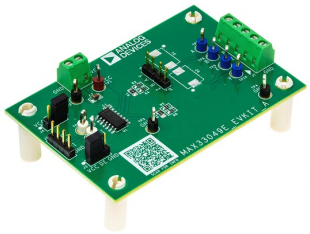
ANALOG DEVICES
MAX33049E
Datasheet and
Product Info



ANALOG DEVICES MAX33049E Datasheet and Product Info User Guide

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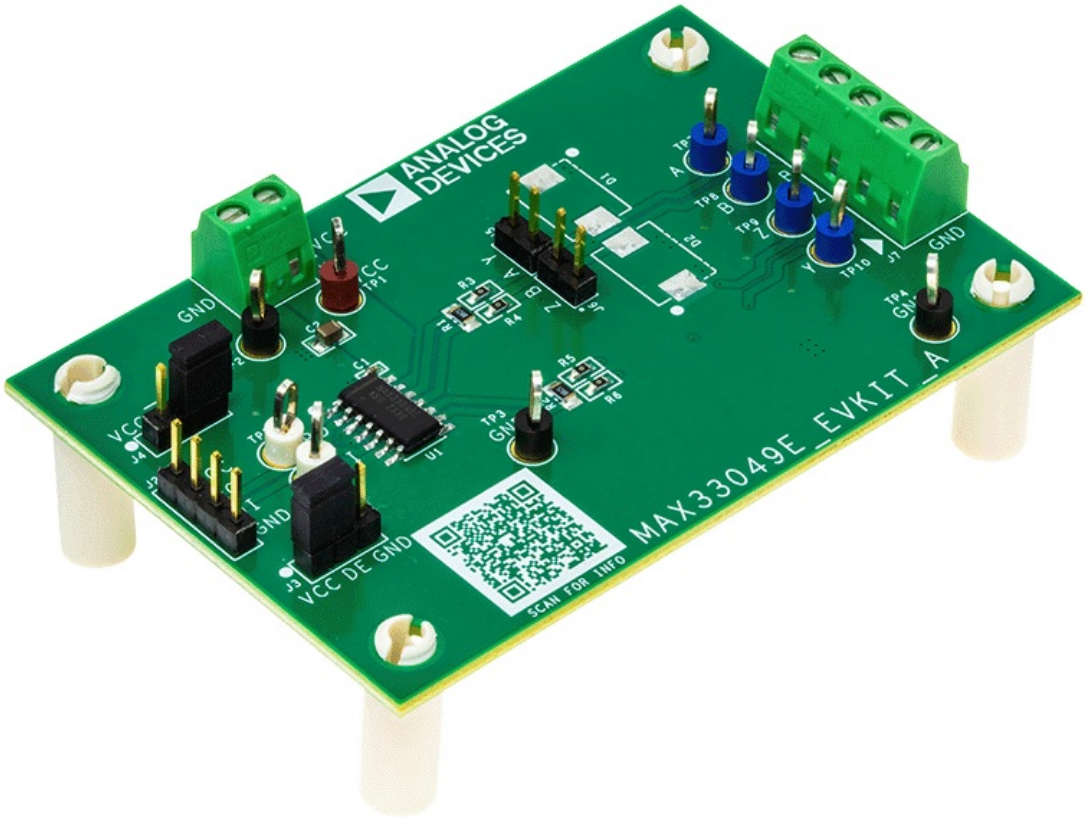


Product Usage Instructions

Quick Start:

Required Equipment:

- +5V power supply
- Signal/function generator
- Oscilloscope

Procedure:

1. Verify all jumpers are in their default setting. Refer to Table 1 for jumper positions.
2. With the +5V power supply disabled, connect the positive terminal to the VCC test point and the negative terminal to a GND test point.
3. Set the signal/function generator to output a 2.5MHz (5Mbps) square wave between 0V to 5V.
4. Connect the signal/function generator to DI (TP6) and a GND test point on the board.
5. Turn on the +5V DC power supply and enable the signal/function generator output.
6. Connect an oscilloscope probe to RO (TP5) and verify that the signal matches the DI input.

FAQs

- **What does the MAX33049E Evaluation Kit evaluate?**
  - The MAX33049E Evaluation Kit evaluates the MAX33049E component.
- **How can I verify the jumper positions on the board?**
  - You can refer to Table 1 in the user manual for the jumper position description.

