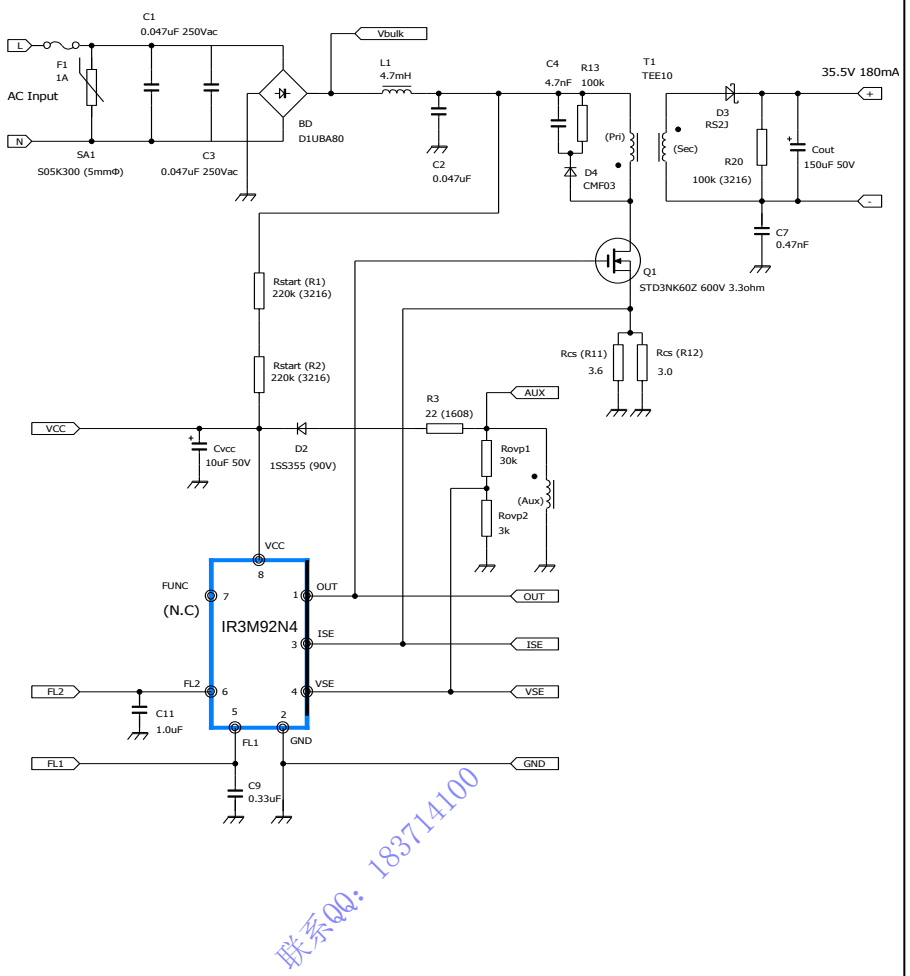
IR3M92N4 The circuit of an evaluation board & BOM (6.4W)

Circuit diagram



BOM

○ Vin=85V～265VAC / Pout = 6.39W(35.5V/180mA) BOM

2013/6/17

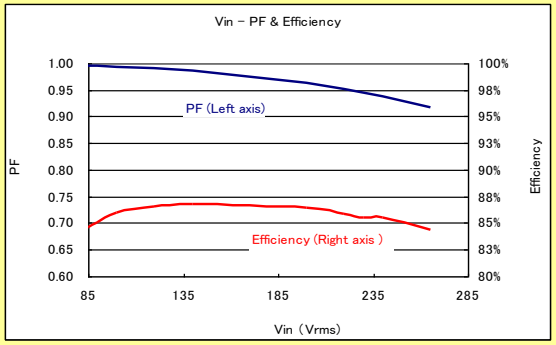
Ref. No.	Description	Model number	Manufactuer	Qty	Remarks
T1	Trans coil	TEE10	Tokyo Parts	1	Np:182T(L=1.1mH), Ns:81T, Na:36T
L1	Choking coil 4.7mH	RCH855	Sumida	1	※Check mains terminal interface voltage
F1	Fuse	250V 1A	Littelfuse	1	8.5＊4mm, pitch5.08mm, φ d=0.6
BD1	Diode bridge rectifier	D1UBA80	Shindengen	1	
C1	Film capacitor (0.047uF 250Vac)	MMBA473	Rubycon	1	
C2	Film capacitor (0.047uF 450Vdc)	MPS473	Rubycon	1	
C3	Film capacitor (0.47uF 250Vac)	MMBA473	Rubycon	1	
C4	4.7nF (630V)		Murata	1	
C7	Y capacitor 0.47nF	DE1E3KX471M	Murata	1	
C9	Capacitor 0.33uF (1608)	0.33uF (1608)	Murata	1	
C11	Capacitor 1uF (2125)	1uF (2125)	Murata	1	
CVCC	Capacitor 10uF (3216)	10.0uF (3216)	Murata	1	
COUT	Electrolytic Capacitor 150uF 50V	YXJ,150uF,50V	Rubycon	1	
D2	Switching diode	1SS355	Rohm	1	
D3	Fast recovery diode	RS2J	Taiwan semiconductor	1	
D4	Fast recovery diode	CMF03	Toshiba	1	
Q1	FET	STD3NK60Z	STMicroelectronics	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	
R8(ROVP1)	Resistor 30k(1608)	30k (1608)		1	
R9(ROVP2)	Resistor 3k(1608)	3k (1608)		1	RCS = (RCS-1//RCS-2)
R11(RCS-1)	Resistor 3.6 (3216)	3.6 (3216)		1	RCS = (RCS-1//RCS-2)
R12(RCS-2)	Resistor 3.0 (3216)	3.0 (3216)		1	
R13	Resistor 100k (3216)	100k (3216)		1	
R20	Resistor 100k (3216)	100k (3216)		1	
SA1	Varistor 300V 5mmφ	S05k300	EPCOS	1	
IC1	SOP-8	IR3M90kai	SHARP	1	
PCB	1.2mm thickness double-side board	FR-4,UL94V-0		1	
Total				29	

IR3M92N4 Fly-back mode Vin=85V-265V / Pout=6.4W (35.5V/180mA)

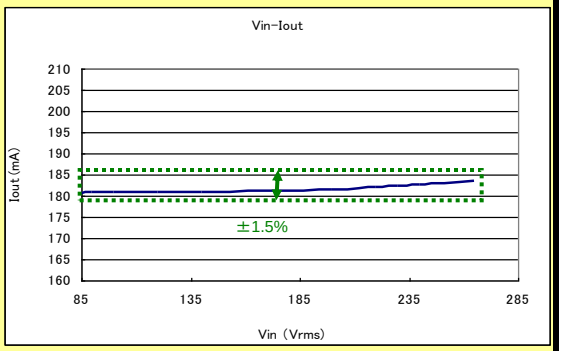
Specification

- Input Voltage：AC85V～AC265V
- System：Isolation （Flyback)
- Output Voltage：35.5V/180mA/6.4W
- Operating Temperature：-30℃～80℃
- Efficiency：85%(typ)
- Power Factor: > 0.9
- Iout ±1.5%@Vin=85-265V&Vo=35.5V

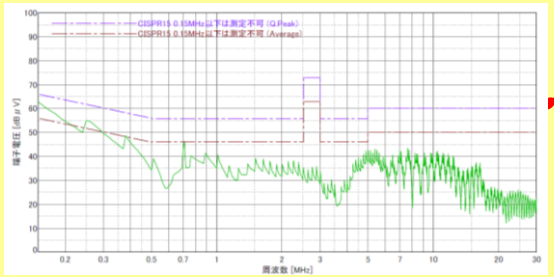
Vin vs. PF & Eff.



