User's Guide

TPS92620Q1EVM User's Guide

ABSTRACT

The TPS92620-Q1 Evaluation Module (EVM) user's guide describes the characteristics of the device and the operation of the EVM. This document also includes complete schematic diagram, printed-circuit board layout, and bill of materials (BOM).

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Trademarks

1 Introduction

The TPS92620Q1EVM helps designers evaluate the operation and performance of the TPS92620-Q1, a linear 2-channel LED driver with LED diagnostic for automotive lighting applications. For linear LED drivers used in automotive lighting end equipment, thermal is a big design challenge. TPS92620-Q1 can help designers to easily deal with the challenge and TPS92620Q1EVM can help validate those features.

1.1 Features

The EVM has the following features:

- LED short and open detection and auto-recover
- Open fault mask during dropout mode
- Thermal sharing with external resistor when supply voltage is high

1.2 Typical Application

The EVM is used in the following applications:

- Automotive exterior rear light: rear lamp, center high mounted stop lamp (CHMSL), side marker
- Automotive exterior small light: door handle, blind spot detection indicator, charging inlet
- Automotive interior light: overhead console, reading lamp
- General-purpose LED driver applications

2 TPS92620Q1EVM Description

This description section describes the connectors and jumpers of TPS92620Q1EVM.

TPS92620Q1EVM Board

Figure 2-1 displays the TPS92620Q1EVM board.

