

## MAX38909 TDFN Evaluation Kit

Evaluates: MAX38909

### General Description

The MAX38909 TDFN evaluation kit (EV kit) evaluates the MAX38909 in a TDFN package. The MAX38909 is a low input voltage, high output current linear regulator. The EV kit operates over an input range of 0.9V to 5.5V and a bias voltage range from 2.7V to 20V. The EV kit provides a resistor configurable output voltage range from 0.6V to 5.0V. The EV kit can deliver up to 2A of current.

### Features

- Evaluates the MAX38909 IC in a 14-pin (3mm x 3mm) TDFN
- 0.9V to 5.5V Input Range
- 2.7V to 20V Bias Voltage to Provide Wider Supply Options
- 0.6V to 5.0V Resistor Configurable Output Voltage (Default Output Set to 1V)
- Up to 2A Output Current
- Proven 4-Layer 1-oz Copper PCB Layout
- Demonstrates Compact Solution Size
- Fully Assembled and Tested

### MAX38909 TDFN EV Kit Files

FILE	DESCRIPTION
MAX38909 TDFN EV Kit BOM	EV Kit Bill of Material
MAX38909 TDFN EV Kit PCB Layout	EV Kit Layout
MAX38909 TDFN EV Kit Schematic	EV Kit Schematic

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

### Quick Start

#### Required Equipment

- MAX38909 TDFN EV kit
- 5.5V, 5A DC power supply (IN)
- 3V, 10mA DC power supply (BIAS)
- Electronic load capable of 2A
- Digital voltmeter (DVM)

#### Procedure

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

**Caution: Do not turn on power supply until all connections are completed.**

- 1) Verify that jumper JU1 is shunted on pins 1 and 2 (EV kit enabled).
- 2) Connect the 5.5V power supply between the IN and nearest GND terminal posts.
- 3) Connect the 3V (or higher, up to 20V) power supply between the BIAS and nearest GND terminal posts.
- 4) Connect the 2A electronic load between the OUT and nearest GND terminal posts.
- 5) Connect the DVM between the OUT and nearest GND terminal posts.
- 6) Turn on the power supply.
- 7) Verify that the voltage at the OUT terminal post is 1V within the device and the resistor divider's accuracy specifications.
- 8) Decrease the power supply to 1.3V (To minimize power dissipation at full load).
- 9) Enable the electronic load.
- 10) Verify that the voltage at the OUT terminal post is 1V within the device and the resistor divider's accuracy specifications.

## Detailed Description of Hardware

The MAX38909 TDFN EV kit evaluates the MAX38909 in a TDFN package. The MAX38909 is a low input voltage, high output current linear regulator that delivers 2A of output current. This regulator requires only 300mV of input-to-output headroom at full load.

The MAX38909 TDFN EV kit operates over an input range of 0.9V to 5.5V and a bias voltage range from 2.7V to 20V. The EV kit comes with the MAX38909ATD+ installed and the output voltage is set to 1V by 1% accurate feedback resistors R1 and R2. The EV kit output can be reconfigured to other voltages from 0.6V to 5.0V by replacing feedback resistors R1 and R2. Refer to the *MAX38909 IC data sheet* for feedback resistor calculation.

### EN (Enable)

The EV kit provides a jumper JU1 to enable or disable the MAX38909. See [Table 1](#) for jumper setting of jumper JU1.

**Table 1. EN (JU1)**

SHUNT POSITION	DESCRIPTION
1-2*	Enabled. EN = BIAS*
2-3	Disabled. EN = GND

\*Default position.

### Bias (BIAS)

The EV kit provides a bias input (BIAS) to accept an input voltage to control the LDO's regulating FET. The bias input voltage must be at least 2V above the output voltage. (i.e., if  $V_{OUT} = 1.0V$ , then  $BIAS \geq 3.0V$ , up to 20V.)

### Power OK (POK)

The EV kit provides a power ok (POK) output to indicate the device regulation status. The POK is open-drain and requires a pullup resistor between 10k $\Omega$  to 100k $\Omega$ . The EV kit POK is pullup to  $V_{OUT}$  through a 100k $\Omega$  resistor R3 by default. The POK can also be pullup to  $V_{IN}$  or an external voltage source. To pullup POK with  $V_{IN}$ , remove resistor R3 and install a resistor with the desired value to R4.