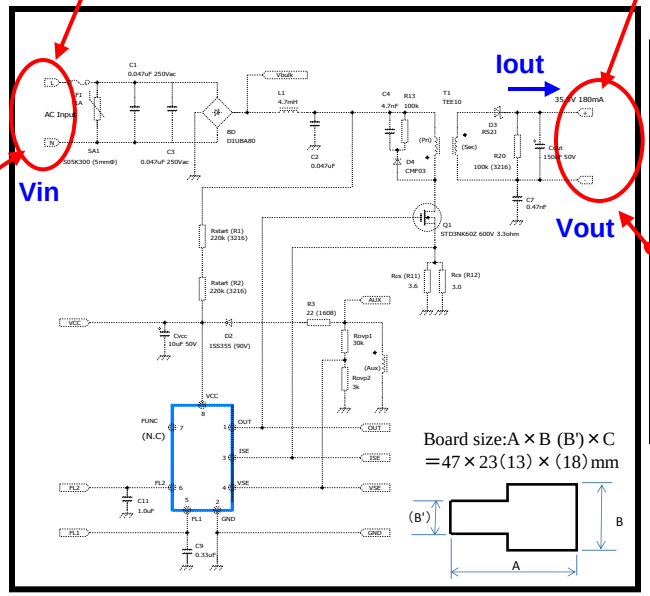
Vin vs. Iout



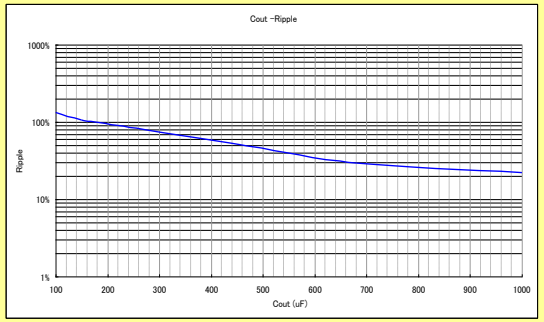
Conducted EMI



Vin =230V



Cout vs Ripple

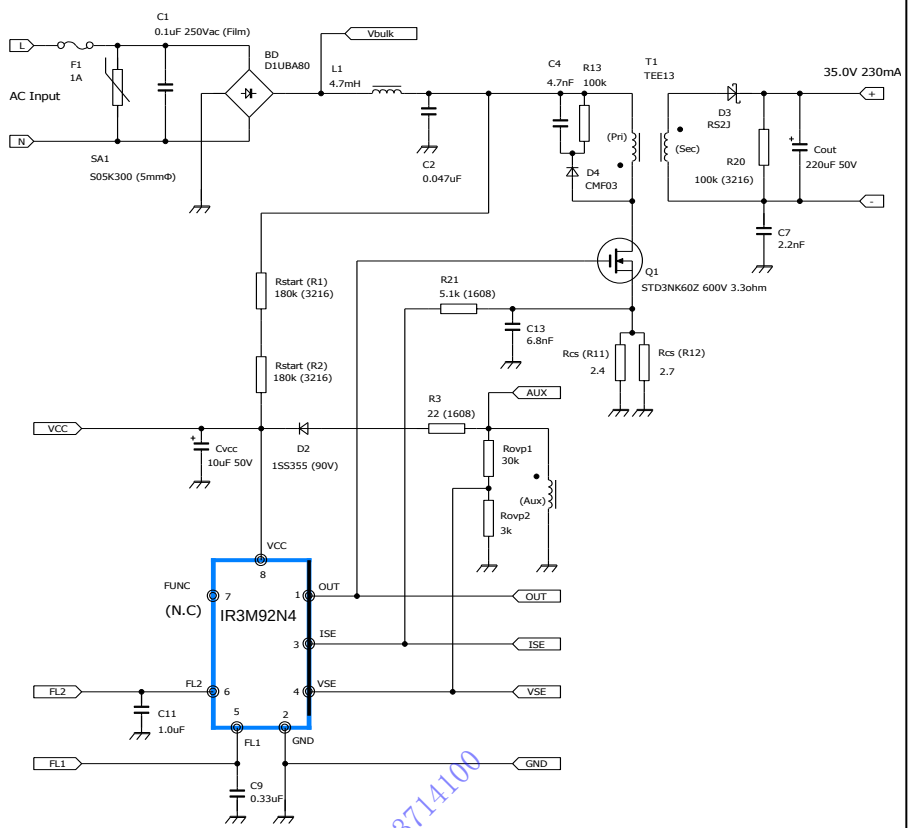


Values written in this sheet are only for your reference.

Please evaluate enough with your products and equipments.

IR3M92N4 The circuit of an evaluation board & BOM (8.0W)