General Description

The MAX33049E evaluation kit is a fully assembled and tested board. It demonstrates the functionality of the MAX33049E full-duplex 20Mbps RS-485 transceiver with ±25V fault protection and ±40kV ESD Human Body Model (HBM) for A/B and Y/Z data lines.

Features

- Easy Evaluation of the MAX33049E
- Power/Ground Connections Through Screw Terminal Blocks
- Screw Terminal Blocks for RS-485 Signals
- Test Points for Measuring All Signals
- Resistors and TVS Footprints for External Protection Devices
- Proven PCB Layout
- Fully Assembled and Tested

Ordering Information appears at end of data sheet.

Quick Start

Required Equipment

- MAX33049E EV kit
- +5V, 500mA DC power supply
- Signal/function generator that can generate a 10MHz square wave signal (Note: The EV kit can accept input signals up to 20Mbps. Ensure the signal swing does not exceed the Absolute Maximum Limits.)
- Oscilloscope

Procedure

1. Verify all jumpers are in their default setting. See Table 1.
2. With the +5V power supply disabled, connect the positive terminal to the VCC test point. Connect the negative terminal to one of the GND test points.
3. Set the signal/function generator to output a 2.5MHz (5Mbps) square wave between 0V to 5V.
4. Connect the positive terminal of the signal/function generator to DI (TP6) and negative terminal to any GND test point on the board.
5. Turn on the +5V DC power supply, and then enable the signal/function generator output.
6. Connect an oscilloscope probe to RO (TP5) and verify that the signal matches the DI input.

EV Kit Photo

Table 1. MAX33049E EV Kit Jumper Position Description

JUMPER	SHUNT POSITION	FEATURE
J3	**1-2**	**DE = VCC, driver enabled**
	2-3	DE = GND, driver disabled
J4	1-2	RE = VCC, receiver disabled
	2-3	**RE = GND, receiver enabled**
J5	**Closed**	**A is connected to Y (loopback configuration)**
	Open	A is not connected to Y
J6	**Closed**	**B is connected to Z (loopback configuration)**
	Open	B is not connected to Z

Default options are bold.

Table 2. MAX33049E EV Kit Test Points Description

REFERENCE DESIGNATOR	SIGNAL
TP1	VCC
TP2	GND
TP3	GND
TP4	GND
TP5	RO
TP6	DI
TP7	A
TP8	B
TP9	Z
TP10	Y

Table 3. MAX33049E EV Kit Terminal Blocks and Headers Description

REFERENCE DESIGNATOR	PIN NUMBER	SIGNAL
J1	1	VCC
	2	GND
J2	1	VCC
	2	RO
	3	DI
	4	GND
J7	1	GND
	2	Y
	3	Z
	4	B
	5	A

Detailed Description of Hardware

The MAX33049E EV kit is a fully assembled and tested circuit board for evaluating the MAX33049E full-duplex RS-485/RS-422 transceiver with ±25V fault protection and ±40kV ESD Human Body Model (HBM) protection. The EV kit can be powered with a +3.0V to +5.5V supply. The EV kit allows all the input and output functions to be exercised without the need for additional external components. Jumper configurations are shown in Table 1, test points are listed in Table 2, and screw terminal blocks and headers are listed in Table 3.

Decoupling Capacitors

The MAX33049E EV kit can be powered by connecting a +3.0V to +5.5V power supply to the screw terminals or adjacent test points for VCC and GND at the top of the evaluation board. A 0.1µF decoupling capacitor is next to

the VCC pin of the RS-485 transceiver (U1). Additionally, the EV kit includes a 22µF tantalum capacitor installed next to the J1 terminal block in case of unfiltered supplies.

Input/Output Connections

The MAX33049E EV kit includes connections for data input (DI) and receiver output (RO). Logic I/O is connected through a 0.1in header, J2, on the left side of the board to allow wire connections to a microcontroller. Connections to an RS-485 bus are made with screw terminal block J7 on the right side of the board. There are two input bus signals, A and B, for noninverting and inverting signals, respectively, and two corresponding output signals, Y and Z. Test points are available on the board and appropriately labeled for all digital and bus I/O signals.