## Component Suppliers

SUPPLIER	WEBSITE
Kemet	www.kemet.com
Murata/TOKO	www.murata.com
TDK	www.tdk.com
Samsung Electro-Mechanics America, Inc.	www.samsungsem.com

**Note:** Indicate that you are using the MAX38909 when contacting these component suppliers.

## Ordering Information

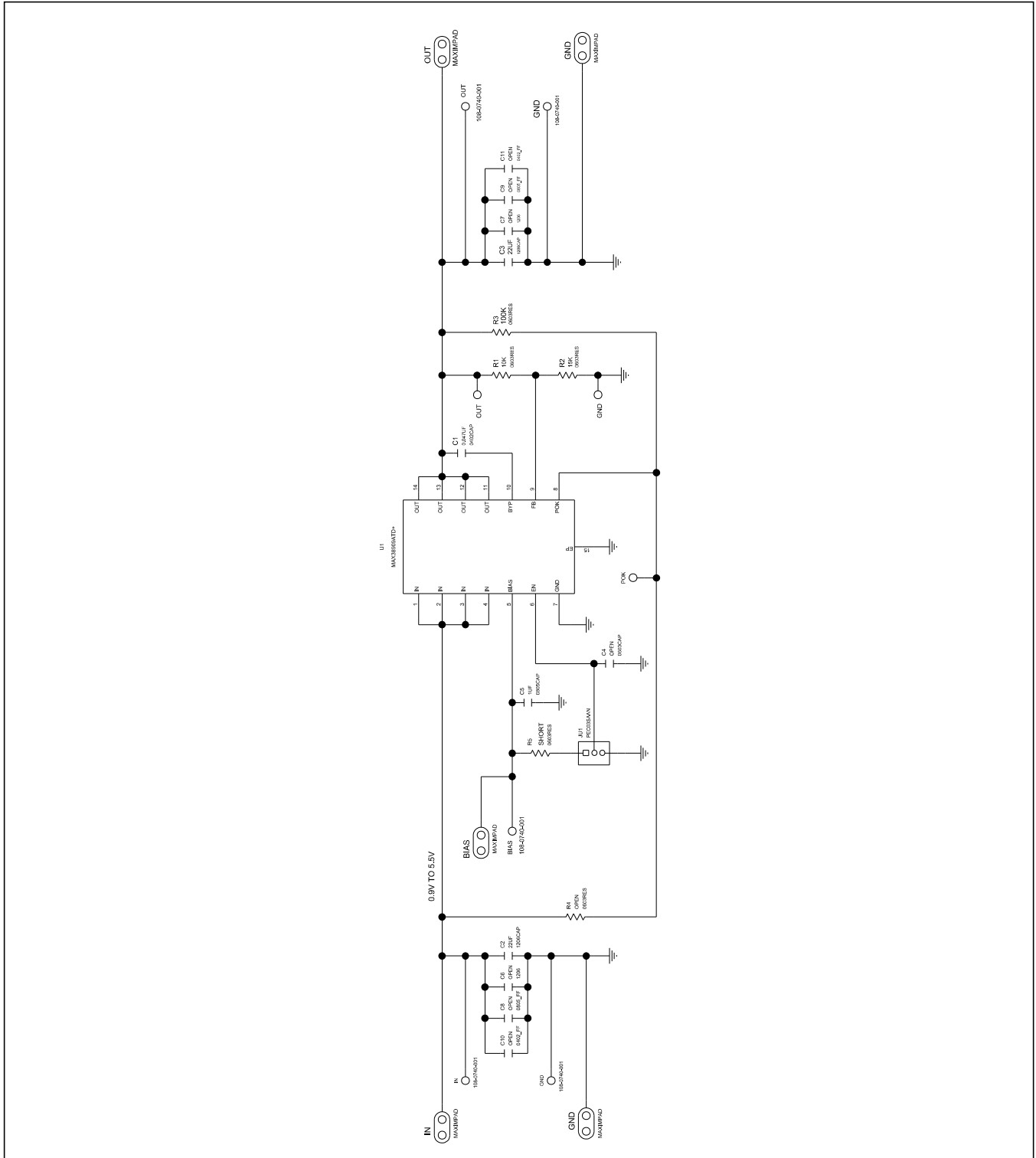
PART	TYPE
MAX38909EVK#TDFN	EV Kit

#Denotes RoHS compliance.

