

IS31LT3918 T8 Lighting Evaluation Board Guide



Description

The IS31LT3918 LED driver IC is a peak current detection buck converter which operates in constant off time mode. It operates over a very wide input voltage supply range of 6VDC to 450VDC or 110VAC/220VAC.

The IS31LT3918 incorporates the special feature of switch dimming by detecting OFF-ON cycles of the main power switch. When the switch is cycled within a 2 second period (typical) the device automatically switches the dimming level to the next step. As a result, dimming can be achieved without replacing any wiring in the original system. There are multiple modes of switch dimming that the user may configure, 2 steps or 3 steps, as well as different levels of dimming via the external pins DIM1 and DIM2.

Features

- User configurable switch dimming levels
- 3% output current accuracy
- Over current, voltage and temperature protection
- High efficiency (typical up to 95%)
- Wide input voltage range: 6VDC~450VDC or 85VAC~ 265VAC
- Linear and PWM dimming
- Very few external components

Applications

- DC/DC or AC/DC LED driver applications
- Signal and decorative LED lighting
- Backlighting LED driver

Quick Start

Recommended Equipment

- 85 ~ 265VAC 50~60Hz power supply
- LED array (12 in series and 24 in parallel)
- Main power switch

Absolute Maximum Ratings

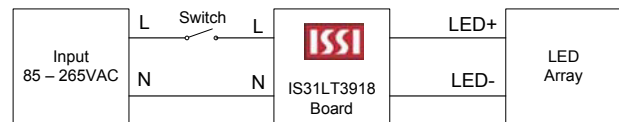
- $\leq 265\text{VAC}$ power supply
- $\leq 42\text{V}$ Vout (Total Vf)

Caution: Do not exceed the conditions listed above, otherwise the board will be damaged or the output will be limited

Procedure

The IS31LT3918 Evaluation Board is fully assembled and tested. Follow the steps listed below to verify board operation.

Caution: Do not turn on the power supply until all connections are completed.



- 1) Connect the positive terminal of the LEDs to the LED+ pin of the Evaluation Board and the negative terminal of the LEDs to the LED- pin of the Evaluation Board.
- 2) Connect the input pins (L and N) of the Evaluation Board via the main power switch to AC power supply.
- 3) Turn on the power supply.

Ordering Information

PART #	TEMP RANGE	IC PACKAGE
IS31LT3918_GRLS2_EBT8	-40 °C to 85°C	SO-8 (5.0 x 6.0mm)

For pricing, delivery, and ordering information, please contact ISSI at analog_mkt@issi.com or call +1-408-969-6600

Detailed Description

Switch Dimming

The action of the main power switch can be divided into two types. The first is “normal switch operation” wherein the switch is toggled from ON to OFF, remaining OFF for longer than 2 seconds (typical). The other is “switch dimming action” wherein the switch is

toggled from ON to OFF and back ON within 2 seconds (typical). When the device experiences normal switch operation, it merely powers on in the first state when the power switch is toggled to ON, and the device turns off when the main power switch is changed to OFF. Switch dimming output current levels are configured by connecting the DIM1 and DIM2 pins as indicated in the table below:

Setting Dimming Current-Level

Pin Name / Setting		DESCRIPTION	
DIM 1	DIM 2	Functionality	Dimming Levels
Floating	Floating	No Dimming	100%
Floating	GND	3 (Three) - levels of dimming	100% -- 30% -- 100%
GND	Floating	3 (Three) - levels of dimming	100% -- 50% -- 100%
GND	GND	2 (Two) - levels of dimming	100% -- 50% -- 20% -- 100%

When operating the power switch normally the device will always power up at 100% output current. The operation of the power switch and the configuration of the DIM1 and DIM2 pins control the dimming process as follows:

1. When DIM1 and DIM2 pins are both floating, there is no switch dimming, and the output current is 100% of the programmed value when the power is on.
2. When DIM1 is floating and DIM2 is GND, the output current is:
 - a) 100% at power on.
 - b) The first switch dimming action causes the current to change to 30%.
 - c) A second switch dimming action causes the current to return to 100%.
 - d) A fourth switch dimming action has the same effect as the first switch dimming action.
 - e) Subsequent switch dimming actions causes the cycle to continue.
3. When DIM1 is GND and DIM2 is floating, the

dimming sequence is as described in (2) above, except that the current sequence is 100%-50%-100%.

4. When both DIM1 and DIM2 are connected to GND, the dimming sequence is as described in (2) above, except that the current sequence is 100%-50%-20%-100%.

If the switch is operated normally, that is, switched ON once after being in the OFF position for a long time, or if both the DIM1 and DIM2 pins are floating, then the output current always starts up at the initial value of 100%.

Note: Because the main power switch is used to initiate the switch dimming function, the device must have a large enough external capacitor on VIN to maintain device operation for 2 seconds. Please refer to the schematic for specific values.

