Click here to ask an associate for production status of specific part numbers.

Evaluate: MAX20408/MAX20410/MAX20408E MAX20410E/MAX26408E/MAX26410E

MAX20408/MAX20410 Evaluation Kits

General Description

The MAX20408/MAX20410 evaluation kits (EV kits) provide a proven design to evaluate the MAX20408/MAX20410/MAX20408E/MAX20410E/MAX26408E/MAX26410E automotive synchronous buck converters with 10µA quiescent current. The EV kit comes with a MAX20410AFOC/VY+ (400kHz) or MAX20408AFOD/VY+ (2.1MHz) installed, as well as various test points and jumpers for evaluation. The EV kit output voltage is fixed 5V or 3.3V and easily configured to 0.8V to 10V with minimum component changes. The MAX20408E/MAX20410E/MAX26408E/MAX26410E can be evaluated by replacing the installed IC (U1) in the EV kit.

The EV kit is designed to deliver up to 8A/10A with input voltage 3V to 36V. The output voltage quality can be monitored by observing the PGOOD signal.

Features

- Input Supply Range from 3V to 36V
- Output Voltage: 3.3V/5V Fixed and Adjustable from 0.8V to 10V
- Delivers up to 8A/10A
- Frequency-Synchronization Input
- Enable Input
- Spread Spectrum Available
- Voltage Monitoring PGOOD Output Available
- Proven PCB Layout

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

Quick Start

Required Equipment

- MAX20408/MAX20410 EV kit
- 36V, 10A DC power supply (PS)
- Appropriate resistive load, or an electronic load that can sink 10A
- Digital multimeter (DMM)
- Oscilloscope

Procedure

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

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 VSUP and GND test pads, respectively.
3) Set the power-supply voltage to 14V.
4) Turn on the power supply.
5) Using the DMM, verify the OUT is approximately 5V on the MAX20410EVKIT# or 3.3V on the MAX20408EVKIT#.
6) Verify that the switching frequency is approximately either 2.1MHz on the MAX20408EVKIT# or 400kHz on the MAX20410EVKIT# by monitoring the inductor switching voltage with the oscilloscope.
7) Turn off the power supply.

Additional Evaluation

1) Connect the positive and negative terminals of the electronic load to VOUT and GND2, respectively.
2) Set the electronic load to the desired current at or below 10A or use an equivalent resistive load with an appropriate power rating.
3) Adjust current limit on the power supply as necessary.
4) Turn on the power supply and electronic load.
5) Verify that voltage across the VOUT and GND2 PCB pads is 5V ± 2% on the MAX20410EVKIT# or 3.3V ± 2% on the MAX20408EVKIT#.

319-100580; Rev 6; 4/25

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Detailed Description of Hardware

The MAX20408/MAX20410 EV kits provide a proven layout for the MAX20408/MAX20410/MAX20408E/MAX20410E/MAX26408E/MAX26410E synchronous buck regulator ICs. The IC accepts input voltages as high as 36V and delivers up to 10A. The EV kit can handle an input supply transient up to 42V. Various test points are included for evaluation.

External Synchronization

The IC can operate in two modes: forced-PWM (FPWM) or skip mode. Skip mode has better efficiency for light load conditions. When SYNC is pulled low, the IC operates in skip mode for light loads and PWM mode for larger loads. When SYNC is pulled high, the IC is forced to operate in PWM mode across all load conditions. SYNC can be used to synchronize with external clock if a clock source is present. The IC is forced to operate in FPWM mode when SYNC is connected to a clock source.

Table 1. Default Jumper Settings

JUMPER	DEFAULT SHUNT POSITION	FUNCTIONS
ENABLE	1-2	Buck enabled
J1	1-2	Forced-PWM mode
J2	Installed	PGOOD pulled up to bias

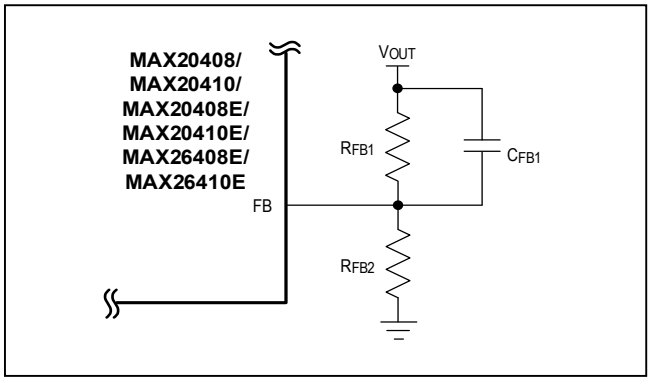


Figure 1. MAX20408 EV Kit Adjustable Output Voltage Setting

Buck Output Monitoring (PGOOD)

The EV kit provides a power-good output test point (PGOOD) to monitor the status of the buck output (OUT). PGOOD is pulled to high when the output is on regulation. It is pulled to ground when the output voltage drops below 7% (typ) of its nominal regulated voltage.

