

## MAX14870 Evaluation Kit

Evaluates: MAX14870, MAX14872

### General Description

The MAX14870 evaluation kit (EV kit) is a fully assembled and tested circuit board that evaluates the MAX14870 full-bridge DC motor driver.

The EV kit can also be used to evaluate the MAX14872.

### Features

- Operates from a Wide 4.5V to 36V Supply
- Standalone or Software-Controlled Operation
- Proven PCB Layout
- Fully Assembled and Tested
- PMOD Compatible Connector

[Ordering Information](#) appears at end of data sheet.

### Quick Start

#### Recommended Equipment

- MAX14870 EV kit
- 100kHz function generator
- 24V, 2A power supply
- 3.3V, 100mA power supply
- DC brushed motor

#### Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation before exercising the full features of the device:

- 1) Verify that all the jumpers are in their default positions, as shown in [Table 1](#).
- 2) Connect the 24V supply to the VDD test point (TP8) and the ground test point (TP5) on the EV kit.
- 3) Connect one wire of the the motor to the J3 terminal block (M1).
- 4) Connect the other wire of the motor to the J3 terminal block (M2).
- 5) Connect the oscilloscope to the M1 test point (TP11), the M2 test point (TP12), and the PWM test point (TP3).
- 6) Connect DIR (TP2) to ground.
- 7) Turn on the 24V power supply.
- 8) Using the function generator, connect a 0V to 3V, 10kHz switching signal to the PWM test point (TP3).
- 9) Monitor M1, M2, and PWM.
- 10) Change the duty cycle on the PWM input to increase/decrease the speed of the motor.

## Detailed Description of Hardware

The MAX14870 EV kit is a fully tested circuit board demonstrating the capabilities of the MAX14870 motor driver.

### Current Regulation

A 100mΩ resistor is connected between COM and ground for current regulation. To disable current regulation, place a shunt on the J1 jumper and connect J4 to 2–3 to connect COM and SNS, respectively, to ground.

### Current Sensing

Connect the J4 jumper to 1–2 to monitor the motor current during operation when J1 is open.

### High-Voltage Transient Protection

The EV kit includes pads for two diodes, D1 and D2. These diodes are not required during normal operation, but can be added for protection against high-voltage transients during short-circuit events.

### Fault Indicator LED

The  $\overline{\text{FAULT}}$  output is connected to the 3.3V logic supply through R4. A fault is generated when an overcurrent condition occurs on M1 and/or M2. LED1 turns on during a fault condition.

**NOTE:** To ensure that LED1 turns on during a short-circuit event, use a power supply capable of supply at least 6A when testing short-circuit functionality.

**Table 1. Jumper Descriptions**

JUMPER	SHUNT POSITON	DESCRIPTION
J1	Open*	COM is connected to ground through a 100mΩ resistor.
	Closed	COM is connected to ground.
J4	1-2*	SNS is connected to COM.
	2-3	SNS is connected to ground. Current regulation is disabled.

\*Default position.