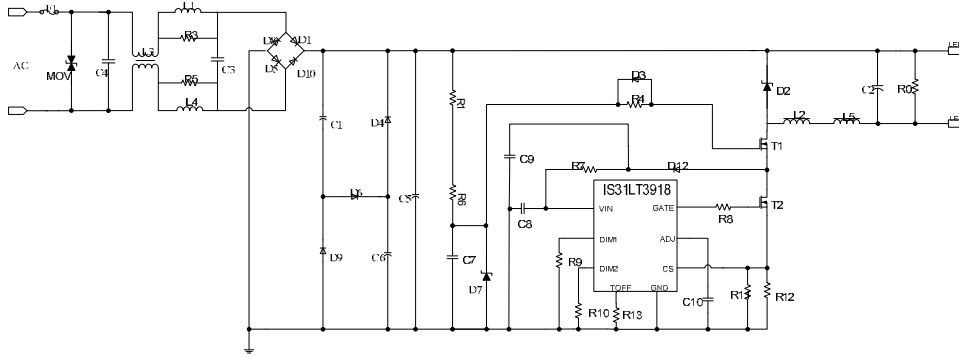


Figure 1 IS31LT3918 Evaluation Board Schematic

Note: ISSI Evaluation Board does not include a LED array



Figure 2. Picture of Evaluation Board

NOTE: Physical dimensions are (L x W x H): 25.1mm x 17mm x 12mm

PCB Layout

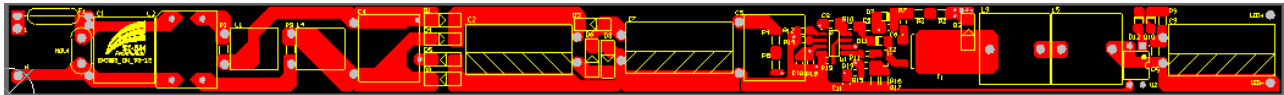


Figure 3. PCB Layout- Top Layer



Figure 4. PCB Layout- Bottom Layer

Bill of Materials

No.	Name	Description	Ref Des.	Qty.	Mfr P/N
1	Fuse	1A/250V	F1	1	
2	AL Capacitor	22uF,250V	C1,C6	2	
3	X Capacitor	0.1 uF,275V	C3,C4	2	
4	Film Capacitor	10nF,630V	C5	1	
5	SMD Capacitor	1uF,50V,0805,X7R	C7	1	
6	SMD Capacitor	10uF,25V,0805,X7R	C8,C9	2	
7	SMD Capacitor	NC	C10	1	
8	Inductor	3mH,10%,8*10,Isat≥200mA	L1,L4	2	
9	Inductor	0.65mH,Isat≥800mA	L2,L5	2	
10	Inductor	NC	L3	1	
11	Diode	1A,1000V,1N4007,SMA	D1,D4-D6,D8-D10	7	
12	FR Diode	1A,600V,ESIJ,SMA	D2	1	
13	FR Diode	NC	D3	1	
14	Zener Diode	12V,5%	D7	1	
15	Schottky Diode	1A,60V,SS16,SMA	D12	1	
16	Resistor	20KΩ,1206,5%	R0	1	
17	Resistor	270KΩ,1206,5%	R1,R6	2	
18	Resistor	4.7KΩ,0805,5%	R3,R5	2	
19	Resistor	150Ω,0805,5%	R4	1	
20	Resistor	3KΩ,0805,1%	R7	2	
21	Resistor	10Ω,0805,5%	R8	1	
22	Resistor	0Ω,0805	R9,R10	2	
23	Resistor	0.68Ω,0805,1%	R11	1	
24	Resistor	0.75Ω,0805,1%	R12	1	
25	Resistor	330KΩ,0805,1%	R13	1	
26	NMOS	4N60,4A/600V,TO-220	T1	1	
27	NMOS	AP2306,5A/30V,SOT-23	T2	1	
28	IC	IS31LT3918,SOP-8	U1	1	

