

## General Description

The MAX12900 evaluation kit (EV kit) provides a proven design to evaluate the MAX12900, loop-powered 4–20mA sensor transmitter. The EV kit includes an evaluation board and a graphical user interface (GUI) that provides communication from a PC to the target device through a USB port.

The EV kit includes Windows® 7, Windows 8, and Windows 10 compatible software for exercising the features of the IC. The EV kit GUI allows to set the Coarse and Fine PWM duty cycle inputs to the MAX12900 to control the 4-20mA loop current with  $\pm 1\mu\text{A}$  resolution.

The EV kit must be powered from an external +24V power supply and consumes less than 2.7mA.

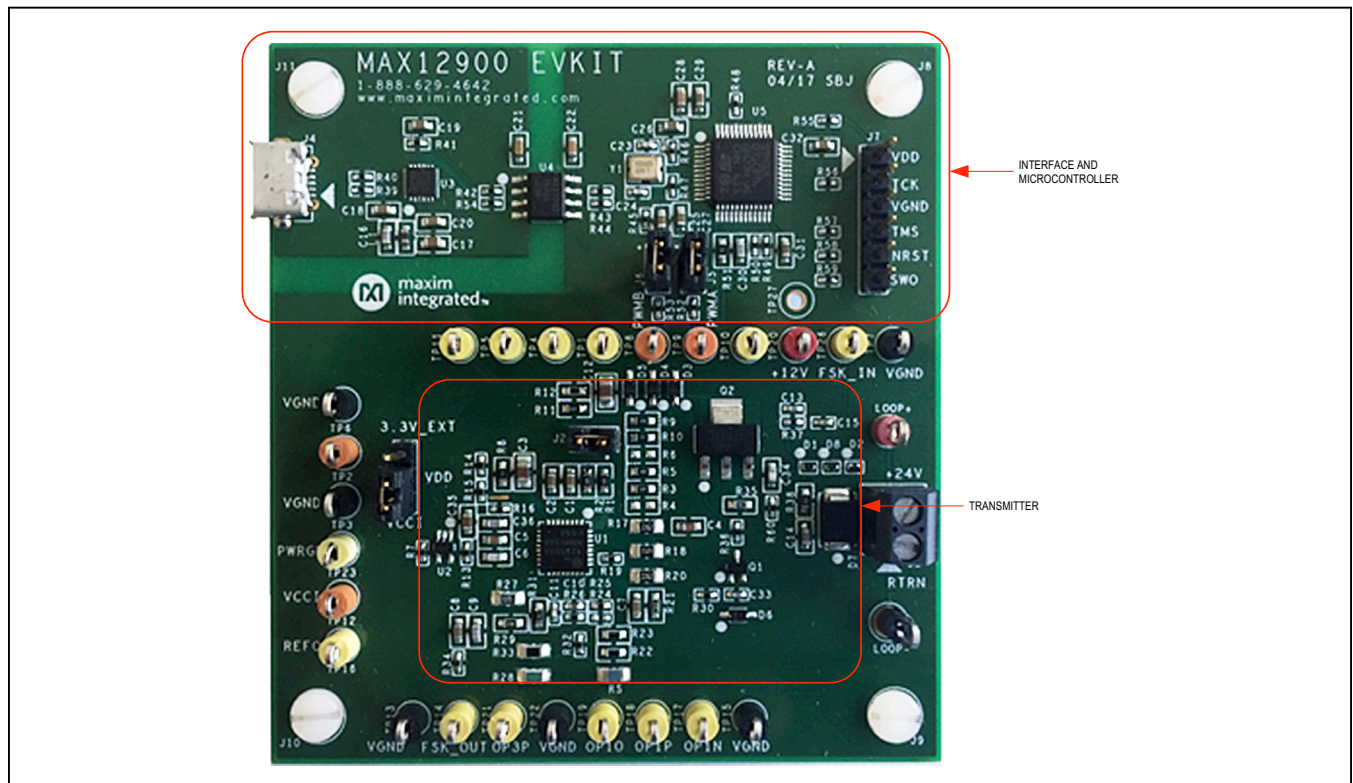
The MAX12900 EV kit comes with a MAX12900ATJ+ installed in a 32-pin, 5 x 5mm TQFN-EP package.

## Features

- Loop-powered 4mA–20mA Transmitter with PWM Inputs
- Robust Operation with Wide Range Of Input Voltages
- On-Board Microcontroller to Generate Two PWM Inputs and Provide Fault Diagnostic
- Supports HART and Fieldbus H1 Communication
- -40°C to +125°C Temperature Range
- Reverse Voltage Protection
- Proven PCB Layout
- Fully Assembled and Tested
- Windows 7, Windows 8, and Windows 10 Compatible Software

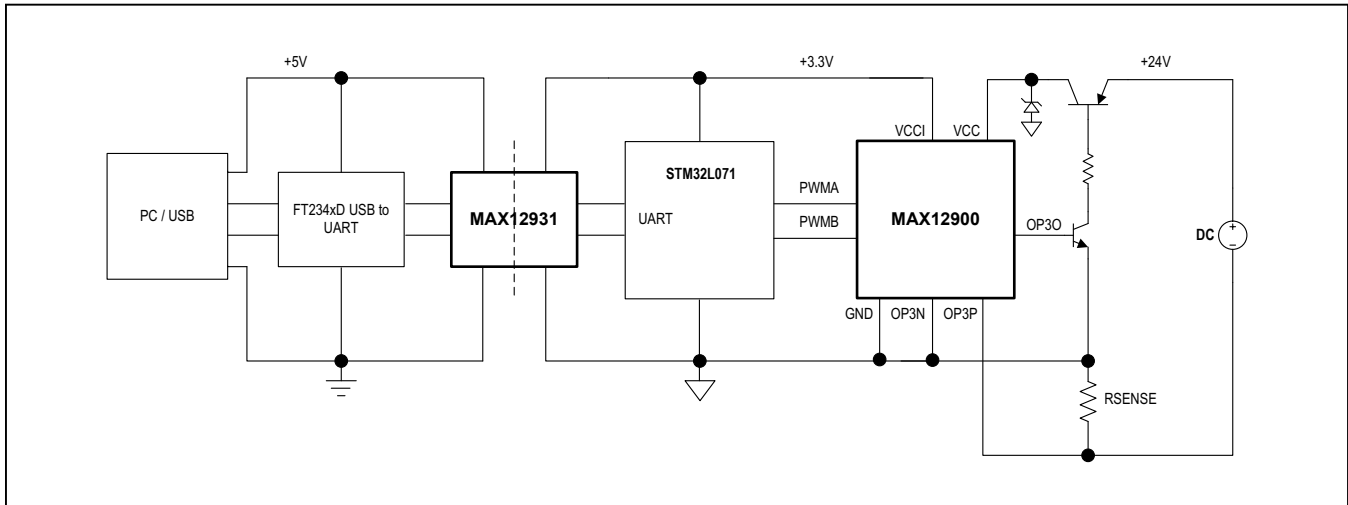
*Ordering Information appears at end of data sheet.*

## MAX12900 EV Kit



Windows is a registered trademark and registered service mark of Microsoft Corporation.

### MAX12900 EV System Block Diagram



### MAX12900 EV Kit Files

| FILE                       | DESCRIPTION               |
|----------------------------|---------------------------|
| MAX12900EVKITSetupV1.0.exe | Application Program (GUI) |

### Quick Start

#### Required Equipment

- MAX12900 EV kit
- +24V DC power supply
- Ampere meter
- PC with installed Windows 7, Windows 8, or Windows 10 and USB port

**Note:** In the following section(s), software-related items are identified by bolding. Text in **bold** refers to items directly from the EV system software. Text in **bold and underline** 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:

- 1) Visit [www.maximintegrated.com/evkitsoftware](http://www.maximintegrated.com/evkitsoftware) to download the latest version of the EV kit software, MAX12900EVKIT.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 **MAX12900EVKITSetupV1.0.exe** program inside the temporary folder. The program files are copied to your PC and icons are created in the Windows **Start | Programs** menu.
- 3) Verify that all jumpers are in their default positions ([Table 1](#)). Note the hardware is configured for communication with a PC and onboard microcontroller by default.
- 4) Power up the EV kit with +24V from an external power supply through J3 Terminal Block or using LOOP+ and LOOP- test points. Connect an ampere meter in series with the power supply and external load. The load range is from 0 to 1kΩ. Alternatively, use a voltmeter in parallel with the resistive load to calculate the loop current.
- 5) Connect the EV kit to a USB port of a PC. A microUSB cable is included.
- 6) Start the EV kit software by opening its icon in the **Start | Programs** menu. The EV kit software appears as shown in [Figure 1](#). Verify that the lower-right status bar indicates the EV kit hardware is **Connected**. The GUI automatically detects EV kit is connected to the PC, and enables communication with the onboard microcontroller. It also retrieves calibration coefficients from the onboard microcontroller EEPROM and indicates them in the Status Log window.

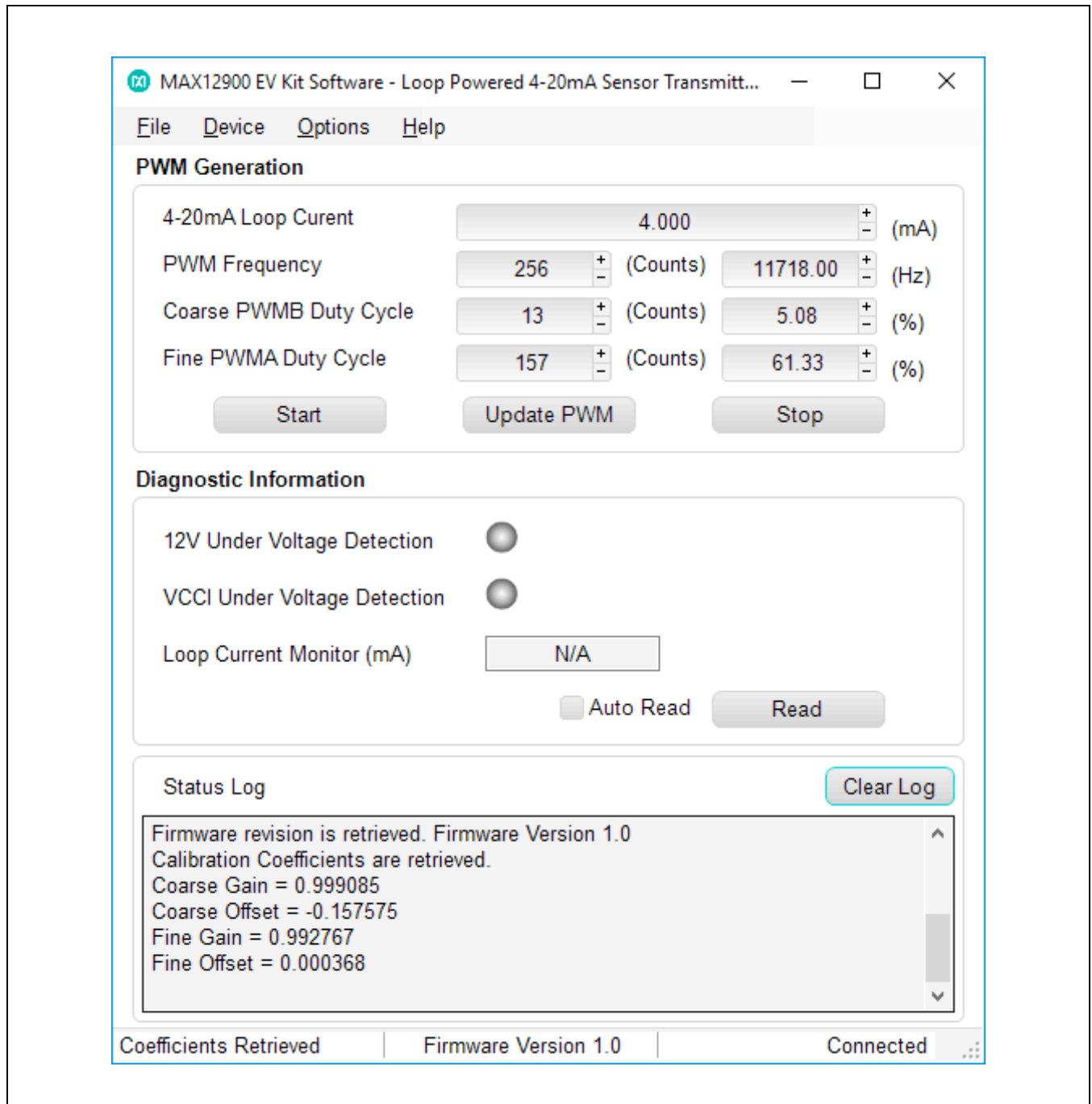


Figure 1. MAX12900 EV Kit GUI

(the following steps are used to verify functionality of the MAX12900)

- 7) Press the Start button in PWM Generation block. By default, it sets the loop current to 15.19mA. Use an ampere meter to check the loop current is correct. The Start button must be pressed every time when GUI starts to enable PWM generation.
- 8) Set the loop current to 4mA by typing in the 4–20mA Loop Current box and pressing the Update PWM button. Verify the loop current changed to 4mA by ampere meter.
- 9) Repeat the previous step with the different values from 4mA to 20mA. Alternatively, change the Coarse and Fine Duty cycle values in the corresponding set boxes (Counts or %). Note that the number of counts is different for different PWM frequencies. The default frequency is 11718.00Hz, based on the oscillator frequency and calculation convenience.
- 10) Press the Stop button to stop PWM. The loop current drops to approximately 2.66mA which is a minimum current consuming by the EV Kit.

