

MAX14819 Evaluation Kit

Evaluates: MAX14819/MAX14819A

General Description

The MAX14819 evaluation kit (EV kit) consists of the evaluation board and software. The EV kit is a fully assembled and tested circuit board that evaluates the MAX14819 IO-Link® dual-channel master transceiver.

The EV kit includes Windows® 7-compatible software that provides a graphical user interface (GUI) for exercising the features of the device. The EV kit is connected to a PC through a USB A-to- micro B cable.

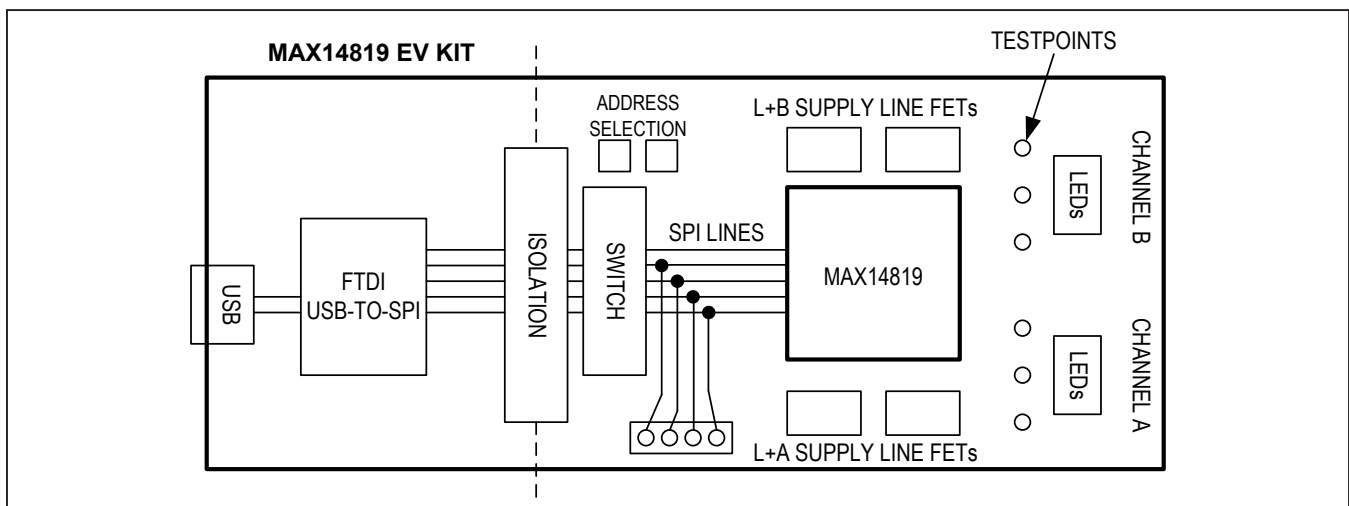
The MAX14819 EV kit can also be used to evaluate the MAX14819A.

Features

- IO-Link-Compliant Device Transceiver
- IO and SPI Interface Terminals
- Windows 7-Compatible Software
- USB-PC Connection
- Proven PCB Layout
- Fully Assembled and Tested

Ordering Information appears at end of data sheet.

MAX14819 EV Kit Block Diagram



IO-Link is a registered trademark of Profibus User Organization (PNO).

Windows, Windows XP, and Windows Vista are registered trademarks and registered service marks of Microsoft Corporation.

Quick Start

Recommended Equipment

- MAX14819 EV kit (USB A-to-B cable included)
- User-supplied Windows 7 PC with a spare USB port
- 24V, 1A DC power supply*
- Multimeter/voltmeter

*L+A and L+B are each configured for a 1A (typ) current limit, so a higher load-capable power supply may be required for testing.

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

- 1) Visit www.maximintegrated.com/evkitsoftware to download the latest version of the EV kit software, MAX14819EVKITSetupVx.xx.ZIP. Save the EV kit software to a temporary folder and uncompress the ZIP file.

- 2) Install the EV kit software and USB driver on your computer by running the MAX14819EVKITSetupVx.xx.EXE program inside the temporary folder. The program files are copied to your PC and icons are created in the Windows **Start | Programs | Maxim Integrated** menu. During software installation, some versions of Windows may show a warning message indicating that this software is from an unknown publisher. This is not an error condition and it is safe to proceed with installation. Administrator privileges are required to install the USB device driver on Windows.
- 3) Verify that all the jumpers are in their default positions, as shown in [Table 1](#).
- 4) Connect the 24V DC power supply on the VCC and GND connectors on the EV kit board.
- 5) Connect the multimeter to the V5 testpoint (TP22)
- 6) Connect the USB cable from the PC to the EV kit board. A Windows message appears when connecting the EV kit board to the PC for the first time. Each version of Windows has a slightly different message. If you see a Windows message stating **ready to use**, then proceed to the next step.
- 7) Start the EV kit software by opening its icon in the Windows **Start | Programs | Maxim Integrated** menu. The EV kit software main window appears, as shown in [Figure 1](#).
- 8) Verify that **Status: MAX14819EVKIT A Connected** is displayed on the status bar at the bottom of the main window ([Figure 1](#)).
- 9) Turn on the 24V supply. Ensure that the V5 voltage (TP22) is 5V.
- 10) Click on the **Read All** button to read all of the registers in the device.
- 11) Select a register in the register table to access the bits in that register by clicking on the register name.
- 12) Using the Register Bit Description table that pops up, set the individual bits by selecting the required setting from the drop-down menu for each bit.
- 13) Press the **Write Changes** button on the GUI to write the registers that have been changed to the MAX14819.