On-Board Termination

A properly terminated RS-485 bus is terminated at each end, and the characteristic impedance of the twisted pair the cable is typically 120Ω. The MAX33049E EV kit provides onboard 120Ω termination (R2) between the Y and Z driver outputs and 120Ω (R1) between the A and B receiver inputs. If the EV kit is evaluated with an already terminated system, remove the on-board 120Ω terminations.

External Protection

The MAX33049E has integrated high ESD protection with a ±40kV Human Body Model (HBM), ±15kV Air-Gap Discharge, and ±10kV Contact Discharge. The MAX33049E EV kit provides options for added external protection. Swap out the 0Ω series resistors R3–R6 on the A, B, Y and/or Z lines for other protection components and/or install TVS diodes on D1–D4 footprints. For applications that require high-voltage transient protection, such as surge transients, external protection is needed on the bus lines. Choose TVS diodes with a clamp voltage below ±30V and ensure external protection added to the bus lines does not slew the signals at the required operating data rate.

Evaluating ESD Protection

The MAX33049E EV kit can be used to evaluate ESD performance for the MAX33049E, based on the IEC 61000-4-2 standard. Without added external protection, the EV kit can verify the ESD performance up to ±10kV Contact Discharge and ±15kV air discharge. Follow the IEC 61000-4-2 guidelines for a proper test setup. Apply ESD stresses on the terminal block J7 for signal A, B, Y, and Z. Place a bleeding resistor cable and an earth ground return as close as possible to where the stress is applied. See Figure 1.

