XRP7613

1.2A 36V Step-Down High brightness LED Driver

November 2012 Rev. 1.0.0

EVALUATION BOARD MANUAL

GENERAL DESCRIPTION

The Exar XRP7613 Evaluation board (EVB) is a fully assembled and tested surface-mount PCB that demonstrates the XRP7613 LED driver. The XRP7613 is a non-synchronous step-down converter with integrated FET optimized to drive high-power LEDs at up to 1.2A of continuous current. A wide 7.0V to 36V input voltage range allows for single supply operations from industry standard 12V, 18V or 24V power rails.

Based on a hysteretic PFM control scheme, the XRP7613 can operate at switching frequency of up to 1MHz and allows for small external components selection while providing very fast transient response and achieving excellent efficiency. The output current is programmable from 150mA to 1.2A through an external sense resistor.

The XRP7613 is offered in RoHS compliant, "green"/halogen free 8-pin Exposed Pad SOIC package.

STANDARD CONFIGURATION

The XRP2524EVB is configured to operate under the following conditions:

- Input voltage range V_{IN}: 7V – 36V
- LED current: 769mA

FEATURES

- **1.2A Continuous Output LED Current**
  - 150mA to 1.2A Programmable Range
- **7V to 36V Single Rail Input Voltage**
- **PWM & Analog Dimming Capability**
  - Up to 40kHz Frequency
- **LED Current Thermal Fold back Control**
  - Selectable Linear Dimming of LED Current with temperature
- **Shutdown Control**
- **Built-in Soft Start**
- **Open LED, LED Short Circuit and Over Temperature Protections**

