MAX8900A Evaluation Kit

Evaluates: MAX8900A/MAX8900B

General Description

The MAX8900A evaluation kit (EV kit) is a fully assembled and tested circuit for evaluating the MAX8900A switch-mode Li+/Li-Poly charger with ±22V input rating and JEITA* battery temperature monitoring. The MAX8900A charges a 1-cell lithium-ion (Li+) or lithium-polymer (Li-Poly) battery. The MAX8900A delivers up to 1.2A of current to the battery from a 3.4V to 6.3V supply. External resistors and potentiometers adjust the fast-charge current and the prequalification and done current thresholds. A JEITA battery temperature monitor adjusts charge current and termination voltage.

The MAX8900A EV kit comes with the MAX8900A installed, but can also be used to evaluate the MAX8900B with IC replacement of U1. Request a free sample of the MAX8900B when you order the MAX8900A EV kit.

Ordering Information

PART	TYPE
MAX8900AEVKIT+	EV KIT

+Denotes lead(Pb)-free and RoHS compliant.

Features

- **3.25MHz Switching Li+/Li-Poly Battery Charger**
- **JEITA Battery Temperature Monitor Adjusts Charge Current and Termination Voltage**
  - **On-Board 3380K NTC Thermistor**
  - **On-Board Potentiometer Allows Easy Evaluation**
- **Battery Fast-Charge Current-Limit Adjustment Range of 50mA to 1200mA**
  - **Dynamic Charge Current Programming Using MOSFET and Resistor Array on the EV Kit**
  - **Potentiometer Adjustment Available**
- **Prequalification and Done Threshold Adjustment Range of 10mA to 200mA**
  - **Dynamic Charge Current Programming Using MOSFET and Resistor Array on the EV Kit**
  - **Potentiometer Adjustment Available**
- **Selectable Charge Source Connector 2.1mm Barrel or Micro-USB**
- **Three Status LED Indicators**
- **Fully Assembled and Tested**

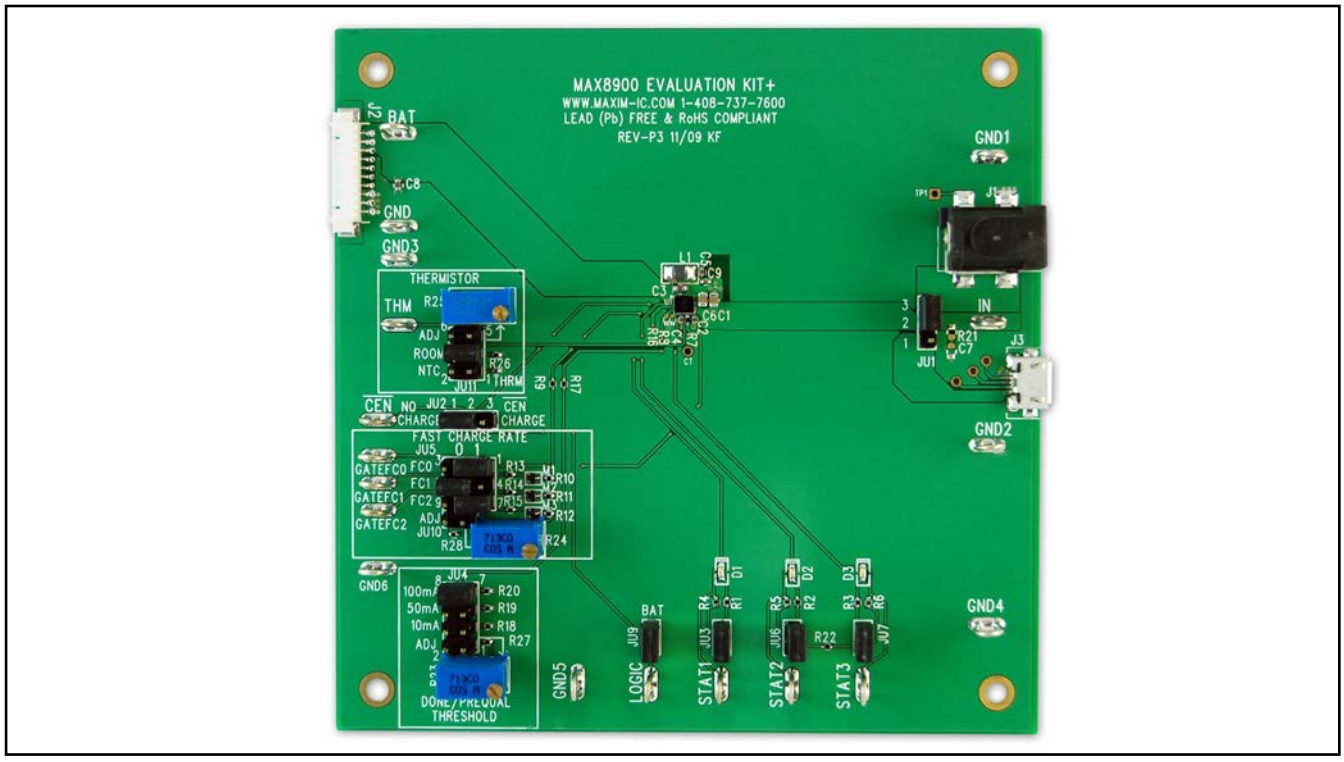

Figure 1. MAX8900 EV Kit Photo

**JEITA (Japan Electronics and Information Technology Industries Association) standard, "A Guide to the Safe Use of Secondary Lithium Ion Batteries in Notebook-type Personal Computers" April 20, 2007.*

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maximintegrated.com.

19-5244; Rev 0; 4/10

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C6	2	0.47µF ±20%, 25V X5R ceramic capacitors (0603) TDK C1608X5R1E474M
C2, C5	2	0.1µF ±20%, 10V X5R ceramic capacitors (0402) TDK C1005X5R1A104K
C3, C8	2	2.2µF ±20%, 6.3V X5R ceramic capacitors (0603) TDK C1608X5R0J225M
C4	1	0.47µF ±20%, 10V X5R ceramic capacitor (0402) TDK C1005X5R1A474M
C7	0	Not installed, capacitor (0603)
C9	1	1µF ±20%, 6.3V X5R ceramic capacitor (0402) TDK C1005X5R0J105M
D1, D2, D3	3	Green LEDs Avago Technologies HSMG-C190
J1	1	Male 2.1mm power connector CUI Inc. PJ-002A-SMT
J2	0	Not installed, 1.25mm (0.049in) pitch header (surface-mount, right-angle, lead-free, 10 circuits)
J3	1	Micro-USB connector Hirose Electric ZX62-AB-5PA
JU1, JU2	2	3-pin headers, 0.1in centers Sullins PEC36SAAN
JU3, JU6, JU7, JU9, JU10	5	2-pin headers, 0.1in centers Sullins PEC36SAAN
JU4	1	2 x 4-pin header, 0.1in centers Sullins PEC36SAAN
JU5	1	3 x 3-pin header, 0.1in centers Sullins PEC36SAAN
JU11	1	2 x 3-pin header, 0.1in centers Sullins PEC36SAAN
L1	1	1µH, 0.055Ω, 1.6A chip inductor (2.5mm x 2mm x 0.9mm) Murata LQM2HPN1R0MGO
M1, M2, M3	3	20V, 238mA n-channel MOSFETs (SC-75) ON Semi NTA4001NT1G

