上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

晶丰明源智能照明
解决方案

2019-2

智能灯泡系统

APP终端
云服务器

WIFI/Zigbee/BLE 模块

3.3V/5V

辅助电源

3.3V/5V

传感器
模块

PWM/模拟信号

AC/DC
输入

LED智能
驱动电源

恒流/恒压输出

电平转换
调光/调色

光源

调光调色驱动

智能照明

辅助电源

1. 50mA：蓝牙/Zigbee/红外等低功耗
2. 300mA：Wi-Fi 辅助供电
3. 隔离型辅助供电

BP8519C：50mA超低功耗待机电源

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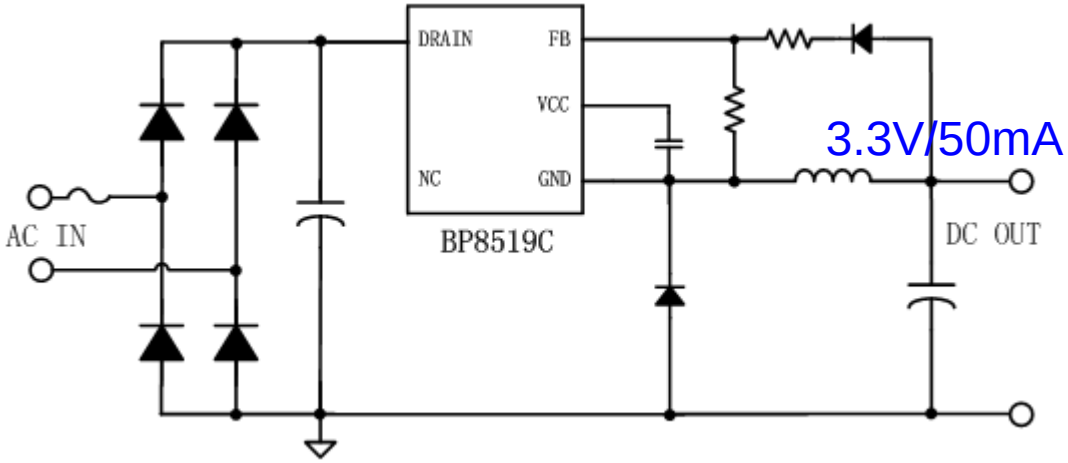
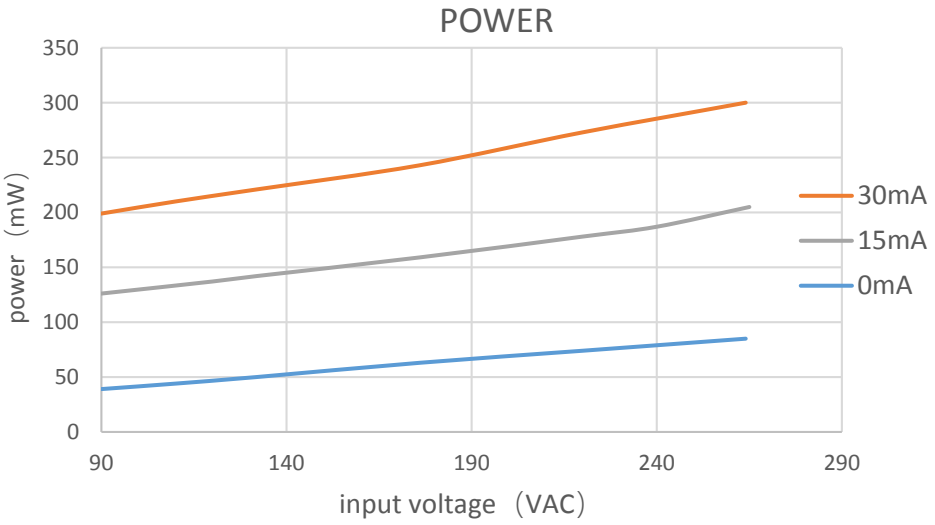


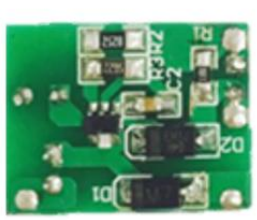


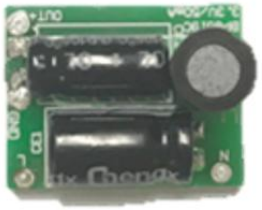
目标应用

- 红外、2.4G、蓝牙、ZigBee、感应模块等智能应用的供电

特点

- 支持直接输出3.3V, 无需LDO
- 超低待机功耗
- 动态响应快，输出电压纹波小
- 输出电压范围可调
- 内置700V高压MOS
- 低音频噪声
- 小体积的SOT23-5封装





Low Standby Power (Vout=3.3V)

BP8516F: 300mA待机电源

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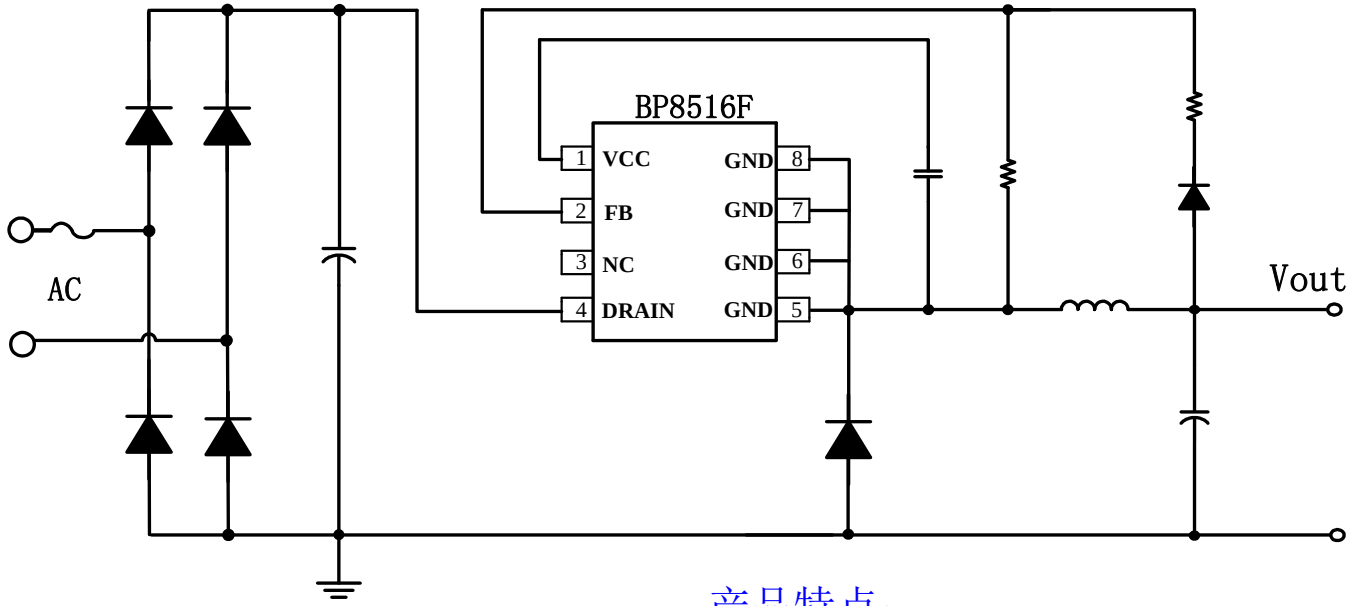

Wi-Fi 模块应用

产品特点：

- 支持直接输出3.3V，无需LDO
- 低待机功耗
- 动态响应快，输出电压纹波小
- 输出电压范围可调，满足不同模块的供电要求
- 内置650V高压MOS
- 完善的保护功能
- 芯片采用SOP8封装

BP2513DP：500mA待机电源

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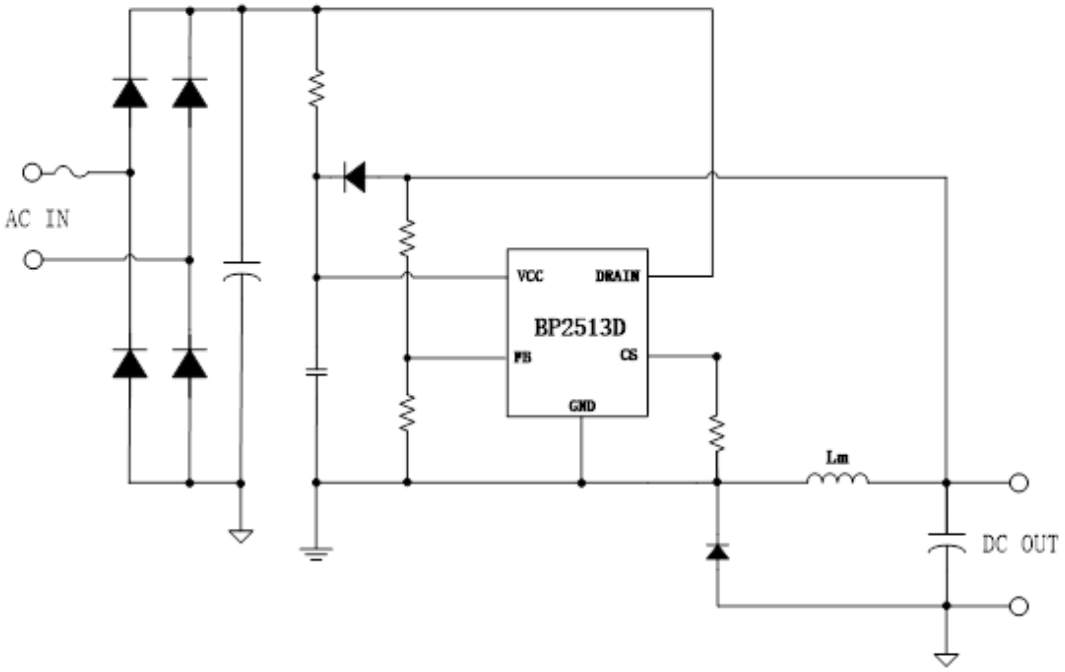