## Ordering Information

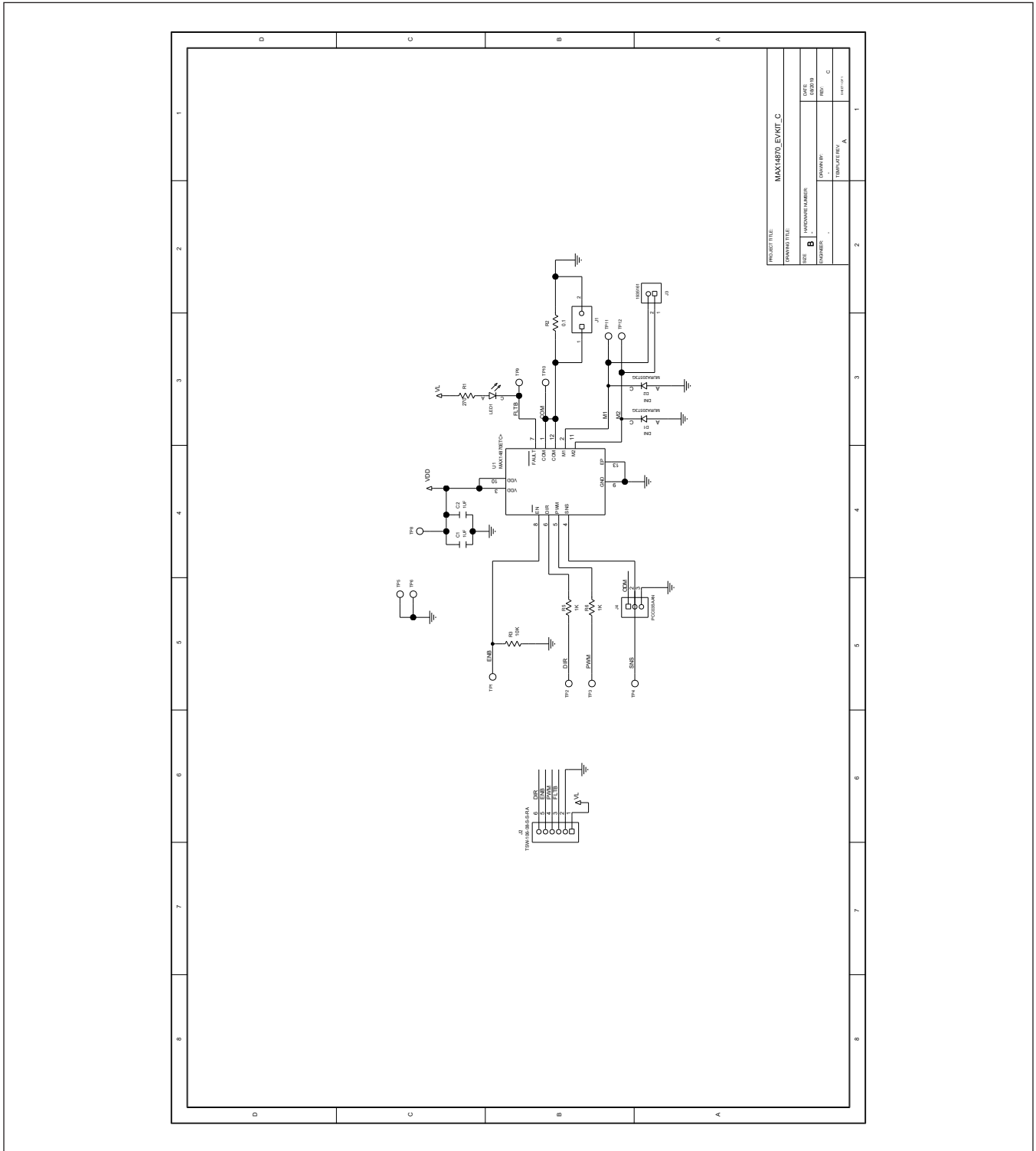
PART	TYPE
MAX14870EVKIT#	EV Kit

#Denotes RoHS compliant.