DESIGNATION	QTY	DESCRIPTION
R1, R2, R3	3	422Ω ±1% resistors (0402), lead-free
R4, R5, R6	3	560kΩ ±1% resistors (0402), lead-free
R7, R26	2	10kΩ ±1% resistors (0402), lead-free
R8, R16	0	Not installed, resistors (0402)
R9, R17, R22	3	0Ω ±1% resistors (0402), lead-free
R10, R18	2	35.7kΩ ±1% resistors (0402), lead-free
R11	1	9.09kΩ ±1% resistor (0402), lead-free
R12	1	4.75kΩ ±1% resistor (0402), lead-free
R13, R14, R15	3	100kΩ ±1% resistors (0402), lead-free
R19	1	7.68kΩ ±1% resistor (0402), lead-free
R20	1	3.83kΩ ±1% resistor (0402), lead-free
R21	0	Not installed, resistor (0603)
R23, R24	2	50kΩ, 25-turn potentiometers Bourns 3296Y-1-503LF
R25	1	200kΩ, 25-turn potentiometer Bourns 3296Y-1-204LF
R27	1	1.21kΩ ±1% resistor (0402), lead-free
R28	1	2.26kΩ ±1% resistor (0402), lead-free
THRM	1	10kΩ NTC thermistor (0402) Murata NCP15XH103F03 (ß = 3380K)
U1	1	High-frequency, switch-mode charger (30 WLP) Maxim MAX8900AEWV+
—	12	Shunts (see Table 1 for jumper settings)
—	1	USB A-to-Micro-USB B, 2.0m cable Molex 68784-0003 Digi-Key WM17147-ND
—	1	Adjustment tool Bourns H-90 Digi-Key H90-ND
—	1	PCB: MAX8900A EVALUATION KIT+

Component Suppliers

SUPPLIER	WEBSITE
Avago Technologies	www.avagotech.com
Bourns, Inc.	www.bourns.com
CUI Inc.	www.cui.com
Digi-Key Corp.	www.digikey.com
Hirose Electric Co., Ltd.	www.hirose.com
Murata Manufacturing Co., Ltd.	www.murata.com
ON Semiconductor	www.onsemi.com
Sullins Electronics Corp.	www.sullinselectronics.com
TDK Corp.	www.component.tdk.com

Note: *Indicate that you are using the MAX8900A when contacting these component suppliers.*

Quick Start

Recommended Equipment

- Adjustable DC power supply capable of at least 1.2A at 6V
- Battery or simulated battery

  1-cell Li+ or Li-Poly battery (Figure 2A)

  Simulated battery, preloaded power supply (Figure 2B)
- Digital multimeter (DMM)
- Two 3A ammeters

Procedure

The MAX8900A EV kit is fully assembled and tested. Follow the steps below to verify board operation. Use twisted wires of appropriate gauge (20AWG) that are as short as possible to connect the battery and power sources.

1) Ensure that the EV kit has the jumper settings as shown in Figure 3 and Table 1.
2) Preset the DC power supply to 5V. Turn off the power supply. Do not turn on the power supply until all connections are completed.
3) Connect the EV kit to the power supply, battery, or preloaded power supply and meters, as shown in Figure 3. Adjust the ammeters to their largest current range to minimize their series impedance. Do not allow the ammeters to operate in their “autorange” mode. If current readings are not desired, short across the ammeters.
4) Turn on the power supply.
5) If $3V \le V_{BAT} \le 4.1V$, then verify that the current from BAT into the battery is approximately 95mA. If V_{BAT} is not in this specified range, refer to Figure 6 in the MAX8900A/MAX8900B IC data sheet for more information.

