



Description

IS31LT3932 is a universal LED driver, which can operate in fly-back, buck-boost and buck convertor. For isolation fly-back, it can achieve high PF, high current accuracy, $\pm 5\%$ load and line regulation and wide voltage input voltage range, without loop compensation. For buck convertor, it also can achieve high PF, high current accuracy, high efficiency, good load and line regulation and wide voltage input voltage range, without loop compensation. with very few components.

IS31LT3932 has special power line sense and output voltage sense circuits, operates in primary feedback mode without opto-coupler and achieve stable output current control without any loop compensation.

IS31LT3932 has multiple protections to improve the system reliability, including LED open circuit, LED short circuit, UVLO, OVP, current sense resistor short, the primary over current limit and over temperature protections.

Features

- Universal isolation and non-isolation
- Single stage PFC fly-back
- No loop compensation required
- No opto-coupler required
- $\pm 3\%$ LED current accuracy
- $\pm 5\%$ line regulation and load regulation
- Wide input voltage: 85~265Vac
- Low start-up current(15uA)
- Valley turn-on MOSFET to achieve high efficiency for buck application
- Few external components
- 1A sourcing current and 2A sinking current
- multiple protections

Applications

- LED bulb

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

- LED Tube lamp
- LED PAR

Quick Start

Recommended Equipment

- 85~265VAC/50~60Hz power supply

Absolute Maximum Ratings

- $\leq 265\text{VAC}$ power supply
- $\leq 90\text{V}$ Vout (Total Vf)

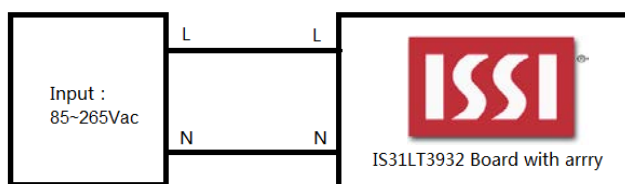
Caution: Do not exceed the conditions listed above, otherwise the board will be damaged or the output will be limited

Procedure

The IS31LT3932 DEMO 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 input pin N of the Evaluation Board via the main power switch to AC power supply N.
- 2) Connect the input pin L of the Evaluation L.
- 3) Turn on the power supply.



Ordering Information

PART#	TEMP RANGE	IC PACKAGE
IS31LT3932-GRLS2-TR	-40 to 125°C	SOP-8

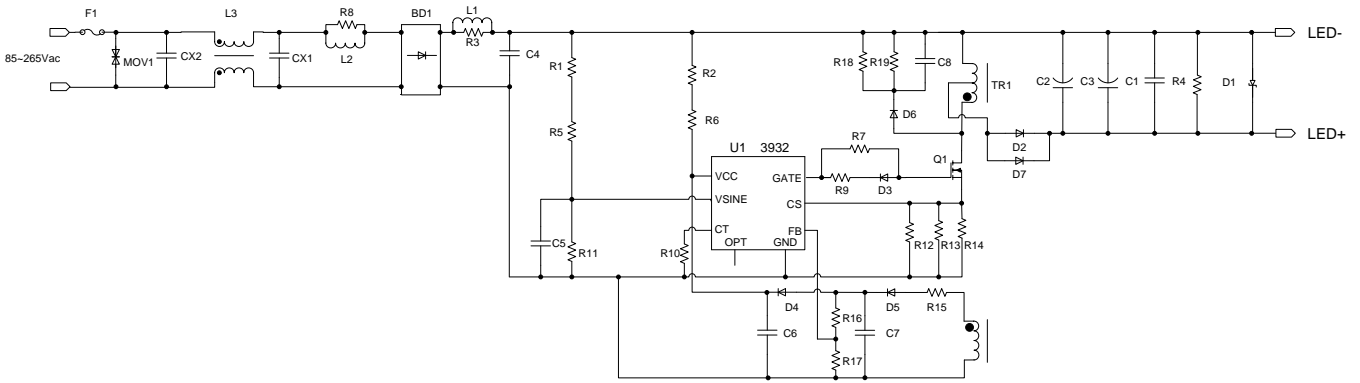


Figure 1 IS31LT3932 Evaluation Board Schematic
 Note: ISSI Evaluation Board does include a LED array



