



BYD BF1030

18W (80V 0.22A)

开关调亮度电源方案



Build Your Dreams



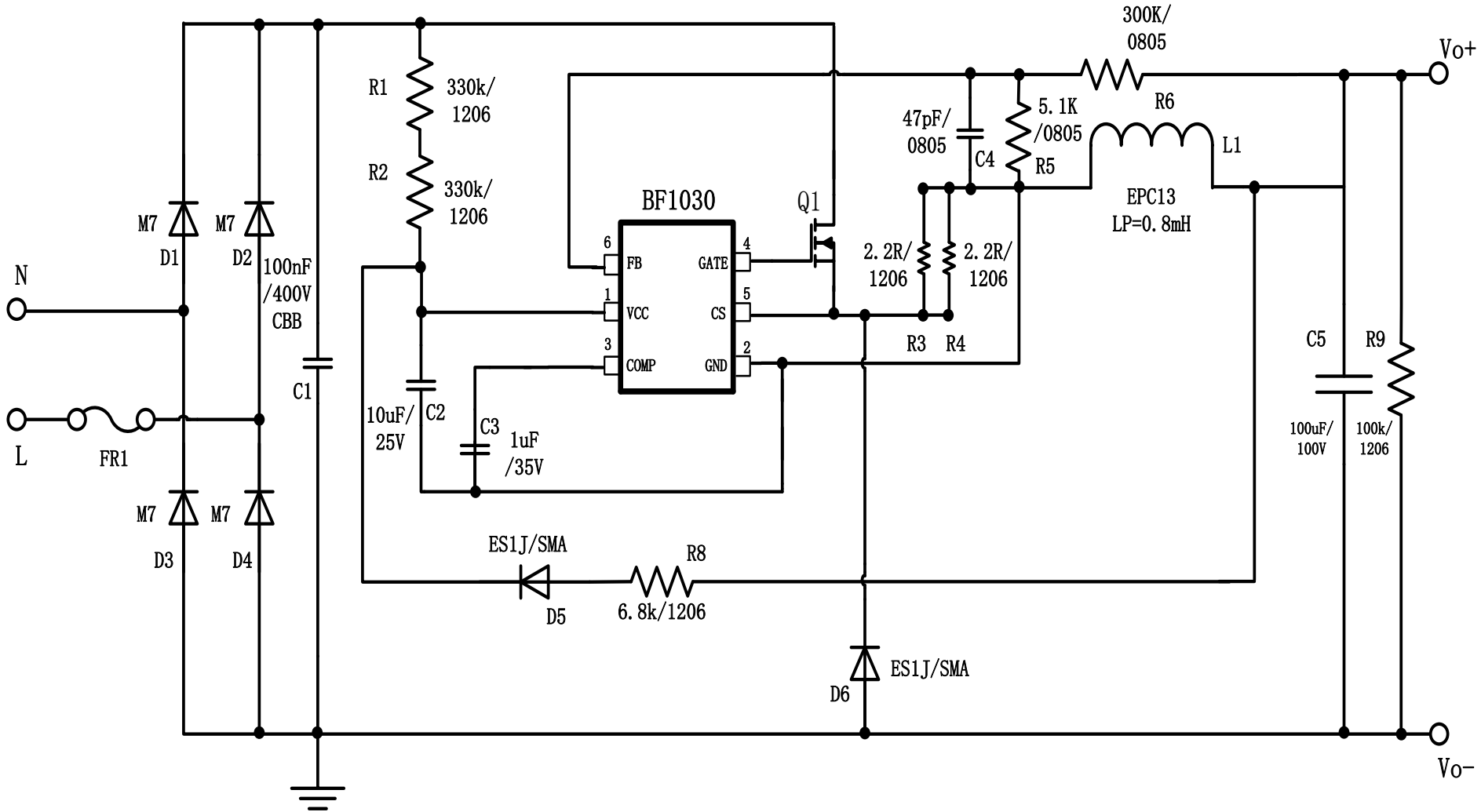
1. 基本特性	2
2. 原理图	3
3. 物料清单	4
4. 电感参数	5
5. 电流特性	6
6. 综合特性	7
7. PF曲线	8
8. Tdimmer波形	9
9. ipk波形	10
10. MOS VDS波形	11
11. 温升测试	12



