ISL97683IRTZEVALZ

ISL97683 LED Driver Evaluation Board User Manual

AN1664
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Introduction

The ISL97683 Evaluation Board provides a complete testing platform for ISL97683, a three channel LED driver. Please refer to the product datasheet for detailed information, including pinout, pin function descriptions, electrical specifications and applications related information.

Instructions

Please follow the steps described below to start your evaluation.

1. Set Switch #1 and Switch #2 (SW1 and SW2) to position 3 (left side).
2. For the enable control jumper, JP1, set the shunt to the "ON" position (right side) to connect the EN pin to VIN. When the shunt is in the "OFF" position, it will disable the chip by pulling the EN pin to ground.
3. Connect JP14 so the VIN pin is connected to PVIN.
4. For JP20, connect the shunt to the upper position.
5. Connect WR and JP2-JP6.
6. Apply 1.5V~5.5V PWM signal between the PWMI pin and AGND.
7. Apply 4V~26.5V between PVIN and PGND and the LEDs should be lit. You may start the evaluation.

Note:

- In Step #1 above, the SW1, SW2 position can be adjusted to different positions for different configurations. Details are provided in the following:

TABLE 1.

SW1 POSITION	SW2 POSITION	DESCRIPTION
1	1	LX switching frequency = 600kHz, PFM CH1-CH3
3	3	LX switching frequency = 1MHz, PFM CH1-CH3
3	1	LX switching frequency = 600kHz, No PFM CH1-CH3
1	3	LX switching frequency = 1MHz, No PFM CH1-CH3

- The LED maximum DC current adjustment
  For each channel, the maximum DC current is set by resistance connected to the RSET pin. The current for each channel can be calculated as follows:

$$I\_LED(mA) = 402 / RSET\langle k\Omega \rangle \quad \text{(EQ. 1)}$$

  On the board, a potentiometer R5 and a few other resistors are provided for easily adjusting the LED maximum DC current; please refer to the evaluation board schematic on page 2 for more details.

- LED dimming frequency and duty cycle

1. As mentioned in Step #4, when the shunt on JP20 is connected to the upper position and the FPWM/DPWM pin is connected to VDC, the device enters direct PWM mode, which means both the LED dimming frequency and the duty cycle are synchronized with the external PWM signal applied on the PWMI pin.
2. When the shunt on JP20 is connected to the lower position, the FPWM/DPWM pin is connected to a resistor. Under such conditions, the LED dimming frequency of the chip is programmed by the resistance connected on the FPWM/DPWM pin per the following equation:

$$FPWM(Hz) = 12.4 \times 10^7 / R\_FPWM(\Omega) \quad \text{(EQ. 2)}$$

   The duty cycle is still modulated by the external PWM signal applied on the PWMI pin. On board, a potentiometer R11 and a few other resistors are provided for easily adjusting the LED dimming frequency under such configuration.

