

MAX38907 TQFN Evaluation Kit

Evaluates: MAX38907

General Description

The MAX38907 TQFN evaluation kit (EV kit) evaluates the MAX38907 in a TQFN package. The MAX38907 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 jumper selectable output voltage range from 0.6V to 5.0V. Additionally, each output voltage selection can be adjusted $\pm 5\%$ for margining. The EV kit can deliver up to 4A of current.

Features

- Evaluates the MAX38907 IC in a 20-Pin (5mm x 5mm) TQFN
- 0.9V to 5.5V Input Range
- 2.7V to 20V Bias Voltage to Provide Wider Supply Options
- 0.6V to 5.0V Jumper Selectable Output Voltage
- Up to 4A Output Current
- Proven 4-Layer 1-oz Copper PCB Layout
- Demonstrates Compact Solution Size
- Fully Assembled and Tested

MAX38907 TQFN EV Kit Files

| FILE | DESCRIPTION |
|---------------------------------|-------------------------|
| MAX38907 TQFN EV Kit BOM | EV Kit Bill of Material |
| MAX38907 TQFN EV Kit PCB Layout | EV Kit Layout |
| MAX38907 TQFN EV Kit Schematic | EV Kit Schematic |

Ordering Information appears at end of data sheet.

Quick Start

Required Equipment

- MAX38907 TQFN EV kit
- 5.5V, 5A DC power supply (IN)
- 8V, 10mA DC power supply (BIAS)
- Electronic load capable of 4A
- 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) Verify that jumper JU2 is shunted on pins 1 and 2 (POK pulled up to IN).
- 3) Verify that jumpers SELA, SELB, and SELC are shunted on pins 1 and 2 (OUT = 5.0V).
- 4) Verify that jumper MRG is shunted on pins 1 and 2 (Add 5% margin to the output voltage).
- 5) Connect the 5.5V power supply between the IN and nearest GND terminal posts.
- 6) Connect the 8V (or higher, up to 20V) power supply between the BIAS and nearest GND terminal posts.
- 7) Connect the 4A electronic load between the OUT and nearest GND terminal posts.
- 8) Connect the DVM between the OUT and nearest GND terminal posts.
- 9) Turn on the power supply.
- 10) Verify that the voltage at the OUT terminal post is 5.25V within the device and the resistor divider's accuracy specifications.
- 11) Enable the electronic load.
- 12) Verify that the voltage at the OUT terminal post is 5.25V within the device and the resistor divider's accuracy specifications.

Detailed Description of Hardware

The MAX38907 TQFN Evaluation kit (EV kit) evaluates the MAX38907 in a TQFN package. The MAX38907 is a low input voltage, high output current linear regulator that delivers 4A of output current. This regulator requires only 300mV of input-to-output headroom at full load.

The MAX38907 TQFN 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 MAX38907ATP+ installed and the output voltage is jumper selectable from 0.6V to 5.0V. Additionally, each output voltage selection can be adjusted $\pm 5\%$ for margining. Refer to the *MAX38907 IC data sheet* for additional detail on output voltage and margin setting.

EN (Enable)

The EV kit provides a jumper JU1 to enable or disable the MAX38907. See [Table 1](#) for jumper JU1 setting.

Bias (BIAS)

The EV kit provides a bias input (BIAS) to accept an input voltage to control the LDO's regulating FET.

Table 1. EN (JU1)

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

*Default position.

The bias input voltage must be at least 2V above the output voltage. (i.e. If OUT = 1.0V, then BIAS \geq 3.0V, up to 20V.)

Power OK (POK)

The MAX38907 features a power ok (POK) output to indicate the device regulation status. The POK is open-drain and requires a pullup resistor between 10k Ω to 100k Ω . The EV kit provides a jumper JU2 to select a pullup voltage source for POK. See [Table 2](#) for jumper JU2 setting.