Programming Buck Output Voltage

The EV kit comes installed with the MAX20410AFOC/VY+ or MAX20408AFOD/VY+ (2.1MHz), which provides an adjustable 0.8V to 10V output voltage. To program the VOUT voltage, remove R5 and place appropriate resistors in the positions R7 and R8 according to the following equation:

Equation 1:

$$R7 = R8 \times [(VOUT/VFB) - 1]$$

Where typically VFB = 0.8V and R8 = 10kΩ.

Refer to the IC data sheet for the C16 value.

Evaluating Other Variants

The EV kit comes installed with either the 3.3V/2.1MHz, 8A variant (MAX20408AFOD/VY+ (2.1MHz)) or 5V/400kHz, 10A variant (MAX20410AFOC/VY+). The other variants can be installed with minimal component changes.

To use the 2.1MHz devices on the MAX20410EVKIT#, change inductor L2 to 0.47µH, and output capacitors C13 and C14 can be removed. For evaluating the MAX20408E/MAX26408E and MAX20410E/MAX26410E variants, depopulate the output capacitance on the EV kit and use the inductor as recommended in the IC data sheet.

Ordering Information

PART	TYPE
MAX20408EVKIT#	3.3V/2.1MHz EV Kit
MAX20410EVKIT#	5V/400kHz EV Kit

#Denotes RoHS compliance.