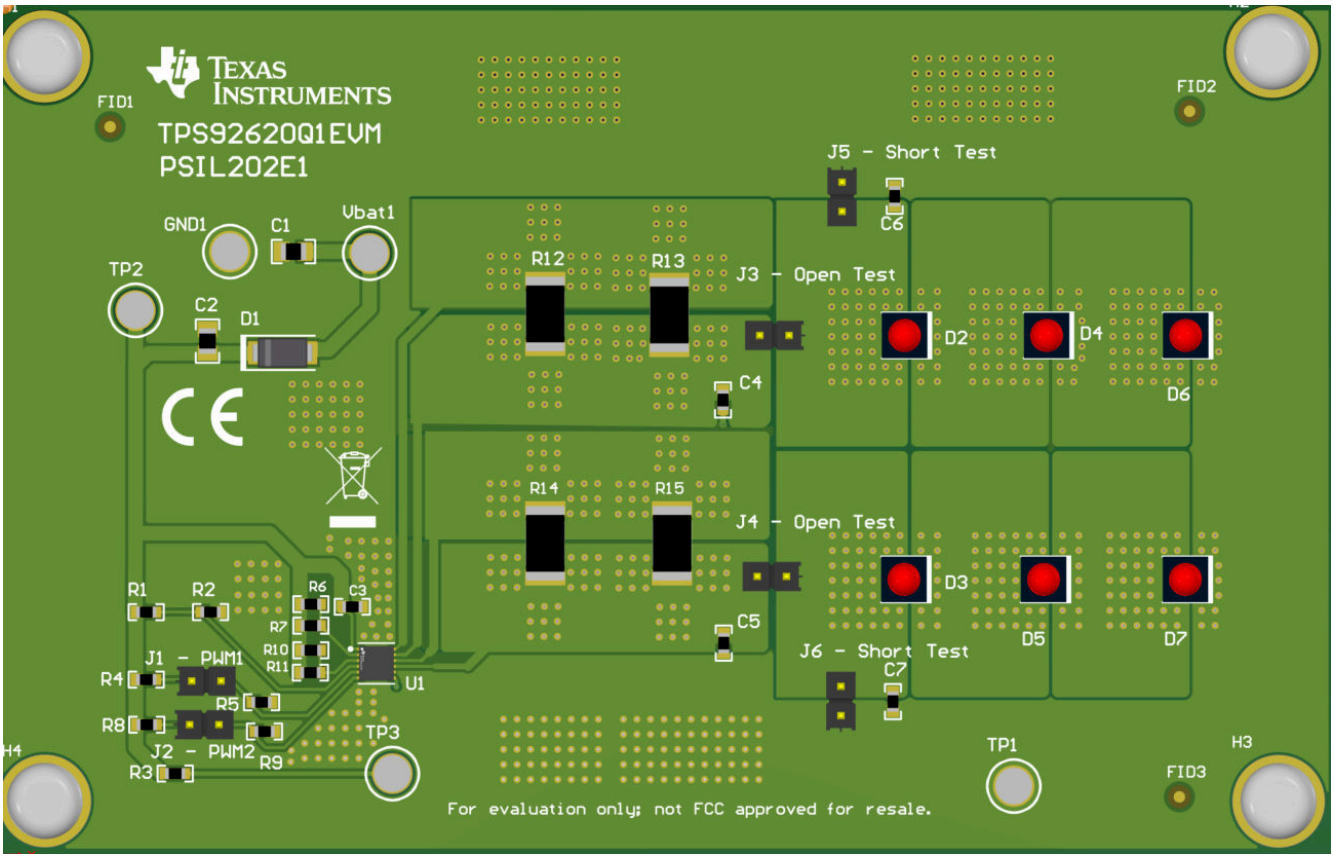

Figure 2-1. TPS92620Q1EVM board

2.1 Connector Map

The EVM has the following connectors. Table 2-1 shows their functions.

Table 2-1. Connector Map

Connector	Description
Vbat1	This connector is the positive input supply voltage.
GND1	This connector is TPS92620-Q1 EVM ground.
TP1	This connector is LED part ground.
TP2	Vbat. This connector can show the positive input supply voltage.
TP3	Fault. This connector is the FAULT status output of the LED driver.

2.2 Jumper Map

The EVM provides some jumpers for designers to conveniently validate the device. Table 2-2 shows the jumper map.

Table 2-2. Jumper Map

Function	Designator	Attached Function	With Shunt	Without Shunt
PWM dimming input	J1	PWM1	Enable PWM1 (PWM1 connected to SUPPLY through a resistor)	Disable PWM1 or use external control signal
	J2	PWM2	Enable PWM2 (PWM2 connected to SUPPLY through a resistor)	Disable PWM2 or use external control signal
Open detect	J3	LED1 open	LED1 string connect to Out1	LED1 string open
	J4	LED2 open	LED2 string connect to Out2	LED2 string open
Short detect	J5	LED1 string short	Short 3 LEDs in LED1 string	3 LED series in LED1 string
	J6	LED2 string short	Short 3 LEDs in LED2 string	3 LED series in LED2 string

3 Test Setup

Table 3-1 shows the typical parameters for the TPS92620Q1EVM. The typical input voltage range is from 9 V to 20 V. The full-scale output current of the TPS92620Q1EVM is 248 mA per channel. Users can adjust the output current by changing the sensing resistor.

Table 3-1. TPS92620Q1EVM Parameters

Parameter	Value
Input voltage (V)	typical: 9-20
Output current per channel (mA)	248
LED per channel	3s1p LED string
Rsns (Ω)	0.605
Rres (Ω)	43.3

4 Schematic, Bill of Materials, and Layout

4.1 Schematic

Figure 4-1 shows the TPS92620Q1EVM schematic.