Output Voltage Selection (SELA, SELB, SELC, MRG)

The MAX38907 EV kit provides output voltage selection jumpers (SELA, SELB, SELC) to set the output voltage during power-up. In addition, the EV kit provides a margin setting jumper (MRG) to margin the output $\pm 5\%$ with respect to each selected output voltage. See [Table 3](#) for output voltage selection jumper setting.

Table 2. POK (JU2)

| SHUNT POSITION | DESCRIPTION |
|----------------|--|
| 1-2* | POK pulled up to IN through R4 (100k Ω) |
| 2-3 | POK pulled up to OUT through R3 (100k Ω) |
| Not Installed | POK pulled up to an external voltage source (between 0V to 5.5V) through an external resistor (between 10k Ω to 100k Ω) |

*Default position.

Table 3. TBD

| SELA | SELB | SELC | OUT (V) AT MRG = GND (2-3) | OUT (V) AT MRG = OPEN (PIN 1 ONLY) | OUT (V) AT MRG = 5.1V (1-2) |
|------------|------------|------------|----------------------------|------------------------------------|-----------------------------|
| Pin 1 only | Pin 1 only | Pin 1 only | 0.57 | 0.6 | 0.63 |
| 2-3 | Pin 1 only | Pin 1 only | 0.6175 | 0.65 | 0.6825 |
| 1-2 | Pin 1 only | Pin 1 only | 0.665 | 0.7 | 0.735 |
| Pin 1 only | 2-3 | Pin 1 only | 0.7125 | 0.75 | 0.7875 |
| 2-3 | 2-3 | Pin 1 only | 0.76 | 0.8 | 0.84 |
| 1-2 | 2-3 | Pin 1 only | 0.8075 | 0.85 | 0.8925 |
| Pin 1 only | 1-2 | Pin 1 only | 0.855 | 0.9 | 0.945 |
| 2-3 | 1-2 | Pin 1 only | 0.9025 | 0.95 | 0.9975 |
| 1-2 | 1-2 | Pin 1 only | 0.95 | 1.0 | 1.05 |
| Pin 1 only | Pin 1 only | 2-3 | 0.9975 | 1.05 | 1.1025 |
| 2-3 | Pin 1 only | 2-3 | 1.045 | 1.1 | 1.155 |
| 1-2 | Pin 1 only | 2-3 | 1.0925 | 1.15 | 1.2075 |

Table 3. TBD (continued)

| SELA | SELB | SELC | OUT (V) AT MRG = GND (2-3) | OUT (V) AT MRG = OPEN (PIN 1 ONLY) | OUT (V) AT MRG = 5.1V (1-2) |
|------------|------------|------|-------------------------------|---------------------------------------|--------------------------------|
| Pin 1 only | 2-3 | 2-3 | 1.14 | 1.2 | 1.26 |
| 2-3 | 2-3 | 2-3 | 1.1875 | 1.25 | 1.3125 |
| 1-2 | 2-3 | 2-3 | 1.235 | 1.3 | 1.365 |
| Pin 1 only | 1-2 | 2-3 | 1.425 | 1.5 | 1.575 |
| 2-3 | 1-2 | 2-3 | 1.71 | 1.8 | 1.89 |
| 1-2 | 1-2 | 2-3 | 1.9 | 2.0 | 2.1 |
| Pin 1 only | Pin 1 only | 1-2 | 2.09 | 2.2 | 2.31 |
| 2-3 | Pin 1 only | 1-2 | 2.375 | 2.5 | 2.625 |
| 1-2 | Pin 1 only | 1-2 | 2.565 | 2.7 | 2.835 |
| Pin 1 only | 2-3 | 1-2 | 2.85 | 3.0 | 3.15 |
| 2-3 | 2-3 | 1-2 | 3.135 | 3.3 | 3.465 |
| 1-2 | 2-3 | 1-2 | 3.42 | 3.6 | 3.78 |
| Pin 1 only | 1-2 | 1-2 | 3.8 | 4.0 | 4.2 |
| 2-3 | 1-2 | 1-2 | 4.275 | 4.5 | 4.725 |
| 1-2 | 1-2 | 1-2 | 4.75 | 5.0 | 5.25 |