Line Regulation Rate and Efficiency

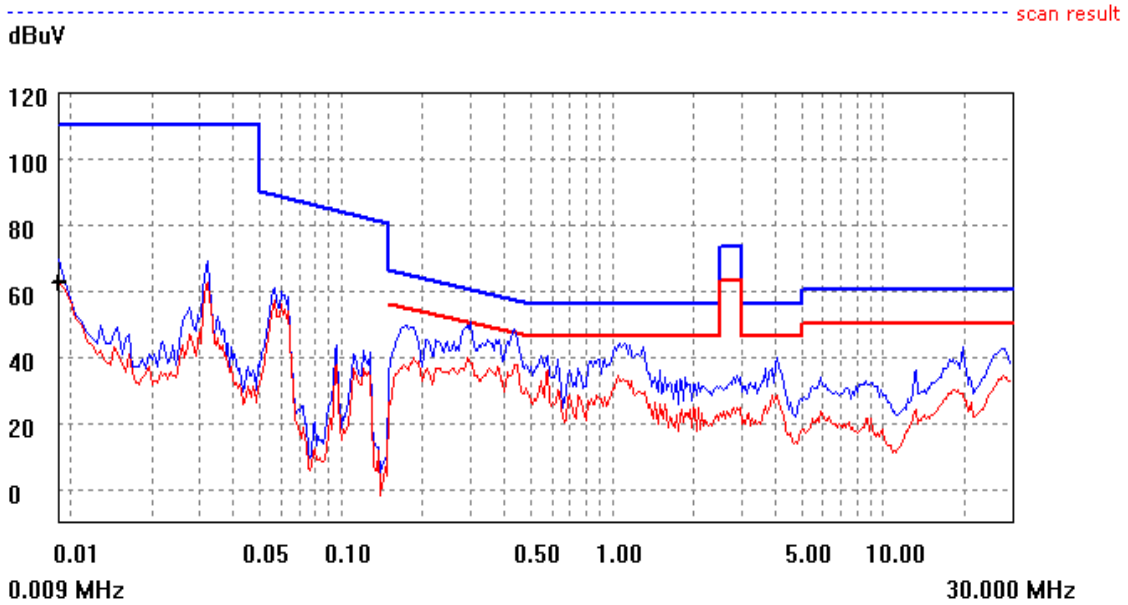
Input Voltage	Input Power	PF	Output Voltage	Output Current	Efficiency
AC: 90V	17.63W	0.853	37.35V	0.420A	88.98%
AC: 110V	17.55W	0.887	37.35V	0.421A	89.60%
AC: 130V	17.65W	0.876	37.30V	0.424A	89.60%
AC: 180V	18.09W	0.830	37.20V	0.434A	89.25%
AC: 220V	18.57W	0.810	37.20V	0.440A	88.14%
AC: 240V	18.82W	0.802	37.20V	0.442A	87.37%

EMI Test Report

EMI TEST REPORT

Organization: kh	Operator: JUSTIN	EUT:	parameter
Place: 检验	Time: 2011/6/27/17:44		
Detector: PK+AV	Test-time(ms): 10		
Limit: EN55015	Transducer: PK0		
Remark:			

Start(MHz)	End(MHz)	Step(MHz)	freq, step
0.009	0.150	0.001	
0.150	3.000	0.002	
3.000	10.000	0.020	
10.000	30.000	0.025	



final test

(AV)	freq(MHz)	lev(dBuV)	Lim(dBuV)	Δ (lev-Lim)
	0.009	62.1	0.0	62.1

Figure 5. L line

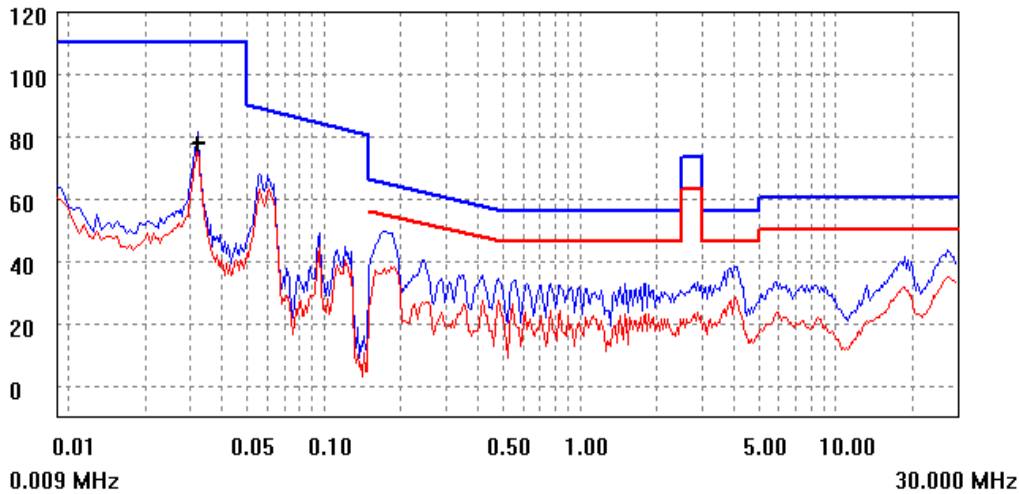
EMI Test Report

EMI TEST REPORT

Organization: kh	Operator: JUSTIN	EUT:	parameter
Place: 检验	Time: 2011/6/27/17:48		
Detector: PK+AV	Test-time[ms]: 10		
Limit: EN55015	Transductor: PK0		
Remark:			

Start(MHz)	End(MHz)	Step(MHz)	freq, step
0.009	0.150	0.001	
0.150	3.000	0.002	
3.000	10.000	0.020	
10.000	30.000	0.025	

dBuV scan result



final test

[AV]	freq(MHz)	lev(dBuV)	Lim(dBuV)	Δ[lev-Lim]
	0.032	77.6	0.0	77.6

Figure 6. N line

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