Click here for production status of specific part numbers.

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.

19-7698; Rev 2; 10/19

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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

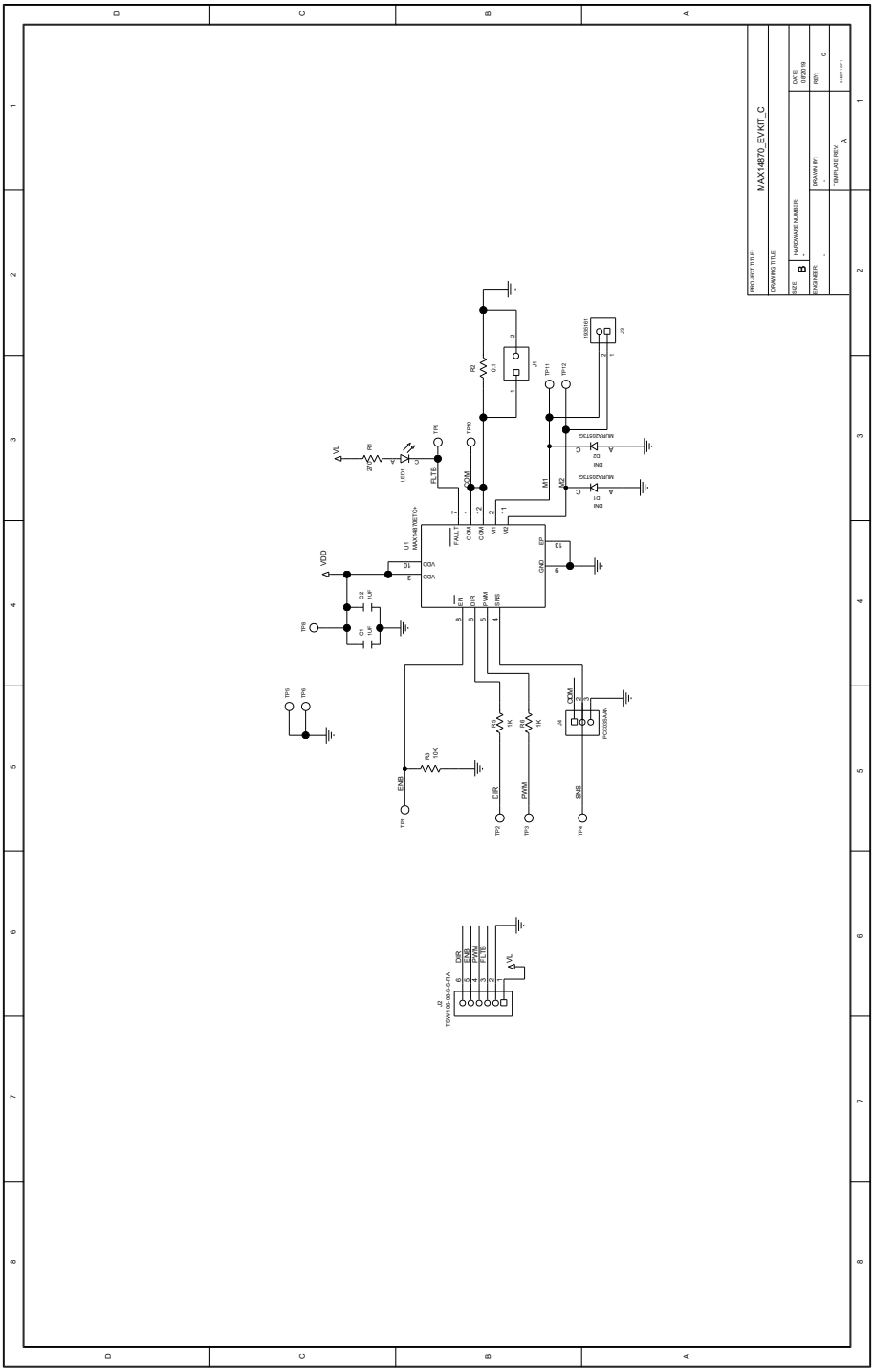
PART	TYPE
MAX14870EVKIT#	EV Kit

#Denotes RoHS compliant.