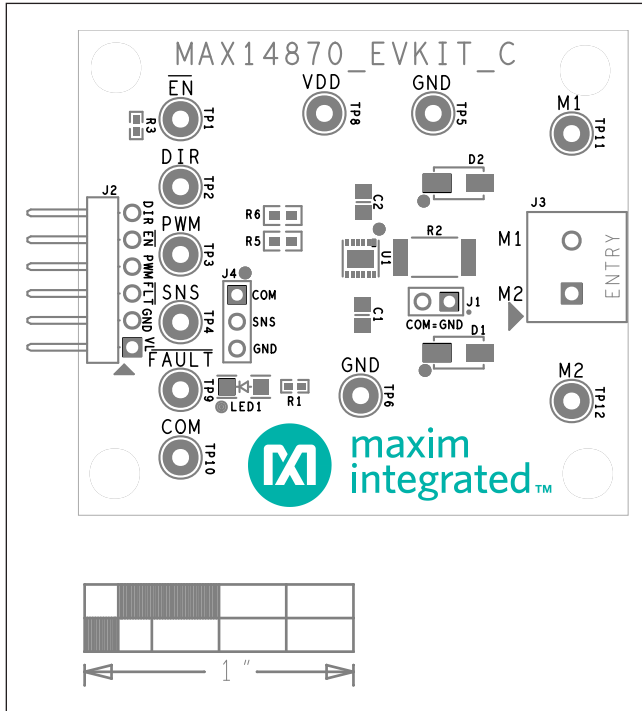
MAX14870 EV Kit Bill of Materials

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	C1, C2	-	2	GRM21BR71H105KA12 ; CL21B105KBFNNN; C2012X7R1H105K085A C; UMK212B7105KG; CGA4J3X7R1H105K125	MURATA; SAMSUNG ELECTRONICS; TDK;TAIY	1UF	CAPACITOR; SMT (0805); CERAMIC CHIP; 1UF; 50V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R
2	J1	-	1	PCC02SAAN	SULLINS	PCC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC
3	J2	-	1	TSW-106-08-S-S-RA	SAMTEC	TSW-106-08-S-S-RA	CONNECTOR; MALE; THROUGH HOLE; 0.025 INCH SQUARE POST HEADER; RIGHT ANGLE; 6PINS
4	J3	-	1	1935161	PHOENIX CONTACT	1935161	CONNECTOR; FEMALE; THROUGH HOLE; GREEN TERMINAL BLOCK; STRAIGHT; 2PINS
5	J4	-	1	PCC03SAAN	SULLINS	PCC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 3PINS; -65 DEGC TO +125 DEGC
6	LED1	-	1	597-3111-407F	DIALIGHT	597-3111-407F	DIODE; LED; SMT LED; RED; SMT (1206); PIV=4V; IF=0.03A
7	MH1-MH4	-	4	9032	KEYSTONE	9032	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON
8	R1	-	1	CRCW0402270RFK	VISHAY DALE	270	RESISTOR; 0402; 270 OHM; 1%; 100PPM; 0.0625W; THICK FILM
9	R2	-	1	CRA2512-FZ-R100ELF	BOURNS	0.1	RESISTOR; 2512; 0.1 OHM; 1%; 75PPM; 3W; METAL FILM
10	R3	-	1	CRCW040210K0FK; RC0402FR-0710KL	VISHAY DALE; YAGEO PHICOMP	10K	RESISTOR; 0402; 10K; 1%; 100PPM; 0.0625W; THICK FILM
11	R5, R6	-	2	CRCW06031K00FK; ERJ-3EKF1001	VISHAY DALE; PANASONIC	1K	RESISTOR; 0603; 1K; 1%; 100PPM; 0.10W; THICK FILM
12	TP1-TP6, TP9-TP12	-	10	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;
13	TP8	-	1	5010	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SIL;
14	U1	-	1	MAX14870ETC+	MAXIM	MAX14870ETC+	IC; DRV; FULL-BRIDGE DC MOTOR DRIVER; TDFN12-EP 3X3
15	PCB	-	1	MAX14870	MAXIM	PCB	PCB:MAX14870
16	D1, D2	DNP	0	MURA205T3G	ON SEMICONDUCTOR	MURA205T3G	DIODE; RECT; SMA (DO-214AC); PIV=50V; IF=2A
TOTAL			29				