Figure 2 Picture of Evaluation Board

NOTE: Physical dimensions of power board are (LxWxH): 218.5mmx17mmx10mm

PCB Layout

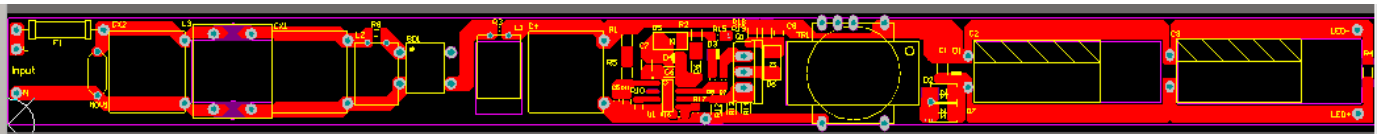


Figure 3 PCB Layout – Top layer

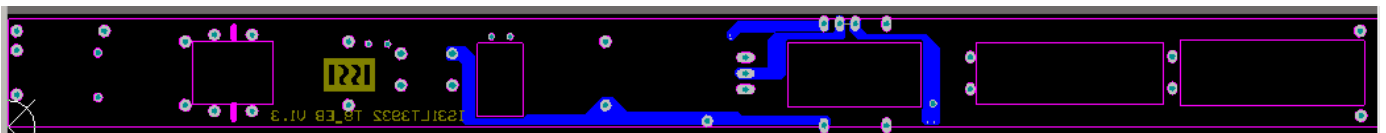


Figure 4 PCB Layout – Bottom layer

Bill of Materials

No.	Name	Description	Ref Des.	Qty.	Mfr P/N
1	FUSE	1A250V Φ 3	F1	1	
2	Bridge rectifier	DB107 DIP4	BD1	1	
3	MOV	7D471	MOV1	1	
4	X2-CAP	0.1uF 275Vac	CX1,CX2	2	
5	INDUCTOR	NC	L2	0	
6	INDUCTOR	3mH 0810	L1	1	
7	INDUCTOR	EE12 20mH	L3	1	
8	Resistor	0R 0805	R8	1	
9	Resistor	5.1k Ω 0805	R3	1	
10	Resistor	300k Ω 1% 1206	R2,R6	2	
11	Resistor	1M Ω 1% 1206	R1,R5	2	
12	Resistor	13K Ω 1% 0805	R11	1	
13	Resistor	10K Ω 1% 0805	R17	1	
14	Resistor	180K Ω 1% 0805	R16	0	
15	Resistor	0 Ω 5% 0603	R7	1	
16	Resistor	390k Ω 1% 0805	R10	1	
17	Resistor	200 Ω 1% 0805	R15	1	
18	Resistor	100K Ω 5% 1206	R4	1	
19	Resistor	0.68 Ω 1% 1206	R12	1	
20	Resistor	0.75 Ω 1% 1206	R13	1	
21	Resistor	NC	R9,R14,D3,D1,C1	0	
22	Resistor	200k Ω 1% 1206	R18,R19	2	
23	CBB-CAP	100nF 400V pin10	C4	1	
24	SMD-CAP	10uF 50V 1206 X7R	C6	1	
25	E-CAP	100uF 100V 1020	C2,C3	2	
26	SMD-CAP	1nF 25V X7R 0805	C5	1	
27	SMD-CAP	1nF 1kV X7R 1206	C8	1	
28	SMD-DIODE	FR107 SMA	D6	1	
29	SMD-DIODE	ES2G SMA	D2,D7	1	
30	SMD-DIODE	ES1J SMA	D5	1	
31	SMD-DIODE	1N4148 SOD-80	D4	1	
32	MOS	4N60C TO-220	Q1	1	
33	IC	IS31LT3932 SOP-8	U1	1	
34	TRANSFORMER	ER2010 5+5	TR1	1	

Transformer Design

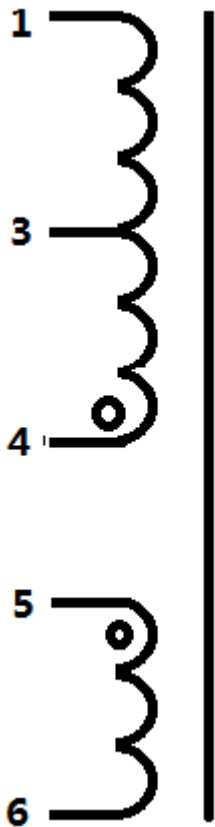
ELECTRICAL SPECIFICATIONS:

1.Primary inductance(L_p)=590 μ H@10kHz

MATERIALS:

1. Core:ER2010(Ferrite Material TDK PC40 or equivalent)
2. Bobin: ER2010 Primary 5,Secondary:5
- 3.. Magnet Wires (Pri) : Type 2-UEW
4. Magnet Wire (Sec) : Triple Insulated Wires
5. Layer Insulation Tape :3M1298 or equivalent.