Detailed Description of Software

Configuring the Registers

Click on a register name in the register table to access the individual bits in that register. When the register name is selected in the register table, a corresponding Register Bit Description table appears, allowing access to set individual bits. Click on the drop-down menu next to each bit in the Register Bit Description table to select the bit

setting. When all of the bits are set as desired, click on the Write Changes button to write the changed bit setting to the MAX14819 over the SPI interface.

Note that full IO-Link communication is not available using the EV kit GUI. Please use the MAXREFDES145 for full IO-Link communication with the MAX14819.

Interrupt Response ($\overline{\text{IRQ}}$)

The MAX14819 features an integrated active-low interrupt indicator pin to actively notify the controller when an interrupt or error condition occurs. Enable interrupts in the by setting the bits in the InterruptEn register.

When an interrupt is triggered, the IRQ bit in the SPI communication is set and the IRQ in the SPI Response box of the GUI turns red. On the EV kit PCB, the IRQ LED (DS6) also turns on.

Detailed Description of Hardware

The MAX14819 EV kit includes the MAX14819 dual-channel IO-Link master transceiver and the external components for evaluating the device. All logic-level I/Os and IO-Link capable I/Os are available on yellow test points.

Logic-Level Power Supply

The MAX14819 features an internal 5V linear regulator which can drive loads up to 20mA. When REGEN is unconnected, this 5V output is available on the V5 test point (TP22). Leave J13 open and close the J5 jumper to use this internal 5V regulator to power the logic level supply (VL).

To use a different logic-level voltage supply, open the J5 jumper and apply the external supply to the VL testpoint (TP23).

Selecting the Device Address

The MAX14819 includes two address pins for SPI addressing, allowing up to four devices on a single bus. Set the SPI address for the MAX14819 on the MAX14819EVKIT by setting the A1 and A0 jumpers (J11 and J12, respectively). Set the device SPI address in the GUI to the same value by selecting the corresponding address in the drop-down menu in the SPI Address box.

Using SPI Interface with an External Master Controller

The MAX14819 EV kit includes an isolated USB-to-SPI interface circuit for communication with the PC/GUI.

To use an external SPI master controller with the MAX14819, open all of the channels on SW1, and connect an external SPI master to the J20 header. Note that the J20 header is not isolated from the MAX14819.