### General Description of Software

When the GUI starts, it automatically detects if the EV kit is connected to a PC and indicates that in the status bar at the bottom edge of the GUI. If the GUI does not recognize the EV kit make sure that the software and all drivers are properly installed, check the USB connection

and go to the Device pulldown menu and select Search for Hardware option. When the EV kit is properly connected, press the Start button to start PWM generation by the microcontroller. Type in a new value to the 4mA–20mA Loop Current control box and press the Update PWM button to set the loop current. The GUI automatically calculates the desired PWMB and PWMA duty cycles based on loop current settings and sends corresponding commands to the microcontroller. All communication commands are shown in the Status Log window for your convenience. Note, the actual data sent to the microcontroller is different from the Coarse and Fine settings due to inversion configuration of the MAX12900 and calibration coefficients, refer to [Figure 2](#).

The Status Log window can be cleared by pressing the Clear Log button and hidden by selecting Hide Log option from the Options menu, or by pressing CTRL+H buttons on the keyboard.

The GUI receives diagnostic information from the COMP1 (12V supply diagnostic) and COMP2 (VCCI diagnostic) comparators and illuminates the corresponding boxes if any of these supplies drops approximately by 20% (not implemented until rev. 2.0).

Also, the GUI can monitor the loop current by enabling ADC reading of the OP2 output. Press the Read button for single read or enable continuous reading by selecting the Auto Read control box in the Diagnostic Information window (not implemented until rev. 2.0).

**Table 1. MAX12900 Board Shunt Positions and Settings**

| HEADER | SHUNT POSITION | DESCRIPTION                                                                                                 |
|--------|----------------|-------------------------------------------------------------------------------------------------------------|
| J1     | 1-2*           | Supply microcontroller from 3.3V VCCI                                                                       |
|        | 2-3            | Supply microcontroller from an external 3.3V source.                                                        |
| J2     | 1-2            | Connect VCC pin to 12V shunt regulator. Place an ampere meter to monitor power consumption of the MAX12900. |
| J5     | 1-2            | Connect the Fine PWM output of microcontroller to PWMA input.                                               |
| J6     | 1-2            | Connect the Coarse PWM output of microcontroller to PWMB input.                                             |

\*Default configuration

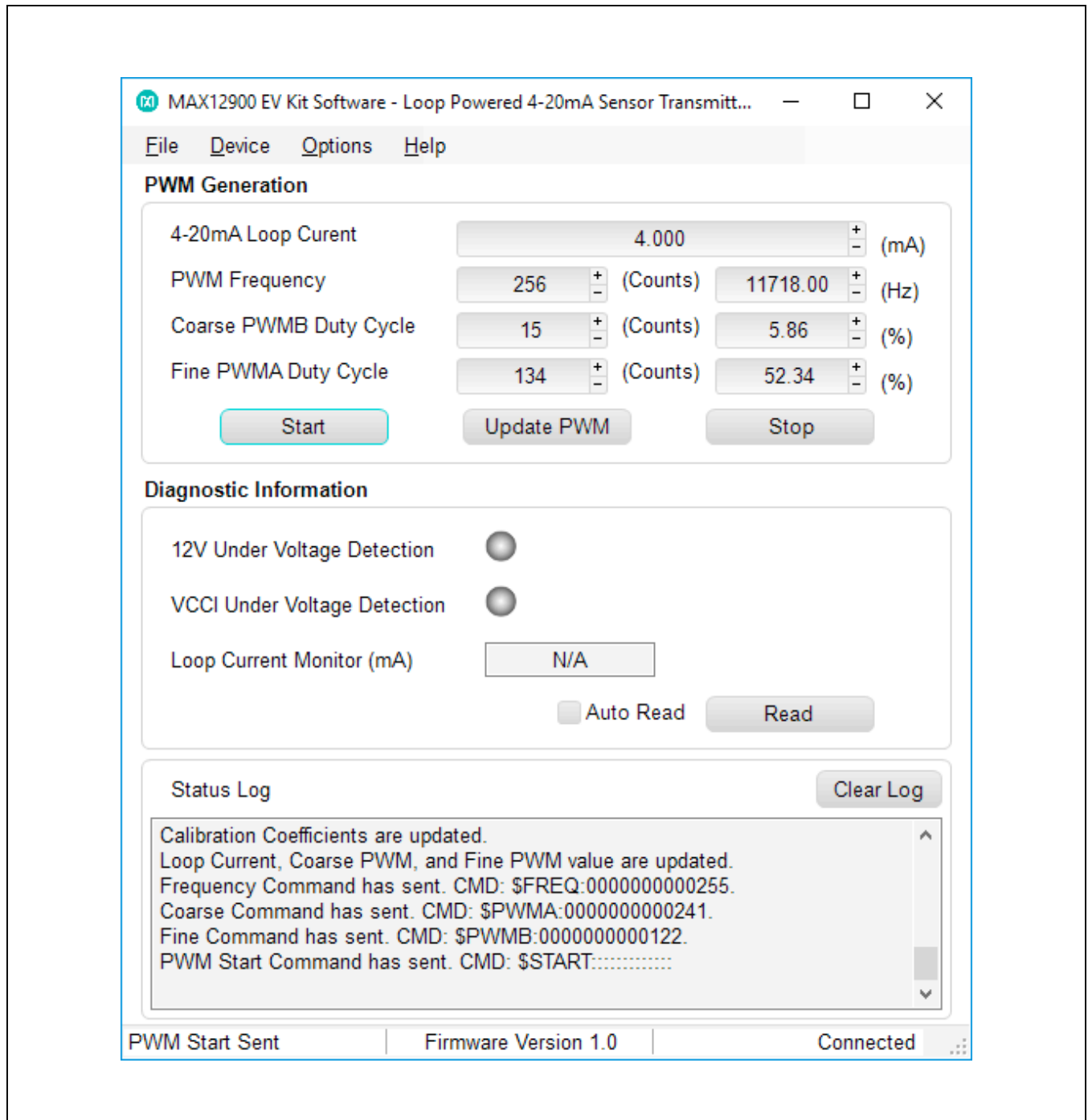


Figure 2. MAX12900 EV Kit GUI Status Log

### Board Calibration

The EV kit is factory calibrated and does not require additional calibration. The calibration coefficients are stored in the microcontroller's EEPROM memory and read by the GUI when the board is connected to a PC. In some cases, the calibration coefficients can be adjusted by the user. Go to Device menu and select Calibration option. The Calibration window pops up, as shown in [Figure 3](#).

A 6.5 digit or better ampere meter should be connected in series with LOOP- terminal and a 24V supply to make a 4-20mA current loop. Follow the 1,2,3,4 steps in Calibration Procedure by pressing the Set button and typing in a measured by the ampere meter loop current. Press the Calculate button when all four steps are completed. A pop-up window will inform that calibration is finished and all coefficients are updated. The new coefficients will be used for loop current/duty cycle calculations.

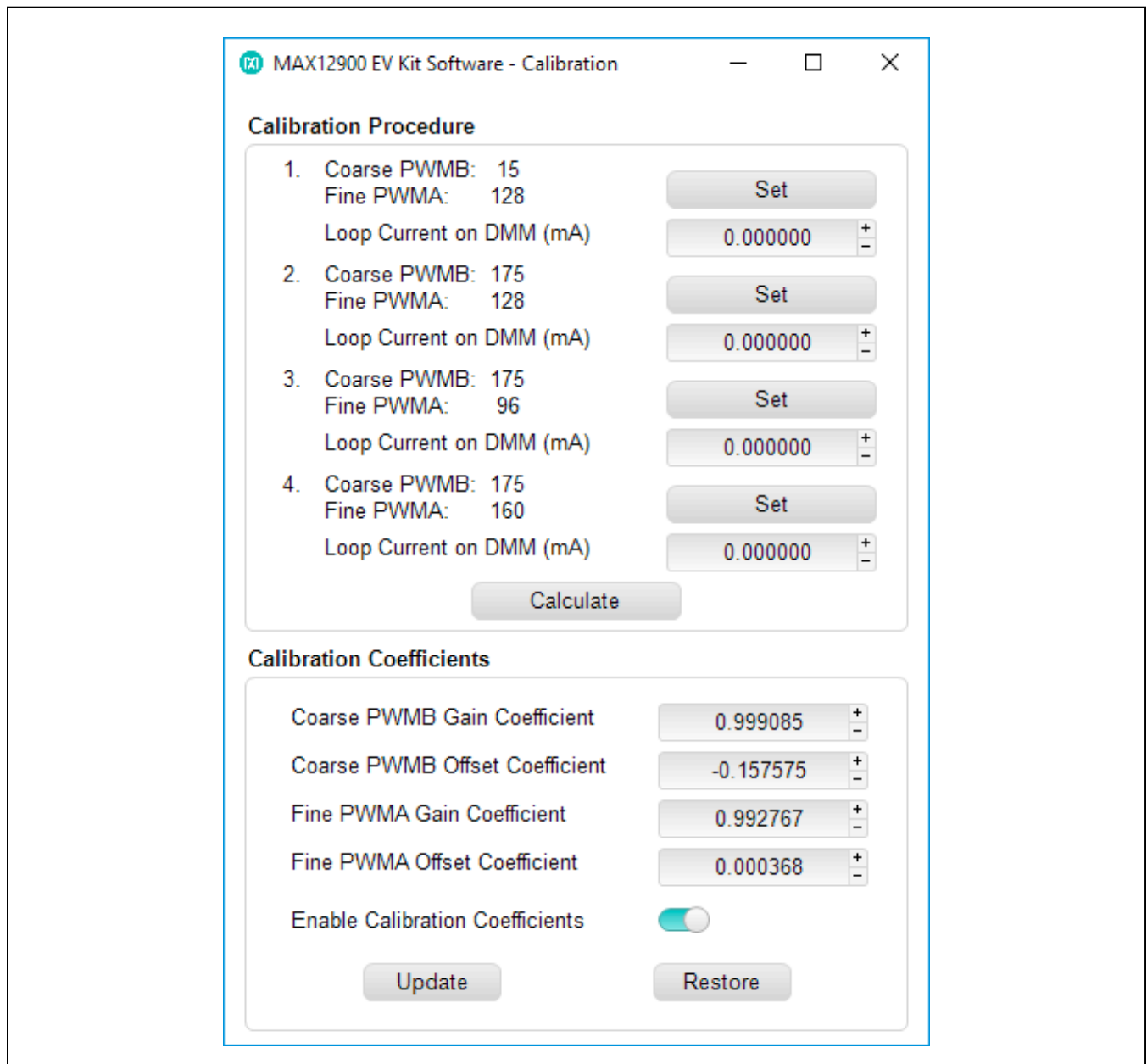


Figure 3. Calibration Window

### General Description of Hardware

The MAX12900 EV kit allows evaluating features and performance of MAX12900 when it is used in a typical 4mA–20mA transmitter application.

The detailed block diagram of MAX12900 configuration is shown in [Figure 4](#).

