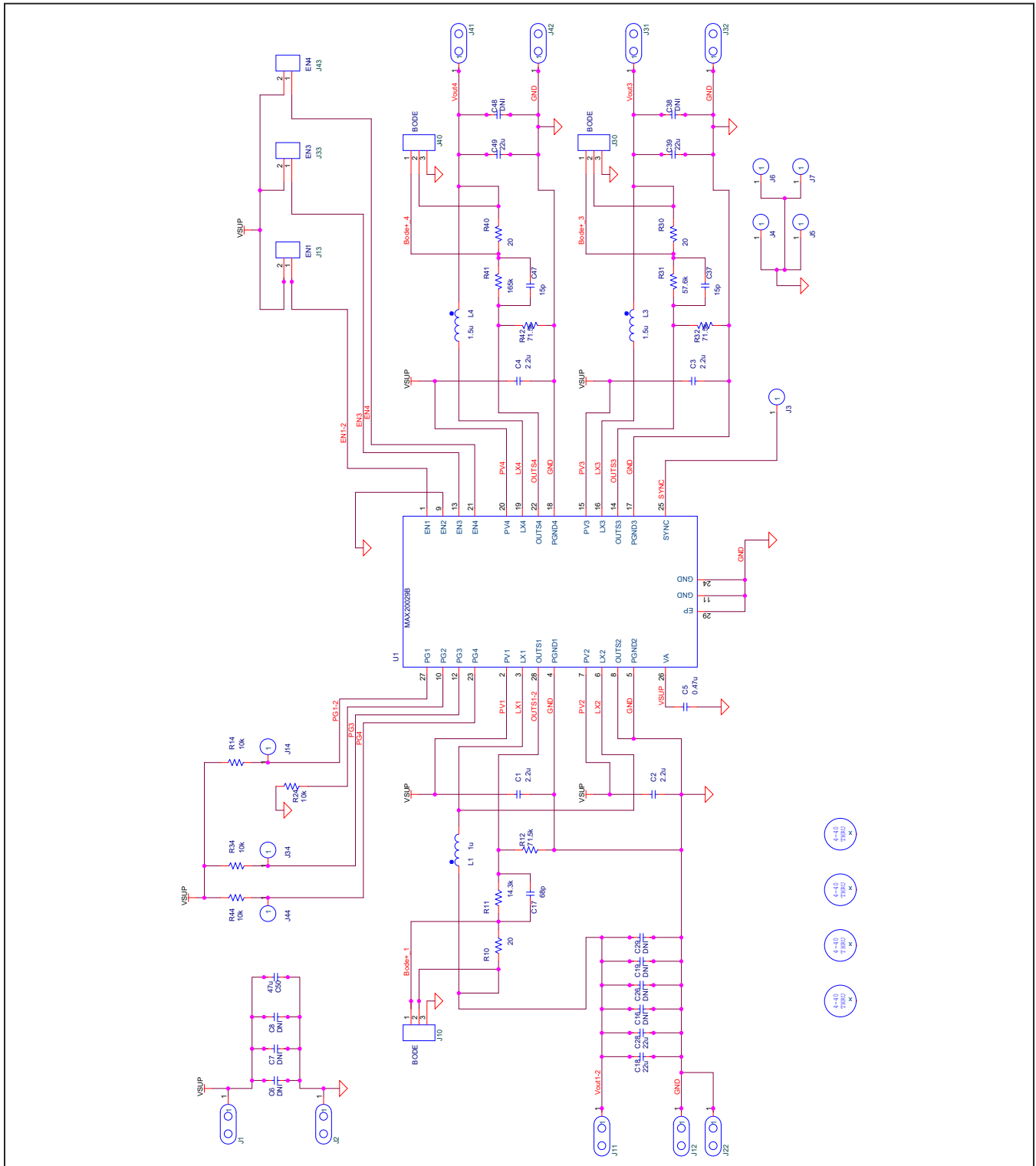
PART	TYPE
MAX20029BEVKIT#	EV Kit

#Denotes RoHS compliant.