1. 基本特性



- 输入电压范围:170-264VAC
- 输出规格:80V 220mA
- 效率>89%
- 恒流精度:±5%
- 高PF值

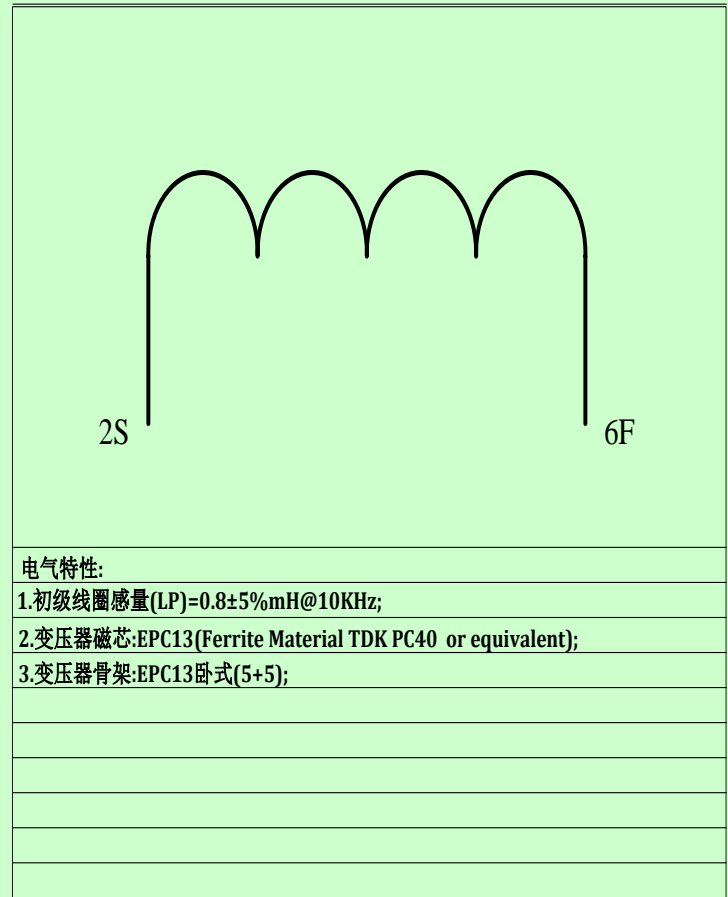
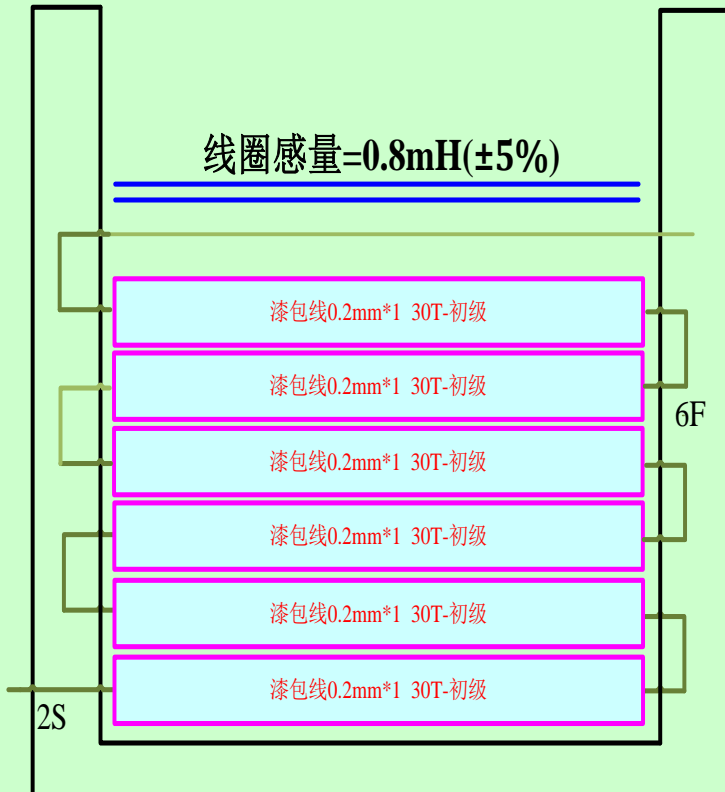




