

The 25W evaluation boards of LED Lighting Driver IC IR3M95N4

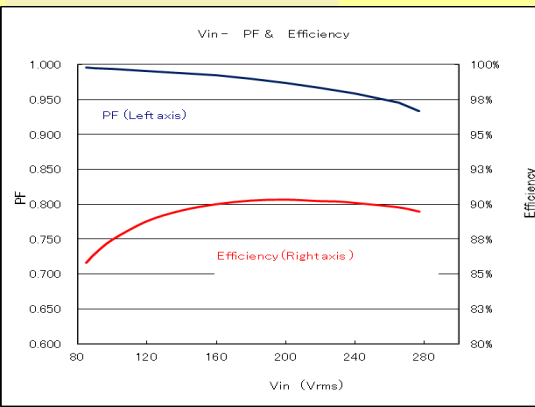
SYSTEM DEVICE UNIT
ELECTRONIC COMPONENTS AND DEVICES DIVISION
Sharp Corporation

IR3M95N4 Fly-back mode $V_{in}=85-265V$ / $P_{out}=25W$ (35V/700mA)

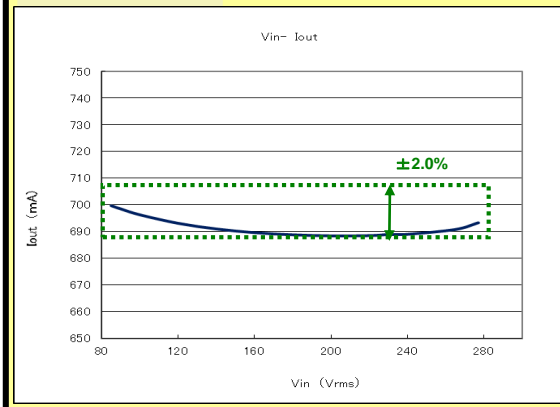
Specification

- Input Voltage: AC85V~AC265V
- Mode: Isolation (Flyback)
- Output Voltage: 35V/70mA/25W
- Operating Temperature: $-30^{\circ}C \sim 80^{\circ}C$
- Efficiency: 89 % (typ)
- Power Factor: > 0.9 (typ)
- $I_{out} \pm 2.0\%$ @ $V_{in}=85-277V, V_o=40V$

Vin vs. PF & Eff.