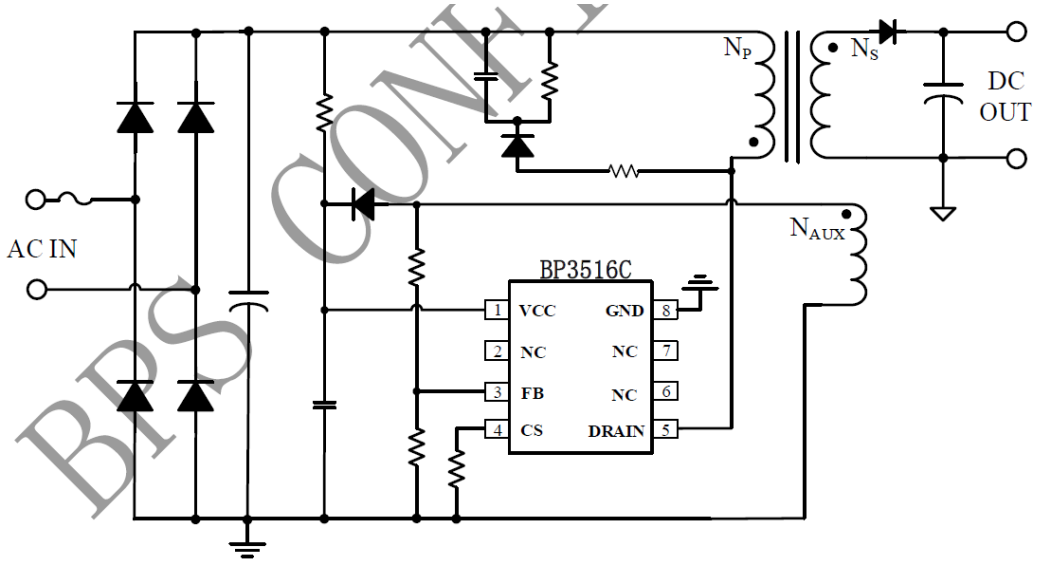
目标应用

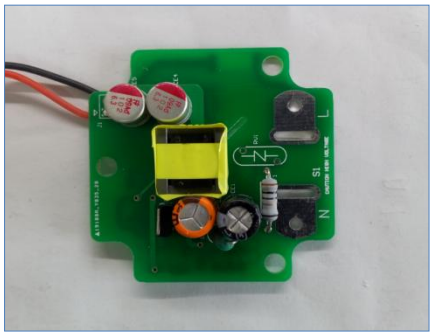
- **Wi-Fi、大功率智能模块的供电。**

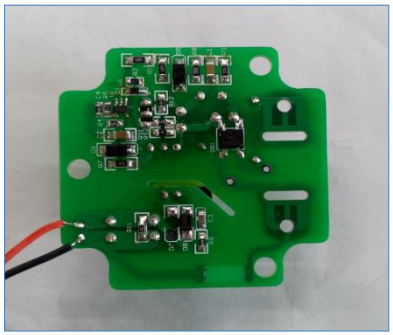
特点

- 直接输出3.3V, 无需LDO
- 输出电压可调，输出电流可调
- 内置500V，10Ω高压MOS
- SOP8 封装

BP3516C：隔离型辅助电源







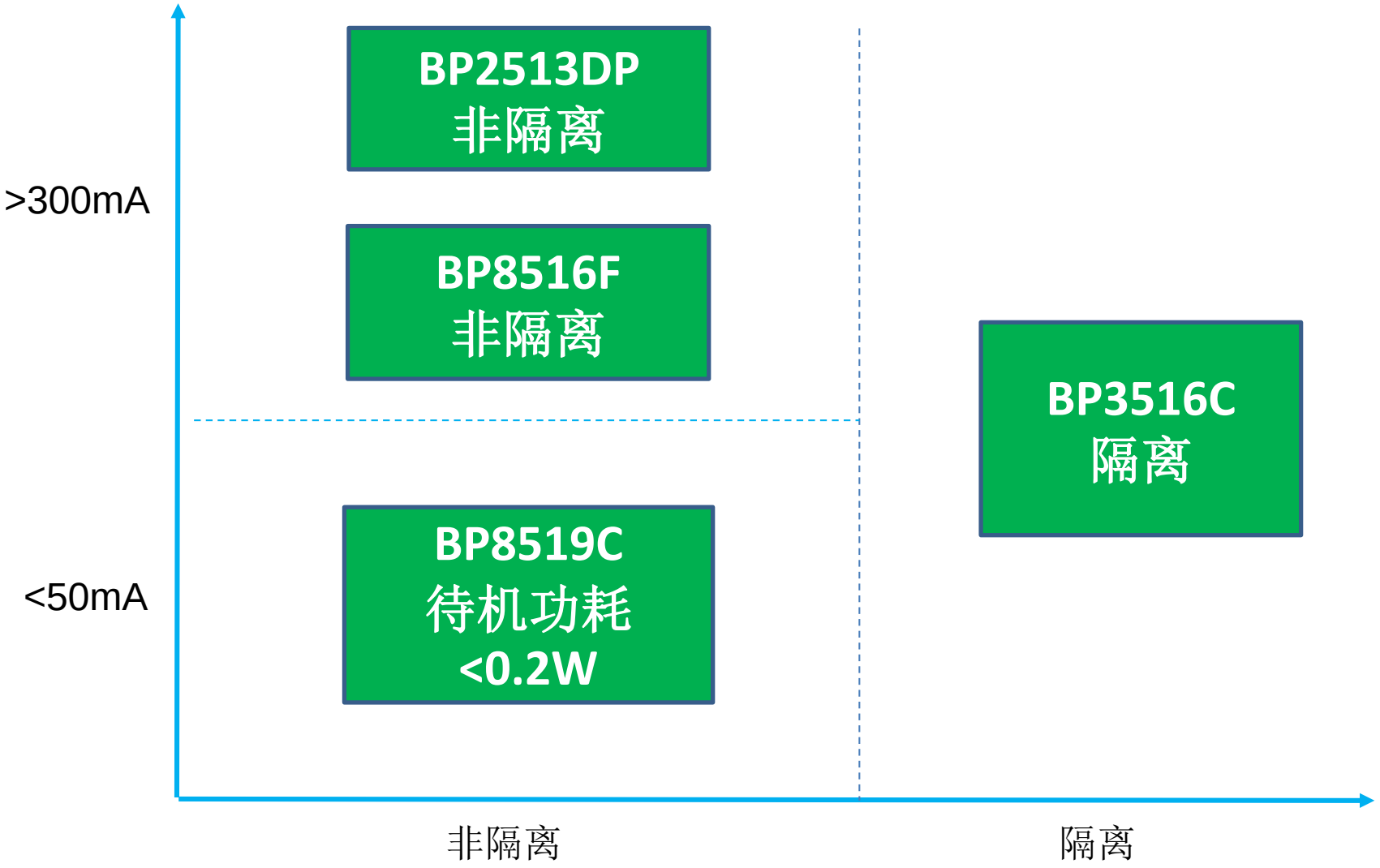
目标应用

- **2.4G、蓝牙、WIFI、ZigBee等智能应用的隔离电源副边的供电**

特点

- 输出电压可调，支持3.3V输出
- 内部集成650V，13Ω功率管
- 输出电流可调
- ±5%输出电压精度
- SOP8封装

辅助电源方案


BP2513DP
非隔离
>300mA
BP8516F
非隔离
BP3516C
隔离
BP8519C
待机功耗
<0.2W
<50mA
非隔离
隔离

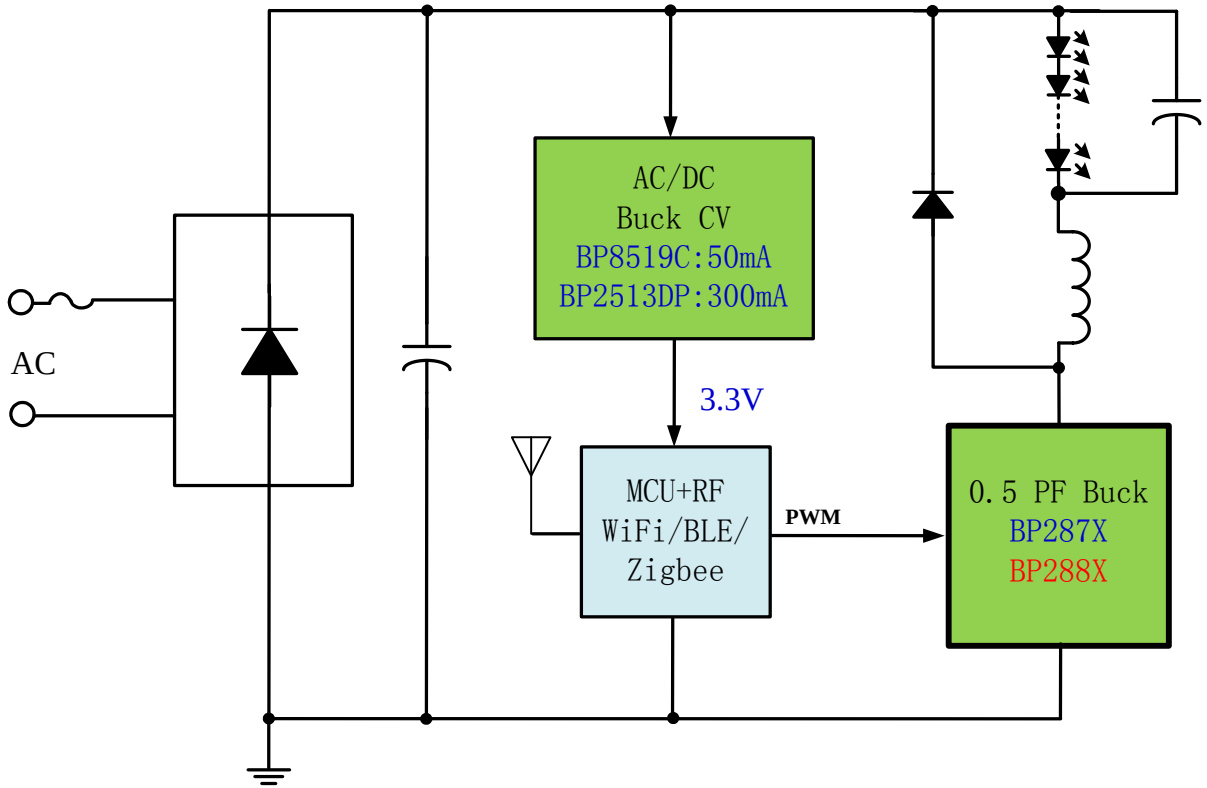
光源类产品
智能照明方案

单路调亮度方案

1. 低PF开关无级调光方案
2. 高PF开关无级调光方案
3. 线性无级调光方案

低PF无级调光方案

➢ 目标应用：
国内/日本/欧洲调光球泡和筒灯



- 低待机功耗：<0.5W；
- 调光深度<1%；
- 低端电流一致性好；
- 调光无频闪；

低PF PWM调光-BP288X

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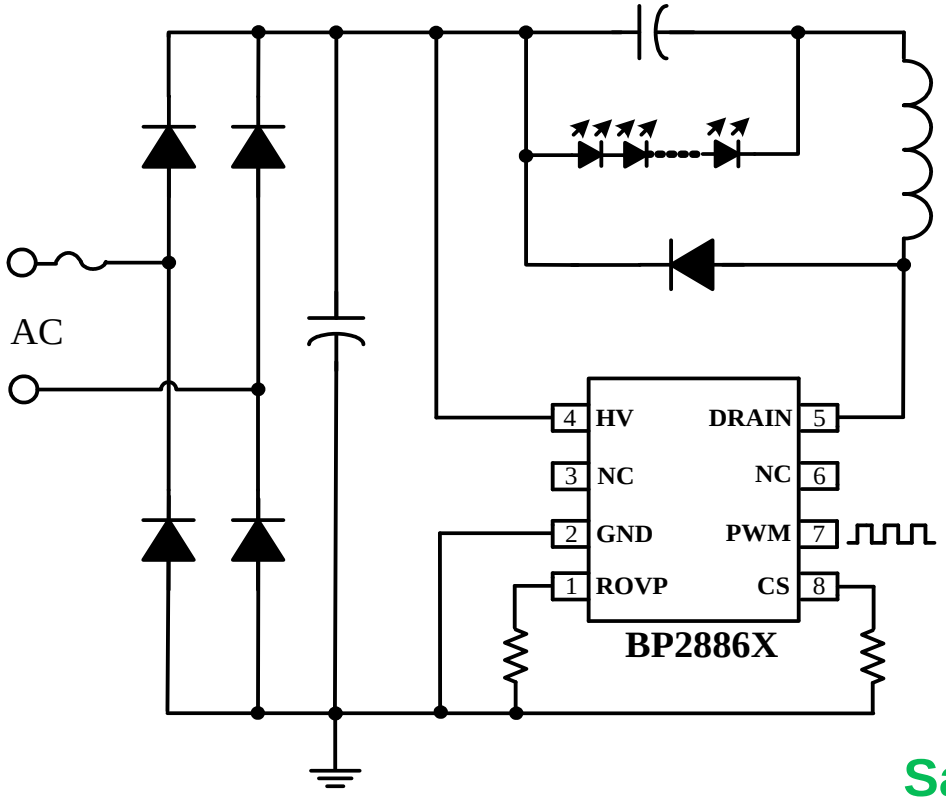


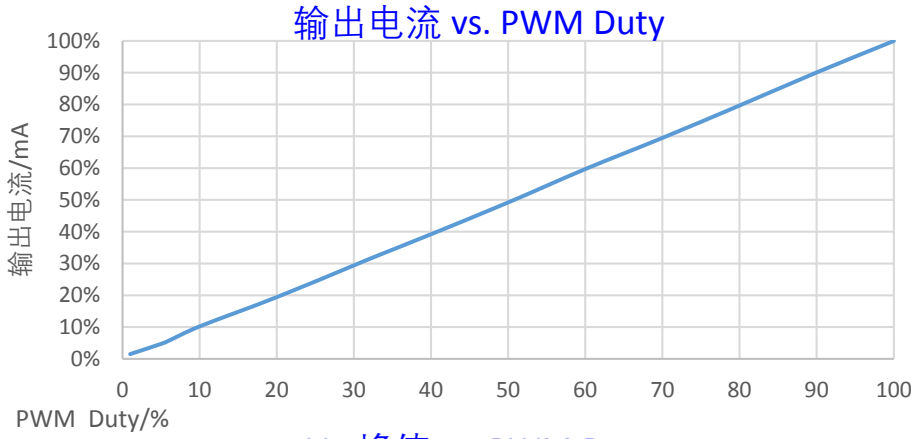
- 支持1%-100% PWM调光
- 全程模拟调光无频闪
- 全程调光无音频噪声
- 低端调光精度好 (3%±0.6%)
- 调光柔顺无台阶感
- 高压启动，即开即亮
- 无需启动电阻和VCC电容

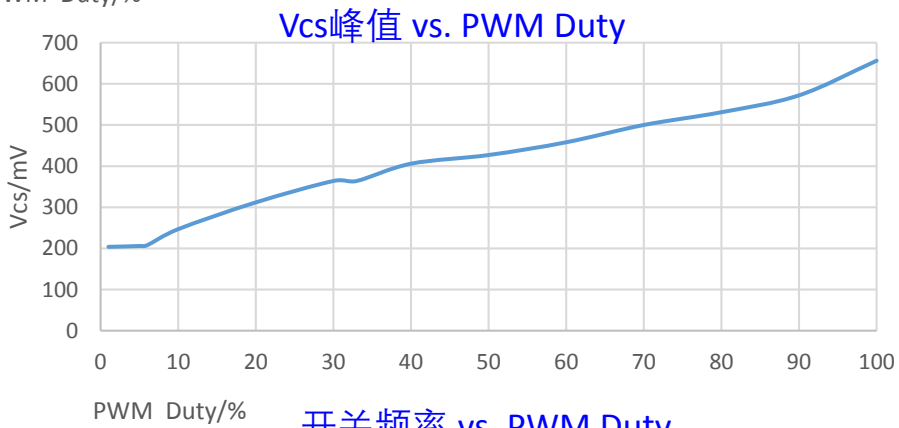
Sample 2019-3

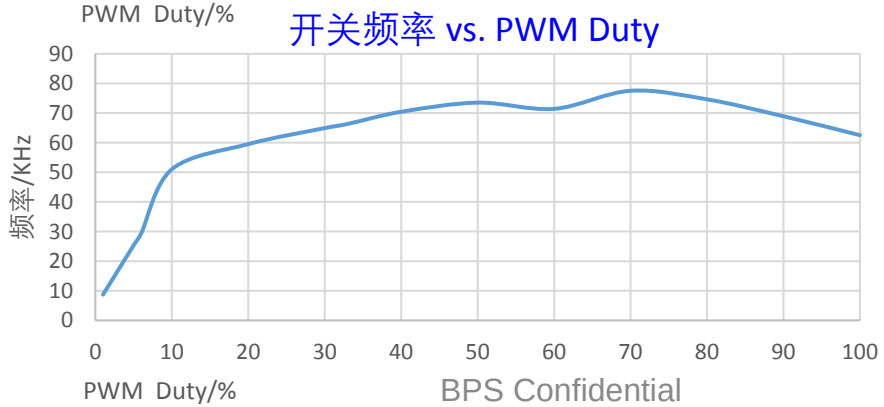
产品名称	Rdson(Ω)	封装
BP2886D	4.8	SOP8
BP2887F	3	DIP7

专利的全程模拟调光技术

BP288X 调光曲线







调光1%-100%线性度好

整个调光范围内
开关频率升高不明显

调光低到3%，开关频率
才进入音频范围

BP288X 调光一致性

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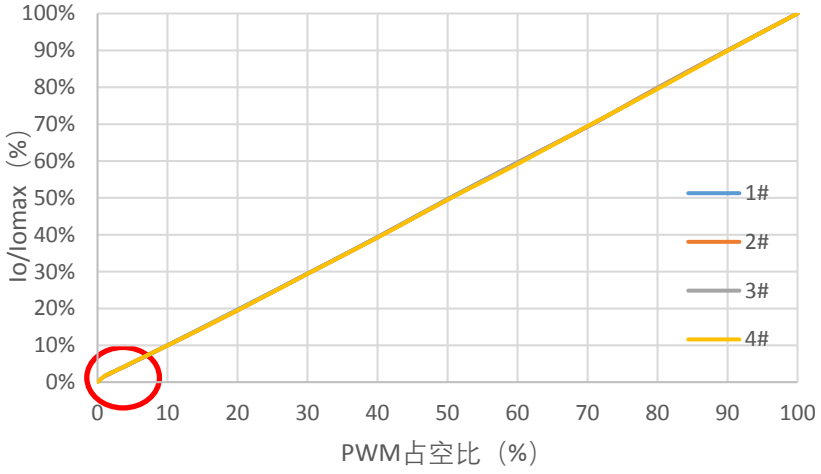
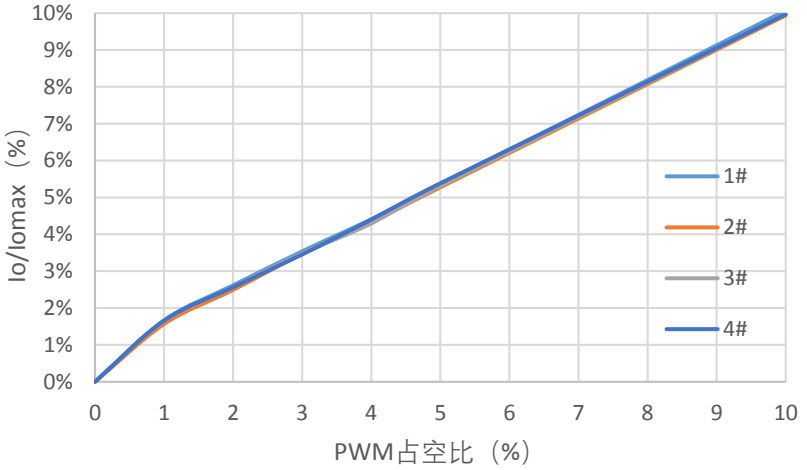
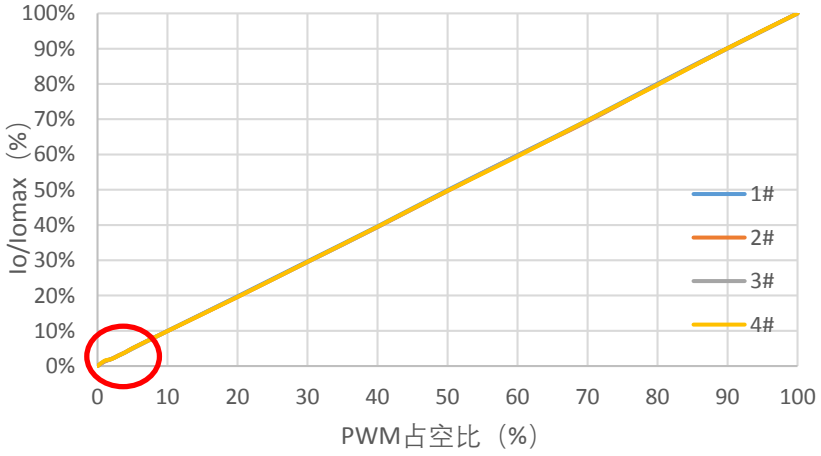
1%~100%下行调光曲线



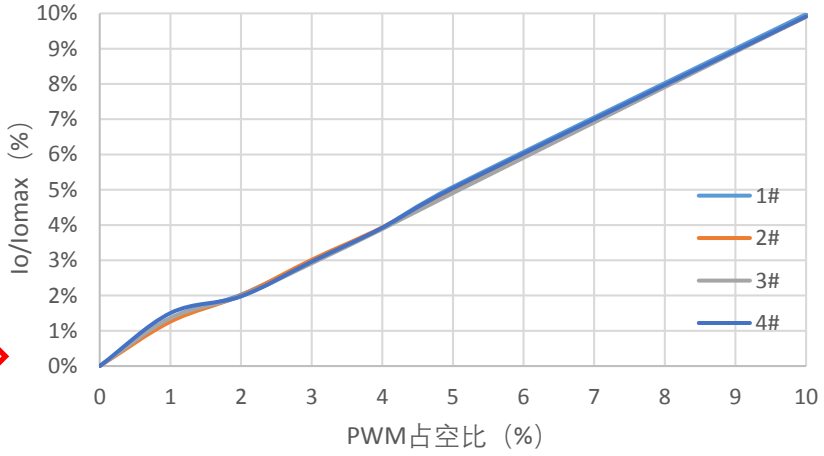
1%~10%下行调光曲线



1%~100%上行调光曲线



1%~10%上行调光曲线



4PCS BP288X 3%调光深度一致性可达±10%，批量精度可达±20%以内。

低PF PWM调光-BP2876/7/8X

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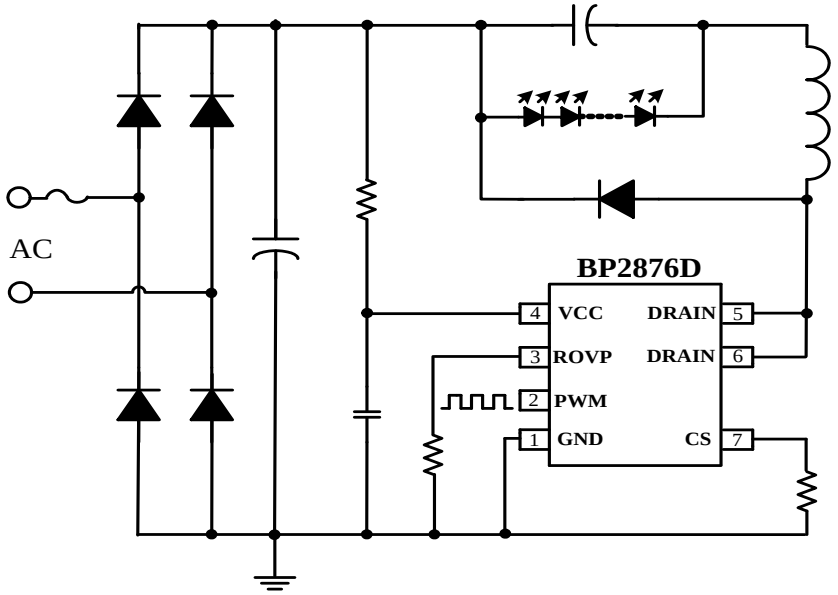

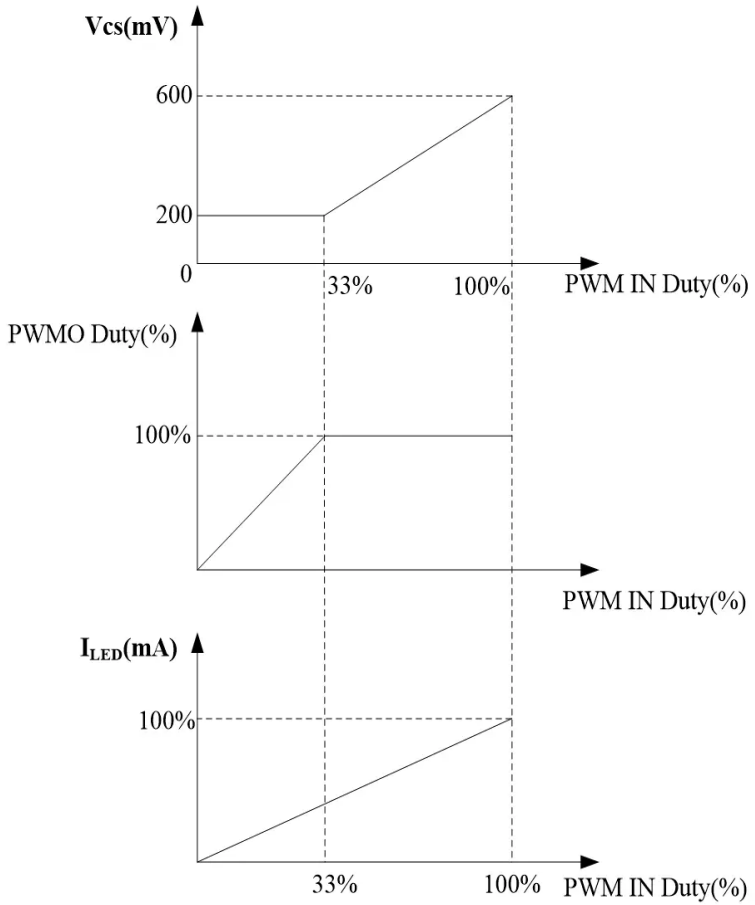

- 调光33%以上无频闪
- 支持1%-100% PWM调光
- 调光柔顺，台阶感不明显
- 调光时低噪声

产品名称	Rdson(Ω)	封装
BP2876A	11	SOP7
BP2876D	4.8	SOP7
BP2877F	3	DIP7
BP2878	External	SOP8