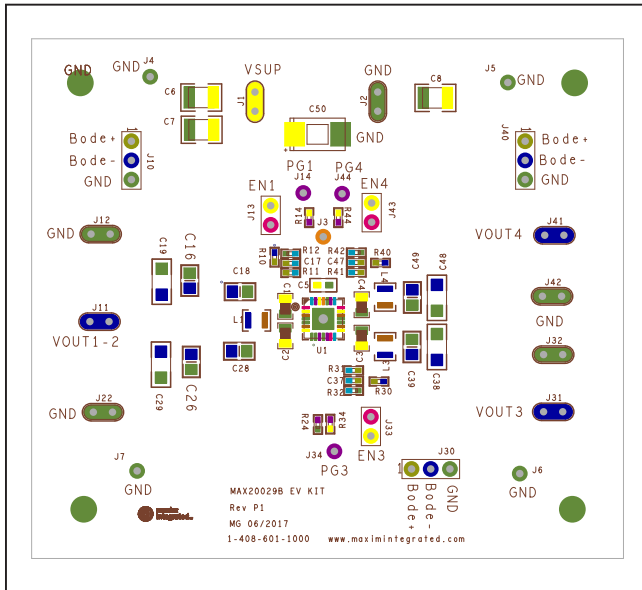
MAX20029B EV Kit Bill of Materials

REFERENCE DESIGNATORS	QTY.	DESCRIPTION	MFG. PART NO.
C1, C2, C3, C4	4	Capacitor, 2.2 μ F, 25V, ceramic, X7R, 0805	Murata GRM21BR71E225KA73
C5	1	Capacitor, 0.47 μ F, 16V, ceramic, X7R, 0603	Murata GCM188R71C474KA55D
C6, C7	7	Capacitor, 22 μ 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 μ 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 μ F, Tant Poly, 6.3V, 2917	Panasonic 6TPF220M5L
L1	1	inductor, 1 μ H, thin film, 2.5mm x 2.0mm	TDK TFM252012ALMA1R0MTAA
L3, L4	2	inductor, 1.5 μ 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#