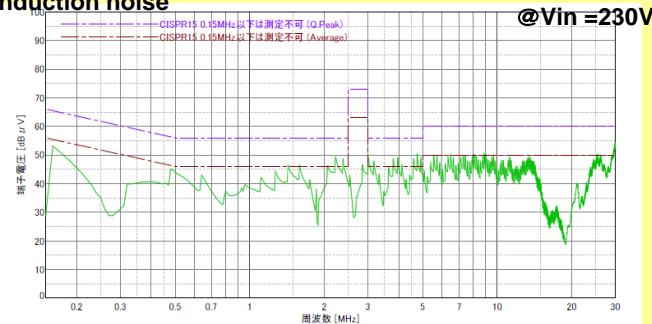


Vin vs. Iout

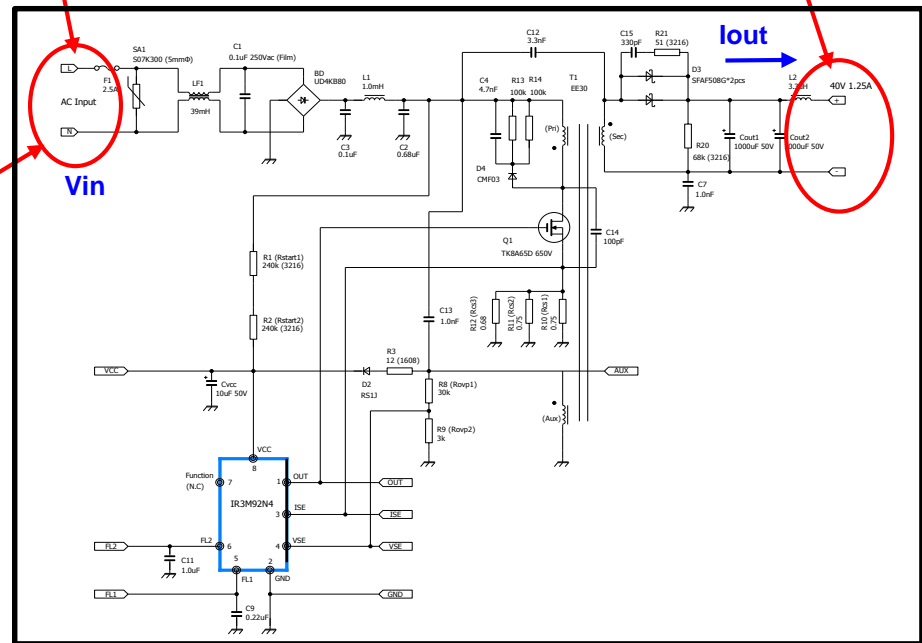
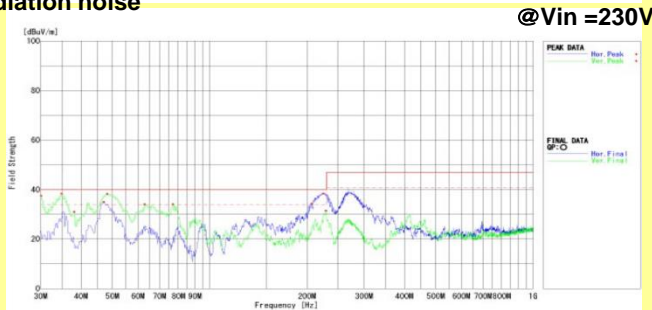


Conducted EMI

Conduction noise



Radiation noise

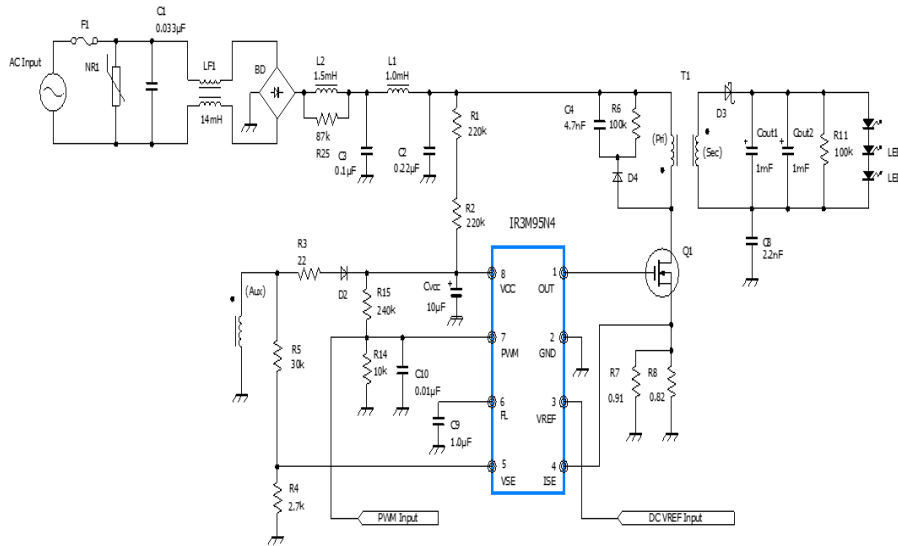


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Please evaluate enough with your products and equipments.

