Click here to ask about the production status of specific part numbers.

DS28S60 Evaluation Kit

Evaluates: DS28S60

General Description

The DS28S60 evaluation system (EV system) provides the hardware and software necessary to exercise the features of the DS28S60Q+. The EV system consists of five DS28S60Q+ devices in a 12-pin TDFN package, a DS9121EQ+ evaluation TDFN socket board, and a DS9482P# USB-to-I²C/SPI/1-Wire® adapter. The evaluation software runs under Windows® 10, Windows 8, and Windows 7 operating systems, both 64-bit and 32-bit versions. It provides a handy user interface to exercise the features of the DS28S60Q+.

***Ordering Information* appears at end of data sheet.**

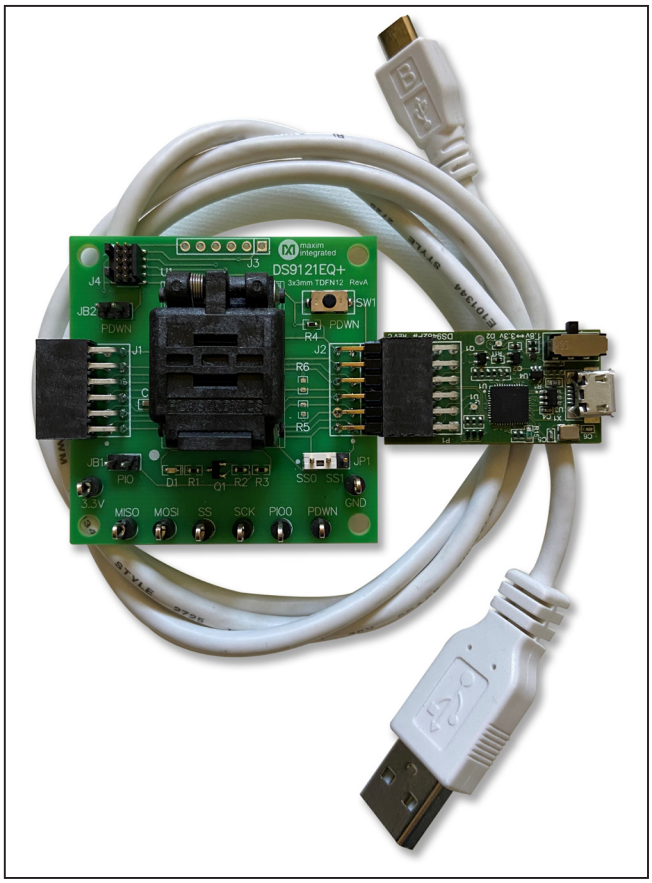
Features

- Demonstrates the Features of the DS28S60Q+ DeepCover® Secure Coprocessor
- SPI Communication is Logged to Aid Firmware Designers Understanding of DS28S60
- SPI/1-Wire/I²C USB Adapter Creates a Virtual COM Port on Any PC
- Fully Compliant with USB Specification v2.0
- Software Runs on Windows 10, Windows 8, and Windows 7 for Both 64-Bit and 32-Bit Versions
- 3.3V ±3% Operating Voltage
- Convenient On-Board Test Points, TDFN Socket
- Evaluation Software Available by Request

EV Kit Contents

QTY	DESCRIPTION
5	DS28S60Q+ DeepCover SPI Secure Authenticator (12 TDFN)
1	DS9121EQ+ Socket Board (12 TDFN)
1	DS9482P# USB to I²C/SPI/1-Wire Adapter
1	USB Type-A to Micro-USB Type-B Cable

DS28S60 EV System



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

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Quick Start

This section includes a list of recommended equipment and instructions on how to set up the Windows-based PC for the evaluation software.

Required Equipment

- DS9482P# USB to I²C/SPI/1-Wire Adapter (included)
- DS9121EQ+ TDFN socket board (included)
- DS28S60Q+ (five devices included)
- USB Type A to Micro-USB Type B cable (included)
- PC with a Windows 10, Windows 8, or Windows 7 operating system (64 bit or 32 bit) and a spare USB 2.0 or higher port
- Download DS28S60 EV kit software (light version) or request full DS28S60 EV kit developer software

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.

Hardware Setup and Driver Installation Quick Start

The following steps were performed on a Windows 10 PC to set up the DS28S60 EV kit hardware/software:

1) Obtain and unpack the **DS28S60_Evaluation_Kit_Lite_Version_Setup_V1_0_0** file or the latest version.
2) In a file viewer (Figure 1), double click on the **DS28S60_Evaluation_Kit_Lite_Version_Setup_V1_0_0.exe** file to begin the installation.
3) The setup wizard opens; click **Next** as shown in Figure 2.