高PF无级调亮度方案

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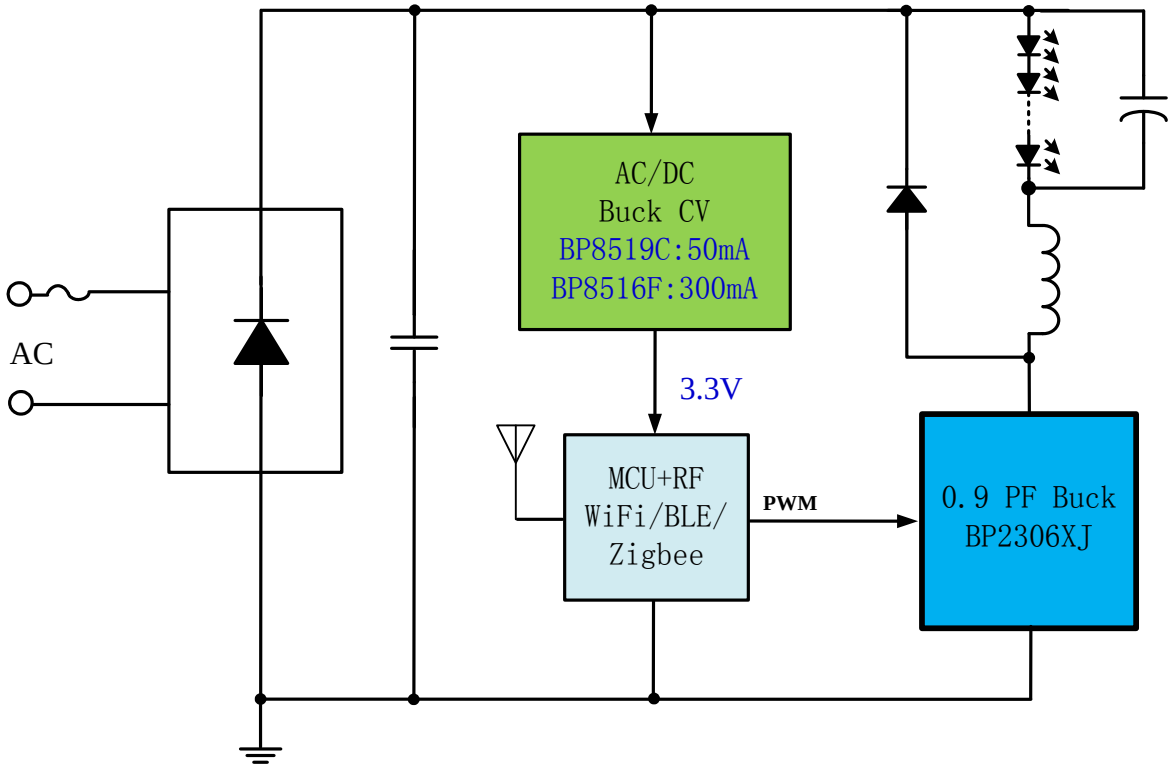
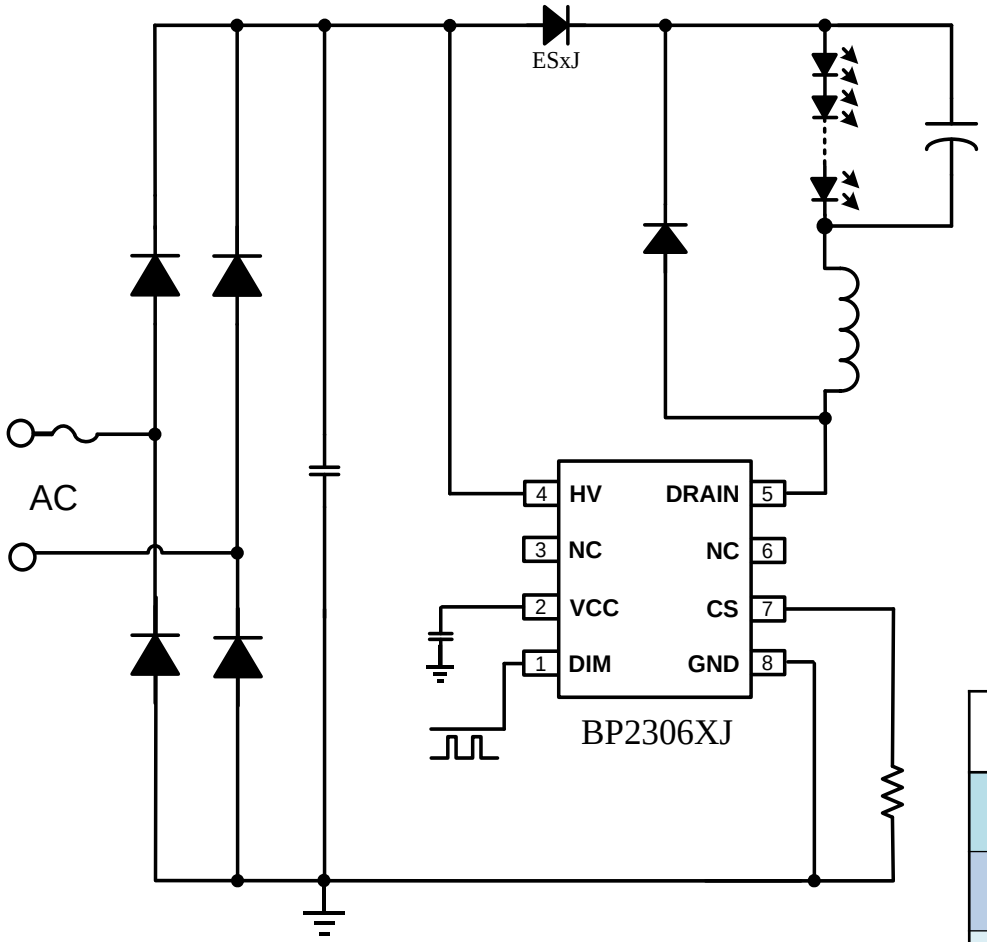
➢ 目标应用：
出口调光灯丝灯/球泡/筒灯/灯管



- 低待机功耗：<0.2W
- PF>0.9；
- 支持1%-100% PWM调光
- 体积小，成本低
- 能够带可控硅调光器工作

BP230XJ 高PF调光



- PF 0.9
- 支持1%-100% PWM直接调光
- 低端调光精度好 (3%±0.6%)
- 支持5%-100% 模拟调光
- 低待机电流 <15uA
- 高压启动，即开即亮
- 带可控硅调光器能够正常工作
- 单绕组电感
- 无COMP电容
- 内置MOS，小体积
- ±3% LED输出电流精度

产品名称	MOS	封装
BP2306CJ	5.2Ω/550V	SOP8
BP2306HJ	2Ω/600V	SOP8
BP2308	External	SOP8

BP2306CJ Application

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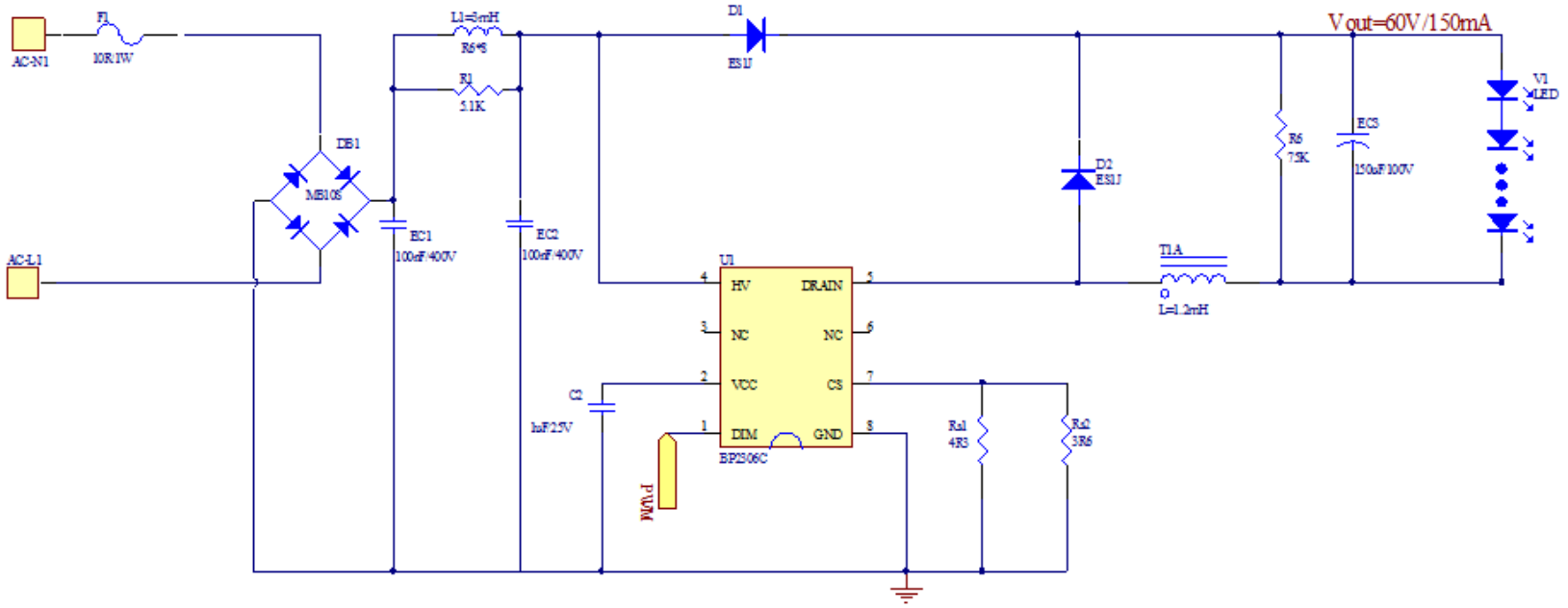
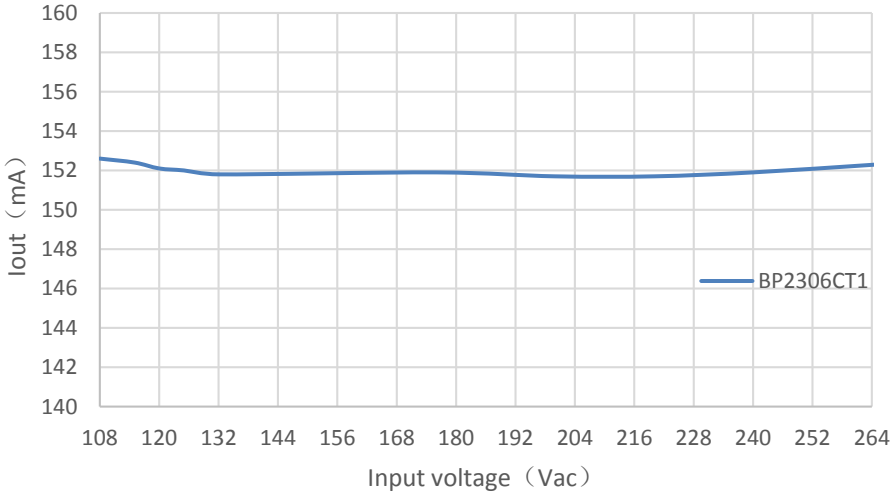
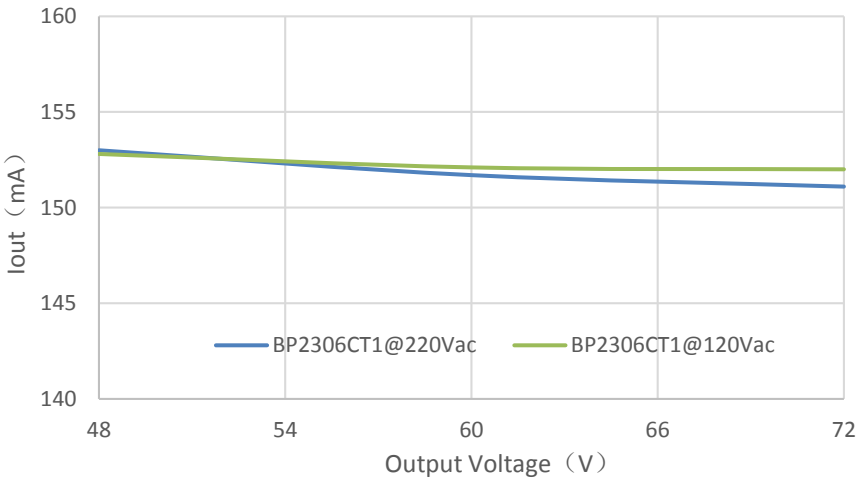


Line Regulation



Load Regulation



BP2306CJ Dimming Curve

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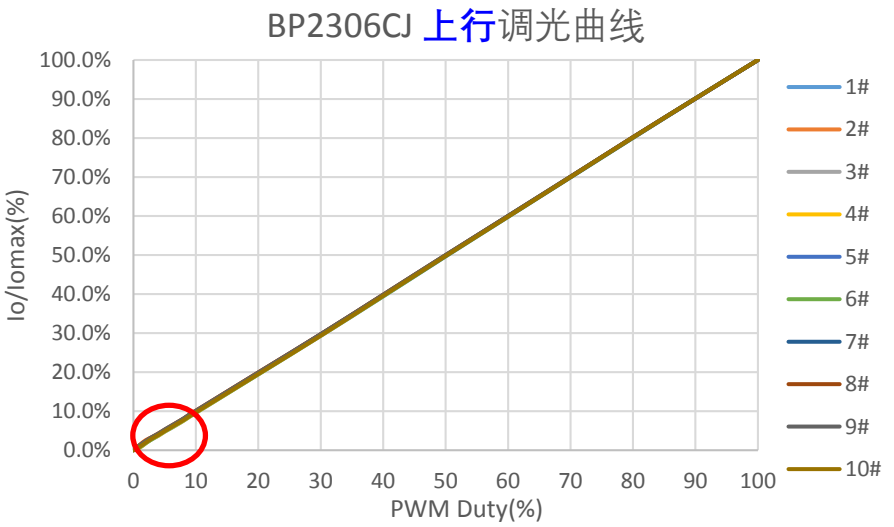

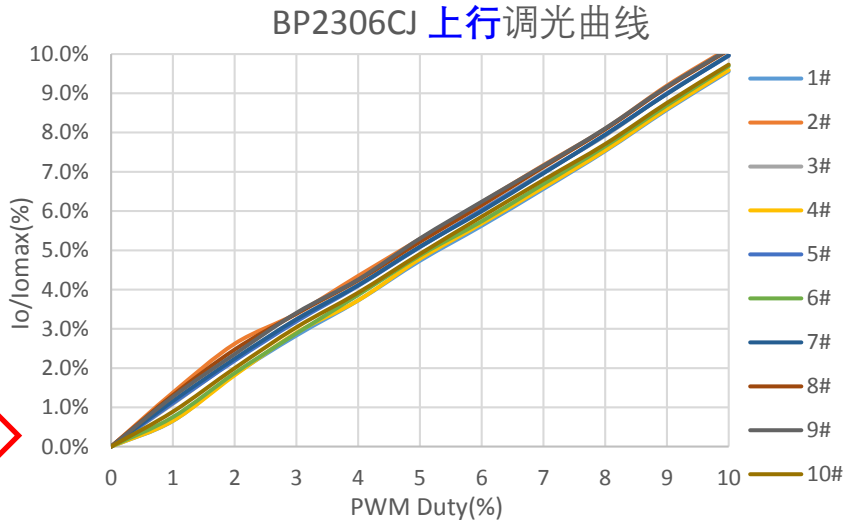

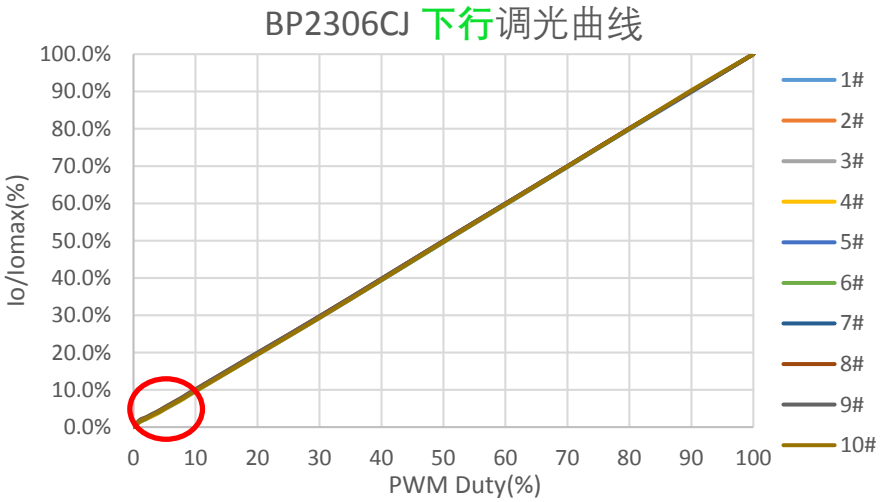

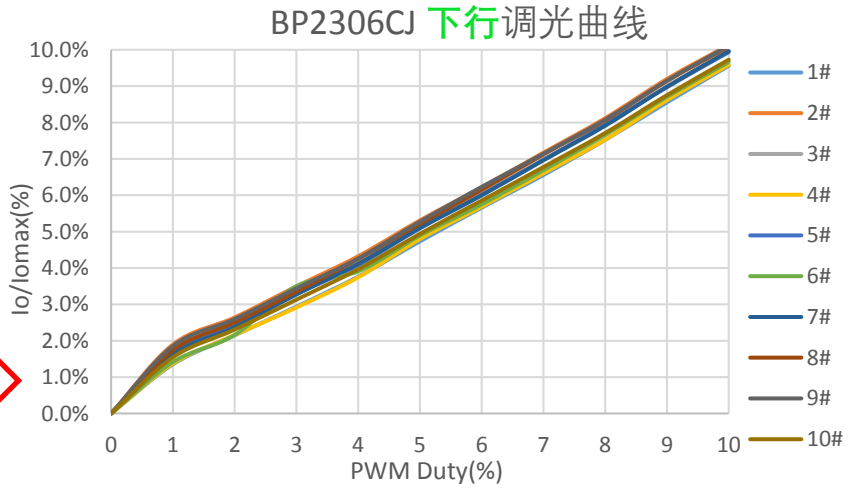

10PCS BP2306CJ 3%调光深度一致性±9%，量产可达±20%以内。

BP2306CJ Standby Power

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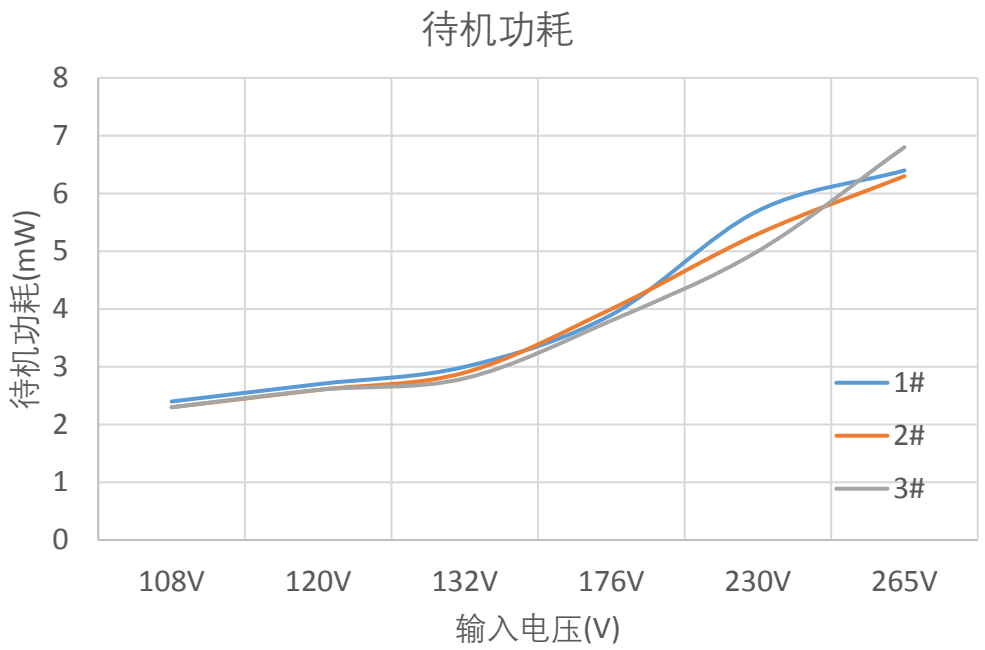
待机功耗(mW)							
IC	Vin(Vac)	108V	120V	132V	176V	230V	265V
BP2306CJ	1#	2.4	2.7	3	3.9	5.7	6.4
	2#	2.3	2.6	2.9	4	5.3	6.3
	3#	2.3	2.6	2.8	3.8	5	6.8
	平均值	2.3	2.6	2.9	3.9	5.3	6.5