Circuit diagram



BOM

○ Vin=85V～265VAC / Pout = 8.0W(35.0V/230mA) BOM

2013/6/17

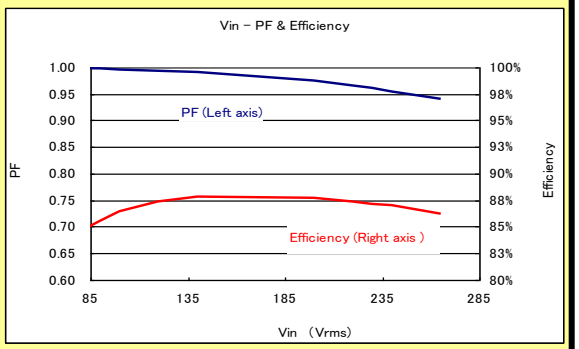
Ref. No.	Description	Model number	Manufactuer	Qty	Remarks
T1	Trans coil	TEE13	Tokyo Parts	1	Np:95T(L=0.77mH)、Ns:42T、Na:19T
L1	Choking coil 4.7mH	RCH855	Sumida	1	※Check mains terminal interface voltage
F1	Fuse	250V 1A	Littelfuse	1	8.5＊4mm, pitch5.08mm, φ d=0.6
BD1	Diode bridge rectifier	D1UBA80	Shindengen	1	
C1	Film capacitor (0.1uF 250Vac)	ECQE2A104	Panasonic	1	18.5＊6.3＊pitch15mm, φ d=0.6
C2	Film capacitor (0.047uF 450Vdc)	ECQE4473	Panasonic	1	18.5＊7.8＊pitch15mm, φ d=0.8
C4	4.7nF (630V)		Murata	1	
C7	Y capacitor 2.2nF	DE1E3KX222M	Murata	1	diameter7mm, pitch10mm, φ d=0.6
C9	Capacitor 0.33uF (1608)	0.47uF (1608)		1	
C11	Capacitor 1uF (2125)	1uF (2125)		1	
CVCC	Electrolytic Capacitor 10uF 50V	YXF, 10uF, 50V	Rubycon	1	
COUT	Electrolytic Capacitor 220uF 50V	YXJ 220uF	Rubycon	1	
D2	Switching diode	1SS355	Rohm	1	
D3	Fast recovery diode	ES2J	Taiwan semiconductor	1	
D4	Fast recovery diode	CMF03	Toshiba	1	
Q1	FET	STD3NK60Z	STMicroelectronics	1	
R1(RSTART-1)	Resistor 180k (3216)	180k (3216)		1	RSTART = (RSTART-1+RSTART-2)
R2(RSTART-2)	Resistor 180k (3216)	180k (3216)		1	RSTART = (RSTART-1+RSTART-2)
R3	Resistor 22 (1608)	22 (1608)		1	
R8(ROVP1)	Resistor 30k(1608)	30k (1608)		1	
R9(ROVP2)	Resistor 3k(1608)	3k (1608)		1	RCS = (RCS-1//RCS-2)
R11(RCS-1)	Resistor 2.4 (3216)	2.4 (3216)		1	RCS = (RCS-1//RCS-2)
R12(RCS-2)	Resistor 2.7 (3216)	2.7 (3216)		1	
R13	Resistor 100k 1W (Axial)	MOS (100k 1W)	KOA	1	
R20	Resistor 100k (3216)	100k (3216)		1	
SA1	Varistor 300V 5mmφ	S05k300	EPCOS	1	
IC1	SOP-8	IR3M90kai	SHARP	1	
PCB	1.2mm thickness double-side board	FR-4,UL94V-0		1	
Total				28	

IR3M92N4 Fly-back mode Vin=85V-265V / Pout=8.0W (35.0V/230mA)

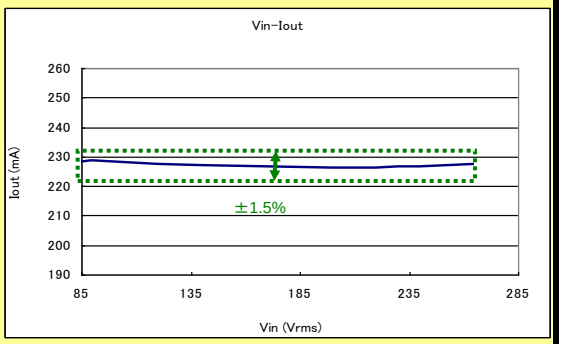
Specification

- Input Voltage：AC85V～AC265V
- System：Isolation （Flyback)
- Output Voltage：35.0V/230mA/8.0W
- Operating Temperature：-30℃～80℃
- Efficiency：86.8%(typ)
- Power Factor: > 0.9
- Iout ±1.5%@Vin=85-265V&Vo=35V

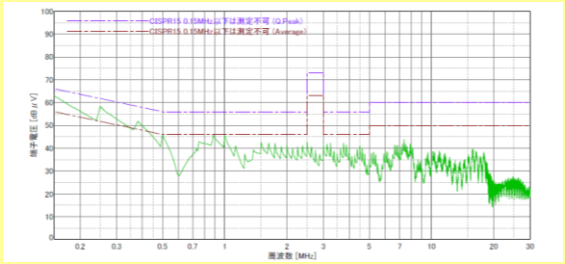
Vin vs. PF & Eff.