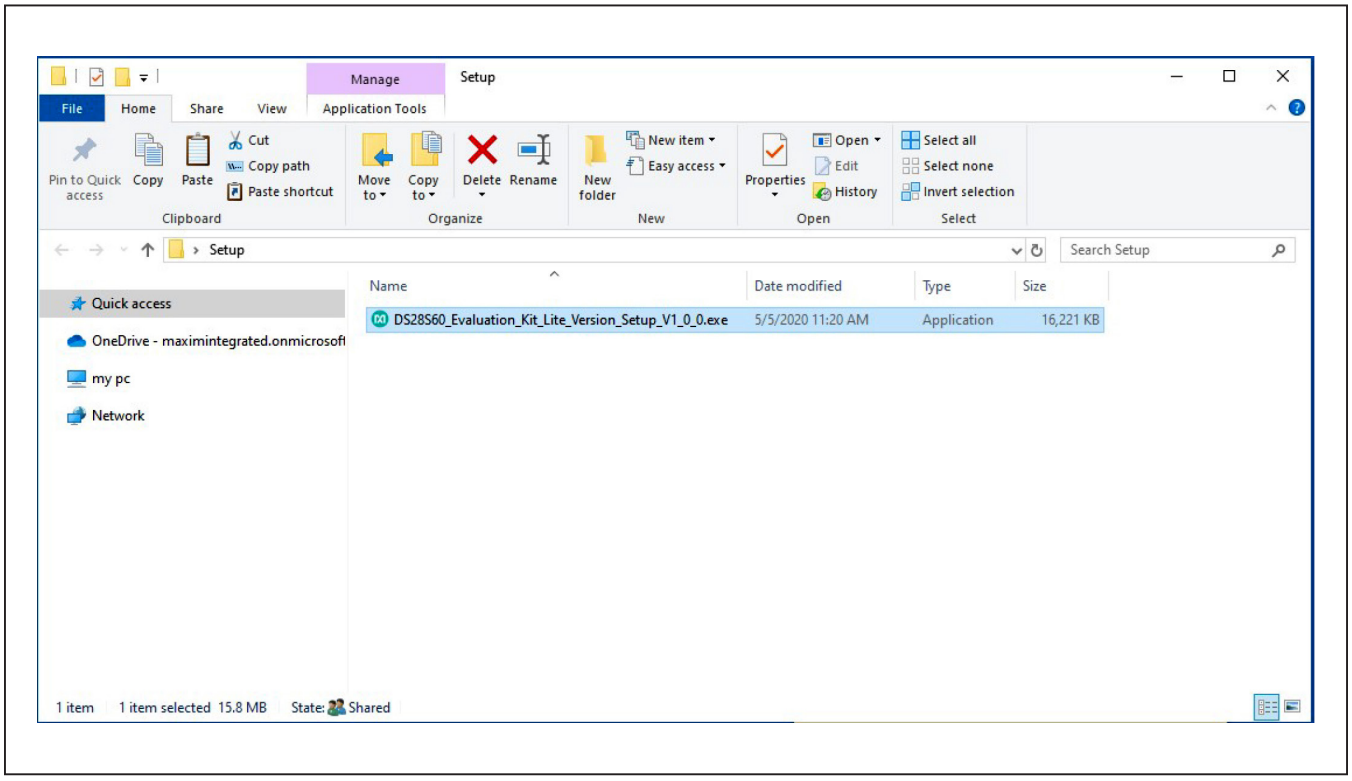


Figure 1. File Viewer

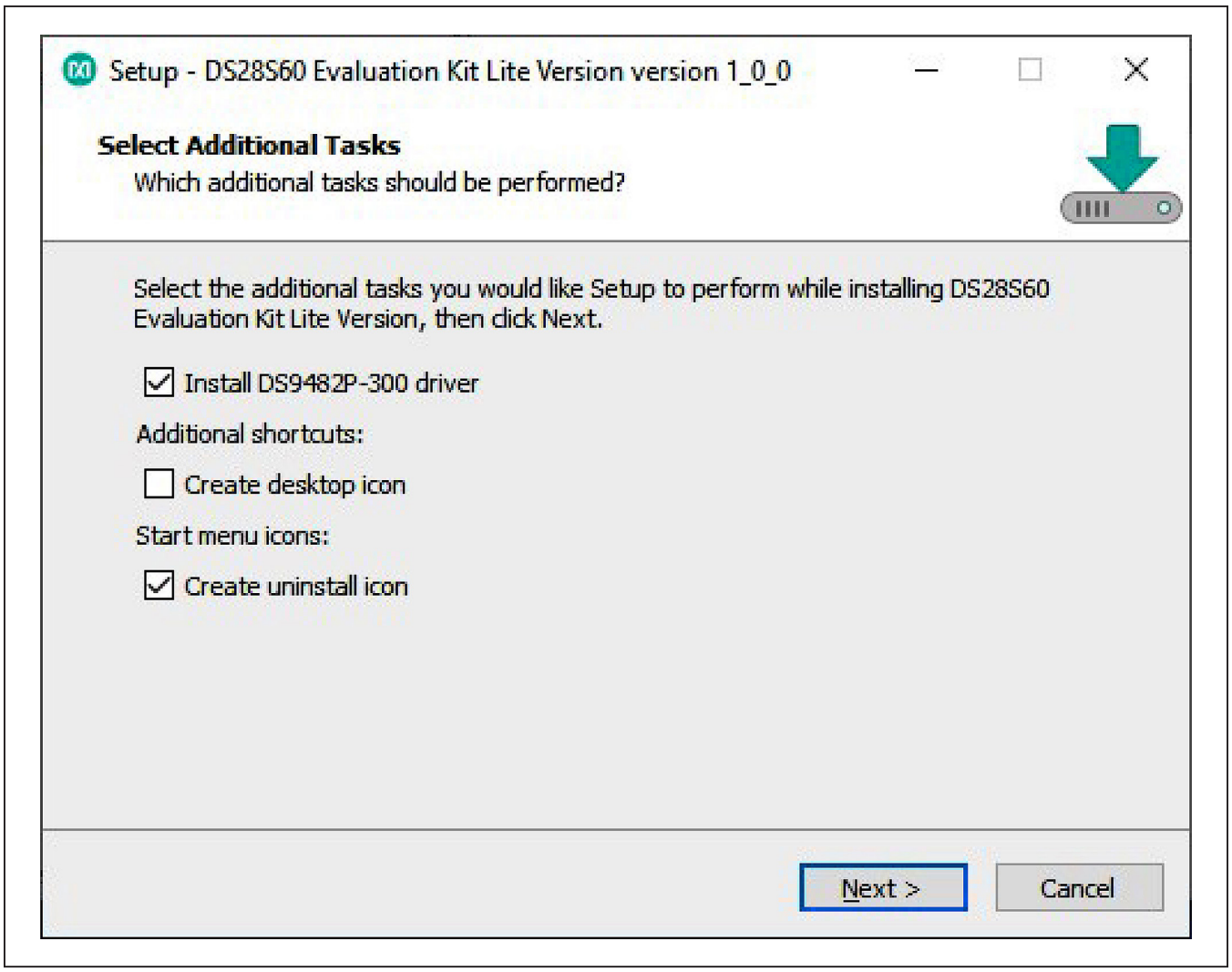


Figure 2. DS28S60 Setup Wizard

4) Follow the instructions in the wizard and click **Next** to install the EV kit software and required drivers (Figure 3 and Figure 4).