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 |

Ordering Information

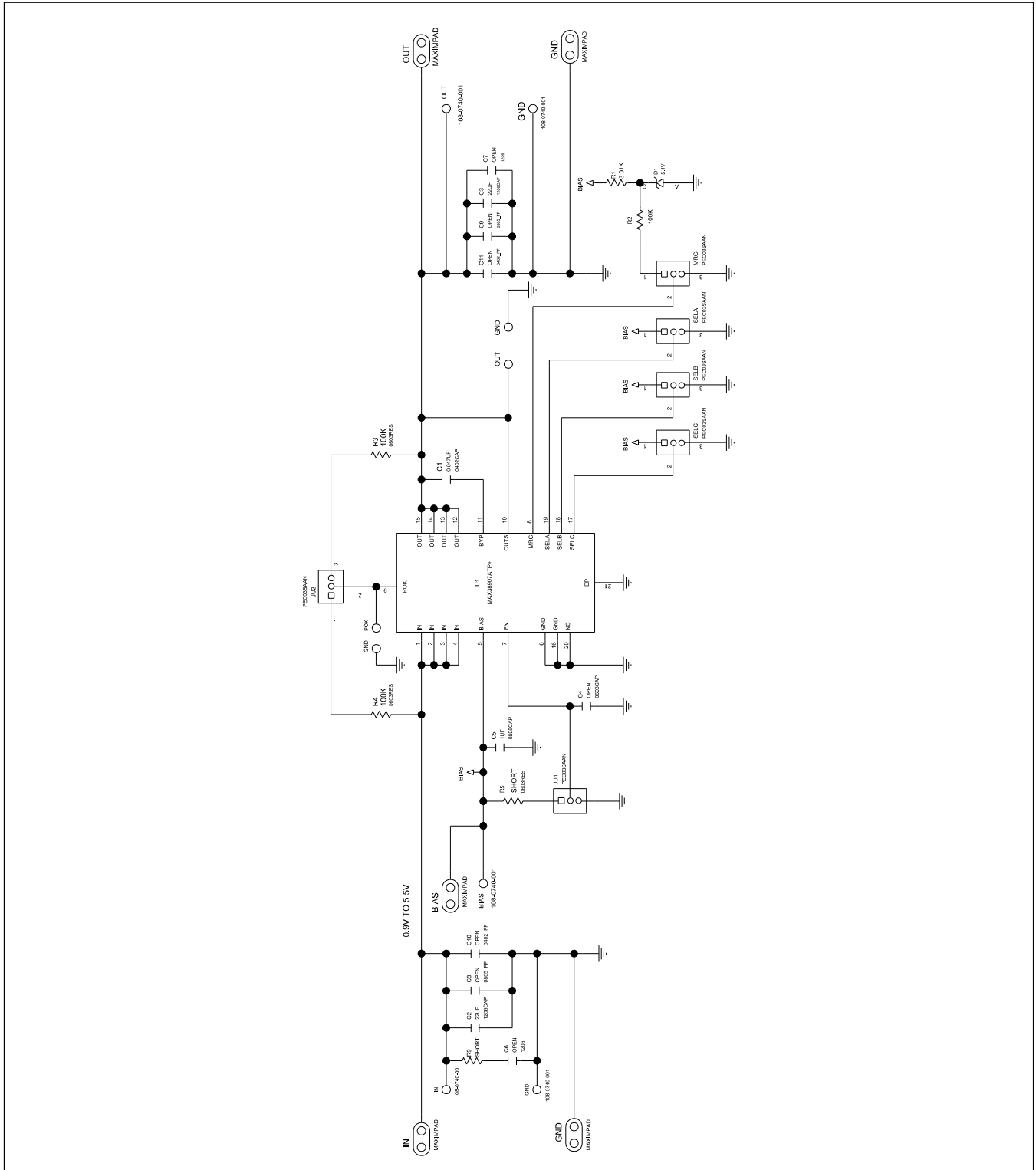
| PART | TYPE |
|------------------|--------|
| MAX38907EVK#TQFN | EV Kit |

#Denotes RoHS compliance.