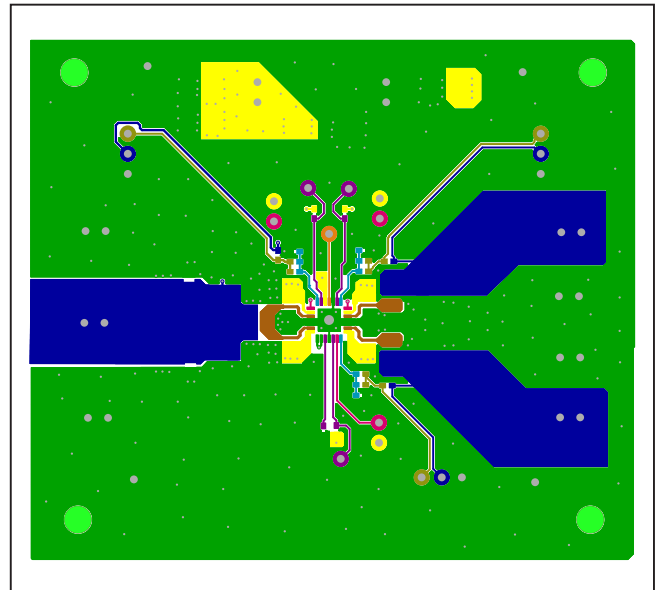
MAX20029B EV Kit Schematic



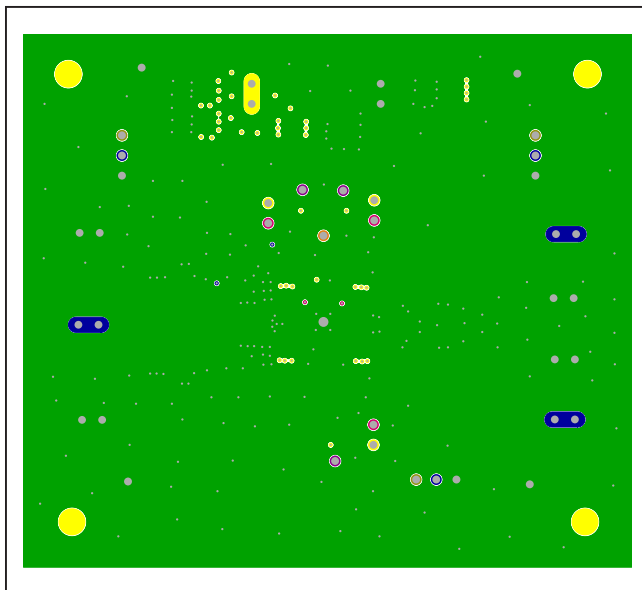
MAX20029B EV Kit PCB Layouts



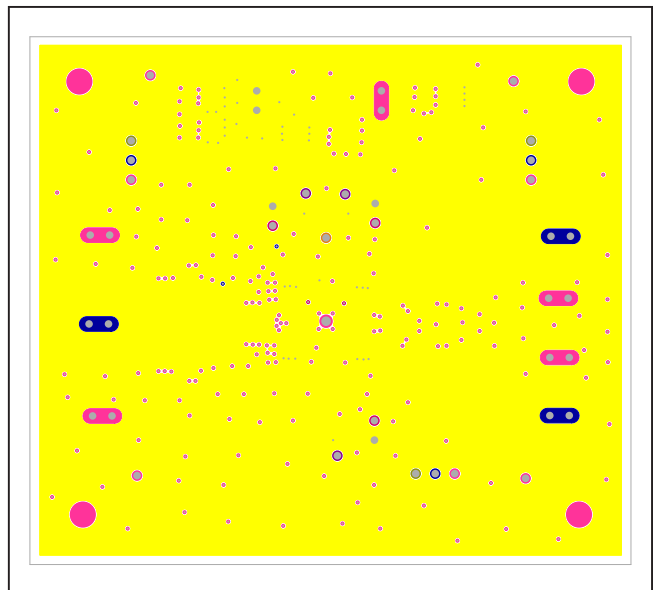
MAX20029B EV Kit Component Placement Guide—Top Assembly



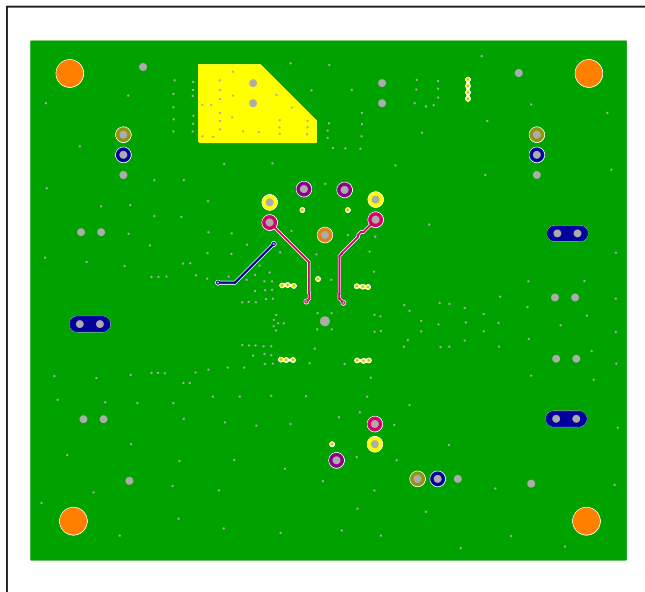
MAX20029B EV Kit PCB Layout—Top Layer



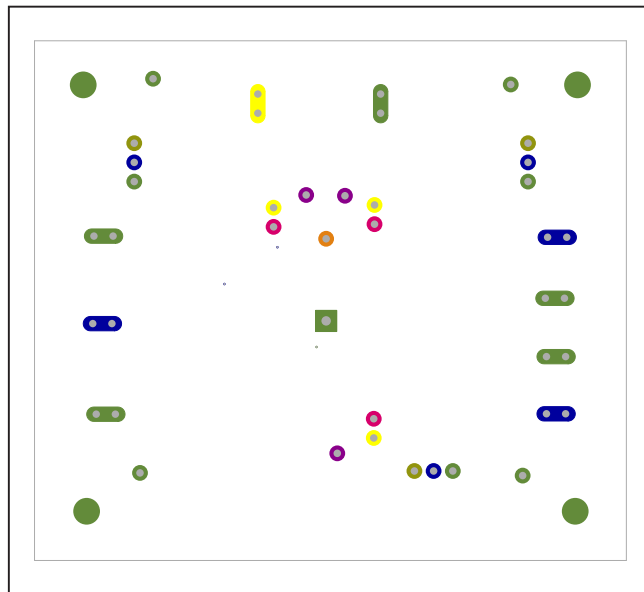
MAX20029B EV Kit PCB Layout—Inner Layer 1



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	—
1	7/20	Replaced title MAX20029B with MAX20029B/MAX20029D, updated <i>Evaluating IC Capabilities</i> section	1–7

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