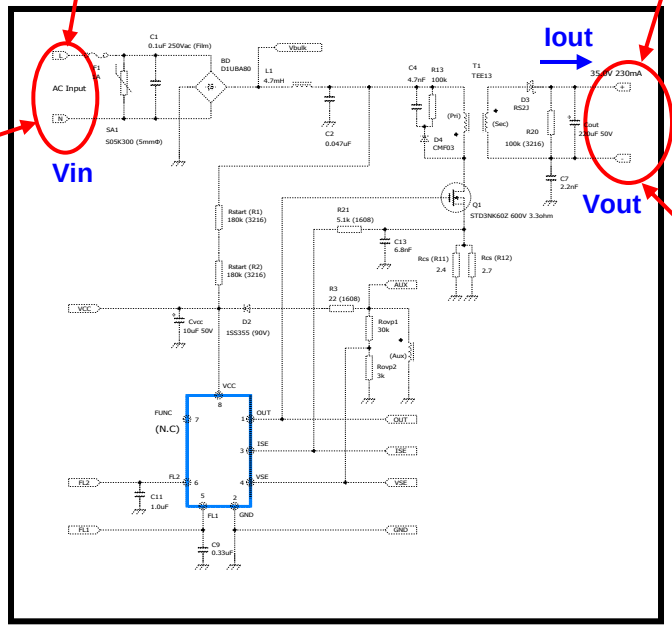
Vin vs. Iout



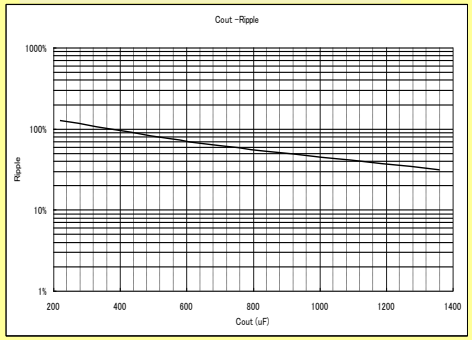
Conducted EMI



Vin =230V



Cout vs Ripple

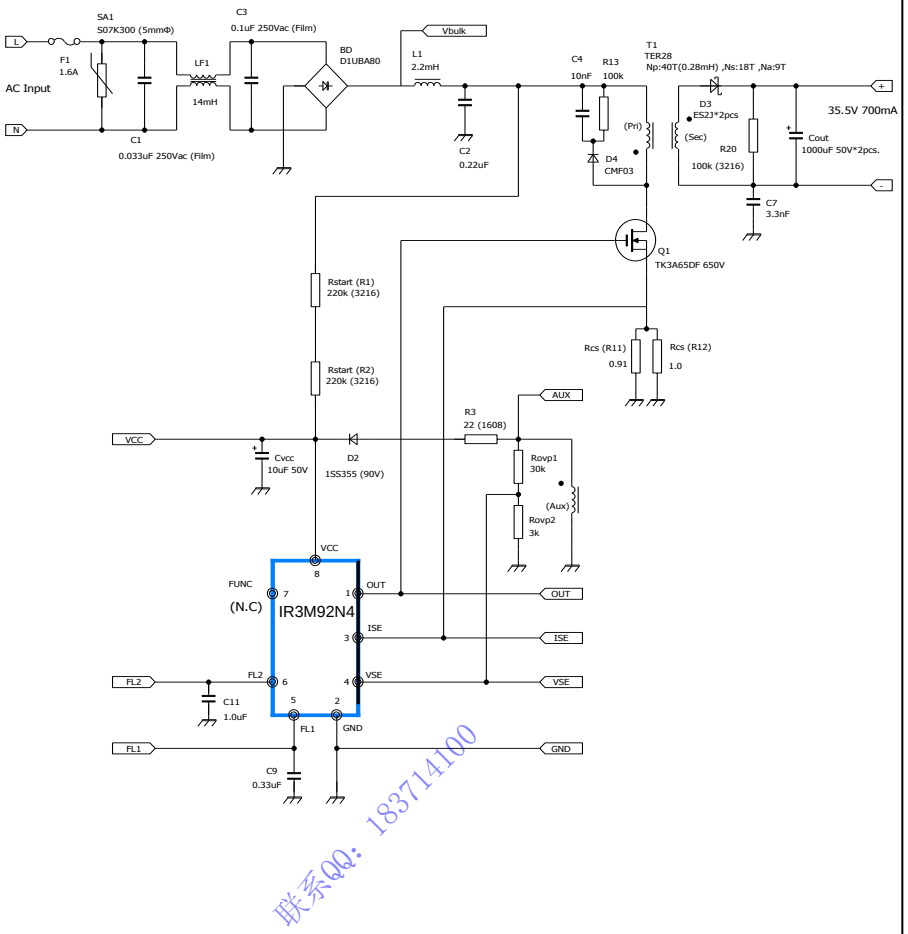


Values written in this sheet are only for your reference.

Please evaluate enough with your products and equipments.

IR3M92N4 The circuit of an evaluation board & BOM (25W)

Circuit diagram



BOM

○ Vin=85V～265VAC / Pout = 25W(35.5V/700mA) BOM

2013/6/17

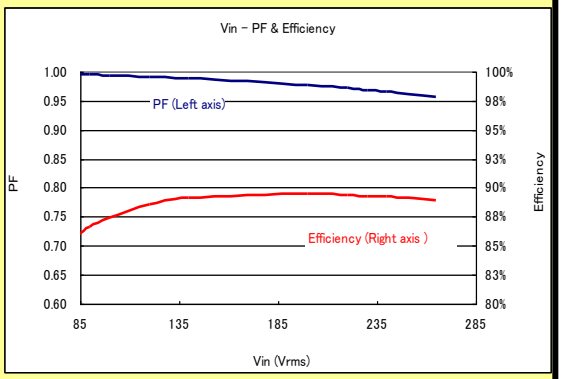
Ref. No.	Description	Model number	Manufactuer	Qty	Remarks
T1	Trans coil	TER28	Tokyo Parts	1	Np:40T(L=0.28mH)、Ns:18T、Na:9T
L1	Choking coil 2. 2mH	RCP1317NP-222L	Sumida	1	※Check mains terminal interface voltage
F1	Fuse AC250V 1.6A	AC250V 1.6A	Littelfuse	1	
SA1	Varistor 300V 7mmφ	S07K300	EPCOS	1	
LF1	Line Filter 14mH	PLY10AN1430R5R2	Murata	1	
BD1	Diode bridge rectifier	D1UBA80	Shindengen	1	
C1	X-capacitor (0. 033uF 250Vac)	ECQU2A333MLA	Panasonic	1	
C2	Film capacitor (0. 22uF 450Vdc)	ECQE4224	Panasonic	1	
C3	X-capacitor (0. 1uF 250Vac)	MMBA104	Rubycon	1	
C4	10nF (450V)		Panasonic	1	
C7	Y capacitor 3.3nF	DE1E3KX332M	Murata	1	
C9	Capacitor 0.33uF (1608)	0.33uF (1608)		1	
C11	Capacitor 1uF (2125)	1uF (2125)		1	
CVCC	Electrolytic Capacitor 10uF 50V	YXF, 10uF, 50V	Rubycon	1	
COUT1	Electrolytic Capacitor 1000uF 50V	YXF, YXM, YXJ	Rubycon	1	
COUT2	Electrolytic Capacitor 1000uF 50V	YXF, YXM, YXJ	Rubycon	1	
D2	Switching diode	1SS355	Rohm	1	
D3	Fast recovery diode	ES2J	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	
R8(ROVP1)	Resistor 30k(1608)	30k (1608)		1	
R9(ROVP2)	Resistor 3k(1608)	3k (1608)		1	
R11(RCS-1)	Resistor 0.91 (3216)	0.91 (3216)		1	RCS = (RCS-1//RCS-2)
R12(RCS-2)	Resistor 1.0(3216)	1.0 (3216)		1	RCS = (RCS-1//RCS-2)
R13	Resistor 100k 1W (Axial)	MO (100k 1W)	KOA	1	
R20	Resistor 100k (3216)	100k (3216)		1	
Q1	FET	TK3A65DF	Toshiba	1	
IC1	SOP-8	IR3M92N4	SHARP	1	
PCB	1.2mm thickness double-side board	FR-4,UL94V-0		1	
Total				32	

IR3M92N4 Fly-back mode Vin=85V-265V / Pout=25W (35.5V/700mA)

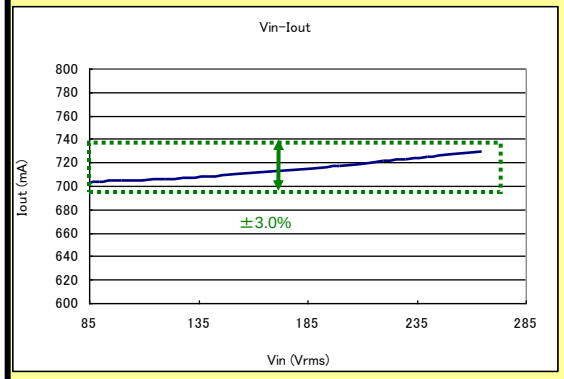
Specification

- Input Voltage : AC85V～AC265V
- Mode : Isolation （Flyback)
- Output Voltage : 35.5V/700mA/25W
- Operating Temperature : -30℃～80℃
- Efficiency : 88%(typ)
- Power Factor: > 0.9(typ)
- Output ripple : < 35% @Cout=2000uF
- Iout ±3.0% @Vin=85-265V,Vo=35.5V

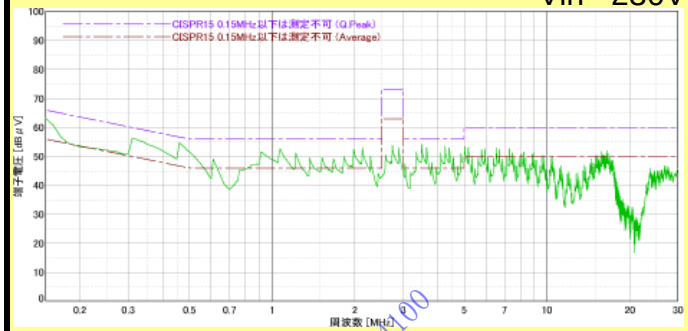
Vin vs. PF & Eff.