BP2306CJ 超低待机功耗：
3mW @120Vac； 6mW @230Vac 。

BP2306CJ PF/THD

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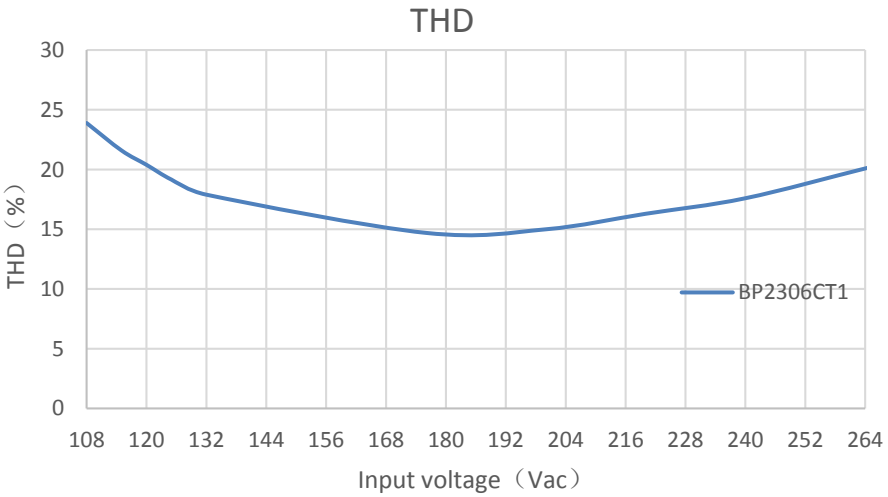
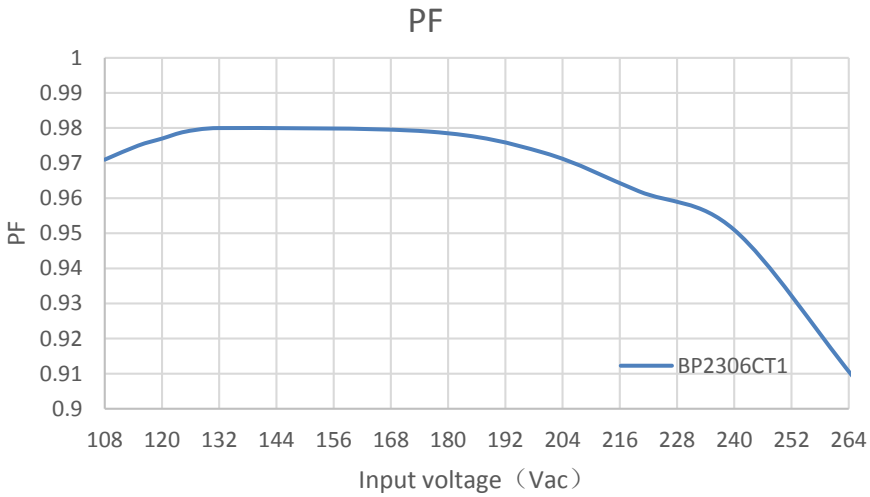
Test condition：60V/150mA

BP2306CJ										
Vac (V)	108	115	120	125	132	176	200	220	240	265
PF	0.971	0.975	0.977	0.979	0.98	0.979	0.973	0.962	0.951	0.909
THD	23.9	21.6	20.4	19.16	17.9	14.7	15	16.3	17.6	20.2



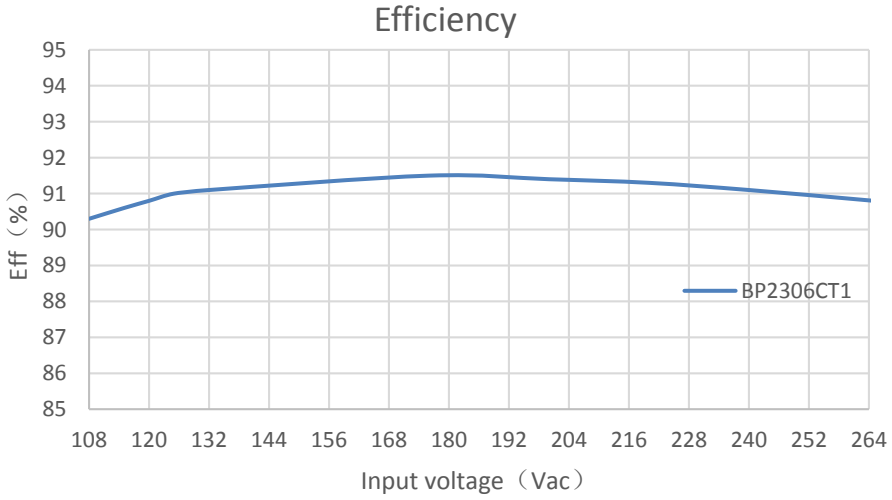


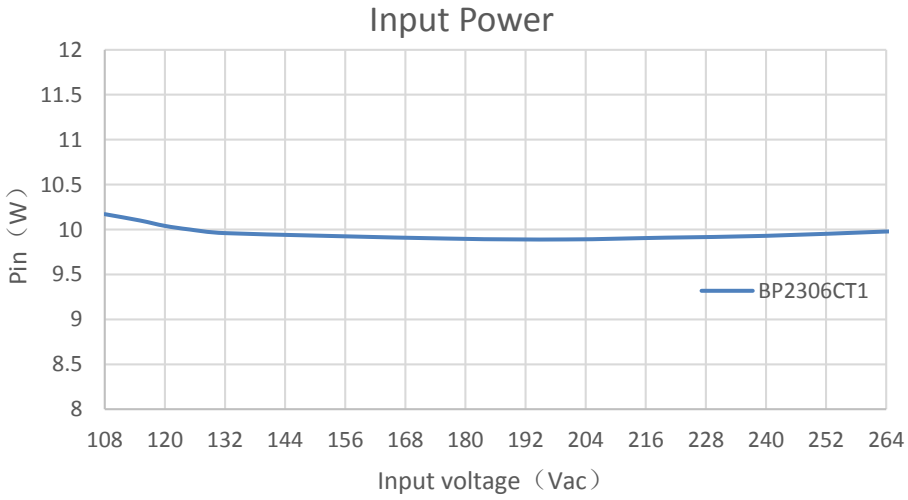
BP2306CJ Efficiency

上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

Test condition：60V/150mA

BP2306CJ										
Vac（V）	108	115	120	125	132	176	200	220	240	265
η（%）	90.3	90.6	90.8	91	91.1	91.5	91.4	91.3	91.1	90.8
Pin（W）	10.17	10.1	10.04	10	9.96	9.9	9.89	9.91	9.93	9.98



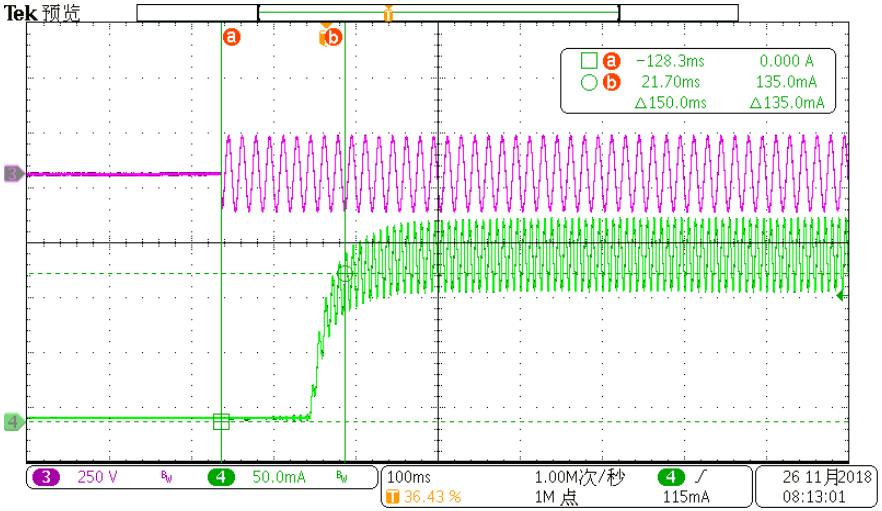


BP2306CJ Startup Time

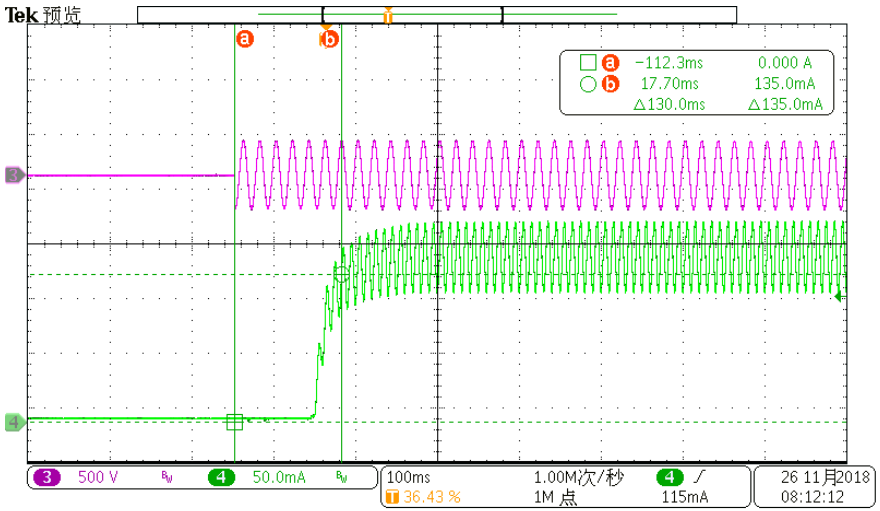
上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

Test condition ： 60V/150mA, PWM=100%
Cout El-cap: 150uF/100V

CH3：DRAIN；　CH4：Io

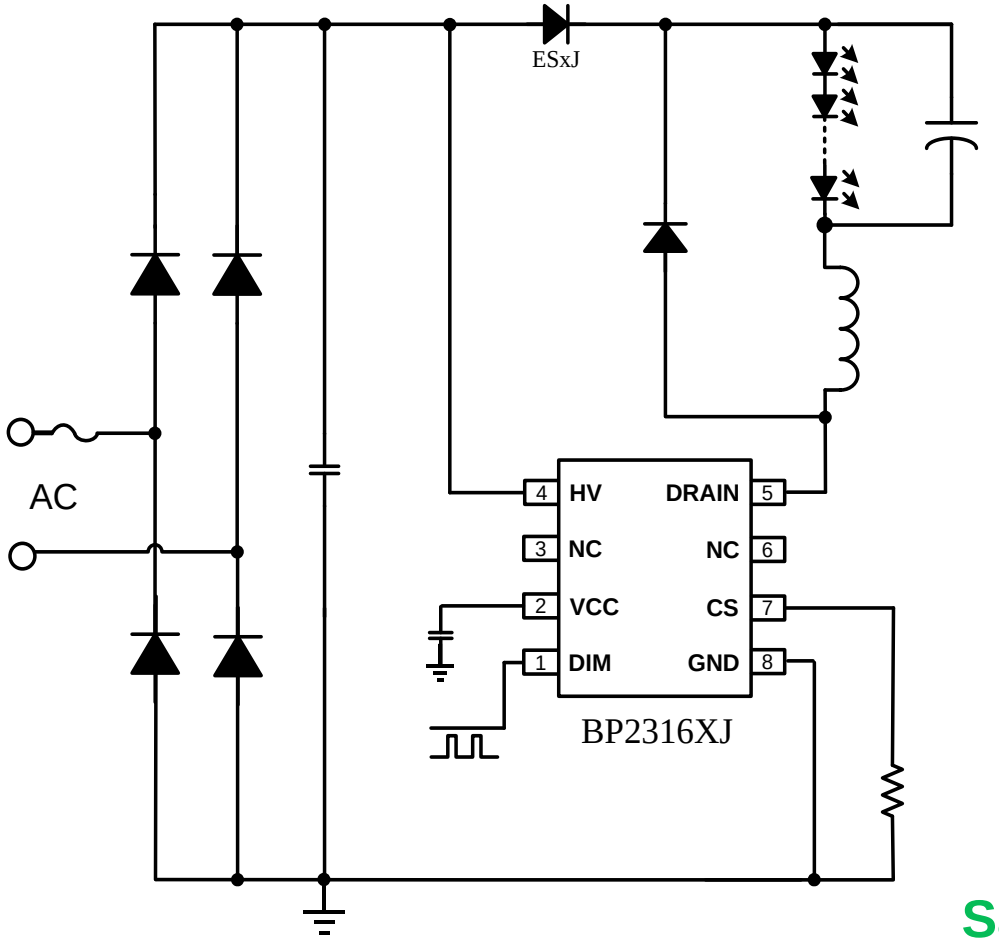


120Vac/60Hz startup time=150ms



220Vac/50Hz startup time=130ms

BP2316C 0.7PF调光



- PF 0.7
- 自适应电感峰值电流限制技术
- 更小的输出电解电容
- 母线电压突变灯光变化小
- 支持1%-100% PWM直接调光
- 低端调光精度好 (3%±0.6%)
- 支持5%-100% 模拟调光
- 低待机电流 <15uA
- 高压启动，即开即亮
- 单绕组电感
- 无COMP电容
- 内置MOS，小体积

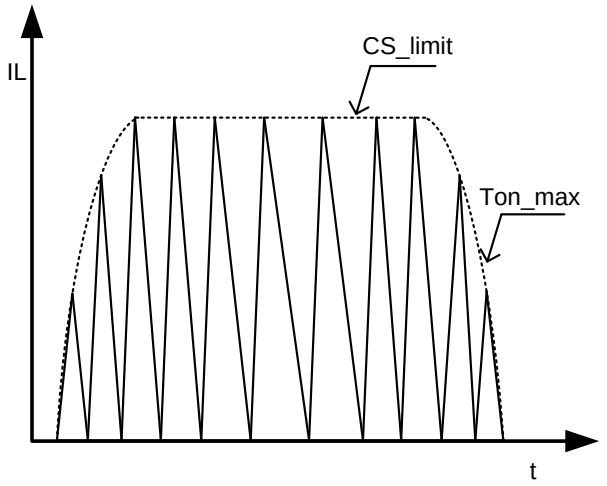
Sample 2019-3

产品名称	MOS	封装
BP2306CJ	5.2Ω/550V	SOP8

BP2316C 0.7PF输出纹波电流

测试条件：输出72V/100mA，灯珠9V/100mA
BP2316C：感量1.0mH
BP2306C：感量1.2mH

	纹波比例\输出电容	120uF/100V	150uF/100V
BP2316C 0.7 PF	120Vac/60Hz	**±24%**	±20%
	220Vac/50Hz	±16%	±15%
BP2306CJ 0.9 PF	120Vac/60Hz	±27.7%	**±23.5%**
	220Vac/50Hz	±26%	±22%



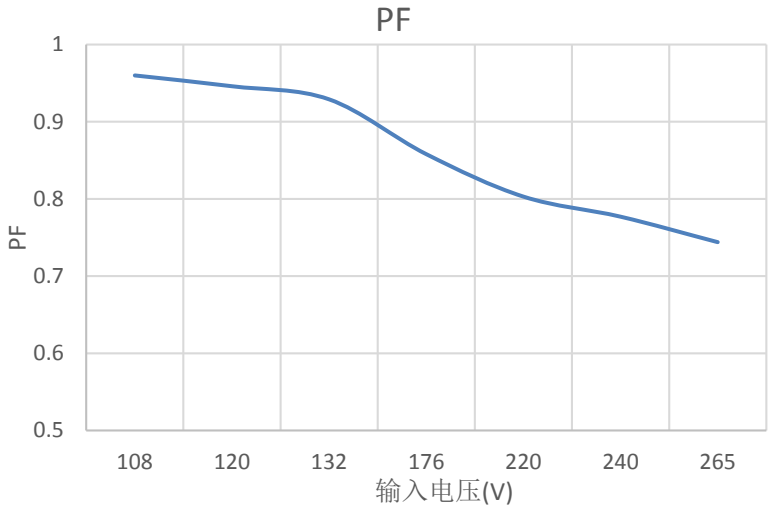
测试条件：输出60V/150mA，灯珠9V/100mA
BP2316C：感量0.6mH
BP2306C：感量1.2mH

