



# MAX2585 Evaluation Kit

## General Description

The MAX2585 evaluation kit (EV kit) simplifies evaluation of the MAX2585 RF-to-baseband receiver IC. The EV kit enables testing of the device's RF performance and requires no additional support circuitry. The EV kit's signal inputs and outputs use SMA and BNC connectors for easy connection to RF test equipment.

## Features

- ◆ Easy Evaluation of the MAX2585
- ◆ On-Board +2.85V Regulators Allow Operation from +5V and -5V Supplies
- ◆ On-Board Op Amps Convert Differential I/Q Baseband Signals into Single-Ended Signals
- ◆ Jumpers for Supply Pins, Digital Power Control, and Shutdown
- ◆ All Critical Peripheral Components Included

## Ordering Information

PART	TEMP RANGE	PIN-PACKAGE	PKG CODE
MAX2585EVKIT	-40°C to +85°C	48 fcLGA-EP*	L4877F-1

\*EP = Exposed paddle.

## MAX2585 Component List

DESIGNATION	QTY	DESCRIPTION
C1, C3, C6, C7, C8, C10, C15, C25, C27, C31, C34, C35, C36, C39, C43, C47, C48, C54, C55, C56, C58, C59, C60, C65–C68, C69, C71, C87, C88, C99, C114–C120	0	Not installed, capacitors
C2, C4	2	6800pF ±10% capacitors (0402) Murata GRM155R71E682K
C5, C32	2	1.5pF ±0.1pF capacitors (0402) Murata GRM1555C1H1R5B
C9, C16	2	0.033µF ±10% capacitors (0402) Murata GRM155R71A333K
C11	1	6800pF ±5% capacitor (0805) Murata GRM2165C1H682J
C12, C86, C123	3	0.01µF ±10% capacitors (0402) Murata GRM155R71C103K
C13	1	0.033µF ±10% capacitor (0603) Murata GRM188R71E333K

DESIGNATION	QTY	DESCRIPTION
C14, C24, C26, C29, C51, C61, C62, C63, C64, C98, C100, C101, C124	13	100pF ±5% capacitors (0402) Murata GRM1555C1H101J
C17, C94	2	1000pF ±10% capacitors (0402) Murata GRM155R71H102K
C18, C90, C91	3	10µF ±10% capacitors (0805) Murata GRM21BR60J106K
C22	1	470pF ±10% capacitor (0402) Murata GRM155R71H471K
C28	1	0.047µF ±10% capacitor (0402) Murata GRM155R71C473K
C30, C79, C82	3	10µF ±10% capacitors (1206) Murata GRM31CR60J106K
C33, C95	2	1.0µF ±10% capacitors (0805) Murata GRM40X7R105K010
C37, C38, C40, C41, C42, C44, C45, C46	8	0.1µF ±10% capacitors (0402) Murata RM155R61A104K
C49	1	22pF ±5% capacitor (0402) Murata GRM1555C1H220J
C50	1	0.033µF ±5% capacitor (1206) Murata GRM3195C1H333J

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## Component List (continued)

DESIGNATION	QTY	DESCRIPTION
<b>C72, C74, C76</b>	3	0.1 $\mu$ F $\pm$ 10% capacitors (0603) Murata GRM188R71C104K
<b>C73, C78</b>	2	0.01 $\mu$ F $\pm$ 10% capacitors (0805) Murata GRM21BR72A103K
<b>C75, C77, C80, C81</b>	4	1.0 $\mu$ F $\pm$ 10% capacitors (1206) Murata GRM319R71C105K
<b>C96, C97</b>	2	22 $\mu$ F $\pm$ 20% capacitors (0805) TDK C2012X5R0J226M
<b>FL1</b>	0	Not installed
<b>FL3</b>	1	220 $\Omega$ surface-mount EMI filter (0603) Murata BLM18AG221SN1D
FL4	1	Cellular RX filter Fujitsu FAR-F5EA-881M50-D27B
FL5	1	PCS RX filter Fujitsu FAR-F6EA-1G9600-D2AC
J1, J6, J9–J15	0	Not installed, 0.062in SMA end-launch jack receptacles Johnson 142-0701-801
J2, J3, <b>J7, J8</b>	4	0.062in SMA end-launch jack receptacles Johnson 142-0701-801
J4, J5	2	50 $\Omega$ BNC PCB receptacles (jack) Amphenol 31-5329-52RFX
J17	1	2 x 10 header dual in-line header (100 mil) Sullins PTC36SAAN
JU1, JU2, JU3, JU13, JU16, JU19, JU23, JU25, JU26, JU28, JU36, JU38	12	1 x 2 header, 2-pin in-line headers (100 mil) Sullins PTC36SAAN
JU7, JU33, JU37, JU39	0	Not installed, in-line headers Sullins PTC36SAAN

DESIGNATION	QTY	DESCRIPTION
JU9, JU10, JU24, JU30	4	1 x 3 header, 3-pin in-line headers (100 mil) Sullins PTC36SAAN
JU11, JU12, JU20, JU21, TP9, TP11, TP12	7	Test points Keystone S9000-ND
<b>L2, L5</b>	2	43nH $\pm$ 5% inductors (0603) Murata LQG15HN43NJ02
<b>L3</b>	1	2.2nH $\pm$ 0.3nH inductor (0402) Murata LQG15HN2N2S00
<b>L4, L8, L9</b>	0	Not installed, inductors
L10, L11	2	33nH $\pm$ 5% inductors (0402) Murata LQG15HN33NJ00
<b>R1, R6, R7, R20, R34–R37</b>	8	1k $\Omega$ $\pm$ 1% resistors (0402)
<b>R2, R9–R12, R30, R33, R38, R39</b>	9	0 $\Omega$ $\pm$ 5% resistors (0402)
R3	1	47k $\Omega$ $\pm$ 5% resistor (0402)
R4	1	3.01 $\Omega$ $\pm$ 1% resistor (0402)
<b>R5, R18, R19, R22–R29, R31, R32, R50, R57, R58, R59, R60, R61, R62</b>	0	Not installed, resistors
<b>R8, R17</b>	2	51 $\Omega$ $\pm$ 5% resistors (0402)
<b>R13</b>	1	4.7k $\Omega$ $\pm$ 5% resistor (0402)
<b>R14, R15</b>	2	20k $\Omega$ $\pm$ 1% resistors (0402)
R16	1	10k $\Omega$ variable resistor Bournes 3296W-1-103
<b>R21</b>	1	22 $\Omega$ $\pm$ 5% resistor (0402)
<b>T1</b>	1	Balun TOKO 617DB-1675
TP2, TP13–TP16	0	Not installed
U1	1	MAX2585 CDMA receiver Maxim MAX2585ELM
—	11	Shunts (JU9, JU10, JU16, JU19, JU23, JU24, JU26, JU28, JU30, JU36, JU38) Sullins STC02SYAN

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## Component List (continued)

DESIGNATION	QTY	DESCRIPTION
<b>U2, U3</b>	2	MAX4444 differential-to-single-ended line receivers Maxim MAX4444ESE
<b>U4</b>	0	Not installed 2088-2174MHz single-band RX VCO GPS and tri-mode ALPS Electric Co. UCVA4X211A
<b>U5, U7</b>	2	MAX8877 low-dropout linear regulators Maxim MAX8877EUK28
<b>U6</b>	1	19.2MHz voltage-controlled TCXO Kyocera KT5032N19200DCB28PLA
<b>U10</b>	0	Not installed MAX4747 50Ω low-voltage quad SPST/dual SPDT analog switches in UCSP Maxim MAX4747EBE-T

**Note:** Components listed in bold are on backside of the board.

## Quick Start

The MAX2585 EV kit is fully assembled and factory tested. Follow the instructions in the *Connections and Setup* section.