3. 物料清单



Item	Designator	Description	Qty
1	C1	CBB Capacitor 100nF/400V 105°C ±20%	1
2	C2	E-Capacitor 10uF/35V 5*11 105°C ±20%	1
3	C3	SMD Capacitor 0805 1uF/35V 105°C ±20% X7R	1
4	C4	SMD Capacitor 0805 47pF/35V 105°C ±20% X7R	1
5	C5	E-Capacitor 100uF/100V 10*12 105°C ±20%	1
6	R1	SMD Resistor 1206 330K ±1%	1
7	R2	SMD Resistor 1206 330K ±1%	1
8	R3	SMD Resistor 1206 2.2R ±1%	1
9	R4	SMD Resistor 1206 2.2R ±1%	1
10	R5	SMD Resistor 0805 5.1K ±5%	1
11	R6	SMD Resistor 0805 300K ±5%	1
12	R8	SMD Resistor 1206 6.8K ±1%	1
13	R9	SMD Resistor 1206 100K ±1%	1
14	D1 D2 D3 D4	SMD DIODE 1N4007 SMA	4
15	D5 D6	SMD DIODE ES1J 1A600V SMA	2
16	Q1	4N60 TO-252 4N/600V	1
17	IC1	PWM Controller IC BF1030 SOT23-6	1
18	L1	Transformer EPC13 Lp=0.8mH	1
19	FR1	Fuse 2A/250V	1
20	Total		23





		输入电压				
		180V	200V	220V	240V	260V
输出电压	80V	0.219A	0.221 A	0.221A	0.223A	0.223A
	70V	0.222A	0.221A	0.222A	0.224A	0.224A
	60V	0.223A	0.222A	0.222A	0.224A	0.226A
	50V	0.223A	0.223A	0.223A	0.226A	0.226A
	40V	0.224A	0.225A	0.226A	0.227A	0.227A
	30V	0.224A	0.225A	0.226A	0.227A	0.227A

备注:上述表格为demo板第一档的电流值测试结果，在不同输出电压和输入电压下测试所得。测试时输出接电子负载仪。

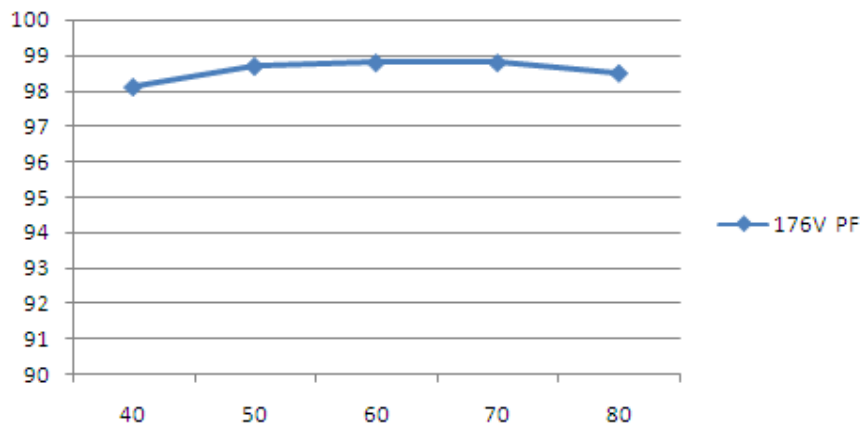


Vin (V)	Dimmer	Iout (mA)	Pin (W)	Vout (V)	Pout(W)	η (%)	f(KHz)
176Vac/ 50Hz	一档	0.218	18.47	76.9	16.76	90.76	59.5
	二档	0.113	8.25	64.3	7.27	88.07	30.8
	三档	0.02	1.14	48.1	0.94	82.46	19.3
265Vac/ 50Hz	一档	0.223	18.86	77.2	17.22	91.28	57.2
	二档	0.114	8.62	67.1	7.65	88.74	38
	三档	0.021	1.37	54.3	1.14	83.42	22.2