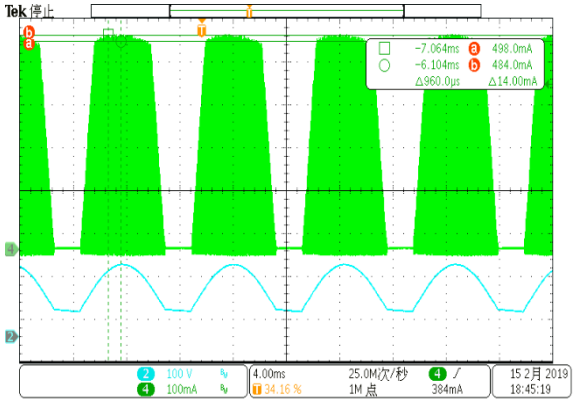
	纹波比例\输出电容	100uF/100V	120uF/100V
BP2316C 0.7 PF	120Vac/60Hz	**24.5±%**	21.5±%
	220Vac/50Hz	17.5±%	14.5±%
BP2306CJ 0.9 PF	120Vac/60Hz	±27.8%	**±23%**
	220Vac/50Hz	±29%	±24%

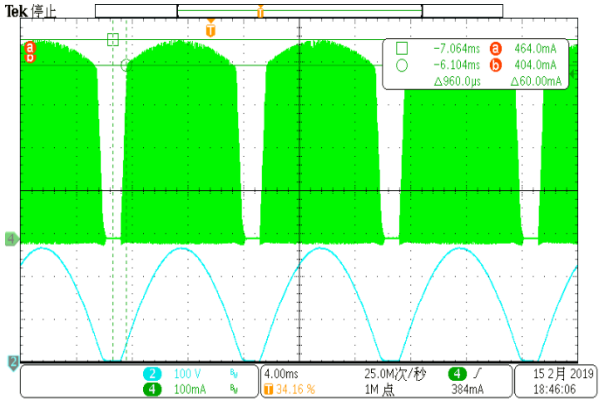
BP2316C 0.7 PF输出电容比0.9 PF：
减小 ~20% @120Vac;
减小 ~40% @220Vac 。

Vin：108~265Vac， Vo：60V/150mA L=1mH

BP2316C 基本电气参数							
输入电压	108	120	132	176	220	240	265
PF	0.96	0.946	0.929	0.858	0.803	0.777	0.744
Io	150.1	150	150	150.3	150.8	151.3	151.7
效率	90.6%	91.0%	91.4%	91.6%	91.4%	91.3%	91.0%







L=1mH 120Vac@60Hz **230Vac@50Hz**

BP2316C 0.7PF输出电流跳变

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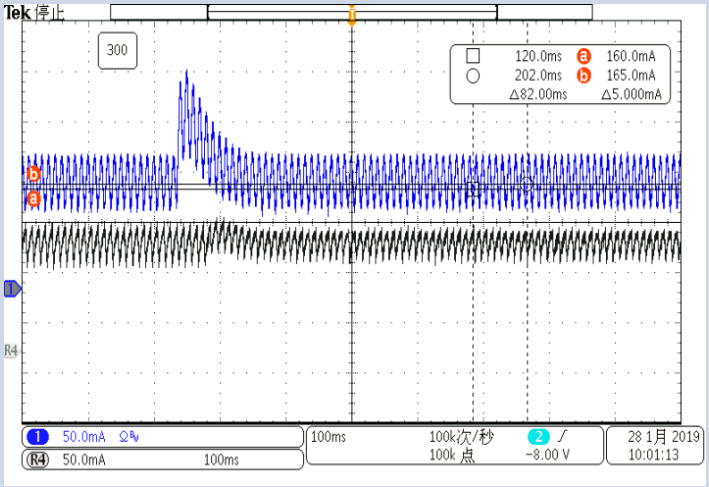
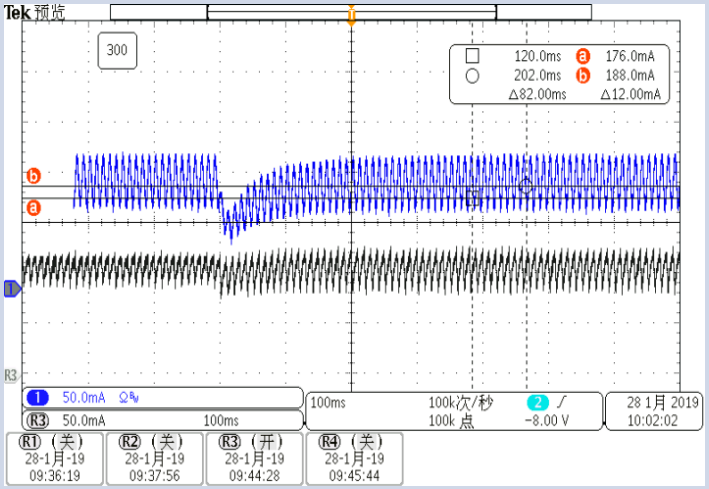
电感量	176→265Vac	265→176Vac
1.2mH		

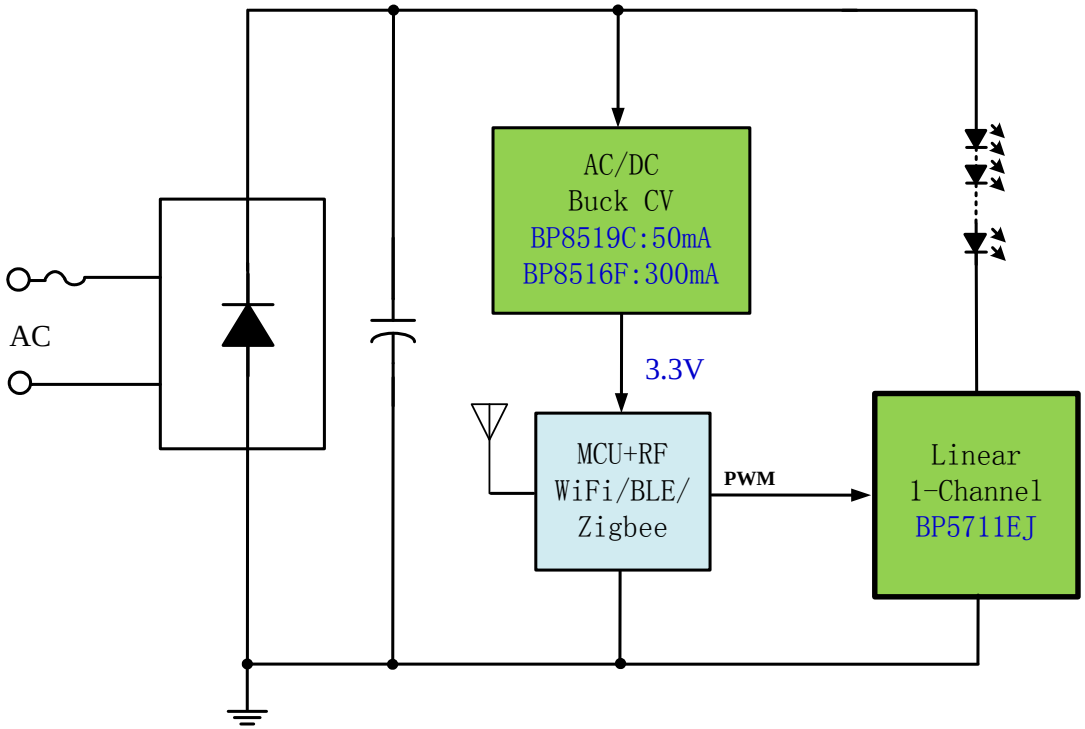
CH1: BP2306CJ (PF 0.9)

R: BP2316C (PF 0.7)

BP2316C 输入电压突变，输出电流波动不明显

线性无级调亮度方案

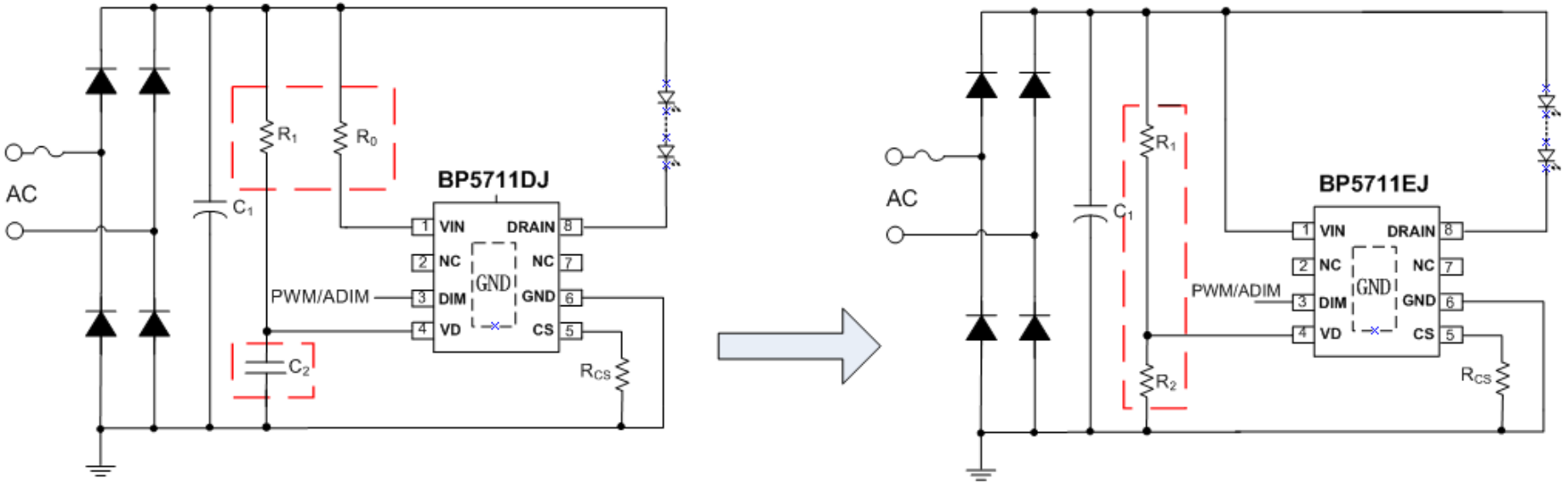
➢ 目标应用：
国内/日本/欧洲调光灯丝灯和球泡



- 适用于全贴片DOB设计；
- 元件少，尺寸小，成本低；
- 低待机功耗：<0.5W ；
- 支持3.3kHz以上调光频率，调光无频闪；
- 母线电压变化±20%仍可正常工作

PWM调光单段线性-BP5711EJ

上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

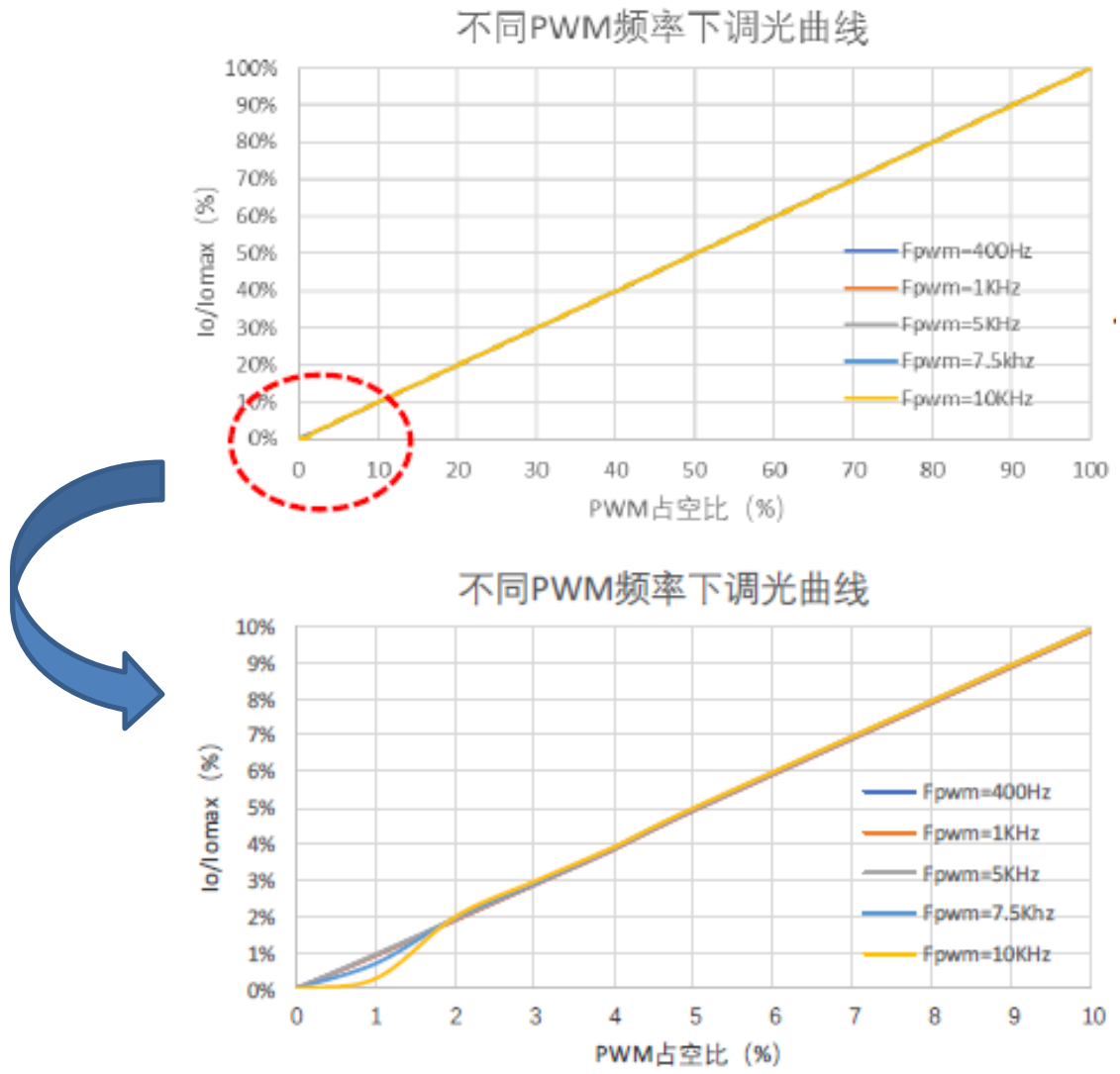


外围使用差异	BP5711EJ	BP5711DJ
VD引脚线电压补偿	双电阻分压补偿VD引脚无需电容，不需要补偿时，VD引脚接地	单电阻补偿，VD引脚需要接电容，不需要补偿时VD引脚接地
调光DIM引脚	默认内置下拉	默认内置上拉，外部需要并联下拉电阻
高压供电Vin引脚	Vin无需串接电阻	Vin需要串接电阻

BP5711EJ Dimming Curve

上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

Dimming curve at different PWM input frequency



BP5711EJ Line Regulation

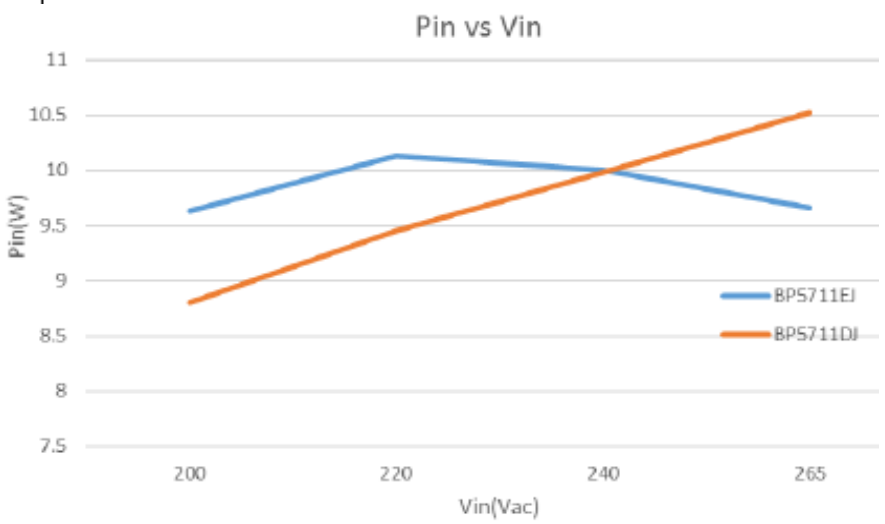
上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

Low PF Application

LPF BP5711EJ Cin=8.2uF/400V Rcs=56R//56R//100R，线补上拉750K,下拉1.5K			
Vin(Vac)	Pin(W)	Iout(mA)	Vout（V）
200	9.63	33.22	244.8
220	10.13	31.28	243.1
240	10	27.91	241
265	9.66	23.71	238.9

LPF BP5711DJ Cin=8.2uF/400V Rcs=56R//56R//62R 线补1.2M			
Vin(Vac)	Pin(W)	Iout(mA)	Vout（V）
200	8.8	31.31	243.3
220	9.45	30.12	241.8
240	9.98	28.8	240.6
265	10.52	27.07	239.2

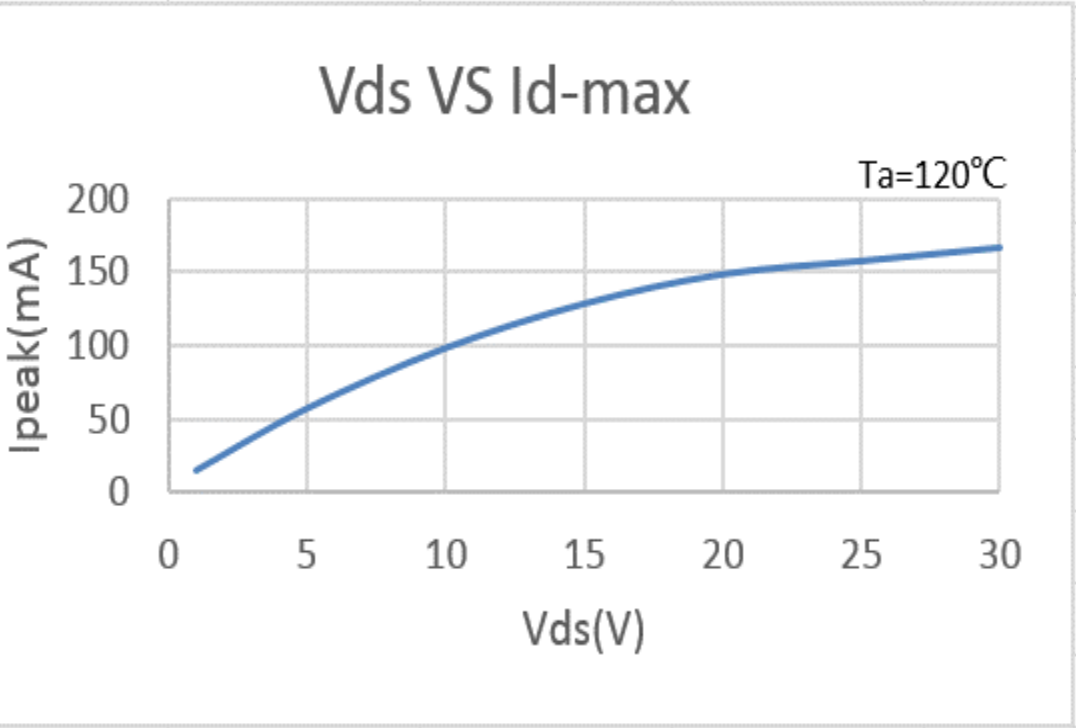
LPF 输入功率 Cin=8.2uF/400V					
Vin/Vac / IC	200	220	240	265	线性调整率
BP5711EJ	9.63	10.13	10	9.66	2.53%
BP5711DJ	8.8	9.45	9.98	10.52	8.90%