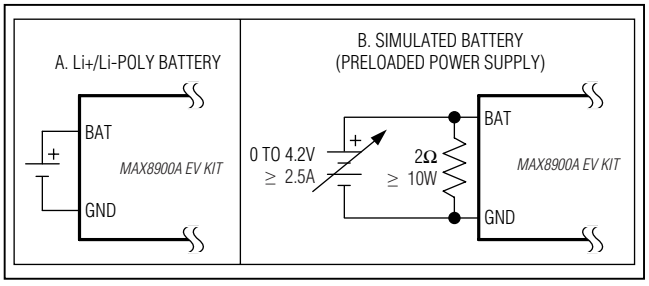

Figure 2. Battery Options for Evaluating the MAX8900A EV Kit

MAX8900A Evaluation Kit

Evaluates: MAX8900A/MAX8900B

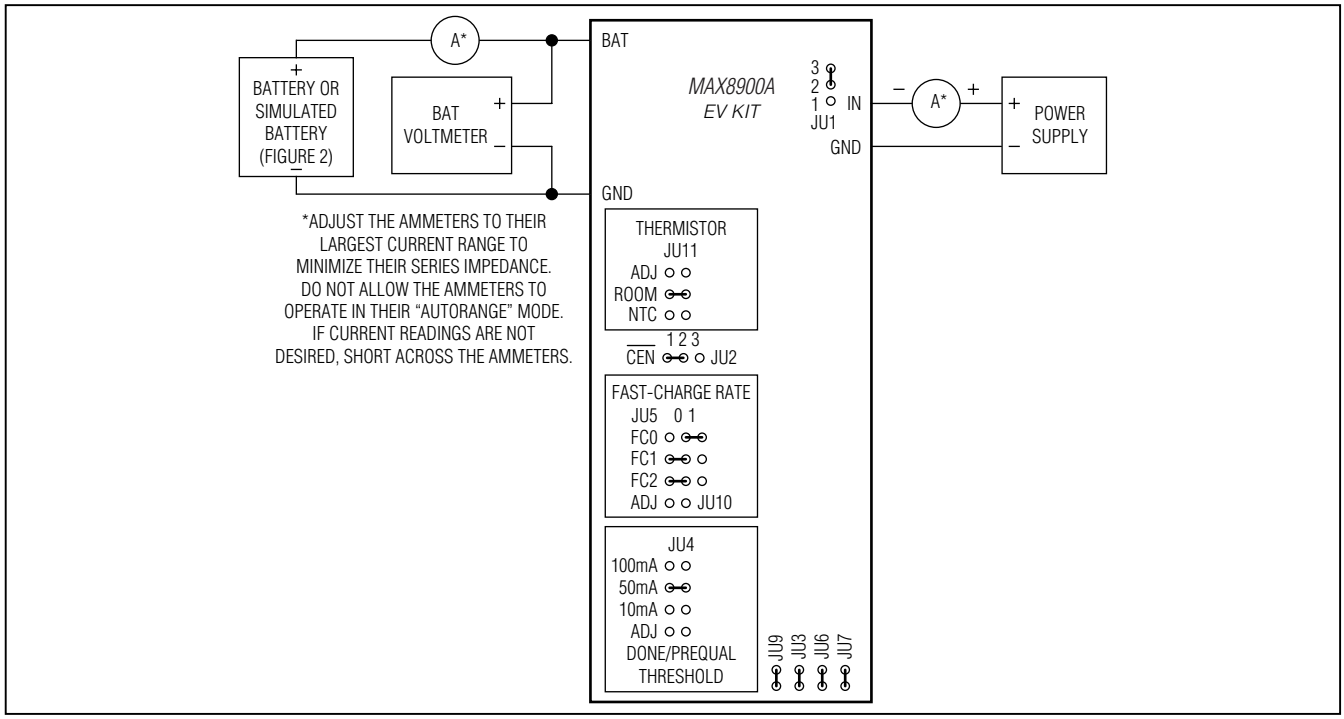

Figure 3. Connection Diagram and Default Jumper Connections

Table 1. Jumper Functions

JUMPER	NODE OR FUNCTION	POSITION	FUNCTION
JU1	IN input selector	Open	Only the "IN" pad is connected to the MAX8900A's power input (IN).
		1-2	Both the "IN" pad and J3 are connected to IN.
		2-3*	Both the "IN" pad and J1 are connected to IN.
JU2	$\overline{CEN}$	1-2	Charger is disabled (logic-high).
		2-3*	Charger is enabled (logic-low).
JU3	STAT1 output	1-2*	D1 LED indicator is connected to STAT1.
		Open	D1 LED indicator is not connected to STAT1.
JU4	DONE/PREQUAL THRESHOLD adjustment	1-2	Adjustable setting. R23 (50kΩ potentiometer) and R27 are connected to DNI.
		3-4	10mA setting. R18 (35.7kΩ) is connected to DNI.
		5-6*	50mA setting. R19 (7.68kΩ) is connected to DNI.
		7-8	100mA setting. R20 (3.83kΩ) is connected to DNI.
JU5	FAST-CHARGE RATE adjustment	1-2*	Gate of M1 driven high. R10 (35.7kΩ) is connected to SETI, which increases the fast-charge current setting by 95mA.
		2-3	Gate of M1 driven low. R10 is disconnected from SETI.
		4-5	Gate of M2 driven high. R11 (9.09kΩ) is connected to SETI, which increases the fast-charge current setting by 375mA.
		5-6*	Gate of M2 driven low. R11 is disconnected from SETI.
		7-8	Gate of M3 driven high. R12 (4.75kΩ) is connected to SETI, which increases the fast-charge current setting by 717mA.
		8-9*	Gate of M3 driven low. R12 is disconnected from SETI.

**Default position.*

Table 1. Jumper Functions (continued)

JUMPER	NODE OR FUNCTION	POSITION	FUNCTION
JU6	STAT2 output	1-2*	D2 LED indicator is connected to STAT2.
		Open	D2 LED indicator is not connected to STAT2.
JU7	STAT3 output	1-2*	D3 LED indicator is connected to STAT3.
		Open	D3 LED indicator is not connected to STAT3.
JU9	LOGIC	1-2*	Connects VBAT to LOGIC. LOGIC serves as the pullup node for the STAT_ indicator LED. Pin 1 of JU2 connects to LOGIC.
		Open	LOGIC must be supplied by an independent power supply that is less than 5V.
JU10	FAST-CHARGE RATE R24 (potentiometer) connection	1-2	Adjustable setting R24 (50kΩ potentiometer) and R28 are connected to SETI.
		Open*	R24 and R28 are not connected to SETI.
JU11	Thermistor adjustment	1-2	NTC is connected to THM.
		3-4*	R26 is connected to THM.
		5-6	R25 (200kΩ potentiometer) is connected to THM.

**Default position.*

Detailed Hardware Description

Input Power Connection

Two input power connectors are provided on the EV kit. J1 is a 2.1mm power connector and J3 is a Micro-USB connector. Shunting pins 1-2 of jumper JU1 connects J1 to IN on the MAX8900A. Shunting pins 2-3 of JU1 connects J3 to IN on the MAX8900A. The IN pad next to JU1 is always connected and can be used to measure the voltage on JU1 or JU3, or used as an input only.

Charger Input Enable ($\overline{CEN}$)

$\overline{CEN}$ is a digital input. Driving $\overline{CEN}$ (JU2) high (pins 1-2) disables the battery charger. Driving $\overline{CEN}$ (JU2) low (pins 2-3) enables the MAX8900A. Leaving $\overline{CEN}$ (JU2) unconnected (pins open) also enables the charger.

Setting the Fast-Charge Current Limit (SETI)

As shown in Figure 3, MOSFET and resistor combinations adjust the total resistance from SETI to ground. The MAX8900_ supports values of fast-charge current (I_{FC}) from 50mA to 1200mA. Table 2 shows the I_{FC} values that are easily obtainable by adjusting jumpers JU5 and JU10. The relationship between R_{SETI} and I_{FC} is as follows:

$$I_{FC} = 3405V/R_{SETI}$$

Setting the Prequalification Current and Done Threshold (DNI)

As shown in Figure 3, several different resistor values can be connected from DNI to ground by using jumper JU4. The resistance from DNI to ground sets the prequalification current (I_{PQ}) and done current (I_{DN}). The MAX8900A supports I_{DN} and I_{PQ} currents from 10mA to 200mA. Table 3 shows the I_{DN} and I_{PQ} values that are easily attained with the EV kit. The relationship between R_{DNI}, I_{DN}, and I_{PQ} is as follows:

$$I_{DN} = 384V/R_{DNI}$$

$$I_{PQ} = 415V/R_{DNI}$$

Thermistor (THM)

The MAX8900A adjusts the charge current and termination voltage, as described in the JEITA specification for safe use of secondary lithium-ion batteries (*A Guide to the Safe Use of Secondary Lithium Ion Batteries in Notebook-type Personal Computers*, April 20, 2007). The temperature thresholds are explained in detail in the MAX8900A/MAX8900B IC data sheet.

The EV kit includes four options for thermistor evaluation:

1) Disable thermistor (JU11 = Pins 3-4): Biases THM at AVL/2, which the MAX8900A interprets as the battery temperature at +25°C.