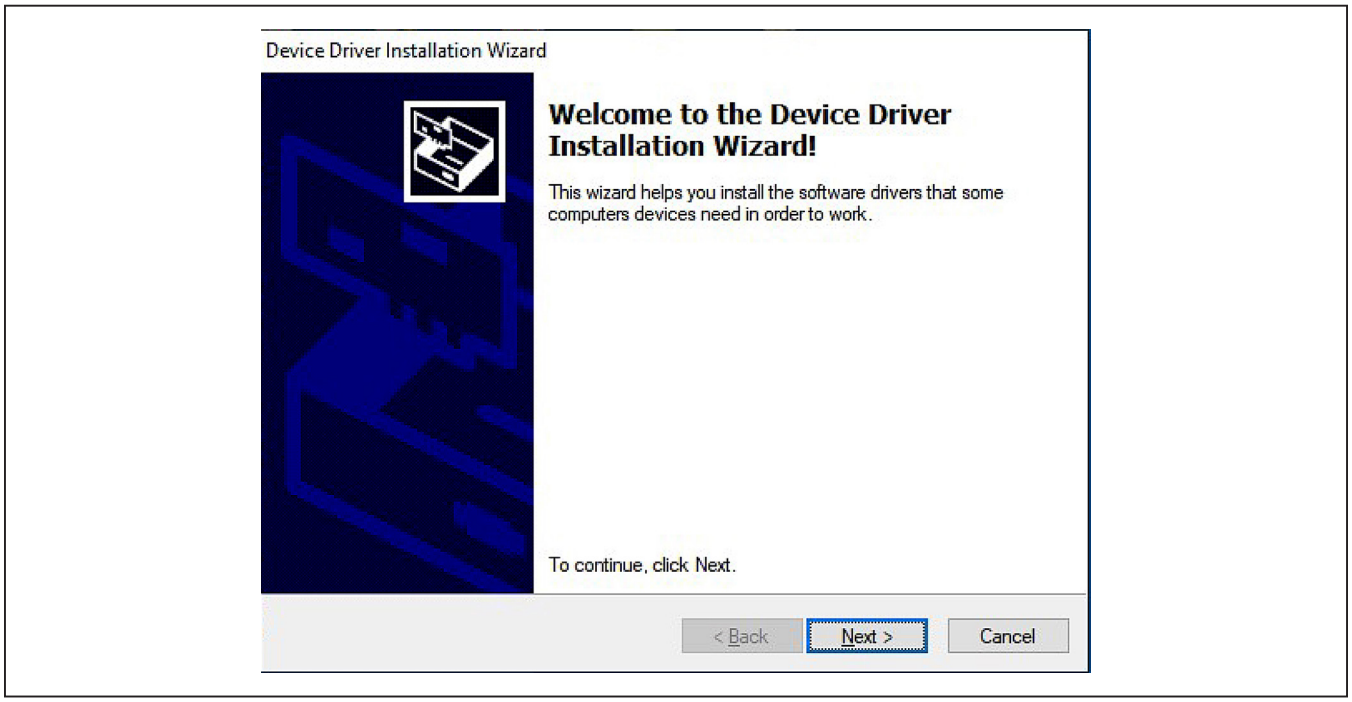


Figure 3. DS9482P# Driver Installation

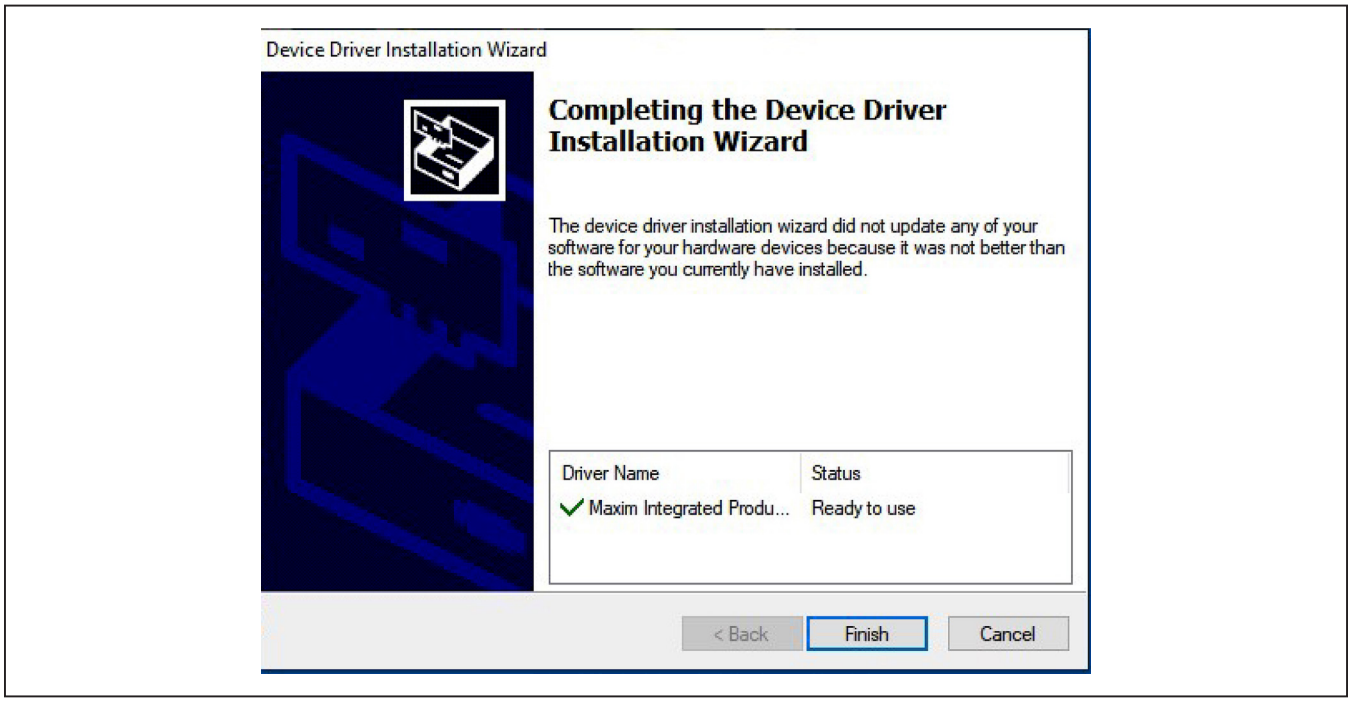


Figure 4. Finish DS9482P# Drivers Installation

5) Wait for the Installation to complete and launch program if desired after completion (Figure 5 and Figure 6).