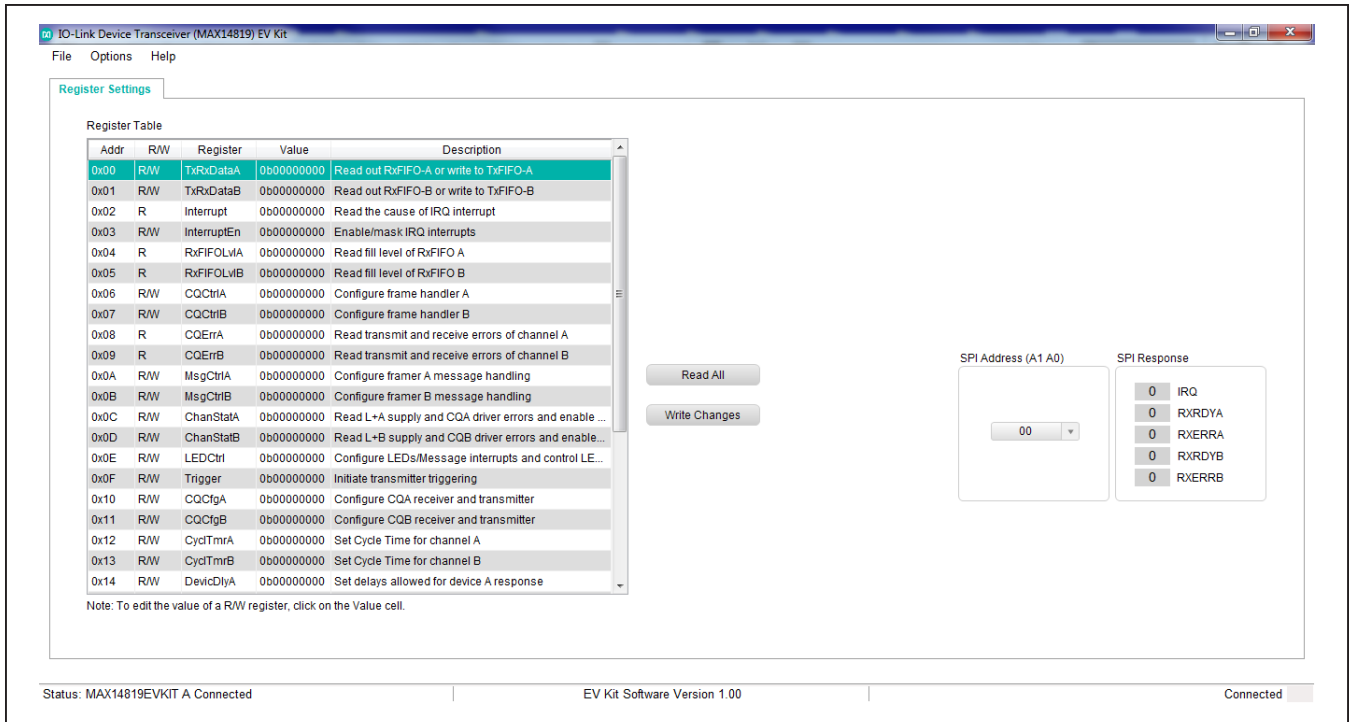


Figure 1. MAX14819 EV Kit Software, EV Kit is Connected

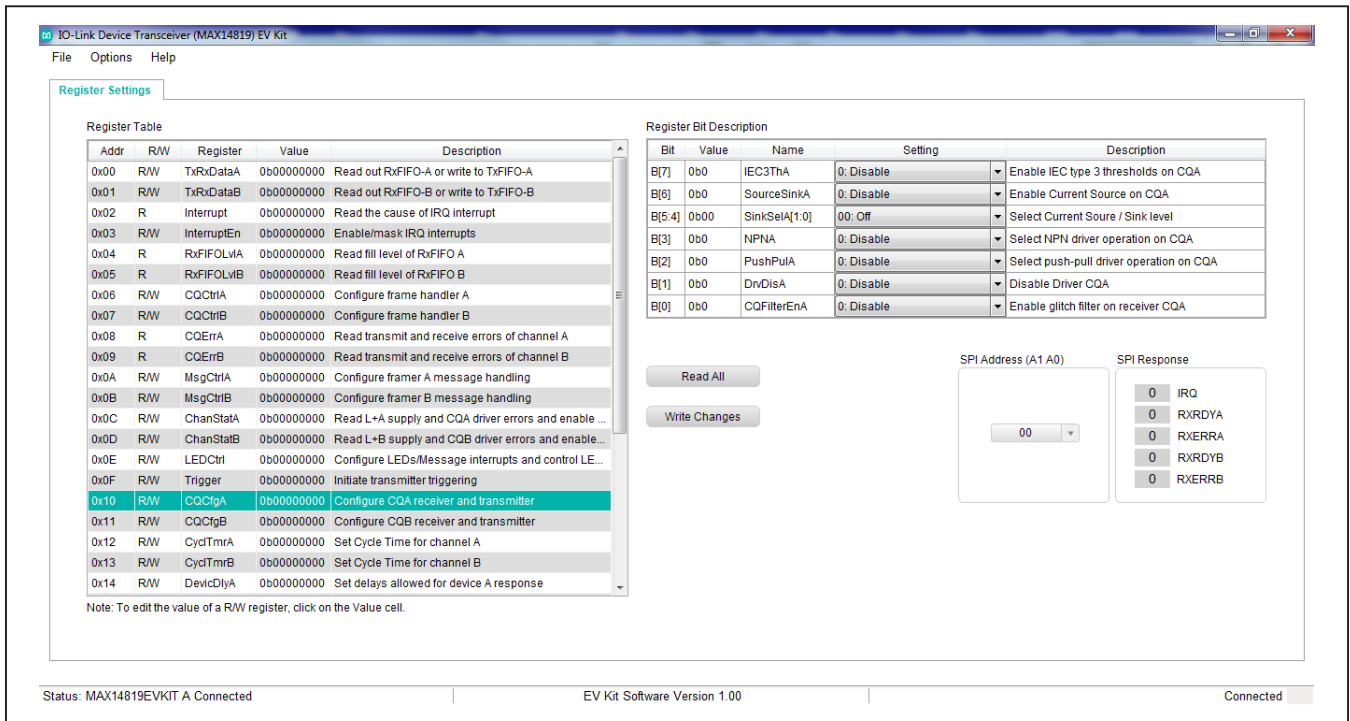


Figure 2. MAX14819 EV Kit Software, Register Bit Description Table

Table 1. Jumper Descriptions

| JUMPER | SHUNT POSITON | DESCRIPTION |
|--------|---------------|---|
| J5 | Open | VL is powered by an external supply. Apply an external voltage to the VL test point for normal operation. |
| | Closed* | VL is connected to V5. |
| J6 | Open | $\overline{\text{IRQ}}$ is not pulled to VL through an LED |
| | Closed* | $\overline{\text{IRQ}}$ is pulled up to VL through an LED |
| J7 | Open | $\overline{\text{RXRDYA/LD1A}}$ is not pulled to VL through an LED |
| | Closed* | $\overline{\text{RXRDYA/LD1A}}$ is pulled up to VL through an LED |
| J8 | Open | $\overline{\text{RXERRA/LD2A}}$ is not pulled to VL through an LED |
| | Closed* | $\overline{\text{RXERRA/LD2A}}$ is pulled up to VL through an LED |
| J9 | Open | $\overline{\text{RXERRB/LD2B}}$ is not pulled to VL through an LED |
| | Closed* | $\overline{\text{RXERRB/LD2B}}$ is pulled up to VL through an LED |
| J10 | Open | $\overline{\text{RXRDYB/LD1B}}$ is not pulled to VL through an LED |
| | Closed* | $\overline{\text{RXRDYB/LD1B}}$ is pulled up to VL through an LED |
| J11 | 1-2 | A1 is connected to VL (high). Chip address pin A1 is 1. |
| | 2-3* | A1 is connected to GND (low). Chip address pin A1 is 0. |
| J12 | 1-2 | A0 is connected to VL (high). Chip address pin A0 is 1. |
| | 2-3* | A0 is connected to GND (low). Chip address pin A0 is 0. |
| J13 | Open* | REGEN is unconnected. Internal 5V regulator is enabled. |
| | Closed | REGEN is connected to GND. Internal 5V regulator is disabled. |
| J14 | Open | TXENA is connected to VL (high) |
| | Closed* | TXENA is connected to GND (low) |
| J16 | Open | TXENB is connected to VL (high) |
| | Closed* | TXENB is connected to GND (low) |

*Default position.

Ordering Information

| PART | TYPE |
|----------------|--------|
| MAX14819EVKIT# | EV Kit |

#Denotes RoHS compliant.