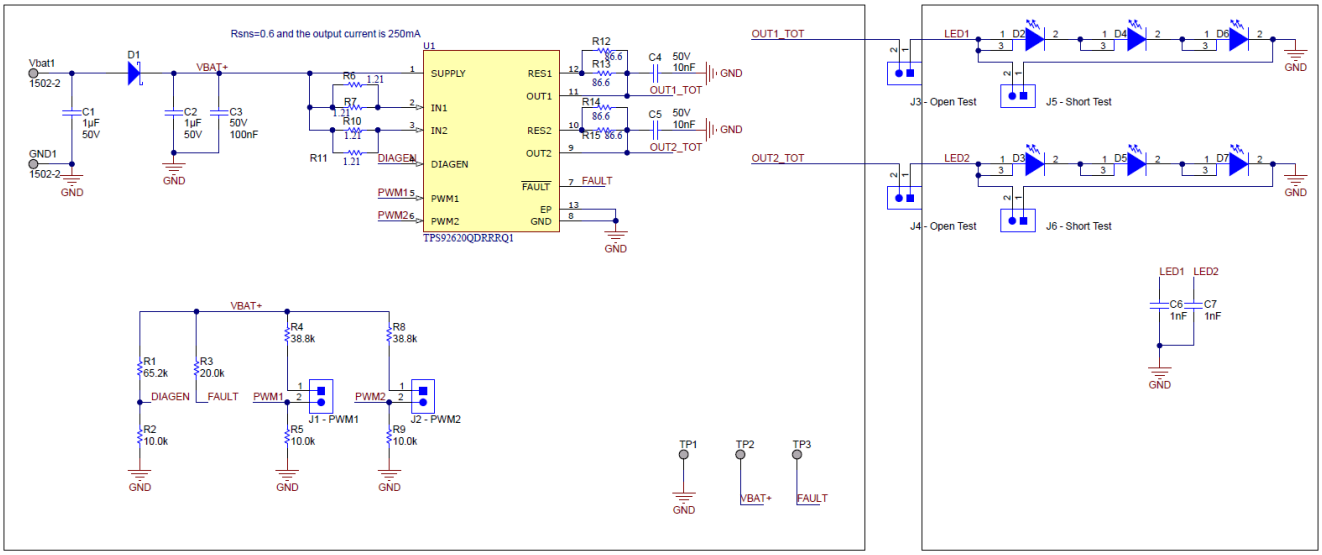

Figure 4-1. Schematic

4.2 Bill of Materials (BOM)

Table 4-1 lists the TPS92620Q1EVM BOM.

Table 4-1. Bill of Materials

Item Number	Designator	Value	Quantity	Part Number	Manufacturer	Description
1	C1, C2	1 µF	2	08055C105K4Z2A	AVX	CAP, CERM, 1 µF, 50 V,+/- 10%, X7R, AEC-Q200 Grade 1, 0805
2	C3	0.1 µF	1	06035C104K4Z4A	AVX	CAP, CERM, 0.1 µF, 50 V,+/- 10%, X7R, AEC-Q200 Grade 0, 0603
3	C4, C5	0.01 uF	2	C1608X7R1H103K080AA	TDK	CAP, CERM, 0.01 uF, 50 V, +/- 10%, X7R, 0603
4	C6, C7	1000 pF	2	C0603C102J5RACAUTO	Kemet	CAP, CERM, 1000 pF, 50 V, +/- 5%, X7R, AEC-Q200 Grade 1, 0603
5	R1	56.2k	1	CRCW120657R6FKEA	Vishay-Dale	RES, 56.2 k, 1%, 0.1 W, 0603
6	R2, R4, R5, R8, R9	10.0k	5	CRCW060320K0FKEA	Vishay-Dale	RES, 10.0 k, 1%, 0.1 W, 0603
7	R3	20.0k	1	CRCW060320K0FKEA	Vishay-Dale	RES, 20.0 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603
8	R6 R7, R10, R11	1.21 ohm	4	CRCW06031R15FKEA	Vishay-Dale	RES, 1.21, 1%, 0.1 W, AEC-Q200 Grade 0, 0603
9	D1		1	SK36A-LTPMSCT-ND	Micro Commercial Co	DIODE, SCHOTTKY, 60V, 3A, DO214AC
10	D2, D3, D4, D5, D6, D7	Red	6	LR H9GP-HZKX-1-1-Z	OSRAM	LED, Red, SMD
11	J1 - PWM1, J2 - PWM2, J3 - Open Test, J4 - Open Test, J5 - Short Test, J6 - Short Test		6	TSW-102-23-T-S	Samtec	Header, 2.54mm, 2x1, Tin, TH
12	U1		1	PTPS92620QPWPRQ1	Texas Instruments	PTPS92620QDRRRQ1

4.3 Layout

Figure 4-2 illustrates the EVM board layout.