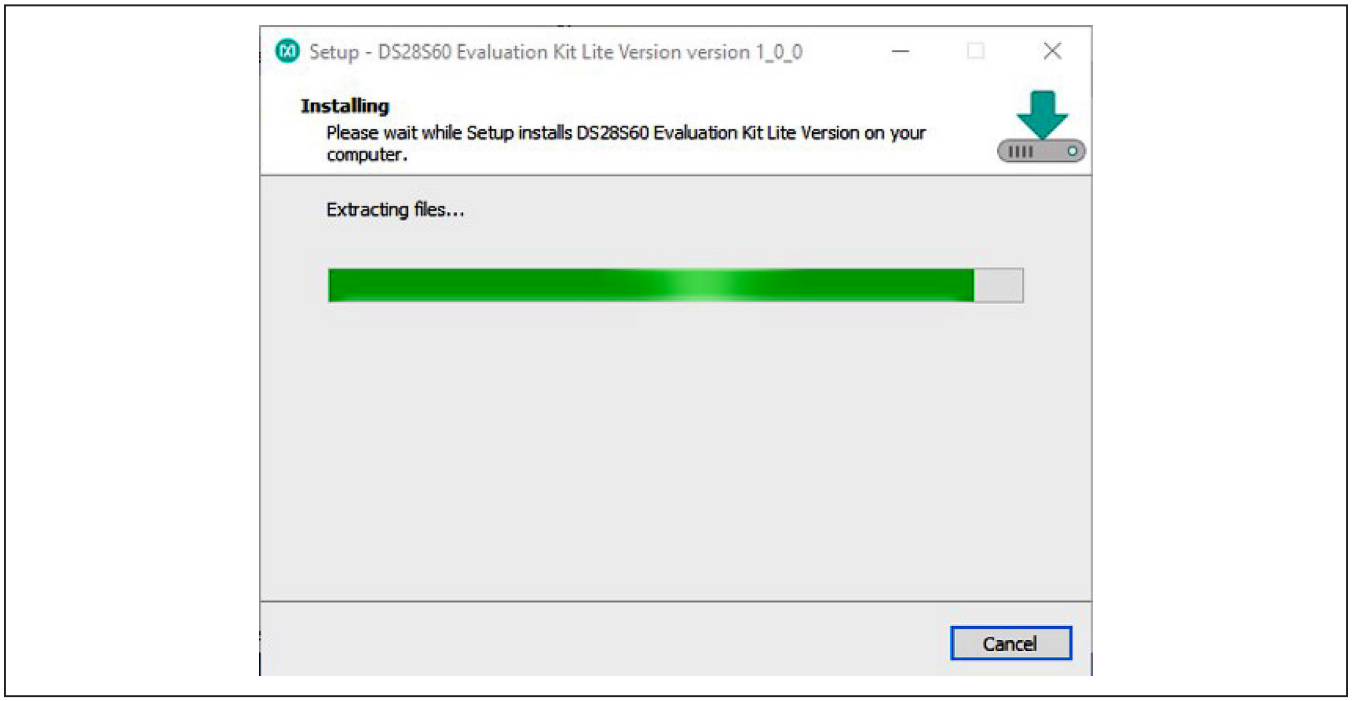


Figure 5. Installation Progress

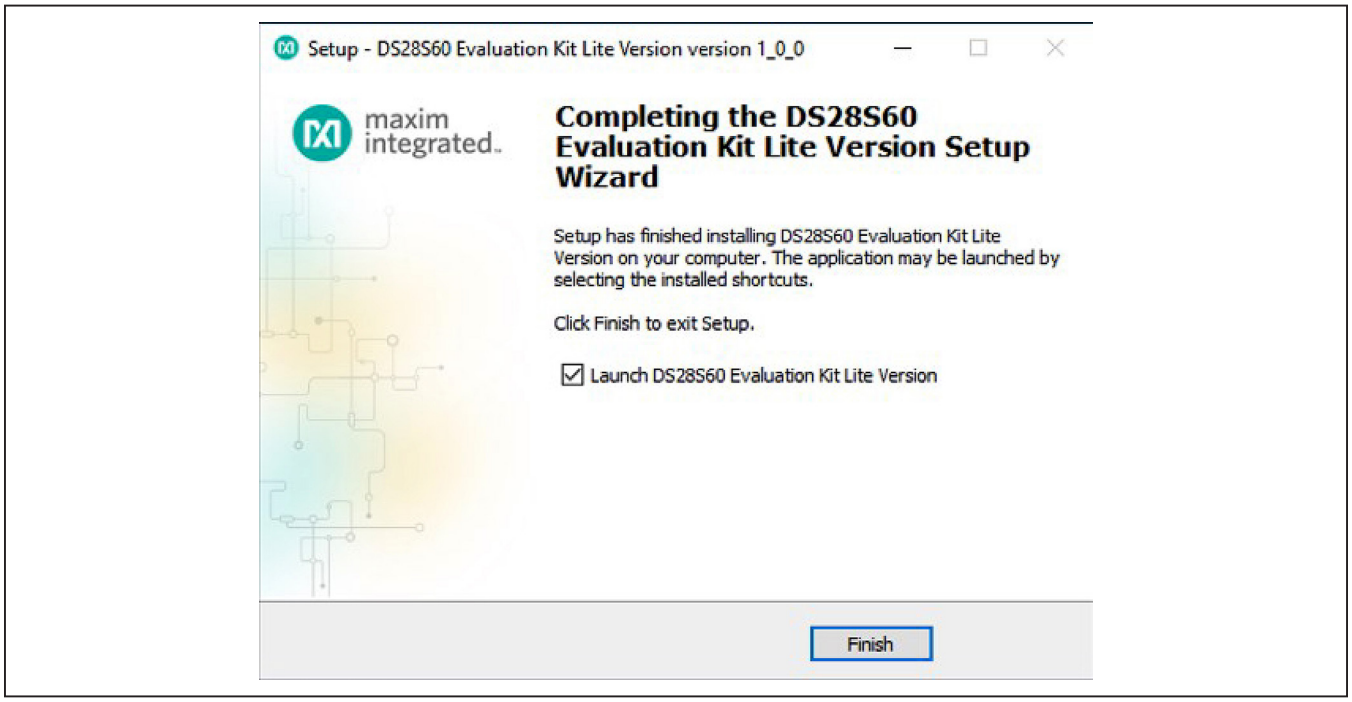


Figure 6. Run Software After Installation

6) Plug the DS9482P# into the PC with DS9121EQ+ socket board by doing the following:
   a. Open socket and insert a DS28S60Q+ as shown in Figure 7. **Note:** Do not use the socket's pin 1 indicator. The pin 1 indicator is denotated on the PCB as a white dot and is located on the opposite side of the socket's marking.
   b. Close burn-in socket.
