A6211/A6213 High-Current LED Driver Evaluation Board Notes

Allegro Microsystems, Sep 27, 2012

The A6211/13 is a single IC switching regulator that provides constant-current output to drive high-power LEDs. It integrates a high-side N-channel DMOS switch for DC-to-DC step- down (buck) conversion. The A6211/13 EVB (evaluation board) accepts input voltage from 6V to 48V to drive a single LED string. LED current can be from several hundred mA up to 3A, selected by jumper combination on the EVB. Switching frequency is fixed at 1MHz for the EVB, but it can be easily changed by changing a resistor (see data sheet for details).
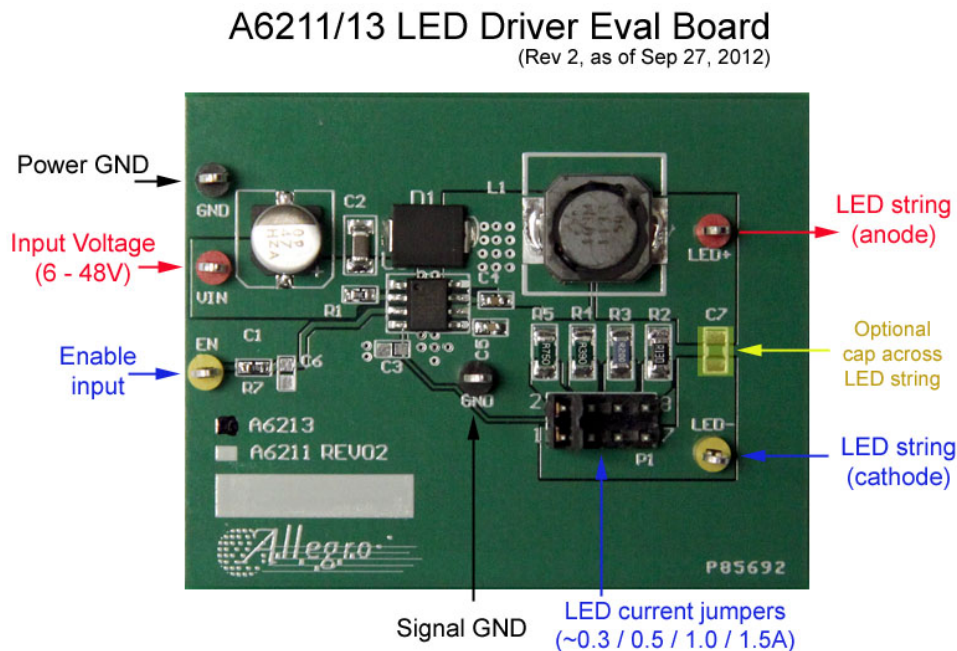

Figure 1 A6211/13 Evaluation Board

Quick Startup Guide:

1. Connect a LED string between LED+ (anode) and LED- (cathode)
2. Insert or remove jumpers from P1 to select the appropriate LED current (see table below)
3. Connect input power between VIN and GND. For LED current regulation, the minimum input voltage should be at least 20% higher than the LED string's operating voltage.
4. Connect EN (enable) to a logic high signal, or connect it to VIN. This will turn on the LED string.
5. For LED dimming: connect EN to a suitable PWM signal (such as 0-3V, 200Hz 50%). Vary the PWM duty cycle between 1% and 100% to control the brightness of LED string.

Jumper Settings vs. LED Current:

Jumper 1-2	Jumper 3-4	Jumper 5-6	Jumper 7-8	Approximate LED current (A)
ON	-	-	-	0.3
-	**ON**	-	-	0.5
-	-	**ON**	-	1.0
-	-	-	**ON**	1.5
-	ON	-	**ON**	2.0
-	-	ON	**ON**	2.5
-	ON	ON	**ON**	3.0