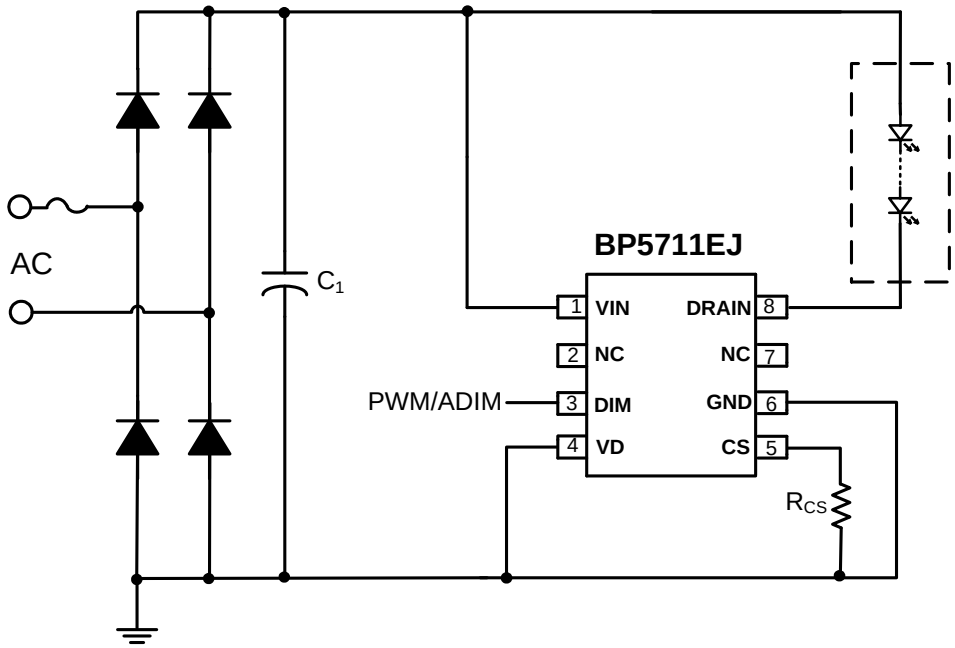
BP5711EJ Max Current

上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

BP5711EJ	
Vds(V)	Id-max(mA)
1	15.0
5	57.0
10	98.0
15	128.0
20	148.0
25	157.0
30	166.0



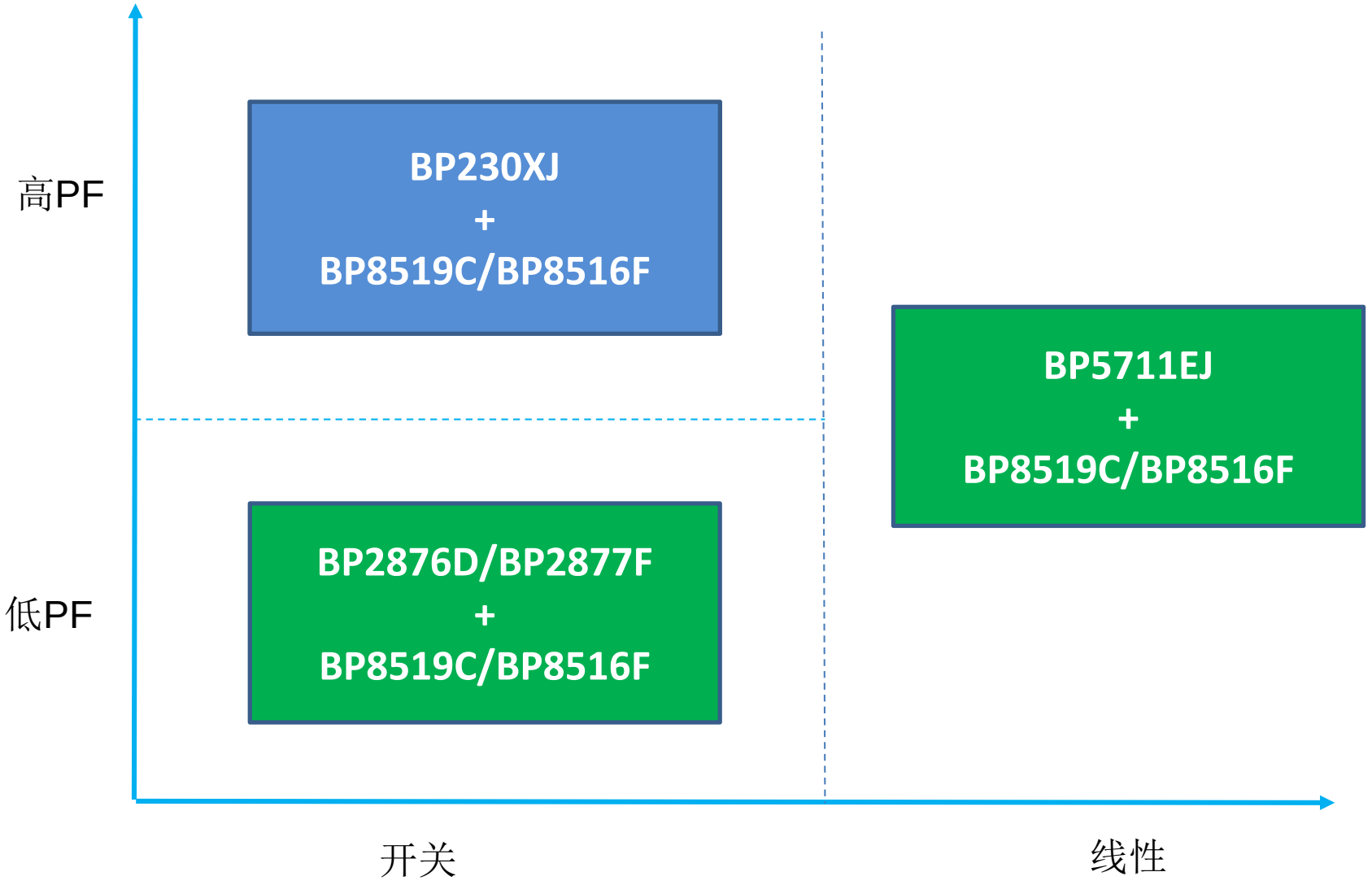
BP5711EJ Standby Power



BP5711EJ LP应用，无线补，Cin=10uF，Rcs=33R//33R	
Vin	120Vac
功耗	19mW

BP5711EJ LP应用，无线补，Cin=8.2uF，Rcs=56R//56R			
Vin	176Vac	220Vac	265Vac
功耗	27mW	35mW	49mW

单路调亮度方案


高PF
低PF
BP230XJ
+
BP8519C/BP8516F
BP5711EJ
+
BP8519C/BP8516F
BP2876D/BP2877F
+
BP8519C/BP8516F
开关
线性

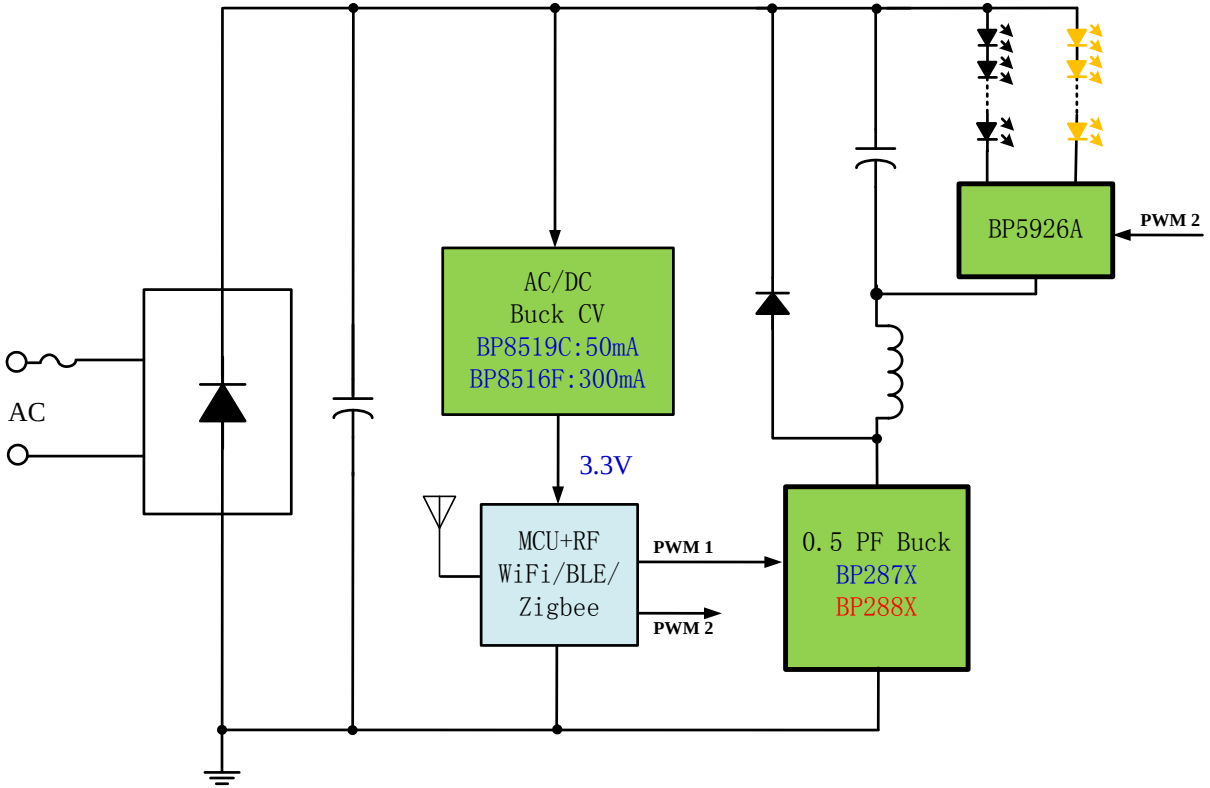
两路调光调色温方案

1. 低PF开关方案
2. 高PF开关方案
3. 线性方案

低PF开关型无级调光调色-恒功率

上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

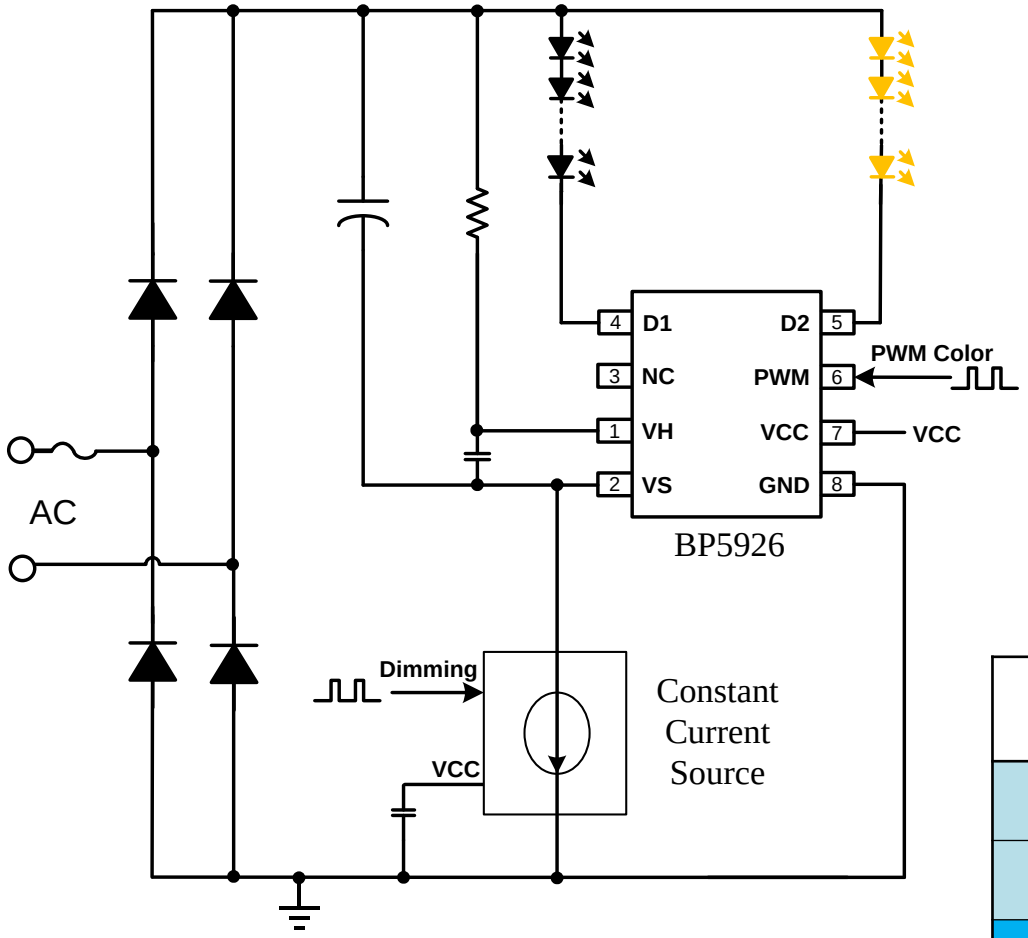
➢ 目标应用：
国内/日本/欧洲调光球泡和筒灯



- 低待机功耗：<0.5W；
- 调光曲线线性度好，色温一致性高；
- 元器件少，体积小；
- 总输入功率不变

BP5926X 两通道混色

上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

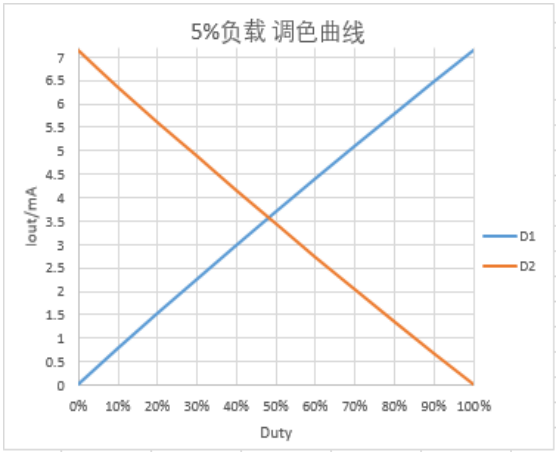


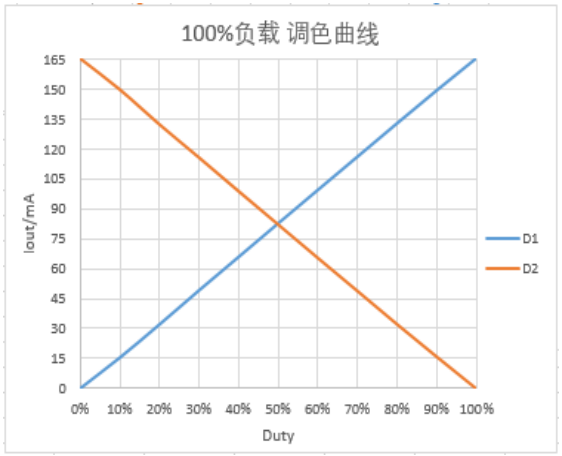
- 支持两路LED 0-100% 混色
- 互补逻辑控制
- 内置双路高压MOS, 小体积
- 600V浮动电压, 兼容全电压应用
- 兼容3.3V/ 5V PWM输入
- 可分辨高达10kHz PWM调色信号
- SOP8封装