   c. Connect the DS9121EQ J2 12-pin female socket, into the DS9482P# 12-pin female plug per Figure 8.
   d. Set the DS9482P# switch to 3.3V as shown in Figure 9.
   e. Plug the DS28S60 EV kit, using a USB Type-A to Micro-USB Type-B cable, into the PC.

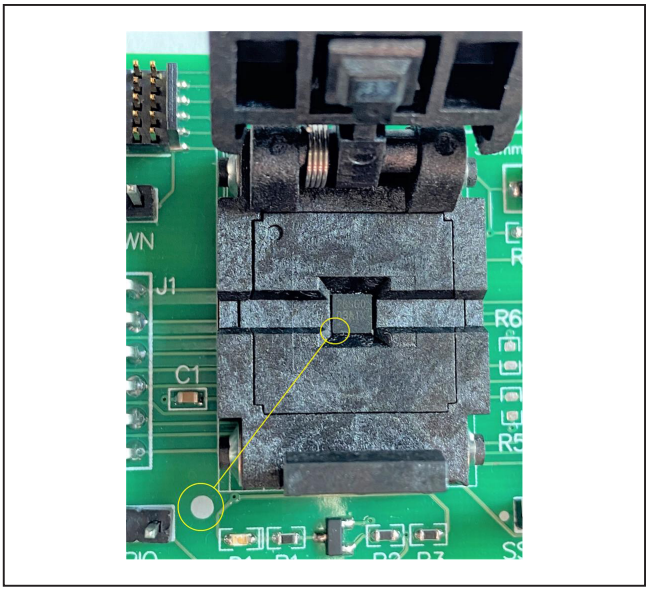


Figure 7. Orientation of the DS28S60 in Burn-In Socket

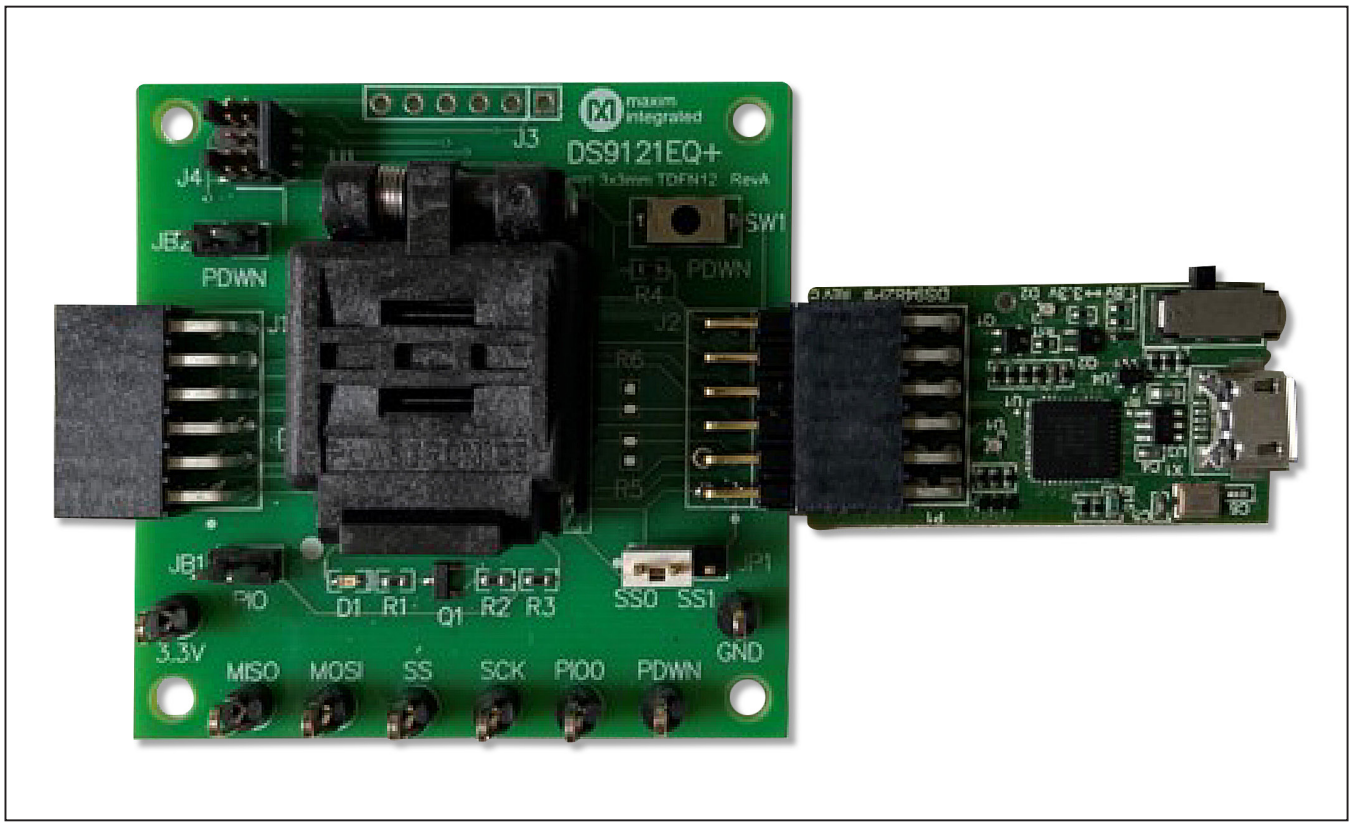


Figure 8. DS9482P# and DS9121EQ

7) The DS28S60 EV kit program opens and automatically connects to the COM port. This can be verified in the lower right corner of the window, as shown in Figure 10.