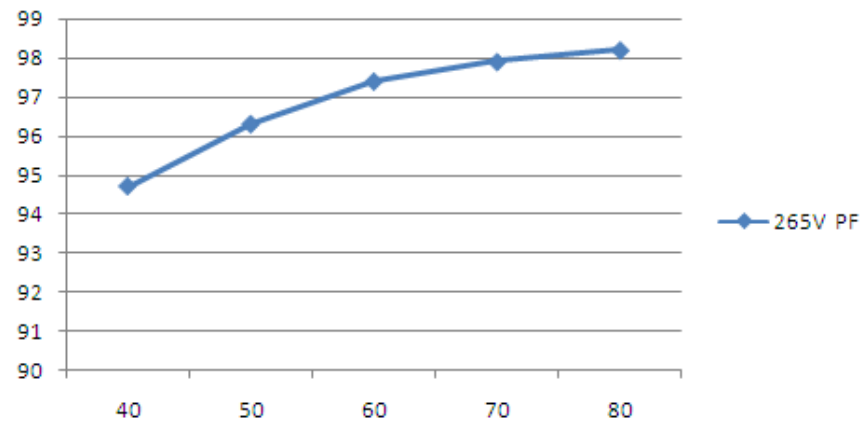
备注：测试时负载接LED（24个1W的灯珠）。



Vin=176V PF



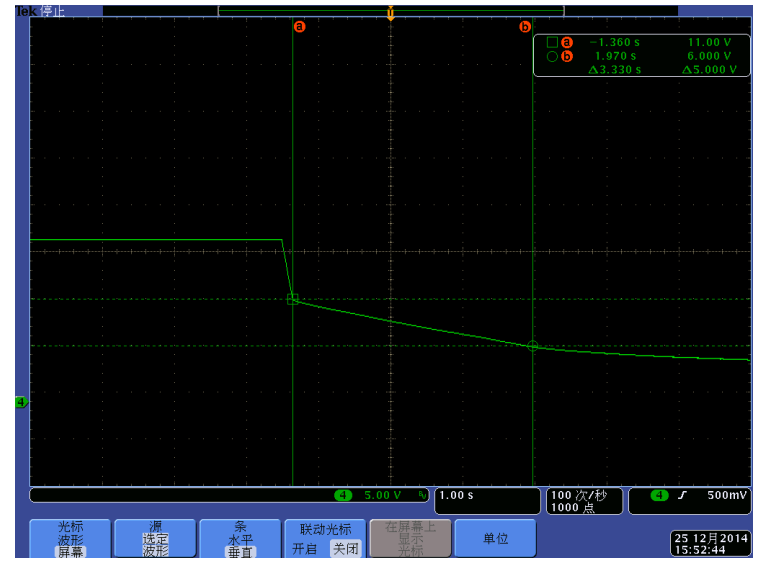
Vin=265V PF



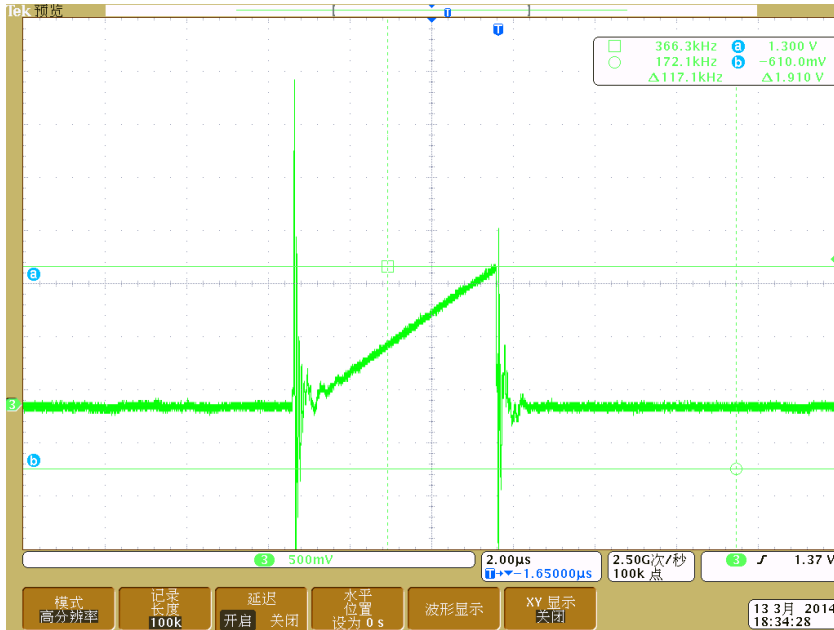
备注：坐标横坐标为输出电压，纵坐标为PF值。



$V_{in}=176V_{ac}$;
 $T_{dimmer}=3.08S$;