产品名称	MOS	最大电流（mA）
BP5926A	0.6Ω/100V	700
BP5926D	5Ω/300V	180
BP5929	External	-

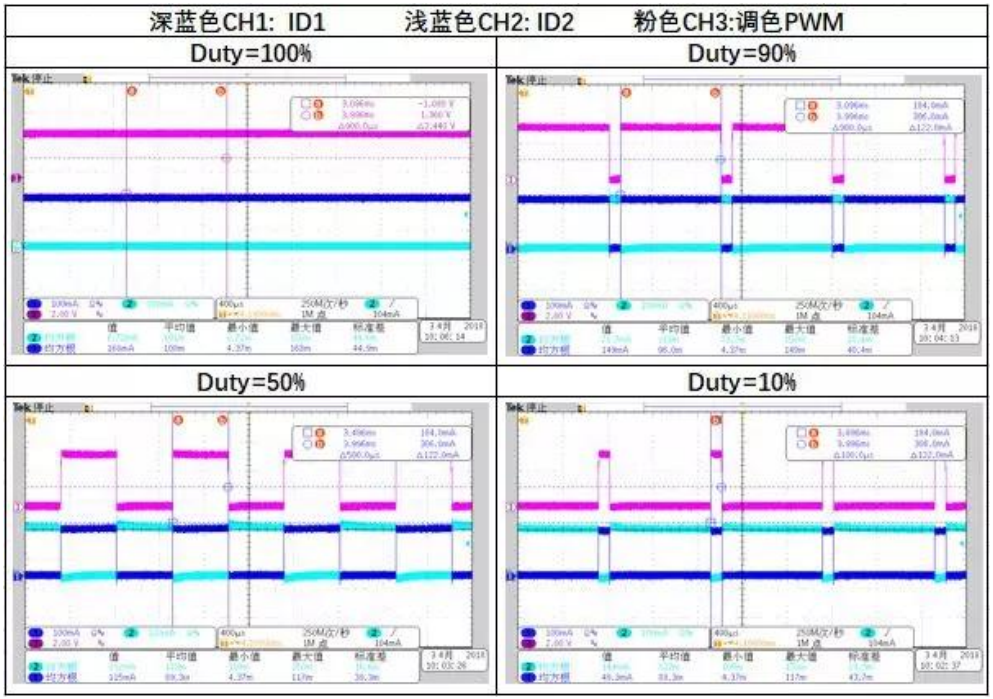
BP5926A Performance

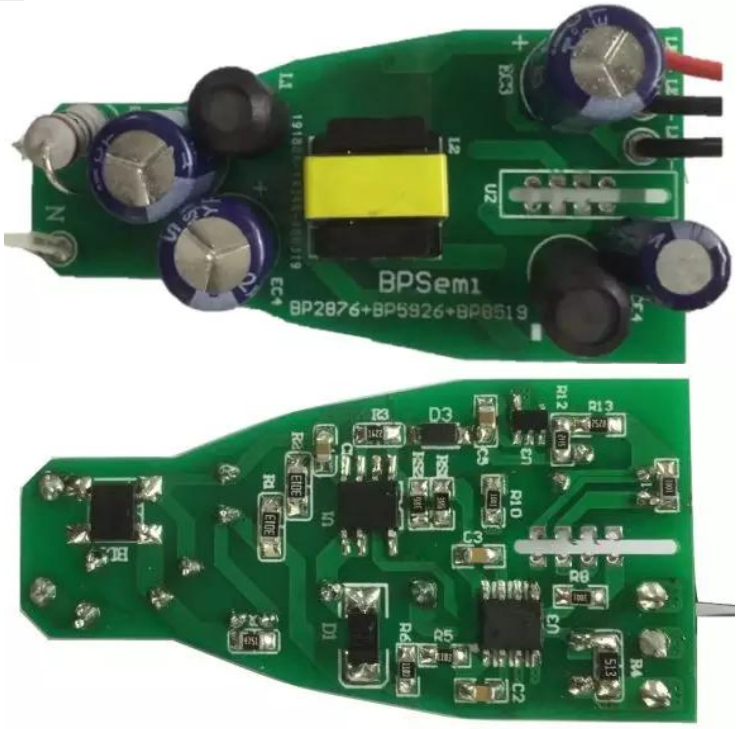
上海晶丰明源半导体股份有限公司
Bright Power Semiconductor





- Few external components
- Small overshoot current at dimming

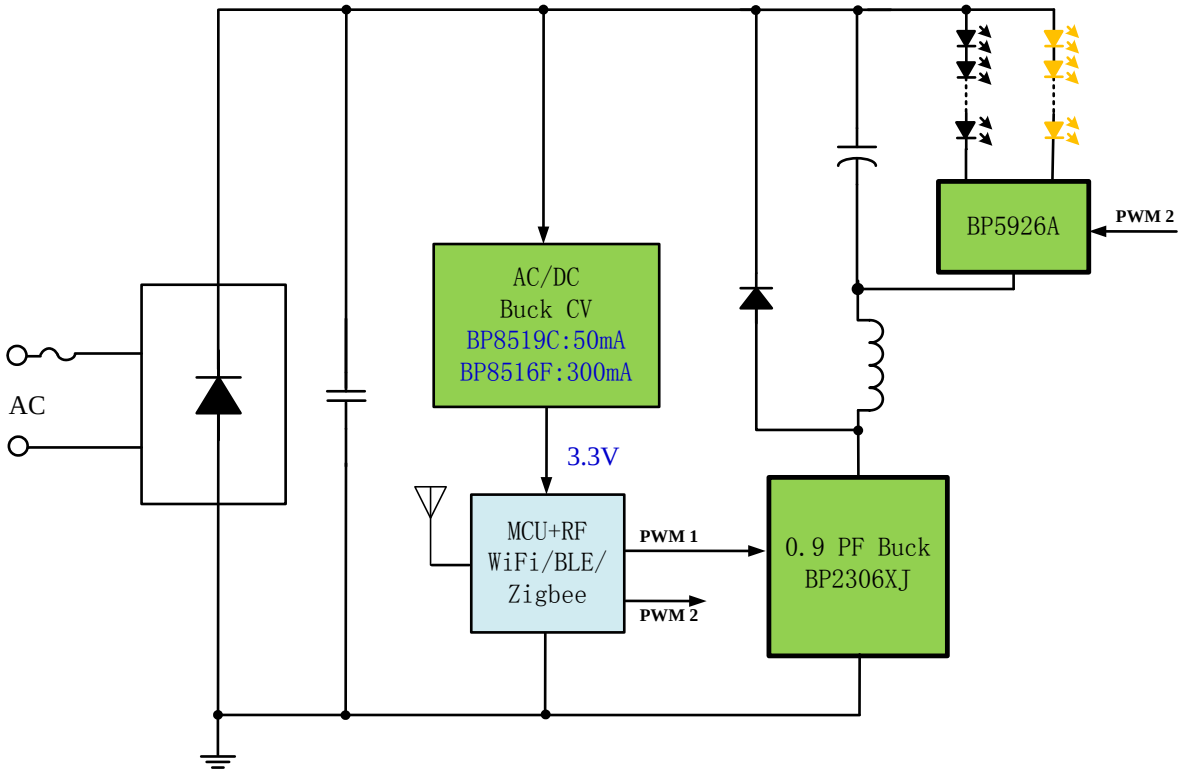




高PF无级调光调色-恒功率

➢ 目标应用：

北美/欧洲调光调色温灯丝灯，球泡，筒灯

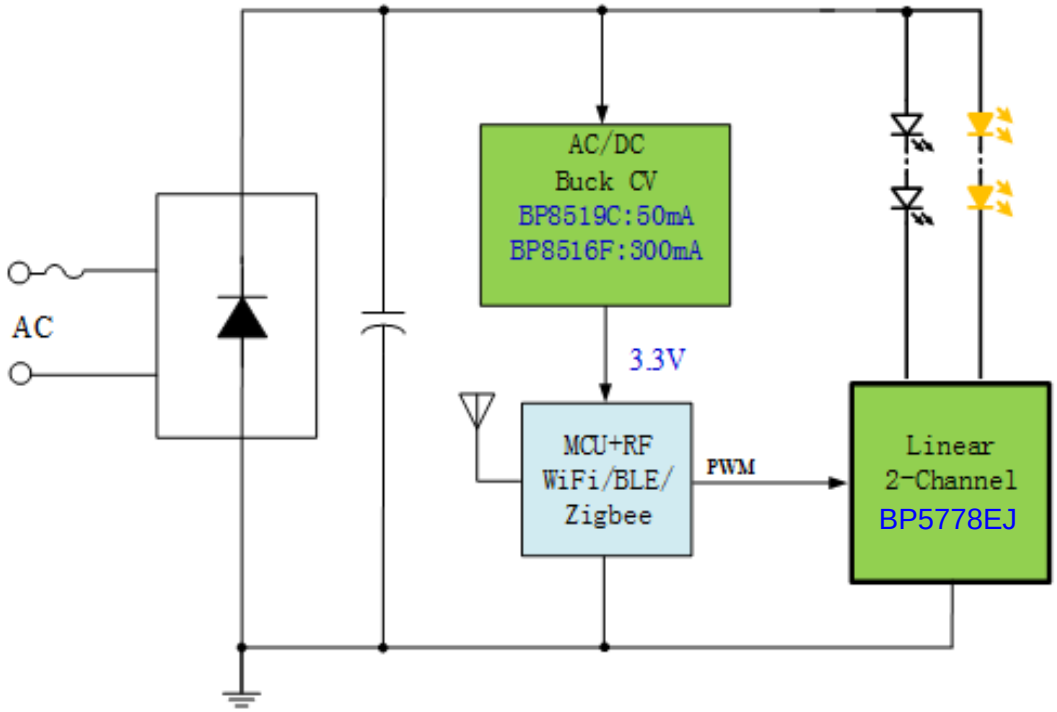


- 低待机功耗：<0.2W
- PF>0.9;
- 元件少，尺寸小；
- 调光深度1%；
- 调光曲线线性度好，色温一致性高；
- 两路灯珠全部最亮时输入功率不变

线性调光调色-倍功率

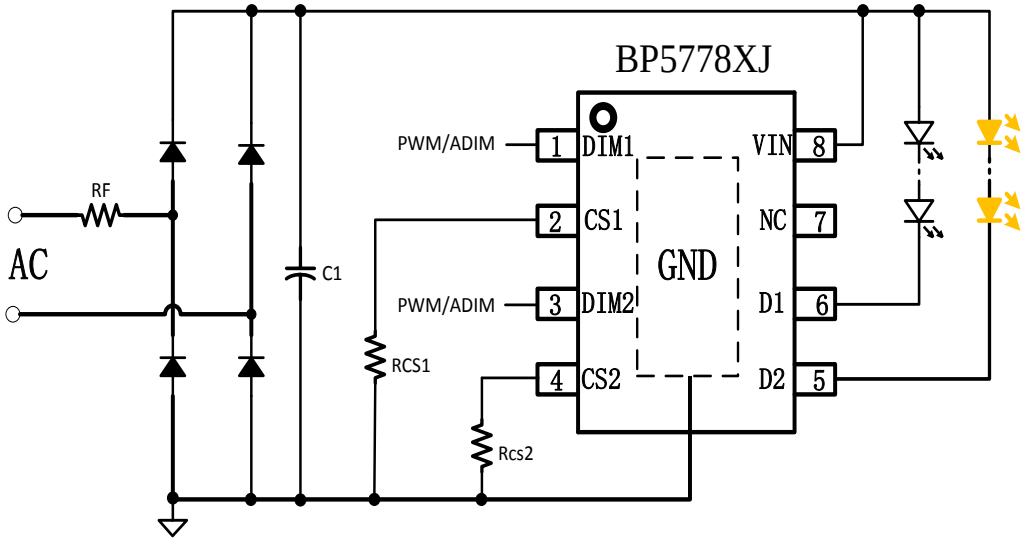
➢ 目标应用：

国内/日本/欧洲调光调色温球泡/筒灯

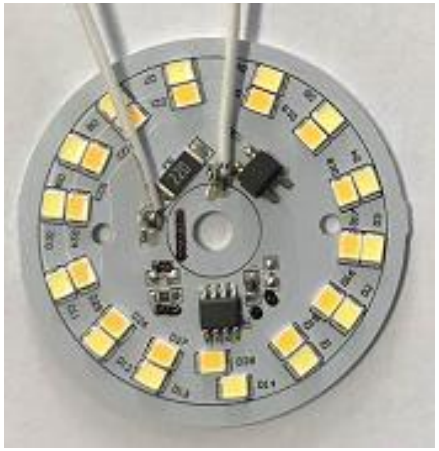


- 低待机功耗：<0.5W；
- 适用于全贴片DOB设计；
- 元件少，尺寸小，成本低；
- 支持3.3kHz以上调光频率，调光无频闪；
- 两路灯珠全部最亮时输入功率翻倍

两通道线性PWM调光调色 (BP5778EJ)



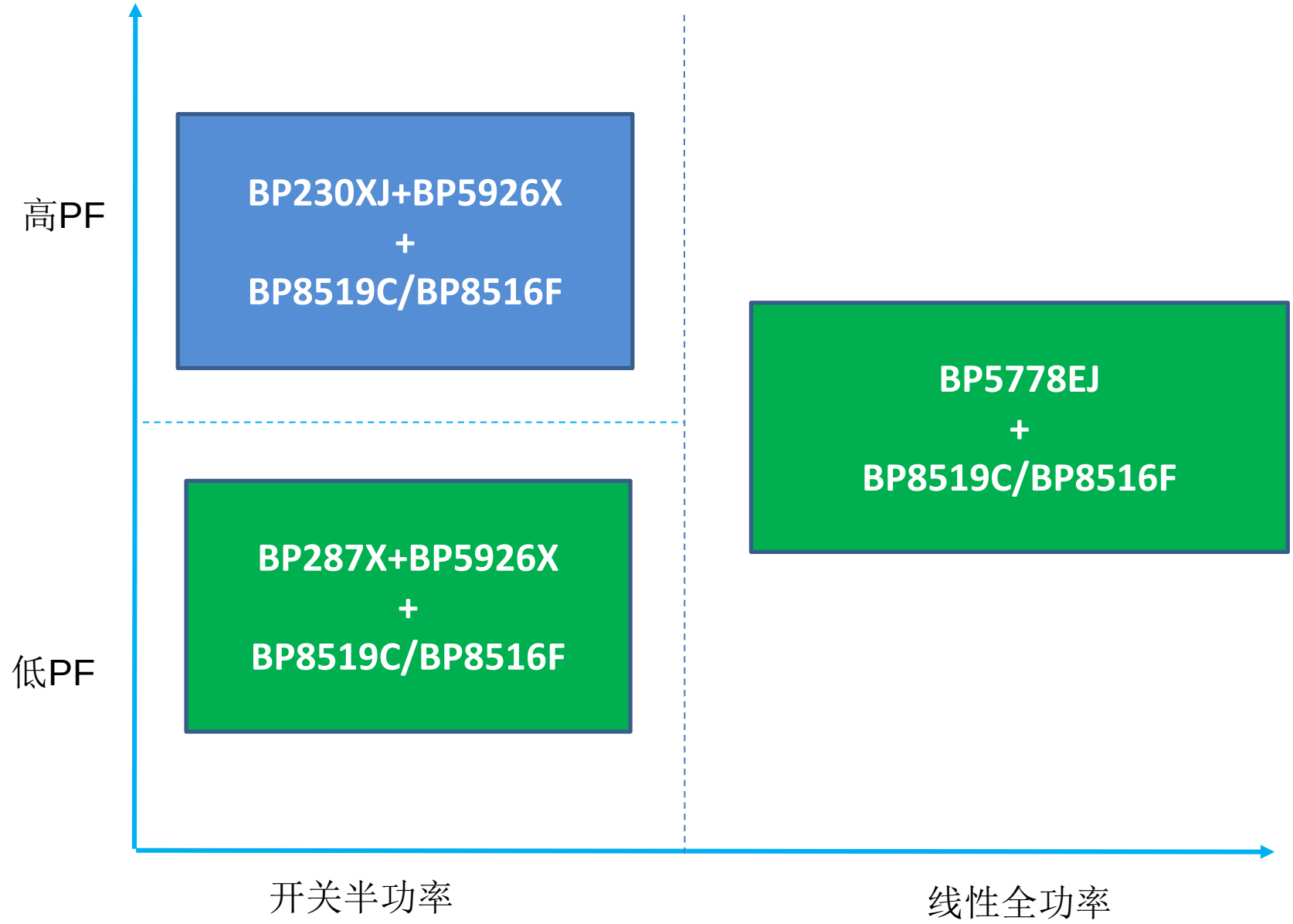
BP5778EJ 低PF典型应用图



产品特点：

- 两通道，兼容PWM和模拟调光信号
- 外围电路简单，驱动器体积小
- 最大电流能力每路 120mA
- 优化了EMI和浪涌能力
- 过温降功率增强系统可靠性
- 可多颗芯片并联使用增加功率

两路调光调色温方案


高PF
低PF
BP230XJ+BP5926X
+
BP8519C/BP8516F
BP287X+BP5926X
+
BP8519C/BP8516F
BP5778EJ
+
BP8519C/BP8516F
开关半功率
线性全功率