### Required Test Equipment

This section lists the recommended test equipment to verify the operation of the MAX2585. It is intended as a guide only, and substitutions may be possible:

- DC supply capable of delivering +5.0V and 250mA of continuous current
- DC supply capable of delivering -5.0V and 250mA of continuous current
- DC supply capable of delivering +2.5V at low current (< 1mA) for the gain control voltage (optional)
- Signal source capable of operating up to 2.5GHz
- RF spectrum analyzer with a minimum 1kHz-to-3GHz frequency range
- IBM PC or compatible with Windows® 95/98/2000/NT 4.0/XP, or later operating system and an available parallel port
- INTF2300 interface board (supplied with the EV kit)

Windows is a registered trademark of Microsoft Corp.

## Connections and Setup

This section provides step-by-step instructions for getting the EV kit up and running in cellular band CDMA mode:

- 1) Verify shunts JU1, JU2, JU3, JU9, JU10, JU16, JU19, JU23, JU24, JU26, JU28, JU30, JU36, and JU38 are in place.
- 2) Verify shunts JU9, JU10, and JU30 are in the ON (VCC) position.
- 3) The gain control pin voltage of the MAX2585 can be controlled by an on-board variable resistor or by an additional DC power supply. To use the variable resistor to adjust the gain control voltage, install a shunt across the two pins of JU24 closest to the edge of the board. Remove JU24 and connect a DC power supply to the VGC connector (TP8) on the board to use an external supply to adjust the gain control voltage.
- 4) Connect the INTF2300 interface cable to the EV kit's 20-pin connector (J17). **Note:** Pin 1 of the interface cable corresponds to the red wire. Pin 1 of the connector is indicated on the printed circuit board (PCB) by a flattened corner in the J17 silkscreen outline.
- 5) With their outputs turned off, connect a +5.0V power supply to the header labeled +5V (JU11), and a -5.0V power supply to the header labeled -5V (JU20). Connect the power-supply ground to the header labeled GND (JU12 or JU21).
- 6) Install and run the MAX2585 control software (available from the factory).
- 7) With the MAX2585 control software active in the entry view screen, select the appropriate device type.
- 8) In the register-view screen of the control software, set the registers to typical cellular band CDMA settings as shown in Table 1.
- 9) Turn on the +5.0V and -5.0V power supplies. Then turn on the gain control power supply (optional).
- 10) Select the resend registers button at the top of the screen to send all registers to the MAX2585.
- 11) With its output turned off, connect a continuous wave RF signal source to CLNA\_IN (J3). Set the RF frequency to 881.1MHz with a -104dBm power level.
- 12) In either the entry view or register view screen of the control software, toggle the DC cal pin box from 1 to 0, and then back to 1.
- 13) Enable the output of the RF signal source.

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- 14) Connect Q\_OUT (J5) or I\_OUT (J4) to the spectrum analyzer. Set the spectrum analyzer to span from 1kHz to 640kHz. Set the resolution bandwidth to 3kHz and the reference level to 0dBm.
- 15) Observe the 100kHz output tone on the spectrum analyzer display. Adjust the VGC voltage to obtain an output power level of -28.5dBm.
- 16) To evaluate the MAX2585 in PCS CDMA mode, enter the typical PCS band CDMA register settings as shown in Table 1 and repeat the steps above with the signal source frequency set to 1960.1MHz and power level set to -104dBm. Connect the signal source to PLNA\_IN (J2) for PCS band operation.

## Layout Considerations

The MAX2585 EV kit can serve as a guide for board layout. Keep PC board trace lengths as short as possible to minimize parasitics. Also, keep decoupling capacitors as close to the IC as possible with a direct connection to the ground plane.

## PCB Construction

The MAX2585 EV kit PCB uses a 10-mil-wide trace for 50Ω transmission line. The PCB has a 6-mil-layer profile on FR4 with a dielectric constant of 4.5.

## INTF2300 SPI Interface Board

The INTF2300 interface board is used to interface 3-wire SPI™ protocol from a PC's parallel port to the EV kit. This board translates 5V logic from the PC to V<sub>CC</sub> of the EV kit. The INTF2300 also provides buffering and EMI filtering. Its absolute maximum supply voltage is 4.6V, limited by the breakdown of the buffer IC. The recommended operating supply voltage range is +2.7V to +3.6V. The INTF2300 gets its power-supply voltage from the MAX2585 board if the shunt on the INTF2300 board is installed in the V<sub>CC</sub> position.

*SPI is a trademark of Motorola, Inc.*

**Table 1. Register Conditions Table**

MODE	REGISTER SETTINGS							
	REG 8: BIAS	REG 9: DCCAL	REG A: NDIV	REG B: PLLCONF	REG C: OPCTRL	REG D: RESERVED1	REG E: RESERVED2	REG F: TEST
PCS Band CDMA	0AAAF	62000	09920	28160	16EDD	00304	55C00	13830
Cellular Band CDMA	0AAAF	62000	15824	A8320	16EDE	00304	55C00	13830

