19-5193; Rev 0; 3/09

MAX9667 Evaluation Kit

General Description

The MAX9667 evaluation kit (EV kit) is a fully assembled and tested circuit board that evaluates the MAX9665, MAX9666, and MAX9667. These devices provide multiple programmable reference voltages for gamma correction in TFT-LCD displays and a programmable reference voltage for VCOM adjustment. These devices include multiple-time programmable (MTP) memory to store gamma and VCOM codes on the chip, eliminating the need for external EEPROM.

The MAX9665/MAX9666/MAX9667 feature an I²C interface to control the programmable reference voltages and a single-wire interface to toggle the VCOM reference voltage up or down.

The EV kit includes Windows® 2000-, Windows XP®-, and Windows Vista® (32-bit)-compatible software that provides a graphical user interface (GUI) for exercising the features of the MAX9665/MAX9666/MAX9667.

The EV kit PCB comes with a MAX9667ETP+ installed. Contact the factory for free samples of the pin-compatible MAX9665ETP+ and MAX9666ETP+ devices.

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Features

- **On-Board Booster Converter Provides Reference and Analog Power Supplies**
- **On-Board DAC and Op Amp Provide VCOM MTP Programming Waveform**
- **Windows 2000-, Windows XP-, and Windows Vista (32-Bit)-Compatible Software**
- **USB Powered (Cable Included)**
- **Proven PCB Layout**
- **Fully Assembled and Tested**

Ordering Information

PART	TYPE
MAX9667EVKIT+	EV Kit

+Denotes lead(Pb)-free and RoHS compliant.

Component List

DESIGNATION	QTY	DESCRIPTION
C1–C10	0	Not installed, ceramic capacitors (0402)
C11, C24, C25, C31	4	0.1µF ±10%, 16V X7R ceramic capacitors (0603) Murata GRM188R71C104K
C12	1	10µF ±10%, 10V X5R ceramic capacitor (0805) Murata GRM21BR61A106K
C13, C15, C32	3	0.1µF ±10%, 25V X7R ceramic capacitors (0603) Murata GRM188R71E104K
C14, C35	2	10µF ±10%, 25V X5R ceramic capacitors (1206) Murata GRM31CR61E106K
C16, C19, C20, C23, C26, C33	6	1µF ±10%, 16V X7R ceramic capacitors (0603) Murata GRM188R71C105K
C17, C18, C21, C22	4	18pF ±5%, 50V C0G ceramic capacitors (0603) Murata GRM1885C1H180J
C27–C30	4	4.7µF ±10%, 10V X5R ceramic capacitors (0805) Murata GRM219R61A475K
C34	1	1000pF ±10%, 50V X7R ceramic capacitor (0603) Murata GRM188R71H102K
D1	1	Red LED (0603)
D2	1	30V 1A Schottky diode (SOD123)
FB1	1	60Ω at 100MHz, 500mA ferrite bead (0603) Murata BLM18PG600SN1
J1	0	Not installed, dual-row header (2 x 20)
J2	1	USB type-B right-angle receptacle
J3	0	Not installed, dual-row header (2 x 5)
JU1, JU2, JU4, JU5, JU8	5	3-pin headers

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

Component List (continued)