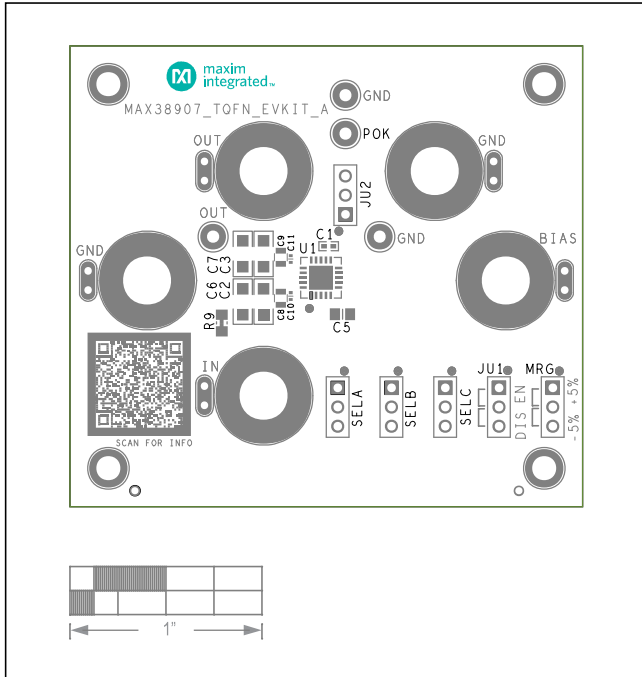
MAX38907 TQFN EV Kit Bill of Materials

| 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 | D1 | - | 1 | MM3Z5V1T1 | ON SEMICONDUCTOR | 5.1V | DIODE, ZNR, SMT (SOD-323), PD=0.20W, VZ=5.1V @ IZT=0.005A | |
| 7 | JU1, JU2, MRG, SELA, SELB, SELC | - | 6 | PEC03SAAN | SULLINS | PEC03SAAN | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS | |
| 8 | POK | - | 1 | 5012 | KEYSTONE | N/A | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; WHITE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; | |
| 9 | R1 | - | 1 | CRCW12063K01FK | VISHAY DALE | 3.01K | RESISTOR; 1206; 3.01K OHM; 1%; 100PPM; 1/4W; THICK FILM | |
| 10 | R2-R4 | - | 3 | 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-SU6 | - | 6 | 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_GND1, TP_GND2 | - | 2 | 5011 | KEYSTONE | N/A | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; | |
| 13 | TP_OUT | - | 1 | 5014 | KEYSTONE | N/A | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; YELLOW; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; | |
| 14 | U1 | - | 1 | MAX38907ATP+ | MAXIM | MAX38907ATP+ | EVKIT PART - IC; 4A PERFORMANCE NMOS LDO LINEAR REGULATORS; PACKAGE OUTLINE DRAWING: 21-0140; PACKAGE CODE: T2055+4C; PACKAGE LAND PATTERN: 90-0009 | |
| 15 | PCB | - | 1 | MAX38907TQFN | MAXIM | PCB | PCB;MAX38907TQFN | - |
| 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 | R5 | DNP | 0 | N/A | N/A | SHORT | PACKAGE OUTLINE 0603 RESISTOR | |
| 22 | R9 | DNP | 0 | N/A | N/A | SHORT | PACKAGE OUTLINE 0805 RESISTOR | |
| TOTAL | | | 37 | | | | | |