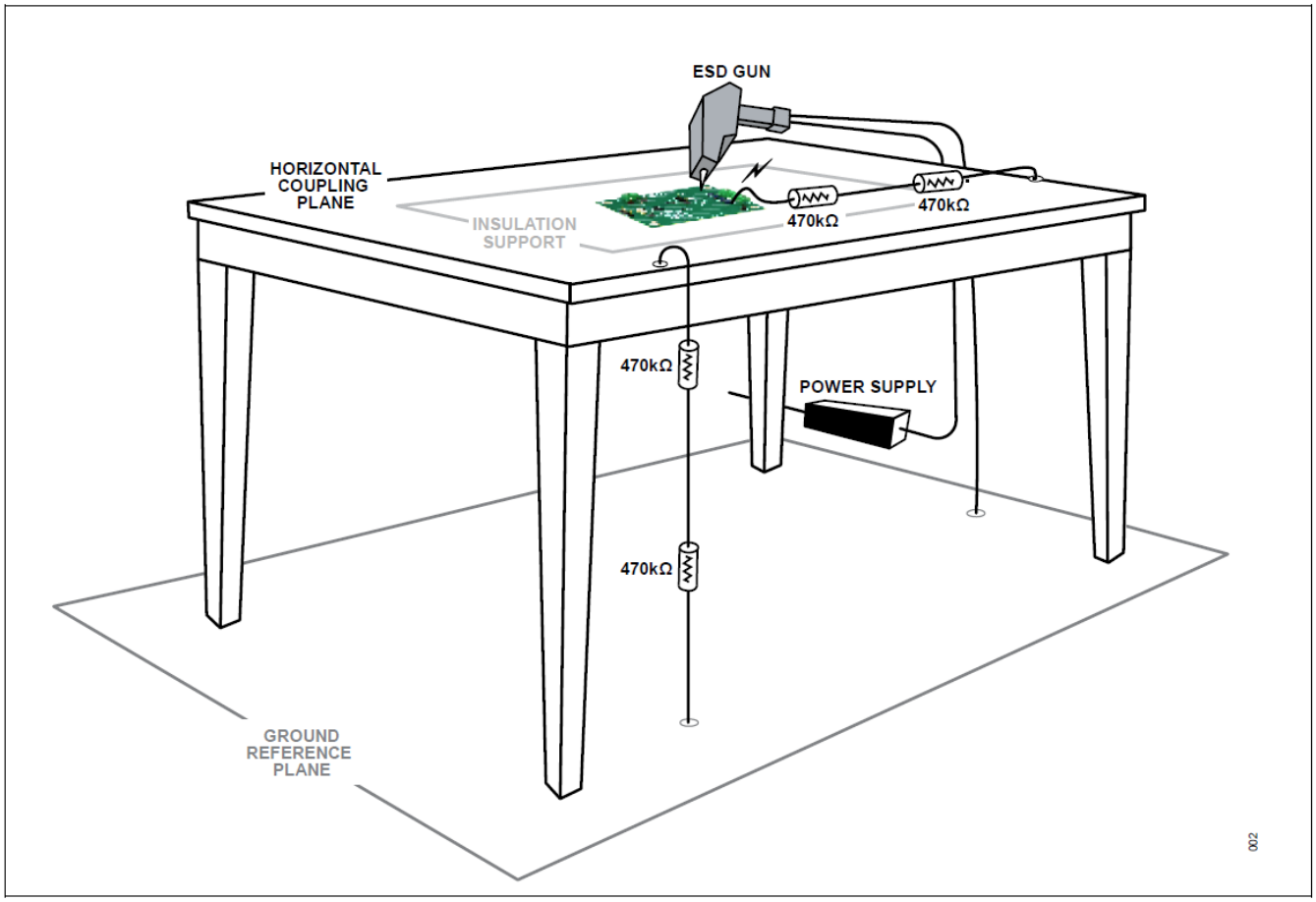


Figure 1. IEC 61000-4-2 ESD Test Setup

Lab Connection

To evaluate the full-duplex functionality using only the MAX33049E EV kit, set the EV kit in the loopback configuration by closing J5 (which connects A and Y) and J6 (which connects B and Z). A signal generator connected to DI allows verification of the bus signals and the receiver output. See Figure 2.