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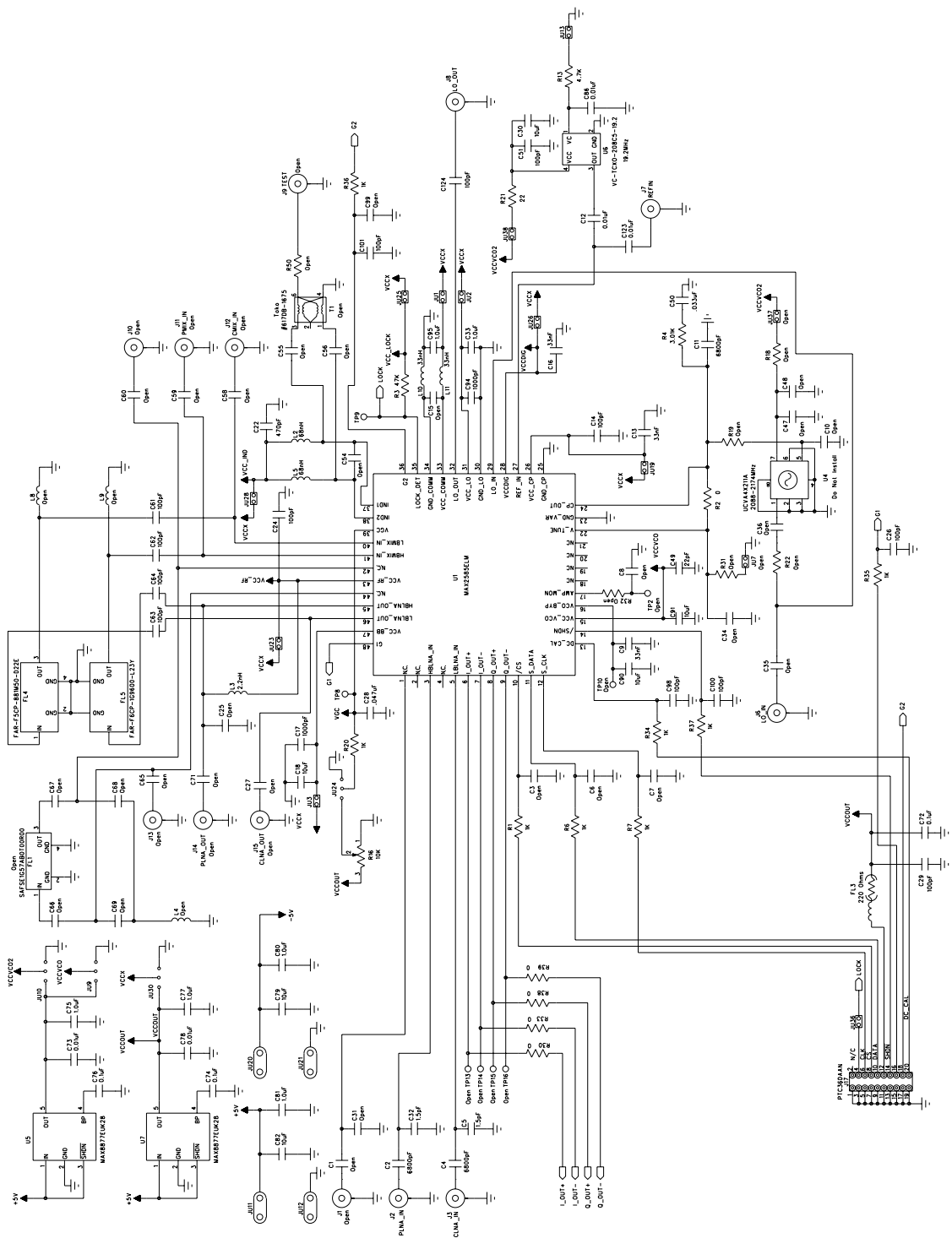


Figure 1. MAX2585 EV Kit Schematic (Sheet 1 of 2)

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Evaluates: MAX2585

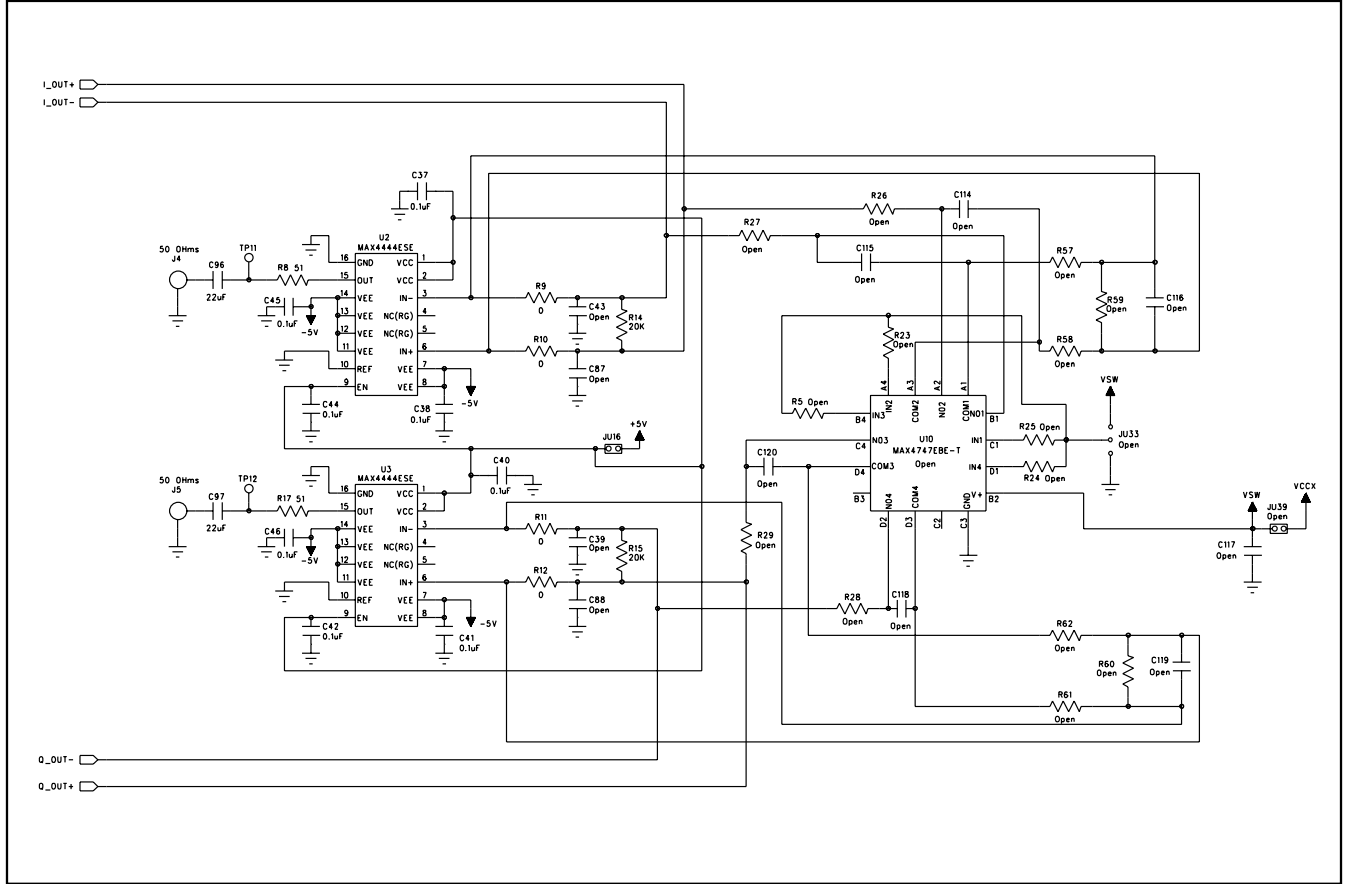


Figure 1. MAX2585 EV Kit Schematic (Sheet 2 of 2)