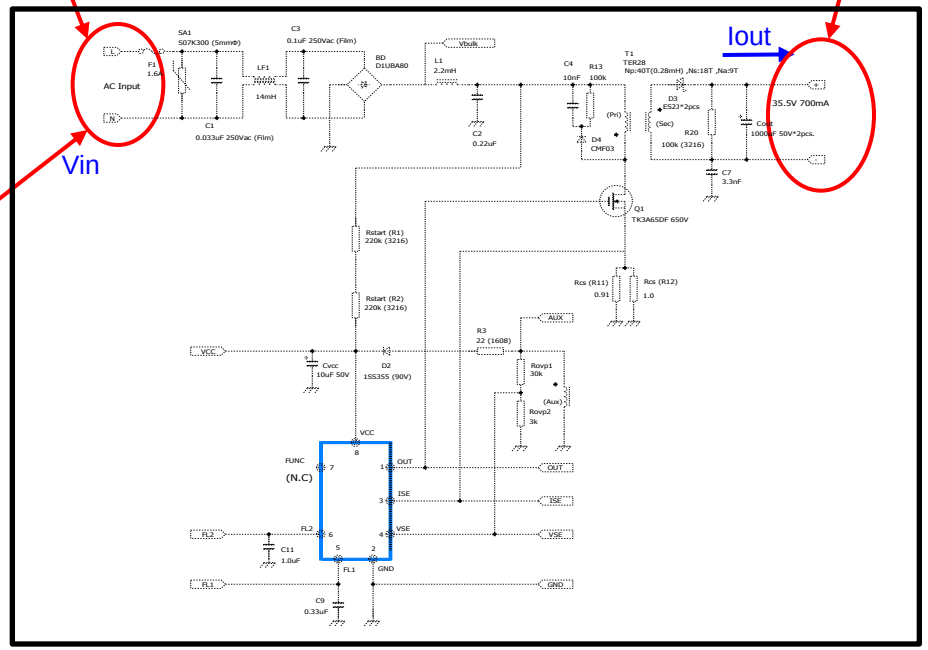


Vin vs. Iout



Conducted EMI



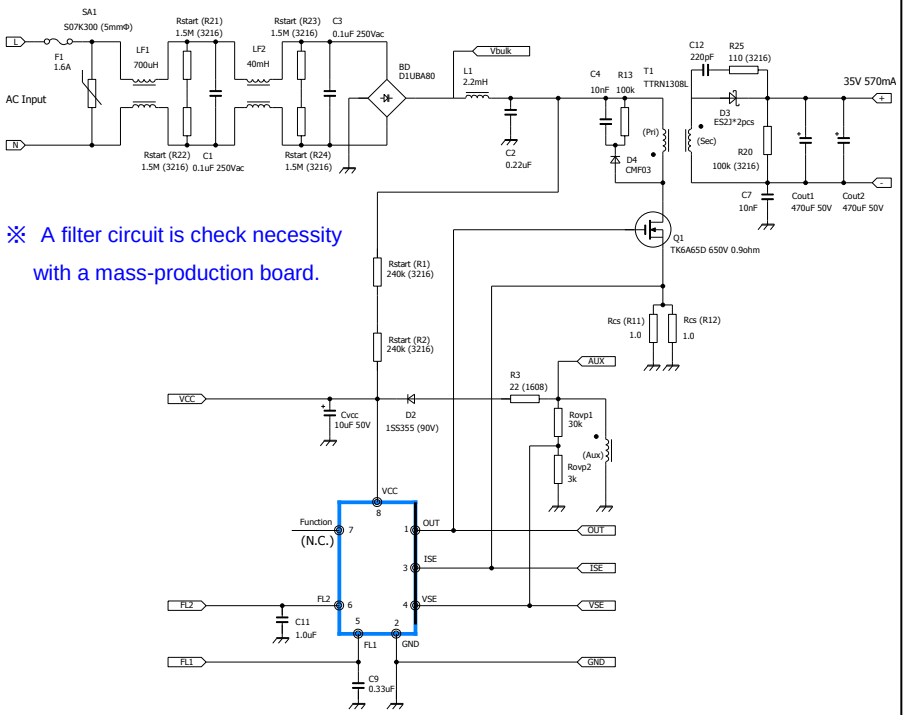


Values written in this sheet are only for your reference.

Please evaluate enough with your products and equipments.

IR3M92N4 T-8 20W Reference Design & BOM

Circuit diagram



※ A filter circuit is check necessity with a mass-production board.

BOM

○ Vin=85V～265VAC / Pout = 20W(35V/570mA) BOM LIST

2013/3/16 Ver.1

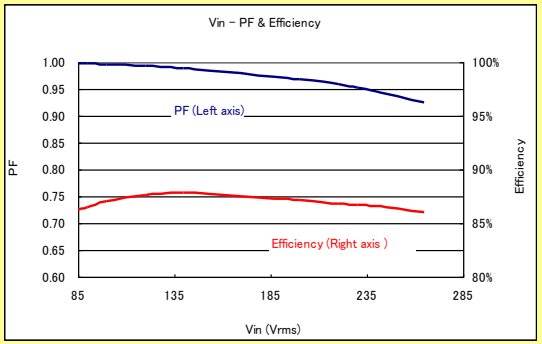
Ref. No.	Description	Model number	Manufactuer	Qty	Remarks
T1	Trans coil	TTRN1308L	Tokyo Coil Engineering	1	Np:20T(L=0.3mH), Ns:9T, Na:5T
L1	Choking coil 2.2mH	CDRH129HF-222	Sumida	1	※Check mains terminal interface voltage
F1	Fuse AC250V 1.6A	AC250V 1.6A	Littelfuse	1	8.5＊4mm, pitch5.08mm, φ d=0.6
SA1	Varistor 300V 7mmφ	S07K300	EPCOS	1	
BD1	Diode bridge rectifier	D1UBA80	Shindengen	1	
LF1	Line Filter 700uH			1	
LF2	Line Filter 40mH EE12			1	
C1	X-capacitor (0.1uF 250Vac)			1	
C3	X-capacitor (0.1uF 250Vac)			1	
R21,22,23,24	Resistor 1.5M (3216)			4	
C2	Film capacitor (0.22uF 450Vdc)	ECQE4224	Panasonic	1	
C4	10nF (630V)		Rubycon	1	
C7	Y capacitor 10nF	DE1E3KX103M	Murata	1	
C9	Capacitor 0.33uF (1608)	0.47uF (1608)		1	
C11	Capacitor 1uF (2125)	1uF (2125)		1	
C12	Capacitor 220pF (3216)	220pF (2126)		2	
C13	Capacitor 22nF (1608)	22nF (1608)		1	
CVCC	Electrolytic Capacitor 22uF 50V	VXF, 22uF, 50V	Rubycon	1	
COUT1	Electrolytic Capacitor 470uF 50V	VXJ 470uF	Rubycon	1	φ 12.5mm
COUT2	Electrolytic Capacitor 470uF 50V	VXJ 470uF	Rubycon	1	φ 12.5mm
D2	Switching diode	1SS355	Rohm	1	
D3	Fast recovery diode	RS2J	Taiwan semiconductor	2	
D4	Fast recovery diode	CMF03	Toshiba	1	
R1(RSTART-1)	Resistor 180k (3216)	180k (3216)		1	RSTART = (RSTART-1+RSTART-2)
R2(RSTART-2)	Resistor 180k (3216)	180k (3216)		1	RSTART = (RSTART-1+RSTART-2)
R3	Resistor 22 (1608)	22 (1608)		1	
R8(ROVP1)	Resistor 30k(1608)	30k (1608)		1	
R9(ROVP2)	Resistor 3k(1608)	3k (1608)		1	
R11(RCS-1)	Resistor 1.0 (3216)	1.0 (3216)		1	RCS = (RCS-1//RCS-2)
R12(RCS-2)	Resistor 1.0 (3216)	1.0 (3216)		1	RCS = (RCS-1//RCS-2)
R13	Resistor 100k 1W (Axial)	MO (100k 1W)	KOA	1	
R20	Resistor 100k (3216)	100k (3216)		1	
R21	Resistor 1.0k (1608)	1.0k (1608)		1	
R22	Resistor 1k (3218)	1k (3218)		1	
R25	Resistor 110 (3216)	110 (3216)		1	
Q1	FET	TK6A65D	Toshiba	1	
IC1	SOP-8	IR3M90kai	SHARP	1	
Total				42	

