User's Guide
SLDU033–December 2017

TPS92611-Q1 Evaluation Module User's Guide

The TPS92611-Q1 evaluation module (EVM) user's guide describes the characteristics and operation of the TPS92611-Q1 EVM. A complete schematic diagram, printed-circuit board layout, and bill of materials (BOM) are also included.

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1 Introduction

The TPS92611-Q1 EVM helps designers evaluate the operation and performance of the TPS92611-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 diagnostics.

1.1 Features

The EVM has the following features:

- Single-channel constant-current LED driver with PWM dimming
- LED short-circuit and open-circuit detection with auto-recovery
- Open-fault detection mask for low-dropout operation

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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

2 TPS92611EVM Description

This section describes the TPS92611EVM connectors, test points, and jumpers.

2.1 TPS92611EVM Board

WARNING

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

Figure 1 displays the EVM board.

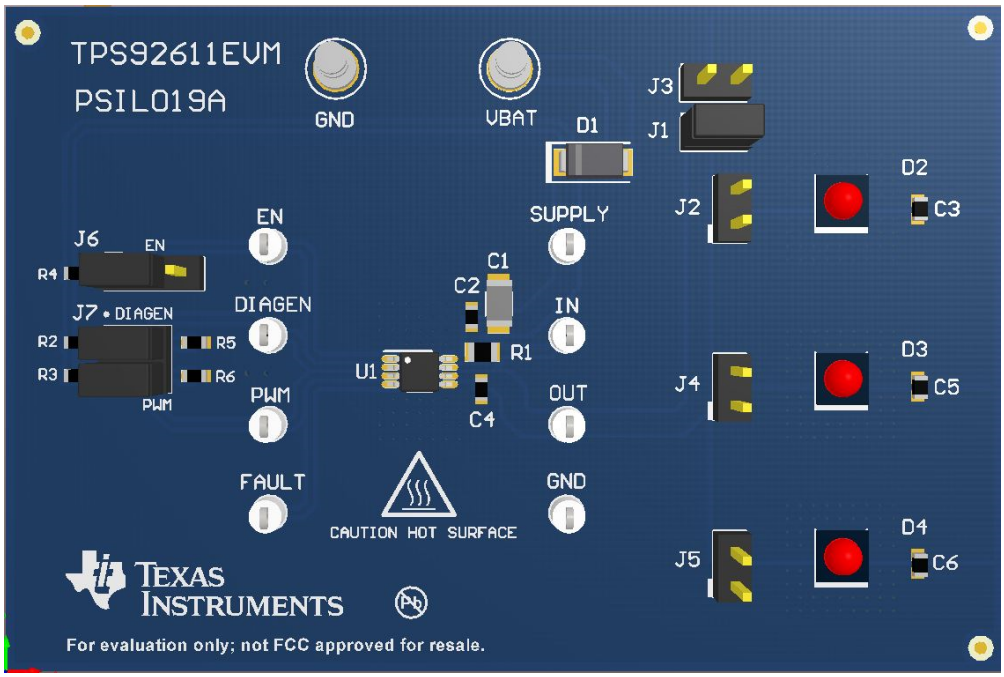


Figure 1. TPS92611EVM Board

2.2 Connectors

The EVM has the following connectors:

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

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2.3 Test Points

All the pins on the TPS92611-Q1 device have test points on the EVM, helping users observe the waveform on the pins, including EN, DIAGEN, PWM, FAULT, GND, SUPPLY, IN, and OUT.

2.4 Jumpers

2.4.1 LED Connection Configuration Jumpers – J1, J2, J3, J4, J5

Jumpers J1–J5 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–J5

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
J5	Single-LED short	Short LED D4	Normal operation

2.4.2 Control Signal Input Jumpers – J6, J7

Jumpers J6 and J7 are used to configure the control signals, including EN, DIAGEN, and PWM.

Table 2. Jumpers J6 and J7

Designator	Attached Function	Jumper Position	Result
J6	EN	With shunt on pins 1–2	The device is enabled (EN connected to SUPPLY via R4)
		With shunt on pins 2–3	The device is disabled (EN connected to GND)
J7 (pins 1–2)	DIAGEN	With shunt	Enable LED open-circuit detection when SUPPLY > 9 V (DIAGEN connected to SUPPLY via a resistor divider)
		Without shunt	Disable LED open-circuit detection (DIAGEN connected to GND via R5)
J7 (pins 3–4)	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 R6)

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3 Test Setup

Table 3 shows the typical parameters for the TPS92611EVM. The typical input voltage range is from 9 V to 16 V. The full-scale output current of the TPS92611EVM is 100 mA. Users can adjust the output current by changing the sensing resistor.