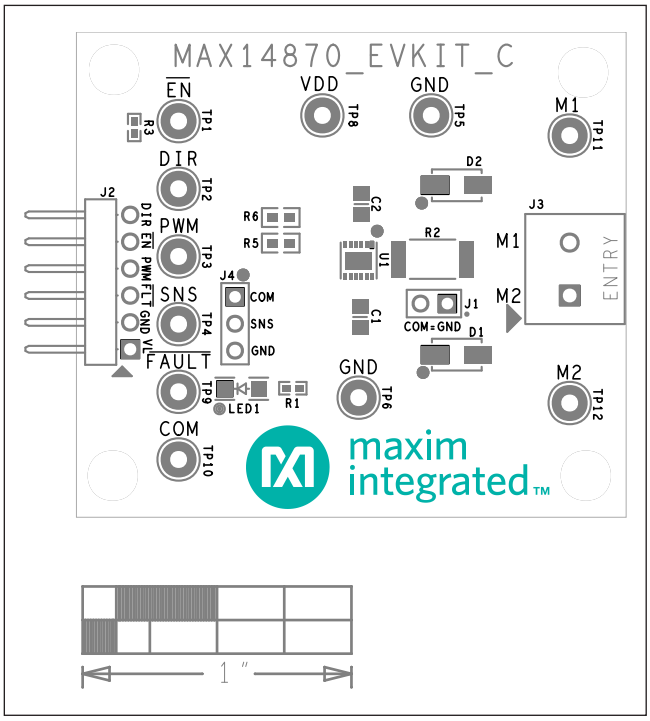
MAX14870 EV Kit Bill of Materials

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	C1, C2	-	2	GRM21BR71H105KA12; CL21B105KBFNNN; C2012X7R1H105K085AC; UMK212B7105KG; CGA4J3X7R1H105K125AB	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				

