LM3699EVM User Guide

User's Guide

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1 Introduction

The Texas Instruments LM3699EVM evaluation module (EVM) helps designers evaluate the operation and performance of the LM3699YFQ High-Efficiency PWM-only Three-String White LED Driver. The LM3699EVM can be easily configured to support 3 parallel LED strings with 2, 3, 4, 5, or 6 series LEDs.

Table 1. Device and Package Configurations

Component	IC	Package
U1	LM3699	DSBGA (YFQ)

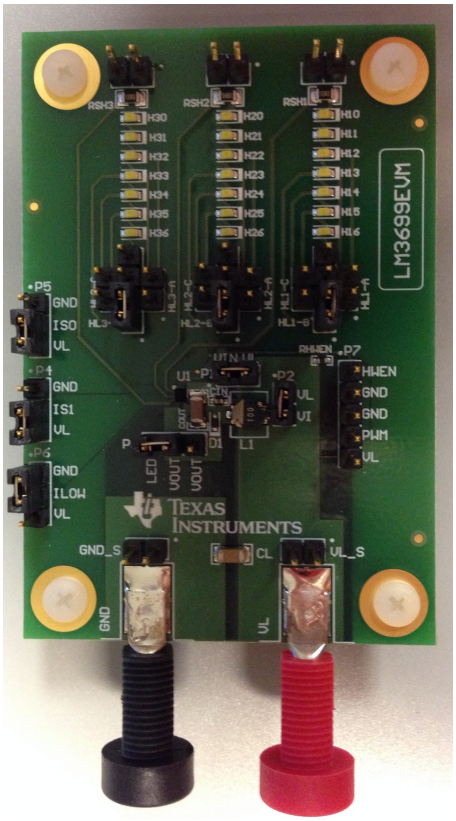


Figure 1. LM3699EVM Picture

2 Set-Up

This section describes the jumpers and connectors on the LM3699EVM as well as how to properly connect, set up, and use the LM3699YFQ.

Input/Output Connector Description

VL - INPUT is the power input terminal for the boost converter and the LM3699 VIN supply. This terminal provides a power (VBAT) connection to allow the user to attach the EVM to a power supply via a cable assembly with banana plugs.

GND - INPUT is the power input terminal for the boost converter and the LM3699 GND. This terminal provides a common ground (GND) connection to allow the user to attach the EVM to a power supply via a cable assembly with banana plugs.

P1 - Connector is the connection between the power input terminal VL and the LM3699 VIN supply. This connector allows the user to insert a current meter between terminals 1 and 2 to measure the LM3699 VIN current. A jumper must be installed when a current meter is not connected between terminals 1 and 2.

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P2 - Connector is the connection between the power input terminal VL and the boost inductor. This connector allows the user to insert a current probe between terminals 1 and 2 to measure the inductor current. A jumper must be installed when a current probe is not connected between terminals 1 and 2.

P3 - Connector is the connection between the LM3699 boost convertor output and all three parallel LED strings. A jumper must be installed between terminals 1 and 2 for normal operation.

P4 - Connector provides access to the LM3699 S1 input terminal. This terminal, along with S0, is used to select one of four full-scale current settings. This input can not be left floating and a jumper must be installed between either terminals 1 and 2 (GND) or 2 and 3 (VL).

P5 - Connector provides access to the LM3699 S0 input terminal. This terminal, along with S1, is used to select one of four full-scale current settings. This input can not be left floating, and a jumper must be installed between either terminals 1 and 2 (GND) or 2 and 3 (VL).

P6 - Connector provides access to the LM3699 ILOW input terminal. This terminal can be used to quickly reduce the LM3699 LED Brightness during camera flash operation. This input can not be left floating and a jumper must be installed between either terminals 1 & 2 (GND) to disable this feature or 2 and 3 (VL) to enable this feature.

P7 - Test Point Connector provides access to the LM3699 HWEN and PWM inputs. An extra jumper is provided between terminals 2 (GND) and 3 (GND). A jumper can be installed between terminals 3 and 4 or terminals 4 and 5 to connect the PWM input to GND or VL respectively. The PWM jumper must be removed if an external signal generator is used to control the PWM duty cycle.

HL1A, HL1B and HL1C - Connector provides a star connection to the HVLED1 string allowing the user to configure the HVLED1 string for 2, 3, 4, 5, or 6 series LEDs.

HL2A, HL2B and HL2C - Connector provides a star connection to the HVLED2 string allowing the user to configure the HVLED2 string for 2, 3, 4, 5, or 6 series LEDs.

HL3A, HL3B and HL3C - Connector provides a star connection to the HVLED3 string allowing the user to configure the HVLED3 string for 2, 3, 4, 5, or 6 series LEDs.