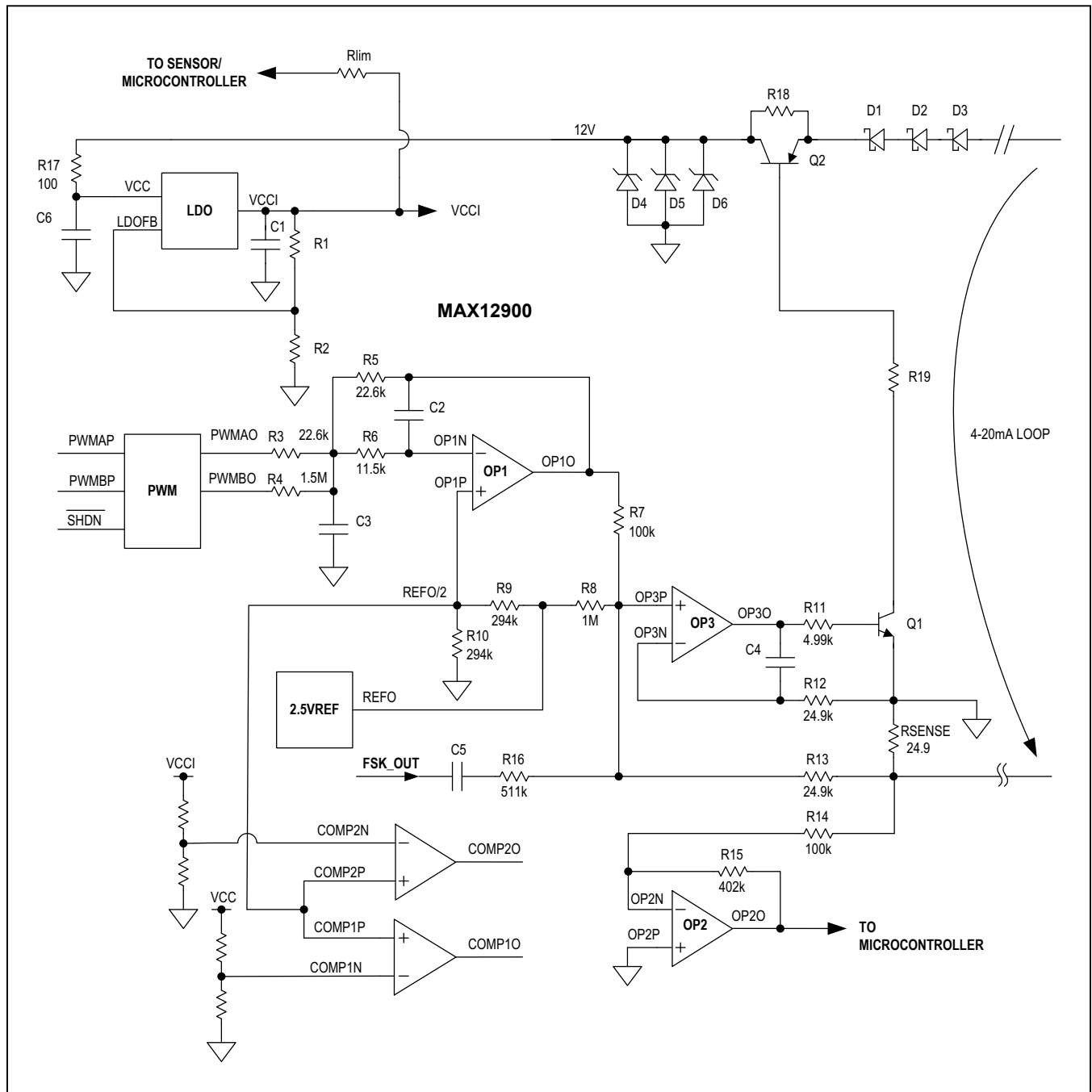


Figure 4. MAX12900 EV Kit Configuration Block Diagram

The two PWM signals (PWMB and PWMA) generated by the onboard microcontroller represent data from the sensor. An ultra-low-power, high-resolution digital-to-analog converter (DAC) is realized with the combination of two conditioner circuits (PWMB and PWMA) and the active filter (OP1). The outputs of the two-conditioner circuits provide a stable PWM amplitude over voltage supply and temperature variation. The wide bandwidth amplifier (OP3) in combination with the discrete transistors Q1 and Q2 implements a voltage to 4mA–20mA loop current converter. The OP3 amplifier features zero-offset and in combination with the low-drift voltage reference provide negligible error over a wide temperature range. Wide bandwidth allows this circuit to realize either HART or Fieldbus Foundation signal modulation. The low-power operational amplifier (OP2) and comparators provide building blocks for enhanced diagnostic features. Supply rail monitoring, output current readback, open circuit and failure detection are a few examples of diagnostic features. The power sequencer circuit and PWRGOOD signaling allow a smooth power up with configurable maximum output current.

### User-Supplied PWMs

To evaluate the EV kit with user-supplied PWMs, remove the J5 and J6 jumpers and apply the coarse PWM to TP8 and fine PWM to TP9. Make sure that the PWM voltage level does not exceed the VCCI level on TP12.

### External +3.3V Power Supply for the Microcontroller

An external +3.3V voltage can supply to TP2, 3.3V\_EXT, to evaluate the performance of the on-chip LDO without loading by microcontroller.

### Hot Plug and Reverse-Voltage Protection

The EV kit is protected for up to 60V reverse-voltage connection and hot plug connections.

### HART or Fieldbus Communication

The EV kit is HART (Highway Addressable Remote Transducer) enabled and meets the FSK Physical Layer Test Specification HCF\_TEST-2. Applying a 500mV HART signal from an external HART modem, such as Maxim's DS8500, between TP14 and VGND, the FSK signal over the loop load can be observed with an oscilloscope.

Warning! Usually the scope probes are Earth/Chassis grounded. Make sure that only one probe is used for measurement or all probes are connected to the same common point. Do not short the sense resistor RS by the probes.

Some modifications need to be done to satisfy Fieldbus H1 requirements, such as,

- 1) Replace the R29 by 100k, 1%, 0805-size resistor.
- 2) Replace the C11 by 82pF, 0603-size capacitor.
- 3) Replace the C33 by 390pF, 0603-size capacitor.

### MAX12900 EV Kit Typical Performance

Typical scope shots of MAX12900 EV kit performance are shown in [Figure 5](#) to [Figure 16](#).

### Noise Measure On Time Domain

The current noise measured as a voltage drop across 500Ω load resistor.