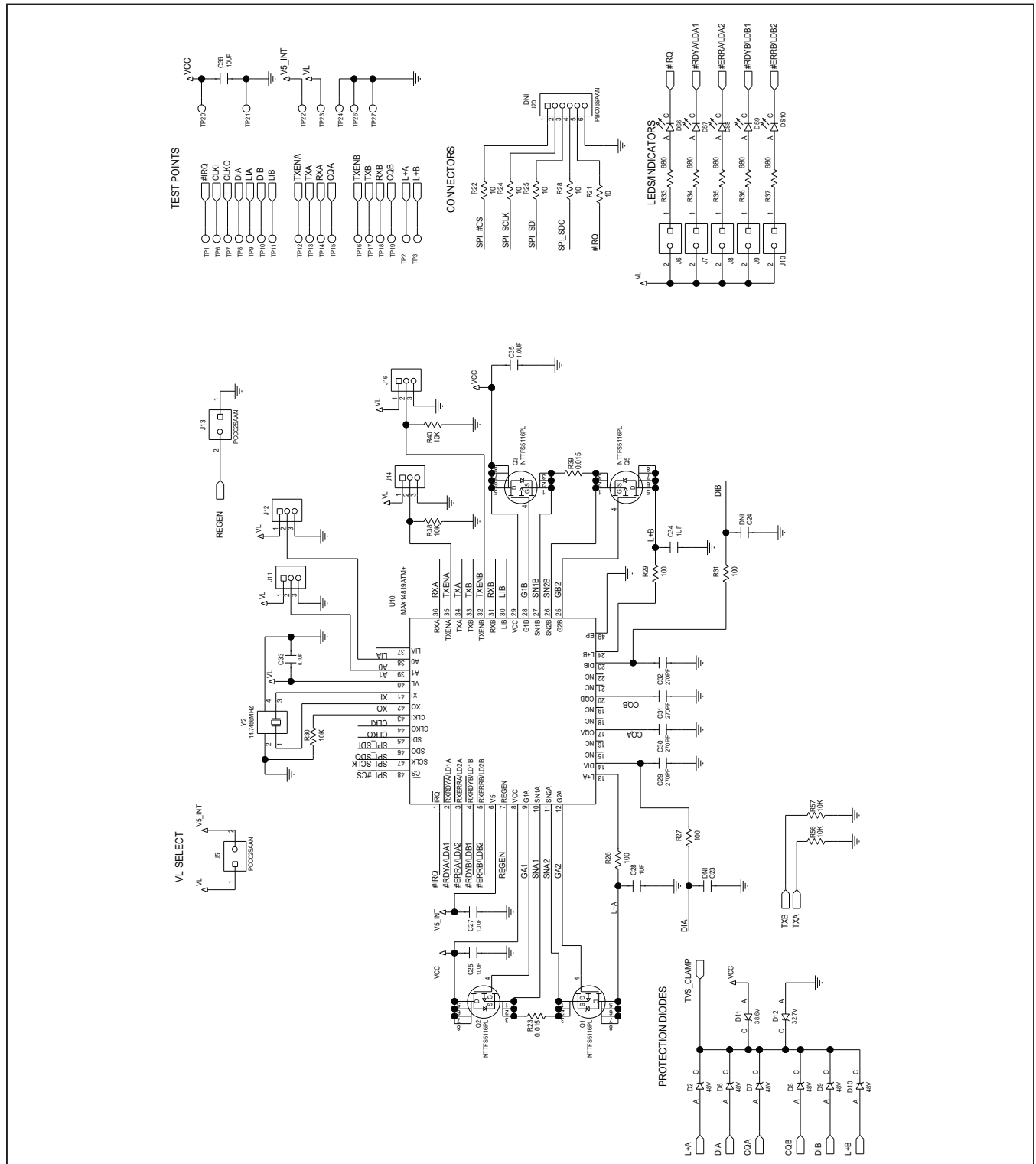
MAX14819 EV Kit Bill of Materials

| ITEM | REF_DES | DNI/DNP | QTY | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION | COMMENTS |
|------|------------------------------------|---------|-----|---|---|-----------------|--|----------|
| 1 | C1 | - | 1 | C1005X7R1V103K050BB | TDK | 0.01UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 0.01UF; 35V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R | |
| 2 | C2, C4, C8 | - | 3 | C0603C475K8PAC; LMK107BJ475KA-T; CGB3B1X5R1A475K; C1608X5R1A475K080; CL10A475K8PNNN | KEMET; TAIYO YUDEN; TDK; SAMSUNG ELECTRONICS | 4.7UF | CAPACITOR; SMT (0603); CERAMIC CHIP; 4.7UF; 10V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R | |
| 3 | C3, C7, C9-C16, C18-C21 | - | 14 | C0402C104J4RAC | KEMET | 0.1UF | CAPACITOR; SMT; 0402; CERAMIC; 0.1uF; 16V; 5%; X7R; -55degC to + 125degC; 0 +/-15% degC MAX. | |
| 4 | C5, C6 | - | 2 | C0402C180J5GAC; GRM1555C1H180JA01J; C1005COG1H180J050 | KEMET/MURATA/TKD | 18PF | CAPACITOR; SMT (0402); CERAMIC CHIP; 18PF; 50V; TOL=5%; TG=-55 DEGC TO +125 DEGC; TC=COG | |
| 5 | C17 | - | 1 | C0402C105K8PAC | KEMET | 1UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 1UF; 10V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R | |
| 6 | C22 | - | 1 | C1608X5R1A106K | TDK | 10UF | CAPACITOR; SMT (0603); CERAMIC CHIP; 10UF; 10V; TOL=10%; MODEL=; TG=-55 DEGC TO +85 DEGC; TC=X5R | |
| 7 | C25, C27, C35 | - | 3 | GMK107BJ105KA; C1608X5R1V105K080AB | TAIYO YUDEN/TKD | 1.0UF | CAPACITOR; SMT (0603); CERAMIC CHIP; 1UF; 35V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R | |
| 8 | C28, C34 | - | 2 | C2012X7S2A105K125; GRJ21BC72A105KE11 | TKD/MURATA | 1UF | CAPACITOR; SMT (0805); CERAMIC CHIP; 1UF; 100V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7S | |
| 9 | C29-C32 | - | 4 | VJ0603A271KXB | VISHAY VITRAMON | 270PF | CAPACITOR; SMT (0603); CERAMIC CHIP; 270PF; 100V; TOL=10%; MODEL=COG; TG=-55 DEGC TO +125 DEGC; TC=+ | |
| 10 | C33 | - | 1 | C0603C104K8RAC | KEMET | 0.1UF | CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1UF; 10V; TOL=10%; MODEL=C0603 SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R | |
| 11 | C36 | - | 1 | C5750X7S2A106M | TDK | 10UF | CAPACITOR; SMT (2220); CERAMIC CHIP; 10UF; 100V; TOL=20%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=X7S | |
| 12 | D2, D6-D10 | - | 6 | SMCJ48A | ST MICROELECTRONICS | 48V | DIODE; TVS; SMC; VRM=48V; IPP=20A | |