SCHEMATIC

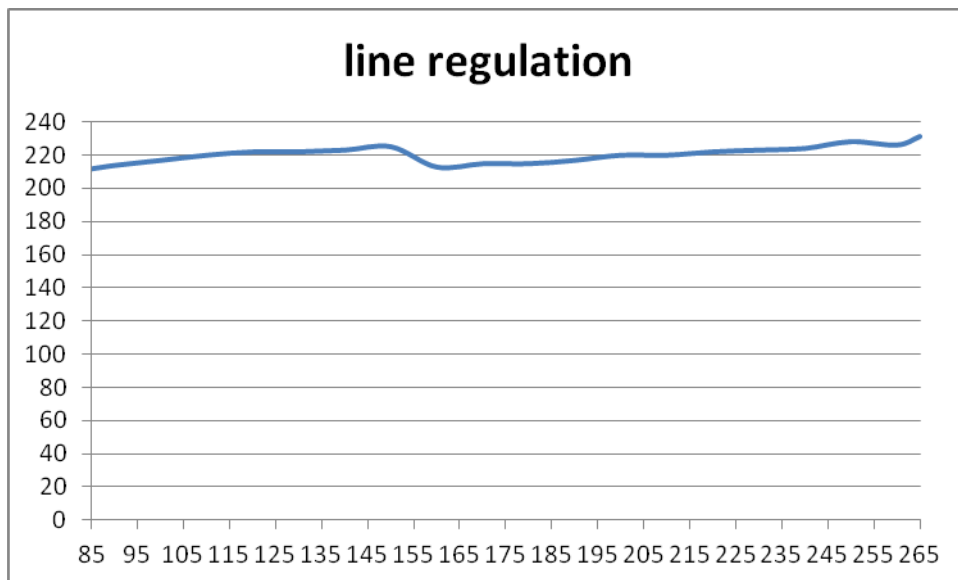


No	winding	start	end	Wires		Tape		
1	N1	4	3	4T	0.3mm-QA	4.0mm-2		
2	N2	3	1	90T	0.3mm-QA	4.0mm-2		
3	N3	5	6	24T	0.15mm-QA	4.0mm-2		