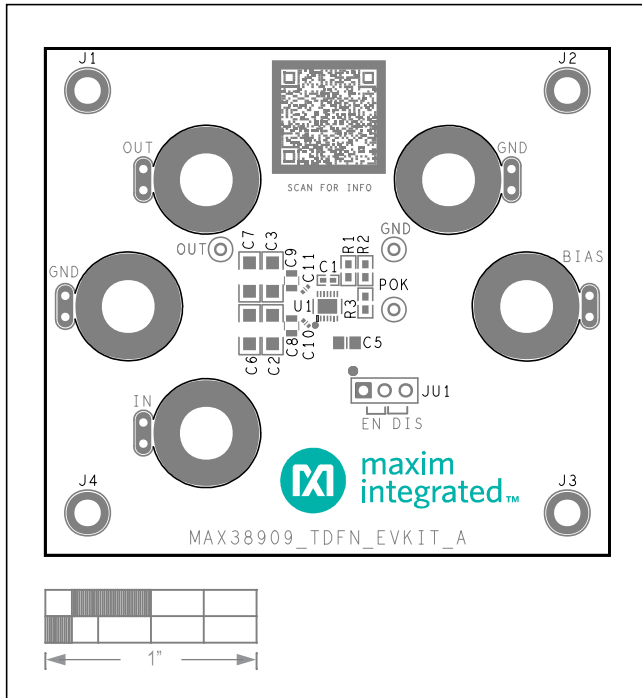
MAX38909 TDFN EV Kit Bill of Materials

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
1	BIAS, GND, GND2, IN, OUT	-	5	108-0740-001	EMERSON NETWORK POWER	108-0740-001	CONNECTOR; MALE; PANELMOUNT; BANANA JACK; STRAIGHT; 1PIN	
2	BIAS_PAD, GND_PAD, GND_PAD2, IN_PAD, OUT_PAD	-	5	9020 BUSS	WEICO WIRE	MAXIMPAD	EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG	
3	C1	-	1	C1005X7R1E473K050BC; GRM155R71E473K; GCM155R71E473KA55	TDK;MURATA;MURATA	0,047UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.047UF; 25V; TOL=10%; TG=-55 DEGC TO +125 DEGC	
4	C2, C3	-	2	GRM31CR70J226K; GCM31CR70J226KE23	MURATA;MURATA	22UF	CAPACITOR; SMT (1206); CERAMIC CHIP; 22UF; 6.3V; TOL=10%; MODEL=GRM SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R	
5	C5	-	1	CGA4J3X7R1H105M125AB	TDK	1UF	CAPACITOR; SMT (0805); CERAMIC CHIP; 1UF; 50V; TOL=20%; TG=-55 DEGC TO +125 DEGC; TC=X7R; AUTO	
6	JU1	-	1	PEC03SAAN	SULLINS	PEC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS	
7	POK	-	1	5002	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER	
8	R1	-	1	CHPHT0603K1002FGT	VISHAY SFRNICE	10K	RESISTOR; 0603; 10K OHM; 1%; 100PPM; 0.0125W; THICK FILM	
9	R2	-	1	CRCW060315K0FK	VISHAY DALE	15K	RESISTOR, 0603, 15K OHM,1%, 100PPM, 0.10W, THICK FILM	
10	R3	-	1	CRCW0603100KFK; RC0603FR-07100KL; RC0603FR-13100KL; ERJ-3EKF1003; AC0603FR-07100KL	VISHAY DALE;YAGEO; YAGEO;PANASONIC	100K	RESISTOR; 0603; 100K; 1%; 100PPM; 0.10W; THICK FILM	
11	SU1	-	1	S1100-B;SX1100-B; STC02SYAN	KYCON;KYCON;SULLINS ELECTRONICS CORP.	SX1100-B	TEST POINT; JUMPER; STR; TOTAL LENGTH=0.24IN; BLACK; INSULATION=PBT;PHOSPHOR BRONZE CONTACT=GOLD PLATED	
12	TP_GND	-	1	5001	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
13	TP_OUT	-	1	5000	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
14	U1	-	1	MAX38909ATD+	MAXIM	MAX38909ATD+	EVKIT PART - IC; 2A HIGH-PERFORMANCE; LDO LINEAR REGULATOR; PACKAGE OUTLINE DRAWING: 21-0137; PACKAGE LAND PATTERN: 90-0063; PACKAGE CODE: T1433+2C; TDFN14-EP	
15	PCB	-	1	MAX38909TDFN	MAXIM	PCB	PCB:MAX38909TDFN	-
16	J1-J4	DNP	0	METAL_STANDOFF_4-40_1/2_6.3	MAXIM	METAL_STANDOFF_4-40_1/2_6.3	KIT; ASSY-STANDOFF 1/2IN; FEMALE-THREADED; HEX; 4-40; 1/2IN; ALUMINUM WITH SCREW; PHILLIPS; PAN; 4-40; 1/4IN; 18-8 STAINLESS STEEL	
17	C4	DNP	0	N/A	N/A	OPEN	PACKAGE OUTLINE 0603 NON-POLAR CAPACITOR	
18	C6, C7	DNP	0	N/A	N/A	OPEN	CAPACITOR; SMT (1206); OPEN; IPC MAXIMUM LAND PATTERN	
19	C8, C9	DNP	0	N/A	N/A	OPEN	CAPACITOR; SMT (0805); OPEN; FORMFACTOR	
20	C10, C11	DNP	0	N/A	N/A	OPEN	CAPACITOR; SMT (0402); OPEN; FORMFACTOR	
21	R4	DNP	0	N/A	N/A	OPEN	PACKAGE OUTLINE 0603 RESISTOR	
22	R5	DNP	0	N/A	N/A	SHORT	PACKAGE OUTLINE 0603 RESISTOR	
TOTAL			24					