2) Ambient temperature monitor (JU11 = Pins 1-2): Connects the on-board thermistor (THRM), which is a 10kΩ NTC thermistor (β = 3380K), allowing ambient temperature monitoring.
3) Potentiometer simulation (JU11 = pins 5-6): Connects a 200kΩ potentiometer (R25), allowing user adjustment of V_{THM} to quickly evaluate all thermistor operating regions.
4) Battery pack (JU11 = Open): Leaves JU11 open such that the EV kit user can wire the THM pad directly to the battery pack's internal thermistor for "true" battery temperature monitoring.

Charge Timers

A fault timer prevents the battery from charging indefinitely. The prequalification and fast-charge timers are controlled by the capacitance at C_{CT}: C4.

$$t_{PQ} = 30min \times \frac{C_{CT}}{0.1\mu F}$$

$$t_{FC} = 180min \times \frac{C_{CT}}{0.1\mu F}$$

The top-off time (t_{TO}) is fixed at 16s:

$$t_{TO} = 16s$$

Connect CT to GND to disable the prequalification and fast-charge timers. With the internal timers of the MAX8900A disabled, an external device such as a microprocessor (µP) can control the charge time through the $\overline{CEN}$ input.

Status Outputs

STAT_ includes pullup resistors R4, R5, and R6, which allow voltage monitoring on the STAT_ pads near the edge of the PCB. Jumpers JU3, JU6, and JU7 allow the connection of indicator LEDs D1, D2, and D3. Table 1 describes the jumper connections. Tables 4 and 5 define the status output truth tables.

When evaluating the MAX8900A, STAT3 pulls low when the battery-temperature monitor detects that the battery temperature is greater than the T4 threshold; otherwise, STAT3 is high impedance. Some systems may want to reduce the battery loading when STAT3 pulls low to prevent the battery from getting excessively hot.

Table 2. Fast-Charge Current-Limit Settings

JU5 (FC0)		JU5 (FC1)		JU5 (FC2)		JU10 (ADJ)	RESISTORS CONNECTED IN PARALLEL FROM SETI TO GROUND	TOTAL RESISTANCE (Ω)	I_{FC}* (mA)
1-2 (1)	2-3 (0)	4-5 (1)	5-6 (0)	7-8 (1)	8-9 (0)	1-2			
—	O	—	O	—	O	O	R10, R11, R12	2869	1187
O	—	—	O	—	O	O	R11, R12	3120	1091
—	O	O	—	—	O	O	R10, R12	4192	812
O	—	O	—	—	O	O	R12	4750	717
—	O	—	O	O	—	O	R10, R11	7245	470
O	—	—	O	O	—	O	R11	9090	375
—	O	O	—	O	—	O	R10	35700	95
O	—	O	—	O	—	O	—	Open	0
O	—	O	—	O	—	—	R24 + R28	Adjustable 52260 to 2260	Adjustable 65.2 to 1507**

Note: *( ) = Parenthetic items reference the silkscreen.*

— = Contact closed (i.e., shunt installed).

O = Contact open (i.e., shunt not installed).

**Current values shown assume T2 < THM < T4.*

***Device rated up to 1200mA.*

Table 3. Prequalification and Done Current-Limit Settings

JU4				RESISTANCE (kΩ)	I_{DN} (mA)	I_{PQ} (mA)*
1-2	3-4	5-6	7-8			
—	O	O	O	R27 + R23 (51.21 to 1.21)	Adjustable 8.1 to 343**	Adjustable 7.5 to 317**
O	—	O	O	R18 (35.7)	10.76	11.63
O	O	—	O	R19 (7.68)	50.00	54.04
O	O	O	—	R20 (3.83)	100.26	108.36

Note: *— = Contact closed (i.e., shunt installed).*

O = Contact open (i.e., shunt not installed).

**Current values shown assume T2 < THM < T4.*

***Device rated for 9.8mA to 200mA.*

Table 4. MAX8900A 2-Pin Status Output Truth Table

STAT1		STAT2		INDICATION
PAD	D1	PAD	D2	
0	On	0	On	Undefined
0	On	1	Off	Charging (dead-battery state or dead battery and prequalification state or prequalification state or fast-charge state)
1	Off	0	On	Timer fault or $V_{IN} > V_{OVLO}$ or battery cold (THM < T1) or battery hot (THM > T4)
1	Off	1	Off	Done state or $\overline{CEN}$ = 1 or $V_{IN} < V_{UVLO}$ or $V_{IN} < (V_{BAT} + V_{IN2BAT})$ or thermal shutdown

Note: *STAT1 and STAT2 are open-drain outputs. 0 indicates that the output device is pulling low; 1 indicates that the output is high impedance.*

Table 5. MAX8900B 3-Pin Status Output Truth Table

STAT1		STAT2		STAT3		INDICATION
PAD	D1	PAD	D2	PAD	D3	
0	On	0	On	0	On	Battery cold (THM < T1)
0	On	0	On	1	Off	$V_{IN} > V_{OVLO}$
0	On	1	Off	0	On	Charging (dead-battery state or dead battery and prequalification state or prequalification state or fast-charge state)
0	On	1	Off	1	Off	Battery hot (THM >T4)
1	Off	0	On	0	On	Done state
1	Off	0	On	1	Off	Undefined
1	Off	1	Off	0	On	Timer fault
1	Off	1	Off	1	Off	$V_{IN} < V_{UVLO}$ or $\overline{CEN}$ = 1 or $V_{IN} < (V_{BAT} + V_{IN2BAT})$ or thermal shutdown

Note: *STAT1, STAT2, and STAT3 are open-drain outputs. 0 indicates that the output device is pulling low; 1 indicates that the output is high impedance.*

PCB Layout Guidelines

The MAX8900_ wafer-level package (WLP) and bump configuration allows for a small-size, low-cost PCB design. Figure 4 shows that the 30 bumps on the MAX8900_ WLP are combined into 18 functional nodes. The bump configuration places all like nodes adjacent to each other to minimize the area required for routing. The bump configuration also allows for a layout that does not use any vias within the WLP bump matrix (i.e., no micro vias). To utilize this no-via layout, $\overline{CEN}$ is left unconnected and the STAT3 pin is not used (2-pin status version). Note that although layouts without micro vias are possible, this EV kit uses filled micro vias that are on the WLP pads of the MAX8900A (A2, A5, A6, B2, C2, D2, and E6). These filled micro vias on pads were used to showcase the small solution size.

Figure 5 shows the recommended land pattern for the MAX8900_. Figure 6 shows the bump cross section of the MAX8900_ under-bump metal (UBM). The diameter of each pad in the land pattern is close to the diameter of the UBM. This land pattern to UBM relationship is important to get proper reflow of each solder bump. Note that although layouts without micro vias are possible, this EV kit uses filled micro vias that are on the WLP pads of the MAX8900A (A2, A5, A6, B2, C2, D2, and E6). These filled micro vias on pads were used to showcase the small solution size.

Underfill is not necessary for the MAX8900_ WLP to pass the JESD22-B111 Board Level Drop Test Method for Handheld Electronic Products. JESD22-B111 covers end applications such as cell phones, PDAs, cameras, and other products that are more prone to being dropped during their lifetime due to their size and weight. Consider using underfill for applications that require higher reliability than what is covered in the JESD22-B111 standard.