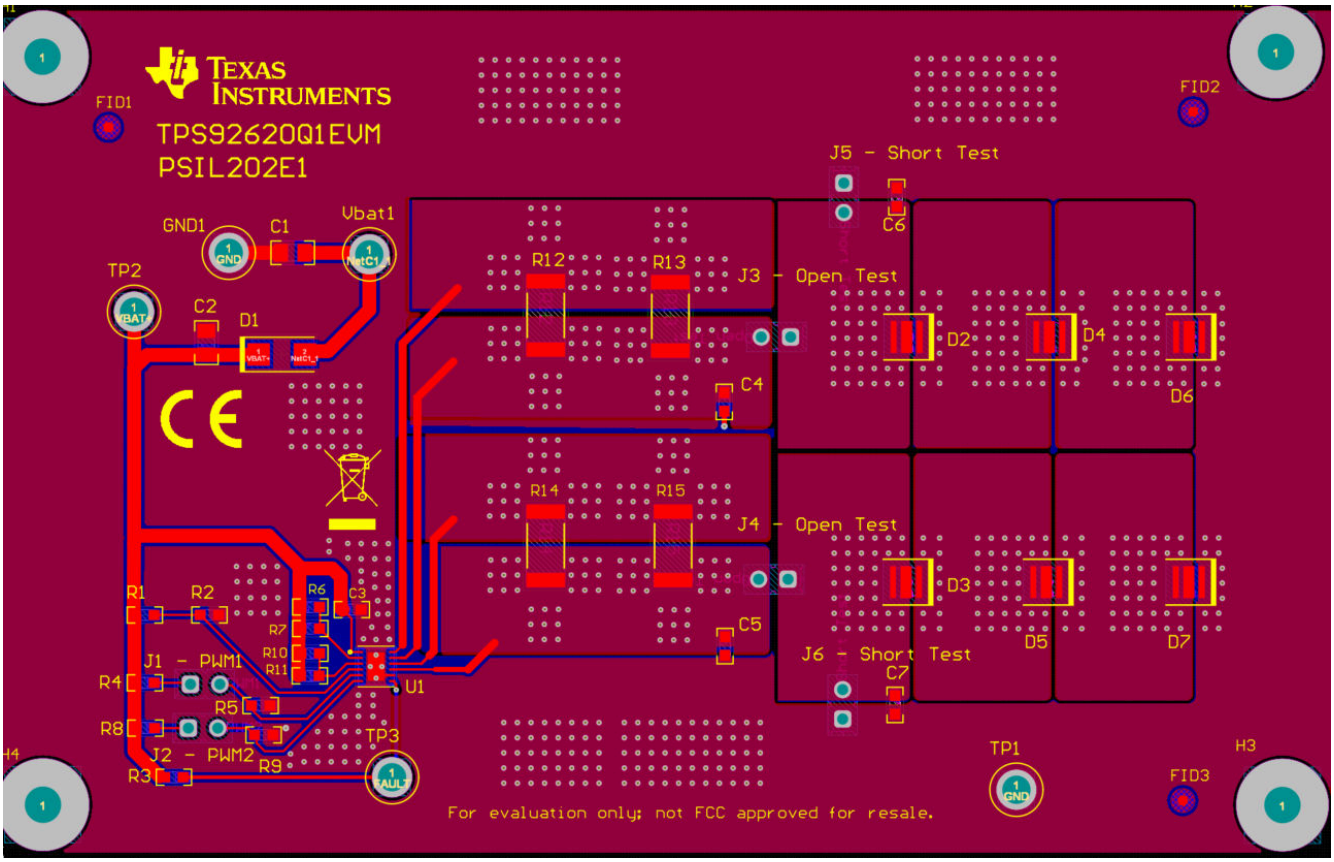

Figure 4-2. Layout

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CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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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.*

3.2 *Canada*

3.2.1 *For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247*

Concerning EVMs Including Radio Transmitters:

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(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

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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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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