Table 3. TPS92611EVM Parameters

Parameter	Value
Input voltage	9 V–16 V typical
Output current	100 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 200 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.

4 Board Layout

Figure 2 illustrates the EVM board layout.

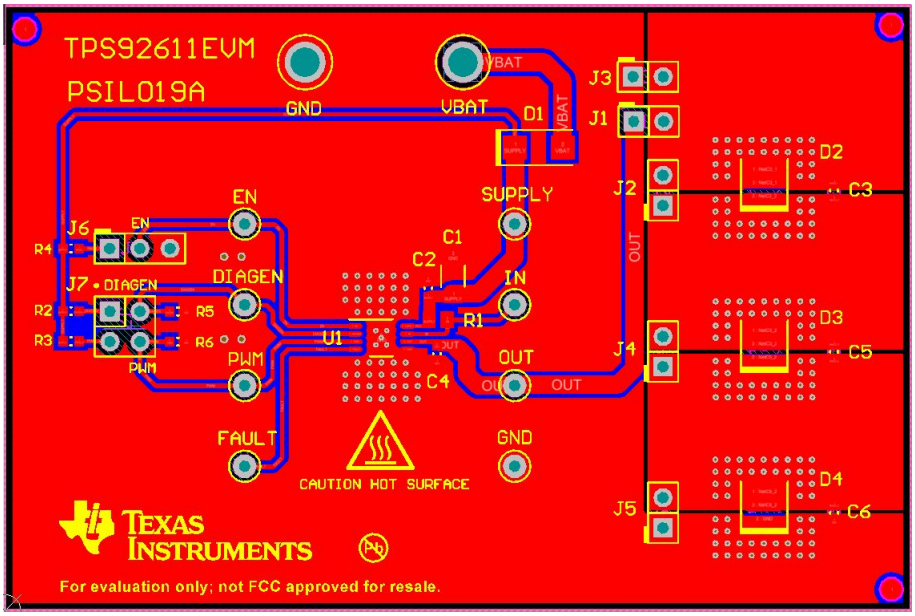


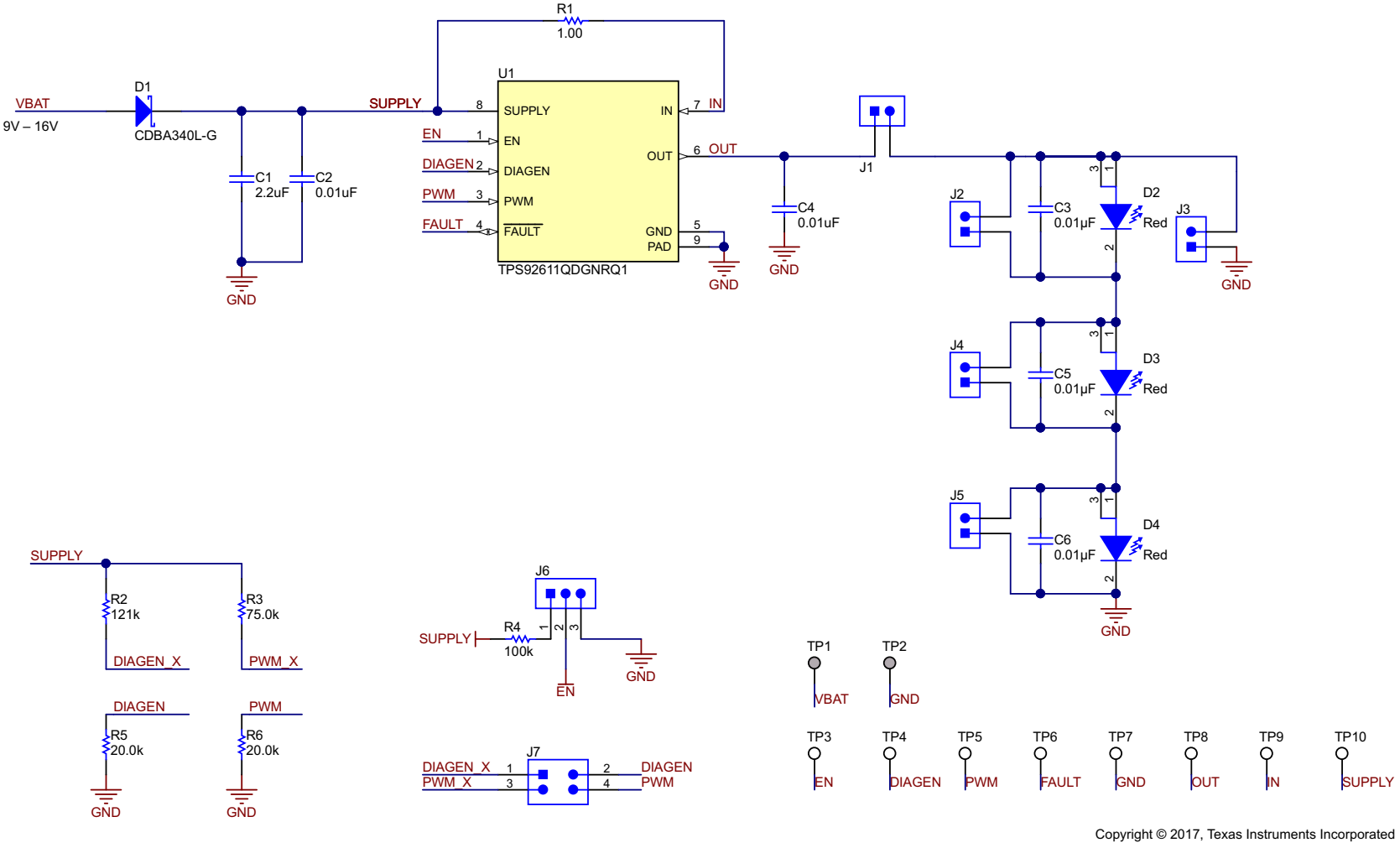
Figure 2. TPS92611EVM Layout

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5 Schematic and Bill of Materials

5.1 Schematic

Figure 3 shows the EVM schematic.



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Figure 3. TPS92611EVM Schematic

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5.2 Bill of Materials

Table 4 lists the TPS92611EVM BOM.

Table 4. TPS92611EVM 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, C4	2	0.01 µF	C0603X103K5RACTU	Kemet	CAP, CERM, 0.01 µF, 50 V, +/- 10%, X7R, 0603	0603
3	C3, C5, C6	3	0.01 µF	0603ZC103KAT2A	AVX	CAP, CERM, 0.01 µF, 10 V, +/- 10%, X7R, 0603	0603
4	D1	1	40 V	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	5		TSW-102-07-G-S	Samtec	Header, 100mil, 2x1, Gold, TH	2x1 Header
7	J6	1		TSW-103-07-G-S	Samtec	Header, 100mil, 3x1, Gold, TH	3x1 Header