Careful printed circuit layout is important for minimizing ground bounce and noise. Figure 4 is an example layout of the critical power components for the MAX8900_. The arrangement of the components that are not shown in Figure 4 is less critical. Figures 8–10 show the entire layout of the MAX8900A EV kit and Table 6 shows the EV kit construction attributes. To ensure a successful layout for the MAX8900A, use the following list of guidelines and refer to Application Note 1891: *Wafer-Level Packaging (WLP) and Its Applications,* which is available at **www.maximintegrated.com**.

The following guidelines are listed in order of importance, with the most important elements listed first:

1) When the step-down converter's high-side MOSFET turns on, C_{INBP} delivers a high di/dt current pulse to INBP. Because of this high di/dt current pulse, place C_{INBP} close to INBP to minimize the parasitic impedance in the PCB trace.
2) When the step-down converter is increasing the current in the inductor, the high-side MOSFET is on and current flows in the following path: from C_{INBP} into INBP → out of LX → through the inductor → into CS → out of BAT → through C_{BAT} and back to C_{INBP} through the ground plane. This current loop should be kept small and the electrical length from the positive terminal of C_{INBP} to INBP should be kept short to minimize parasitic impedance. The electrical length from the negative terminal of C_{BAT} to the negative terminal of C_{INBP} should be short to minimize parasitic impedance. Keep all sensitive signals such as feedback nodes or audio lines outside of this current loop with as much isolation as your design allows.
3) When the step-down converter is decreasing the inductor current, the low-side MOSFET is on and the current flows in the following path: out of LX → through the inductor → into CS → out of BAT → through C_{BAT} → into PGND → out of LX again. This current loop should be kept small and the electrical length from the negative terminal of C_{BAT} to PGND should be short to minimize parasitic impedance. Keep all sensitive signals such as feedback nodes or audio lines outside of this current loop with as much isolation as your design allows.
4) The LX node voltage switches between INBP and PGND during the operation of the step-down converter. Minimize the stray capacitance on the LX node to maintain good efficiency. Also, keep all sensitive signals such as feedback nodes or audio lines away from LX with as much isolation as your design allows.
5) In Figure 4, the CS node is connected to the second layer of metal with vias. Use low-impedance vias capable of handling 1.5A of current. Also, keep the routing inductor current path on layer 2 just underneath the inductor current path on layer 1 to minimize impedance.
6) Both C_{BST} and C_{PVL} deliver current pulses for the MAX8900_'s MOSFET drivers. These components should be placed as shown in Figure 4 to minimize parasitic impedance.

7) Each of the MAX8900_ WLP bumps have approximately the same ability to remove heat from the die. Connect as much metal as possible to each bump to minimize the θ_{JA} associated with the MAX8900_. Refer to the *Thermal Management* section in the MAX8900A/MAX8900B IC data sheet for more information on θ_{JA}.

In Figure 4, many of the top-layer bump pads are connected together in top metal. When connecting bumps together with top-layer metal, the solder mask must define the pads from 180µm to 210µm, as shown in Figure 5. When using solder-mask defined pads, double-check the solder-mask openings on the PCB Gerber files before ordering boards because some PCB layout tools have configuration settings that automatically oversize solder-mask openings. Also, give special instruction in your PCB construction attributes (Table 6) that the BGA solder mask under the MAX8900A should not be modified by the board manufacturer. Occasionally, optimization tools are used at the PCB fabrication house that modify solder masks. Layouts that do not use solder-mask defined pads are possible. When using these layouts, adhere to guidelines 1–7.