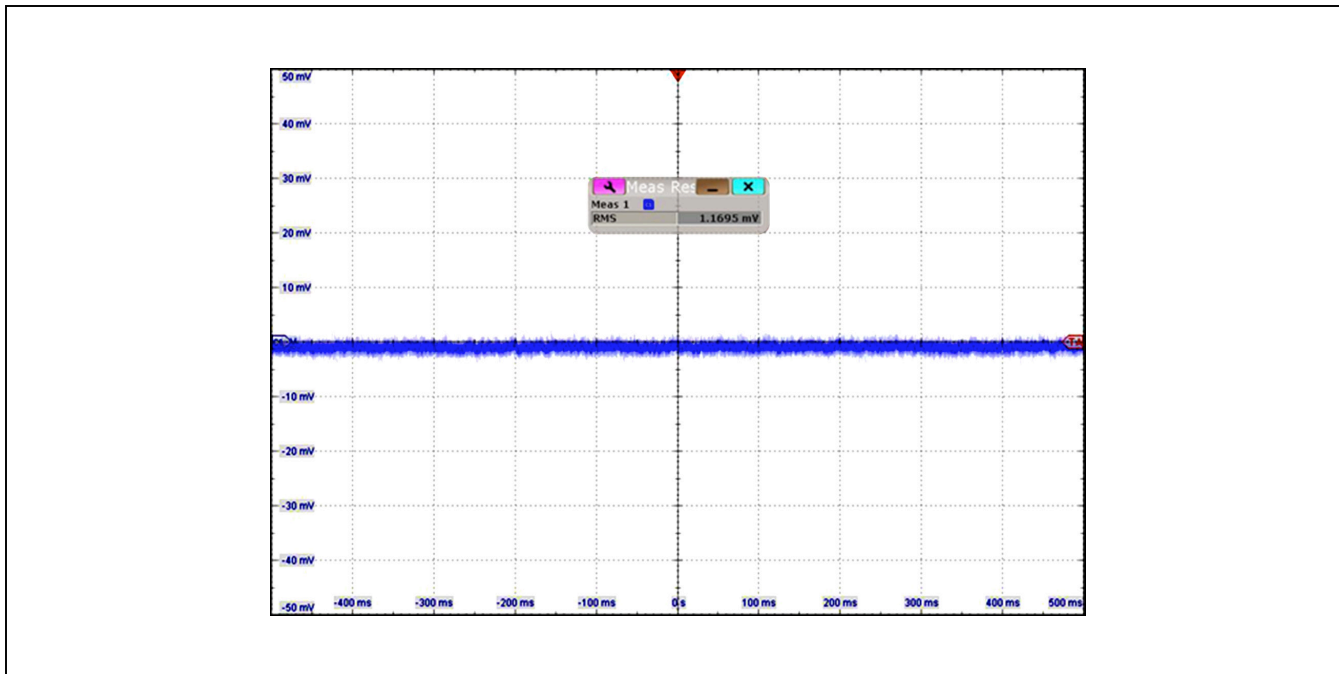


Figure 5. 4mA Loop Current Noise During Silence Over 500Ω Load Resistor

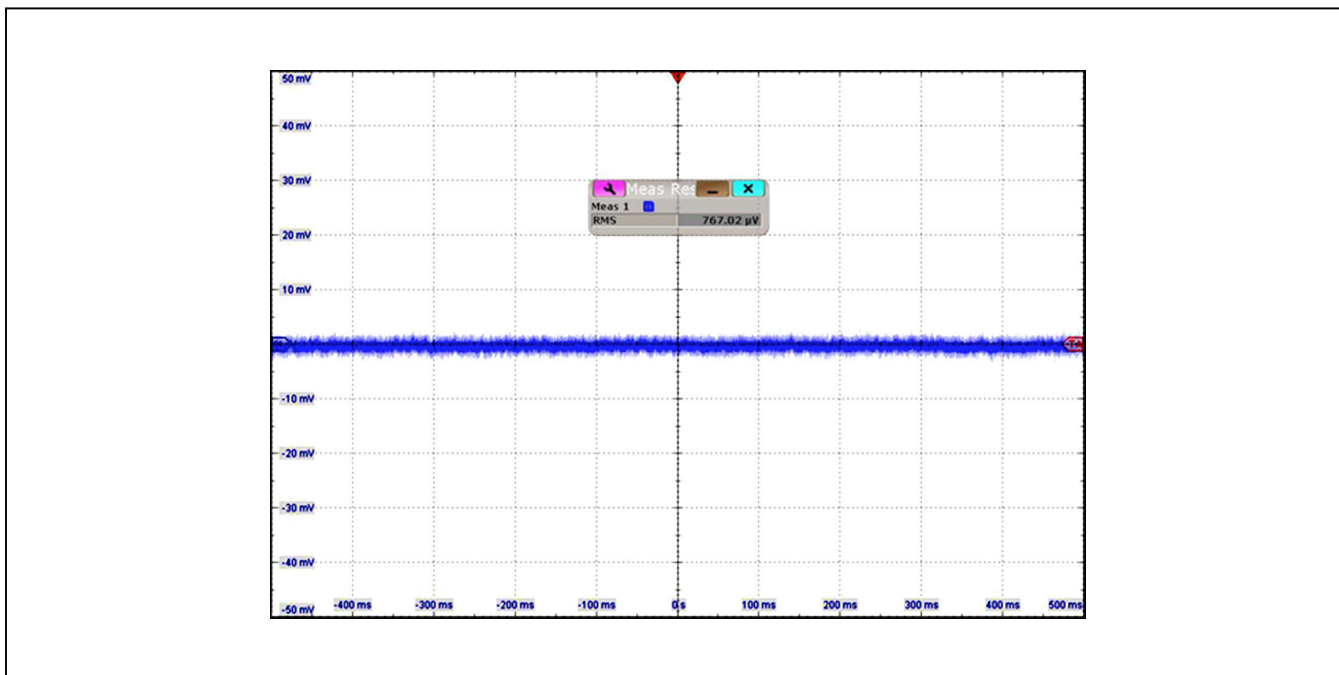


Figure 6. 20mA Loop Current Noise During Silence over 500Ω Load Resistor

Big-Signal Step Response

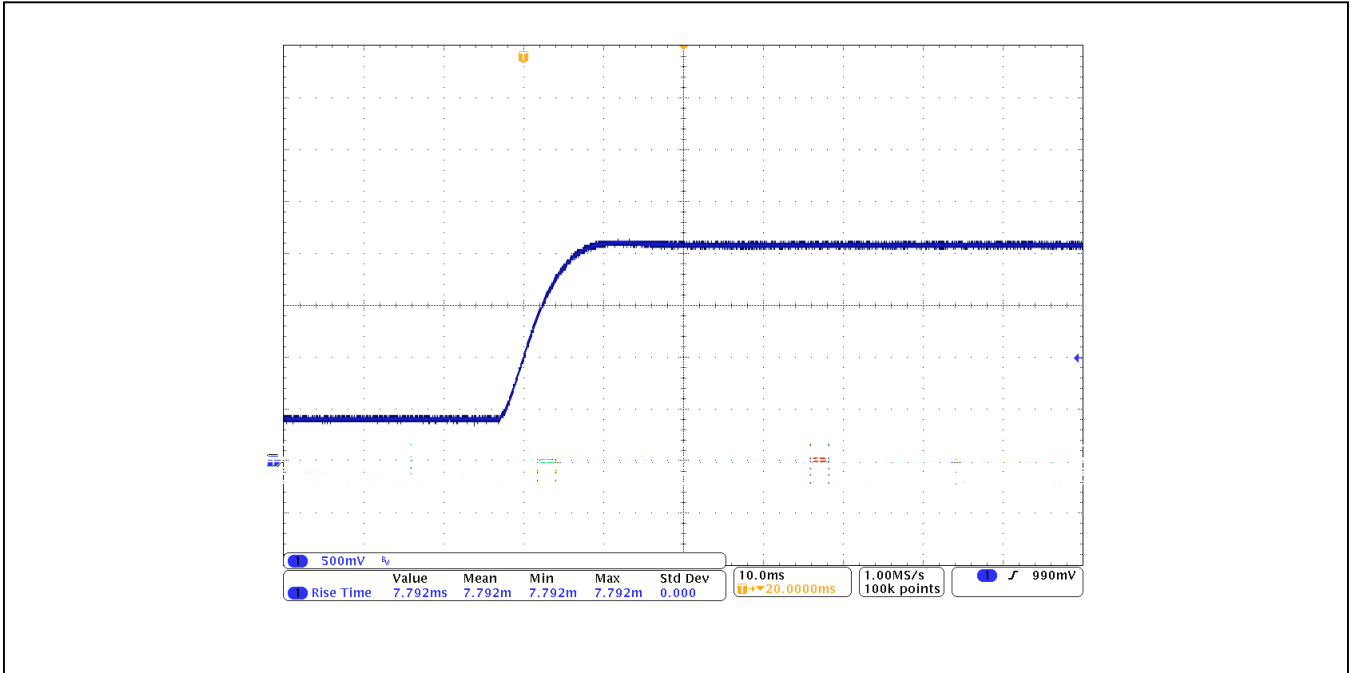


Figure 7. 4mA to 20mA Transition

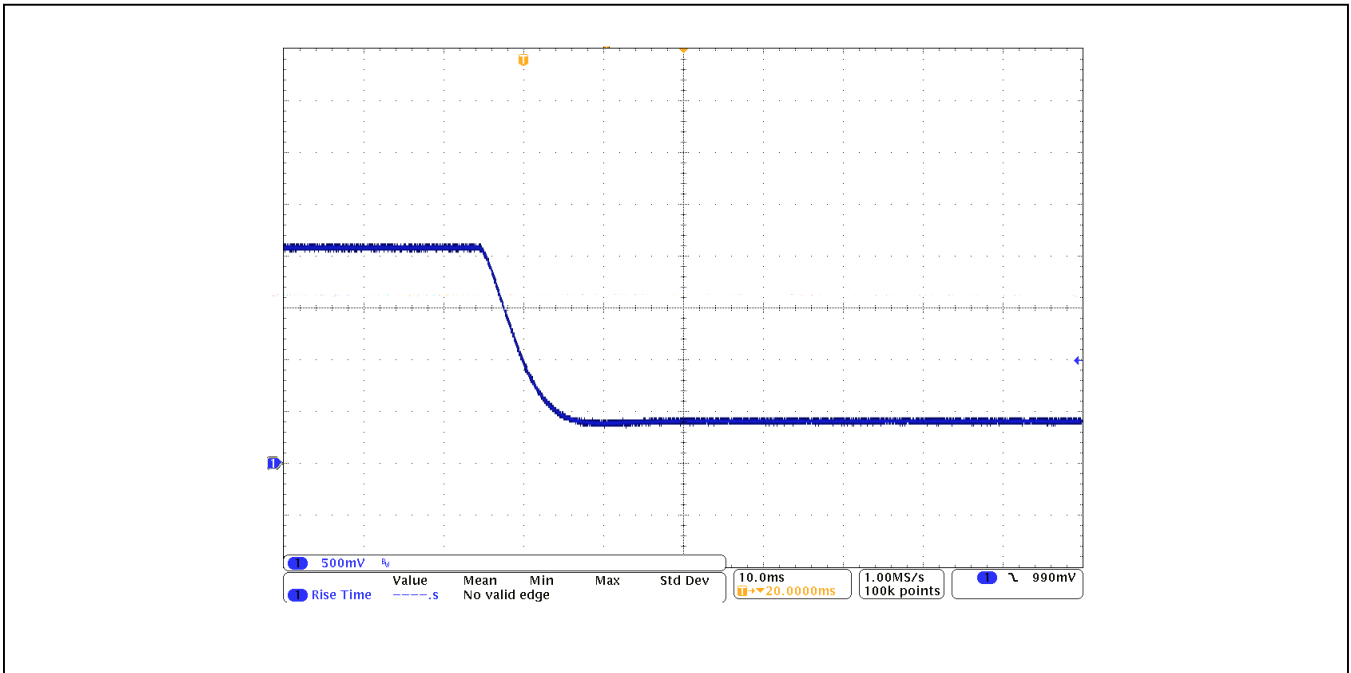


Figure 8. 20mA to 4mA Transition

Small-Signal Step Response

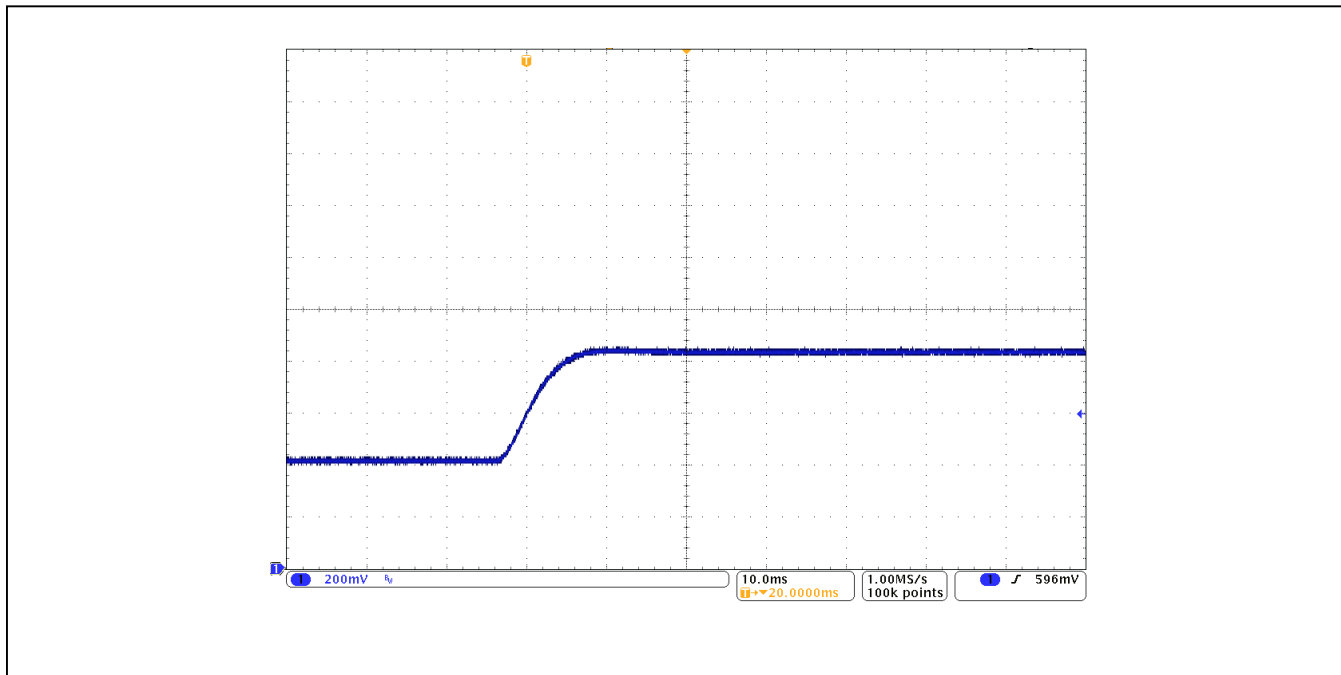


Figure 9. 4mA to 8mA Transition

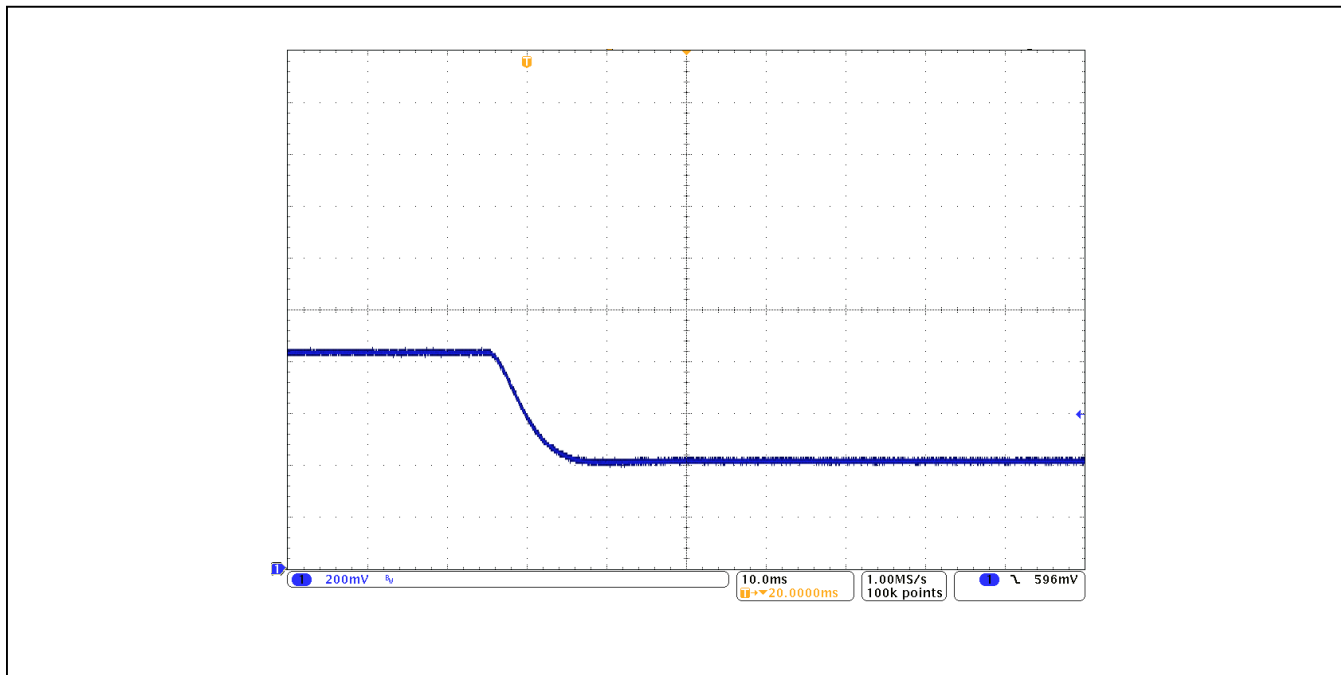


Figure 10. 8mA to 4mA Transition

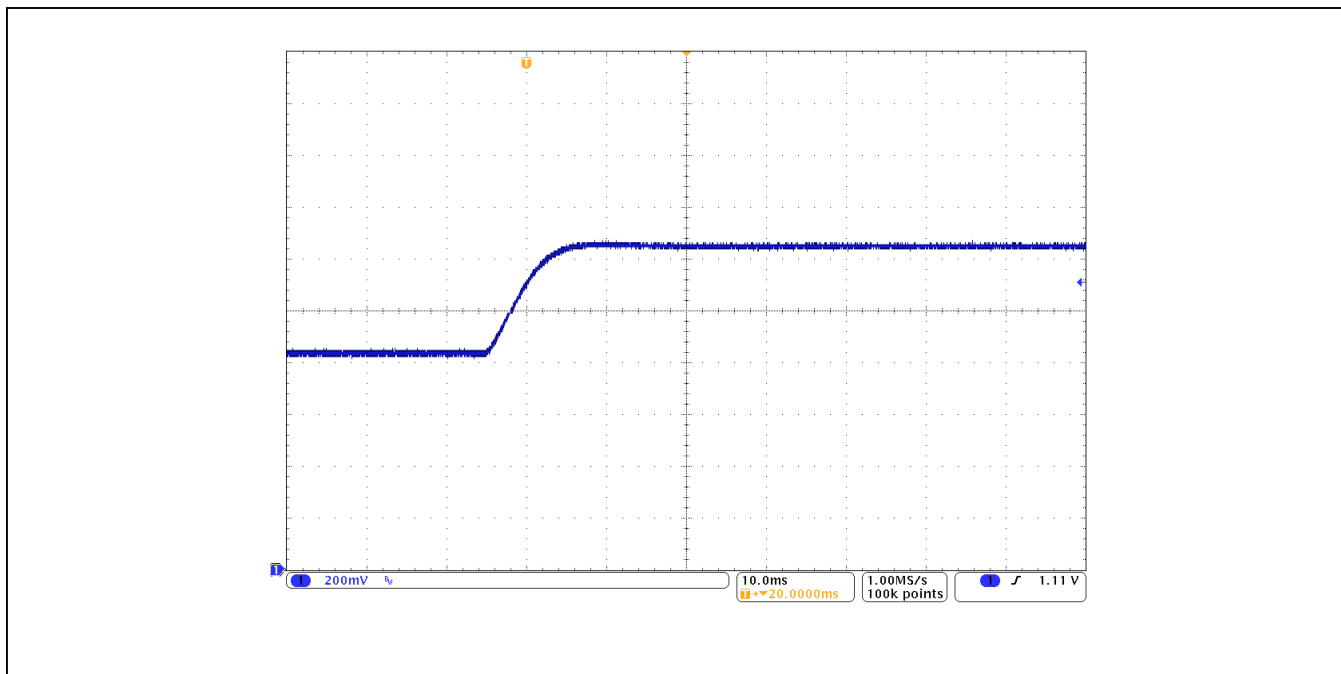


Figure 11. 8mA to 12mA Transition

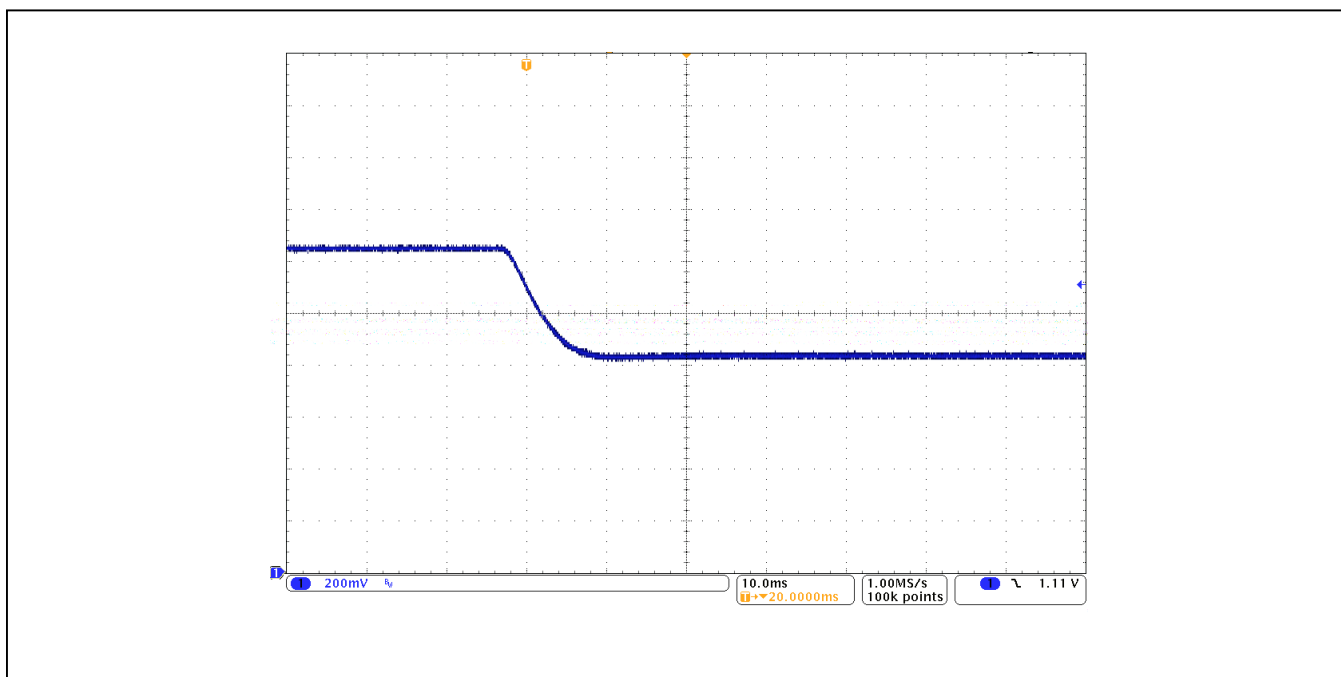


Figure 12. 12mA to 8mA Transition

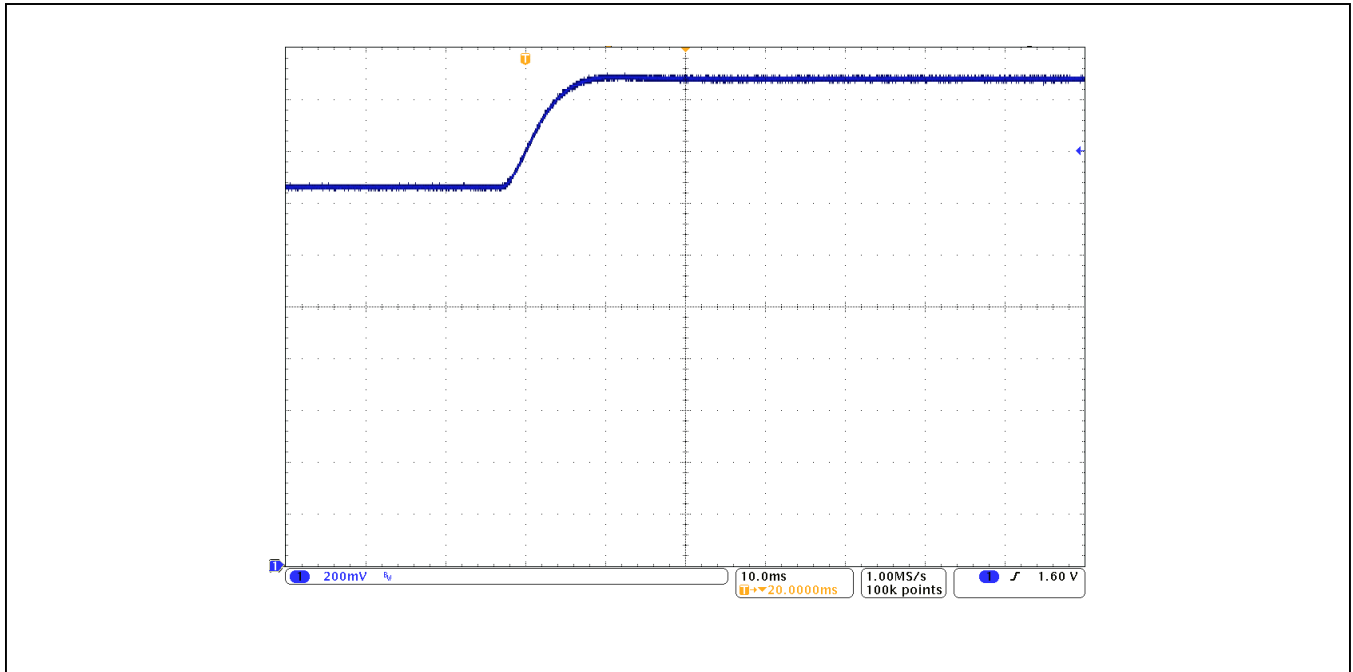


Figure 13. 14mA to 18mA Transition

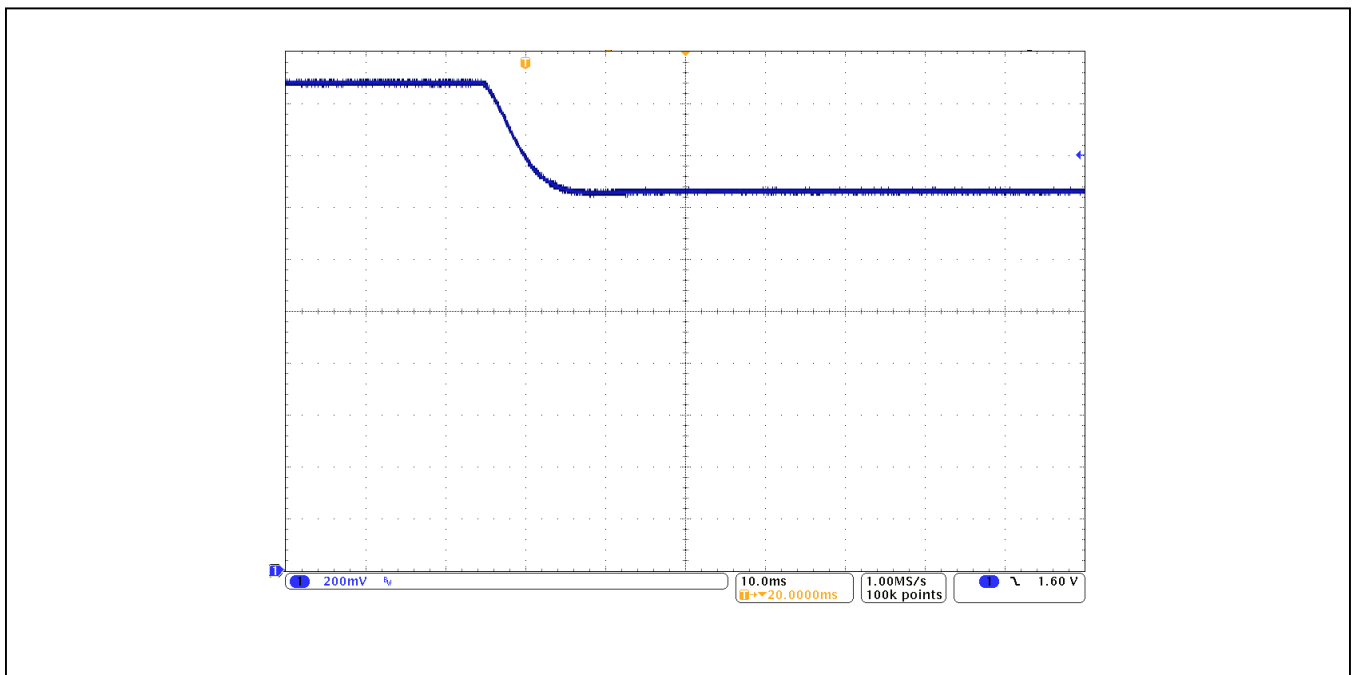


Figure 14. 18mA to 14mA Transition

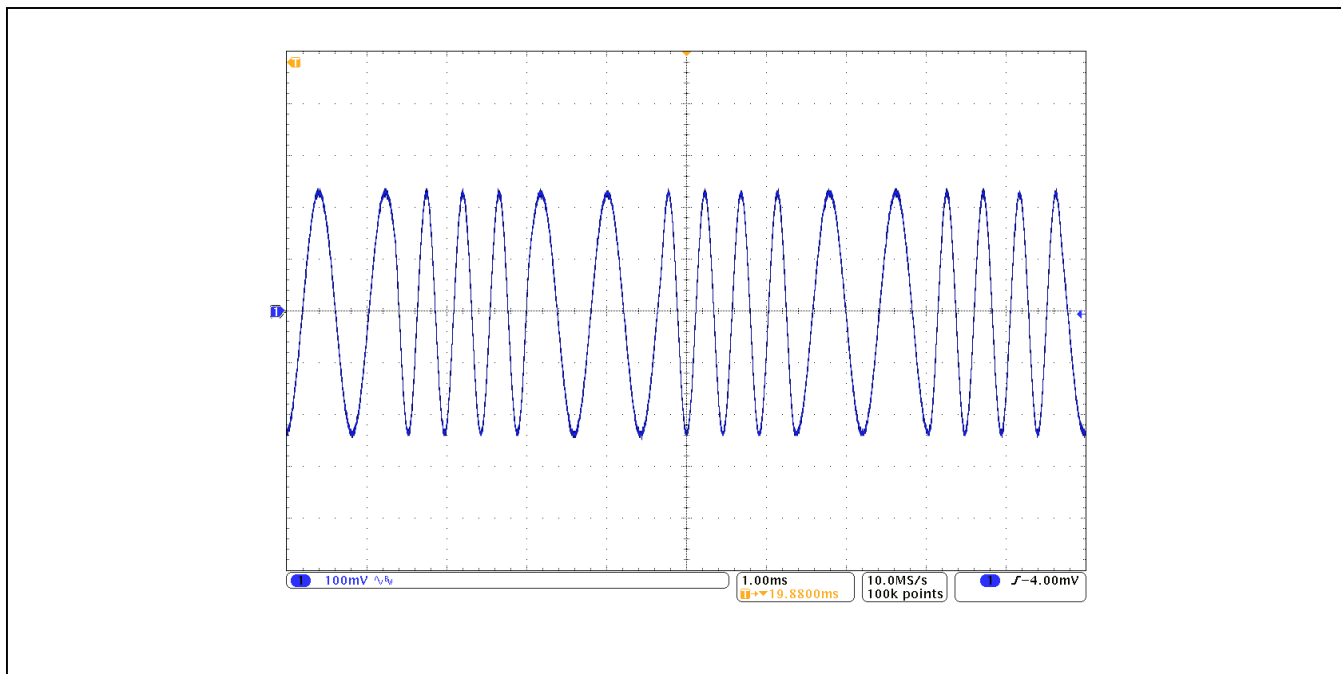


Figure 15. HART Modulation at 4mA Loop Current

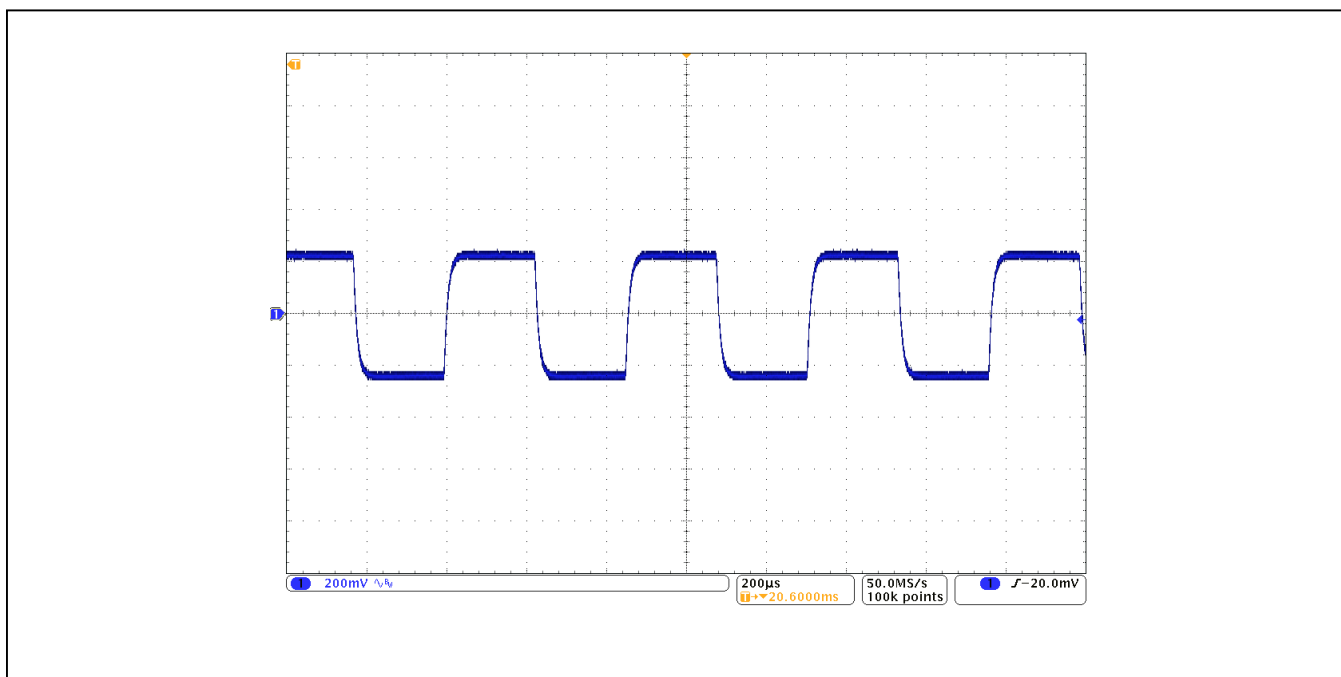


Figure 16. 2.2kHz Square Wave Over 4mA–20mA Current Loop

MAX12900 EV Kit Bill of Materials

| ITEM | REF DES                                         | DNI/DNP | QTY | MFG PART #                                                          | MANUFACTURER                          | VALUE                   | DESCRIPTION                                                                                                             | COMMENTS |
|------|-------------------------------------------------|---------|-----|---------------------------------------------------------------------|---------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------|----------|
| 1    | C1, C2, C7, C8, C18-C20, C25-C27, C29, C31, C32 | -       | 13  | GRM188R72A104KA35; CC0603KRX7R0BB104                                | MURATA; TDK                           | 0.1UF                   | CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1UF; 100V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R                             |          |
| 2    | C3, C12                                         | -       | 2   | C2012X752A105K125; GRJ21B7C2A105KE11                                | TDK/MURATA                            | 1UF                     | CAPACITOR; SMT (0805); CERAMIC CHIP; 1UF; 100V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7S                               |          |
| 3    | C4                                              | -       | 1   | C1608X7R1H334K; C0603C334K5RAC                                      | AVX/KEMET                             | 0.33UF                  | CAPACITOR; SMT (0603); CERAMIC CHIP; 0.33UF; 50V; TOL=10%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=X7R                     |          |
| 4    | C5                                              | -       | 1   | C0603C224K3RAC; GMC10X7R224K25; GRM188R71E224KA88; C1608X7R1E224K08 | KEMET; MURATA; TDK                    | 0.22UF                  | CAPACITOR; SMT (0603); CERAMIC CHIP; 0.22UF; 25V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R                             |          |
| 5    | C6                                              | -       | 1   | GRM1885C1H202JA01                                                   | MURATA                                | 2000PF                  | CAPACITOR; SMT (0603); CERAMIC CHIP; 2000PF; 50V; TOL=5%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=COG                      |          |
| 6    | C9, C16, C30, C36                               | -       | 4   | C1608C0G1E103J                                                      | TDK                                   | 0.01UF                  | CAPACITOR; SMT (0603); CERAMIC CHIP; 0.01UF; 25V; TOL=5%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=COG                      |          |
| 7    | C10                                             | -       | 1   | C0402C103K5RAC; GRM155R71H103KA88                                   | KEMET/MURATA                          | 0.01UF                  | CAPACITOR; SMT (0402); CERAMIC CHIP; 200PF; 50V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R                              |          |
| 8    | C11                                             | -       | 1   | C0402C201J5GAC; GRM1555C1H201JA01                                   | KEMET/MURATA                          | 200PF                   | CAPACITOR; SMT (0402); CERAMIC CHIP; 200PF; 50V; TOL=5%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=COG                       |          |
| 9    | C13, C33                                        | -       | 2   | C0402C102K5GAC                                                      | KEMET                                 | 1000PF                  | CAPACITOR; SMT (0402); CERAMIC CHIP; 1000PF; 50V; TOL=10%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=COG                     |          |