IR3M95N4 Reference Design & BOM (25W)

Application circuit



BOM

○ Vin=85V~265VAC / Pout = 25W(35V/700mA) BOM LIST

2014/7/14

Ref. No.	Description	Model number	Manufacturer	Qty	Remarks
T1	Trans coil	TER28	Tokyo Parts	1	Np:40T(L=0.28mH), Ns:18T, Na:9T
L1	Choking coil 1.0mH	RCP1317NP-102L	Sumida	1	※Check mains terminal interface voltage
L2	Choking coil 1.5mH	RCP1317NP-152L	Sumida	1	※Check mains terminal interface voltage
F1	Fuse AC250V 1.6A	AC250V 1.6A	Littelfuse	1	8.5 * 4mm, pitch5.08mm, φd=0.6
NR1	Varistor 300V 7mmφ	S07K300	EPCOS	1	
LF1	Line Filter 14mH	PLY10AN1430R5R2	Murata	1	
BD1	Diode bridge rectifier	D1UBA80	Shindengen	1	
C1	X-capacitor (0.033uF 250V ac)	ECQU2A333MLA	Panasonic	1	
C2	Film capacitor (0.22uF 450V dc)	450MMG224	Rubycon	1	
C3	Film capacitor (0.1uF 450V dc)	450MMG104	Rubycon	1	
C4	4.7nF	RDER72J472	Murata	1	
C8	Y capacitor 2.2nF	DE1E3KX222M	Murata	1	diameter7mm, pitch10mm, φd=0.6
C9	Capacitor 1.0uF (1608)	1.0uF (1608)		1	
C11	Capacitor 10nF (1608)	10nF (1608)		1	
CVCC	Electrolytic Capacitor 10uF 50V	YXF, 10uF, 50V	Rubycon	1	
COU1	Electrolytic Capacitor 1000uF 50V	YXF, YXM, YXJ	Rubycon	1	
COU2	Electrolytic Capacitor 1000uF 50V	YXF, YXM, YXJ	Rubycon	1	
D2	Switching diode	1SS355	Rohm	1	
D3	Fast recovery diode	H51G	Taiwan semiconductor	2	
D4	Fast recovery diode	CMF03	Toshiba	1	
R1 (RSTART-1)	Resistor 220k (3216)	220k (3216)		1	RSTART = (RSTART-1+RSTART-2)
R2 (RSTART-2)	Resistor 220k (3216)	220k (3216)		1	RSTART = (RSTART-1+RSTART-2)
R3	Resistor 22 (1608)	22 (1608)		1	
R5 (ROVP1)	Resistor 30k(1608)	30k (1608)		1	
R4 (ROVP2)	Resistor 2.7k(1608)	2.7k (1608)		1	
R7 (RCS-1)	Resistor 0.91 (3216)	0.91 (3216)		1	RCS = (RCS-1//RCS-2)
R8 (RCS-2)	Resistor 0.82 (3216)	0.82 (3216)		1	RCS = (RCS-1//RCS-2)
R6	Resistor 100k 1W (Axial)	MO (100k 1W)	KOA	1	
R11	Resistor 100k (3216)	100k (3216)		1	
R25	Resistor 82k (3216)	82k (3216)		1	
Q1	FET	TK3A65DF	Toshiba	1	
IC1	SOP-8	IR3M95N4	SHARP	1	
PCB	1.2mm thickness double-side board	FR-4UL94V-0		1	
Total				34	

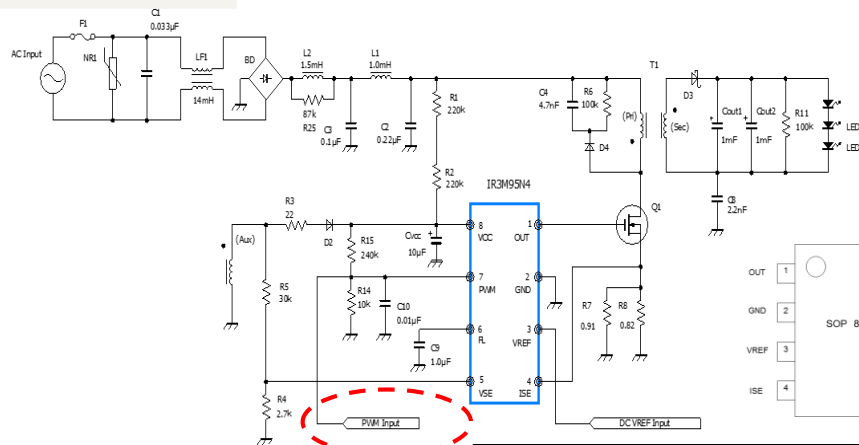
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IR3M95N4 PWM dimming