| 13 | D11 | - | 1 | SM30T39AY | ST MICROELECTRONICS | 38.6V | DIODE; TVS; SMC (DO-214AB); VRM=38.6V; IPP=56.3A | |
| 14 | D12 | - | 1 | SM30T33AY | ST MICROELECTRONICS | 32.7V | DIODE; TVS; SMC (DO-214AB); VRM= 32.7V; IPP=66.1A | |
| 15 | DS1 | - | 1 | LG L29K-G2J1-24 | OSRAM | LG L29K-G2J1-24 | DIODE; LED; SMT (0603); Vf=1.7V; If(test)=0.002A; -40 DEGC TO +100 DEGC | |
| 16 | DS6-DS10 | - | 5 | LTST-C150CKT | LITE-ON ELECTRONICS; INC. | LTST-C150CKT | DIODE; LED; STANDARD; RED; SMT (1206); PIV=1.8V; IF=0.02A | |
| 17 | J1 | - | 1 | 105017-0001 | MOLEX | 105017-0001 | CONNECTOR; FEMALE; SMT; MICRO-USB B RECEPTACLE; RIGHT ANGLE; 5PINS | |
| 18 | J5-J10, J13 | - | 7 | PCC025AAN | SULLINS | PCC025AAN | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC | |
| 19 | J11, J12, J14, J16 | - | 4 | PCC035AAN | SULLINS | PCC035AAN | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 3PINS; -65 DEGC TO +125 DEGC | |
| 20 | L1 | - | 1 | BLM21AG6015N1D | MURATA | 600 | INDUCTOR; SMT (0805); FERRITE-BEAD; 600; TOL=+/-25%; 0.2A | |
| 21 | Q1-Q3, Q5 | - | 4 | NTTF55116PL | ON SEMICONDUCTOR | NTTF55116PL | TRAN; POWER MOSFET; PCH; WDFN8; PD-(40W); I-(-20A); V-(-60V) | |
| 22 | R1, R2, R10-R13 | - | 6 | ERJ-2RKF10R0X | PANASONIC | 10 | RESISTOR; 0402; 10 OHM; 1%; 100PPM; 0.10W; THICK FILM | |
| 23 | R3, R9, R30, R38, R40, R56, R57 | - | 7 | RC0603JR-0710KL | YAGEO PHYCOMP | 10K | RESISTOR; 0603; 10K OHM; 5%; 100PPM; 0.1W; THICK FILM | |
| 24 | R4 | - | 1 | CRCW060315K0FK | VISHAY DALE | 15K | RESISTOR, 0603, 15K OHM,1%, 100PPM, 0.10W, THICK FILM | |
| 25 | R5, R16-R19, R54 | - | 6 | CRCW040210K0FK; RC0402FR-0710K | VISHAY DALE; YAGEO PHICOMP | 10K | RESISTOR; 0402; 10K; 1%; 100PPM; 0.0625W; THICK FILM | |
| 26 | R6 | - | 1 | CRCW04022K20FK; RC0402FR-072K2L | VISHAY DALE/ YAGEO PHICOMP | 2.2K | RESISTOR, 0402, 2.2K OHM, 1%, 100PPM, 0.0625W, THICK FILM | |
| 27 | R7 | - | 1 | CRCW060312K0FK | VISHAY DALE | 12K | RESISTOR, 0603, 12K OHM, 1%, 100PPM, 0.10W, THICK FILM | |
| 28 | R8 | - | 1 | CRCW06034K70FK | VISHAY DALE | 4.7K | RESISTOR; 0603; 4.7K; 1%; 100PPM; 0.10W; THICK FILM | |
| 29 | R14, R15 | - | 2 | CRCW0603100RFK; ERJ-3EKF1000 | VISHAY DALE/ PANASONIC | 100 | RESISTOR; 0603; 100 OHM; 1%; 100PPM; 0.10W; THICK FILM | |
| 30 | R21, R22, R24, R25, R28 | - | 5 | CRCW040210R0FK; 9C04021A10R0FL | VISHAY DALE | 10 | RESISTOR; 0402; 10 OHM; 1%; 100PPM; 0.0625W; THICK FILM | |