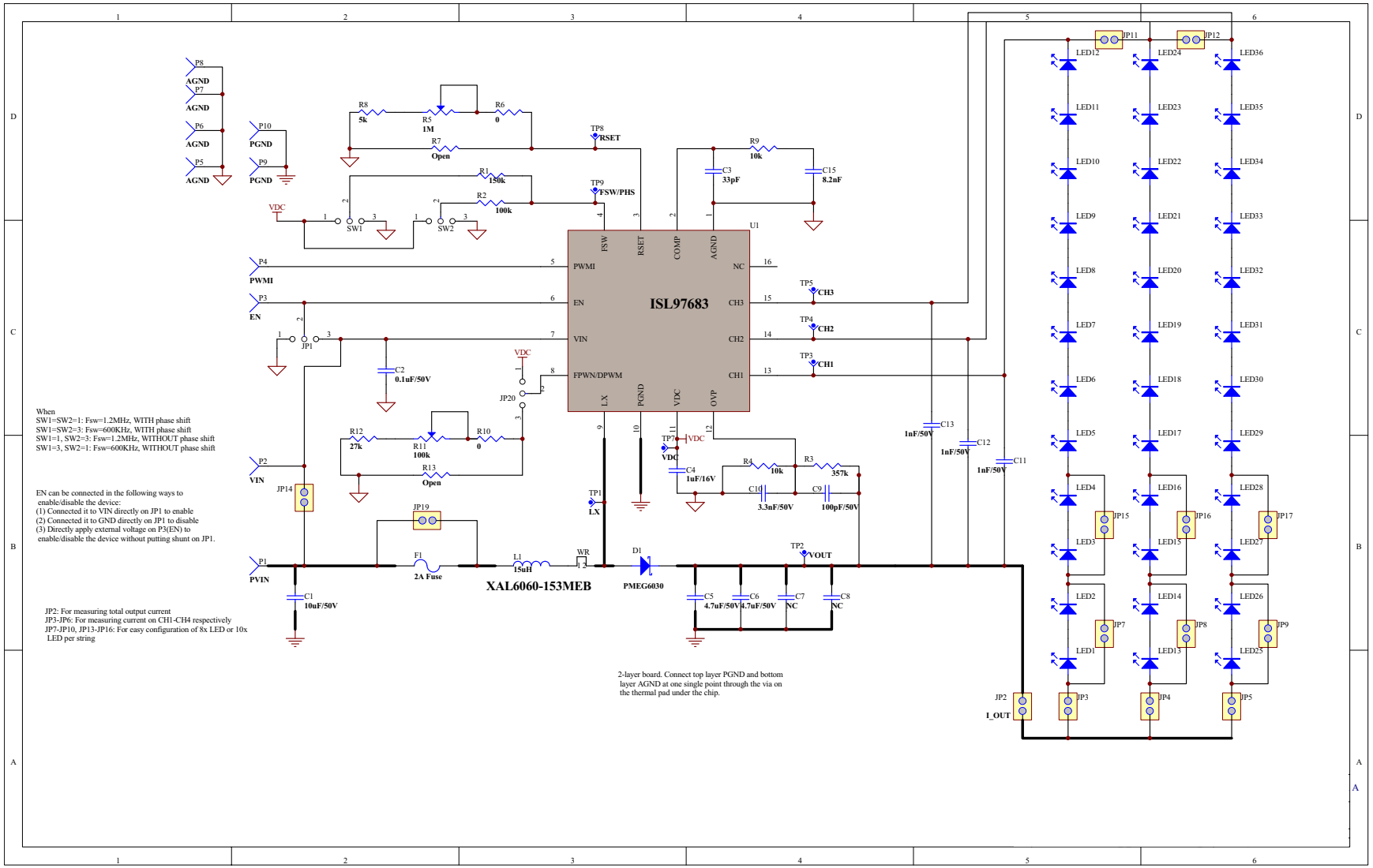

FIGURE 1. EVALUATION BOARD SCHEMATIC

PCB Layout