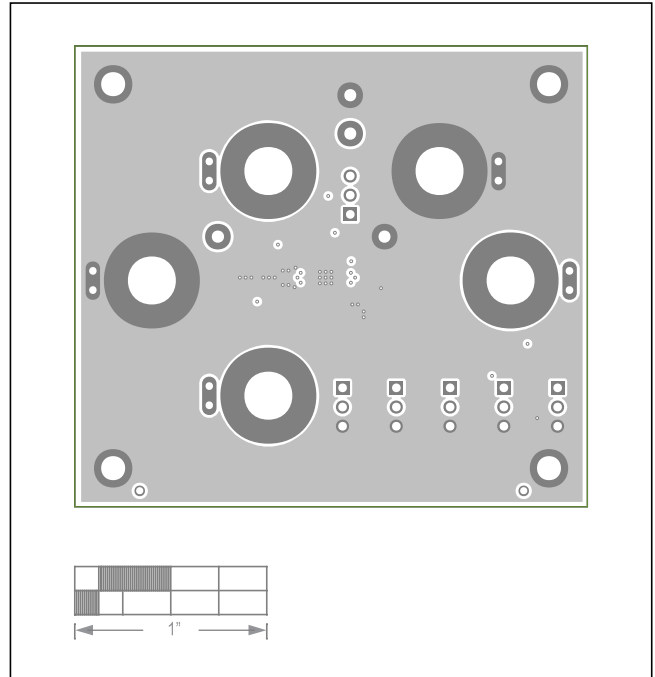
MAX38907 TQFN EV Kit Schematics



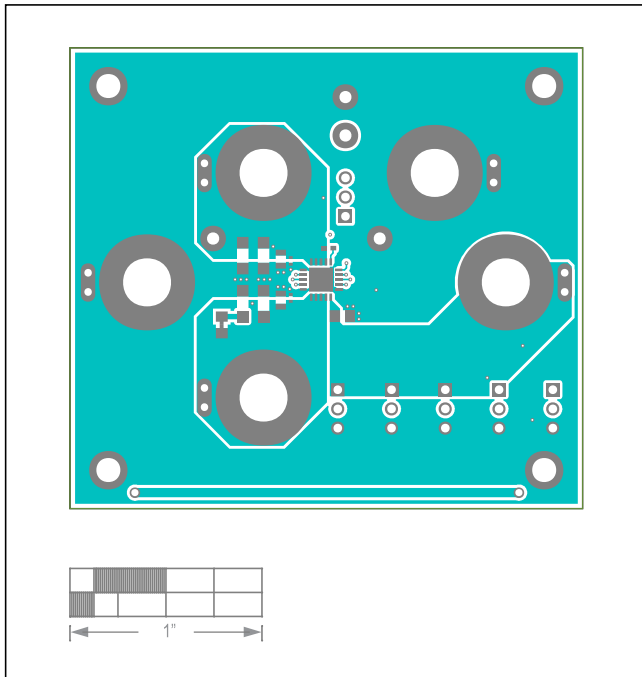
MAX38907 TQFN EV Kit PCB Layout Diagrams



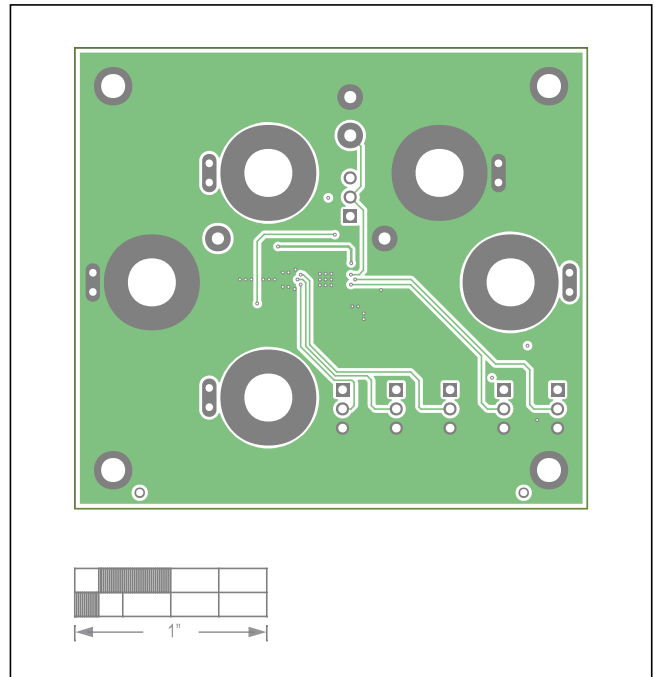
MAX38907 TQFN EV Kit PCB Layout—Top Silkscreen