# MAX2585 Evaluation Kit

Evaluates: MAX2585

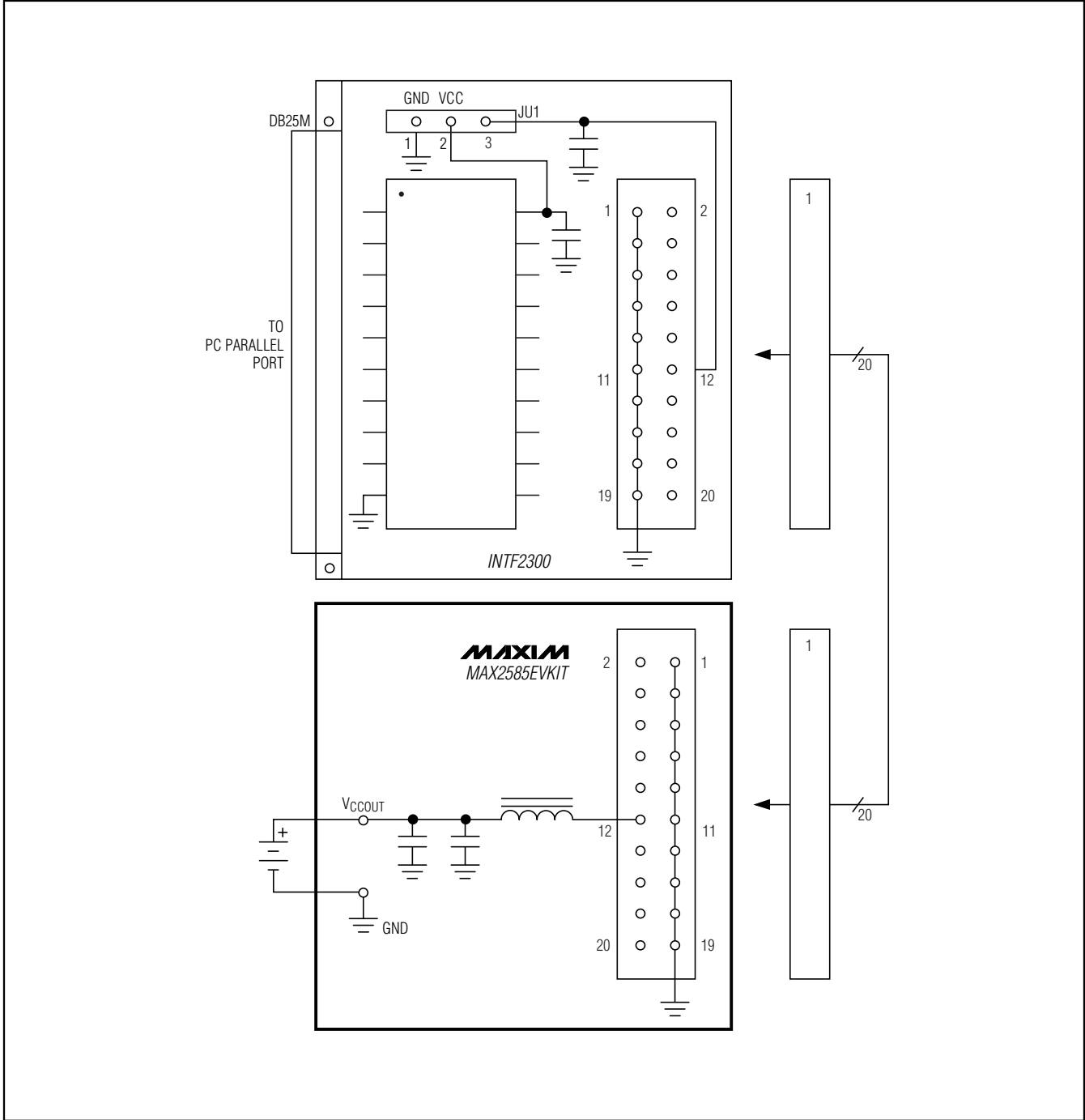


Figure 2. INTF2300 Schematic

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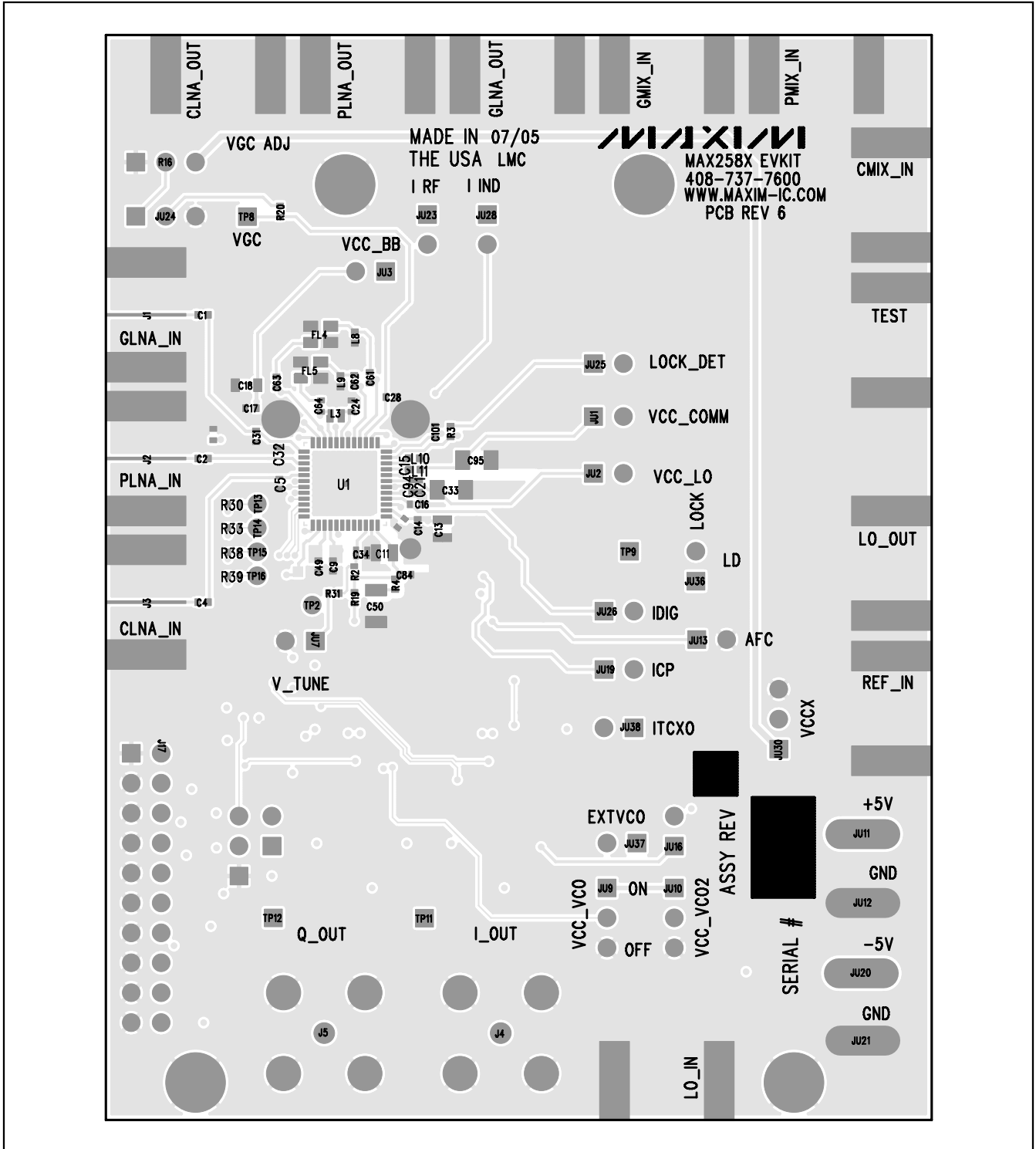