IR3M92N4 T-8 20W Vin=85V~265V / Pout=20W

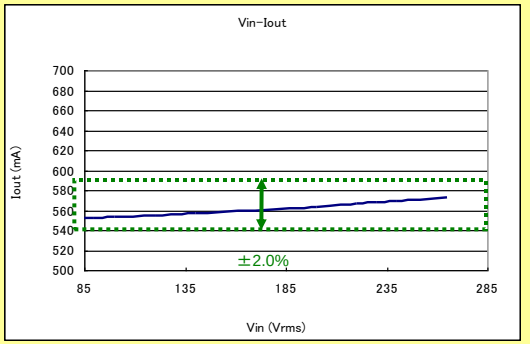
Specification

- Input Voltage：AC85V ~ AC265V
- System：Isolation　(Flyback)
- Output：35V/570mA/20W
- Efficiency：87%(typ)
- Power Factor: > 0.9
- Iout ±2.0%@Vin=85-265V&Vo=35V
- Ripple：　59%@Vin=100V

Vin vs. PF & Eff.

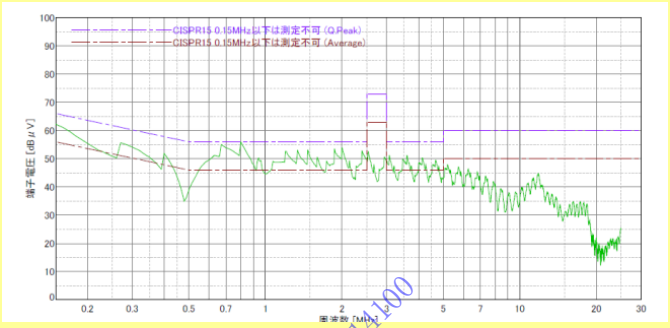


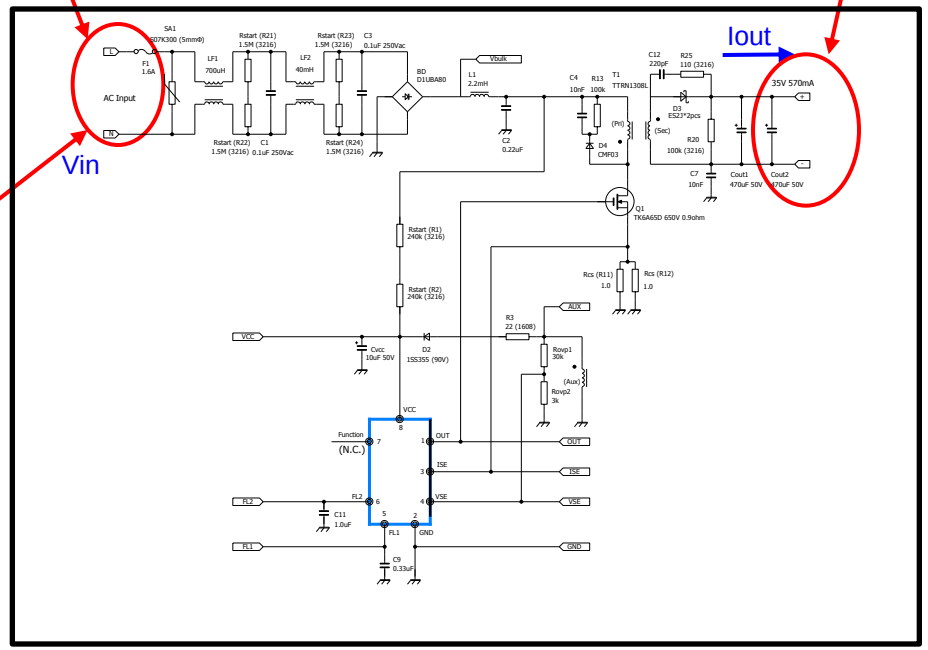
Vin vs. Iout



Conducted EMI

Vin =230V





Values written in this sheet are only for your reference.

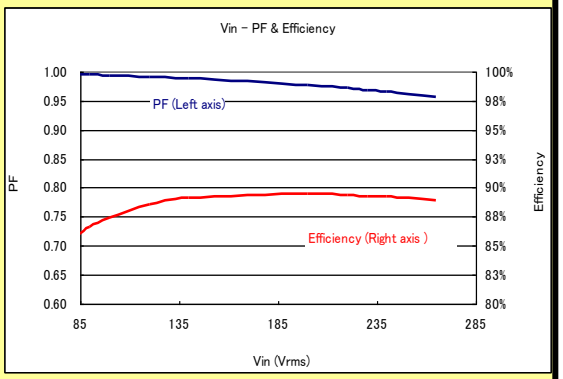
Please evaluate enough with your products and equipments.