MAX20408/MAX20410 EV Kit Bill of Materials

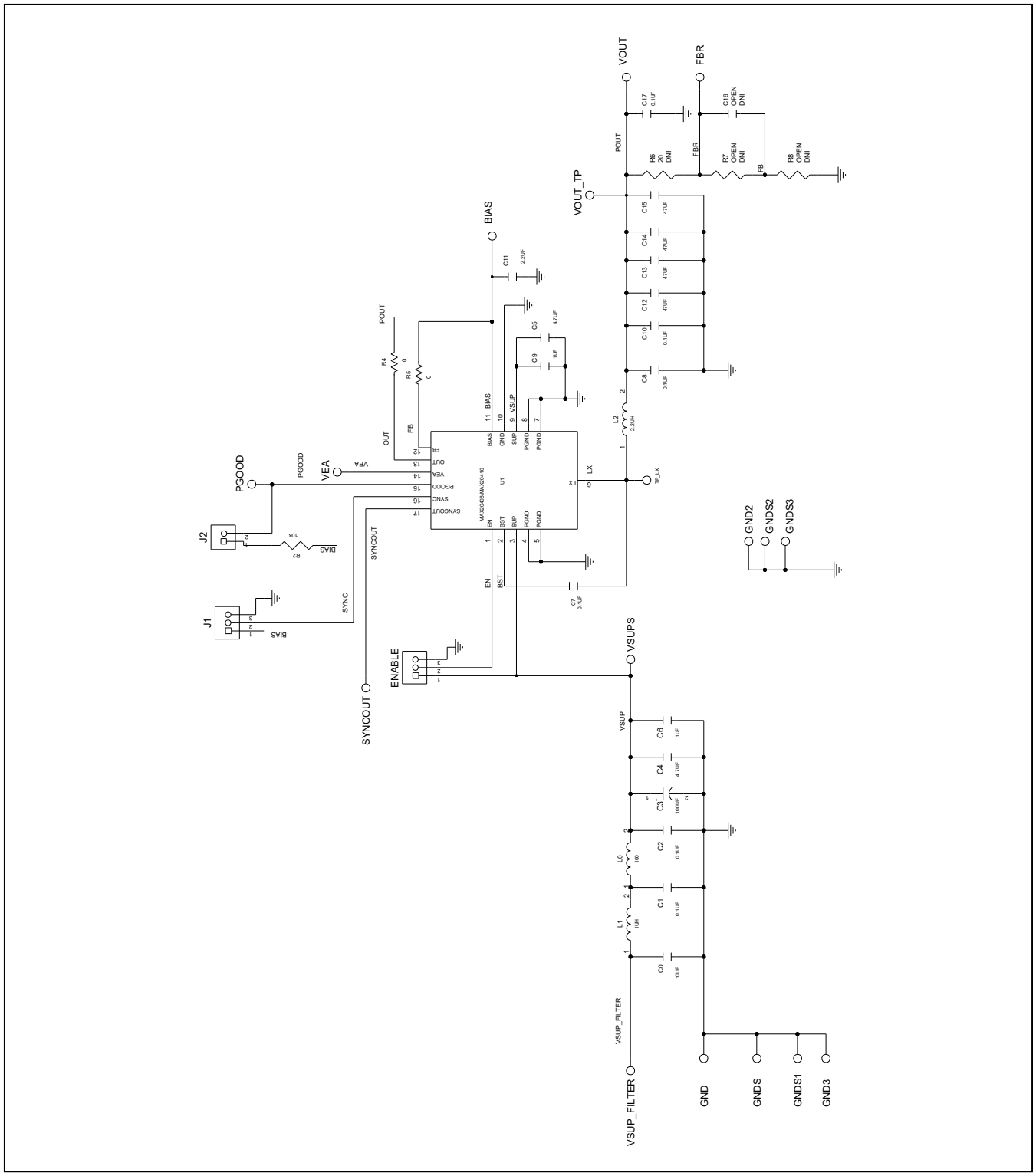
MAX20408/MAX20410 EV Kit BOM–400kHz

REF_DES	MFG PART #	MANUFACTURER	DESCRIPTION
BIAS, FBR, GND2, GNDS, GNDS1-GNDS3, PGOOD, SYNCOUT, VEA, VOUT_TP, VSUPS	5012	KEYSTONE	TEST POINT
C0	GCM32EC71H106KA03	MURATA	10 µF ±10% 50V Ceramic Capacitor X7S 1210
C1, C2, C7, C8, C10, C17	CGA3E2X7R1H104K080AE	TDK	0.1 µF ±10% 50V Ceramic Capacitor X7R 0603
C3	EEH-ZA1H101P	PANASONIC	100UF ±20% 50V ALUMINUM-ELECTROLYTIC
C4, C5	C1206C475K5RACAUTO	KEMET	4.7 µF ±10% 50V Ceramic Capacitor X7R 1206
C6, C9	C0603C105K9RACAUTO	KEMET	1 µF ±10% 6.3V Ceramic Capacitor X7R 0603
C11	CGA3E3X7S1A225K080AE	TDK	2.2 µF ±10% 10V Ceramic Capacitor X7S 0603
C12-C15	CGA6P1X7S1A476M250AC	TDK	47 µF ±20% 10V Ceramic Capacitor X7S 1210
ENABLE, J1	PEC03SAAN	SULLINS	Connector Header Through Hole 3 position 0.100"
GND, GND3, VOUT, VSUP_FILTER	575-4	KEYSTONE	Banana Jack Connector Standard Banana Solder
J2	PEC02SAAN	SULLINS	Connector Header Through Hole 2 position 0.100"
L0	74279226101	WURTH ELECTRONICS	100 Ohms @ 100 MHz 1 Ferrite Bead 1812 8A 6mOhm
L1	XEL5030-102ME	COILCRAFT	1 µH Shielded Molded Inductor 17.8 A 5.8mOhm
L2	XGL6060-222ME	COILCRAFT	2.2 µH Shielded Molded Inductor 12.5 A 4.9mOhm
R2	ERA-2AEB103	PANASONIC	10 kOhms ±0.1% 0.063W, 1/16W Chip Resistor 0402
R4, R5	ERJ-2GE0R00	PANASONIC	0 Ohms Jumper Chip Resistor 0402
U1	MAX20410AFOC/VY+	ANALOG DEVICES	IC STEP DOWN CONVERTER 17L-FC2QFN
R6, R7, R8, C16	-	-	Do not Install