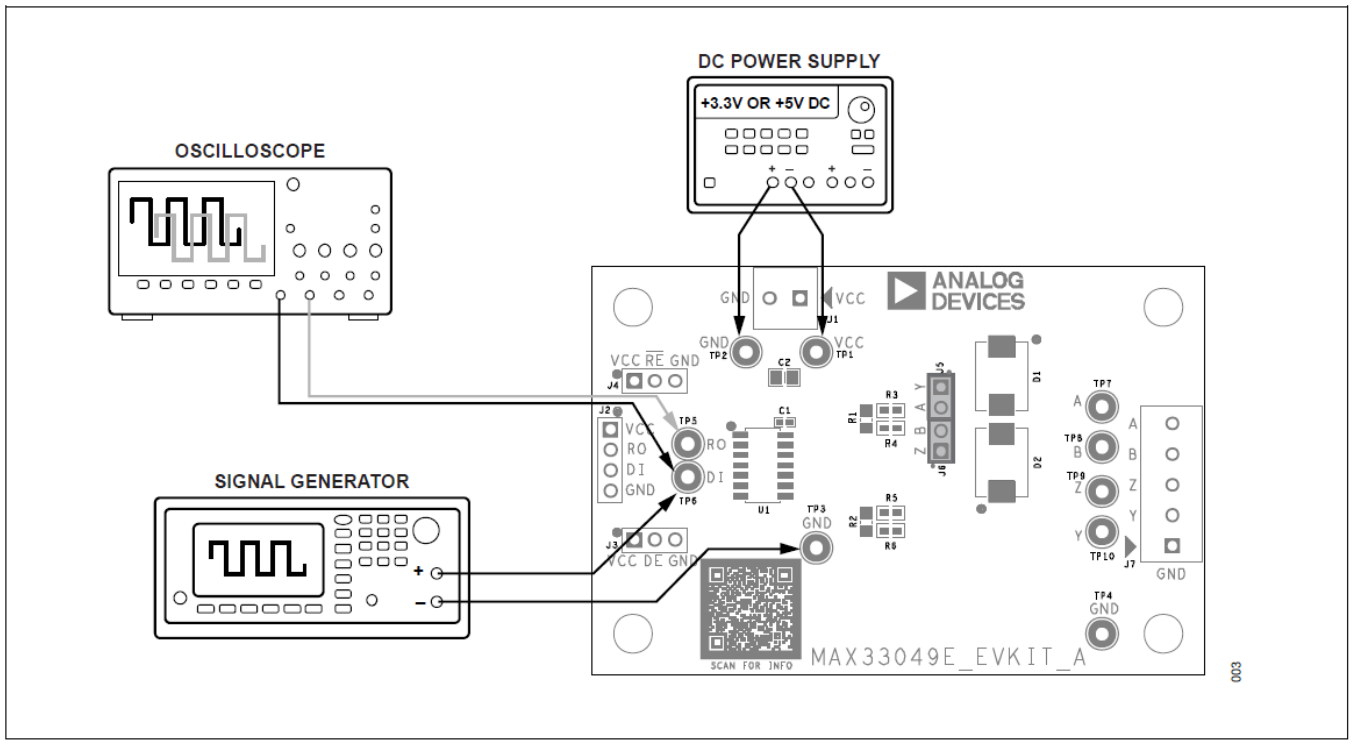


Figure 2. Connection Diagram

Ordering Information

PART	TYPE
MAX33049EEVKIT#	EV Kit

#Denotes RoHS compliance.

