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sense and simplicity

Subject: Power Supply LG
date: September 2011

Theo Heijnen
Consumer Care

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Overview

Supplier: LGiT					
Article Id	**Description**	**Platform**			**Remarks**
2722 171 90326	POW SUPP MOD PSL 37 PLDD-P014A B	TV550 - Singapore			37PFL76X6H/T/M/K
2722 171 90318	POW SUPP MOD PSL 40 PLDE-P007A B	TV550 - Singapore			40PFL5806K 40PFL66X6H/T/M/K /
2722 171 90321	POW SUPP MOD PSL 55 PLDK-P011A B	TV550 - Singapore			55PFL6606H/T/M/K/D /
8204 001 56271	POW SUPP MOD PSU 32 PSLC-P019A B		TV550 - Bruges		32PFL9606H/T/M/K
8204 001 56281	POW SUPP MOD PSL 37 PSLD-P020A		TV550 - Bruges		37PFL9606H/T/M/K
2722 171 90361	POW SUPP MOD PSL 40 PLDE-P017A B			MTK - Singapore	40PFL56X6H/12/60/58
2722 171 90418	POW SUPP MOD PSL 55 PLDK-P021A B	TV550 - Singapore			55PFL7606H/T/M/K
2722 171 90441	POW SUPP MOD PSL 46 PLDG-P009A (1.1)B	TV550 - Singapore			46PFL5X06H/K / 46PFL6XX6H/T/M/K /

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1. Electrical SPEC

◆ LED Driver SPEC

Item	Symbol	Condition	Min	Typ	Max	Unit	Remarks
LED driver output power	Pout	BL-I-CTRL=100% BL-DIM1=100%	-	**See next slide**	*	W	Typical LED current output
Back light ON/OFF Control	BL ON_OFF	LED ON = High	2.4	-	3.3	Vdc	-
		LED OFF = Low	0.0	-	0.4		
BL-I-CTRL , BL-DIM1 input	BL-I-CTRL, BL-DIM1	High	2.4	-	3.3	V	-
		Low	0.0	-	0.4		
BL-I-CTRL duty ratio	BL-I-CTRL duty	BL-I-CTRL freq=10KHz	0	-	100	%	External input from SSB
BL-I-CTRL freq	BL-I-CTRL freq	-	9.8K	10K	10.2K	Hz	Depending on SSB output
Burst (PWM) Frequency	Fb	-	98	-	362	Hz	External input from SSB
PWM duty ratio	PWM duty	at 320Hz	5	-	100	%	External input from SSB
LED driver output voltage	V LED	BL-I-CTRL=100% BL-DIM1=100%	*	**See next slide**	*	V	One LED driver output with 5 LED strings connected in parallel
LED driver output current	ILED (Min)	BL-I-CTRL=0% BL-DIM1=100%	182	210	238	mA	One LED driver output with 5 LED strings connected in parallel Tol=4.5%
	ILED (Max)	BL-I-CTRL=100% BL-DIM1=100%	602	630	658		

◆ Mode of operation

Standby	BL_ON-OFF	3V3stdby	12Vssb	Vsnd	Vbolt-on	HV	Note
High	Low	ON	OFF	OFF	OFF	OFF	Standby
Low	Low	ON	ON	ON	ON	OFF	Semi-standby
Low	High	ON	ON	ON	ON	ON	ON

◆ SMPS SPEC

Symbol	3V3stdby	12Vssb	Vsnd	LED-driver	Val
Nominal voltage	3.3V	12.3V	24.5V	See display-specification	12.3V
Voltage tolerance	± 3%	± 5%	20V ~ 27V		± 5%
Min. Current (A)	0	0.1	0		0
Nom. Current (A)	0.1	2.2	0.3		1.1
Max. Current (A)	0.2	2.8	2.2		1.1
Peak Current (A)	0.5	4.5	2.2		1.7
Ripple and noise	50mV	100mV	200mV		100mV
Ground	GND1	GND1	GND_SND		GND_AL

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Delta's

Description	Pout (W) (Typ.)	VLED (V)			Remarks
		min	typ	max	
POW SUPP MOD PSL 37 PLDD-P014A B	73	58	64	70	37PFL76X6H/T/M/K
POW SUPP MOD PSL 40 PLDE-P007A B	58	101	112	132	40PFL5806K 40PFL66X6H/T/M/K /
POW SUPP MOD PSL 55 PLDK-P011A B	102	116	128	140	55PFL6606H/T/M/K/D /
POW SUPP MOD PSU 32 PSLC-P019A B	51	28,8	32	35	32PFL9606H/T/M/K
POW SUPP MOD PSL 37 PSLD-P020A	57	58	64	74	37PFL9606H/T/M/K
POW SUPP MOD PSL 40 PLDE-P017A B	44	95	106	117	40PFL56X6H/12/60/58

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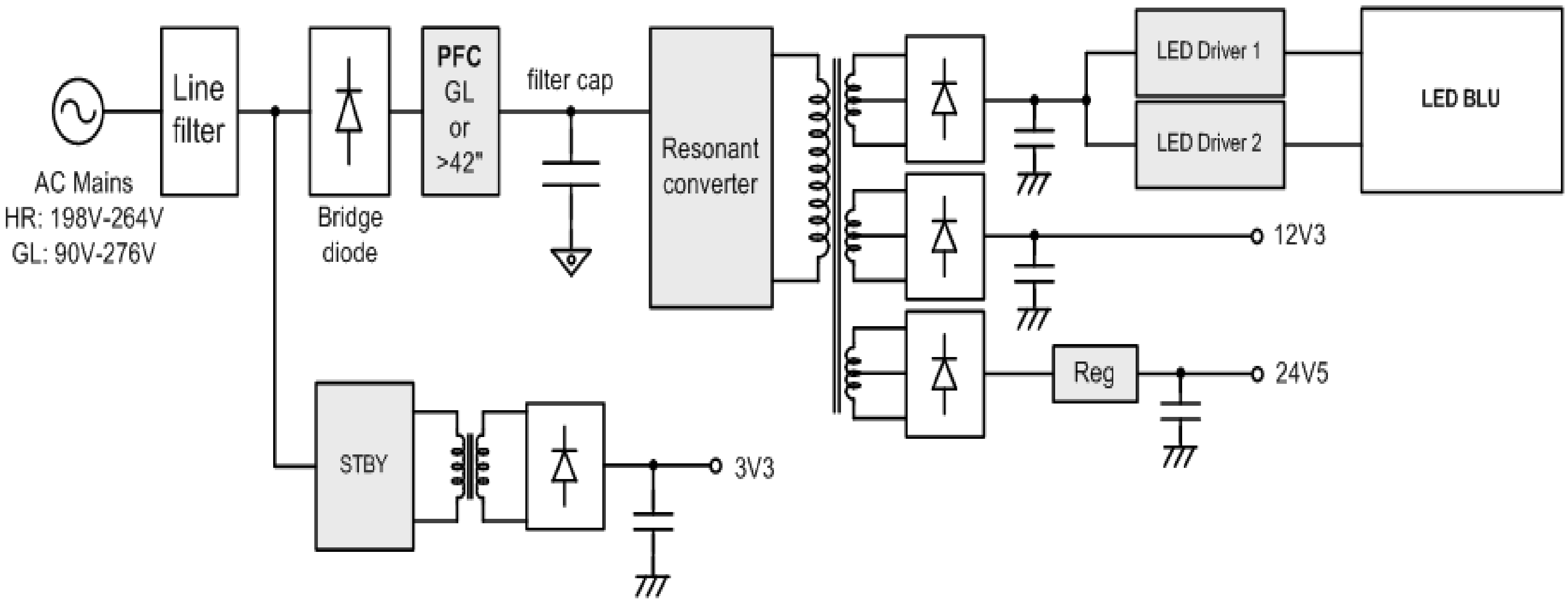
2. Power Supply Block diagram



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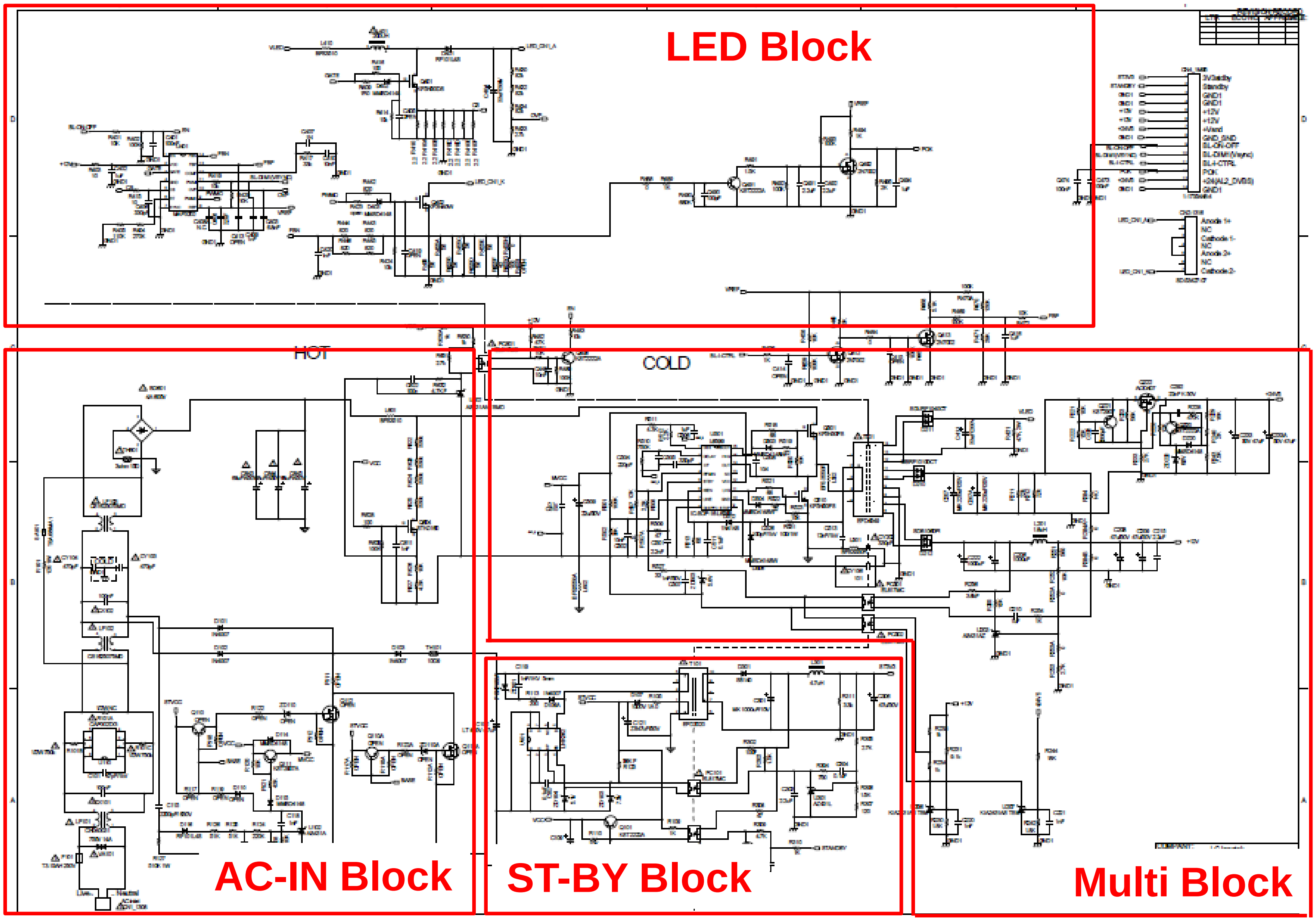
(Schematic)