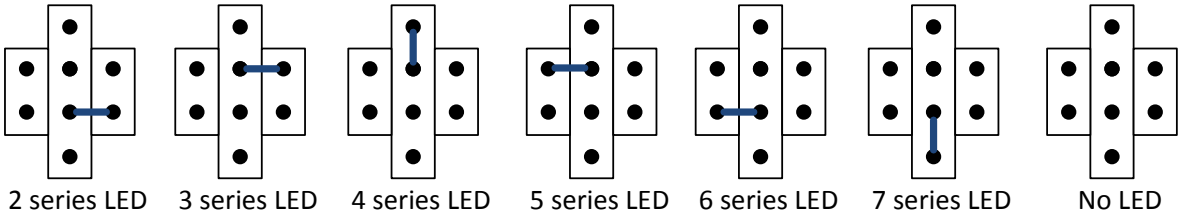


Figure 2. HL1A-C, HL2A-C and HL3A-C Star Jumper Configuration Settings (Blue Line Indicates Jumper Position)

Note: The 7 series LED configuration should not be used due to the LM3699 24-V OVP setting and the LED maximum forward voltage of 3.5 V.

LM3699EVM Configuration

Figure 3 illustrates how to properly configure the LM3699EVM for three parallel four series (3p4s) LED string configuration.

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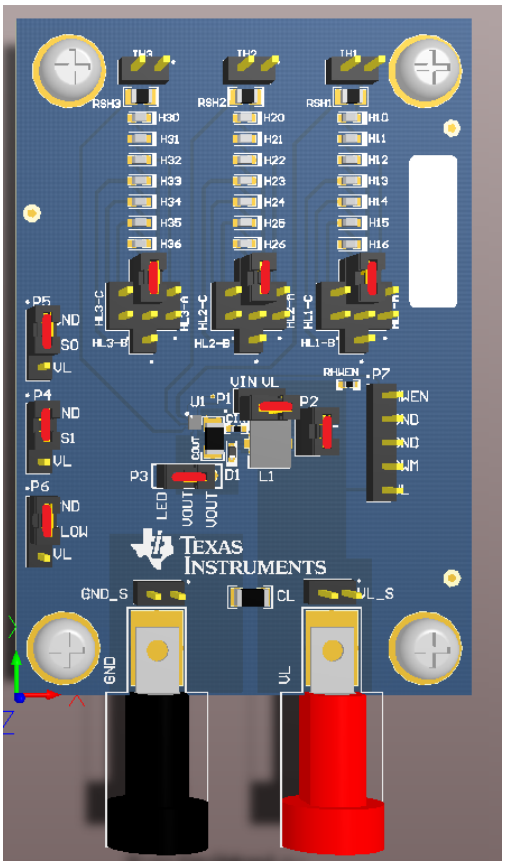


Figure 3. LM3699EVM Configuration (Top Side)

2.1 Required Equipment

The following test equipment is required to evaluate the LM3699:

- 5.5-V, 1.0-A Power Supply
- Pulse Generator

After supplying power to the LM3699EVM VL and GND inputs from the external power supply the user can quickly verify the LM3699EVM operation by moving the jumper on P7 between terminals 3 and 4 to P7 terminals 4 and 5. This will set the PWM input to 100% duty cycle and turn on all three led strings. Connecting an external pulse generator to P7 terminals 3 and 4 allows the user to verify operation while varying the PWM duty cycle and frequency. Refer to the LM3699 datasheet to set the correct pulse generator signal levels (Vih/Vil/ABSMAX).

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3 LM3699EVM Component Placement

Figure 4 shows the component placement on the top and bottom PCB layers of the LM3699EVM.