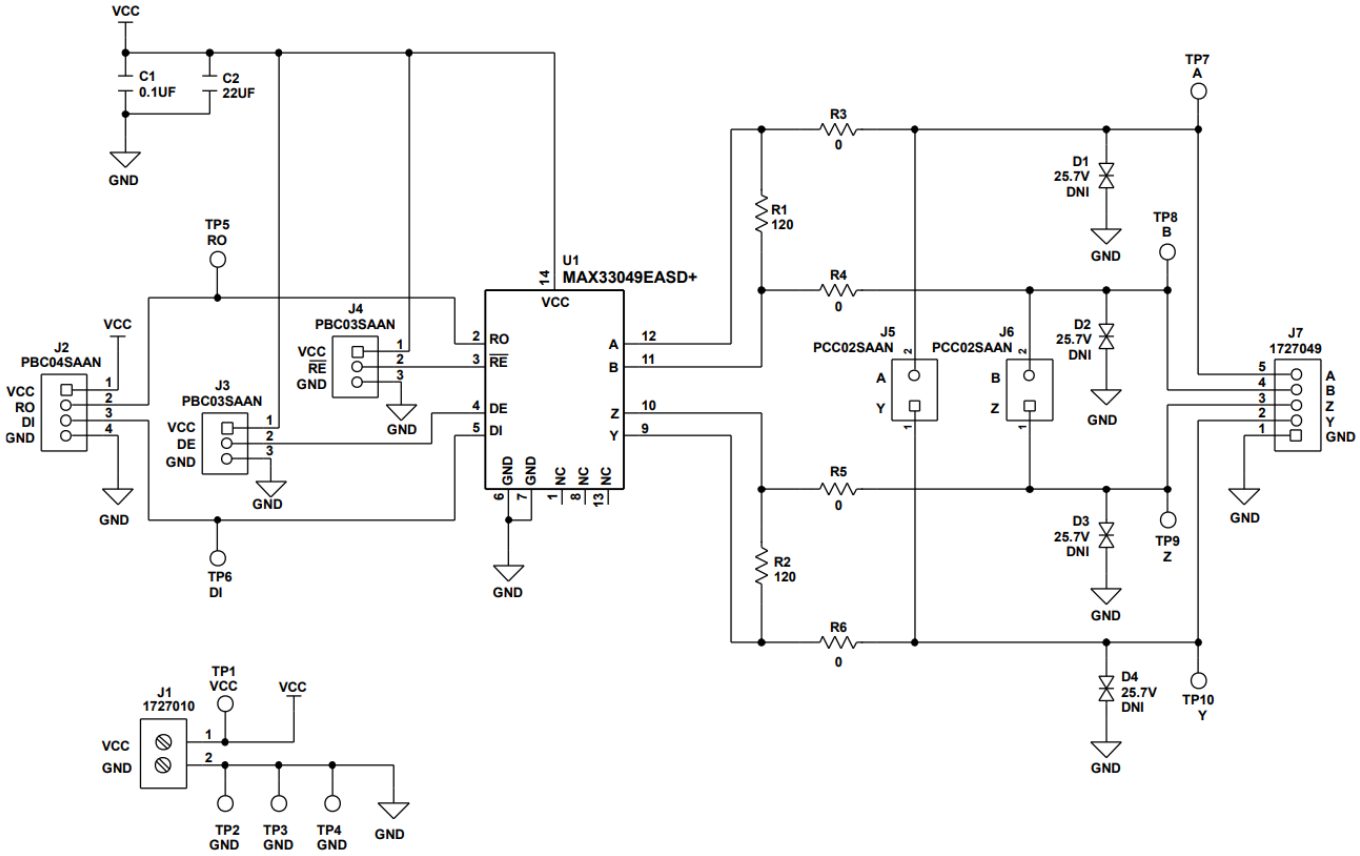
MAX33049E EV Kit Bill of Materials

REF DES	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
C1	1	GCM155L81E104 KE02	MURATA	0.1UF	CAP; SMT (0402); 0.1UF; 10%; 25V; X8L; CERAMIC
C2	1	GRM21BD71A226ME44	MURATA	22UF	CAP; SMT (0805); 22UF; 20%; 10V; X7T; CERAMIC
J1	1	1727010	PHOENIX CONTACT	1727010	CONNECTOR; FEMALE; THROUGH HOLE; GREEN TERMINAL BLOCK; RIGHT ANGLE; 2PINS
J2	1	PBC04SAAN	SULLINS ELECTRONICS CORP.	PBC04SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 4PINS; -65 DEGC TO +125 DEGC
J3, J4	2	PBC03SAAN	SULLINS	PBC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS; -65 DEGC TO +125 DEGC
J5, J6	2	PCC02SAAN	SULLINS	PCC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC
J7	1	1727049	PHOENIX CONTACT	1727049	CONNECTOR; THROUGH HOLE; GREEN TERMINAL BLOCK; RIGHT ANGLE; 5PINS
R1, R2	2	CRCW0805120RFK	VISHAY DALE	120	RES; SMT (0805); 120; 1%; +/- 100 PPM/DEGC; 0.1250W
R3–R6	4	RC1608J000CS; CR0603-J/- 000ELF;RC0603JR-070RL	SAMSUNG ELECTRONICS;BOURNS;YAGEO PH	0	RES; SMT (0603); 0; 5%; JUMPER; 0.1000W

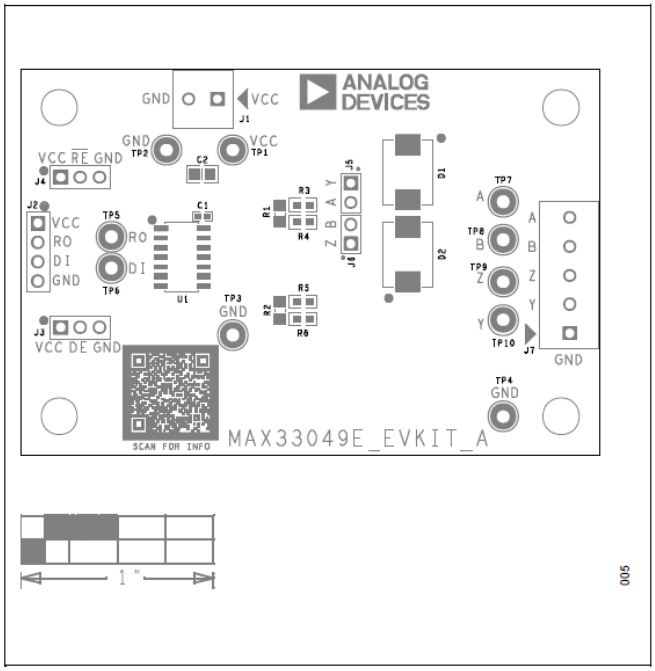
TP1	1	5010	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SIL;
TP2–TP4	3	5011	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
TP5, TP6	2	5012	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; WHITE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
TP7– TP10	4	5127	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLUE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
U1	1	MAX33049EASD+	ANALOG DEVICES	MAX33049EASD+	EVKIT PART – IC; MAX33049EASD; PACKAGE CODE: SOIC_N; PACKAGE OUTLINE DRAWING: R-14; SOIC14
PCB	1	MAX33049E	MAXIM	PCB	PCB:MAX33049E
D1–D4	4	SM30T26CAY	ST MICROELECTRON ICS	25.7V	DIODE; TVS; SMC (DO-214AB); PIV=25.7V; IF=0.2UA;