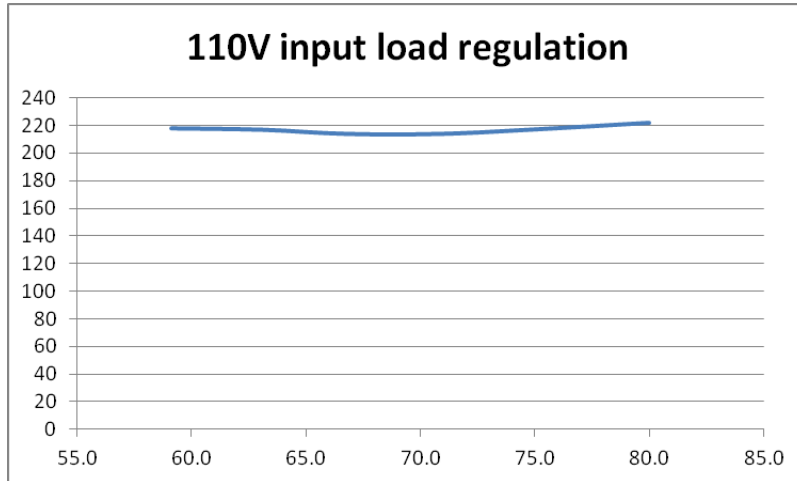
Test data

Vin	PF	THD	PIN	VOUT	IOUT	eff..
85	1.000	1.3%	19.92	79.4	212	84.5%
90	1.000	1.5%	19.97	79.6	214	85.3%
100	0.999	1.5%	20.05	79.7	217	86.3%
110	0.999	1.6%	20.17	79.8	220	87.0%
120	0.998	1.8%	20.16	80.0	222	88.1%
130	0.998	1.9%	20.10	80.0	222	88.4%
140	0.997	1.9%	20.17	80.0	223	88.4%
150	0.996	1.7%	20.24	79.8	225	88.7%
160	0.994	1.8%	19.06	79.6	213	89.0%
170	0.992	1.9%	19.19	79.6	215	89.2%
180	0.990	2.0%	19.20	79.7	215	89.2%
190	0.988	2.1%	19.38	79.7	217	89.2%
200	0.983	2.1%	19.61	79.8	220	89.5%
210	0.982	2.1%	19.61	79.9	220	89.6%
220	0.978	2.1%	19.78	79.8	222	89.6%
230	0.973	2.2%	19.78	79.8	223	90.0%
240	0.969	2.4%	19.91	79.8	224	89.8%
250	0.965	2.3%	20.27	79.9	228	89.9%
260	0.959	2.6%	20.20	79.8	226	89.3%
265	0.957	2.4%	20.71	80.0	231	89.2%

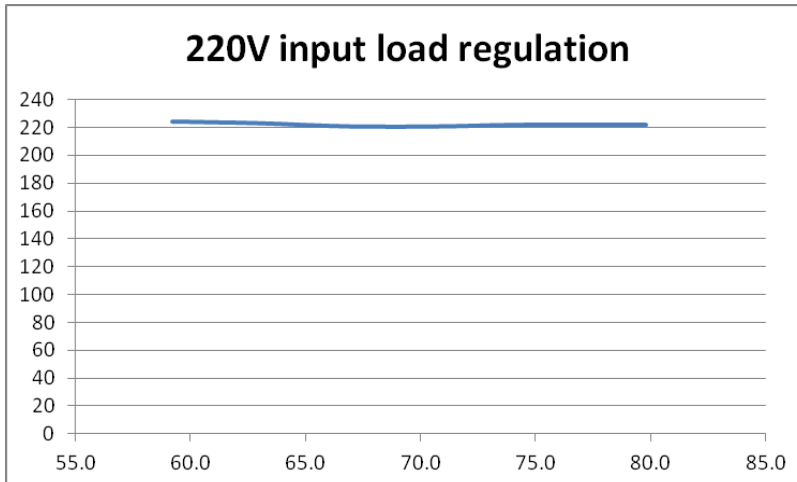


Load regulation

Vin	PF	THD	PIN	VOUT	IOUT	eff..
110	0.998	2.1%	14.73	59.1	218	87.5%
110	0.998	2.5%	15.70	63.1	217	87.2%
110	0.998	2.9%	16.73	66.8	214	85.4%
110	0.999	3.0%	17.98	70.8	214	84.3%
110	0.999	2.2%	19.12	74.7	217	84.8%
110	0.998	1.9%	20.10	80.0	222	88.4%



Vin	PF	THD	PIN	VOUT	IOUT	eff..
220	0.961	2.5%	14.88	59.2	224	89.1%
220	0.966	2.4%	15.76	62.9	223	89.0%
220	0.970	2.3%	16.67	66.9	221	88.7%
220	0.972	2.4%	17.67	70.8	221	88.6%
220	0.975	2.2%	18.54	74.5	222	89.2%
220	0.978	2.1%	19.78	79.8	222	89.6%