8	J7	1		TSW-102-07-G-D	Samtec	Header, 100mil, 2x2, Gold, TH	2x2 Header
9	R1	1	1.00 Ω	RC0805FR-071RL	Yageo America	RES, 1.00 Ω, 1%, 0.125 W, 0805	0805
10	R2	1	121 kΩ	RC0603FR-07121KL	Yageo America	RES, 121 kΩ, 1%, 0.1 W, 0603	0603
11	R3	1	75.0 kΩ	RC0603FR-0775KL	Yageo America	RES, 75.0 kΩ, 1%, 0.1 W, 0603	0603
12	R4	1	100 kΩ	ERJ-3GEYJ104V	Panasonic	RES, 100 kΩ, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603
13	R5, R6	2	20.0 kΩ	RC0603FR-0720KL	Yageo America	RES, 20.0 kΩ, 1%, 0.1 W, 0603	0603
14	SH-J1, SH-J2, SH-J3, SH-J4	4	1x2	SPC02SYAN	Sullins Connector Solutions	Shunt, 100mil, Flash Gold, Black	Closed Top 100mil Shunt
15	TP1, TP2	2		1502-2	Keystone	Terminal, Turret, TH, Double	Keystone1502-2
16	TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10	8		5002	Keystone	Test Point, Miniature, White, TH	White Miniature Testpoint
17	U1	1		TPS92611QDGNRQ1	Texas Instruments	Automotive Single Channel LED Driver, DGN0008D (VSSOP-8)	DGN0008D

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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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Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

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