User's Guide
SLDU034–December 2017

TPS92612-Q1 Evaluation Module User's Guide

The TPS92612-Q1 evaluation module (EVM) user's guide describes the characteristics and operation of the TPS92612-Q1 EVM. A complete schematic diagram, printed-circuit board layout, and bill of materials (BOM) are also included.

Contents

1 Introduction 1
2 TPS92612EVM Description 2
3 Test Setup 3
4 Board Layout 4
5 Schematic and Bill of Materials 5

List of Figures

1 TPS92612EVM Board 2
2 TPS92612EVM Layout 4
3 TPS92612EVM Schematic 5

List of Tables

1 Jumpers J1, J2, J3, J4, J6 3
2 Jumpers J5 3
3 TPS92612EVM Parameters 3
4 TPS92612EVM Bill of Materials 6

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1 Introduction

The TPS92612-Q1 EVM helps designers evaluate the operation and performance of the TPS92612-Q1 device, a linear single-channel LED driver for automotive lighting applications. It is a simple and elegant solution to deliver constant current for a single LED string with full LED protection.

1.1 Features

The EVM has the following features:

- Single-channel constant-current LED driver with PWM dimming
- LED short-circuit protection with auto-recovery

1.2 Typical Applications

The EVM is used in the following applications:

- Automotive convenience lighting: dome light, door handles, reading lamp, and miscellaneous lamps
- Automotive rear lamp, center high-mounted stop lamp, side markers, blind-spot detection indicator, charging inlet indicator
- General-purpose LED driver application

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2 TPS92612EVM Description

This section describes the TPS92612EVM connectors, test points, and jumpers.

2.1 TPS92612EVM Board

WARNING

Hot surface. Contact may cause burns. Do not touch.

Figure 1 displays the EVM board.

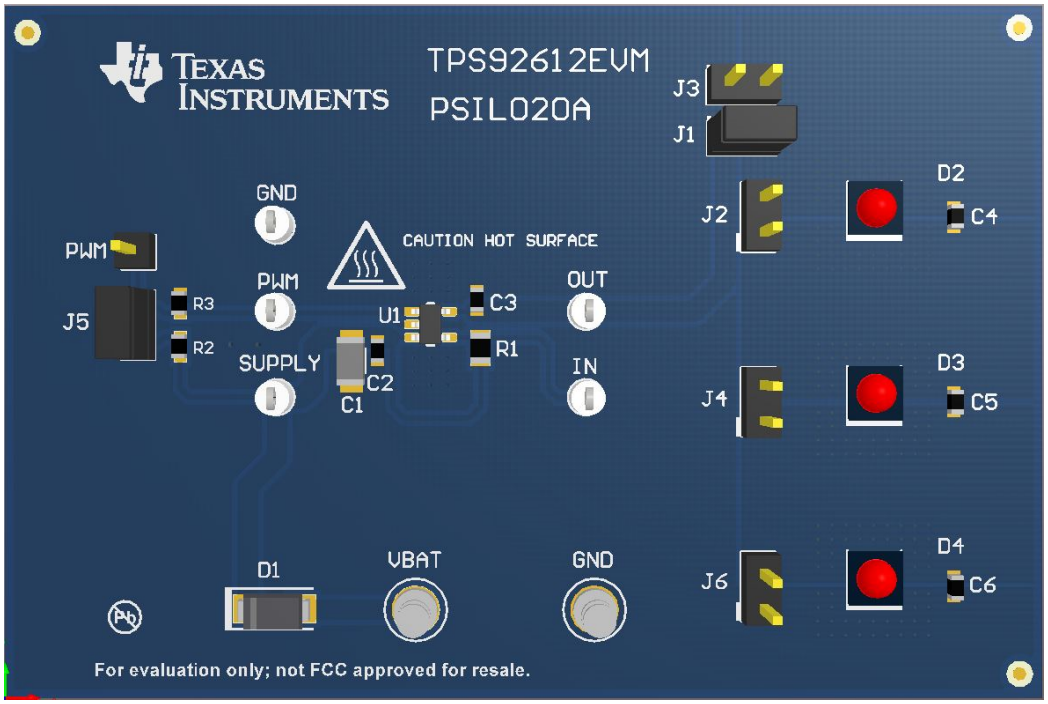


Figure 1. TPS92612EVM Board

2.2 Connectors

The EVM has the following connectors:

- TP1 (VBAT): Input power supply
- TP2 (GND): Supply ground

2.3 Test Points

All the pins on the TPS92612-Q1 device have test points on the EVM, helping users observe the waveform on the pins, including PWM, SUPPLY, IN, OUT, and GND.

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2.4 Jumpers

2.4.1 LED Connection Configuration Jumpers – J1, J2, J3, J4, J6

Jumpers J1–J4 and J6 are used to configure the connection of the LED string, including LED open, LED short to GND, and single-LED short.