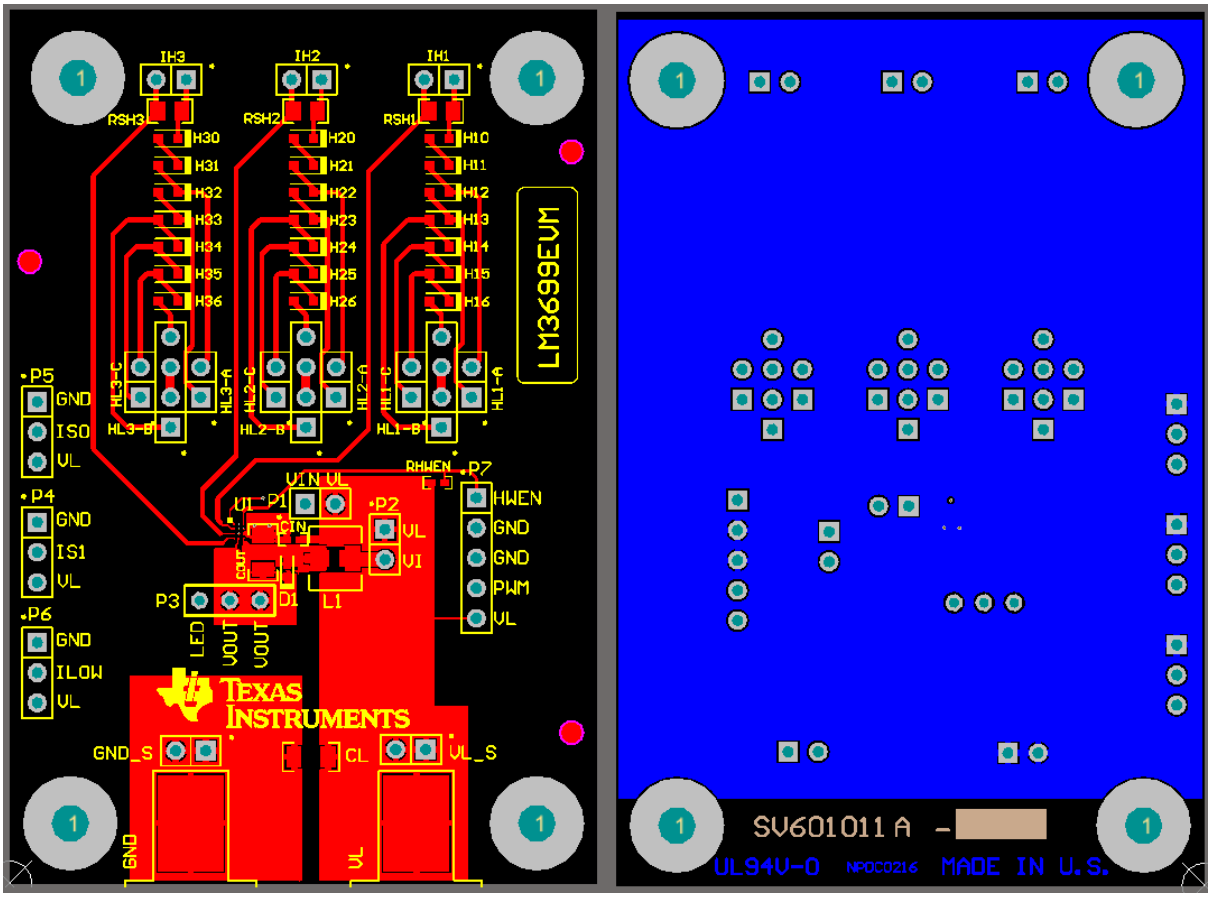


Figure 4. LM3699EVM Top and Bottom Layers

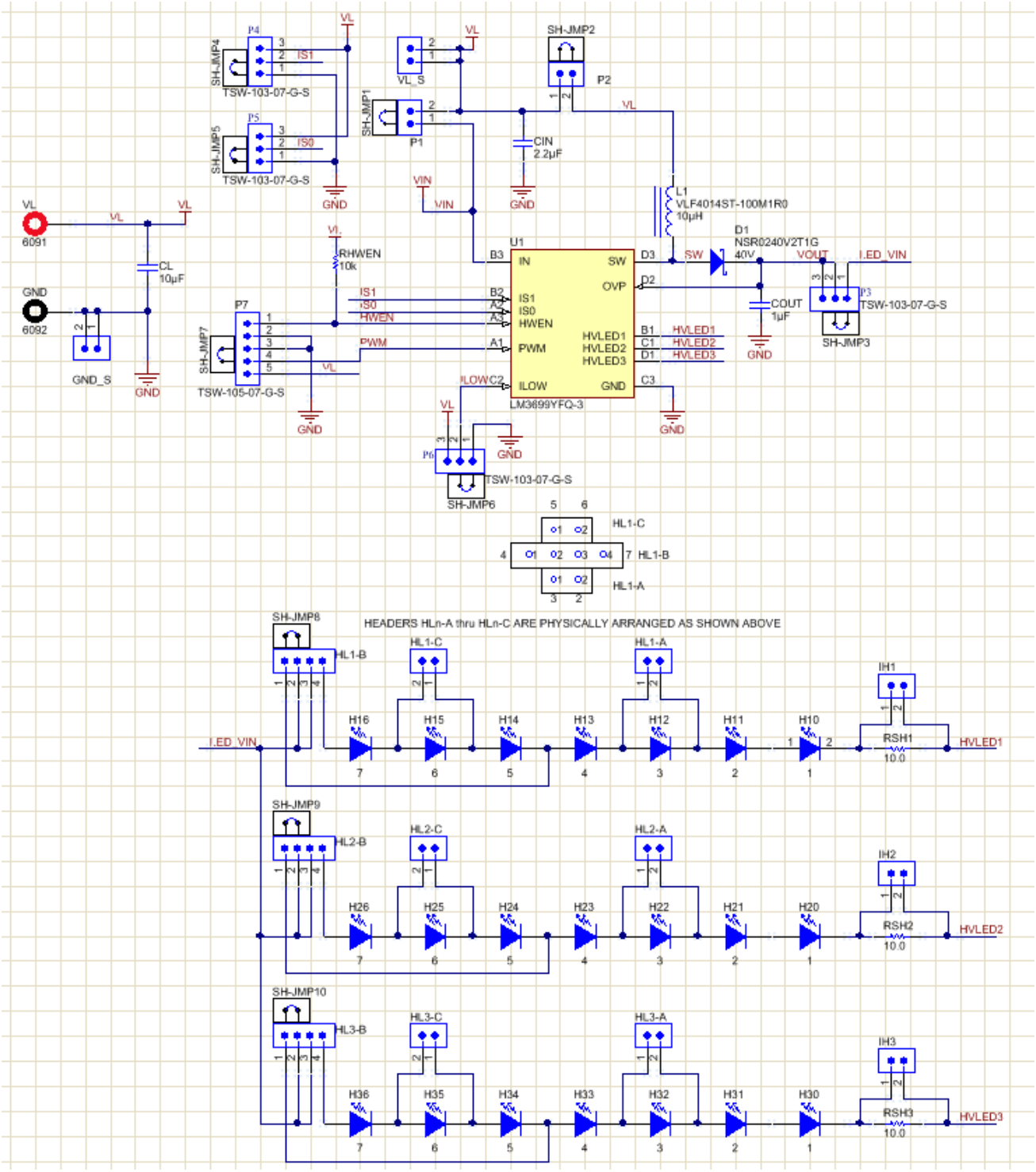
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LM3699EVM Component List