Kit Schematic

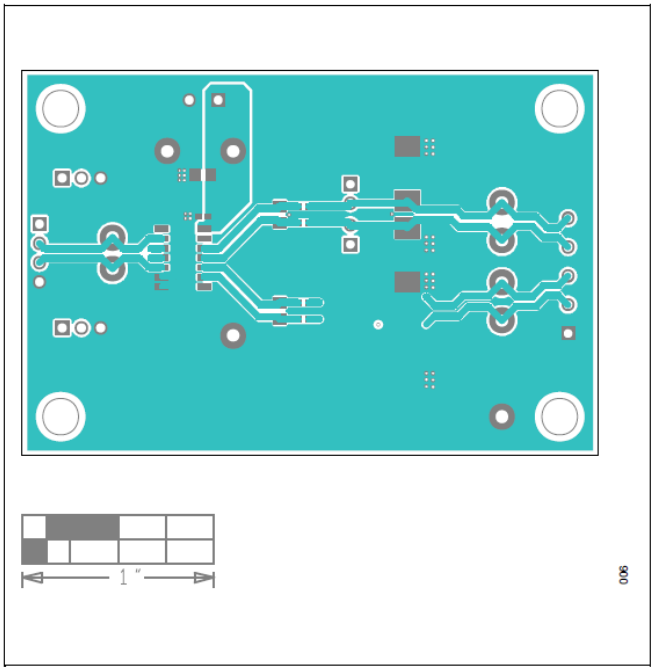
MAX33049E EV Kit Schematic



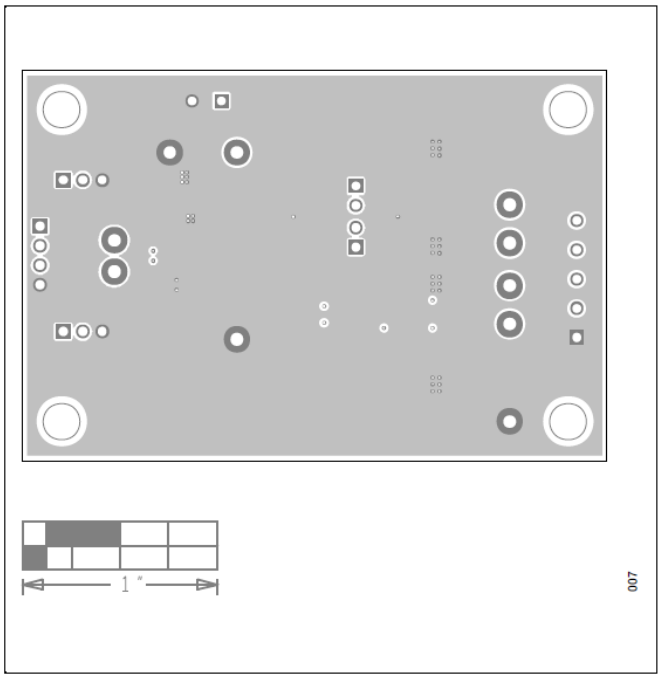
MAX33049E EV Kit PCB Layout



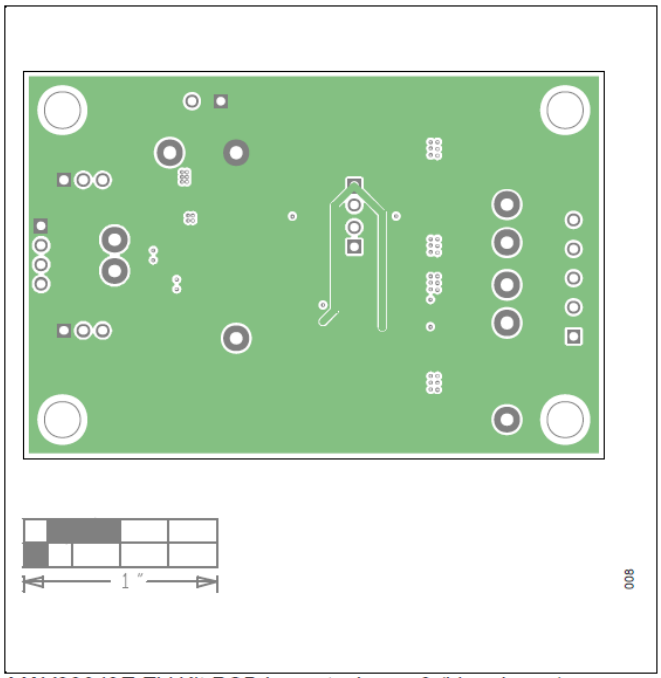
MAX33049E EV Kit—Top Silkscreen



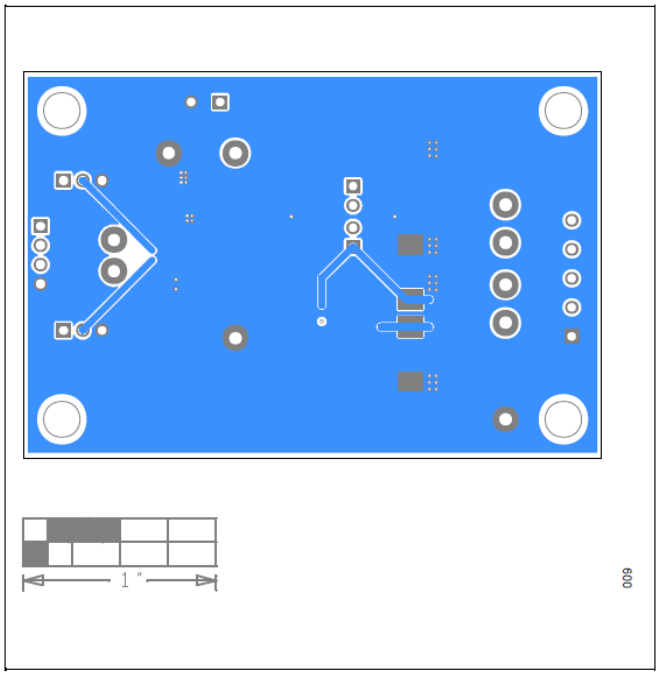
MAX33049E EV Kit PCB Layout—Top Layer



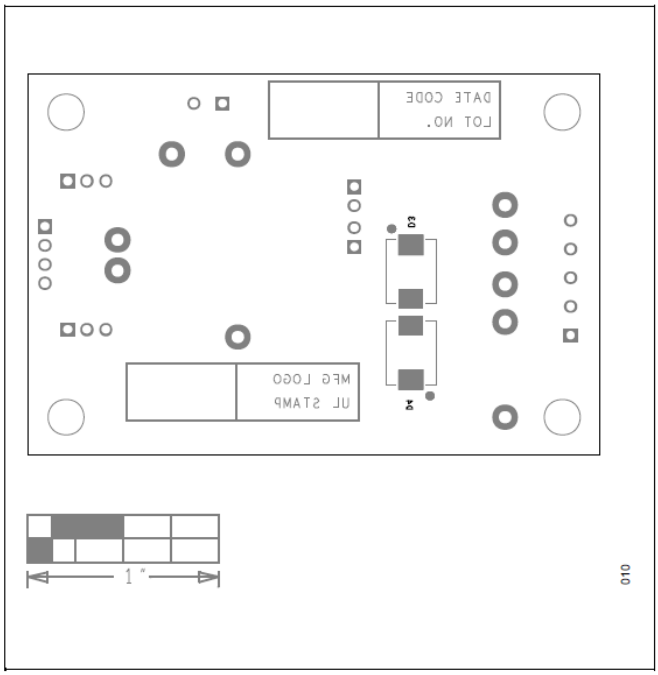
MAX33049E EV Kit PCB Layout—Layer 2 (GND Layer)



MAX33049E EV Kit PCB Layout—Layer 3 (V_{CC} Layer)



MAX33049E EV Kit PCB Layout—Bottom Layer



MAX33049E EV Kit—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	12/24	Initial release	—

MORE INFORMATION

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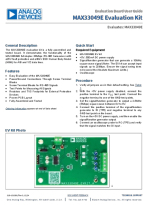	ANALOG DEVICES MAX33049E Datasheet and Product Info [pdf] User Guide MAX33049E, MAX33049E Datasheet and Product Info, MAX33049E, Datasheet and Product Info, Product Info, Info

References

- Mixed-signal and digital signal processing ICs | Analog Devices
- Document Feedback Form | Analog Devices
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- Support | Analog Devices
- User Manual