Figure 3. MAX2585 EV Kit PCB Layout—Top Silkscreen



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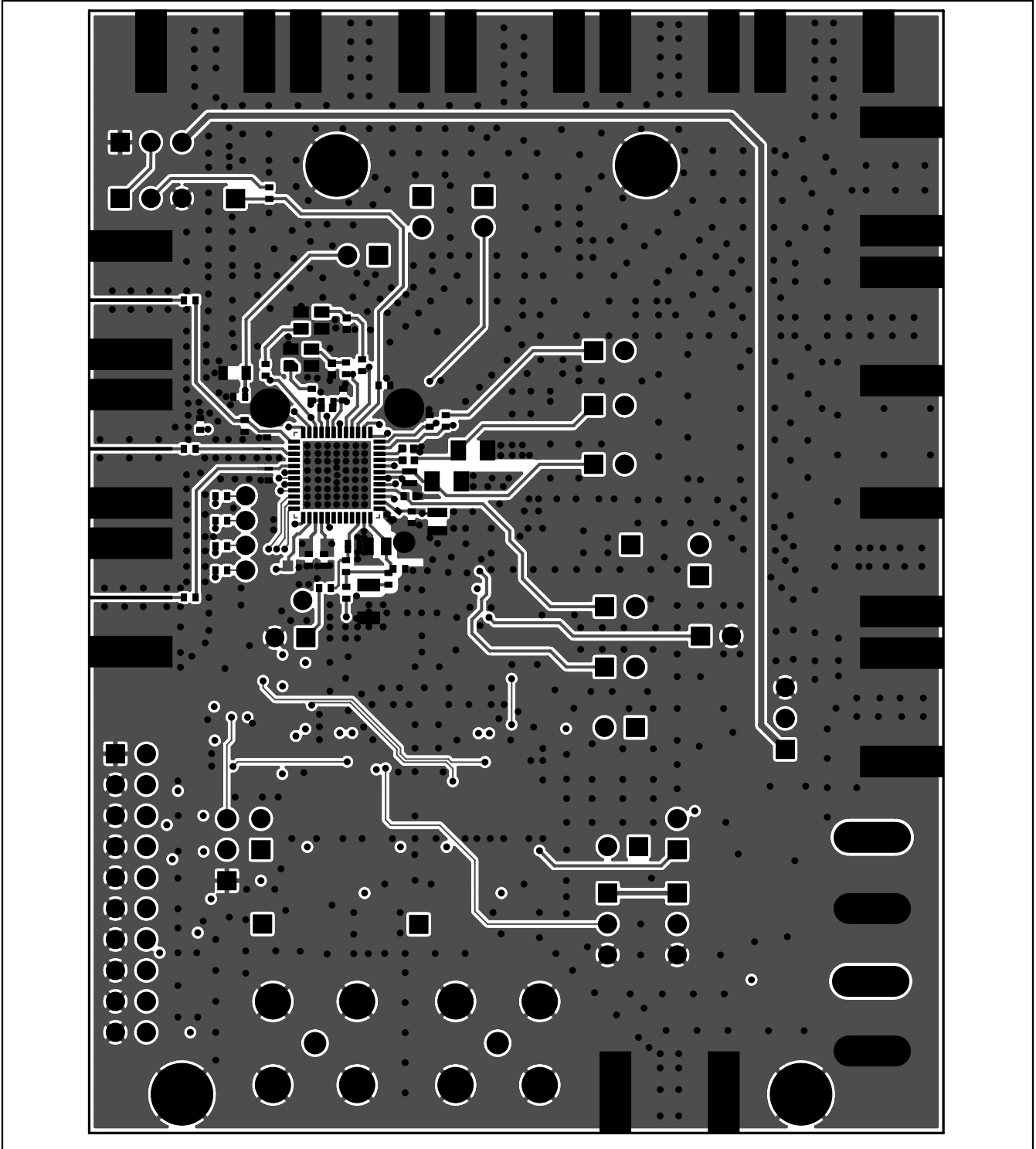