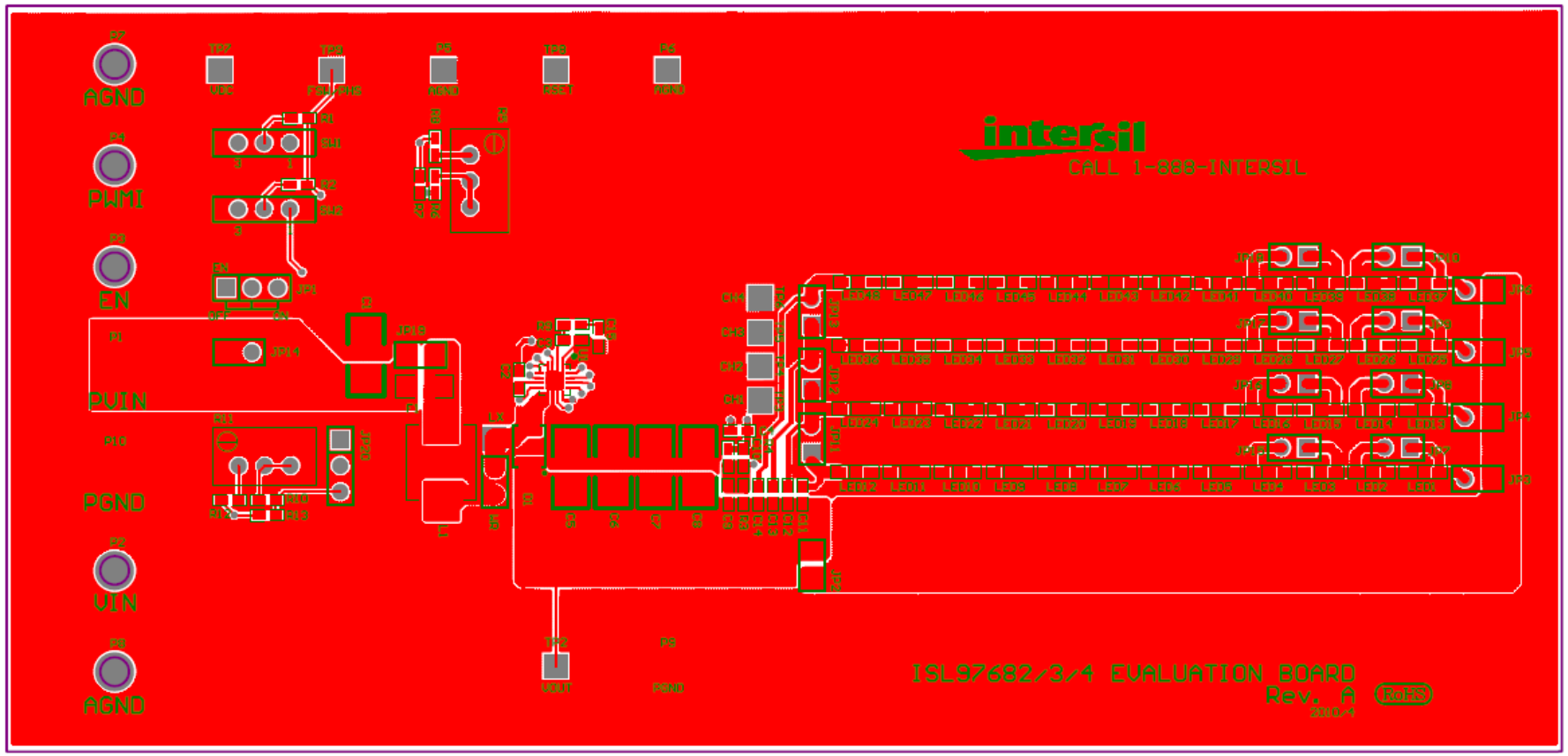

FIGURE 2. TOP SILKSCREEN LAYER AND TOP LAYER

PCB Layout (Continued)