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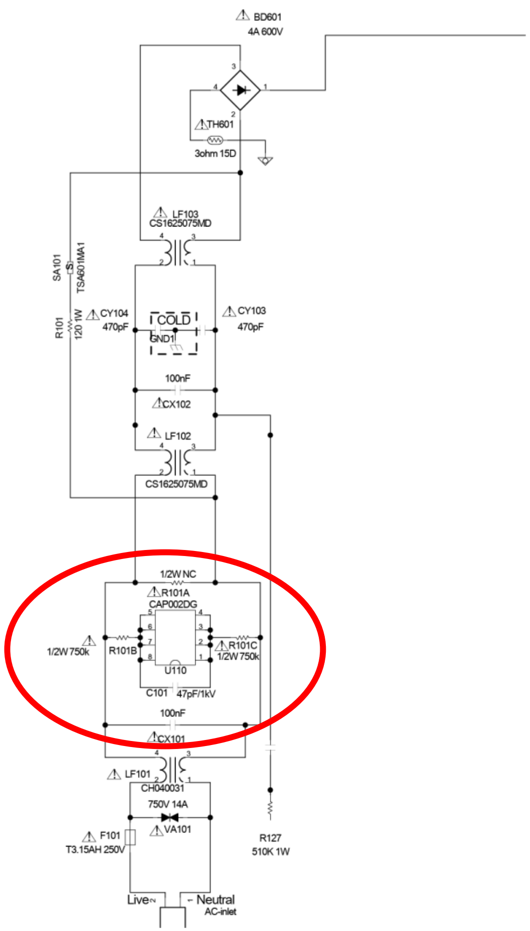
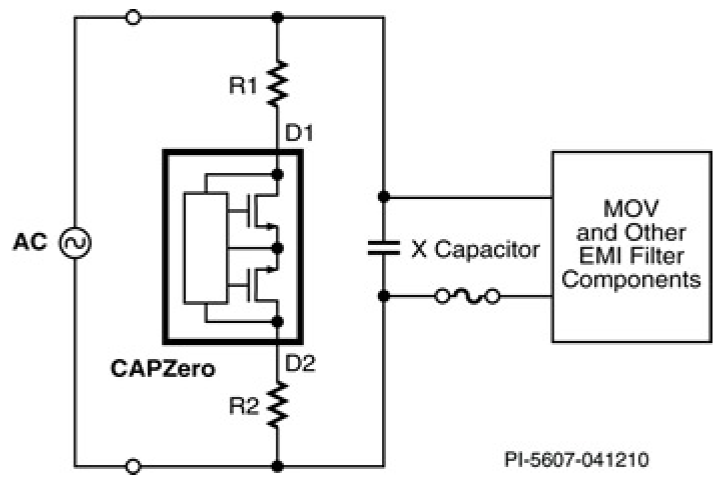
Mains Filter





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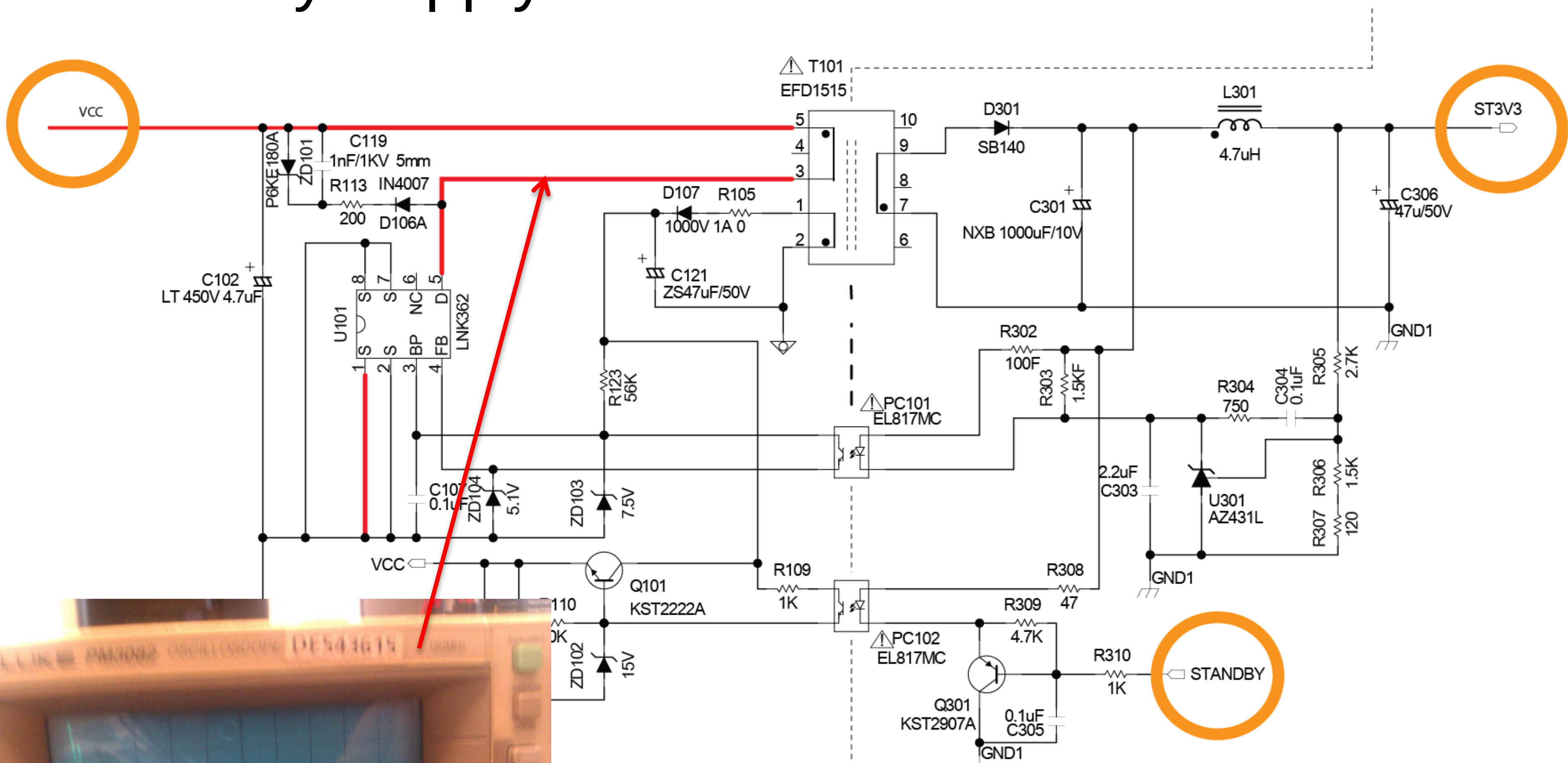
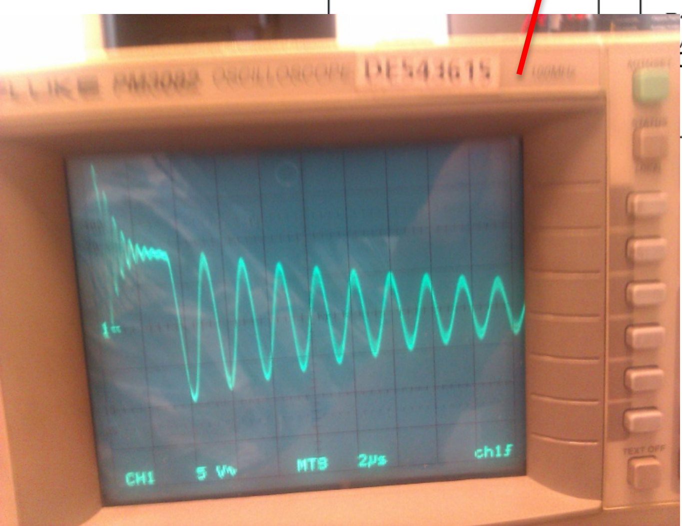
Stand By Supply