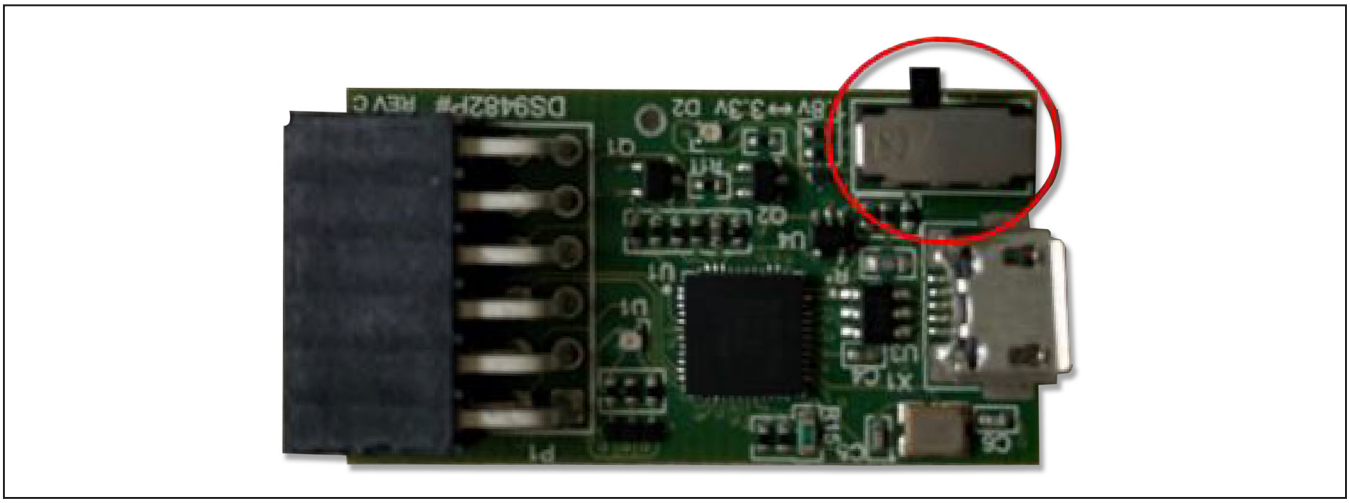


Figure 9. Set DS9482P# to 3.3V

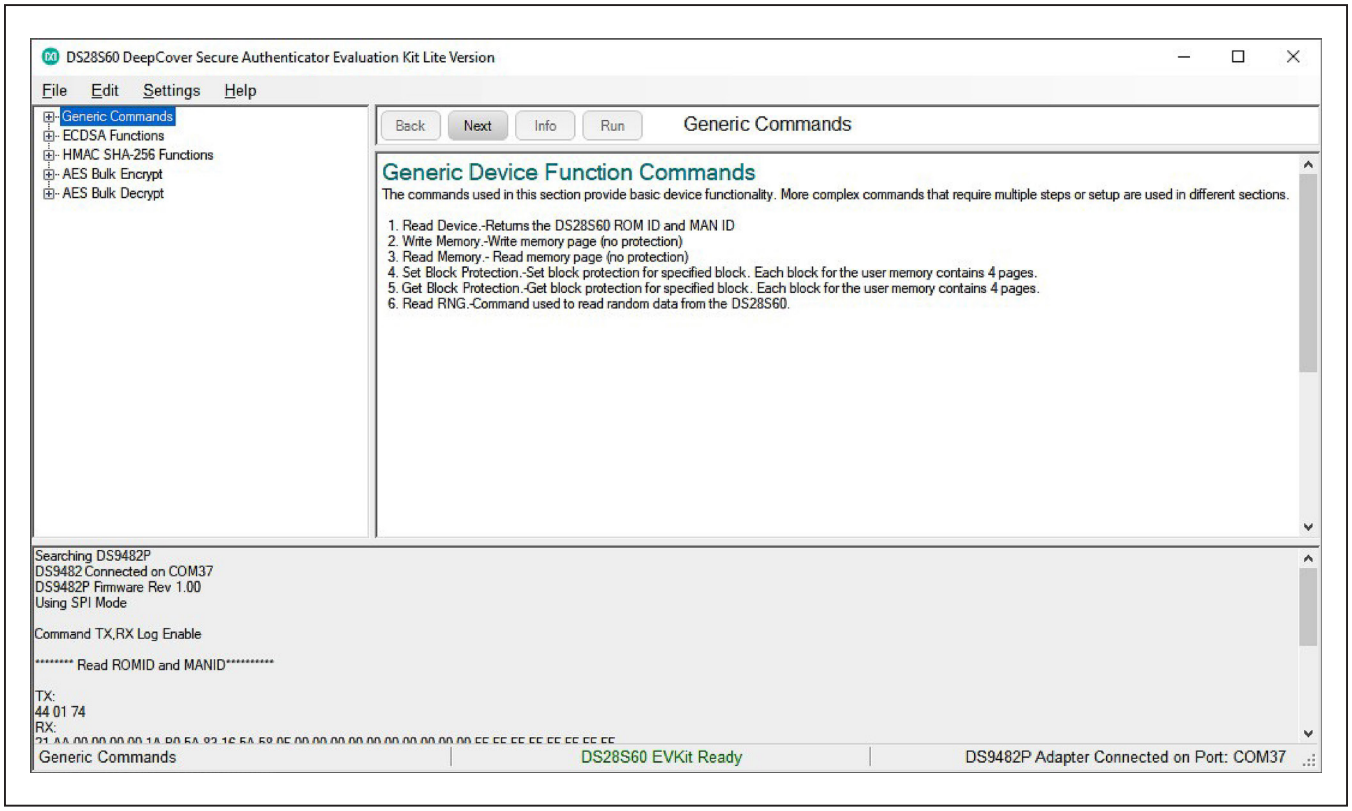


Figure 10. DS28S60 EV Kit Program (Default View Upon Opening)

EV Kit Supported Functions

The DS28S60 EV kit program is designed as a usage example. The GUI optionally displays all the SPI command sequence transactions as well as SHA and ECDSA computations when Settings→Debug Info is enabled. See Table 1 for descriptions of the functions in the GUI.