Table 1. Jumpers J1, J2, J3, J4, J6

Designator	Attached Function	With Shunt	Without Shunt
J1	LED open	LED string connected to OUT	LED string open
J3	LED short	LED string short to GND	Normal operation
J2	Single-LED short	Short LED D2	Normal operation
J4	Single-LED short	Short LED D3	Normal operation
J6	Single-LED short	Short LED D4	Normal operation

2.4.2 PWM Input Jumper – J5

Jumper J5 is used to configure the PWM input signal.

Table 2. Jumpers J5

Designator	Attached Function	Jumper Position	Result
J5	PWM	With shunt	Enable PWM when SUPPLY > 6 V (PWM connected to SUPPLY via a resistor divider)
		Without shunt	Disable PWM or use external control signal (PWM connected to GND via R3)

3 Test Setup

Table 3 shows the typical parameters for the TPS92612EVM. The typical input voltage range is from 9 V to 16 V. The full-scale output current of the TPS92612EVM is 40 mA. Users can adjust the output current by changing the sensing resistor.

Table 3. TPS92612EVM Parameters

Parameter	Value
Input voltage	9 V–16 V typical
Output current	40 mA
LED	3s1p LED string

Follow these steps for the EVM test setup:

1. Set the voltage of the dc power supply to 12 V and set the current limit to 100 mA.
2. Connect the positive and negative outputs of the power supply to connectors VBAT and GND on the EVM board.
3. With the default jumper connections, the board should begin operating as soon as the power supply is turned on. Modify the jumpers for other operating modes.

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4 Board Layout

Figure 2 illustrates the EVM board layout.

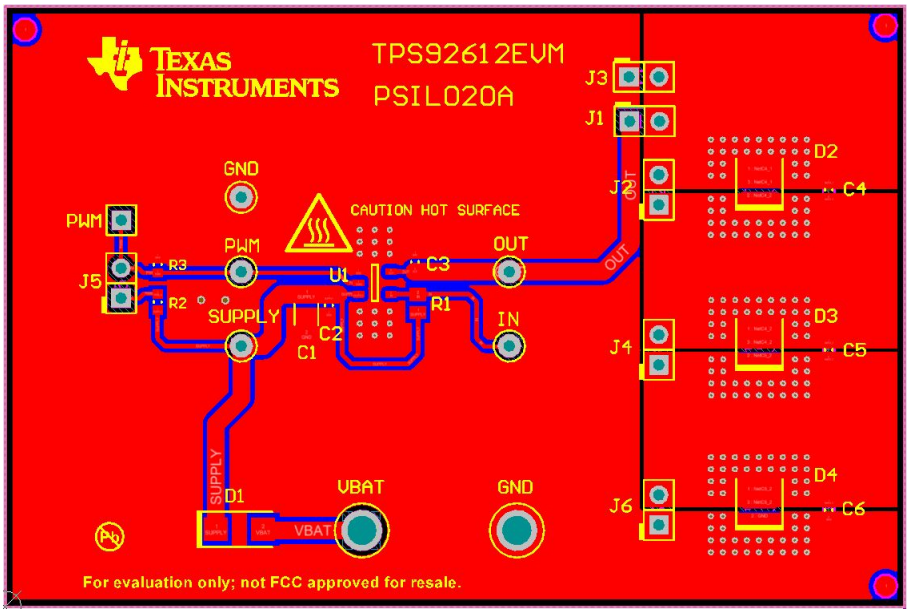


Figure 2. TPS92612EVM Layout

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5 Schematic and Bill of Materials

5.1 Schematic

Figure 3 shows the EVM schematic.