EVALUATION BOARD SCHEMATICS

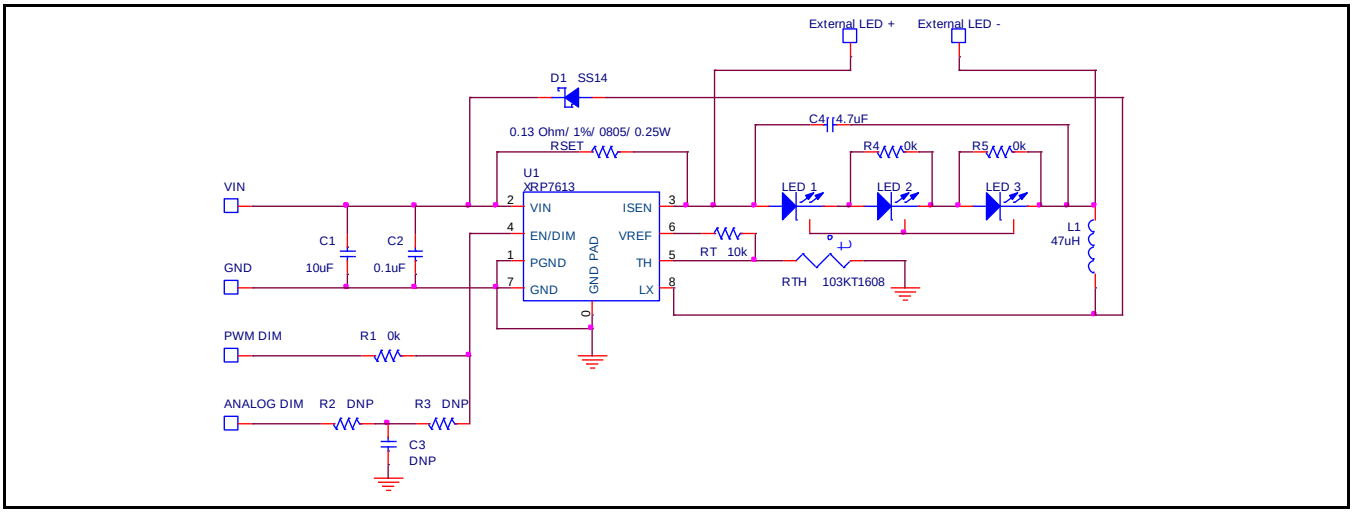


Fig. 1: XRP7613 Evaluation Board Schematics

PIN ASSIGNMENT

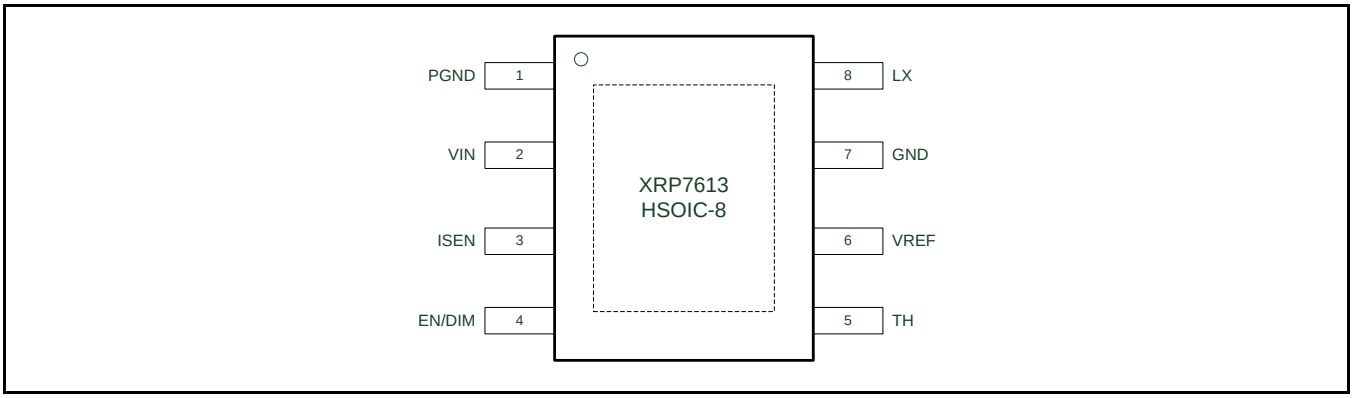


Fig. 2: XRP7613 Pin Assignment

PIN DESCRIPTION

Name	Pin	Description
PGND	1	Power ground pin.
VIN	2	Power supply input pin. Place an input decoupling capacitor as close as possible to this pin.
ISEN	3	LED current setting pin. Connect resistor RSET from this pin to VIN (pin 2) to define nominal average LED current.
EN/DIM	4	Dimming and Enable pin. For automatic startup, leave pin floating.
TH	5	LED temperature protection sense input. Connect temperature thermal sense resistors to turn off output current above a preset temperature threshold.
VREF	6	Reference Voltage for thermal protection.
GND	7	Ground pin.
LX	8	Connect to the output inductor.
GND	Exposed Pad	Power ground pin.

ORDERING INFORMATION

Refer to XRP7613's datasheet and/or www.exar.com for exact and up to date ordering information.

USING THE EVALUATION BOARD

POWERING UP THE BOARD

Connect a power supply to the VIN and GND pins of the PCB. Upon powering up the XRP7613 will regulate the LED current at 769mA nominal. Nominal operating frequency is 200kHz at 12VIN. The input voltage can be varied from 7V to 36V.

DRIVING EXTERNAL LEDS

To drive an external LED or string of LEDs, remove resistor R4 or R5 from the PCB. Then connect the external LEDs to the posts marked "External LED+" and "External LED-" on the PCB.

PROGRAMMING THE LED CURRENT

The PCB is supplied with a 0.13Ω programming resistor "RSET". This sets the current to I_{LED}=0.1V/0.13Ω=0.769A. To program a different current use the above equation to select the appropriate resistor.