○ PWM dimming (1%~100%)

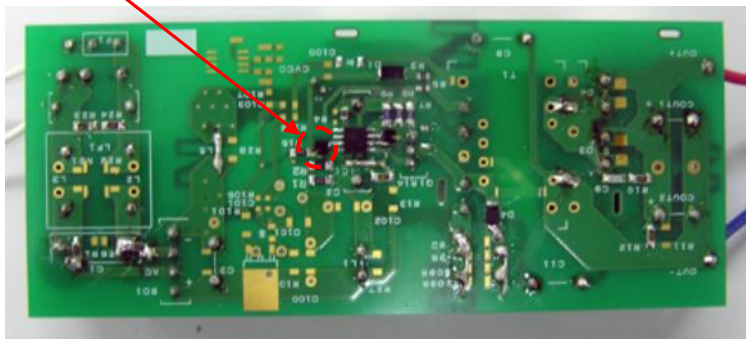
Circuit diagram



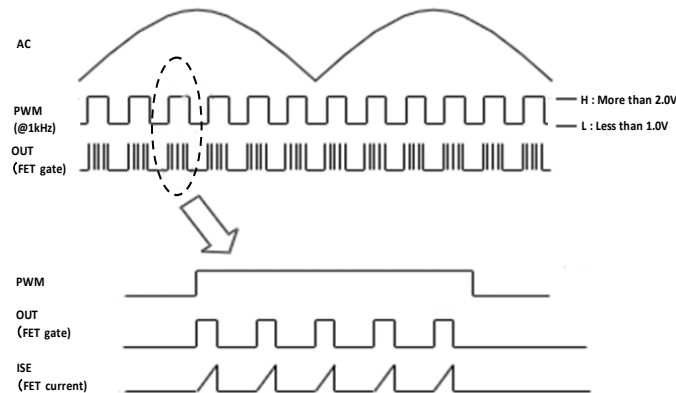
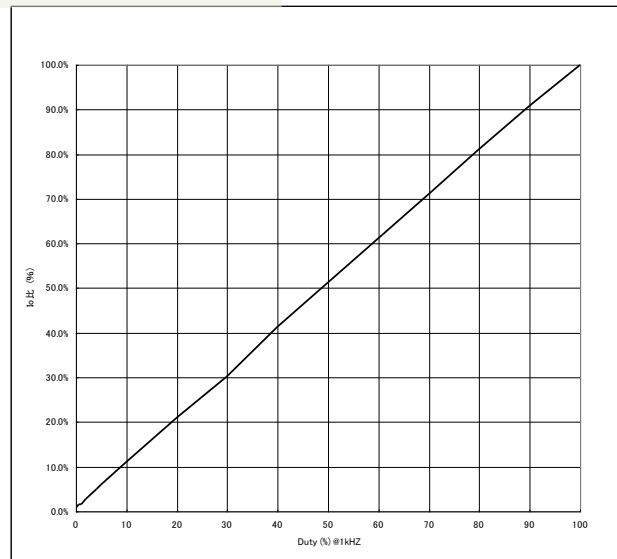
PWM Input

- f PWM: 1kHz
- V_PWM_Hi : MIN.0.5V
- V_PWM_Low : MAX.0.1V

Pin	Name	Pin description
1	OUT	Gate drive for external switching MOS-FET
2	GND	Ground pin
3	VREF	Reference voltage input pin
4	ISE	Current sense of the primary winding pin
5	VSE	Voltage sense of the auxiliary winding pin
6	FL	The output pin error amplifier
7	PWM	PWM signal input pin
8	VCC	Power supply pin