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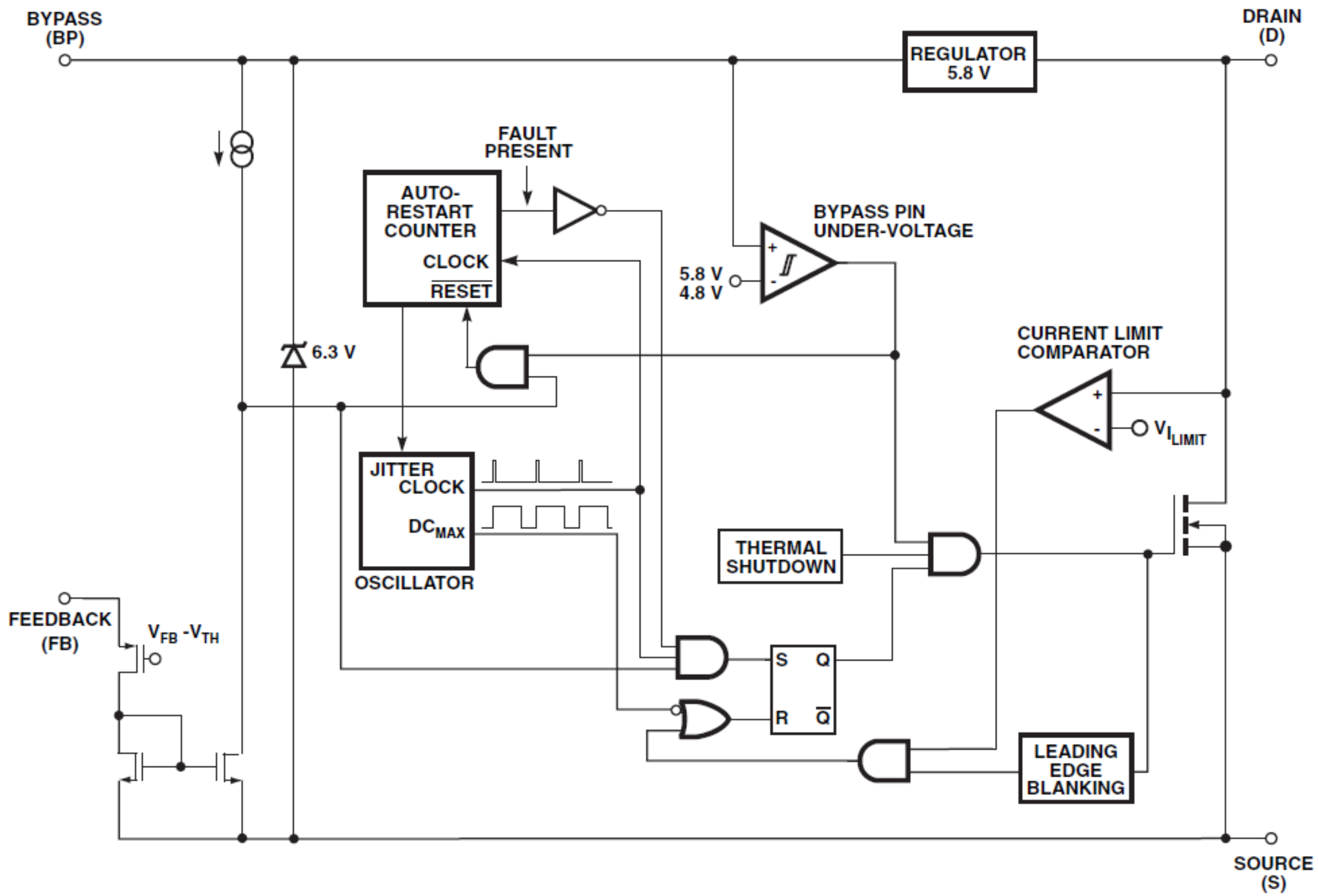

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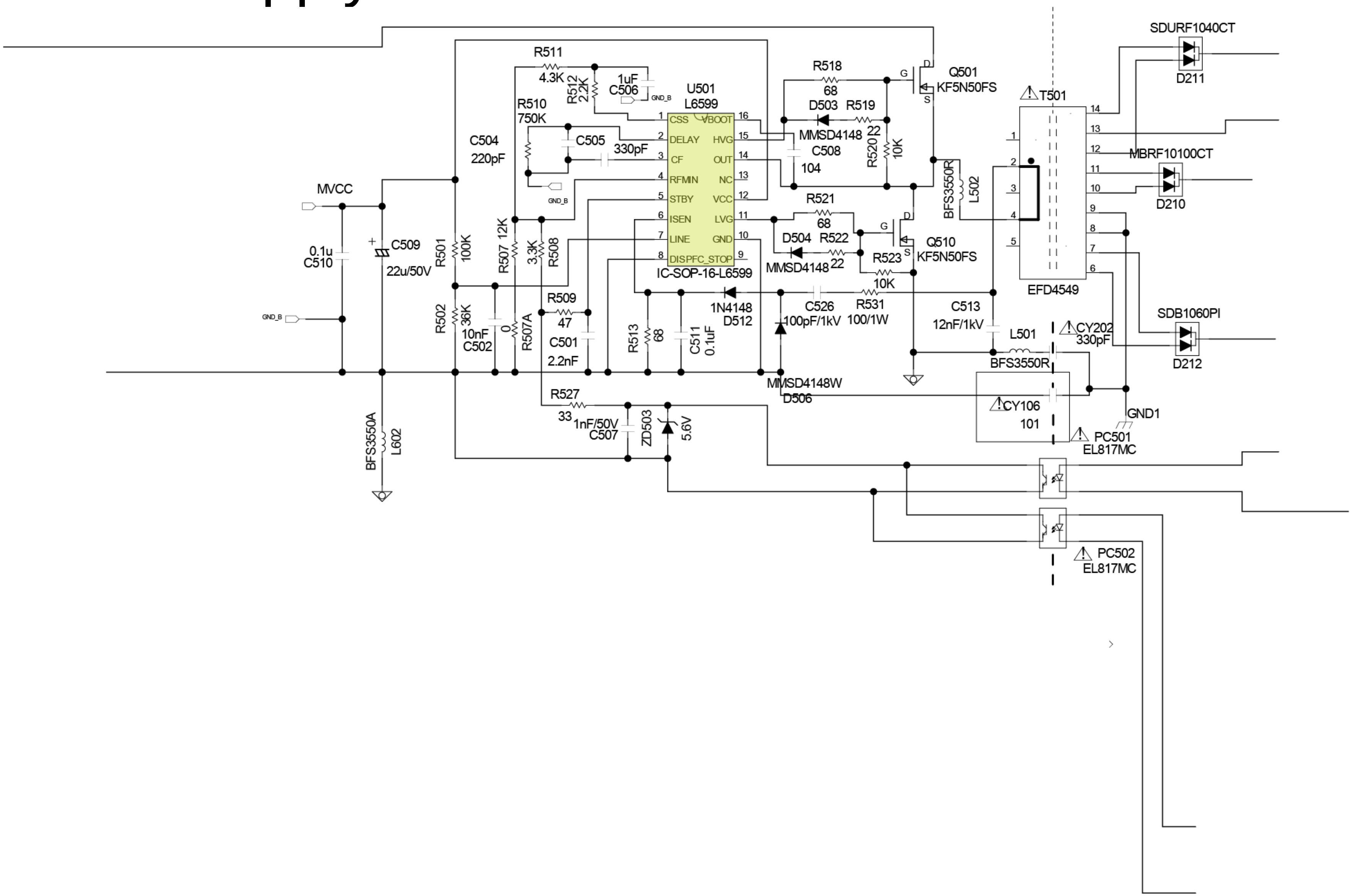
Main Supply



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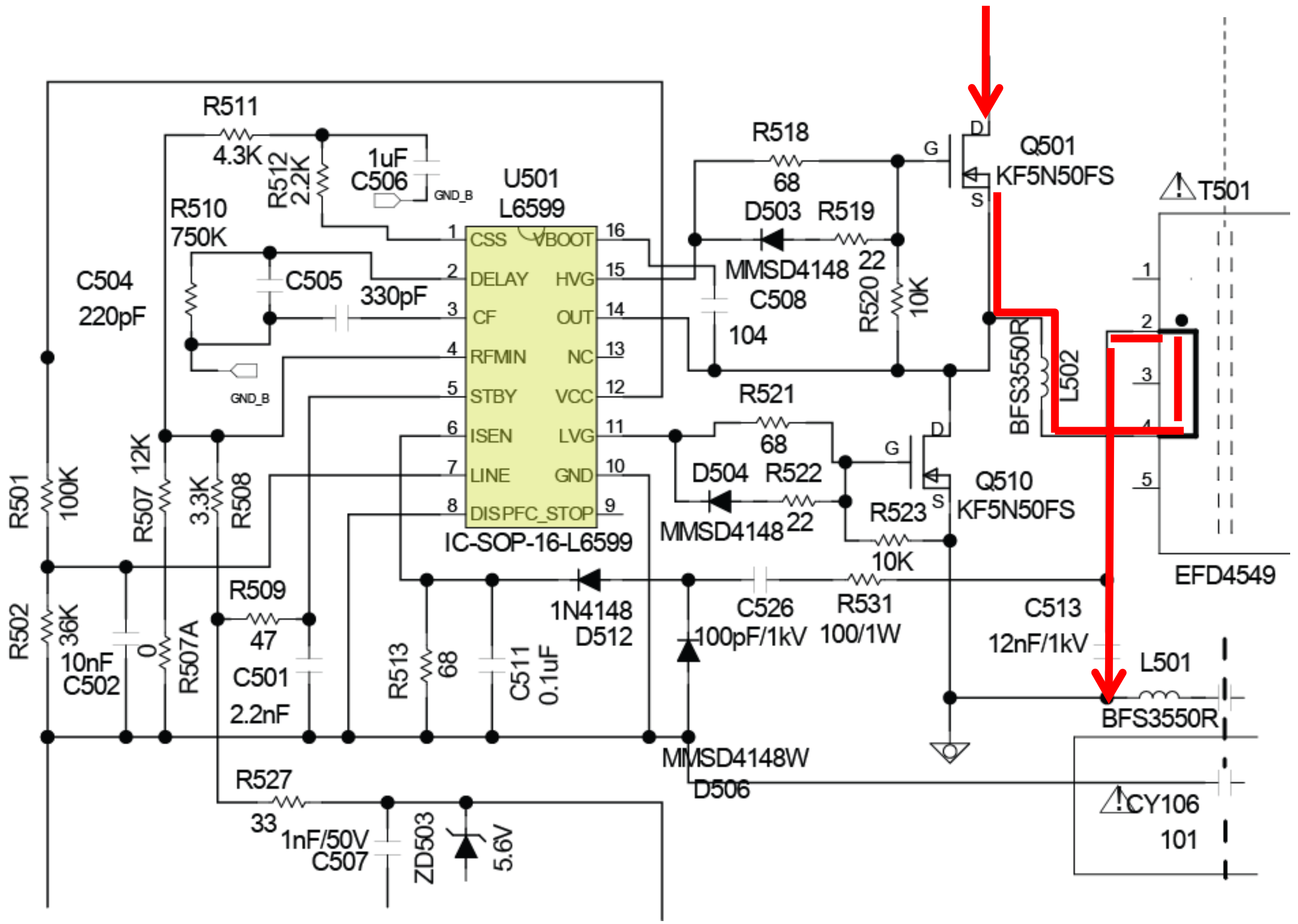
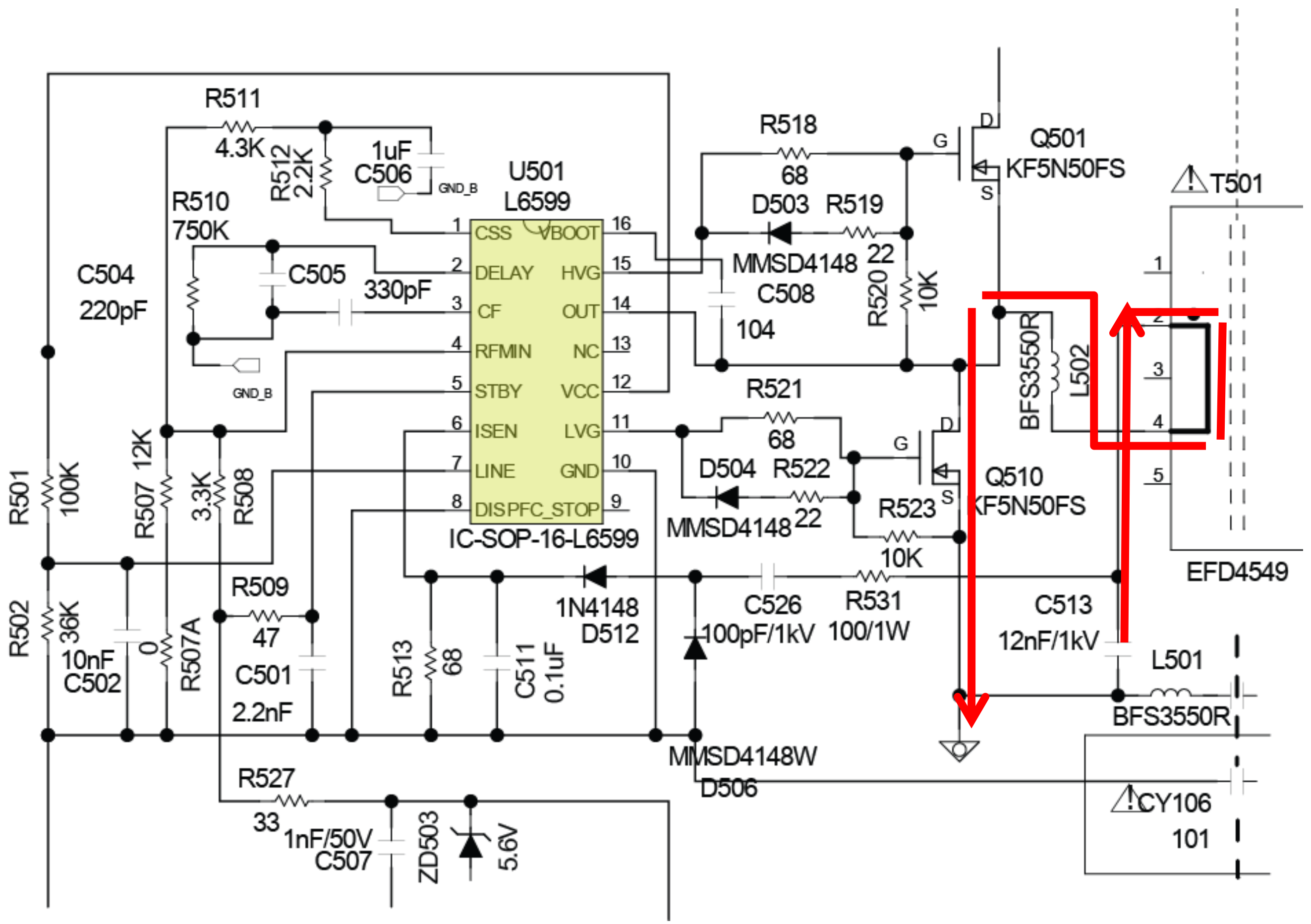
1e Sequence