| 10   | C14                                             | -       | 1   | C0603X472J1GAC                                                      | KEMET                                 | 4700PF                  | CAPACITOR; SMT (0603); CERAMIC CHIP; 4700PF; 100V; TOL=5%; MODEL=FT-CAP; TG=-55 DEGC TO +125 DEGC; TC=COG               |          |
| 11   | C15                                             | -       | 1   | GRM155R72A222KA01                                                   | MURATA                                | 2200PF                  | CAPACITOR; SMT (0402); CERAMIC CHIP; 2200PF; 100V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R                            |          |
| 12   | C17, C35                                        | -       | 2   | GRM188C71A475KE11; C1608X751A475K080AC                              | MURATA; TDK                           | 4.7UF                   | CAPACITOR; SMT (0603); CERAMIC CHIP; 4.7UF; 10V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7S                              |          |
| 13   | C21, C22, C28                                   | -       | 3   | C0603C105K4RAC; GRM188R71C105KA12; C1608X7R1C105K; EMK107B7105KA    | KEMET/MURATA/TKD/TAIYO YUDEN          | 1UF                     | CAPACITOR; SMT (0603); CERAMIC CHIP; 1UF; 16V; TOL=10%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=X7R                        |          |
| 14   | C23, C24                                        | -       | 2   | C0402C200J5GAC                                                      | KEMET                                 | 20PF                    | CAPACITOR; SMT (0402); CERAMIC CHIP; 20PF; 50V; TOL=5%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=COG                        |          |
| 15   | C34                                             | -       | 1   | C0603C100K1GAC                                                      | KEMET                                 | 10PF                    | CAPACITOR; SMT (0603); CERAMIC CHIP; 10PF; 100V; TOL=10%; MODEL=COG; TG=-55 DEGC TO +125 DEGC; TC=+/                    |          |
| 16   | D1, D2, D8                                      | -       | 3   | PMEG6002ELD                                                         | NEXPERIA                              | PMEG6002ELD             | DIODE; SCH; SMT (DFN1006D-2); PIV=60V; IF=0.2A                                                                          |          |
| 17   | D3-D5                                           | -       | 3   | BZX384-B12                                                          | NXP                                   | 12V                     | DIODE; ZNR; SOD-323; Vz=12V; Iz=0.005A                                                                                  |          |
| 18   | D6                                              | -       | 1   | BZX384-CSV6                                                         | NXP                                   | 5.6V                    | DIODE; ZNR; SMT (SOD-323); Vz=5.6V; Iz=0.000001A; -65 DEGC TO +150 DEGC                                                 |          |
| 19   | D7                                              | -       | 1   | SMBJ40CA                                                            | BOURNS                                | 40V                     | DIODE; TVS; SMB (DO-214AA); VRM=40V; IPP=9.3A                                                                           |          |
| 20   | J1                                              | -       | 1   | PCC03SAAN                                                           | SULLINS                               | PCC03SAAN               | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 3PINS; -65 DEGC TO +125 DEGC                                |          |
| 21   | J2, J5, J6                                      | -       | 3   | PCC02SAAN                                                           | SULLINS                               | PCC02SAAN               | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC                                |          |
| 22   | J3                                              | -       | 1   | ED555/ZDS                                                           | ON-SHORE TECHNOLOGY INC               | ED555/ZDS               | CONNECTOR; FEMALE; THROUGH HOLE; TERMINAL BLOCK; RIGHT ANGLE; 2PINS                                                     |          |
| 23   | J4                                              | -       | 1   | ZX62RD-AB-5P8                                                       | HIROSE ELECTRIC CO LTD.               | ZX62RD-AB-5P8           | CONNECTOR; MALE; SMT; MICRO-USB CONNECTOR MEETING REQUIREMENTS OF USB 2.0 STANDARD; RIGHT ANGLE; 5PINS                  |          |