Evaluation result



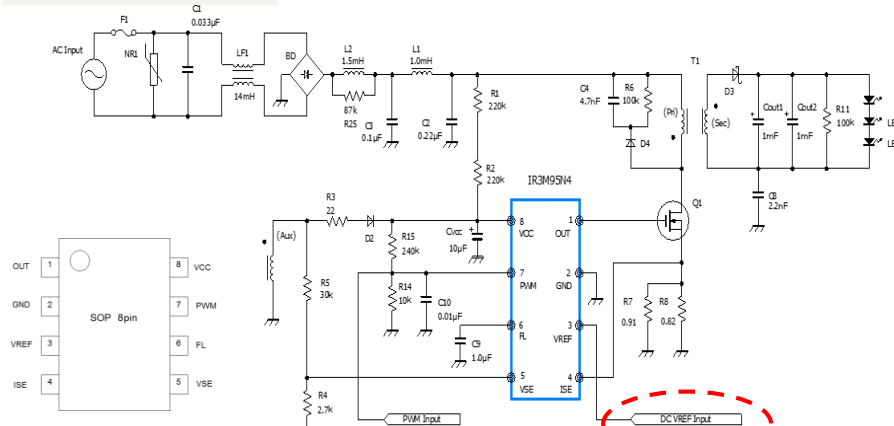
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IR3M95N4 Linear dimming

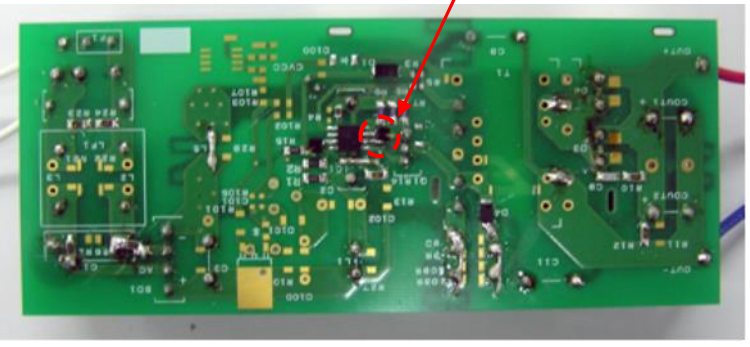
○ Linear dimming is possible by DC analog voltage input. (1%~100%)

Circuit diagram

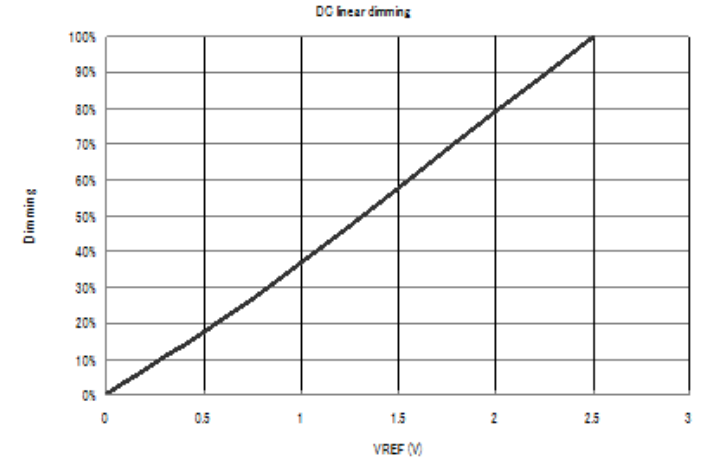


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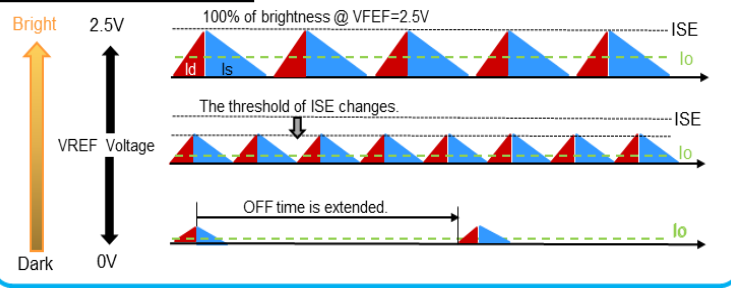
The DC analog voltage is input to VREF pin.
The voltage of 2.5V to 0V is inputted



Evaluation result



Structure of dimming



By control of frequency and ID peak current, it decreases in sound of a transformer and a coil.

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SHARP