DESIGNATION	QTY	DESCRIPTION
JU3, JU6, JU7	3	2-pin headers
L1	1	47µH inductor (1210) Murata LQH32CN470K23L
R1–R11	0	Not installed, resistors (0402)
R12, R13, R27–R35	11	0Ω ±5% resistors (0402)
R14, R15	2	2.2kΩ ±5% resistors (0603)
R16, R17	2	33.2Ω ±1% resistors (0603)
R18	1	10kΩ ±5% resistor (0603)
R19	1	300Ω ±5% resistor (0603)
R20	1	931kΩ ±1% resistor (0603)
R21	1	499kΩ ±1% resistor (0603)
R22	1	100kΩ ±5% resistor (0603)
R23	1	100kΩ ±1% resistor (0603)
R24	1	18.2kΩ ±1% resistor (0603)
R25	1	49.9kΩ ±1% resistor (0603)
R26	1	604kΩ ±1% resistor (0603)
TP1–TP12	0	Not installed, miniature test points
TP13, TP14, TP19, TP20	4	White multipurpose test points
TP15, TP17	2	Red multipurpose test points
TP16, TP18	2	Black multipurpose test points
U1	1	Gamma and VCOM reference generator (20 TQFN-EP*) Maxim MAX9667ETP+
U2	1	USB peripheral controller (24 TQFN-EP*) Maxim MAX3420EETG+
U3	1	Microcontroller (68 QFN-EP*) Maxim MAXQ2000-RAX+
U4	1	Quad bidirectional level translator (12 TQFN-EP*) Maxim MAX3395EETC+
U5	1	2.5V LDO regulator (5 SC70) Maxim MAX8511EXK25+
U6	1	200mA adjustable output LDO regulator (6 SOT23) Maxim MAX8880EUT+
U7	1	8-bit DAC (5 SOT23) Maxim MAX5382LEUK+
U8	1	High-current VCOM drive op amp (5 SOT23) Maxim MAX9650AZK+
U9	1	30V booster converter (6 TDFN-EP*) Maxim MAX1605ETT+
Y1	1	12MHz crystal Hong Kong X'tals SSM12000N1HK188F0-0
Y2	1	20MHz crystal Hong Kong X'tals SSM20000N1HK188F0-0
—	8	Shunts
—	1	PCB: MAX9667 EVALUATION KIT+

**EP = Exposed pad.*

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
Hong Kong X'tals Ltd.	852-35112388	www.hongkongcrystal.com

Note: *Indicate that you are using the MAX9667 when contacting these component suppliers.*

MAX9667 EV Kit Files

FILE	DESCRIPTION
INSTALL.EXE	Installs the EV kit files on your computer
MAX9667.EXE	Application program
UNINST.INI	Uninstalls the EV kit software

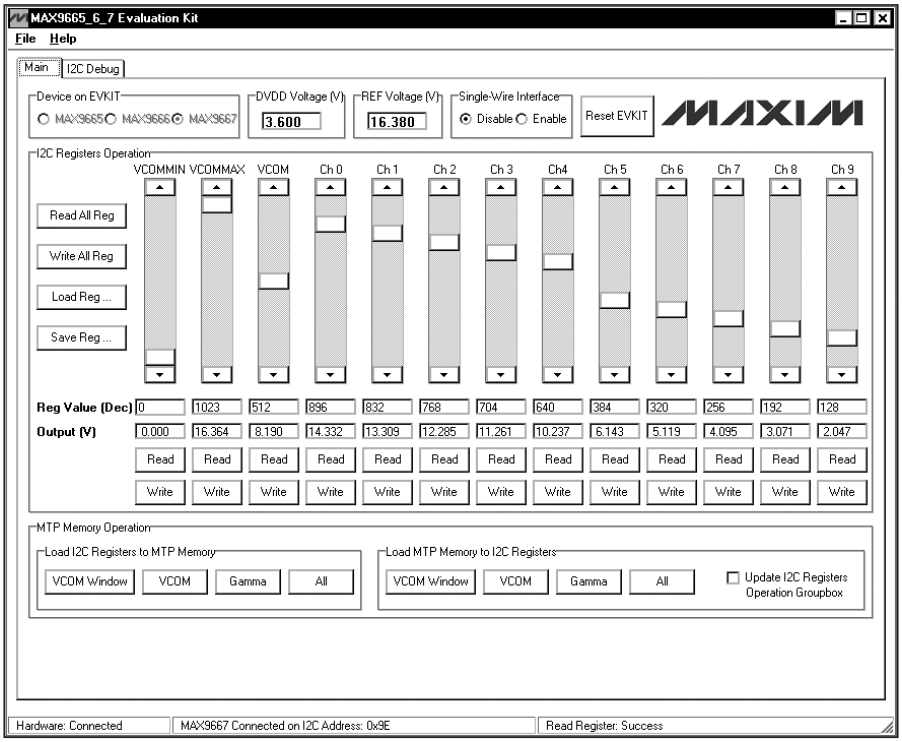

Figure 1. MAX9667 Evaluation Software (Main Tab)