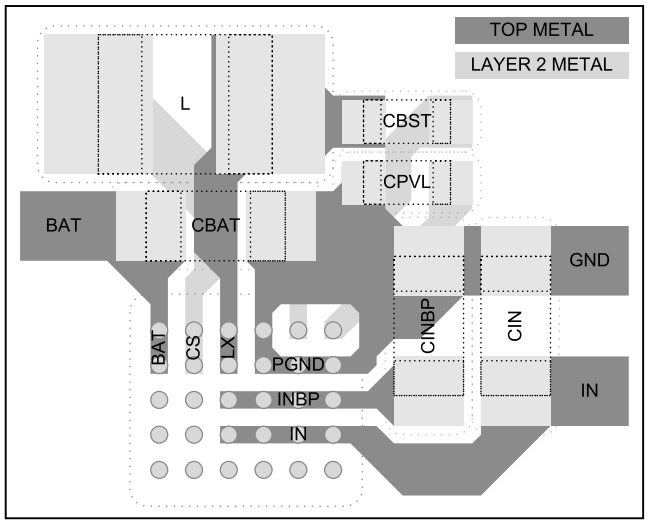

Figure 4. Power PCB Layout Example

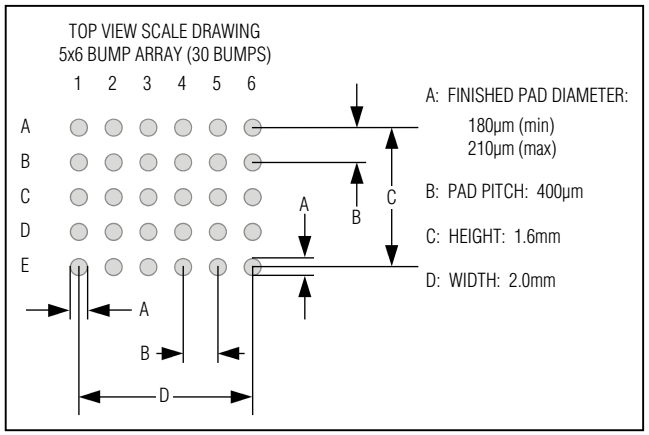

Figure 5. Recommended Land Pattern

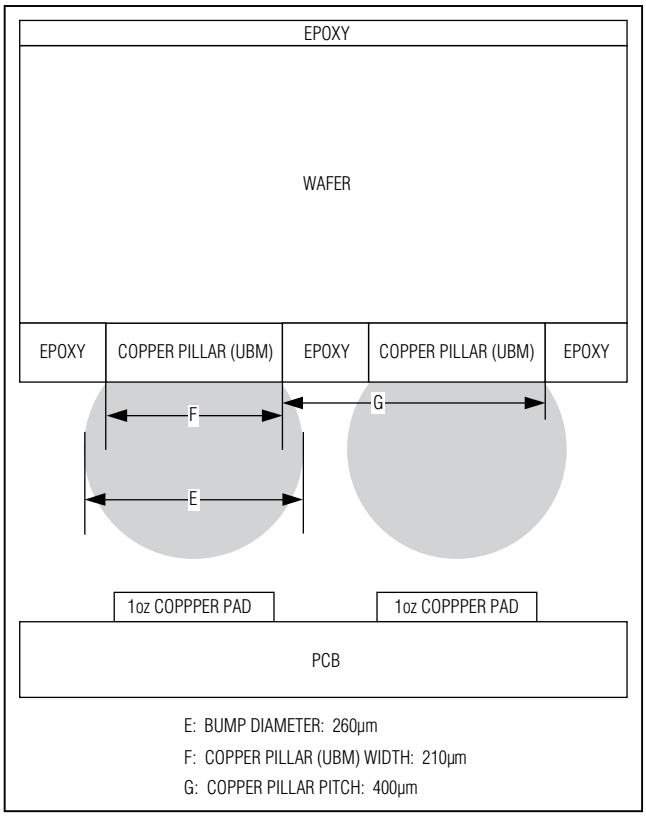

Figure 6. Bump Cross Section and Copper Pillar Detail

Evaluating the MAX8900B

The EV kit comes with the MAX8900A installed, but can also be used to evaluate the MAX8900B. To evaluate the MAX8900B, carefully remove the MAX8900A (U1) from the EV kit and replace it with a MAX8900B; no other component changes are required. For guidelines on how to remove and replace the MAX8900_, refer to the Component Rework section in Application Note 3377: *Maxim Wafer-Level Package Assembly Guide,* which is available at www.maximintegrated.com.

Request a free sample of the MAX8900B when you order the MAX8900A EV kit.

EV Kit I/O Pads

The EV kit has I/O pads on several points of interest (see Figure 9: IN, BAT, GND, etc.). A 20AWG bare wire installed in the I/O pad provides a convenient means to attach scope probes or the clip leads of a power supply or DMM. Figure 7 shows a 20AWG bare wire loop installed in an I/O pad. Note that most production EV kits are shipped without wire installed in the I/O pads. EV kits that have been customized or have been used for additional testing within Maxim typically have wire installed in the I/O pads.

Table 6. PCB Construction Attributes

MATERIAL:	RoHS-compliant FR-4 laminate material compatible with lead-free soldering processes
SIZE:	4.000in x 4.000in
THICKNESS:	0.064in
LAYERS:	Two
SOLDER MASK:	Green LPI SMOBC
LEGENDS:	White (clipped all legends from exposed metal)
COPPER CLAD FINISH:	1oz top and 1oz bottom
VIA UNDER WLP:	6 mil drill and 3 mill annular ring on top and bottom layers, filled via (Figure 8)
VIA ON REMAINING AREA OF PCB:	10 mil drill and 5 mill annular ring on top and bottom layers (Figure 8)
SPECIAL INSTRUCTIONS (WLP SPECIFIC):	BGA is solder-mask defined (do not oversize during manufacturing)
SPECIAL INSTRUCTIONS (6 MIL VIAS):	Nonconductive epoxy on the 6 mil drill vias