MAX38907 TQFN EV Kit PCB Layout—Internal2

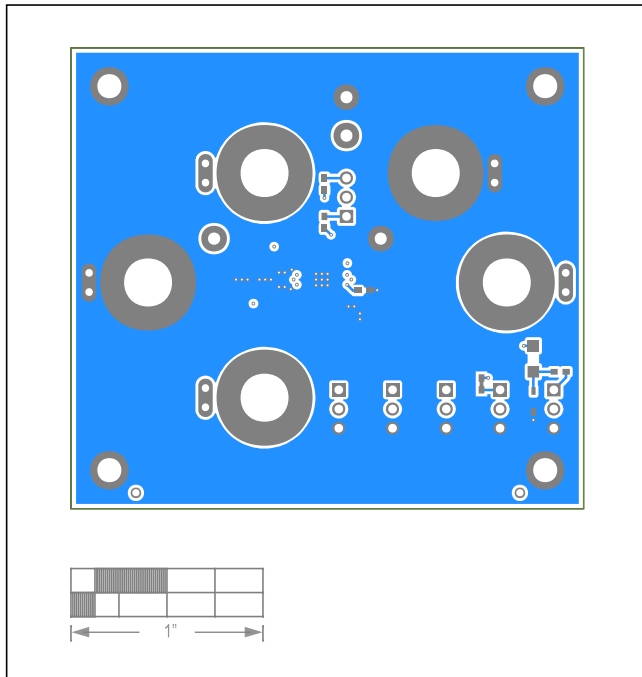


MAX38907 TQFN EV Kit PCB Layout—Top

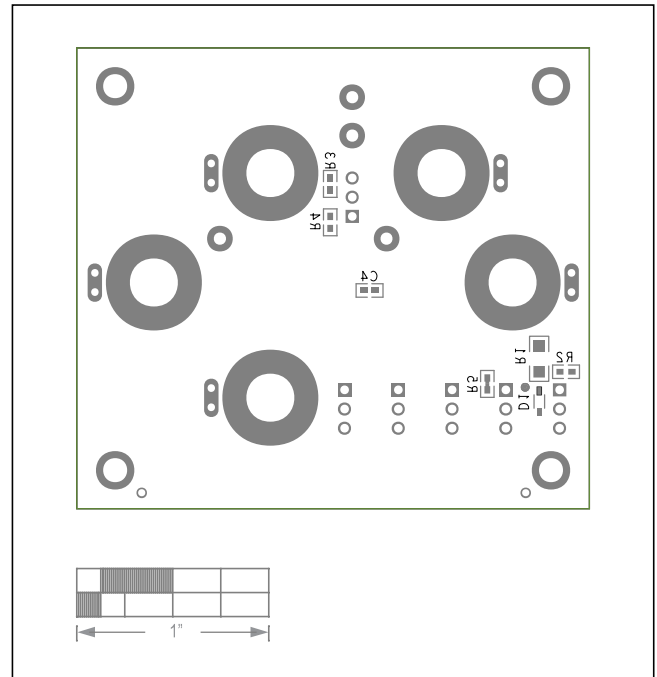


MAX38907 TQFN EV Kit PCB Layout—Internal3

MAX38907 TQFN EV Kit PCB Layout Diagrams (continued)



MAX38907 TQFN EV Kit PCB Layout—Bottom



MAX38907 TQFN EV Kit PCB Layout—Silk Bottom

Revision History

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

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