Quick Start

Required Equipment

- MAX9667 EV kit (USB cables included)
- User-supplied Windows 2000, Windows XP, or Windows Vista PC with a spare USB port
- DC voltage measurement equipment (e.g., voltmeter or equivalent)

Note: In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and underlined** refers to items from the Windows operating system.

Procedure

The MAX9667 EV kit is fully assembled and tested. Follow the steps below to verify board operation:

1) Visit **www.maxim-ic.com/evkitsoftware** to download the latest version of the EV kit software, 9667Rxx.ZIP. Save the EV kit software to a temporary folder and uncompress the ZIP file.
2) Install the EV kit software on your computer by running the INSTALL.EXE program inside the temporary folder. The program files are copied and icons are created in the Windows **Start | Programs** menu.
3) Verify that all jumpers are in their default positions, as shown in Table 1.
4) Connect the EV kit board to one of the PC USB ports.
5) Verify that red LED D1 on the EV kit board is turned on.
6) Start the MAX9667 EV kit software by opening its icon in the **Start | Programs** menu.
7) The EV kit software main window appears, as shown in Figure 1. Verify that the message **Hardware: Connected** is displayed on the status bar at the bottom of the software main window.
8) Measure the DVDD and the REF voltages with the voltmeter and type the values in the **DVDD Voltage (V)** and **REF Voltage (V)** edit boxes, respectively. Press the Enter key when finished.
9) Measure the buffer output voltages on the J1 header. Verify that they are close to the voltages shown in the **Output (V)** edit boxes for each channel.

Table 1. Jumper Descriptions (JU1–JU8)

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1-2*	DVDD connected to on-board regulated 3.6V power supply
	2-3	DVDD applied externally on the TP15 test point
JU2	1-2*	REF connected to AVDD
	2-3	REF applied externally on the TP19 test point
JU3	1-2*	CE connected to the on-board microcontroller GPO pin
	Open	CE disconnected from the on-board microcontroller GPO pin
JU4	1-2*	SDA pin connected to the on-board microcontroller
	2-3	SDA pin connected to GND
	Open	SDA applied externally on the TP14 test point
JU5	1-2*	SCL pin connected to the on-board microcontroller
	2-3	SCL pin connected to GND
	Open	SCL applied externally on the TP13 test point
JU6	1-2*	DVDD connected to the level translator
	Open	DVDD disconnected from the level translator
JU7	1-2*	CTL generated by the on-board DAC and op amp
	Open	CTL applied externally on the TP20 test point
JU8	1-2*	AVDD connected to on-board 16V power supply
	2-3	AVDD applied externally on the TP17 test point