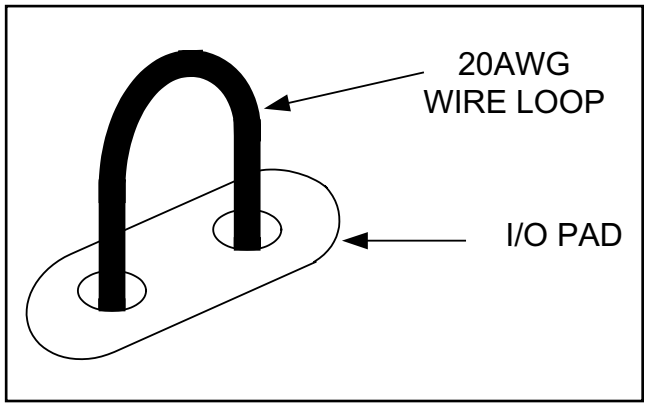

Figure 7. Wire Loop in I/O Pad Provides Convenient Attach Point

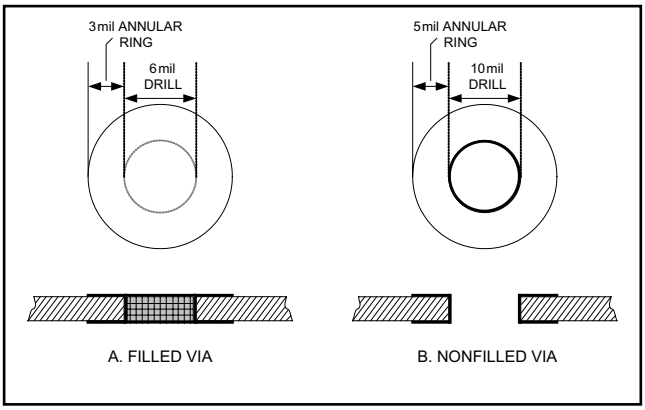

Figure 8. Via Details

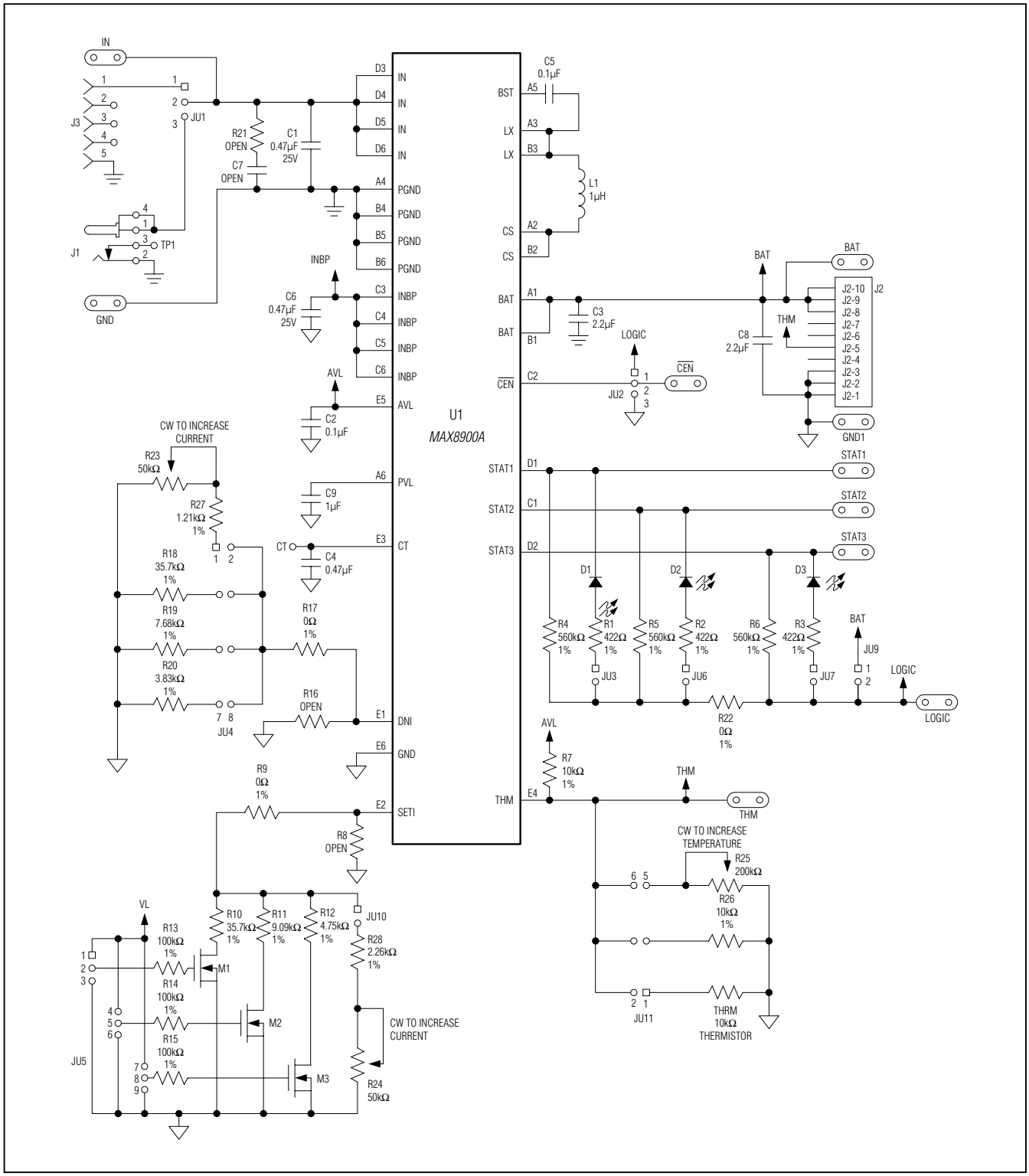

Figure 9. MAX8900A EV Kit Schematic

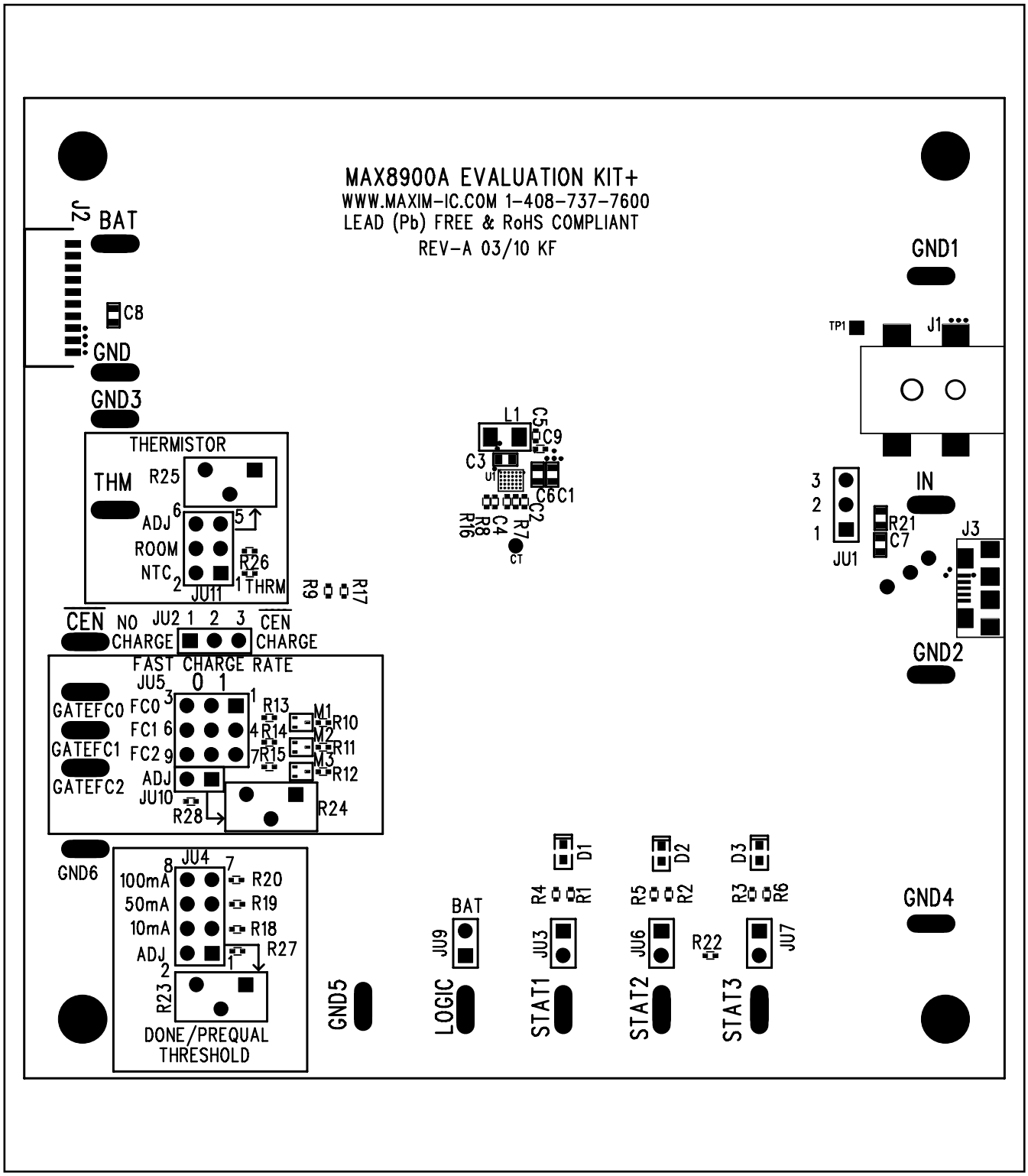