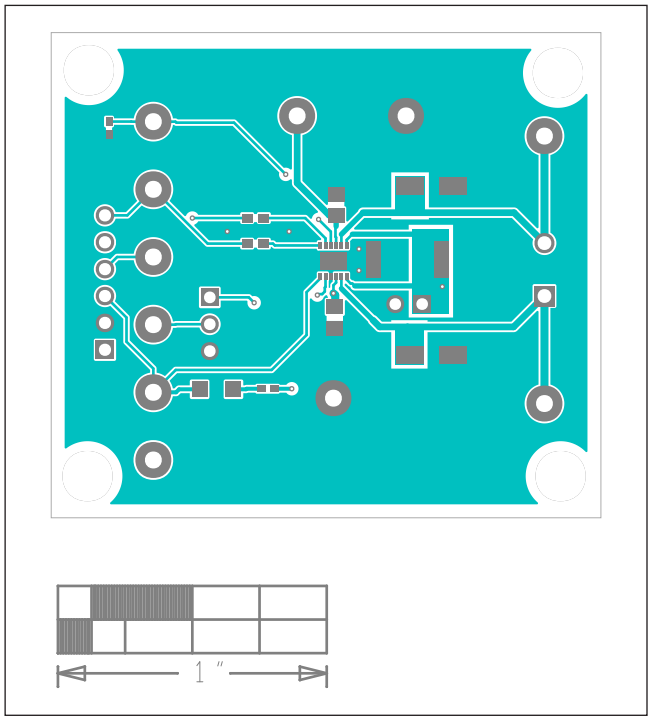
MAX14870 EV Kit Schematic



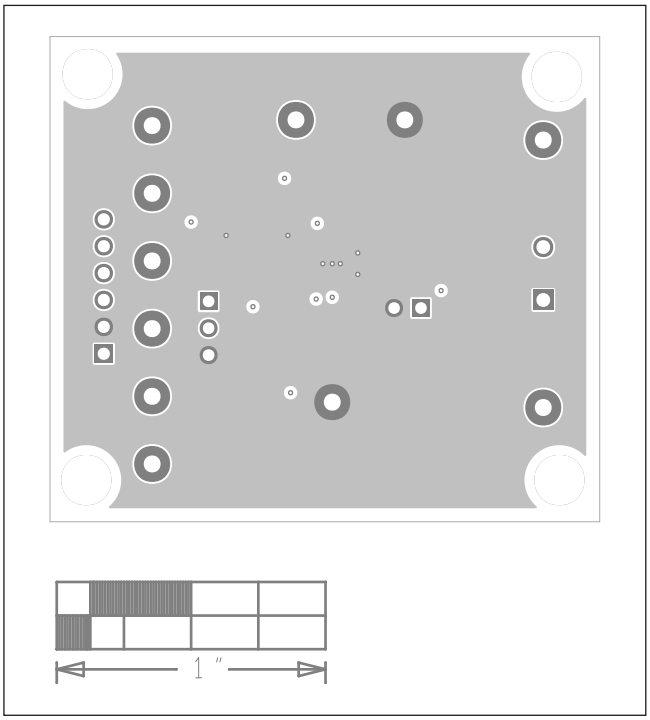
MAX14870 EV Kit PCB Layout Diagrams



MAX14870 EV Kit PCB Layout—Top Silkscreen

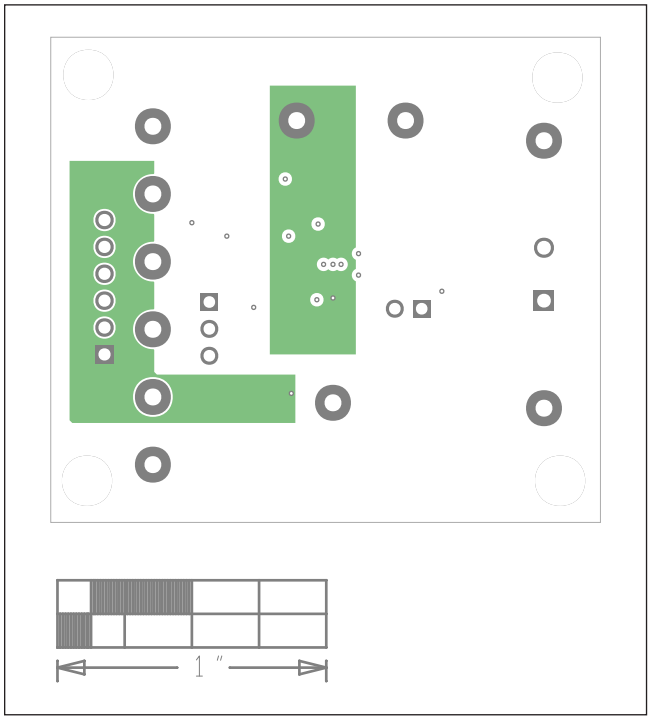


MAX14870 EV Kit PCB Layout—Top Layer

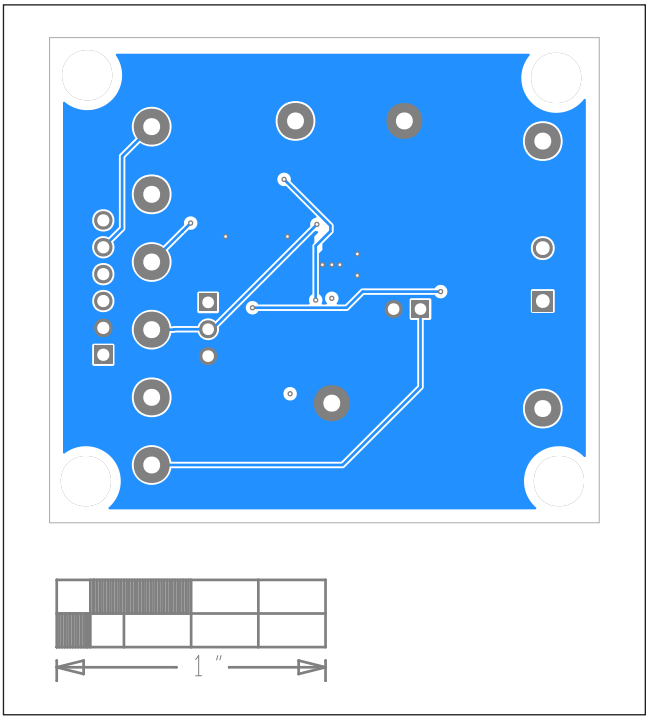


MAX14870 EV Kit PCB Layout—Layer 2

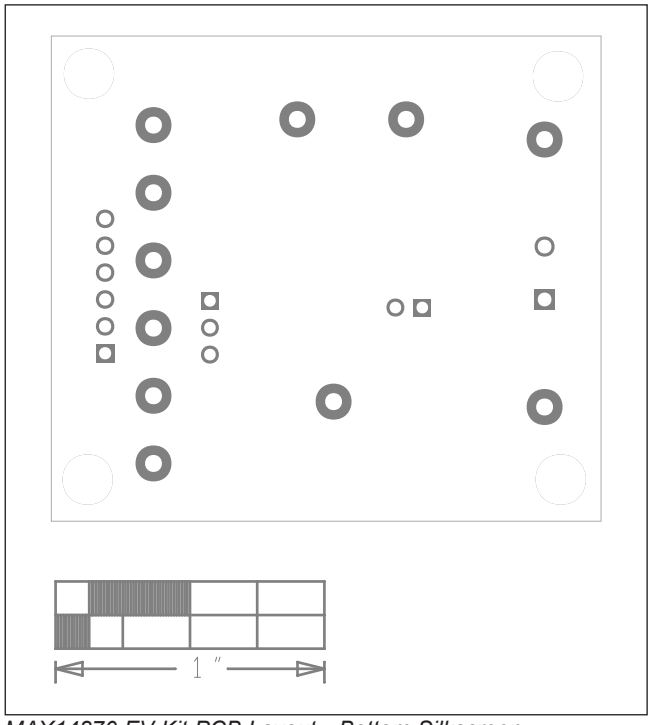
MAX14870 EV Kit PCB Layout Diagrams (continued)



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 *Quick Start* section and added the *Current Regulation, Current Sensing,* and *High-Voltage Transient Protection* sections	1–2