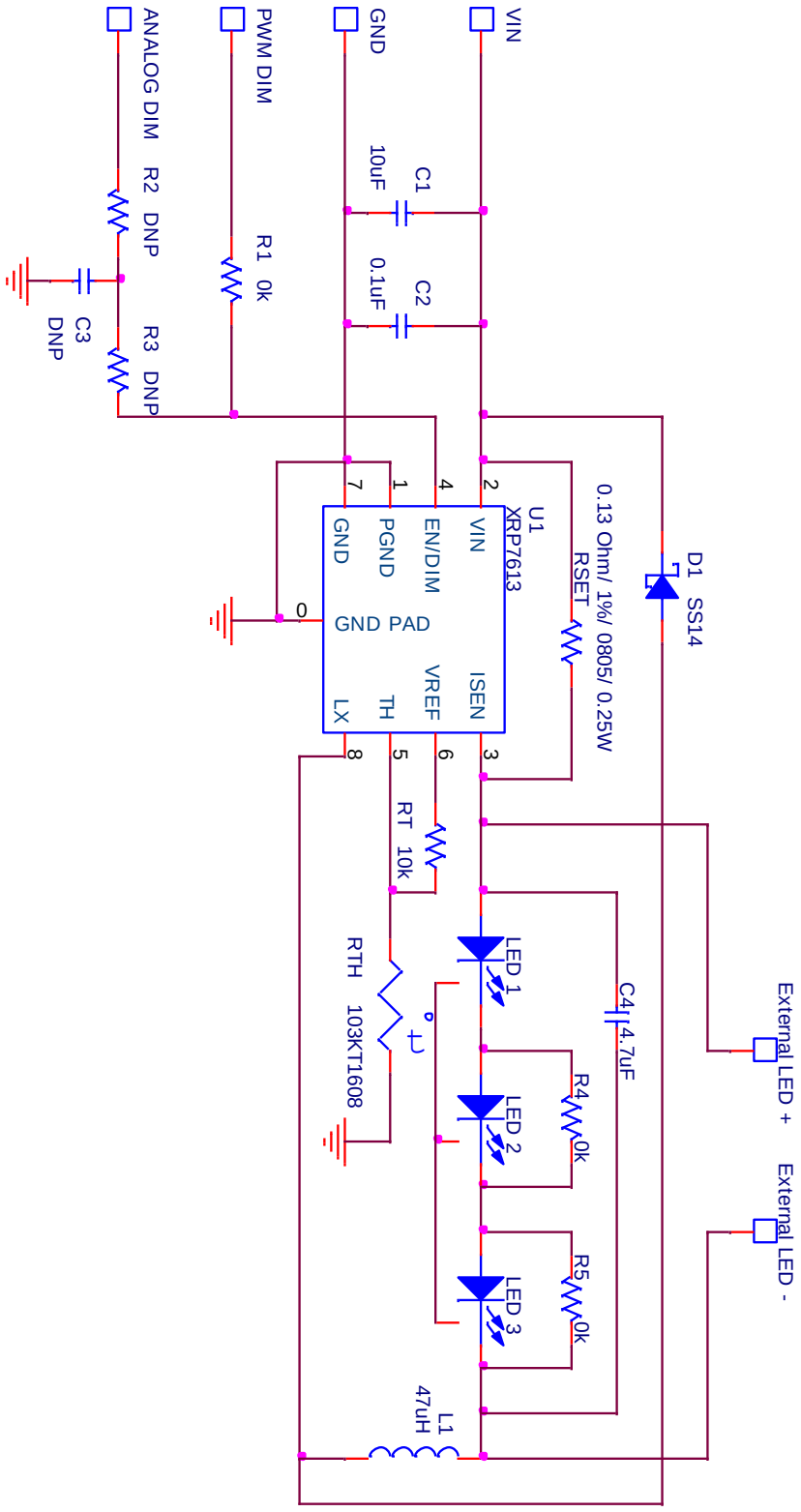
PWM DIMMING

The LED light, which is proportional to average LED current, can be dimmed using a logic-level signal applied to the "PWM DIM" pin. Maximum dimming frequency is 40kHz.

ANALOG DIMMING

A DC voltage in the range of 0.4V to 1.25 volt can be applied to EN/DIM pin in order to achieve analog dimming. Populate R2/R3 as necessary and apply the dimming signal to the "ANALOG DIM" pin. A 0.1uF bypass capacitor is recommended (populate C3).