IR3M92N4 Fly-back mode Vin=85V-265V / Pout=25W (35.5V/700mA)

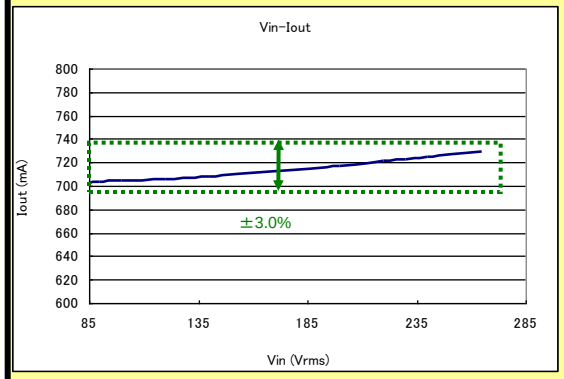
Specification

- Input Voltage : AC85V～AC265V
- Mode : Isolation （Flyback)
- Output Voltage : 35.5V/700mA/25W
- Operating Temperature : -30℃～80℃
- Efficiency : 88%(typ)
- Power Factor: > 0.9(typ)
- Output ripple : < 35% @Cout=2000uF
- Iout ±3.0% @Vin=85-265V,Vo=35.5V

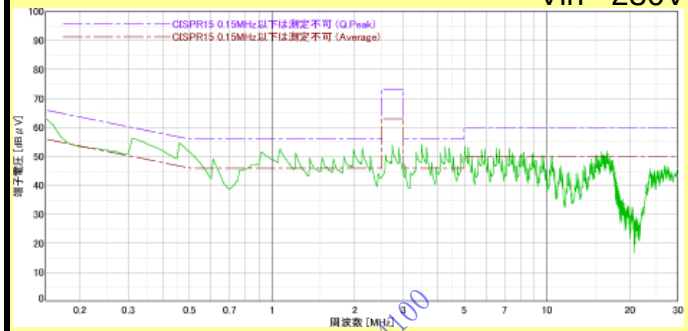
Vin vs. PF & Eff.

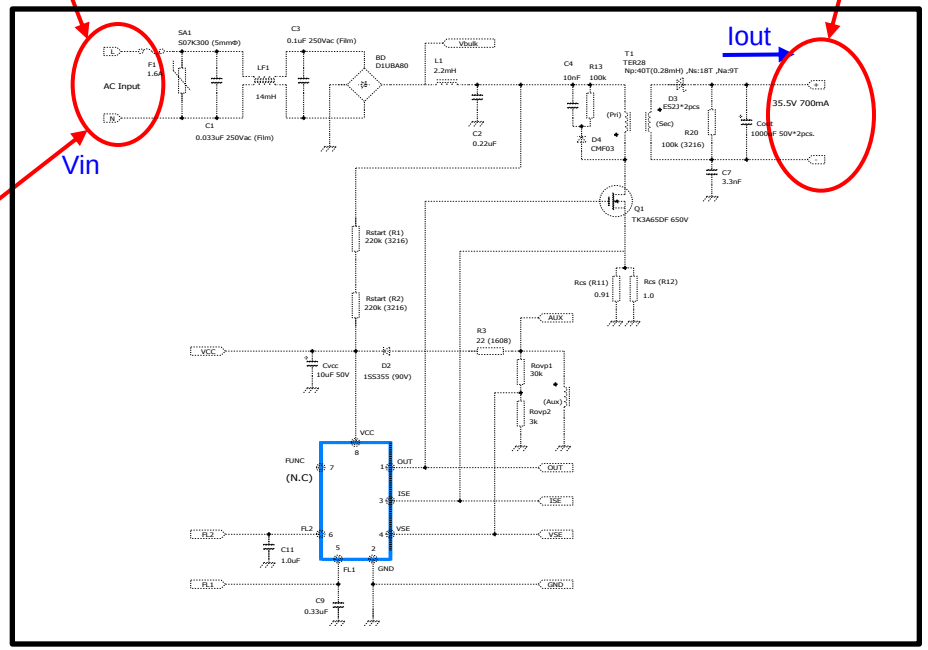


Vin vs. Iout



Conducted EMI





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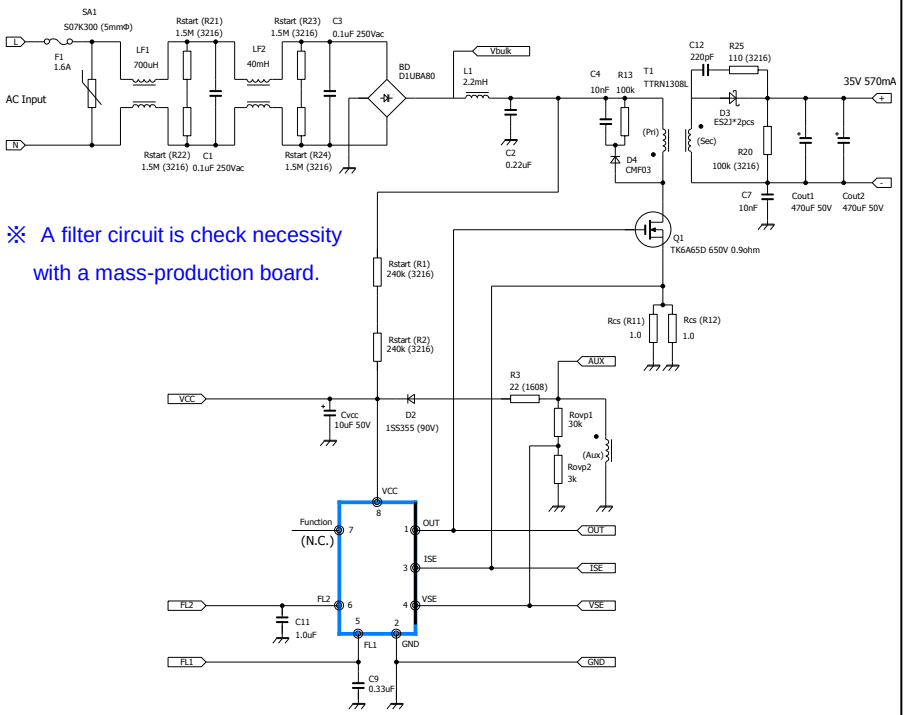
IR3M92N4 T-8 20W Reference Design & BOM

Circuit diagram



※ A filter circuit is check necessity with a mass-production board.