Table 1. GUI Setup and Usage Flows Supported

FLOW	DESCRIPTION
Generic Commands	Generic DS28S60 commands without SHA or ECDSA encryption, authentication, or protection. (e.g., Read Device, Read and Write Memory, Set and Read Protection and RNG function)
ECDSA Functions*	Examples to set up device for ECDSA authentication, certificate generation and verification. Examples for ECDSA encryption, authentication, signature generation and verification.
HMAC SHA-256 Functions*	Examples provided to setup device for HMAC authentication and verification and for HMAC encryption, authentication and the SHA-256 Generator.
AES Bulk Encrypt*	Examples to execute the DS28S60 AES Bulk Encrypt feature.
AES Bulk Decrypt*	Examples to execute the DS28S60 AES Bulk Decrypt feature.

**Available only in full EV Kit Version.*

Ordering Information

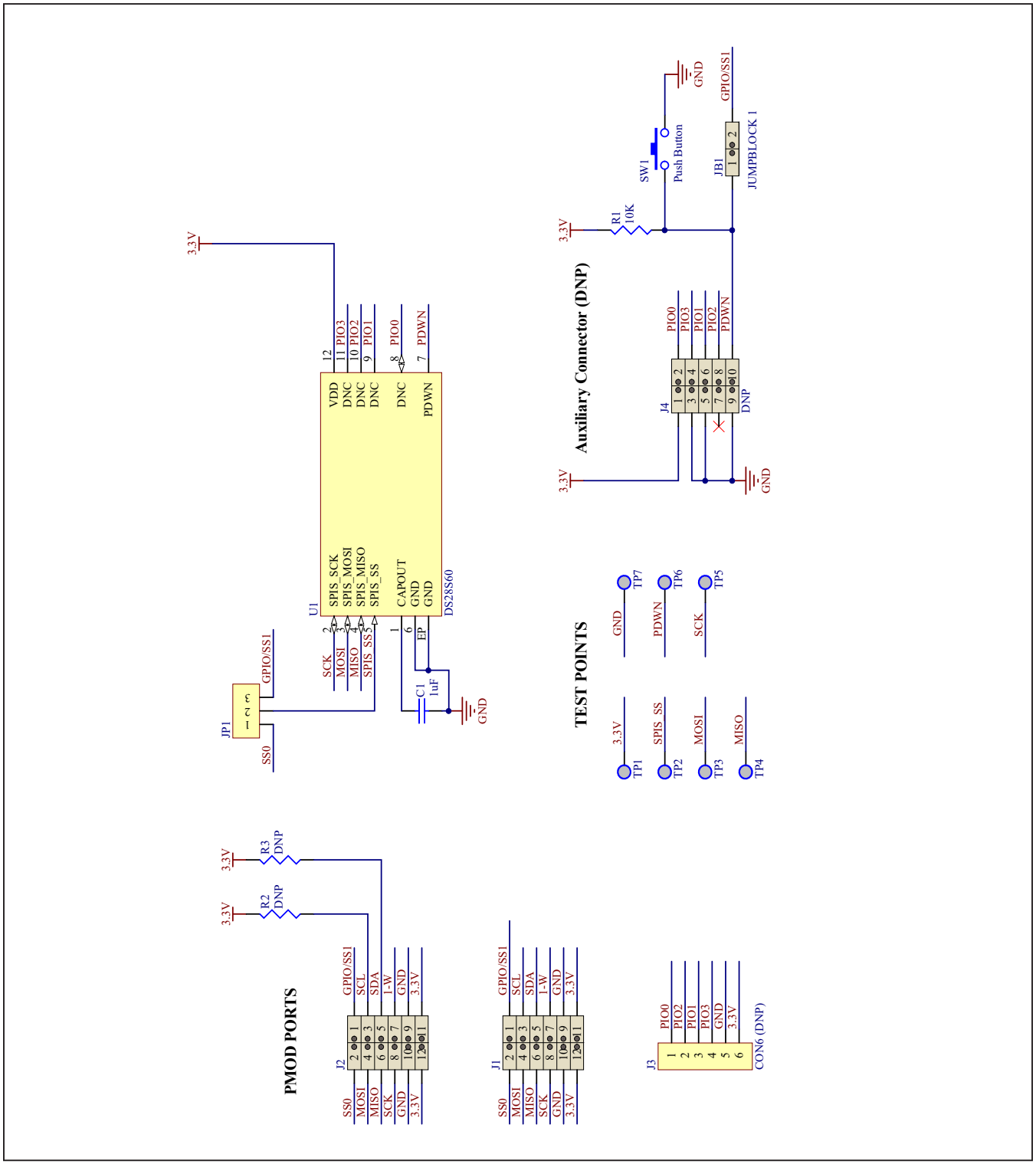
PART	TYPE
DS28S60EVKIT#	EV Kit

#Denotes RoHS compliant.

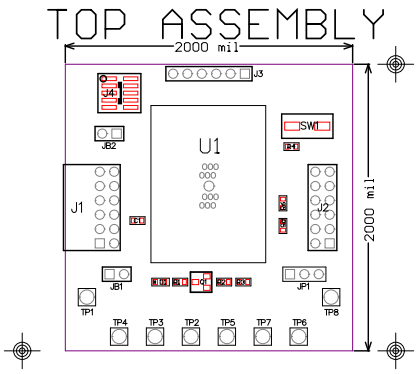
DS28S60 EV Kit Bill of Materials

DESIGNATOR	QTY	DESCRIPTION	MANUFACTURER	PART NO.
U1	1	DS28S60 12P TDFN 3x3 socket	Plastronics	12QN50S33030
C1	1	CAP CER 1µF 25V X7R 0603	Kemet	06033C105KAT2A
J1	1	CONN HEADER R/A 12POS 2.54MM	Sullins Connector Solutions	PRPC006DBAN-M71RC
J2	1	CONN RCPT 12POS 0.1 TIN PCB R/A	Samtec Inc.	SSW-106-02-T-D-RA
JB1	1	2P jumper block	Sullins Connector Solutions	PEC02SAAN
JP1	1	HDR, BRKWAY,.100 3POS VERT,0.318”	Tyco Electronics	9-146276-0
R1	1	RES SMD 10KΩ 1% 1/10W 0603	Panasonic Electronic Components	ERJ-3EKF1002V
SW1	1	SWITCH TACTILE SPST-NO 0.05A 32V	C&K Components	KSR221GLFS
TP1–TP7	7	Test points	Keystone Electronics	36-5011-ND