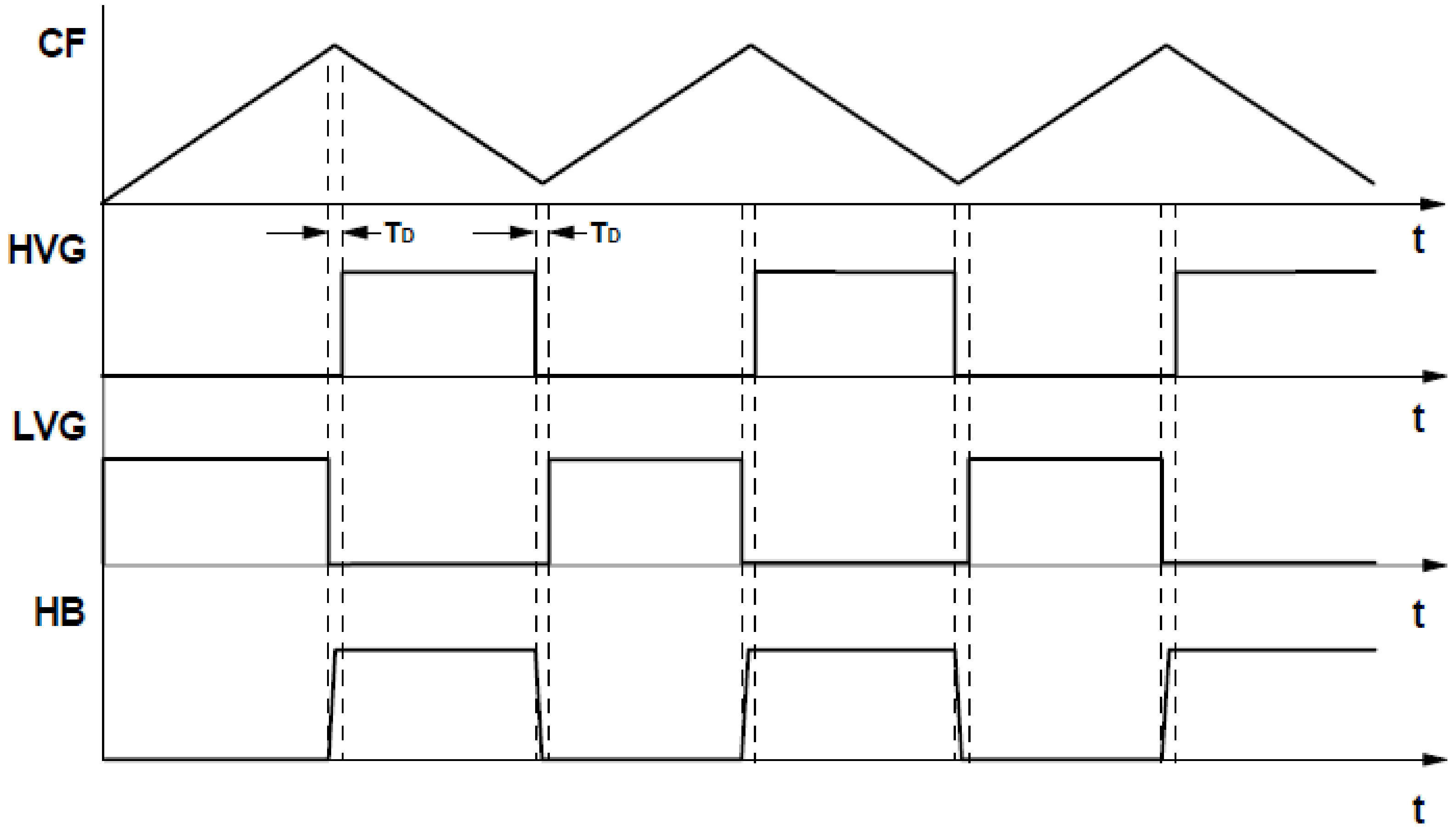


2e Sequence

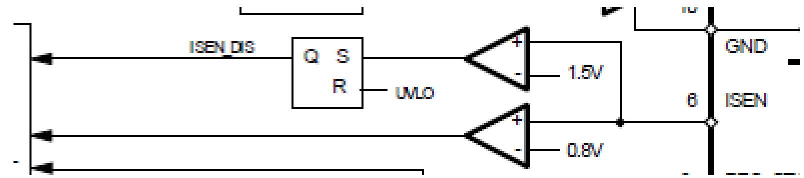


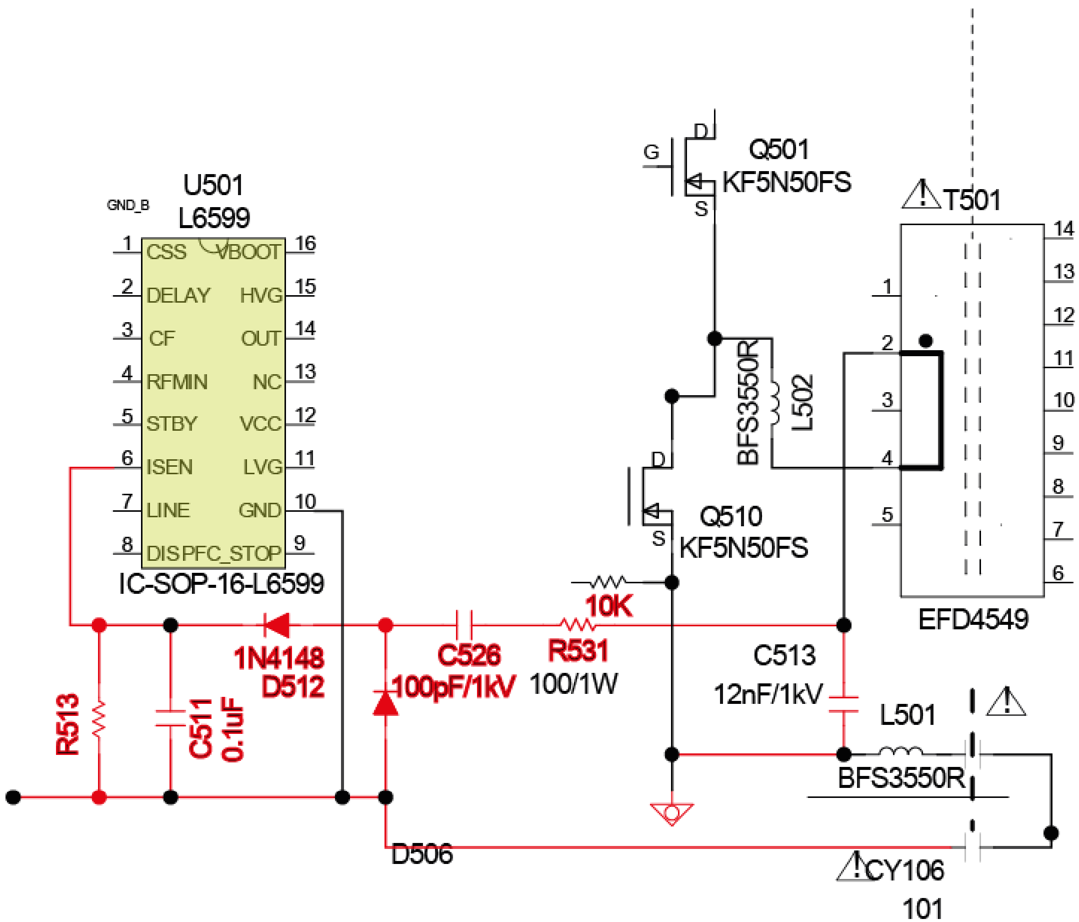
R511
4.3K
R512
2.2K
1uF
C506
GND_B
U501
L6599
R510
750K
C504
220pF
C505
330pF
CSS
VBOOT
DELAY
HVG
CF
OUT
RFMIN
NC
STBY
VCC
ISEN
LVG
LINE
GND
DISPFC_STOP
IC-SOP-16-L6599
R518
68
D503
R519
MMSD4148
22
C508
104
R520
10K
Q501
KF5N50FS
T501
R521
68
D504
R522
MMSD4148
22
R523
10K
Q510
KF5N50FS
BFS3550R
L502
EFD4549
R501
100K
R507
12K
3.3K
R508
R502
36K
10nF
C502
0
R507A
R509
47
C501
2.2nF
R513
68
C511
0.1uF
1N4148
D512
C526
100pF/1kV
R531
100/1W
C513
12nF/1kV
L501
BFS3550R
MMSD4148W
D506
R527
33
1nF/50V
C507
ZD503
5.6V
CY106
101