EVALUATION BOARD SCHEMATICS



BILL OF MATERIAL

Ref.	Qty	Manufacturer	Part Number	Size	Component
PCB	1	Exar	XRP7613EVB	1.5"x2.2"	XRP7613 Evaluation kit
U1	1	Exar	XRP7613	PSO-8	LED Driver
D1	1	FAIRCHILD	SS14	SMA	Schottky Rectifier
LED1	1	Philips/Lumileds	LXA7-PW57	4.5x3.05mm	Luxeon R SMT High Current LED
LED2-LED3	0	DNP	DNP	DNP	DNP
L1	1	COOPER-Bussmann	DR74-470-R	7.6x7.6mm	47uH shielded inductor
C1	1	Murata Corp.	GRM32ER61H106KA12L	1210	CER CAP 10uF, 50V, X5R
C2	1	Murata Corp.	GRM188R71H104KA93D	0603	CER CAP 0.1uF, 50V, X7R
C3	0	DNP	DNP	DNP	DNP
C4	1	Murata Corp.	GRM32ER71H475KA88L	1210	CAP CER 4.7uF, 50V, X7R
R1,R4,R5	3	Panasonic	ERJ-3GEY0R00V	0603	Resistor 0.00 Ohm, 1/10W
R2,R3	0	DNP	DNP	DNP	DNP
RT	1	Panasonic	ERJ-3EKF1002V	0603	Resistor 10K Ohm, 1/10W,1%
RSET	1	Panasonic	ERJ-S6SFR13V	0805	Resistor 0.13 Ohm,0.25W,1%
RTH	1	Semitec	103KT1608T-1P	0603	Thermistor 10K Ohm, 1%
Test Point	2	Mill-Max	0300-1-15-01-47-27-1-0		Pin RCPT
VIN, GND, PWM DIM, ANALOG DIM	4	Vector Electronic	K24C/M	.042 Dia	Test Point Post

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EVALUATION BOARD LAYOUT

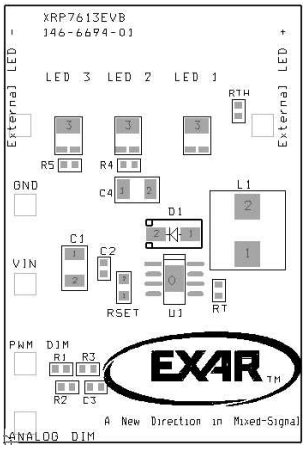

Fig. 3: Component Placement – Top Side

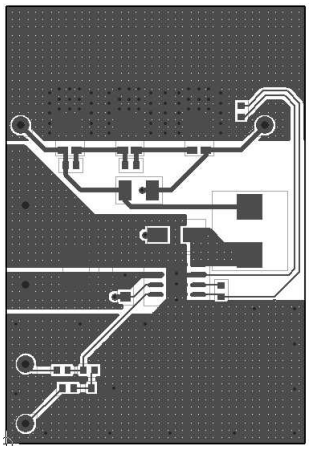

Fig. 4: Layout – Top Side

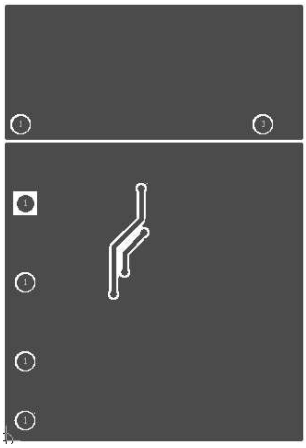

Fig. 5: Layout - Bottom

DOCUMENT REVISION HISTORY

Revision	Date	Description
1.0.0	11/09/2012	Initial release of document

BOARD REVISION HISTORY

Board Revision	Date	Description
146-6694-01	11/09/2012	Initial release of evaluation board

FOR FURTHER ASSISTANCE

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