Figure 4. MAX2585 EV Kit PCB Layout—Primary Component Side

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Evaluates: MAX2585

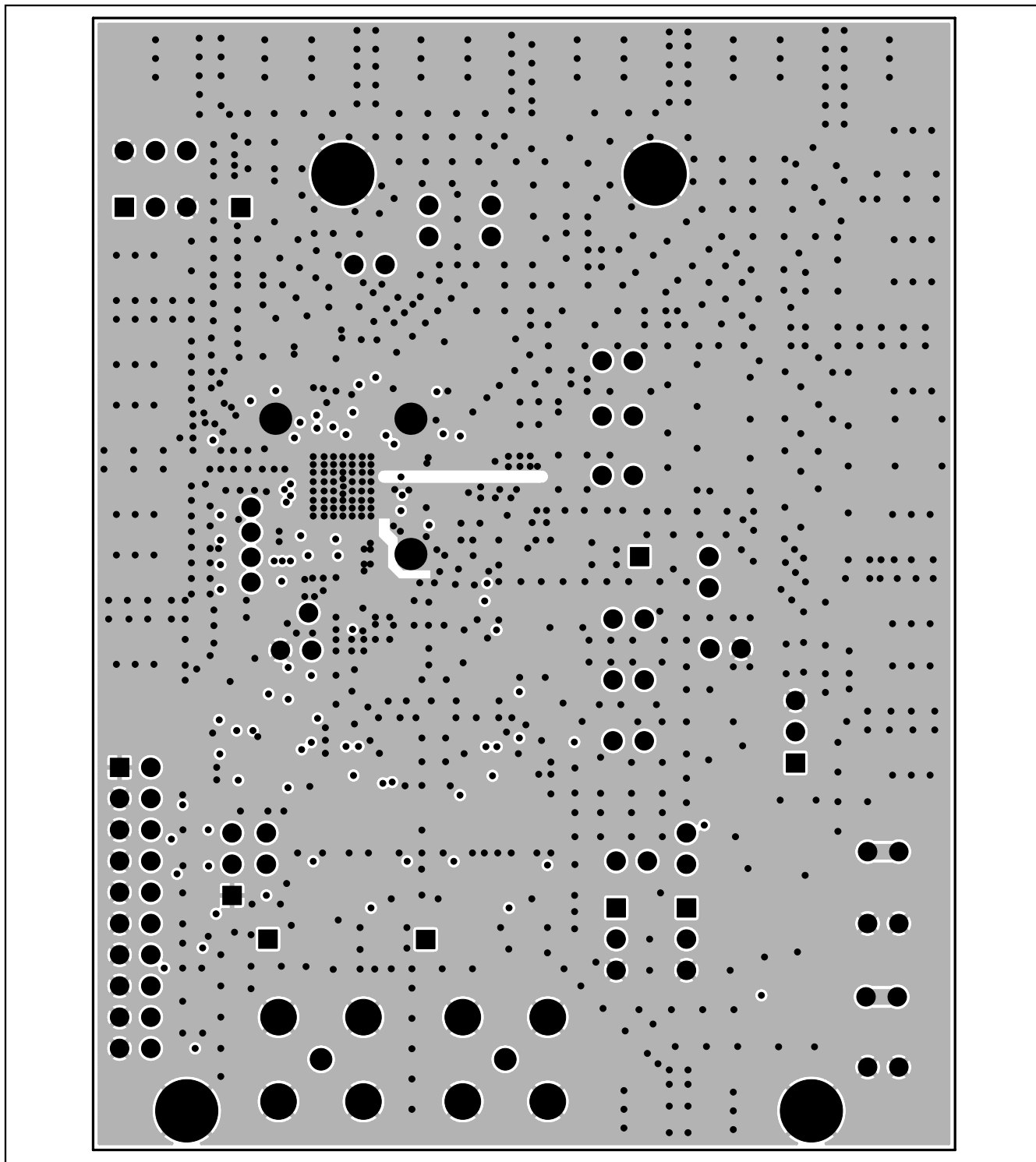


Figure 5. MAX2585 EV Kit PCB Layout—Inner Layer 2

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Evaluates: MAX2585

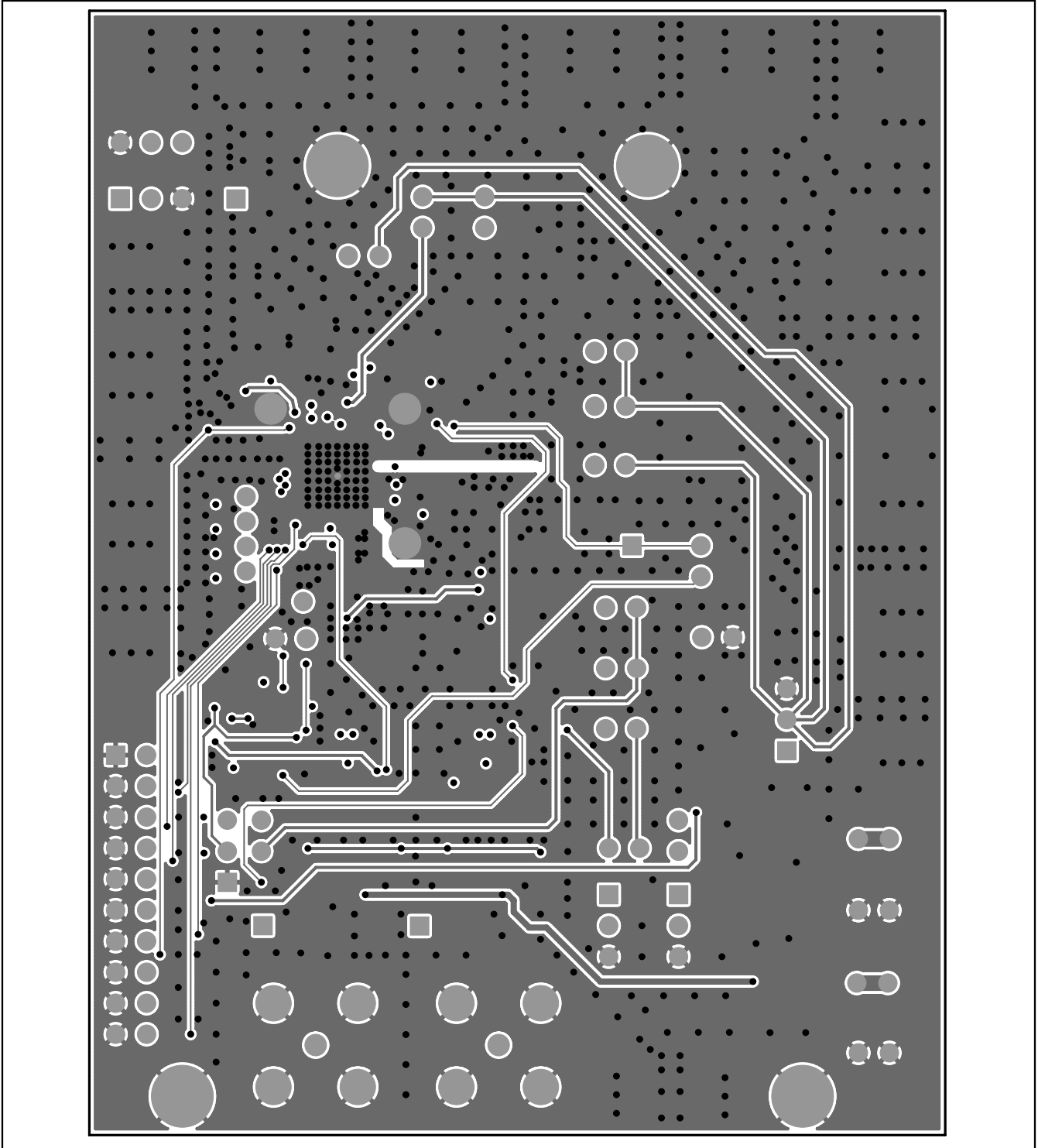


Figure 6. MAX2585 EV Kit PCB Layout—Inner Layer 3