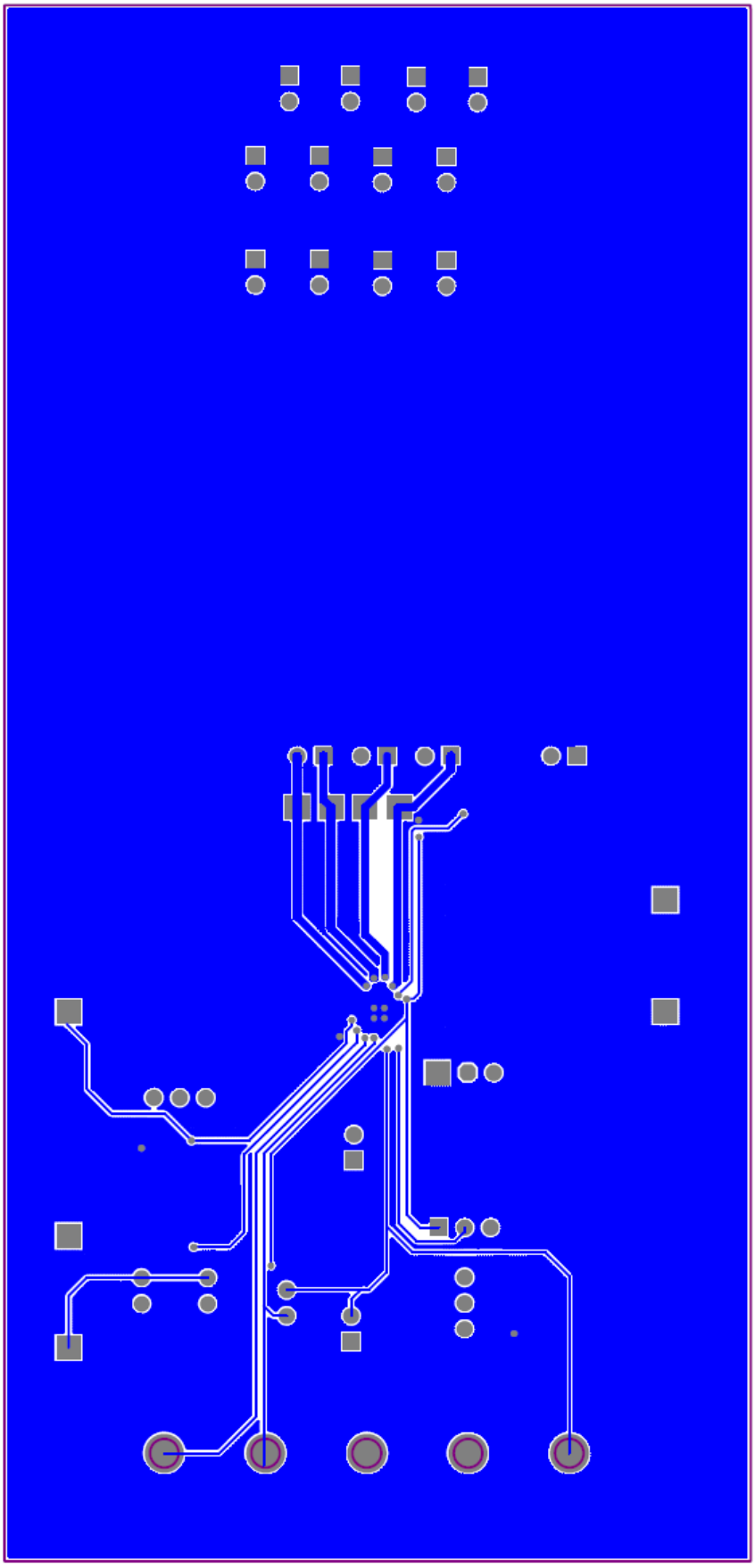

FIGURE 3. BOTTOM LAYER

Bill of Materials (BOM)

DESIGNATOR	PART TYPE	FOOTPRINT	PART MANUFACTURER/NUMBER
R1	150k	603	1% SMD Resistor
R2	100k	603	General purpose
R3	357k	603	
R4	10k	603	
R5	1M	VRES	
R6	0	603	
R7	Open	603	
R8	5k	603	
R9	10k	603	
R10	0	603	
R11	100k	VRES	
R12	27k	603	
R13	Open	603	
L1	15µH		CoilCraft, XAL6060-153MEB
D1	PMEG6030	SOD128	NXP SEMICONDUCTOR
C1	10µF/50V	1210	General purpose
C2	0.1µF/50V	603	Ceramic X5R/X7R capacitors
C3	33pF	603	
C4	1µF/16V	603	
C5	4.7µF/50V	1210	Murata, GRM32ER71H475KA88L
C6	4.7µF/50V	1210	
C7	Place Holder	1210	Not Populated
C8	Place Holder	1210	
C9	100pF/50V	603	General purpose
C10	3.6nF/50V	603	Ceramic X5R/X7R capacitors
C11	1nF/50V	603	
C12	1nF/50V	603	
C13	1nF/50V	603	
C14	Place Holder	603	
C15	8.2nF	603	
F1	2A Fuse	1206	Bel Fuse Inc, C1Q 2
U1		QFN16 3MM	Intersil, ISL97682/3/4
JP2-JP19	JUMPER-2PIN	JUMPER-2PIN	FCI
WR	JUMPER-2PIN	JUMPER-2PIN	68000-236HLF-1x2
JP1	JUMPER-3PIN	JUMPER-3PIN	FCI
JP20	JUMPER-3PIN	JUMPER-3PIN	68000-236HLF-1x3
LED1-LED48	LED-SMT	LW_Y87C	
TP1	LX	TEST POINT	Keystone Electronics
TP2	VOUT	TEST POINT	5010

Bill of Materials (BOM)

DESIGNATOR	PART TYPE	FOOTPRINT	PART MANUFACTURER/NUMBER
TP3	CH1	TEST POINT	
TP4	CH2	TEST POINT	
TP5	CH3	TEST POINT	
TP6	CH4	TEST POINT	
TP7	VDC	TEST POINT	
TP8	RSET	TEST POINT	
TP9	FSW/PHS	TEST POINT	
P5	AGND	TEST POINT	Keystone Electronics
P6	AGND	TEST POINT	5011
P9	PGND	TEST POINT	
P1	PVIN	POWERPOST	Mill Max
P2	VIN	POWERPOST	3156-1-00-00-00-00-08-0
P3	EN	POWERPOST	
P4	PWMI	POWERPOST	
P7	AGND	POWERPOST	
P8	AGND	POWERPOST	
P10	PGND	POWERPOST	
SW2	SPDT	SWITCH-SLIDE-SPDT	EAO
SW1	SPDT	SWITCH-SLIDE-SPDT	09.03201.02

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