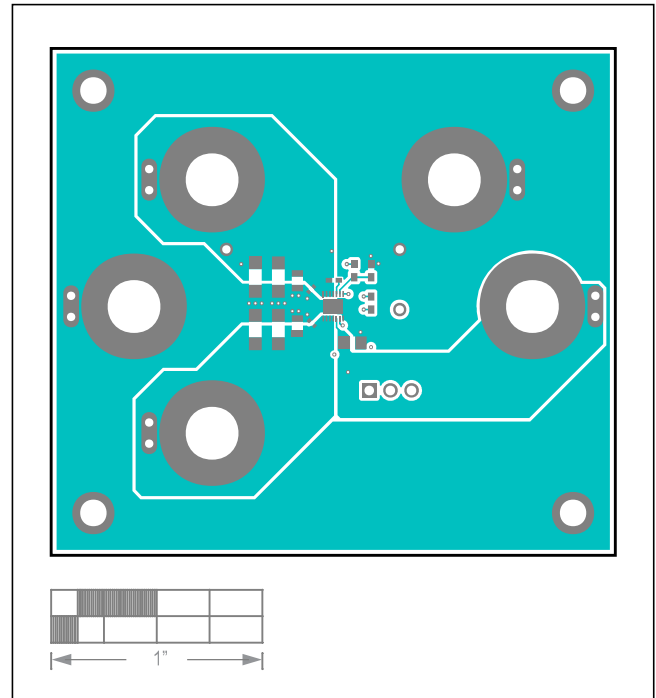
MAX38909 TDFN EV Kit Schematic



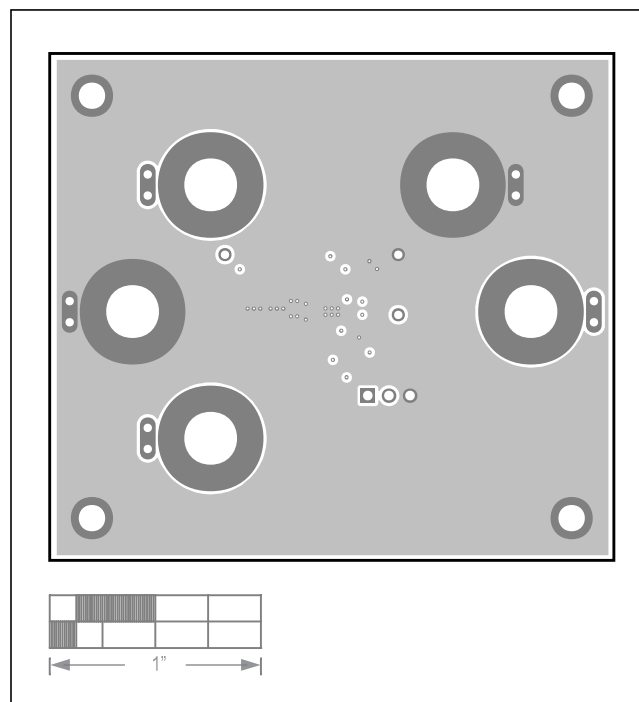
MAX38909 TDFN EV Kit PCB Layout Diagrams