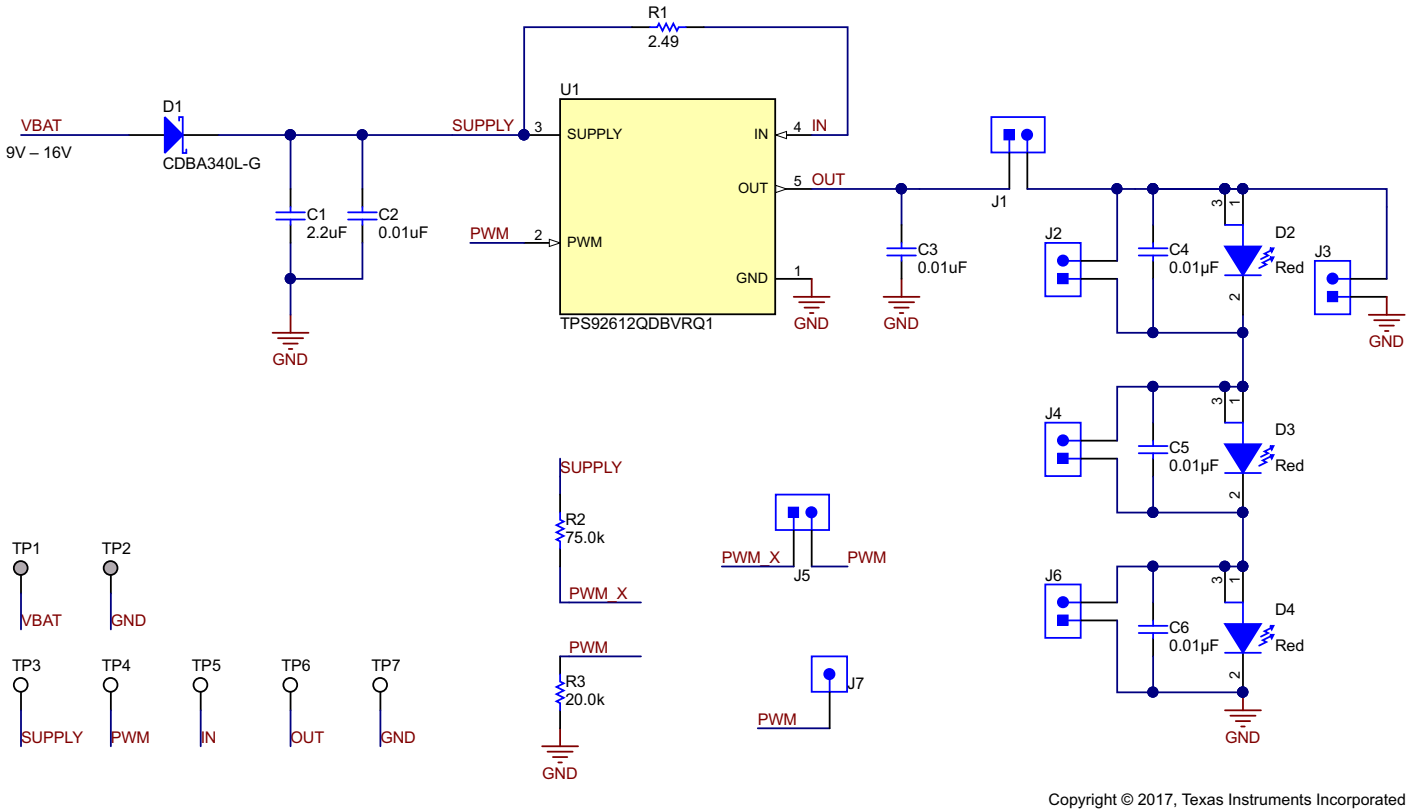


Figure 3. TPS92612EVM Schematic

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5.2 Bill of Materials

Table 4 lists the TPS92612EVM BOM.

Table 4. TPS92612EVM Bill of Materials

Item No.	Designator	QTY	Value	Part Number	Manufacturer	Description	Package Reference
1	C1	1	2.2 µF	C3216X7R1H225K160AB	TDK	CAP, CERM, 2.2 µF, 50 V, +/- 10%, X7R, 1206	1206
2	C2, C3	2	0.01 µF	C0603X103K5RACTU	Kemet	CAP, CERM, 0.01 µF, 50 V, +/- 10%, X7R, 0603	0603
3	C4, C5, C6	3	0.01 µF	0603ZC103KAT2A	AVX	CAP, CERM, 0.01 µF, 10 V, +/- 10%, X7R, 0603	0603
4	D1	1	40V	CDBA340L-G	Comchip Technology	Diode, Schottky, 40 V, 3 A, SMA	SMA
5	D2, D3, D4	3	Red	LR H9GP-HZKX-1-1-Z	OSRAM	LED, Red, SMD	3.85x3.85mm
6	J1, J2, J3, J4, J5, J6	6		TSW-102-07-G-S	Samtec	Header, 100mil, 2x1, Gold, TH	2x1 Header
7	J7	1		TSW-101-07-G-S	Samtec	Header, 100mil, 1pos, Gold, TH	Testpoint
8	R1	1	2.49 Ω	RC0805FR-072R49L	Yageo America	RES, 2.49 Ω, 1%, 0.125 W, 0805	0805
9	R2	1	75.0 kΩ	RC0603FR-0775KL	Yageo America	RES, 75.0 kΩ, 1%, 0.1 W, 0603	0603
10	R3	1	20.0 kΩ	RC0603FR-0720KL	Yageo America	RES, 20.0 kΩ, 1%, 0.1 W, 0603	0603
11	SH-J1, SH-J2	2	1x2	SPC02SYAN	Sullins Connector Solutions	Shunt, 100mil, Flash Gold, Black	Closed Top 100mil Shunt
12	TP1, TP2	2		1502-2	Keystone	Terminal, Turret, TH, Double	Keystone1502-2
13	TP3, TP4, TP5, TP6, TP7	5		5002	Keystone	Test Point, Miniature, White, TH	White Miniature Testpoint
14	U1	1		TPS92612QDBVRQ1	Texas Instruments	Automotive Single Channel LED Driver, DBV0005A (SOT-23-5)	DBV0005A

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- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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