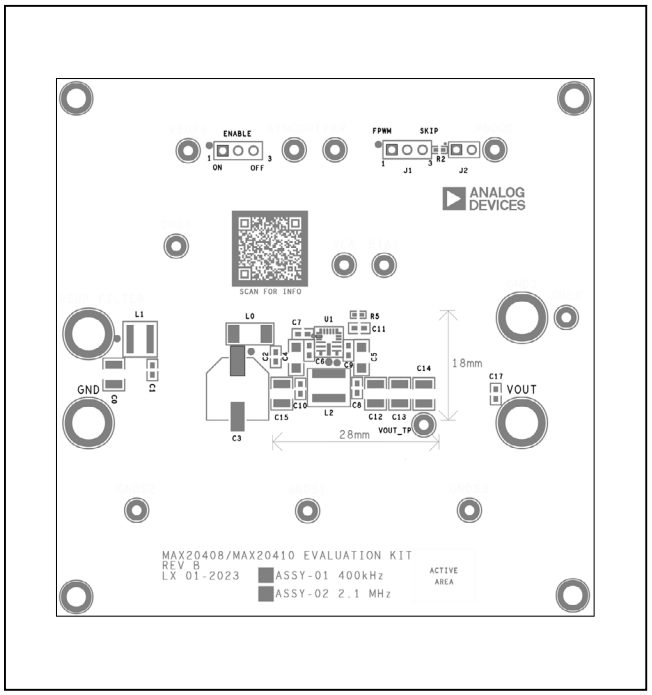
MAX20408/MAX20410 EV Kit BOM–2.1MHz

REF_DES	MFG PART #	MANUFACTURER	DESCRIPTION
BIAS, FBR, GND2, GNDS, GNDS1-GNDS3, PGOOD, SYNCOUT, VEA, VOUT_TP, VSUPS	5012	KEYSTONE	TEST POINT
C0	GCM32EC71H106KA03	MURATA	10 µF ±10% 50V Ceramic Capacitor X7S 1210
C1, C2, C7, C8, C10, C17	CGA3E2X7R1H104K080AE	TDK	0.1 µF ±10% 50V Ceramic Capacitor X7R 0603
C3	EEH-ZA1H101P	PANASONIC	100UF ±20% 50V ALUMINUM-ELECTROLYTIC
C4, C5	C1206C475K5RACAUTO	KEMET	4.7 µF ±10% 50V Ceramic Capacitor X7R 1206
C6, C9	C0603C105K9RACAUTO	KEMET	1 µF ±10% 6.3V Ceramic Capacitor X7R 0603
C11	CGA3E3X7S1A225K080AE	TDK	2.2 µF ±10% 10V Ceramic Capacitor X7S 0603
C12, C15	CGA6P1X7S1A476M250AC	TDK	47 µF ±20% 10V Ceramic Capacitor X7S 1210
ENABLE, J1	PEC03SAAN	SULLINS	Connector Header Through Hole 3 position 0.100"
GND, GND3, VOUT, VSUP_FILTER	575-4	KEYSTONE	Banana Jack Connector Standard Banana Solder
J2	PEC02SAAN	SULLINS	Connector Header Through Hole 2 position 0.100"
L0	74279226101	WURTH ELECTRONICS	100 Ohms @ 100 MHz 1 Ferrite Bead 1812 8A 6mOhm
L1	XEL5030-102ME	COILCRAFT	1 µH Shielded Molded Inductor 17.8 A 5.8mOhm
L2	XGL6030-471ME	COILCRAFT	470 nH Shielded Molded Inductor 25 A 2.7mOhm
R2	ERA-2AEB103	PANASONIC	10 kOhms ±0.1% 0.063W, 1/16W Chip Resistor 0402
R4, R5	ERJ-2GE0R00	PANASONIC	0 Ohms Jumper Chip Resistor 0402
U1	MAX20408AFOD/VY+	ANALOG DEVICES	IC STEP DOWN CONVERTER 17L-FC2QFN
C13, C14	-	-	Do not install
R6, R7, R8, C16	-	-	Do not install