| 24   | J7                                              | -       | 1   | PBC06SAAN                                                           | SULLINS ELECTRONICS CORP.             | PBC06SAAN               | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 6PINS; -65 DEGC TO +125 DEGC                                        |          |
| 25   | J8-J11                                          | -       | 4   | EVKIT_STANDOFF_4-40_3/8                                             | ?                                     | EVKIT_STANDOFF_4-40_3/8 | KIT; ASSY-STANDOFF 3/8IN; 1PC. STANDOFF/FEM/HEX/4-40IN/ (3/8IN)/NYLON; 1PC. SCREW/SLOT/PAN/4-40IN/ (3/8IN)/NYLON        |          |
| 26   | L1                                              | -       | 1   | BLM18AG601SN1                                                       | MURATA                                | 600                     | INDUCTOR; SMT (0603); FERRITE-BEAD; 600; TOL=+/-; 0.5A                                                                  |          |
| 27   | LOOP+                                           | -       | 1   |                                                                     | 5010 KEYSTONE                         | N/A                     | TESTPOINT WITH 1.80MM HOLE DIA. RED. MULTIPURPOSE;                                                                      |          |
| 28   | LOOP-                                           | -       | 1   |                                                                     | 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; |          |
| 29   | Q1                                              | -       | 1   | MMST3904-F                                                          | DIODES INCORPORATED                   | MMST3904-F              | TRAN; 60V NPN SMALL SIGNAL TRANSISTOR; NPN; SOT-323; PD-(0.2W); I-(0.2A); V-(40V)                                       |          |
| 30   | Q2                                              | -       | 1   | DZT751                                                              | DIODES INCORPORATED                   | DZT751                  | TRAN; LOW VCESAT PNP SURFACE MOUNT TRANSISTOR; PNP; SOT-223; PD-(1W); I-(3A); V-(60V)                                   |          |
| 31   | R1-R3, R5, R9, R11                              | -       | 6   | CRCW06031M00FK; MCR03EZPFX1004                                      | VISHAY DALE/ROHM                      | 1M                      | RESISTOR; 0603; 1M OHM; 1%, 100PPM; 0.10W; THICK FILM                                                                   |          |
| 32   | R7, R32                                         | -       | 2   | CRCW0402100KFK; RCD402FR-07100KL                                    | VISHAY DALE; YAGEO PHICOMP            | 100K                    | RESISTOR; 0402; 100K; 1%; 100PPM; 0.0625W; THICK FILM                                                                   |          |
| 33   | R8                                              | -       | 1   | CRCW0603100RFK; ERJ-3EKF1000                                        | VISHAY DALE/PANASONIC                 | 100                     | RESISTOR; 0603; 100 OHM; 1%; 100PPM; 0.10W; THICK FILM                                                                  |          |
| 34   | R10                                             | -       | 1   | ERJ-3EKF6653; CRCW0603665KFK                                        | PANASONIC; VISHAY DALE                | 665K                    | RESISTOR; 0603; 665K OHM; 1%; 100PPM; 0.1W; THICK FILM                                                                  | 665K     |
| 35   | R12                                             | -       | 1   | ERJ-3EKF1433V                                                       | PANASONIC                             | 143K                    | RESISTOR; 0603; 143K OHM; 1%; 100PPM; 0.10W; THICK FILM                                                                 | 143K     |
| 36   | R13                                             | -       | 1   | CRCW0402100RFK; 9C04021A1000FL; RCD402FR-07100RL                    | VISHAY DALE; PANASONIC; YAGEO PHICOMP | 100                     | RESISTOR; 0402; 100 OHM; 1%; 100PPM; 0.063W; THICK FILM                                                                 |          |
| 37   | R14, R26                                        | -       | 2   | CRCW0402402KFK                                                      | VISHAY DALE                           | 402K                    | RESISTOR; 0402; 402K OHM; 1%; 100PPM; 0.063W; METAL FILM                                                                |          |