Figure 10. MAX8900A EV Kit Component Placement Guide—Top Layer

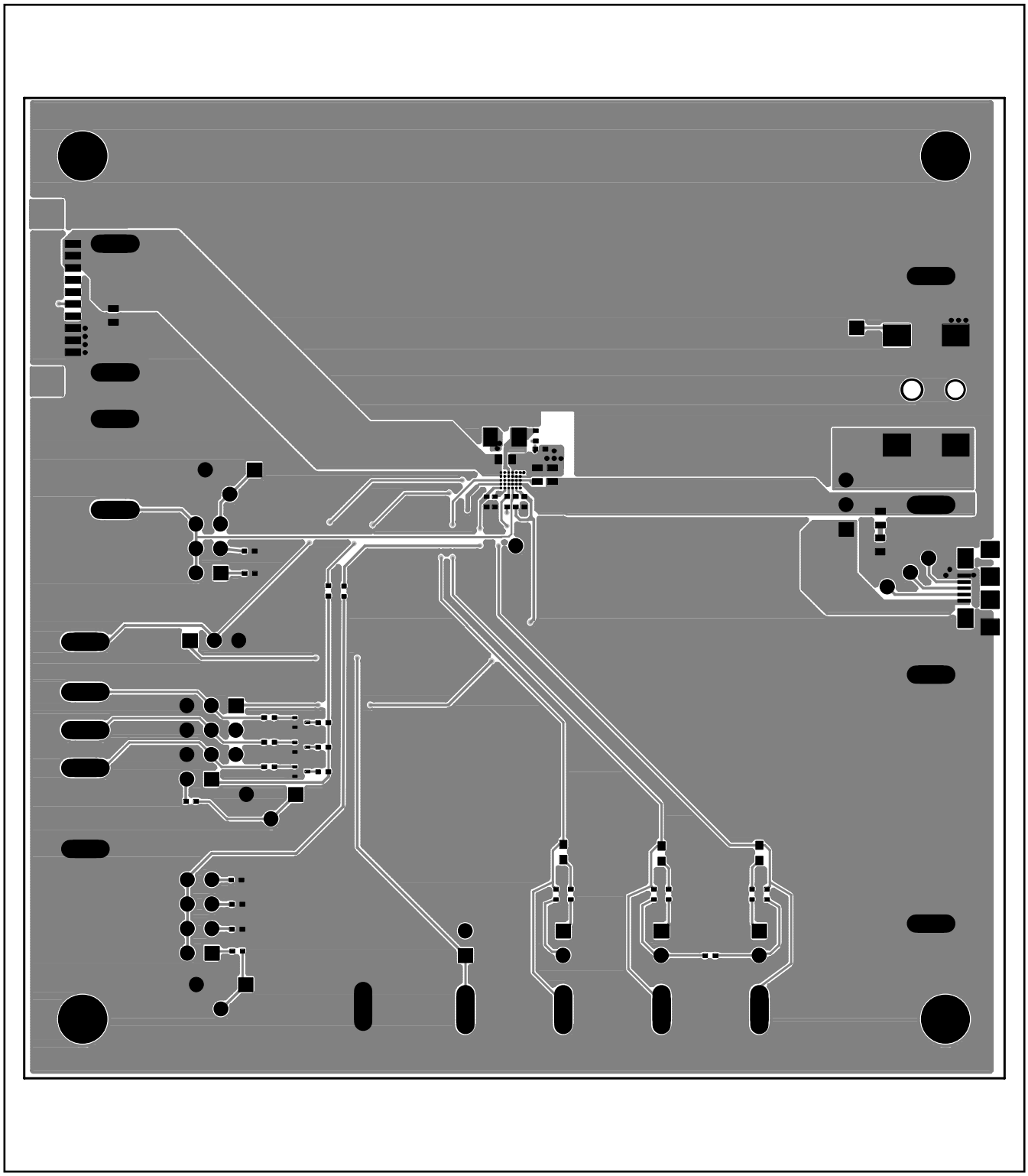

Figure 11. MAX8900A EV Kit PCB Layout—Top Layer

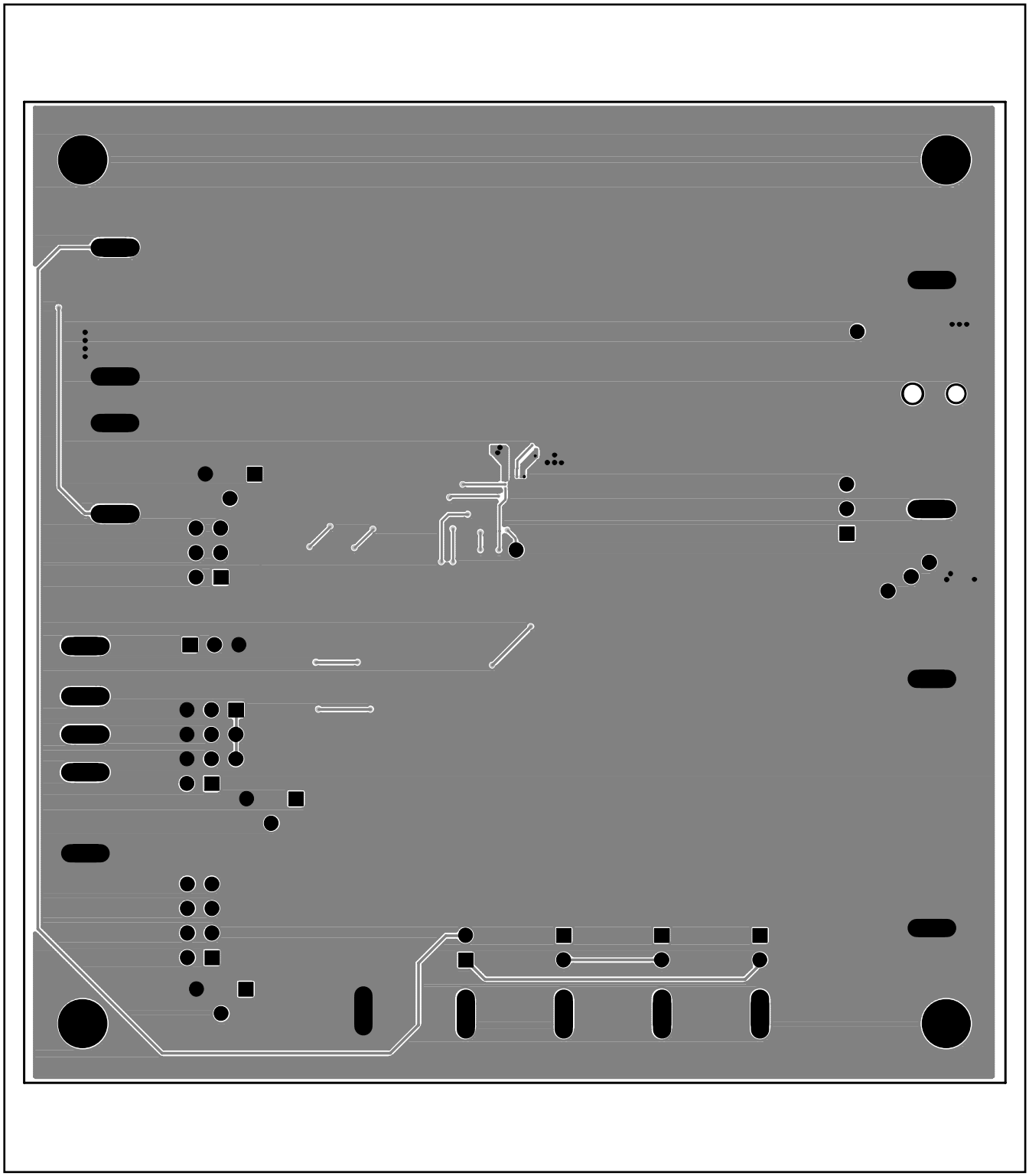

Figure 12. MAX8900A EV Kit PCB Layout—Bottom Layer

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	4/10	Initial release	—