**Default position.*

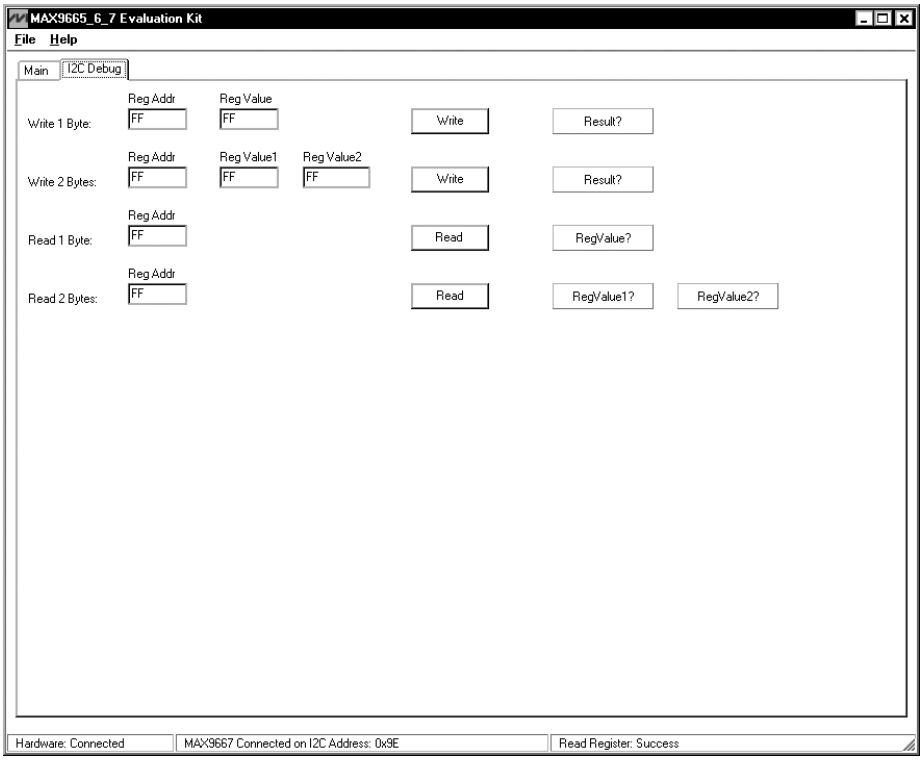

Figure 2. MAX9667 Evaluation Software (I2C Debug Tab)

Detailed Description of Software

The MAX9667 EV kit evaluation software's main window is shown in Figure 1. There are two tabs in the main window, **Main** and **I2C Debug**.

Main Tab

The major section of the **Main** tab sheet features the **I2C Registers Operation** group box and the **MTP Memory Operation** group box.

The **Main** tab sheet includes the **Device on EVKIT** group box, which shows the device installed on the EV kit.

In the **Main** tab sheet, a user can type in the DVDD and REF voltages. A user can also enable or disable the single-wire interface.

I2C Debug Tab

The **I2C Debug** tab sheet is shown in Figure 2. This tab sheet gives a user more flexibility to exercise the features of the MAX9665/MAX9666/MAX9667 devices. Single register read/write and two consecutive registers read/write operations are possible.

Software Menu Bar

Select **File | Exit** to exit the application.

The **Help** menu item gives information about the MAX9667 EV kit software.

Detailed Description of Hardware

The MAX9667 EV kit is a fully assembled and tested circuit board that evaluates the MAX9665, MAX9666, and MAX9667.

These devices are a family of multichannel, programmable reference voltages. Each channel has a 10-bit DAC to create the reference voltage. One channel has an amplifier that follows the DAC, while all the other channels have a buffer after the DAC. The user can program the DAC codes into on-chip nonvolatile memory, which is called multiple-time programmable (MTP) memory since data can be written into it up to 100 times.

Each part has an I²C interface for programming both the MTP memory and the I²C registers. For compatibility with legacy flicker adjustment production equipment, these devices include a single-wire interface that is compatible with the MAX1512.

Power Supplies

By default, the EV kit is powered by USB (J2). The different power supplies for the MAX9667 can be applied according to user requirements. See Table 1 for possible power-supply configurations.