Designator	Description	Manufacturer	PartNumber	Qty
!PCB	Printed Circuit Board	Any	SV601011A	1
CL	CAP, CERM, 10uF, 25V, +/-10%, X5R, 1206	MuRata	GRM31CR61E106KA12L	3
CIN	CAP, CERM, 2.2uF, 10V, +/-10%, X5R, 0402	TDK	C1005X5R1A225K050BC	1
COUT	CAP, CERM, 1uF, 50V, +/-10%, X7R, 1206	TDK	C3216X7R1H105K	1
P7	Header, TH, 100mil, 5x1, Gold plated, 230 mil above insulator	Samtec, Inc.	TSW-105-07-G-S	1
D1	Diode, Schottky, 40V, 0.25A, SOD-523	ON Semiconductor	NSR0240V2T1G	1
GND	Standard Banana Jack, Insulated, Black	Keystone	6092	1
GND_S, HL1-A, HL1-C, HL2-A, HL2-C, HL3-A, HL3-C, IH1, IH2, IH3, P1, P2, P3, VL_S	Header, TH, 100mil, 2x1, Gold plated, 230 mil above insulator	Samtec, Inc.	TSW-102-07-G-S	14
H1, H2, H3, H4	Machine Screw, Round, #4-40 x 1/4, Nylon, Philips panhead	B and F Fastener Supply	NY PMS 440 0025 PH	4
H5, H6, H7, H8	Standoff, Hex, 0.5"L #4-40 Nylon	Keystone	1902C	4
H10, H11, H12, H13, H14, H15, H16, H20, H21, H22, H23, H24, H25, H26, H30, H31, H32, H33, H34, H35, H36	LED, White, SMD	Rohm	SML312WBCW1	21
HL1-B, HL2-B, HL3-B	Header, TH, 100mil, 4x1, Gold plated, 230 mil above insulator	Samtec, Inc.	TSW-104-07-G-S	3
P3, P4, P5, P6	Header, TH, 100mil, 3x1, Gold plated, 230 mil above insulator	Samtec, Inc.	TSW-103-07-G-S	3
L1	INDUCTOR POWER 10UH 1.0A SMD	TDK	VLF4014ST-100M1R0	1
LBL1	Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	Brady	THT-14-423-10	1
RHWEN	RES, 10k ohm, 5%, 0.063W, 0402	Vishay-Dale	CRCW040210K0JNED	5
RSH1, RSH2, RSH3	RES 10 OHM 1/8W .1% 0805 SMD	Bourns	CRT0805-BY-10R0ELF	3
SH-JMP1, SH-JMP2, SH-JMP3, SH-JMP4, SH-JMP5, SH-JMP6, SH-JMP7, SH-JMP8, SH-JMP9	Shunt, 100mil, Gold plated, Black	3M	969102-0000-DA	9
U1	LM3699 High-Efficiency Three-String White LED Driver, YFQ0012AEAC	Texas Instruments	LM3699YFQ	1
VL	Standard Banana Jack, Insulated, Red	Keystone	6091	1

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4 LM3699EVM Schematic



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