Oscillator Waveform / Gate Driver

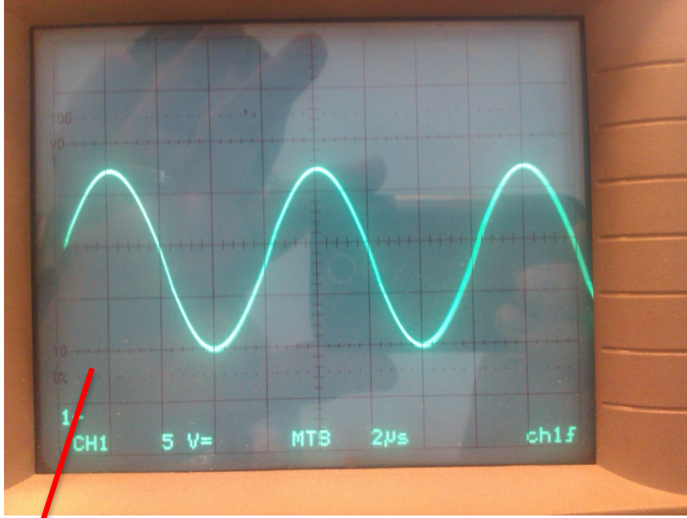


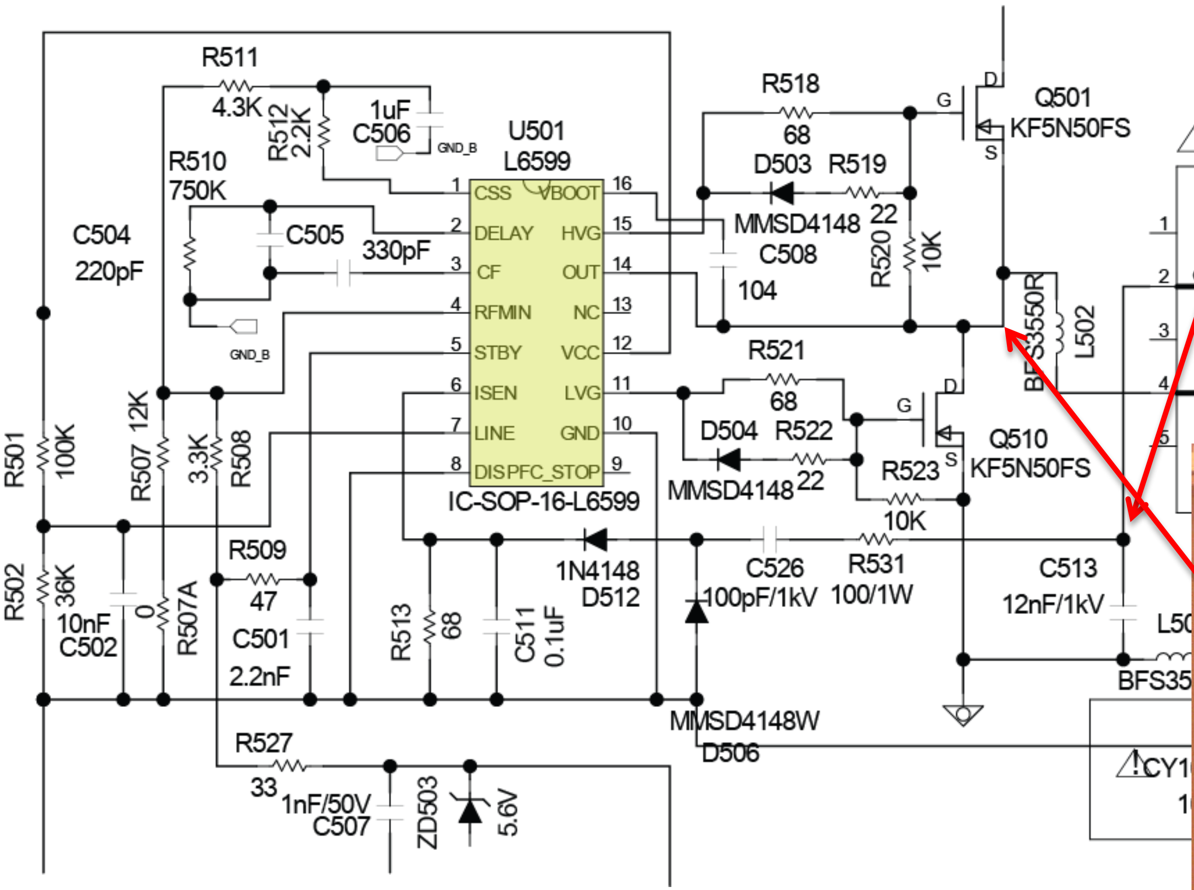
Current Sensing

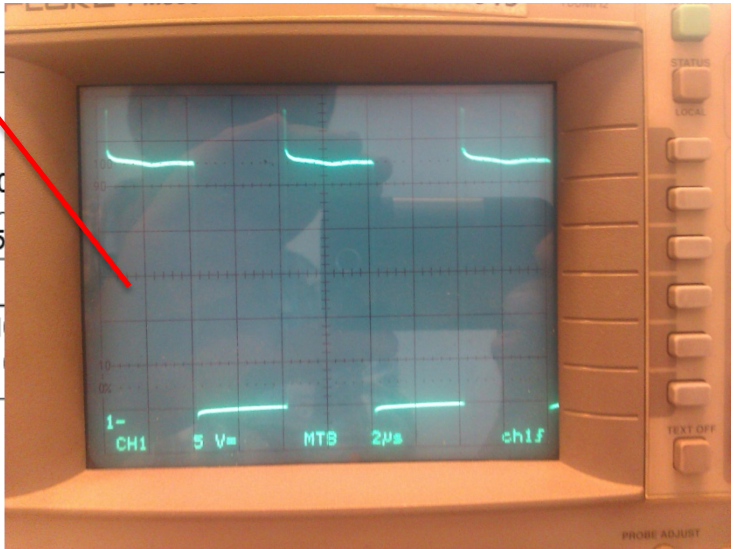




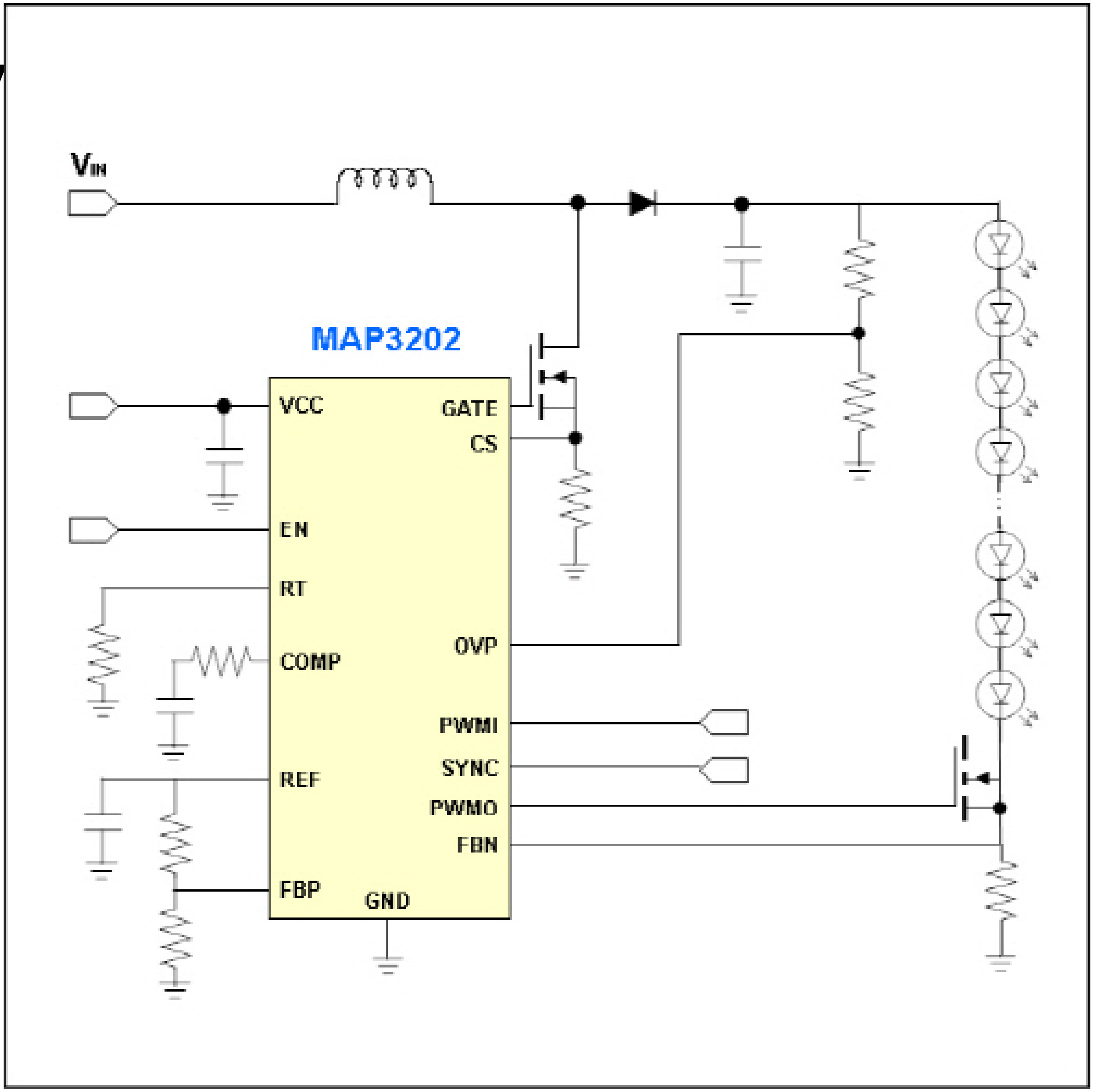
Measurements







LED Supply


VIN
MAP3202
VCC
GATE
CS
EN
RT
COMP
OVP
PWMI
SYNC
REF
PWMO
FBN
FBP
GND

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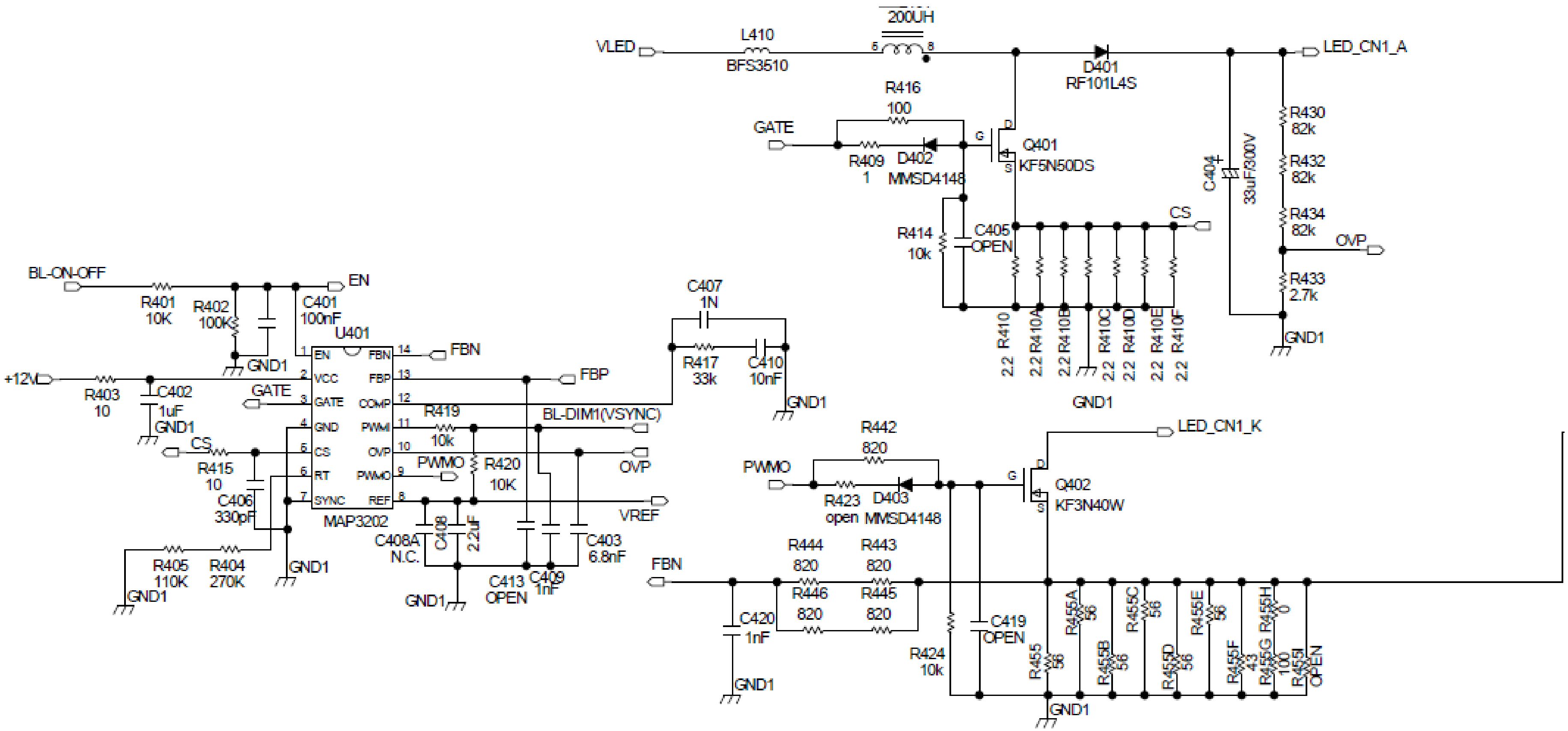

VLED
L410
BFS3510
200UH
D401
RF101L4S
LED_CN1_A
R416
100
GATE
R409
1
D402
MMSD4148
Q401
KF5N50DS
C404
33uF/300V
R430
82k
R432
82k
R434
82k
OVP
R433
2.7k
GND1
R414
10k
C405
OPEN
CS
R410
2.2
R410A
2.2
R410B
2.2
R410C
2.2
R410D
2.2
R410E
2.2
R410F
2.2
GND1
BL-ON-OFF
R401
10K
R402
100K
C401
100nF
EN
U401
GND1
FBN
FBP
+12V
R403
10
C402