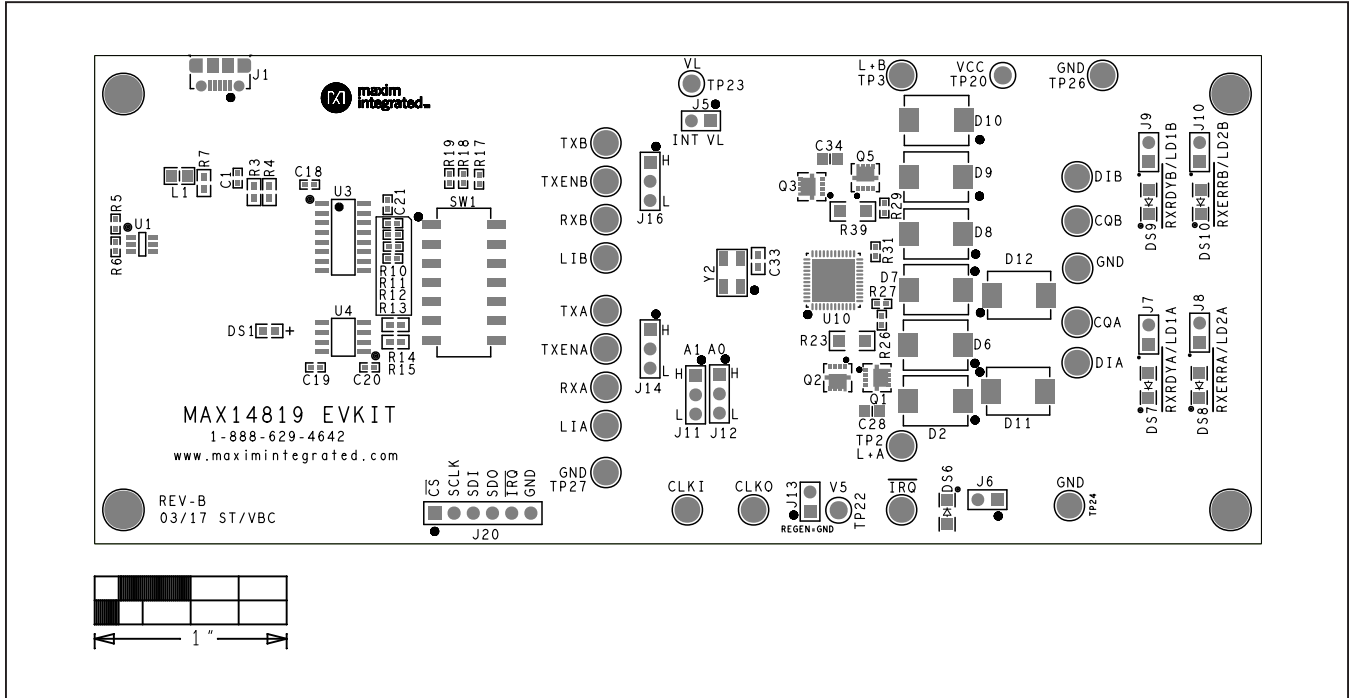
MAX14819 EV Kit Bill of Materials (continued)

| ITEM | REF_DES | DNI/DNP | QTY | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION | COMMENTS |
|-------|----------------------------|---------|-----|---|-------------------------------------|----------------|--|----------|
| 31 | R23, R39 | - | 2 | ERJ8CWFR015 | PANASONIC | 0.015 | RESISTOR; 1206; 0.015 OHM; 1%; 75PPM; 1W; THICK FILM | |
| 32 | R26, R27, R29, R31 | - | 4 | RC0402JR-07100RL | YAGEO PHYCOMP | 100 | RESISTOR; 0402; 100 OHM; 5%; 100PPM; 0.063W; THICK FILM | |
| 33 | R33-R37 | - | 5 | CRCW0603680RFK | VISHAY DALE | 680 | RESISTOR, 0603, 680 OHM, 1%, 100PPM, 0.10W, THICK FILM | |
| 34 | SU1, SU3-SU7, SU12-SU15 | - | 10 | STC02SYAN | SULLINS ELECTRONICS CORP. | STC02SYAN | TEST POINT; JUMPER; STR; TOTAL ENGT=0.256IN; BLACK; INSULATION=PBT CONTACT=PHOSPHOR BRONZE; COPPER PLATED TIN OVERALL | |
| 35 | SW1 | - | 1 | 219-7MST | CTS | 219-7MST | SWITCH; SPST; SMT; STRAIGHT; 20V; 0.1A; SURFACE MOUNT DIP SWITCH-AUTO PLACEABLE; RINSULATION=1000M OHM | |
| 36 | TP1-TP3, TP6-TP19 | - | 17 | 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; | |
| 37 | TP20, TP22, TP23 | - | 3 | 5010 | KEYSTONE | N/A | TESTPOINT WITH 1.80MM HOLE DIA, RED, MULTIPURPOSE; | |
| 38 | TP21, TP24, TP26, TP27 | - | 4 | 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; | |
| 39 | U1 | - | 1 | 93LC66BT-I/OT | MICROCHIP | 93LC66BT-I/OT | IC; EPROM; 4K MICROWIRE SERIAL EEPROM; SOT23-6 | |
| 40 | U2 | - | 1 | FT2232HL | FUTURE TECHNOLOGY DEVICES INTL LTD. | FT2232HL | IC; MMRY; DUAL HIGH SPEED USB TO MULTIPURPOSE UART/ FIFO; LQFP64 | |
| 41 | U3 | - | 1 | MAX14931FASE+ | MAXIM | MAX14931FASE+ | IC; DISO; 3/1 CHANNEL; 150MBPS; DEFAULT LOW; 2.75KVRMS DIGITAL ISOLATOR; NSOIC16 150MIL | |
| 42 | U4 | - | 1 | MAX12930BASAS+ | MAXIM | MAX12930BASAS+ | EVKIT PART - IC; DISO; 2/0 CHANNEL; 25MBPS; DEFAULT HIGH; 3.75KVRMS DIGITAL ISOLATOR; NSOIC8 | |
| 43 | U5 | - | 1 | MAX15006AATT+ | MAXIM | MAX15006AATT+ | IC; VREG; ULTRA-LOW QUIESCENT-CURRENT LINEAR REGULATOR; TDFN6-EP 3X3 | |
| 44 | U10 | - | 1 | MAX14819ATM+ | MAXIM | MAX14819ATM+ | EVKIT PART-IC; PKG. DWG. NO.: 21-0144; PKG. CODE: T4877-4C; LAND PATTERN DWG. NO.: 90-0130; TQFN48-EP 7 X 7 | |
| 45 | Y1 | - | 1 | ABM7-12.000MHZ-D2Y-T | ABRACON | 12MHZ | CRYSTAL; SMT ; 18PF; 12MHZ; +/-20PPM; +/-30PPM | |
| 46 | Y2 | - | 1 | MJ-14.74560-12-30/30/4085 | MERCURY ELECTRONICS EUROPE | 14.7456MHZ | CRYSTAL; SMT; 12PF; 14.7456MHZ; +/-30PPM | |
| 47 | PCB | - | 1 | MAX14819 | MAXIM | PCB | PCB:MAX14819 | - |
| 48 | C23, C24 | DNP | 0 | C0805C474K5RAC; GCM21BR71H474K; GRM21BR71H474KA88 | KEMET/MURATA | 0.47UF | CAPACITOR; SMT (0805); CERAMIC CHIP; 0.47UF; 50V; TOL=10%; MODEL=X7R; TG=-55 DEGC TO +125 DEGC; TC=+ | |
| 49 | J20 | DNP | 0 | PBC06SAAN | SULLINS ELECTRONICS CORP. | PBC06SAAN | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 6PINS; -65 DEGC TO +125 DEGC | |
| TOTAL | | | 149 | | | | | |