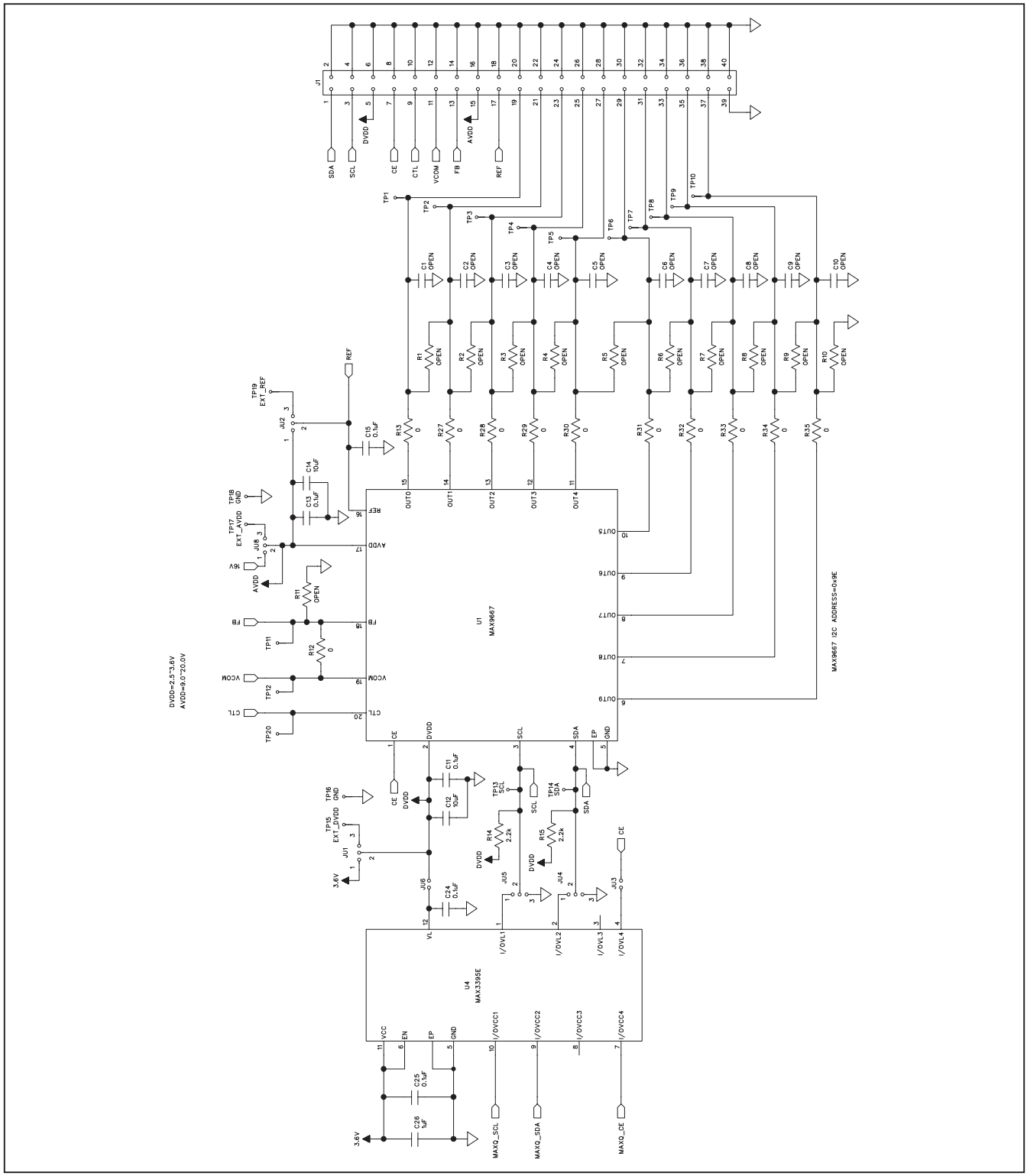

Figure 3a. MAX9667 EV Kit Schematic (Sheet 1 of 2)