Note that due to contact resistance introduced by connectors and jumpers, the above current settings are approximate.
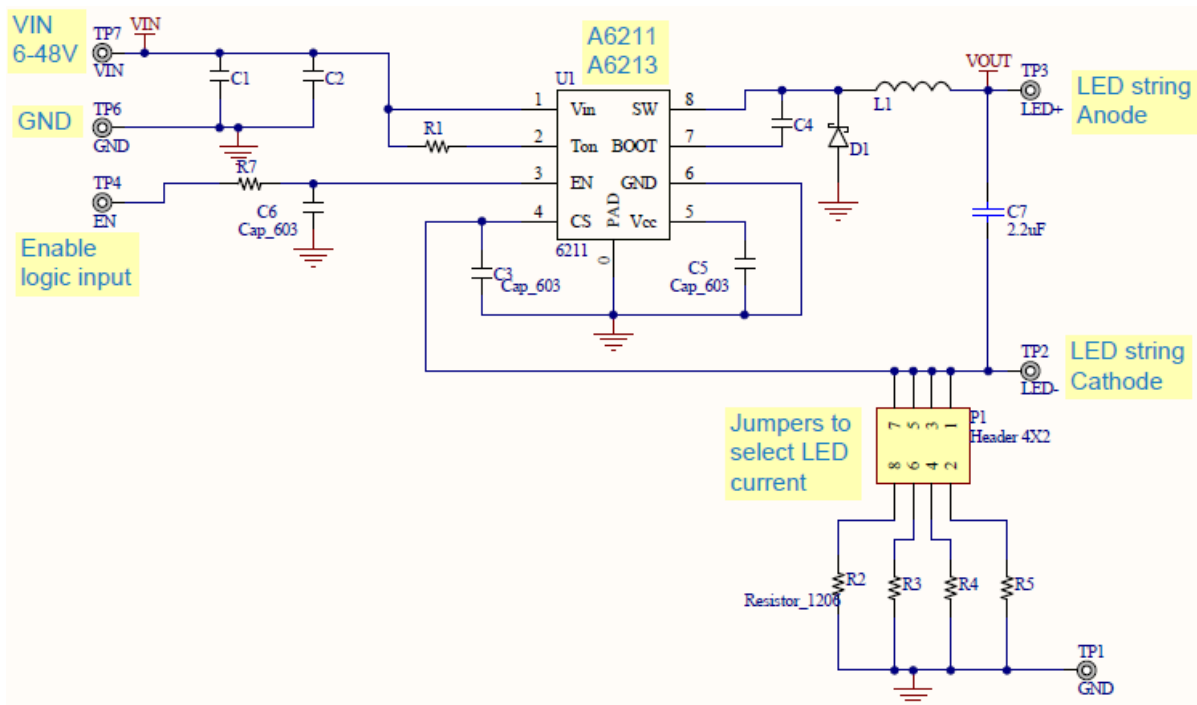
Schematics:

Figure 2 A6211/13 EVB schematic

Bill of Material:

Ref	Qty	Description	Footprint	Part Number	Remarks
C1	1	CAP 47UF 50V ELECT MZA SMD	Cap Radial 8mm surface mount	565-2568-1-ND	Vin filter electrolytic cap (exactly value not critical)
C2	0	CAP CER 10UF 50V X5R 1210	Capacitor_1210	587-2225-1-ND	
	1	CAP CER 4.7UF 50V X5R 1206	Capacitor_1206	587-1962-1-ND	Vin filter ceramic cap
C3	0	0.1uF 10V X7R ceramic	Resistor_Capacitor_0603	399-1095-1-ND	Optional, use in case of nosiy sense line
C4	1	0.047UF 50V X7R 0603	Resistor_Capacitor_0603	445-5095-1-ND	BOOT cap
C5	1	0.1uF 10V X7R ceramic	Resistor_Capacitor_0603	399-1095-1-ND	Vcc filter cap
C6	0	10nF 50V X7R	Resistor_Capacitor_0603	490-1511-1-ND	optional input cap for EN (can be used for 10K pull-down resistor instead)
C7	0	2.2uF 50V X5R	Capacitor_1206	587-2402-1-ND	Optional filter cap across LED string. Try 0.47uF to 4.7uF
D1	0	B350A-13-F DIODE SCHOTTKY 3A 50V SMA	Diode_SMA	B350A-FDICT-ND	for LED current up to ~2A
	1	B560C-13-F DIODE SCHOTTKY 5A 60V SMC	Diode_SMC	B560C-FDICT-ND	for LED current up to 3A
L1	0	VLF12060T-220M4R1 (22UH 4A 36mOhm, 12*11.7*6mm)	12x12mm	445-3595-1-ND	Use larger inductance for lower frequency and lower current
	1	B82464G4103M (10uH 3.4A 10x10x5mm)	10.4x10.4mm	5-1796-1-ND	Use smaller inductance for higher frequency and current
	0	NR8040T100M (10uH 3.4A 20% 44mohm, 8*8*4mm	8x8mm	587-2001-1-ND	This 8mm inductor is only good for up to ~2A LED current!
P1	1	Header, 4-Pin, Dual row	HDR2X4		
R1	1	63.4K 0.1W 1%	603	P63.4KHDKR-ND	Ron=63.4K gives F_sw = 1MHz
	0	27.4K 0.1W 1%	603	P27.4KHCT-ND	Ron=27.4K gives F_sw = 2MHz
R2	1	0.13 ohm 0.5W 1%	Resistor_1206	RL16R.13FCT-ND	**~1.35A (due to jumper resistance)**
R3	1	0.20 ohm 0.5W 1%	Resistor_1206	RL16R.20FCT-ND	**~0.9A**
R4	1	0.39 ohm 0.5W 1%	Resistor_1206	RL16R.39FCT-ND	**~0.45A**
R5	1	0.75 ohm 0.5W 1%	Resistor_1206	RL16R.75FCT-ND	**~0.24A**
R7	1	1K 0.1W 1%	Resistor_Capacitor_0603	P1.0KDBCT-ND	Limits the input current in case EN > Vin
EN, LED-	2	Test Point, Yellow	Test_Point	5014K-ND	
LED+, VIN	2	Test Point, Red	Test_Point	5010K-ND	
GND, GND1	2	Test Point, Black	Test_Point	5011K-ND	
U1	1	A6211/A6213	SOICN 8		Narrow SOIC-8 with exposed pad