1uF
GND1
GATE
CS
R415
10
C406
330pF
EN
VCC
GATE
GND
CS
RT
SYNC
FBN
FBP
COMP
PWMI
OVP
PWMO
REF
MAP3202
R419
10k
PWMO
R420
10K
BL-DIM1(VSYNC)
OVP
VREF
C407
1N
R417
33k
C410
10nF
GND1
C408A
N.C.
C408
2.2uF
C413
OPEN
C409
1nF
C403
6.8nF
GND1
R405
110K
R404
270K
GND1
GND1
LED_CN1_K
R442
820
PWMO
R423
open
D403
MMSD4148
Q402
KF3N40W
R444
820
R443
820
FBN
R446
820
R445
820
C420
1nF
GND1
R424
10k
C419
OPEN
R455
56
R455A
56
R455B
56
R455C
56
R455D
56
R455E
56
R455F
43
R455G
100
R455H
0
R455I
OPEN
GND1

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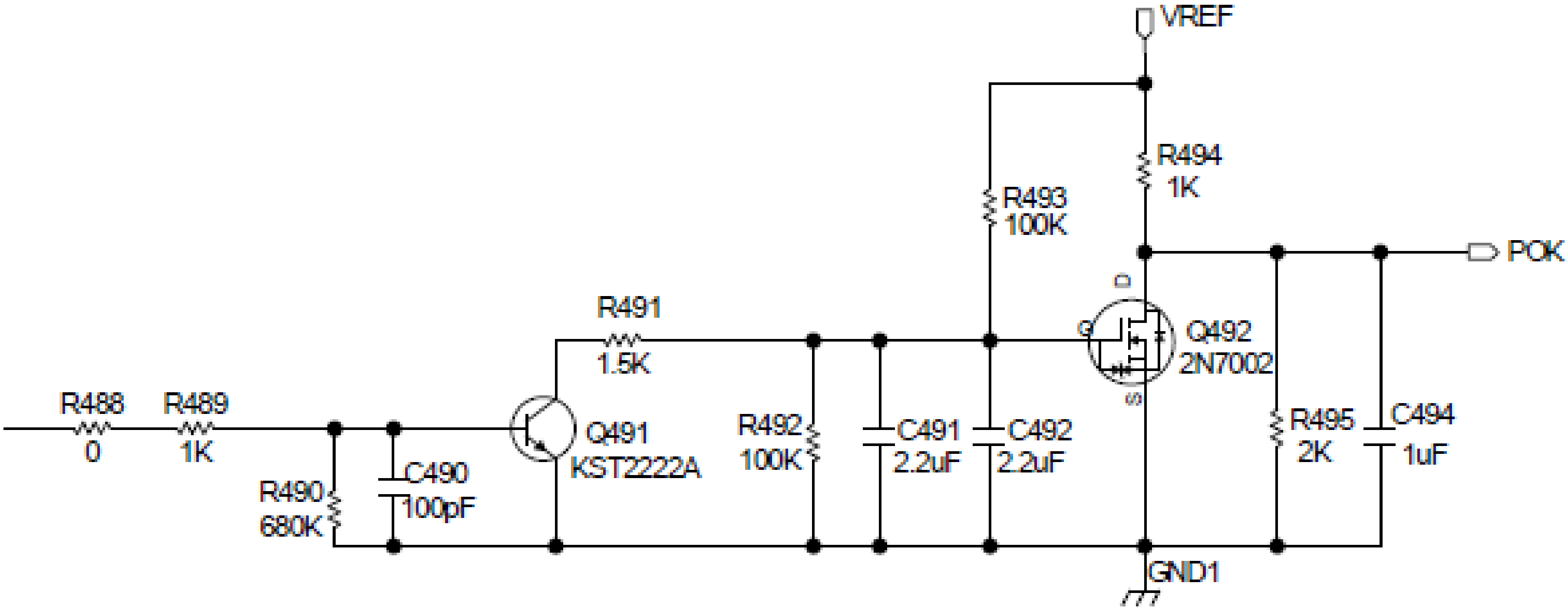
VREF
R494
1K
R493
100K
POK
D
R491
1.5K
G
Q492
2N7002
S
R488
0
R489
1K
Q491
KST2222A
R492
100K
C491
2.2uF
C492
2.2uF
R495
2K
C494
1uF
C490
100pF
R490
680K
GND1