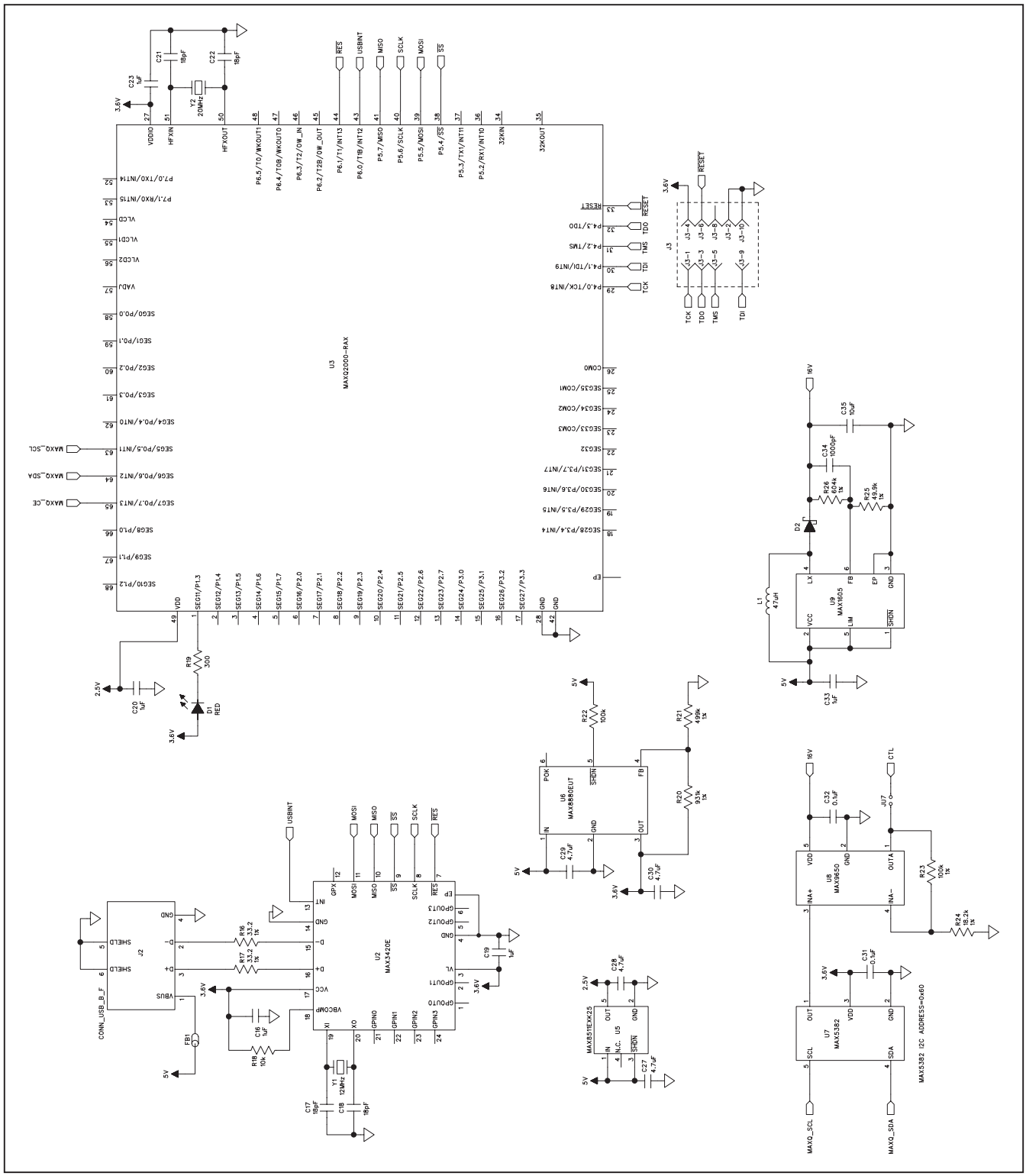

Figure 3b. MAX9667 EV Kit Schematic (Sheet 2 of 2)