DS28S60 EV Schematic Diagram



DS28S60 EV Kit PCB Layout Diagrams

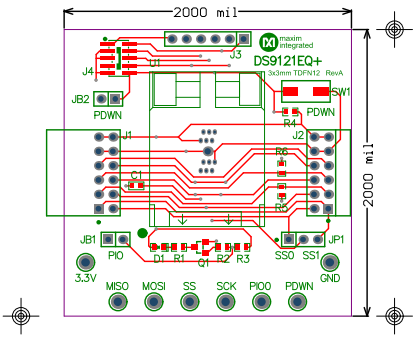


DS9121EQ+				
Part Number: 89-???				
Property of maxim integrated			Rev	A
Drill and Mechanical Layer				
Date: JAN 06 2020	Units in mils			

SIZE	QTY	SYM	PLATED	TOLERANCE
12	23		YES	+/- 0.003
18	12		YES	+/- 0.003
39	37		YES	+/- 0.003
45	1		YES	+/- 0.003
59	1		NO	+/- 0.003
59	8		YES	+/- 0.003
70	1		NO	+/- 0.003
125	4		NO	+/- 0.003

Notes:
1. Fabricate using FR4 or similar material
2. Material: Must be RoHS Compliant
3. Board Dimensions: (2000 x 2000 mils)
4. Board Thickness: 62 mils +/- 10%
5. Layers: 2
6. Minimum Trace/Spacing: 10mil / 7mil
7. Copper Thickness: 1oz on all layers
8. Surface mount pads: 31 Through Hole Pads: 57 Nonplated through holes: 6
9. Soldermask: GREEN
10. Legend: White. Double-Sided. Non-Conductive Epoxy ink or Equiv.
11.
12. Finish: Most Economical Lead free and RoHS compliant process
13. Vendor Logo & date code: Allowed on bottom side only
14. Through holes: quantity 87, Slot holes 0, minimum size 12 mil
15. Tolerances:
    Plated-through holes +/- 3 mil
    Pattern to pattern +/- 6 mil
    Legend to legend no preference
    Soldermask to pattern +/- 6 mil
16. Electrical testing needed: YES

DS28S60 EV Kit—Top Assembly

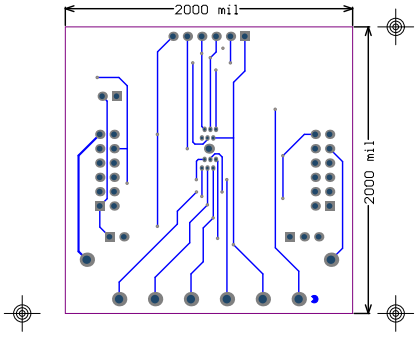


DS9121EQ+				
Part Number: 89-???				
Property of maxim integrated			Rev	A
Drill and Mechanical Layer				
Date: JAN 06 2020	Units in mils			

SIZE	QTY	SYM	PLATED	TOLERANCE
12	23		YES	+/- 0.003
18	12		YES	+/- 0.003
39	37		YES	+/- 0.003
45	1		YES	+/- 0.003
59	1		NO	+/- 0.003
59	8		YES	+/- 0.003
70	1		NO	+/- 0.003
125	4		NO	+/- 0.003

Notes:
1. Fabricate using FR4 or similar material
2. Material: Must be RoHS Compliant
3. Board Dimensions: (2000 x 2000 mils)
4. Board Thickness: 62 mils +/- 10%
5. Layers: 2
6. Minimum Trace/Spacing: 10mil / 7mil
7. Copper Thickness: 1oz on all layers
8. Surface mount pads: 31 Through Hole Pads: 57 Nonplated through holes: 6
9. Soldermask: GREEN
10. Legend: White. Double-Sided. Non-Conductive Epoxy ink or Equiv.
11.
12. Finish: Most Economical Lead free and RoHS compliant process
13. Vendor Logo & date code: Allowed on bottom side only
14. Through holes: quantity 87, Slot holes 0, minimum size 12 mil
15. Tolerances:
    Plated-through holes +/- 3 mil
    Pattern to pattern +/- 6 mil
    Legend to legend no preference
    Soldermask to pattern +/- 6 mil
16. Electrical testing needed: YES

DS28S60 EV Kit—Top Silkscreen



DS9121EQ+				
Part Number: 89-???				
Property of maxim integrated			Rev	A
Drill and Mechanical Layer				
Date: JAN 06 2020	Units in mils			

SIZE	QTY	SYM	PLATED	TOLERANCE
12	23		YES	+/- 0.003
18	12		YES	+/- 0.003
39	37		YES	+/- 0.003
45	1		YES	+/- 0.003
59	1		NO	+/- 0.003
59	8		YES	+/- 0.003
70	1		NO	+/- 0.003
125	4		NO	+/- 0.003

Notes:
1. Fabricate using FR4 or similar material
2. Material: Must be RoHS Compliant
3. Board Dimensions: (2000 x 2000 mils)
4. Board Thickness: 62 mils +/- 10%
5. Layers: 2
6. Minimum Trace/Spacing: 10mil / 7mil
7. Copper Thickness: 1oz on all layers
8. Surface mount pads: 31 Through Hole Pads: 57 Nonplated through holes: 6
9. Soldermask: GREEN
10. Legend: White. Double-Sided. Non-Conductive Epoxy ink or Equiv.
11.
12. Finish: Most Economical Lead free and RoHS compliant process
13. Vendor Logo & date code: Allowed on bottom side only
14. Through holes: quantity 87, Slot holes 0, minimum size 12 mil
15. Tolerances:
    Plated-through holes +/- 3 mil
    Pattern to pattern +/- 6 mil
    Legend to legend no preference
    Soldermask to pattern +/- 6 mil
16. Electrical testing needed: YES

DS28S60 EV Kit—Bottom Metal

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	6/20	Initial release	—

For pricing, delivery, and ordering information, please visit Maxim Integrated's online storefront at https://www.maximintegrated.com/en/storefront/storefront.html.