MAX12900 EV Kit Bill of Materials (continued)

| ITEM  | REF DES                                                      | DNI/DNP | QTY | MFG PART #                                                | MANUFACTURER                          | VALUE         | DESCRIPTION                                                                                                                 | COMMENTS |
|-------|--------------------------------------------------------------|---------|-----|-----------------------------------------------------------|---------------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------|----------|
| 38    | R15                                                          | -       | 1   | ERJ-2RKF6983                                              | PANASONIC                             | 698K          | RESISTOR; 0402; 698K OHM; 1%; 100PPM; 0.1W; THICK FILM                                                                      |          |
| 39    | R16                                                          | -       | 1   | CRCW0402562KFK                                            | VISHAY DALE                           | 562K          | RESISTOR; 0402; 562K OHM; 1%; 100PPM; 0.063W; THICK FILM                                                                    |          |
| 40    | R17, R18                                                     | -       | 2   | 1676258; RN73C2A22K6B                                     | TE CONNECTIVITY                       | 22.6K         | RESISTOR; 0805; 22.6K OHM; 0.1%; 10PPM; 0.1W; THIN FILM                                                                     |          |
| 41    | R18                                                          | -       | 1   | CPF0805B1M5E; 1-1614959-1                                 | TE CONNECTIVITY                       | 1.5M          | RESISTOR; 0805; 1.5M OHM; 0.1%; 25PPM; 0.1W; THIN FILM                                                                      |          |
| 42    | R19, R41, R45, R48                                           | -       | 4   | CRCW040210K0FK; RC0402FR-0710K                            | VISHAY DALE; YAGEO PHICOMP            | 10K           | RESISTOR; 0402; 10K; 1%; 100PPM; 0.0625W; THICK FILM                                                                        |          |
| 43    | R21                                                          | -       | 1   | RC0603FR-0711KSL                                          | YAGEO PHYCOMP                         | 11.5K         | RESISTOR; 0603; 11.5K OHM; 1%; 100PPM; 0.10W; THICK FILM                                                                    |          |
| 44    | R22, R23                                                     | -       | 2   | TNPW0603294KBE                                            | VISHAY DALE                           | 294K          | RESISTOR; 0603; 294K OHM; 0.1%; 25PPM; 0.1W; THIN FILM                                                                      |          |
| 45    | R25, R46, R47                                                | -       | 3   | ERJ-2GEOR00X                                              | PANASONIC                             | 0             | RESISTOR; 0402; 0 OHM; 0%; JUMPER; 0.10W; THICK FILM                                                                        |          |
| 46    | R27                                                          | -       | 1   | RP73D2A1M0BTF; TNPW08051M00BE                             | TE CONNECTIVITY/VISHAY DALE           | 1M            | RESISTOR; 0805; 1M OHM; 0.1%; 15PPM; 0.125W; THICK FILM                                                                     | 15PPM    |
| 47    | R28                                                          | -       | 1   | TNPW0805100KBE; ERA-6ARB104V; RN73C2A100KBTF              | VISHAY DALE/PANASONIC/TE CONNECTIVITY | 100K          | RESISTOR; 0805; 100K; 0.1%; 10PPM; 0.125W; THIN FILM                                                                        | 10PPM    |
| 48    | R29                                                          | -       | 1   | ERJ-3EKFS113                                              | PANASONIC                             | 511K          | RESISTOR; 0603; 511K OHM; 1%; 100PPM; 0.1W; THICK FILM                                                                      |          |
| 49    | R30, R36, R60                                                | -       | 3   | ERJ-2RKF4991X                                             | PANASONIC                             | 4.99K         | RESISTOR; 0402; 4.99K OHM; 1%; 100PPM; 0.10W; THICK FILM                                                                    |          |
| 50    | R31                                                          | -       | 1   | CRCW060324K9FK                                            | VISHAY DALE                           | 24.9K         | RESISTOR; 0603; 24.9K OHM; 1%; 100PPM; 0.10W; THICK FILM                                                                    |          |
| 51    | R33                                                          | -       | 1   | 1676266-2; RN73C2A24K9BTF                                 | TE CONNECTIVITY                       | 24.9K         | RESISTOR; 0805; 24.9K OHM; 0.1%; 10PPM; 0.10W; THIN FILM                                                                    | 10PPM    |
| 52    | R34, R49, R50, R52, R53                                      | -       | 5   | CRCW040249R9FK; RK73H1ETTP49R9F                           | VISHAY DALE/KOA SPEER                 | 49.9          | RESISTOR; 0402; 49.9 OHM; 1%; 100PPM; 0.0625W; THICK FILM                                                                   |          |
| 53    | R35                                                          | -       | 1   | ICR03EZPFX2002; ERJ-3EKF2002                              | ROHM; PANASONIC                       | 20K           | RESISTOR; 0603; 20K OHM; 1%; 100PPM; 0.10W; THICK FILM                                                                      |          |
| 54    | R37                                                          | -       | 1   | ERJ-2RKF1582                                              | PANASONIC                             | 15.8K         | RESISTOR; 0402; 15.8K OHM; 1%; 100PPM; 0.1W; THICK FILM                                                                     |          |
| 55    | R38                                                          | -       | 1   | CRCW0603499RFK; RK73H1J4990FT; ERJ-3EKF4990V; RC1608F4990 | KOA; VISHAY; PANASONIC; SAMSUNG       | 499           | RESISTOR; 0603; 499 OHM; 1%; 100PPM; 0.10W; THICK FILM                                                                      |          |
| 56    | R39, R40, R42-R44, R54-R59                                   | -       | 11  | ERJ-2RKF27R0X; RC0402FR-0727RL                            | PANASONIC; YAGEO PHICOMP              | 27            | RESISTOR, 0402, 27 OHM, 1%, 100PPM, 0.0625W, THICK FILM                                                                     |          |
| 57    | R51                                                          | -       | 1   | CRCW06031001FK; ERJ-3EKF1001V                             | VISHAY DALE; PANASONIC                | 1K            | RESISTOR; 0603; 1K; 1%; 100PPM; 0.10W; THICK FILM                                                                           |          |
| 58    | R5                                                           | -       | 1   | RN73C2A24R9BTG; PFC-W0805LF-03-24R9-B                     | TE CONNECTIVITY/TT ELECTRONICS        | 24.9          | RESISTOR; 0805; 24.9 OHM; 0.1%; 10PPM; 0.25W; THIN FILM                                                                     | 10PPM    |
| 59    | SU1-SU4                                                      | -       | 4   | SX1100-B                                                  | KYCON                                 | SX1100-B      | TEST POINT; JUMPER; STR; TOTAL LENGTH=0.24IN; BLACK; INSULATION=PBT;PHOSPHOR BRONZE CONTACT=GOLD PLATED                     |          |
| 60    | TP1, TP4, TP5, TP10, TP11, TP14, TP16-TP19, TP21, TP23, TP26 | -       | 13  |                                                           | 5009 KEYSTONE                         | N/A           | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; YELLOW; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;     |          |
| 61    | TP2, TP8, TP9, TP12                                          | -       | 4   |                                                           | 5008 KEYSTONE                         | N/A           | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; ORANGE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;     |          |
| 62    | TP3, TP6, TP7, TP13, TP15, TP22                              | -       | 6   |                                                           | 5006 KEYSTONE                         | N/A           | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;      |          |
| 63    | TP20                                                         | -       | 1   |                                                           | 5005 KEYSTONE                         | N/A           | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;        |          |
| 64    | U1                                                           | -       | 1   | MAX12900ATJ+                                              | MAXIM                                 | MAX12900ATJ+  | EVKIT PART - IC; SNR; LOOP-POWER 4-20MA SENSOR TRANSMITTER BACK END; TQFN32-EP                                              |          |
| 65    | U2                                                           | -       | 1   | MAX4594EXK                                                | MAXIM                                 | MAX4594EXK    | IC, ASW,Low-Voltage, Single-Supply SPST (NO) , SC70-5                                                                       |          |
| 66    | U3                                                           | -       | 1   | FT234XD                                                   | FUTURE TECHNOLOGY DEVICES INTL LTD    | FT234XD       | IC; INFC; USB TO BASIC UART; DFN12-EP                                                                                       |          |
| 67    | U4                                                           | -       | 1   | MAX12931BASA+                                             | MAXIM                                 | MAX12931BASA+ | EVKIT PART - IC; DISO; 1/1 CHANNEL; 25MBPS; DEFAULT HIGH; 3.75KVRMS DIGITAL ISOLATOR; NSOIC8                                |          |
| 68    | U5                                                           | -       | 1   | STM32L071CBT6                                             | ST MICROELECTRONICS                   | STM32L071CBT6 | IC; UCON; ACCESS LINE ULTRA-LOW-POWER; 32-BIT MCU ARM-BASED CORTEX-M0+ WITH 128KB FLASH; 20KB SRAM; 6KB EEPROM; ADC; LQFP48 |          |
| 69    | Y1                                                           | -       | 1   | ECS-120-20-33-CKM                                         | ECS INC                               | 12MHZ         | CRYSTAL; SMT 3.2X2.5; 20PF; 12MHZ; +/-10PPM; +/-10PPM                                                                       |          |
| 70    | PCB                                                          | -       | 1   | MAX12900                                                  | MAXIM                                 | PCB           | PCB:MAX12900                                                                                                                |          |
| 71    | MISC1                                                        | DNI     | 1   | AK67421-1-R                                               | ASSMANN                               | AK67421-1-R   | CONNECTOR; MALE; USB; USB 2.0 MICRO CONNECTION CABLE; USB B MICRO MALE TO USB A MALE; STRAIGHT; SPINS-4PINS                 |          |
| 72    | R4, R6                                                       | DNP     | 0   | CRCW06031M00FK; MCR03EZPFX1004                            | VISHAY DALE/ROHM                      | 1M            | RESISTOR, 0603, 1M OHM, 1%, 100PPM, 0.10W, THICK FILM                                                                       | DNI      |
| 73    | R24                                                          | DNP     | 0   | CRCW04021M00FK                                            | VISHAY DALE                           | 1M            | RESISTOR; 0402; 1M; 1%; 100PPM; 0.0625W; THICK FILM                                                                         | DNI      |
| 74    | TP27                                                         | DNP     | 0   |                                                           | 5008 KEYSTONE                         | N/A           | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; ORANGE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;     | DNI      |
| TOTAL |                                                              |         | 154 |                                                           |                                       |               |                                                                                                                             |          |