MAX9667 Evaluation Kit

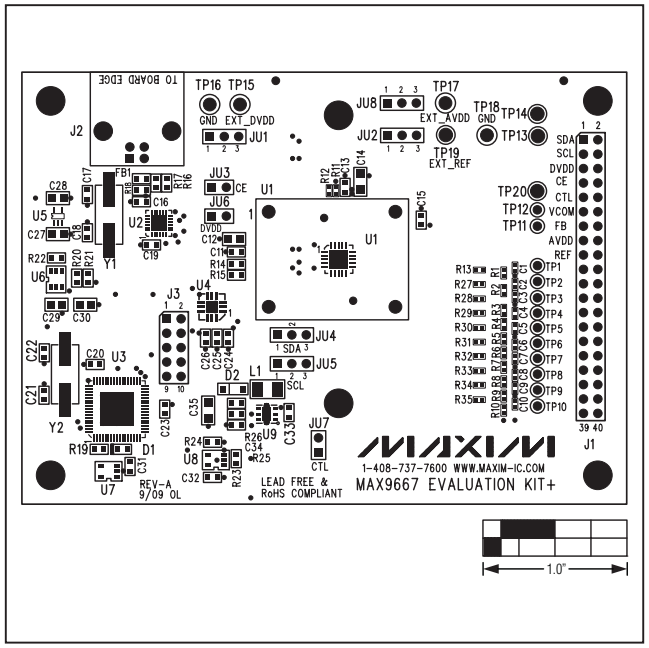

Figure 4. MAX9667 EV Kit Component Placement Guide—Component Side

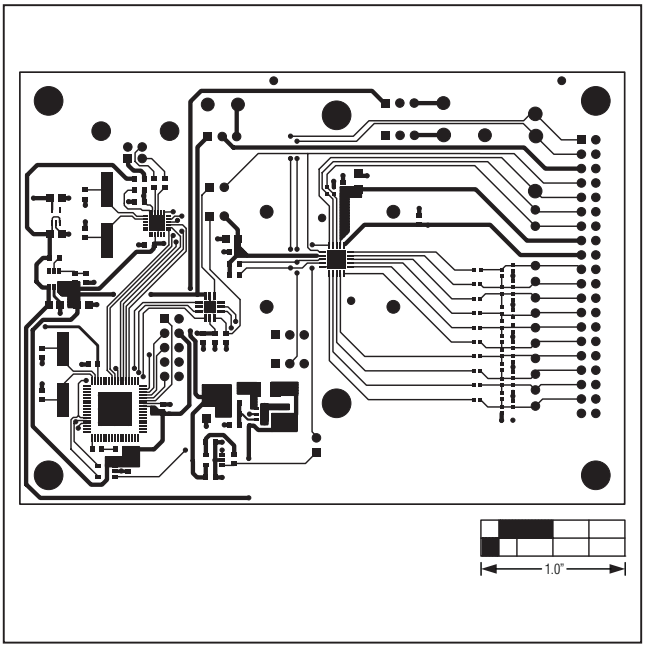

Figure 5. MAX9667 EV Kit PCB Layout—Component Side

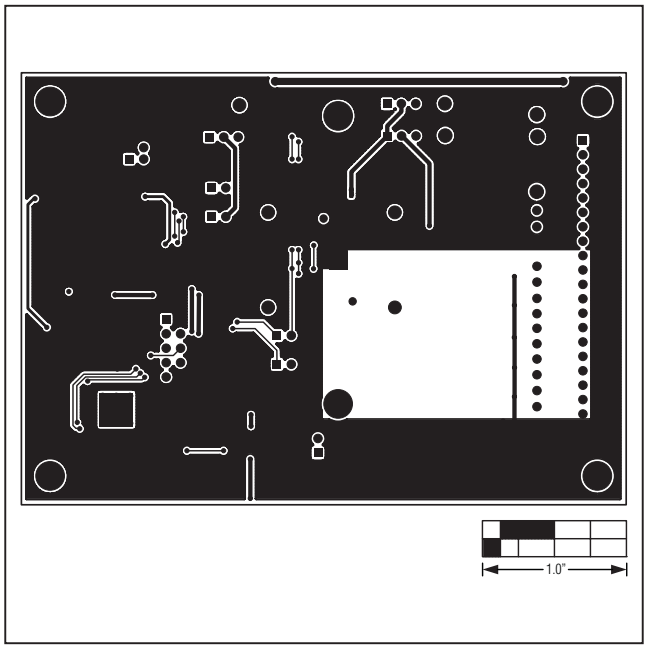

Figure 6. MAX9667 EV Kit PCB Layout—Solder Side

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