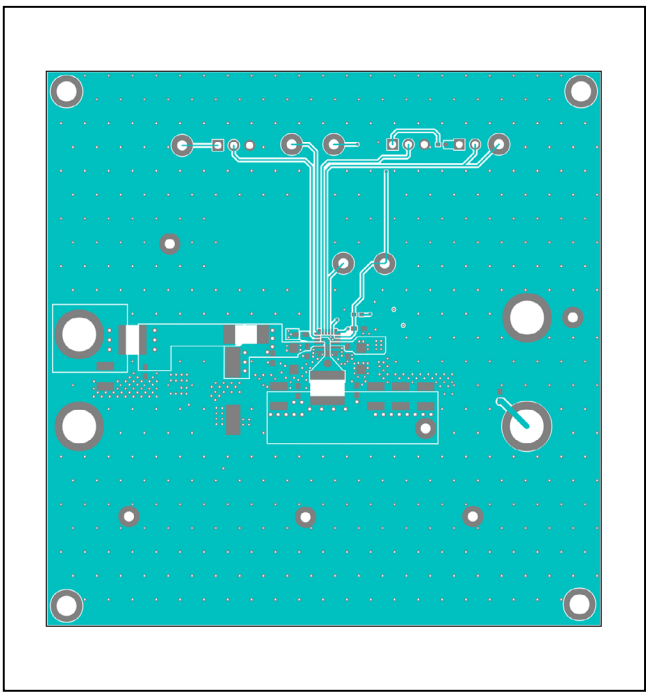
MAX20408/MAX20410 EV Kit Schematic



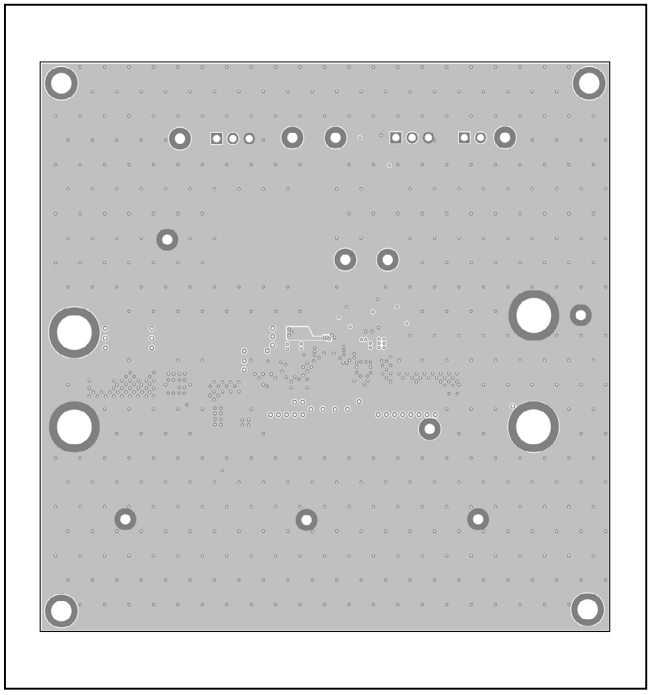
MAX20408/MAX20410 EV Kit PCB Layouts



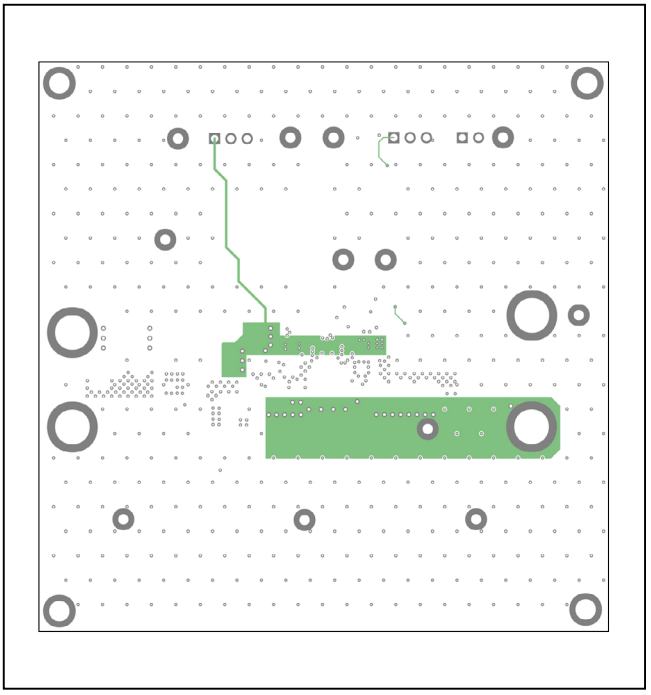
MAX20408/MAX20410 EV Kit Component Placement Guide—Top Silkscreen