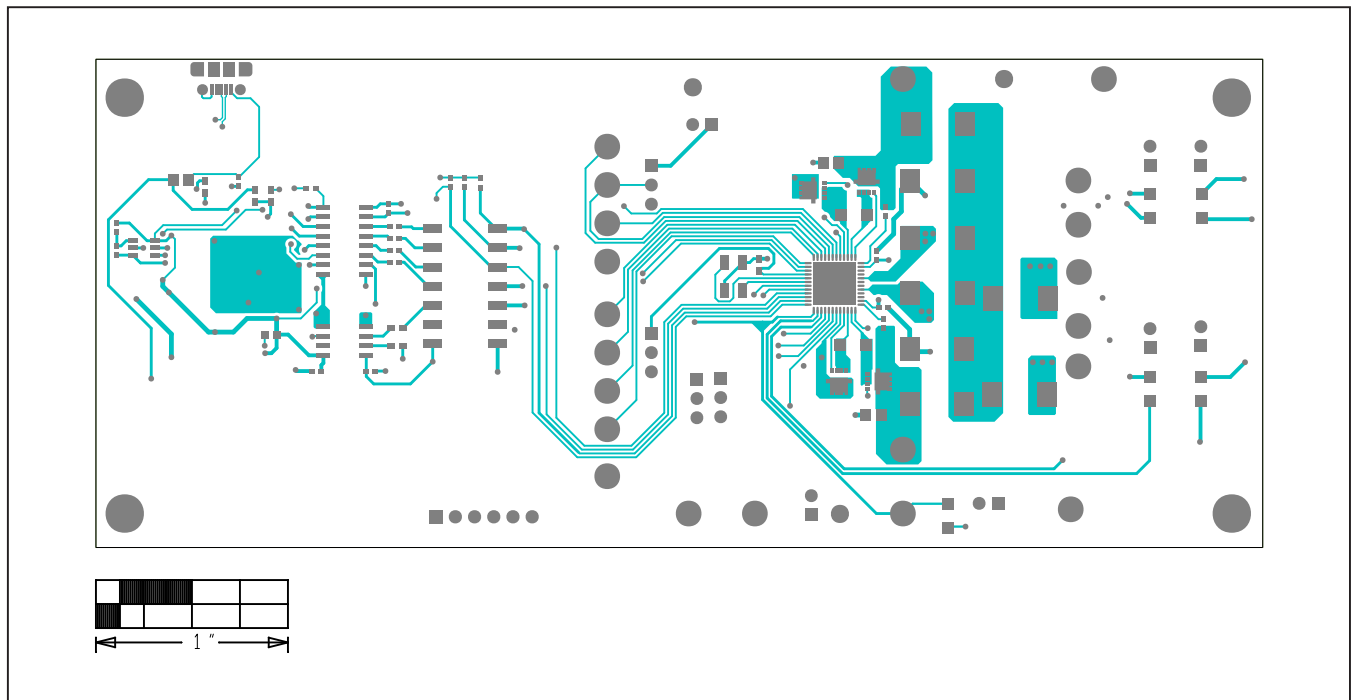
MAX14819 EV Kit Schematic (continued)