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Evaluates: MAX2585

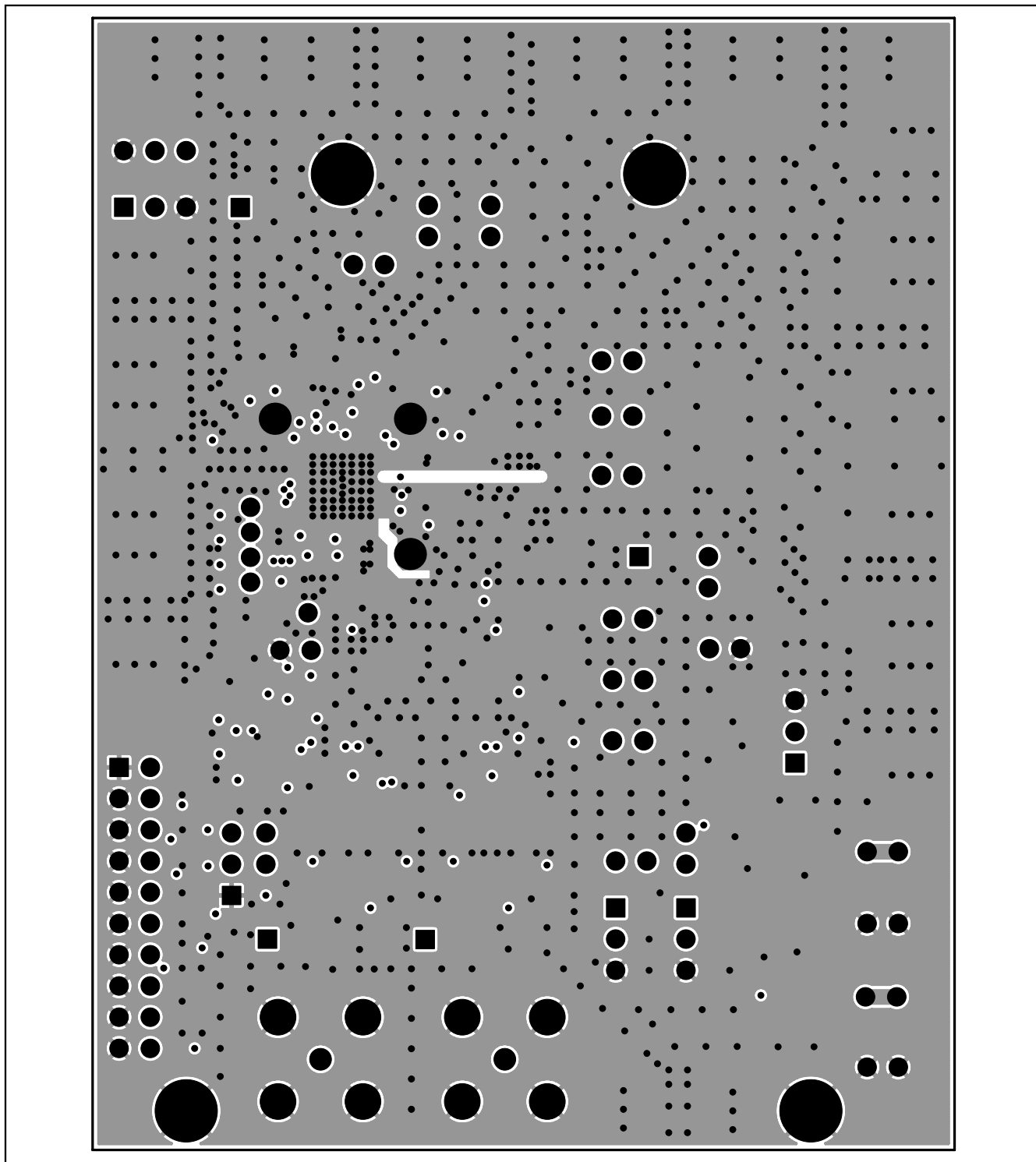


Figure 7. MAX2585 EV Kit PCB Layout—Inner Layer 4

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Evaluates: MAX2585

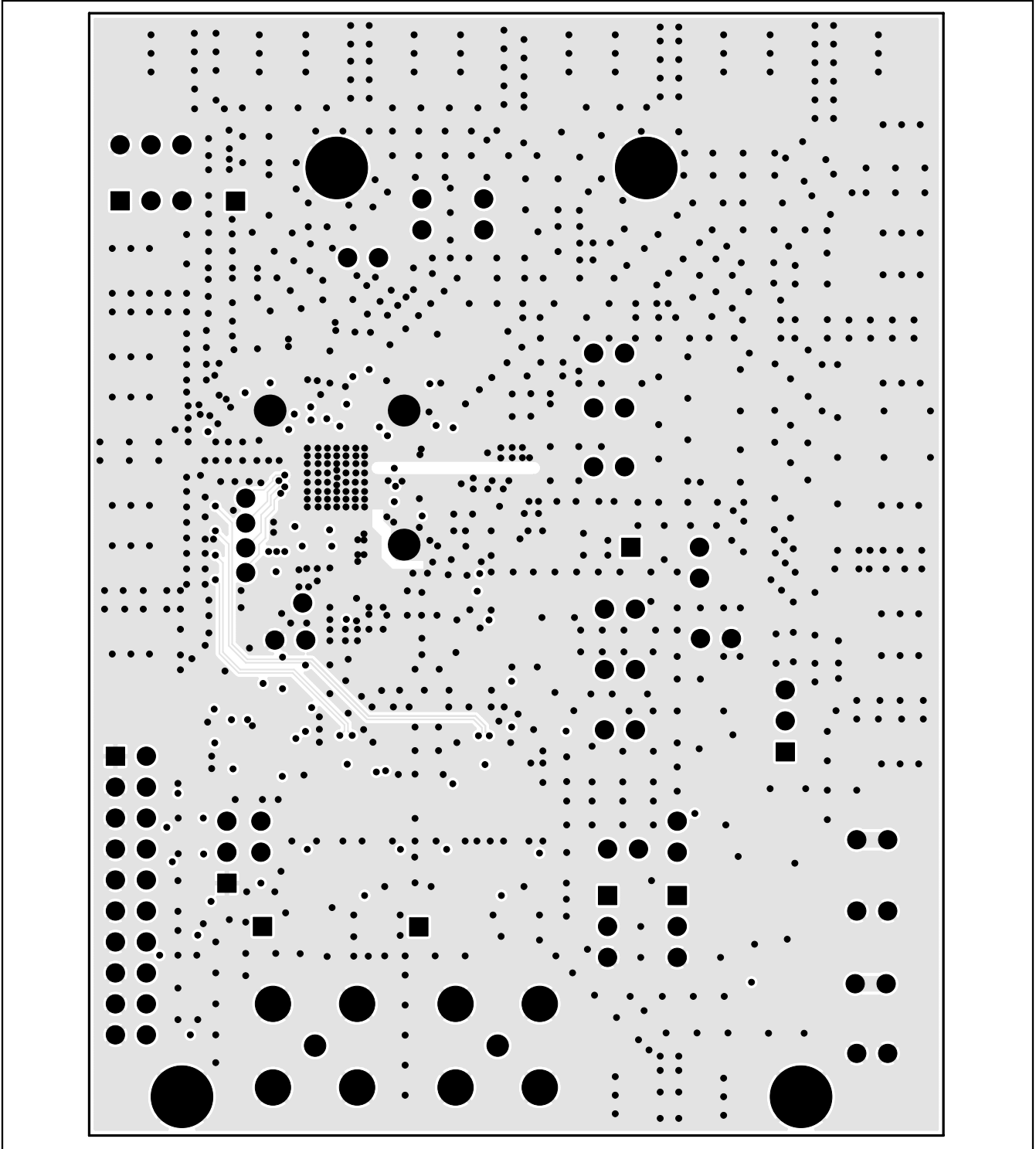


Figure 8. MAX2585 EV Kit PCB Layout—Inner Layer 5