BOM

○ Vin=85V～265VAC / Pout = 20W(35V/570mA) BOM LIST

2013/3/16 Ver.1

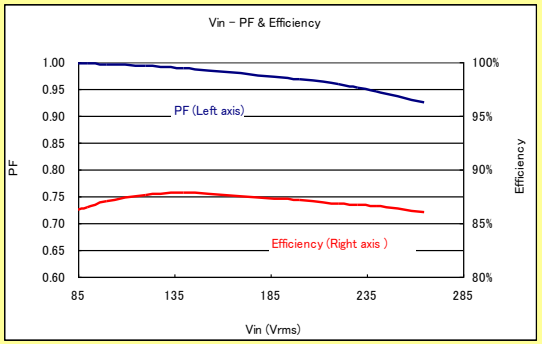
Ref. No.	Description	Model number	Manufactuer	Qty	Remarks
T1	Trans coil	TTRN1308L	Tokyo Coil Engineering	1	Np:20T(L=0.3mH), Ns:9T, Na:5T
L1	Choking coil 2.2mH	CDRH129HF-222	Sumida	1	※Check mains terminal interface voltage
F1	Fuse AC250V 1.6A	AC250V 1.6A	Littelfuse	1	8.5＊4mm, pitch5.08mm, φ d=0.6
SA1	Varistor 300V 7mmφ	S07K300	EPCOS	1	
BD1	Diode bridge rectifier	D1UBA80	Shindengen	1	
LF1	Line Filter 700uH			1	
LF2	Line Filter 40mH EE12			1	
C1	X-capacitor (0.1uF 250Vac)			1	
C3	X-capacitor (0.1uF 250Vac)			1	
R21,22,23,24	Resistor 1.5M (3216)			4	
C2	Film capacitor (0.22uF 450Vdc)	ECQE4224	Panasonic	1	
C4	10nF (630V)		Rubycon	1	
C7	Y capacitor 10nF	DE1E3KX103M	Murata	1	
C9	Capacitor 0.33uF (1608)	0.47uF (1608)		1	
C11	Capacitor 1uF (2125)	1uF (2125)		1	
C12	Capacitor 220pF (3216)	220pF (2126)		2	
C13	Capacitor 22nF (1608)	22nF (1608)		1	
CVCC	Electrolytic Capacitor 22uF 50V	VXF, 22uF, 50V	Rubycon	1	
COUT1	Electrolytic Capacitor 470uF 50V	VXJ 470uF	Rubycon	1	φ 12.5mm
COUT2	Electrolytic Capacitor 470uF 50V	VXJ 470uF	Rubycon	1	φ 12.5mm
D2	Switching diode	1SS355	Rohm	1	
D3	Fast recovery diode	RS2J	Taiwan semiconductor	2	
D4	Fast recovery diode	CMF03	Toshiba	1	
R1(RSTART-1)	Resistor 180k (3216)	180k (3216)		1	RSTART = (RSTART-1+RSTART-2)
R2(RSTART-2)	Resistor 180k (3216)	180k (3216)		1	RSTART = (RSTART-1+RSTART-2)
R3	Resistor 22 (1608)	22 (1608)		1	
R8(ROVP1)	Resistor 30k(1608)	30k (1608)		1	
R9(ROVP2)	Resistor 3k(1608)	3k (1608)		1	
R11(RCS-1)	Resistor 1.0 (3216)	1.0 (3216)		1	RCS = (RCS-1//RCS-2)
R12(RCS-2)	Resistor 1.0 (3216)	1.0 (3216)		1	RCS = (RCS-1//RCS-2)
R13	Resistor 100k 1W (Axial)	MO (100k 1W)	KOA	1	
R20	Resistor 100k (3216)	100k (3216)		1	
R21	Resistor 1.0k (1608)	1.0k (1608)		1	
R22	Resistor 1k (3218)	1k (3218)		1	
R25	Resistor 110 (3216)	110 (3216)		1	
Q1	FET	TK6A65D	Toshiba	1	
IC1	SOP-8	IR3M90kai	SHARP	1	
Total				42	

IR3M92N4 T-8 20W Vin=85V~265V / Pout=20W

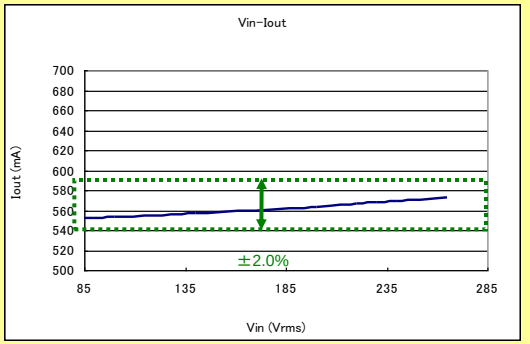
Specification

- Input Voltage：AC85V ~ AC265V
- System：Isolation　(Flyback)
- Output：35V/570mA/20W
- Efficiency：87%(typ)
- Power Factor: > 0.9
- Iout ±2.0%@Vin=85-265V&Vo=35V
- Ripple：　59%@Vin=100V

Vin vs. PF & Eff.

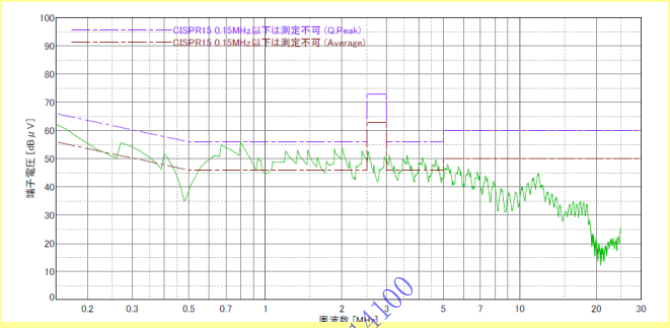


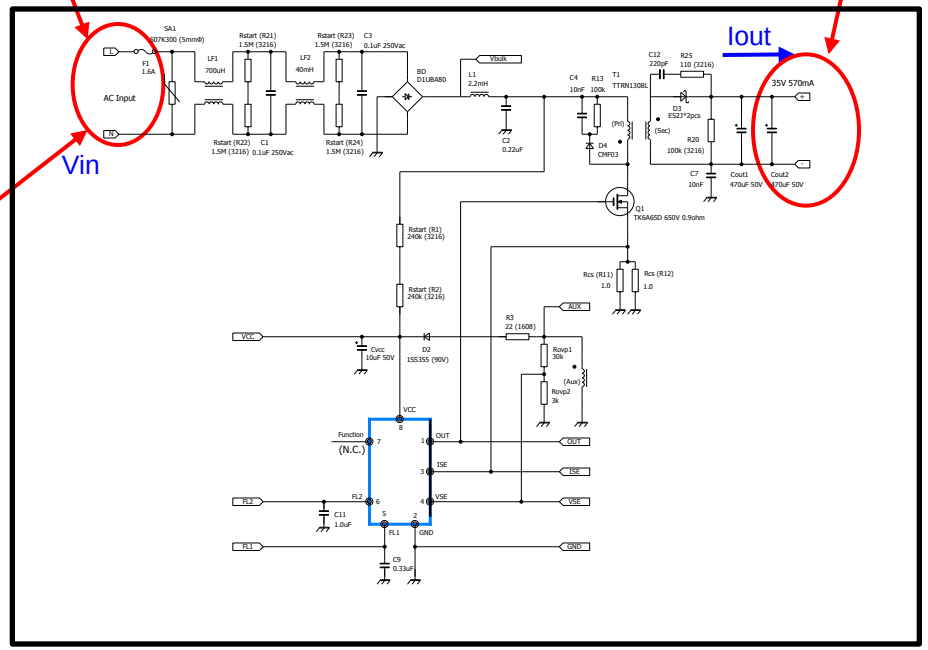
Vin vs. Iout



Conducted EMI

Vin =230V





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