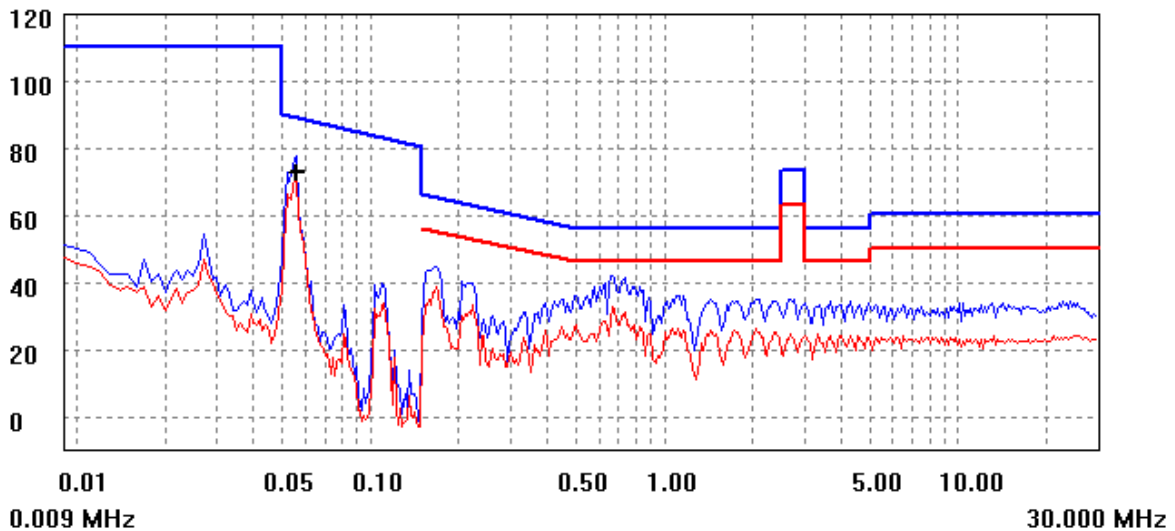
EMI test Report

EMI TEST REPORT

Organization: ISSI	Operator: lory	EUT: IS31LT3932
Place: XM	Time: 2013/11/7/10:34	
Detector: PK+AV	Test-time(ms): 10	
Limit: EN55015	Transductor: PK0	
Remark: L		

Start(MHz)	End(MHz)	Step(MHz)
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



final test

[AV]	freq(MHz)	lev(dBuV)	Lim(dBuV)	Δ (lev-Lim)
	0.056	72.5	0.0	72.5

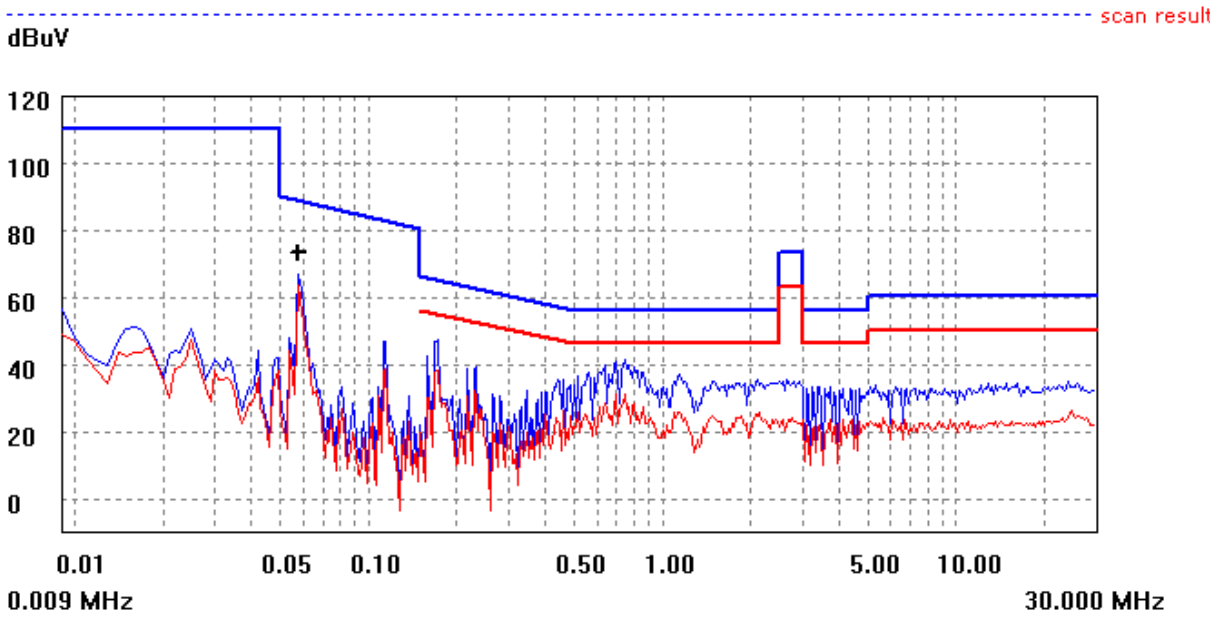
Figure 5. L line



EMI TEST REPORT

Organization: ISSI	Operator: lory	EUT: IS31LT3932
Place: XM	Time: 2013/11/7/10:28	
Detector: PK+AV	Test-time(ms): 10	
Limit: EN55015	Transductor: PK0	
Remark: N		

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



[AV]	freq(MHz)	lev(dBuV)	Lim(dBuV)	Δ(lev-Lim)
	0.057	73.2	0.0	73.2

Figure 6. N line

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