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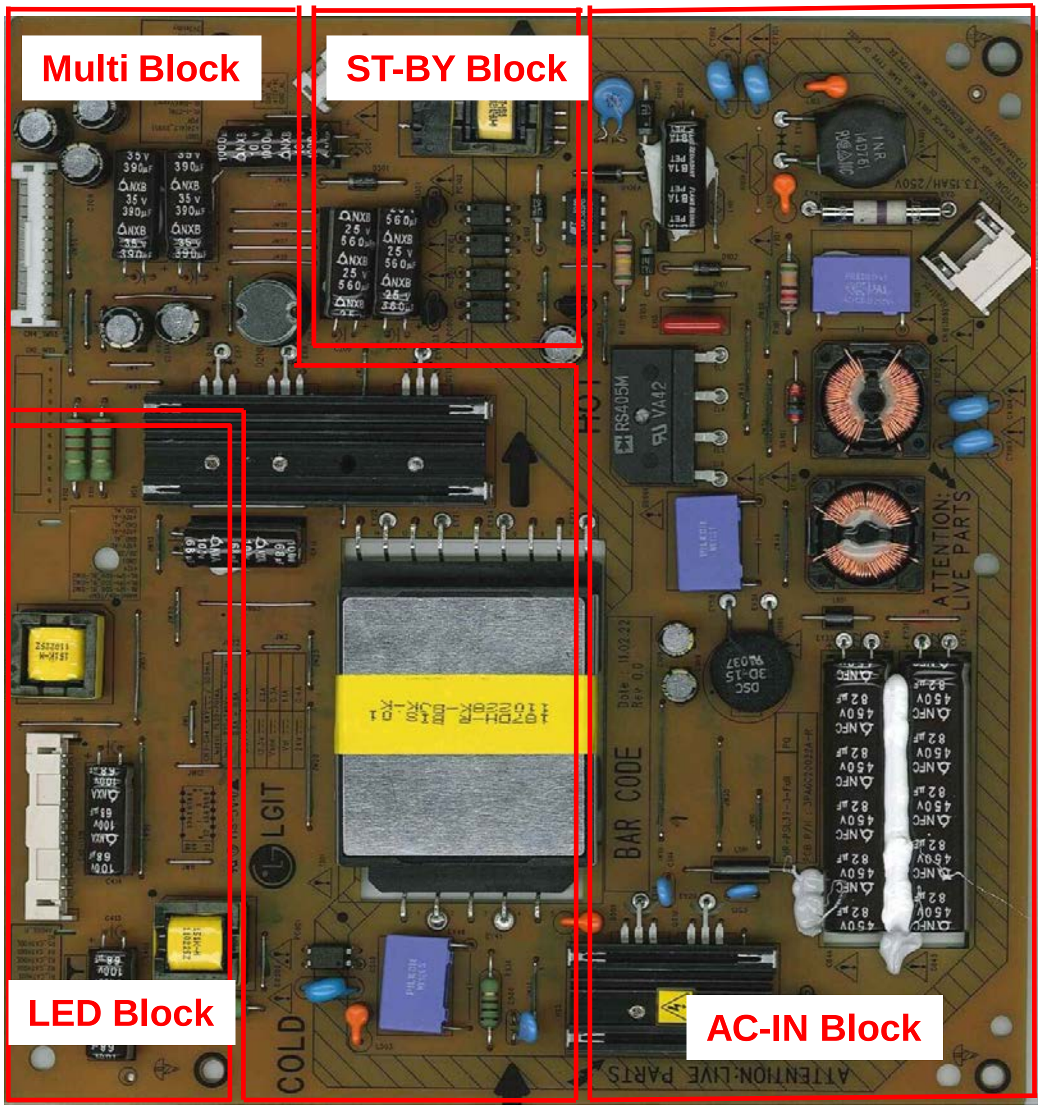
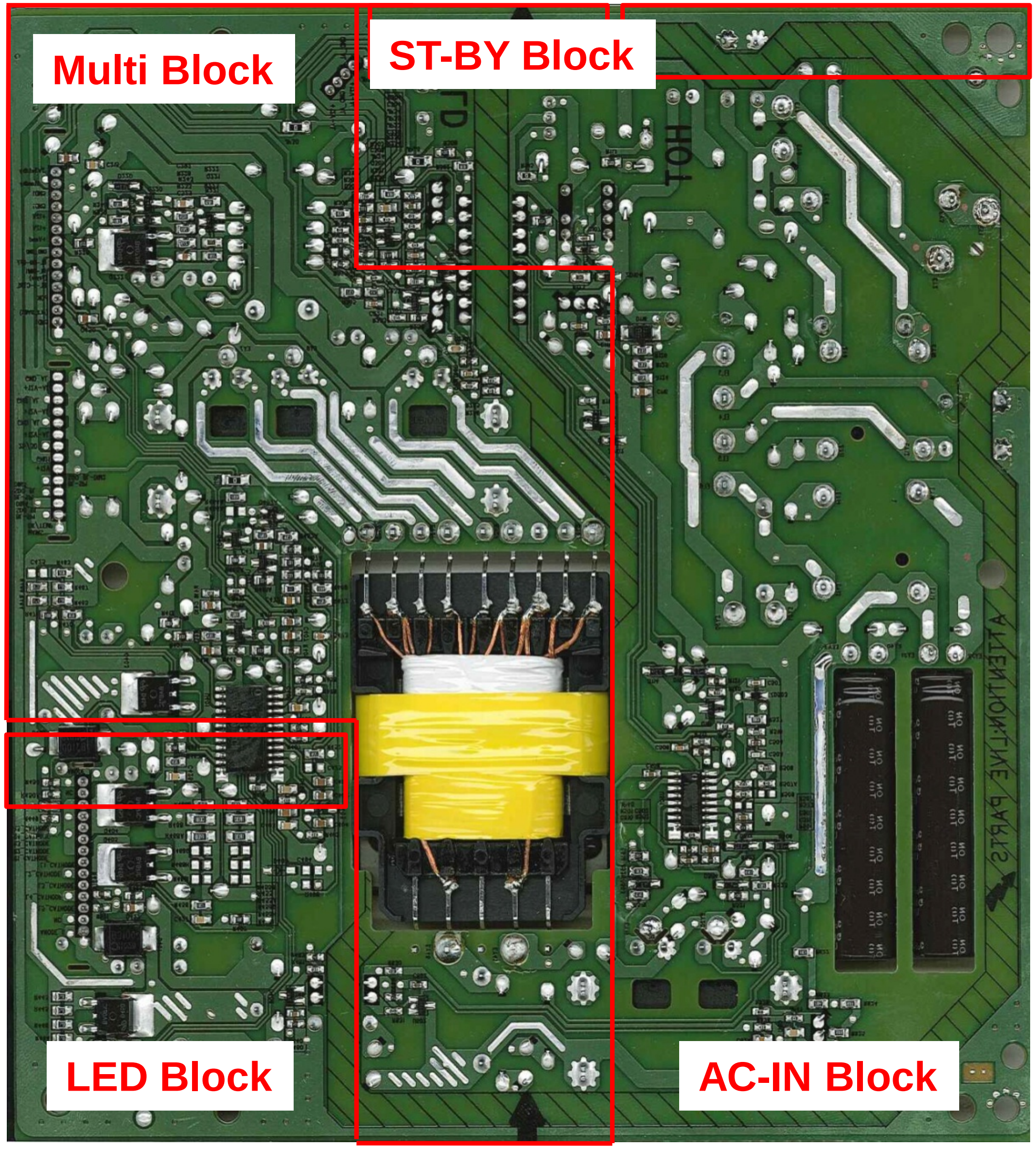
3. Block (Top side of sample)



(Bottom side of sample)

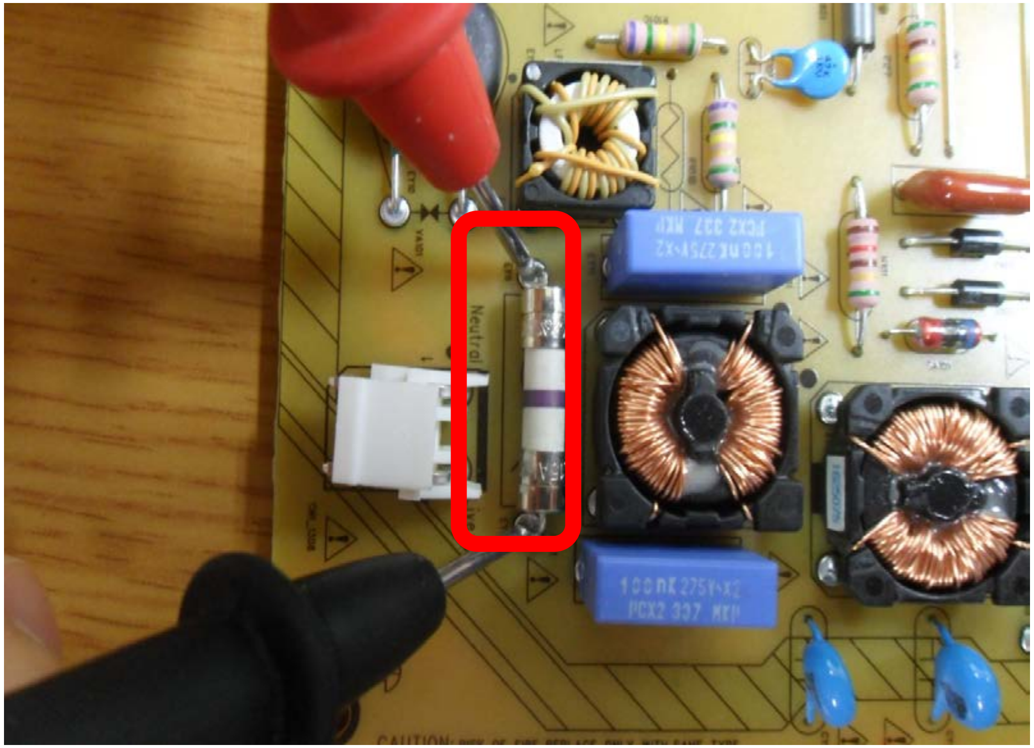


1. Check step

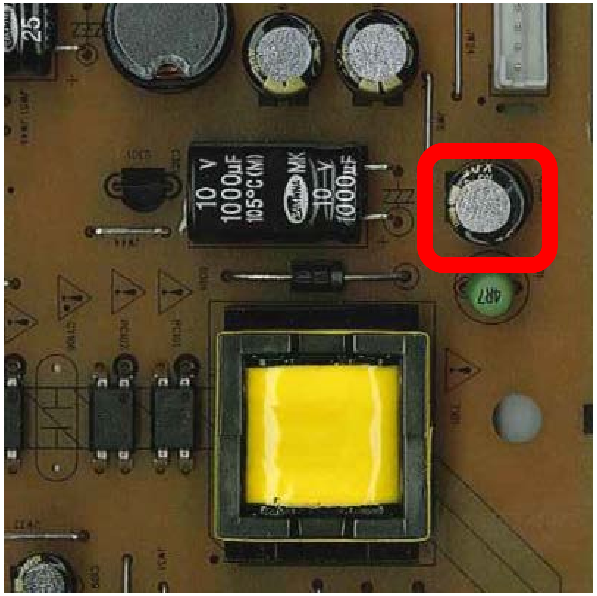
Check	First step	Second step
Normal operation	1) Fuse check	
Put the Vac 220V	2) STANDBY voltage level check	ST-BY block check (PC102, VCC…etc)
Put the low level voltage (GND) at STANDBY pin	3) PFC output (380V~400V) check Not applied PFC, the voltage is Vac* $\sqrt{2}$	PFC block check (VCC, IC…etc)
	4) Multi output check 24.5V and 12.3V	Multi block check (MVCC, IC…etc)
Put the high signal (3.3V) at BL_ON_OFF pin	LED output check	No turn on / a few time turn on issue
		5) Reference voltage check of LED Driver IC
		Needs detail analysis (this step is difficult to analyze, so study LED Drive IC)