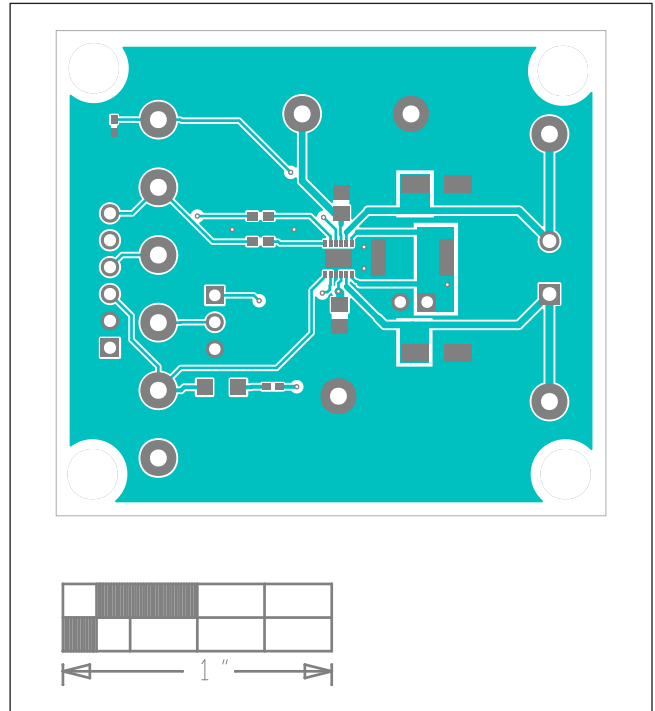
MAX14870 EV Kit Schematic



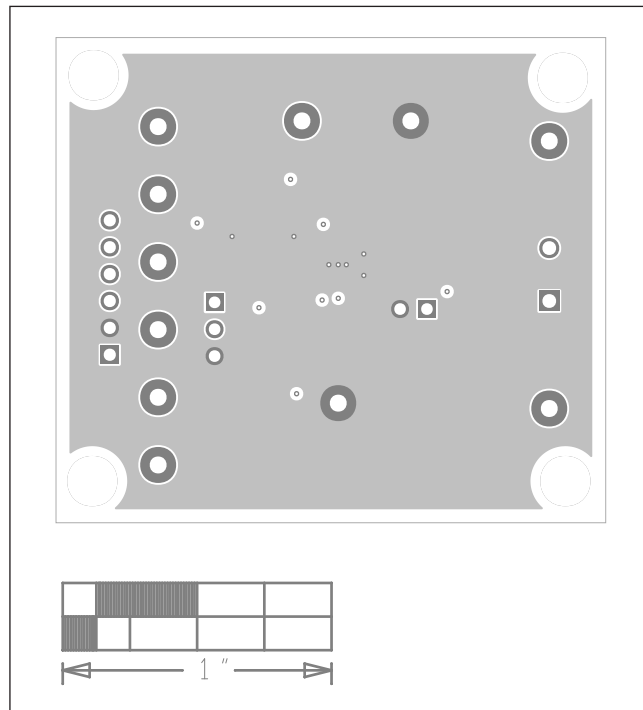
MAX14870 EV Kit PCB Layout Diagrams



MAX14870 EV Kit PCB Layout—Top Silkscreen

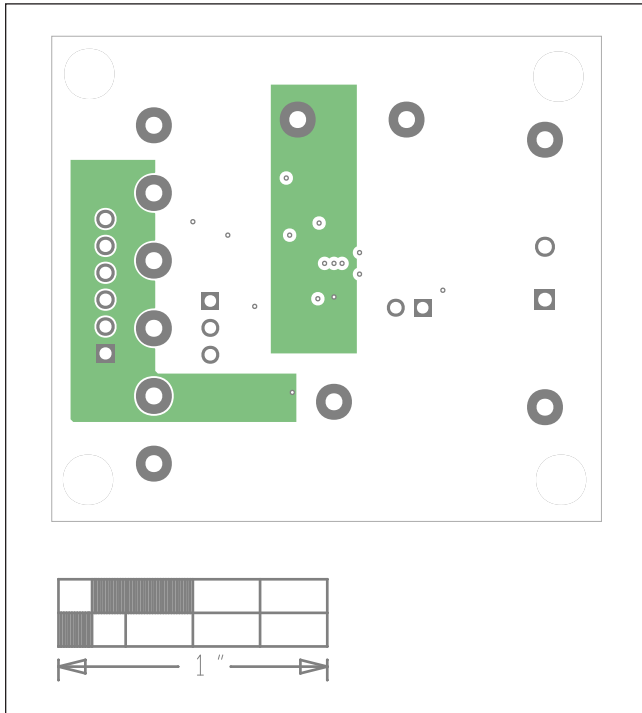


MAX14870 EV Kit PCB Layout—Top Layer

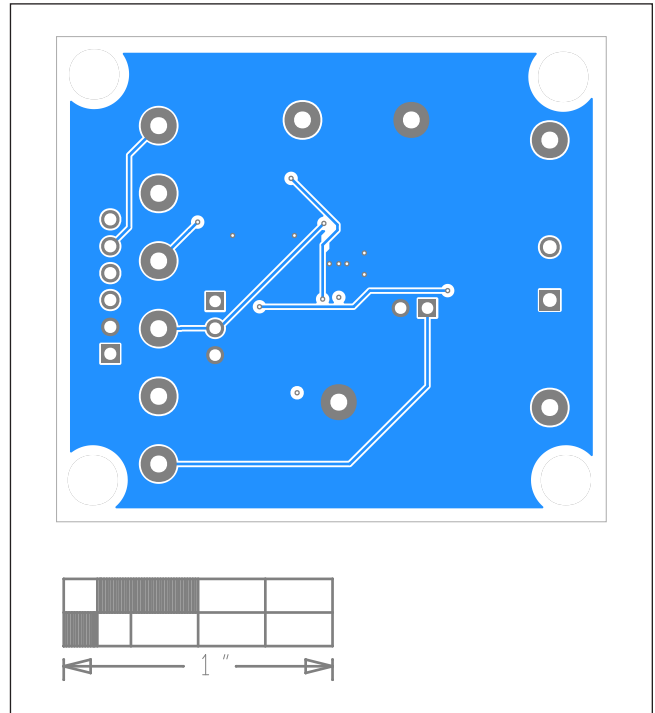


MAX14870 EV Kit PCB Layout—Layer 2

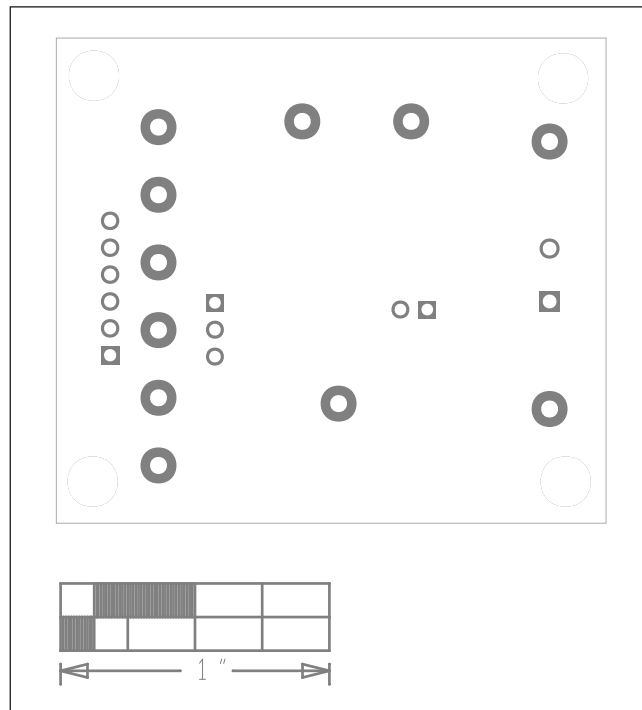
MAX14870 EV Kit PCB Layout Diagrams (continued)



MAX14870 EV Kit PCB Layout—Layer 3



MAX14870 EV Kit PCB Layout—Bottom Layer



MAX14870 EV Kit PCB Layout—Bottom Silkscreen

## Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	6/15	Initial release	—
1	9/19	Updated all sections	1–7
2	10/19	Updated the <i>Quick Start</i> section and added the <i>Current Regulation</i> , <i>Current Sensing</i> , and <i>High-Voltage Transient Protection</i> sections	1–2

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

*Maxim Integrated cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim Integrated product. No circuit patent licenses are implied. Maxim Integrated reserves the right to change the circuitry and specifications without notice at any time.*