MAX14819 EV Kit PCB Layout Diagrams

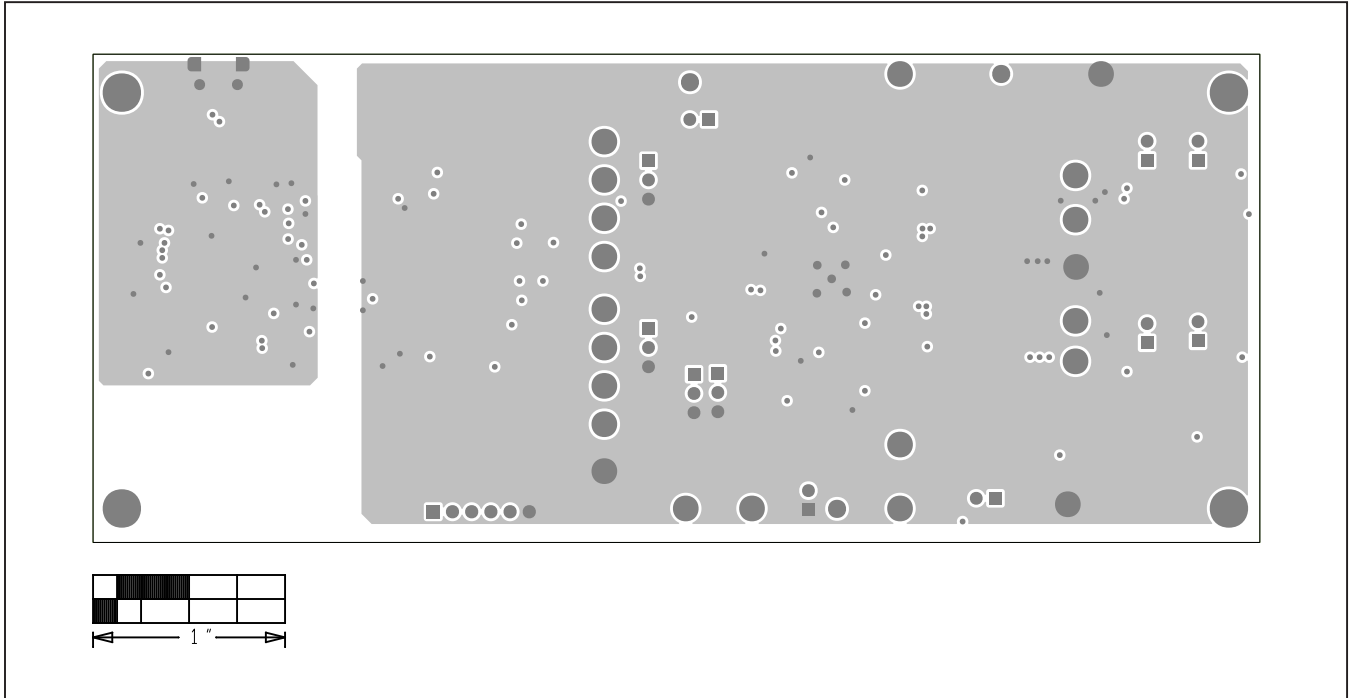


MAX14819 EV Kit PCB Layout—Top Silkscreen

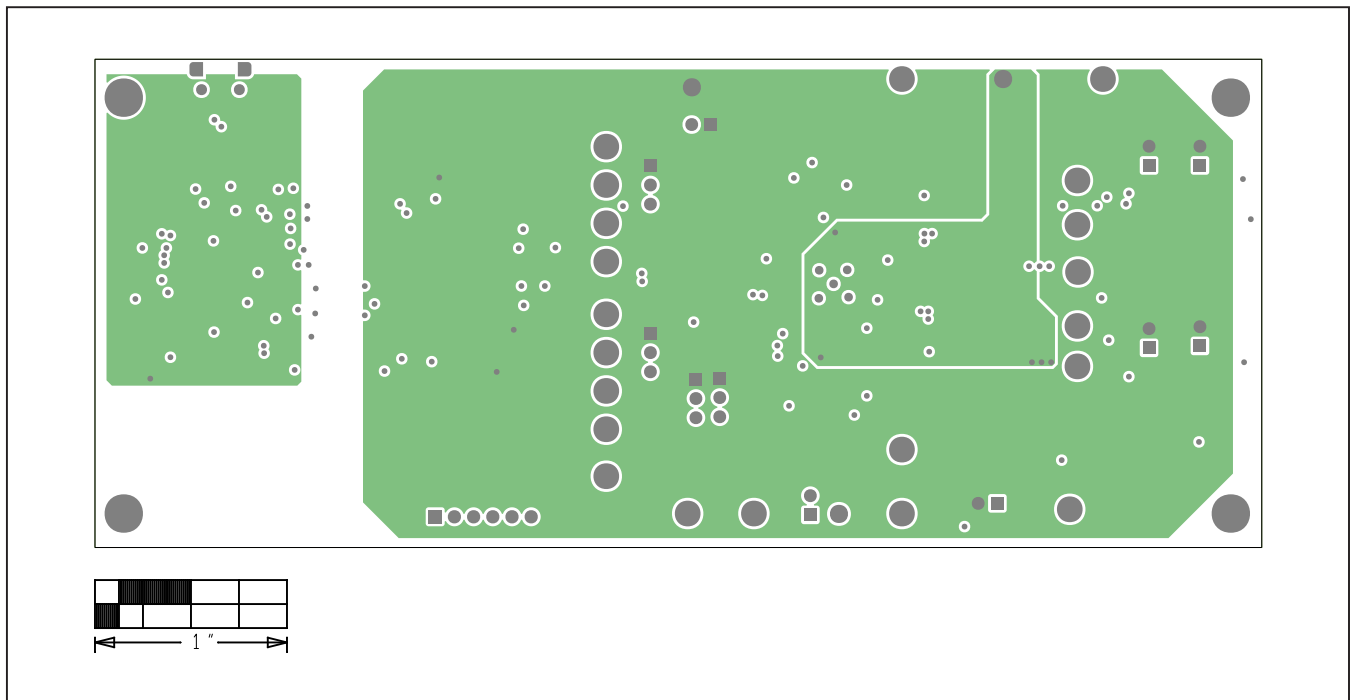


MAX14819 EV Kit PCB Layout—Top

MAX14819 EV Kit PCB Layout Diagrams (continued)



MAX14819 EV Kit—Ground



MAX14819 EV Kit—Power

Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|-----------------|---------------|--|---------------|
| 0 | 3/17 | Initial release | — |
| 1 | 9/17 | Updated schematic and bill of materials | 5, 9 |
| 2 | 3/20 | Updated title and <i>General Description</i> | 1–12 |

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.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Maxim Integrated:](#)

[MAX14819EVKIT#](#)