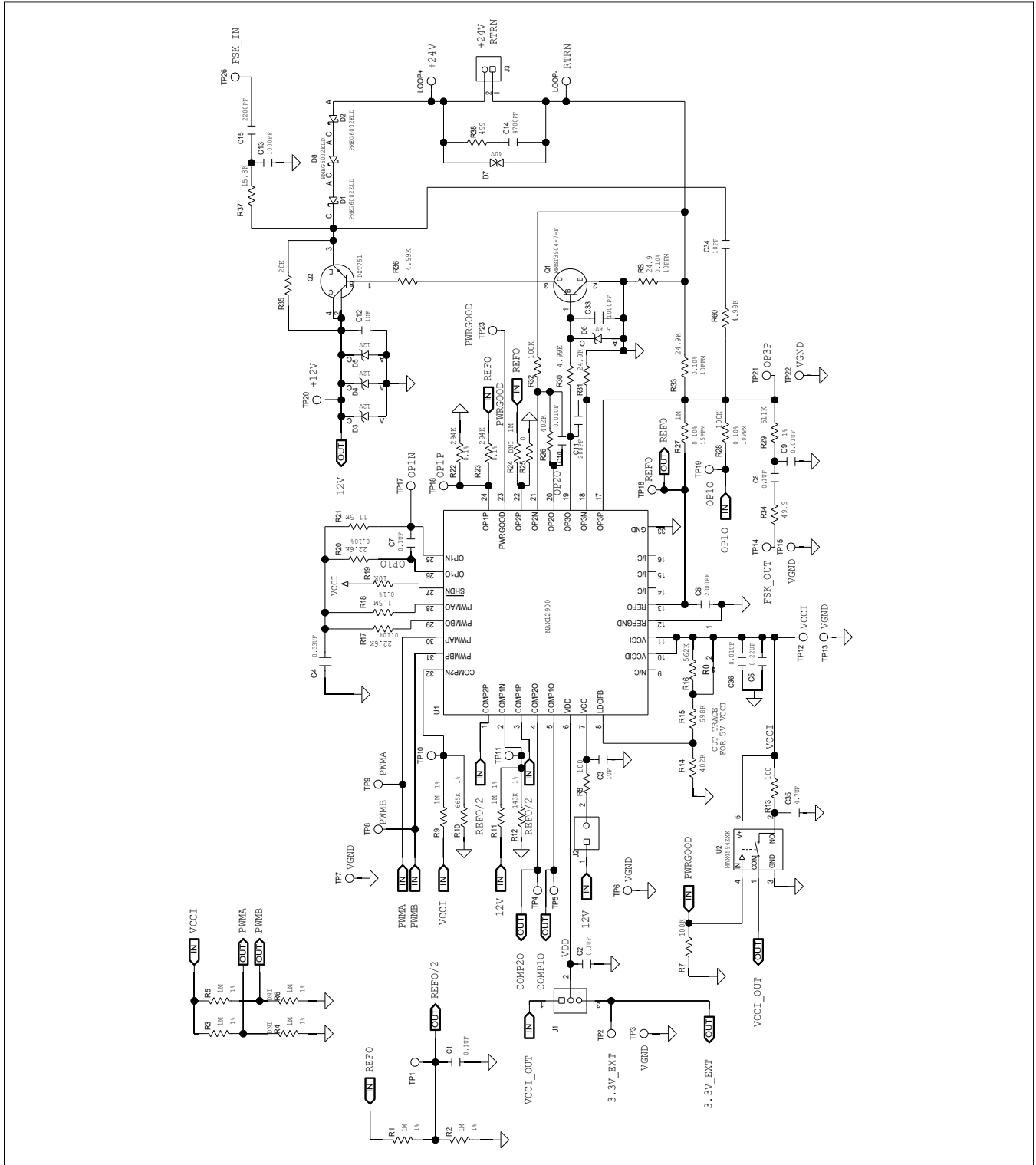
Ordering Information

| PART           | TYPE   |
|----------------|--------|
| MAX12900EVKIT# | EV Kit |

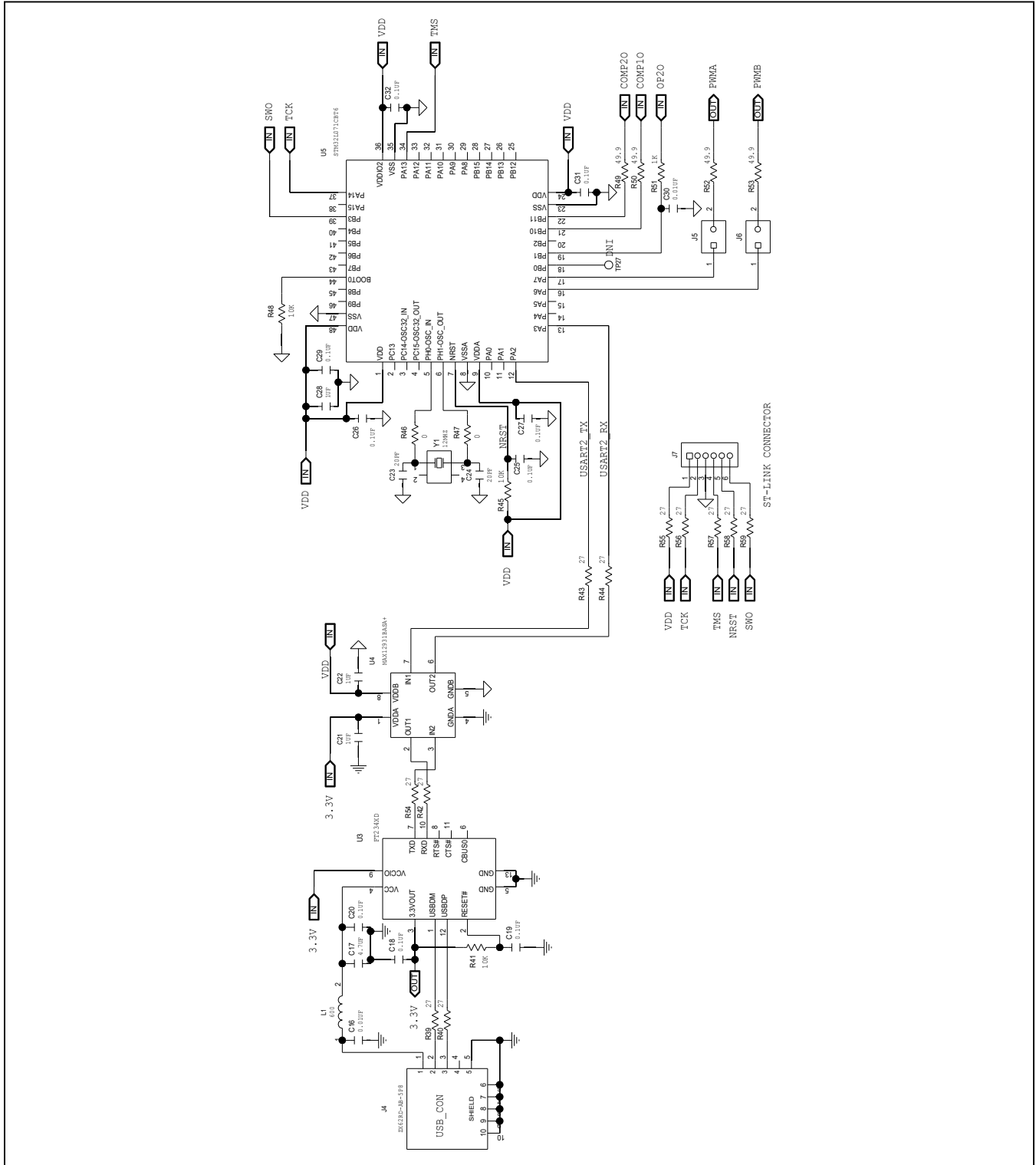
#Denotes RoHS compliant.



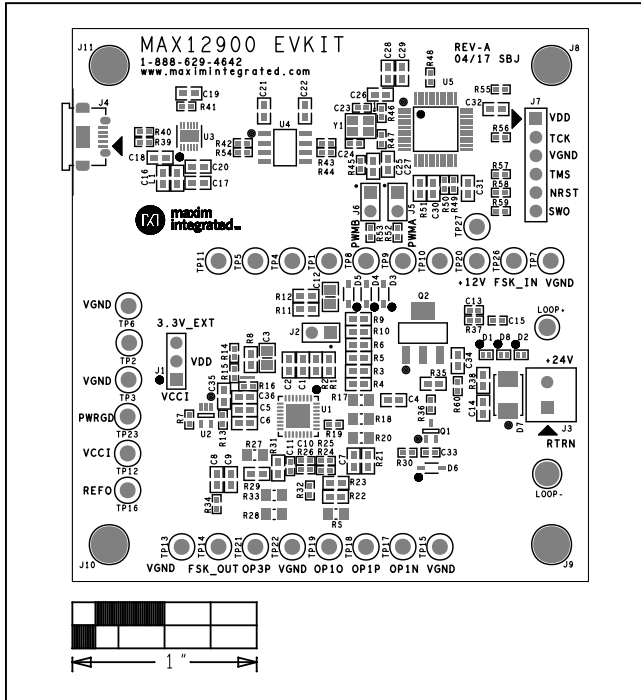
MAX12900 EV Kit Schematic



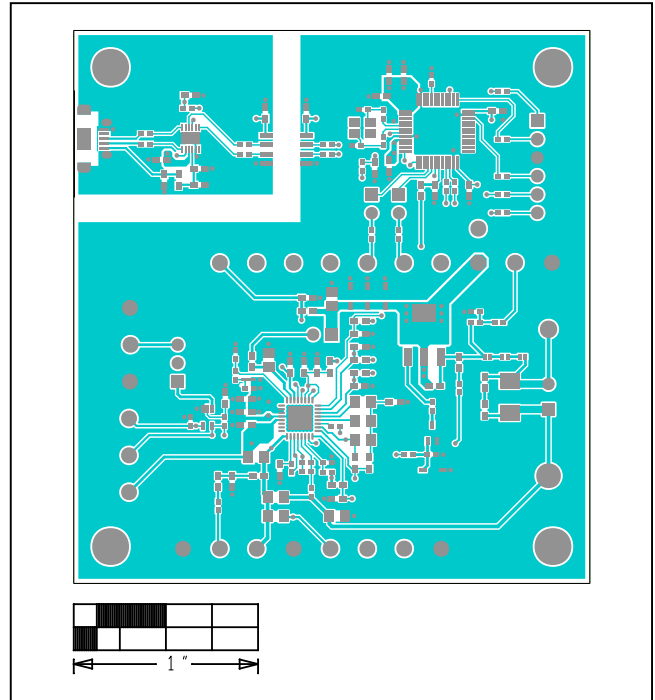
MAX12900 EV Kit Schematic (continued)



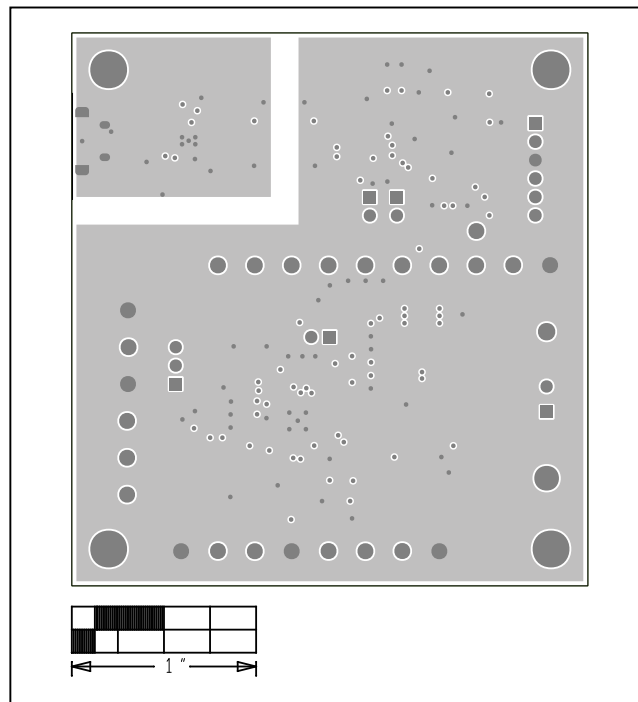
MAX12900 EV Kit PCB Layout Diagrams



MAX12900 EV Kit—Top Silkscreen

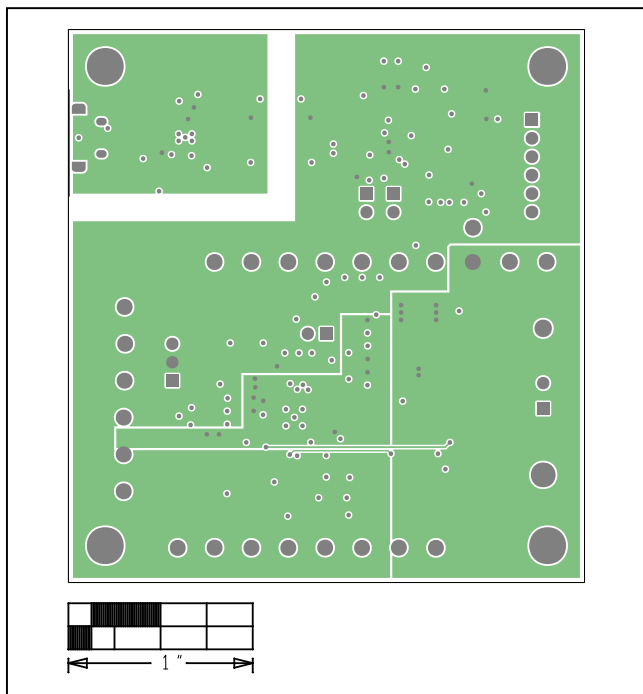


MAX12900 EV Kit—Top

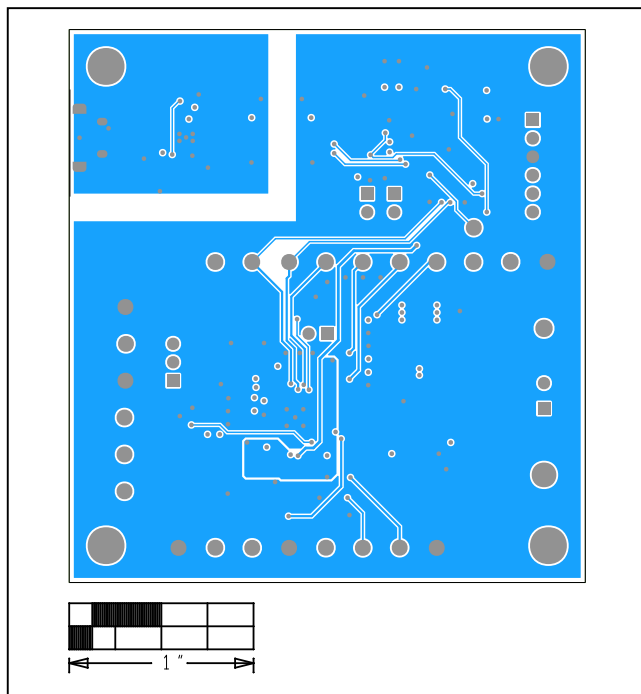


MAX12900 EV Kit—Internal 2

MAX12900 EV Kit PCB Layout Diagrams (continued)



MAX12900 EV Kit—Internal 3



MAX12900 EV Kit—Bottom

## Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION                      | PAGES CHANGED |
|-----------------|---------------|----------------------------------|---------------|
| 0               | 11/17         | Initial release                  | —             |
| 1               | 11/17         | Removed Component Supplier table | 16            |

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at [www.maximintegrated.com](http://www.maximintegrated.com).

*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.*

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Data Conversion IC Development Tools](#) category:*

*Click to view products by [Maxim](#) manufacturer:*

Other Similar products are found below :

[EVAL-AD7265EDZ](#) [EVAL-AD7719EBZ](#) [EVAL-AD7767-1EDZ](#) [EVAL-AD7995EBZ](#) [AD9211-200EBZ](#) [AD9251-20EBZ](#) [AD9251-65EBZ](#)  
[AD9613-170EBZ](#) [AD9629-20EBZ](#) [AD9716-DPG2-EBZ](#) [AD9737A-EBZ](#) [AD9993-EBZ](#) [DAC8555EVM](#) [EVAL-AD5061EBZ](#) [EVAL-](#)  
[AD5062EBZ](#) [EVAL-AD5443-DBRDZ](#) [EVAL-AD5570SDZ](#) [EVAL-AD7992EBZ](#) [EVAL-AD7994EBZ](#) [AD9119-MIX-EBZ](#) [AD9233-125EBZ](#)  
[AD9629-80EBZ](#) [AD9650-80EBZ](#) [AD9767-EBZ](#) [DAC8531EVM](#) [LM96080EB/NOPB](#) [EVAL-AD5445SDZ](#) [EVAL-AD5660EBZ](#) [EVAL-](#)  
[AD7685SDZ](#) [EVAL-AD7687SDZ](#) [MAX5318PMB#](#) [MAX1246EVL11-QSOP](#) [MAX117EVKIT-DIP](#) [DC2365A-C](#) [DC2795A-B](#) [DC2795A-A](#)  
[DAC088S085EB/NOPB](#) [SIM8909-EVB-KIT](#) [82635ASRCDVKHV 961443](#) [DC1466B-B](#) [EVAL-AD5413SDZ](#) [ADC12D1600RB/NOPB](#) [1083](#)  
[RFPDK FOR CMT2X5X](#) [TS7003DB](#) [TSC2014EVM-PDK](#) [MOD-USB3G](#) [KDC5514EVALZ](#) [650201392G](#) [ISL28005FH-100EVAL1Z](#)