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Evaluates: MAX2585

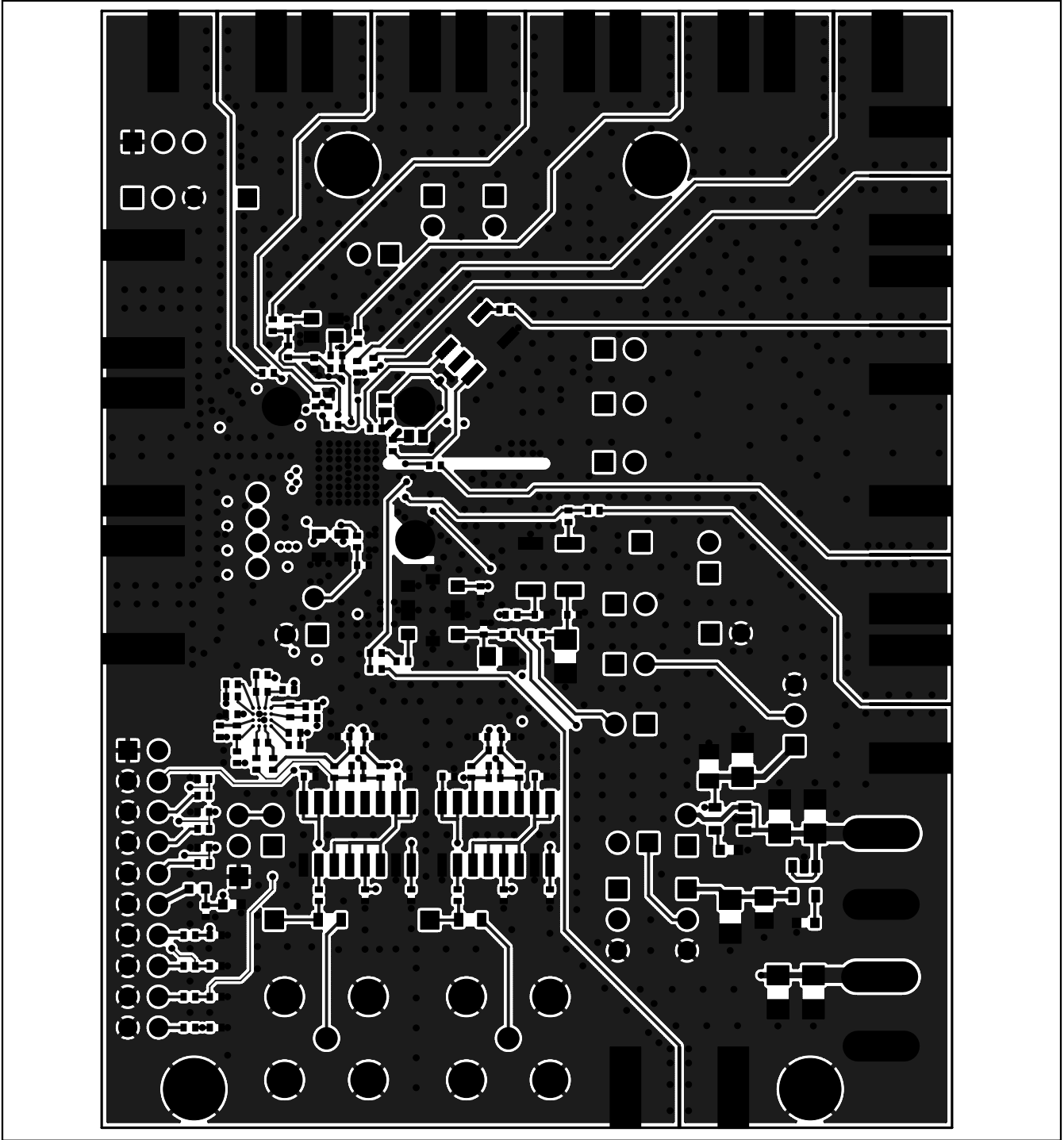


Figure 9. MAX2585 EV Kit PCB Layout—Secondary Component Side

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Evaluates: MAX2585

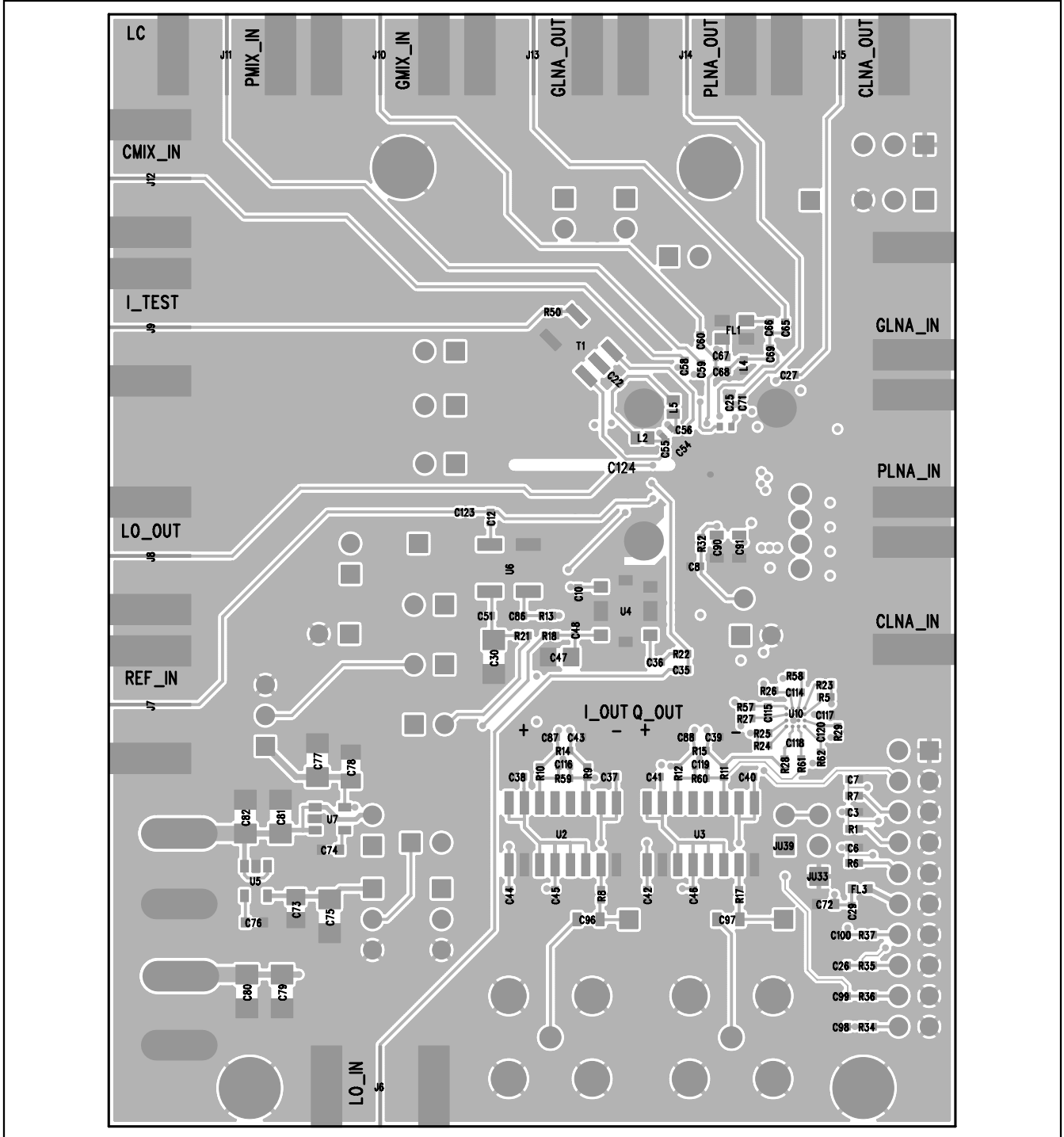


Figure 10. MAX2585 EV Kit PCB Layout—Bottom Silkscreen

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