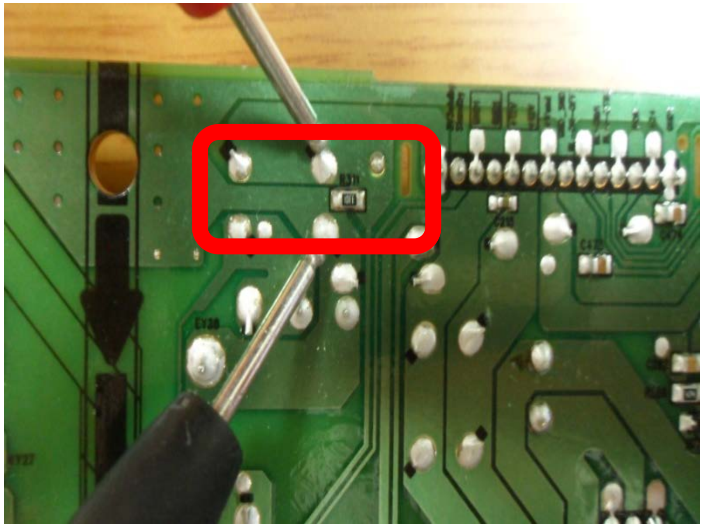
3. Checking point

1) Fuse check (F101)



2) Stand-by check (C306)



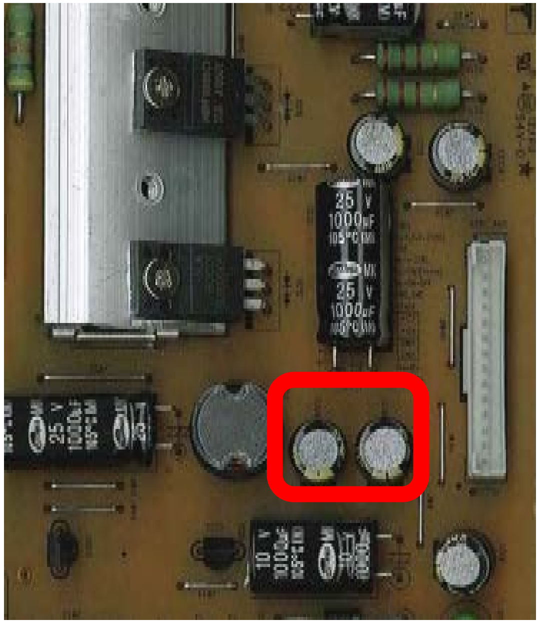


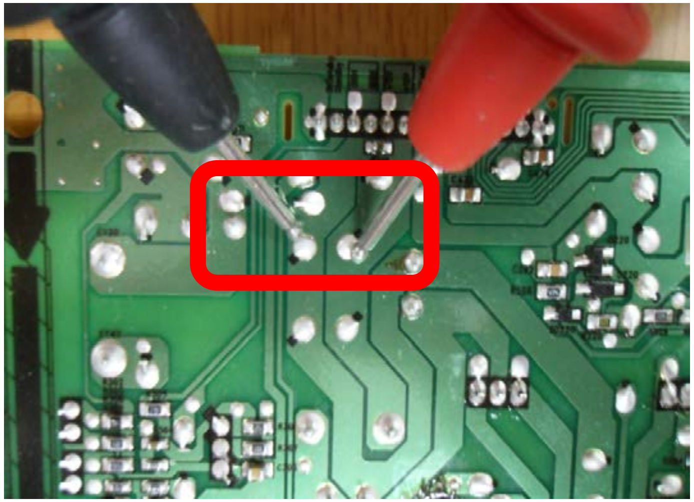
⋆ It has to be measured 3.3V. [using Digital Multi Meter]

3) PFC Voltage level (C644)

⋆ It has to be measured 380V~400V. [using Digital Multi Meter]
Not applied PFC, the voltage is 311V at 220V.

4) 12.3V Multi check (C208)

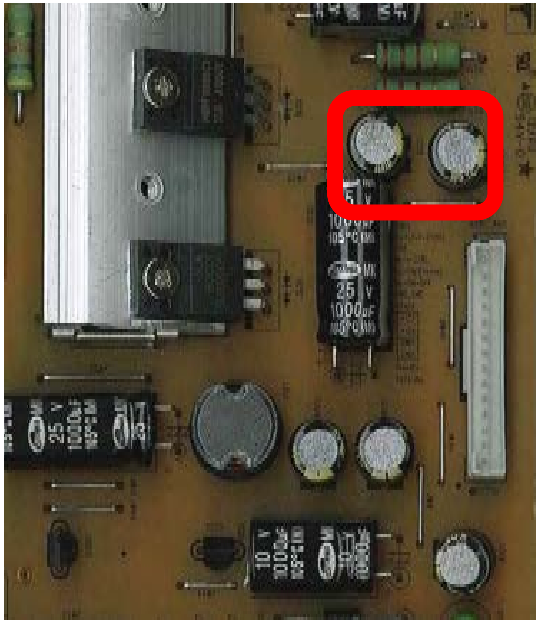




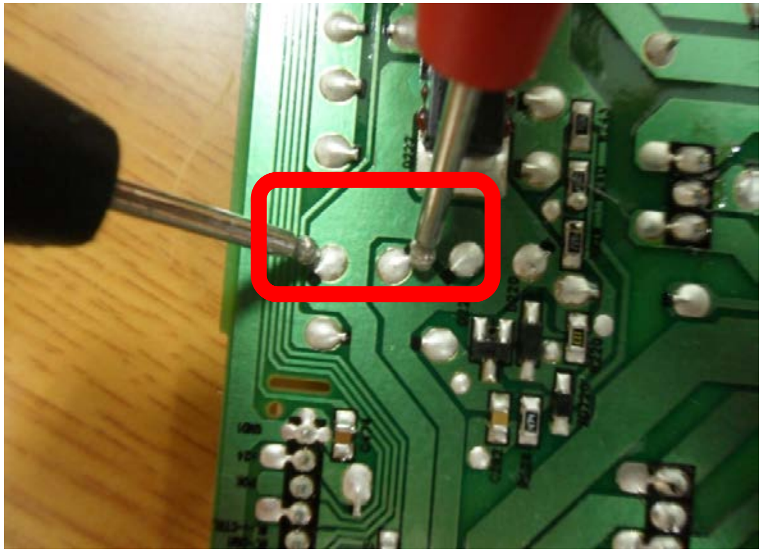
Multi 12.3V **Multi 12.3V**

* It has to be measured 12.3V. [using Digital Multi Meter]

4) 24.5V Multi check (C233)



Multi 24.5V



Multi 24.5V

* It has to be measured 24.5V. [using Digital Multi Meter]

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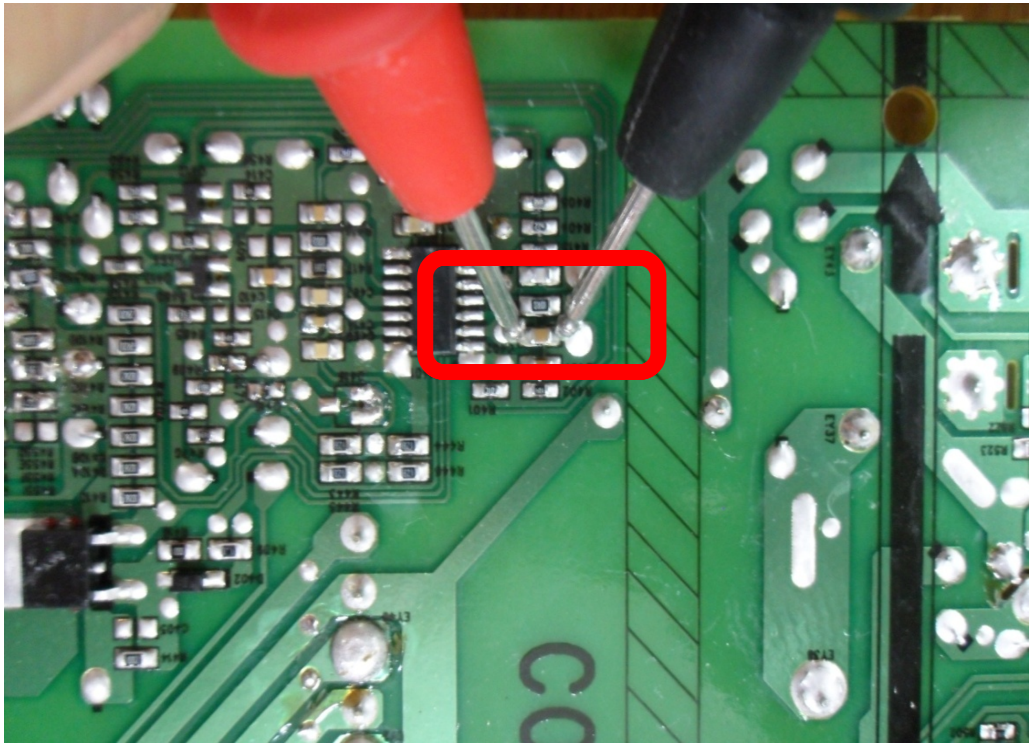
5) Reference voltage check of LED Driver IC (U401)



* It has to be measured roughly 12V. [using Digital Multi Meter]

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