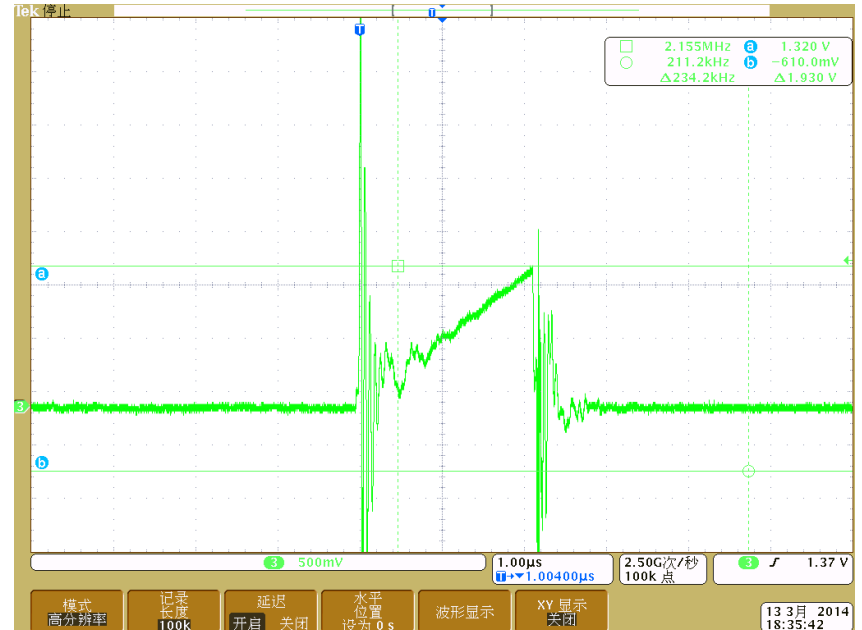
$V_{in}=264V_{ac}$;
 $T_{dimmer}=3.33S$;



176Vac; Vo=80V; Io=0.218A;

$I_{pk}=0.896A$;

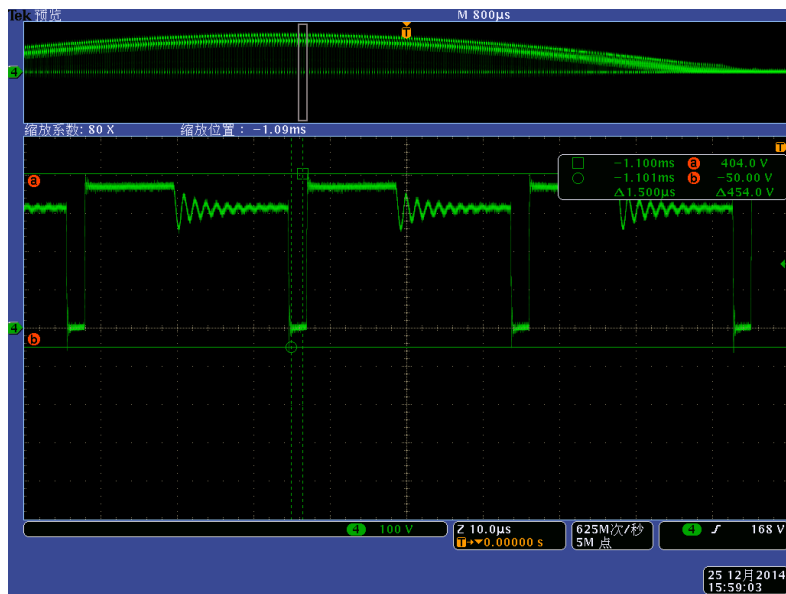
$$\begin{aligned}
 B_{max} &= I_{pk} * L_p / (N_p * A_e) \\
 &= 896mA * 0.8mH / 180T * 12.5mm^2 \\
 &= 0.318Tesla;
 \end{aligned}$$



264Vac; Vo=80V; Io=0.226A;

$I_{pk}=0.928A$;

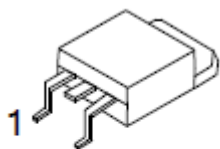
$$\begin{aligned}
 B_{max} &= I_{pk} * L_p / (N_p * A_e) \\
 &= 928mA * 0.8mH / 180T * 12.5mm^2 \\
 &= 0.329Tesla;
 \end{aligned}$$



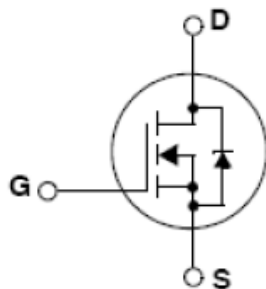
264Vac;Vo=80V;Io=0.22A;

$V_{DS}=464V$

开关管Q1基本参数要求(4N60 ,TO-252)



TO-252



Parameter	Symbol	Rating	Unit
Drain-Source Voltage	VDSS	600	V
Gate-Source Voltage	VGSS	±30V	V
Drain Current(Continuous)	ID	4	A
Drain Current(Pulsed)	IDM	16	
Power Dissipation	PD	106	W
Operating junction and Storage Temperature Range	TJ Tstg	-55~150	°C



项目	Iout=0.24A	
	Vin=220Vac	
	温度(°C)	温升(°C)
芯片U1(BF1030)	95	15
开关管Q1(MOSFET,4N60)	103	23
电感线圈 Lm1(EPC13)	111	31
续流二极管D5(ES1J)	107	27
环境温度	80°C	