MAX38909 TDFN EV Kit PCB Layout—Top Silkscreen

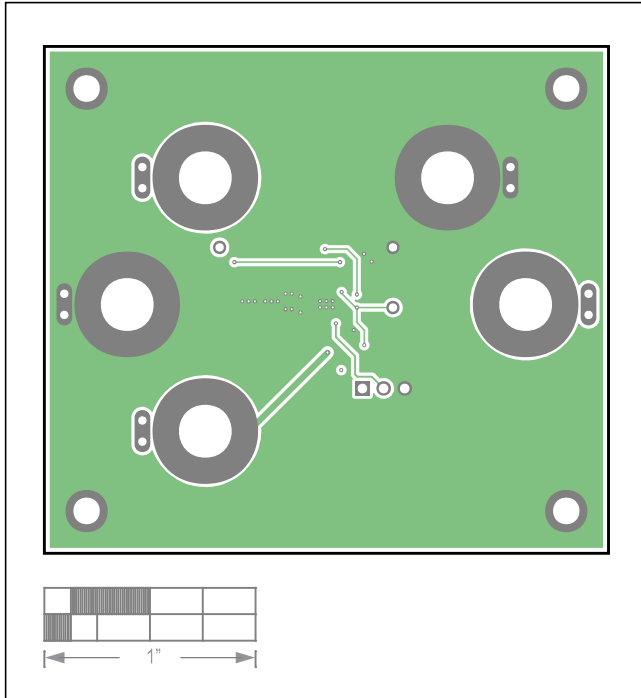


MAX38909 TDFN EV Kit PCB Layout—Top Layer

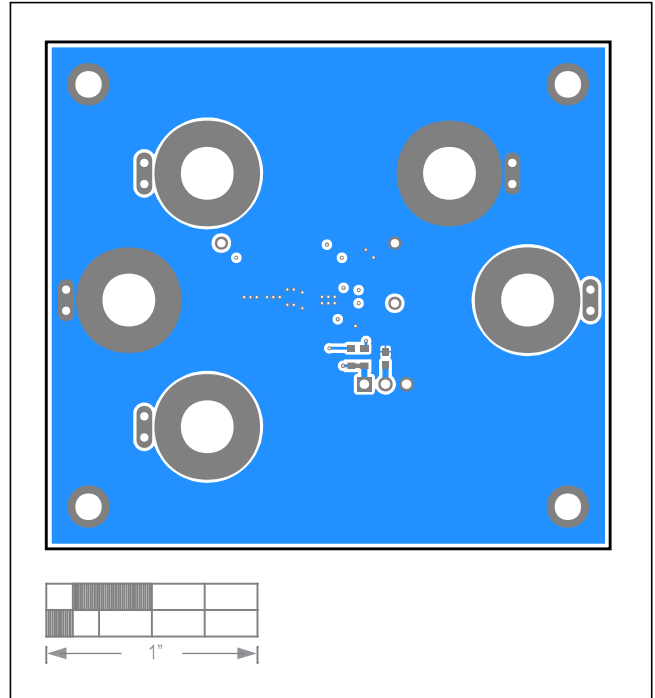


MAX38909 TDFN EV Kit PCB Layout—Internal Layer 2

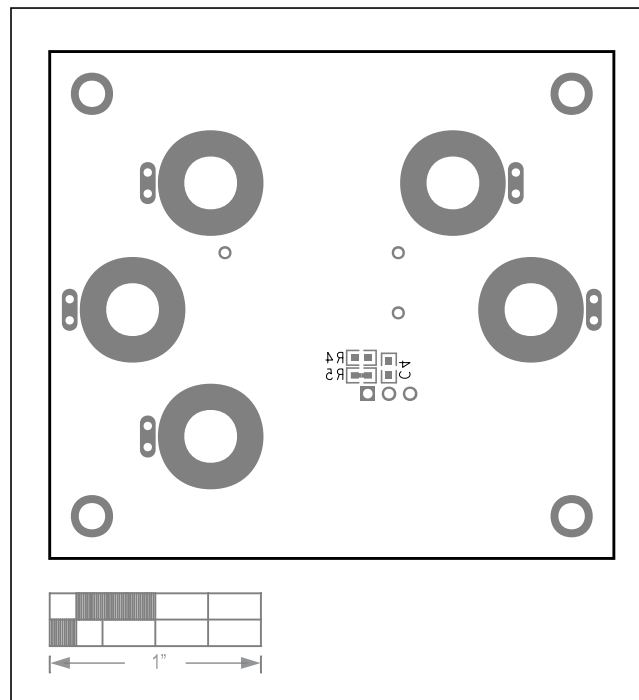
MAX38909 TDFN EV Kit PCB Layout Diagrams (continued)



MAX38909 TDFN EV Kit PCB Layout—Internal Layer 3



MAX38909 TDFN EV Kit PCB Layout—Bottom Layer



MAX38909 TDFN EV Kit PCB Layout—Bottom Silkscreen

## Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	10/20	Initial release	—

For pricing, delivery, and ordering information, please visit Maxim Integrated's online storefront at <https://www.maximintegrated.com/en/storefront/storefront.html>.

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