MAX20408/MAX20410 EV Kit PCB Layout—Top

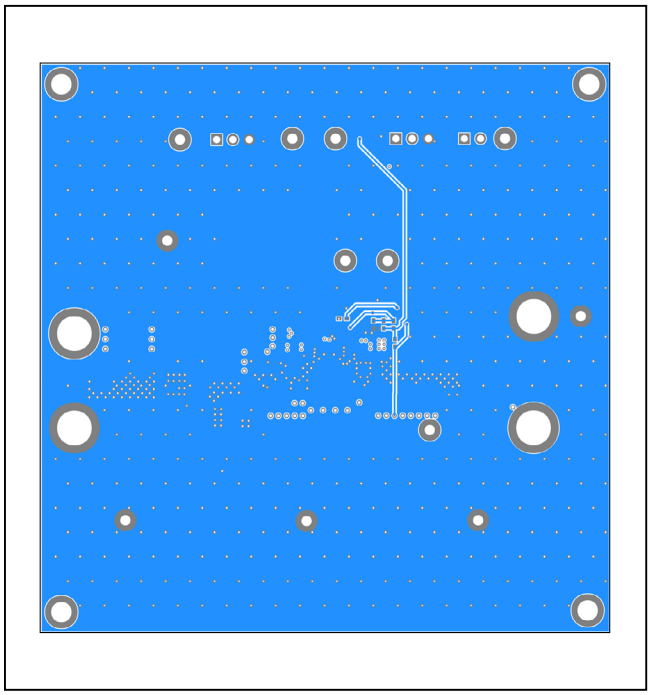


MAX20408/MAX20410 EV Kit PCB Layout—Inner Layer 2

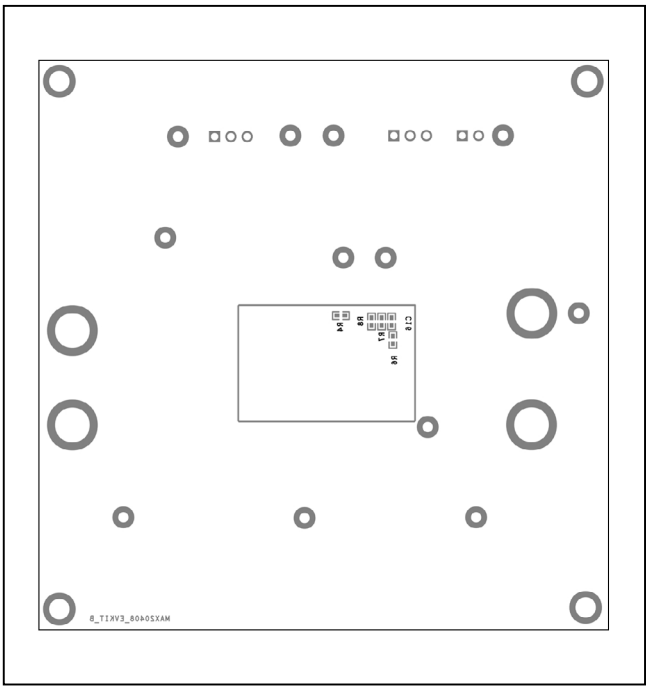


MAX20408/MAX20410 EV Kit PCB Layout—Inner Layer 3

MAX20408/MAX20410 EV Kit PCB Layouts (continued)



MAX20408/MAX20410 EV Kit PCB Layout—Bottom



MAX20408/MAX20410 EV Kit Component Placement Guide—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/20	Initial release	—
1	5/21	Replaced part number MAX20408 with MAX20408/MAX20410, updated *General Description*, *Quick Start*, *Detailed Description of Hardware* sections, and *MAX20408/MAX20410 EV Kit Bill of Materials*	1–7
2	5/21	Updated *General Description*, *Quick Start*, *Detailed Description of Hardware* sections, Table 1, *Ordering Information* table, *MAX20408/MAX20410 EV Kit Bill of Materials,* and *MAX20408/MAX20410 EV Kit PCB Layouts*	1–3, 5, 6
3	7/21	Updated *General Description*, *Detailed Description of Hardware* sections, *Ordering Information* table, and *MAX20408/MAX20410 EV Kit Bill of Materials*	1–3
4	7/21	Updated *General Description*, *Features*, *Quick Start,* and *Detailed Description of Hardware* sections	1–3
5	7/24	Added E variant to all sections and updated *MAX20408/MAX20410 EV Kit Schematic* and *MAX20408/MAX20410 EV Kit PCB Layouts*	All
6	4/25	Added MAX26408E/MAX26410E	All