多路彩色智能方案

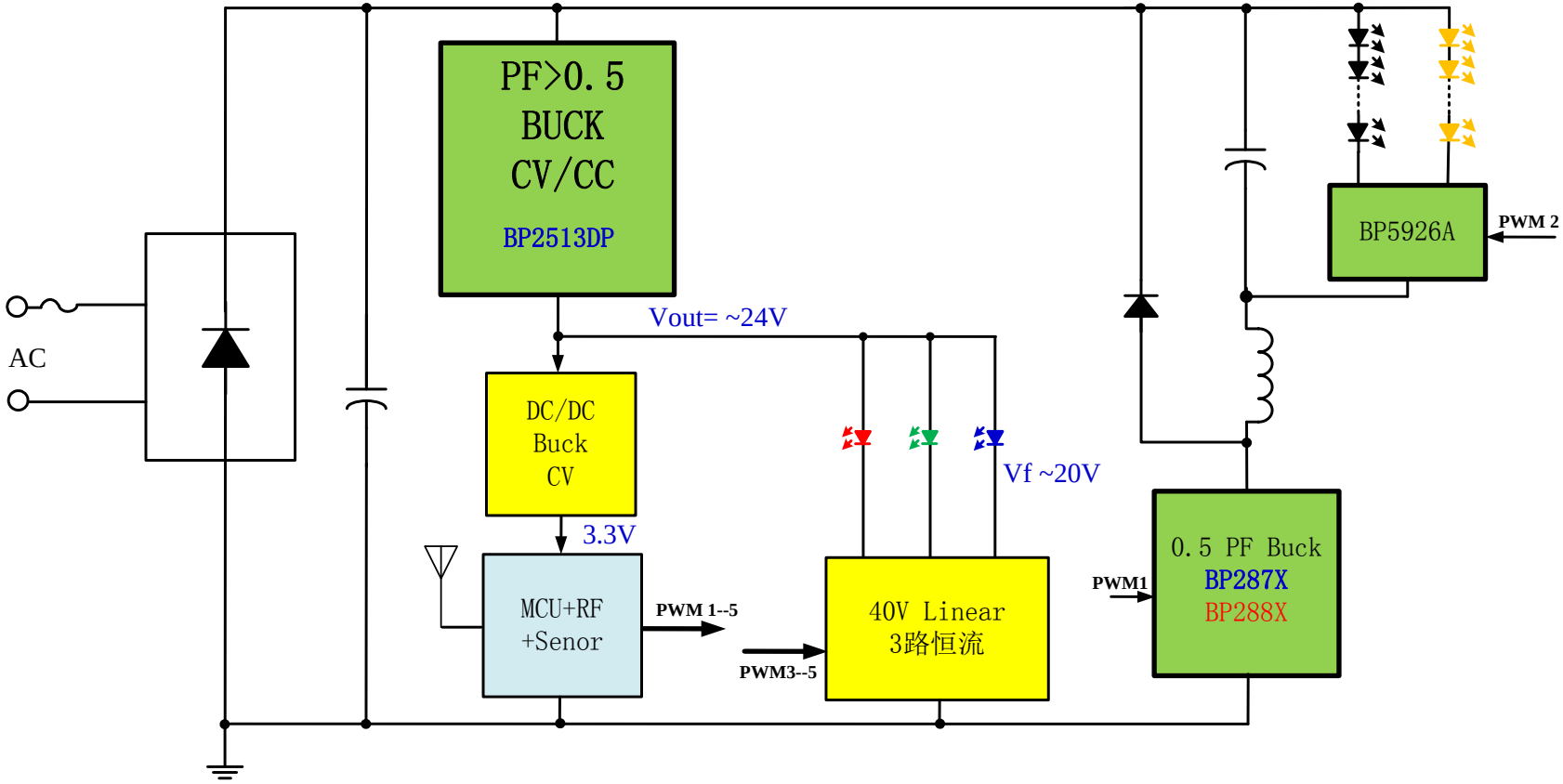
1. 低PF方案
2. 高PF方案

低PF RGBW彩灯应用方案

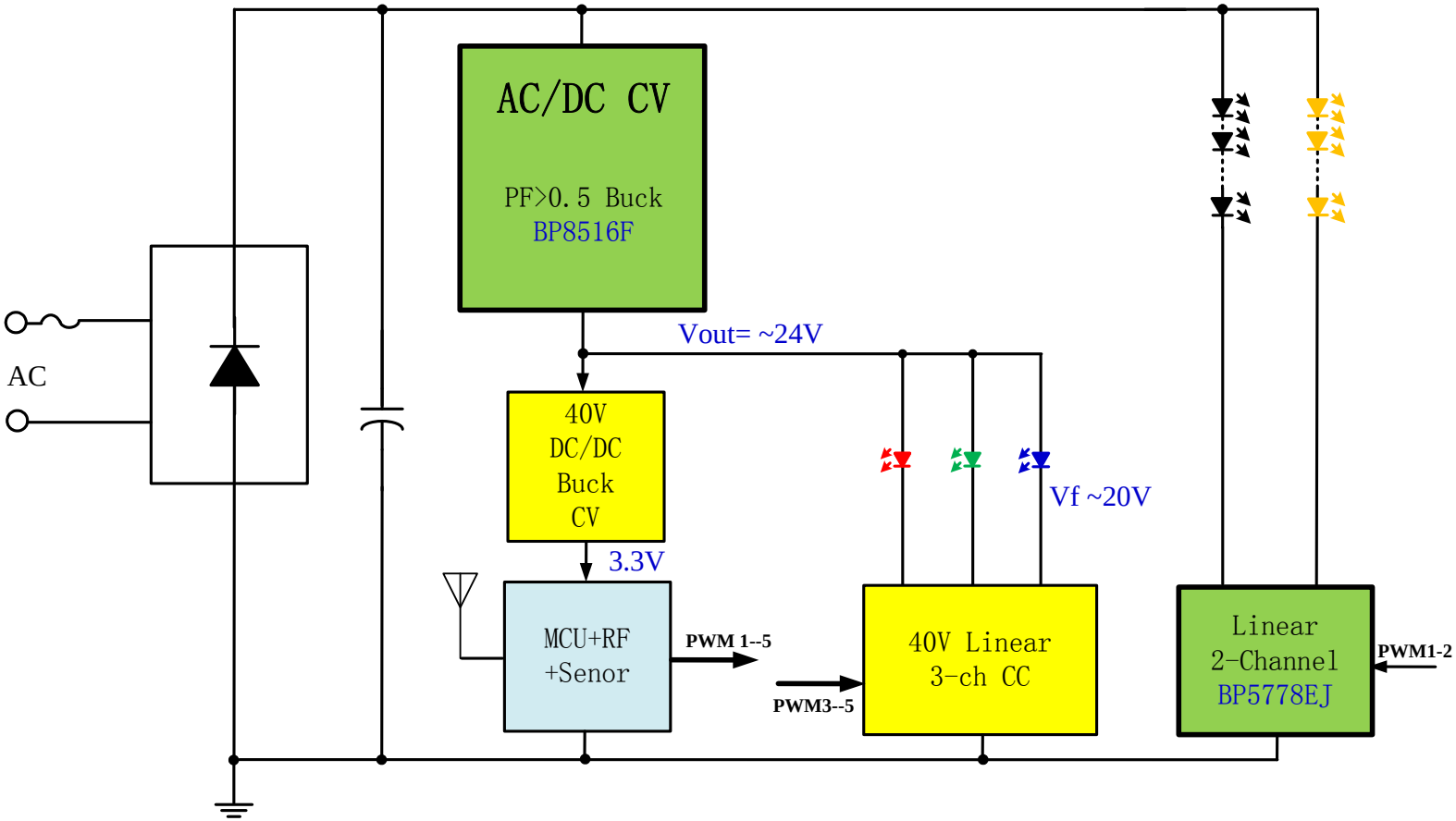
上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

➢ 目标应用：
彩色球泡

- 白光电流大，作为主照明满足流明要求；
- 彩色电流小，作为气氛烘托；



LPF RGBCW Linear Solution



体积小，成本低

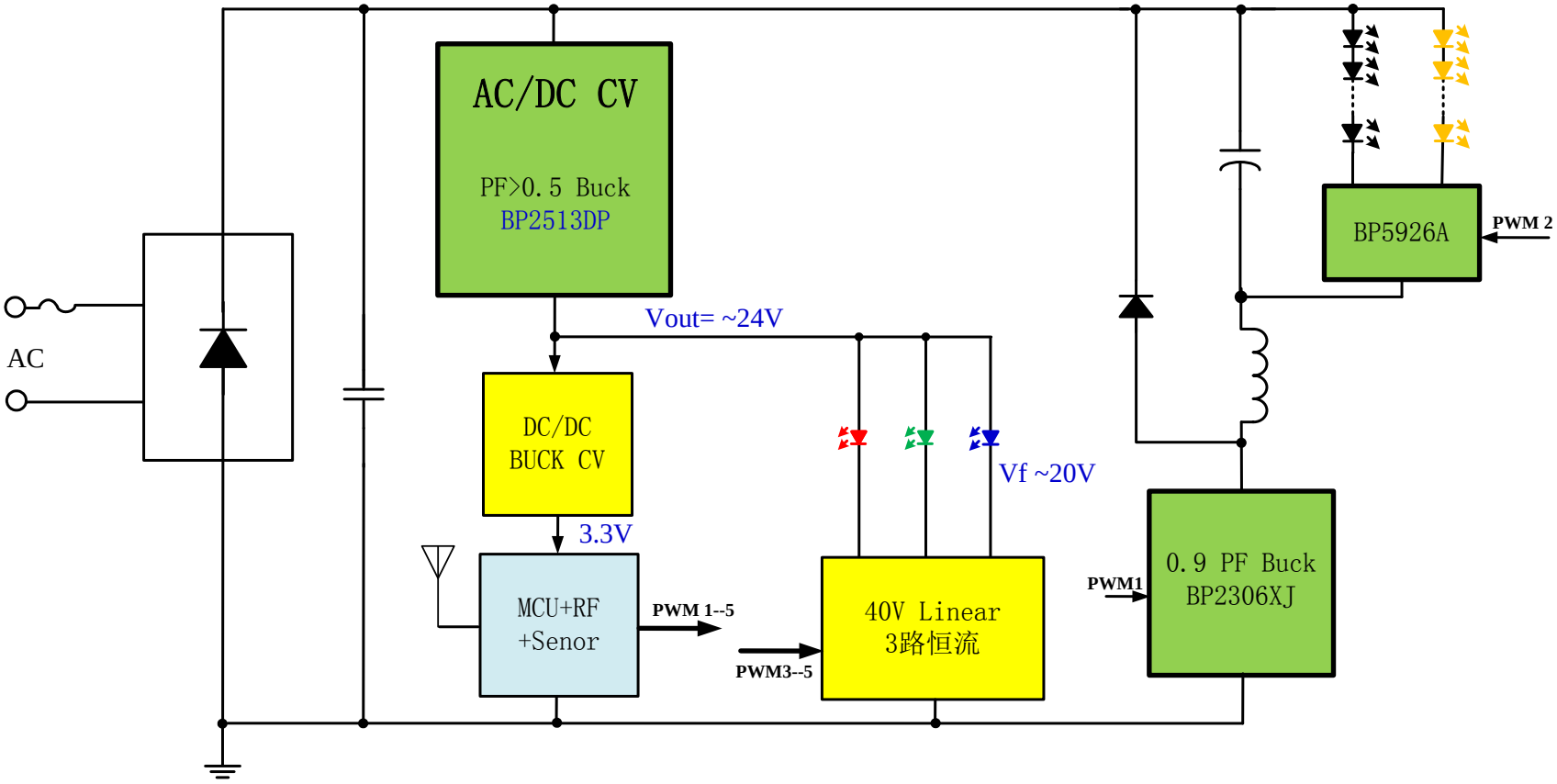
效率低

高PF RGBW彩灯应用方案

上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

➢ 目标应用：
高光效彩色球泡

- 白光电流大，作为主照明满足流明要求；
- 彩色电流小，作为气氛烘托；



High Efficiency RGBCW Application

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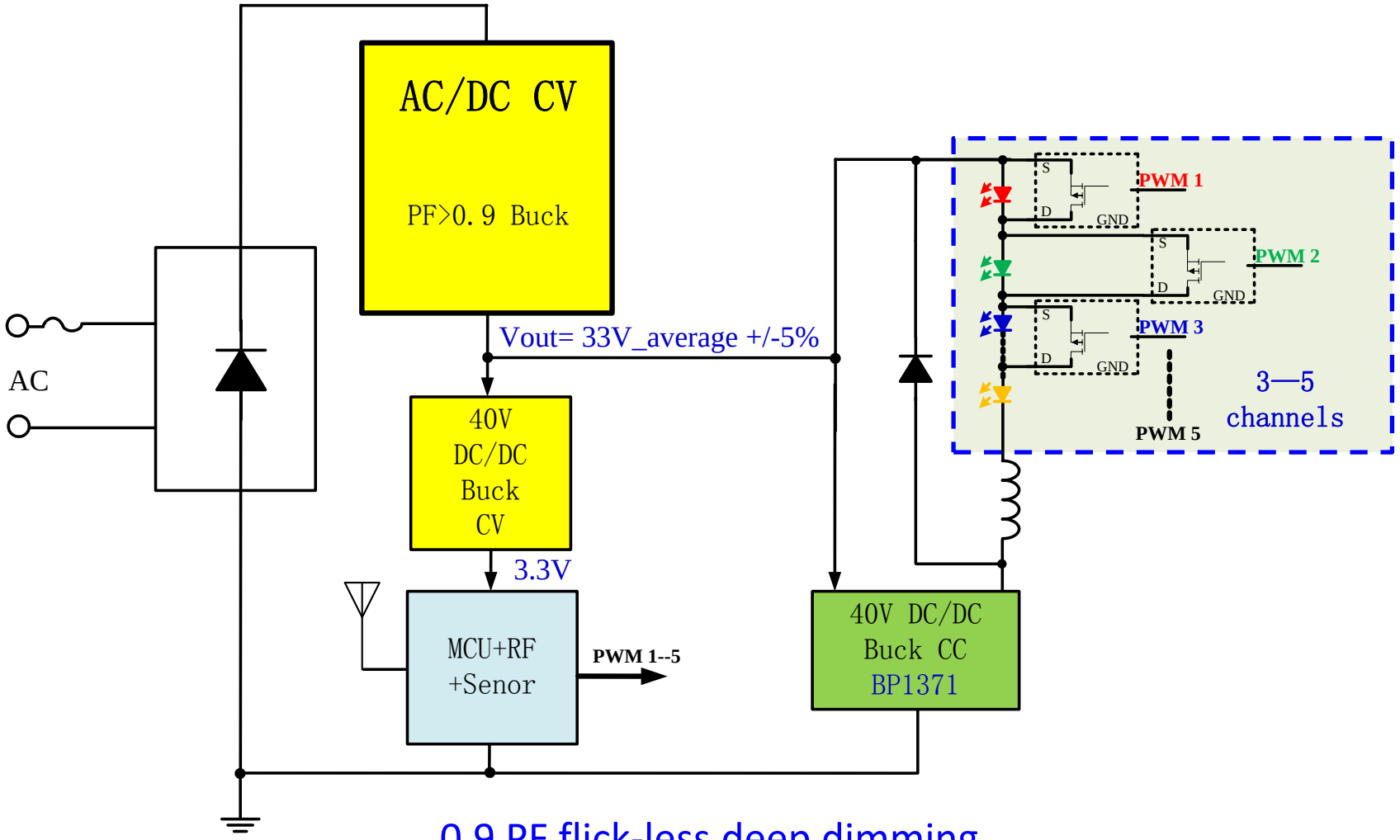
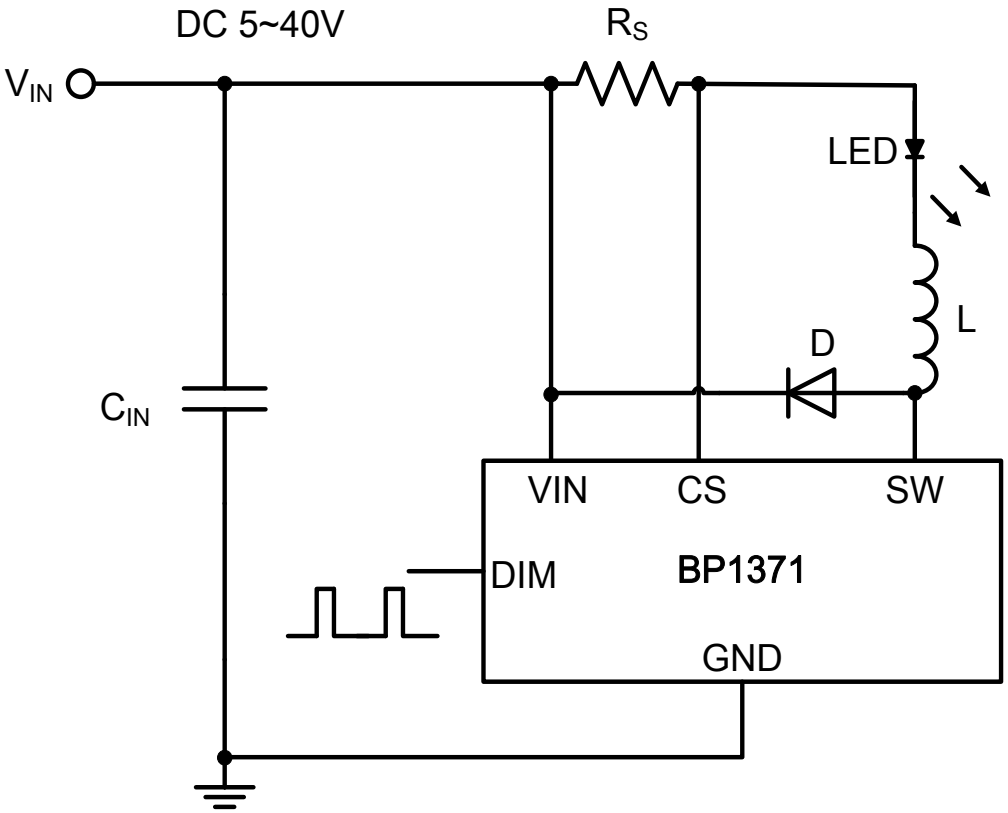
Bright Power Semiconductor



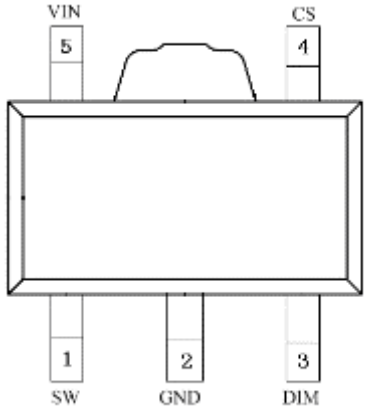
0.9 PF flick-less deep dimming
Higher Efficiency for RGB application

BP1371: 40V DC/DC Buck

上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

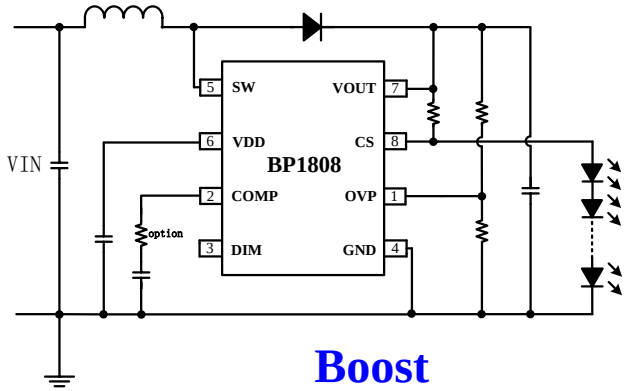


- 5~40V/1.2A Input Buck
- Rdson 280mΩ
- PWM/Analog Dimming Interface
- Fast Hysteresis Control
- SOT89-5 package

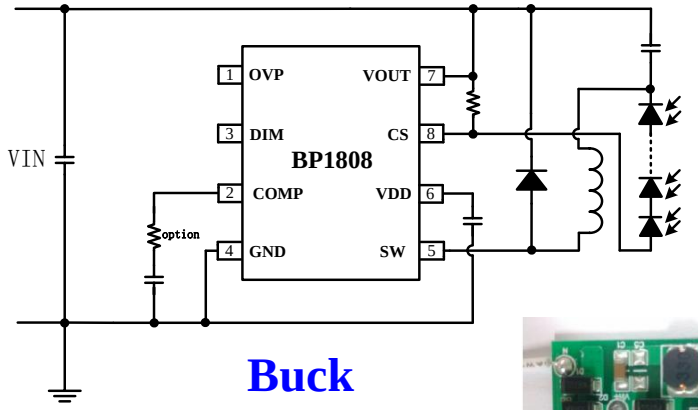


BP1808: 70V DC/DC

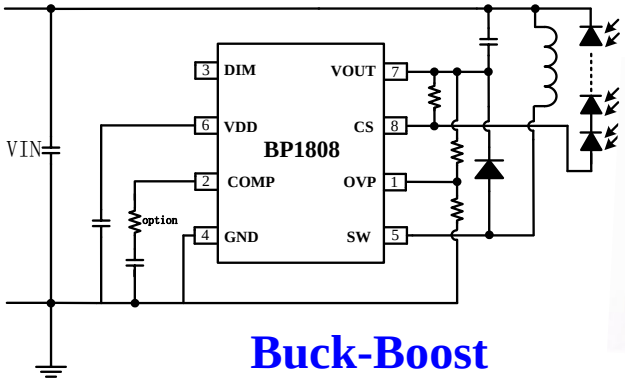
上海晶丰明源半导体股份有限公司
Bright Power Semiconductor



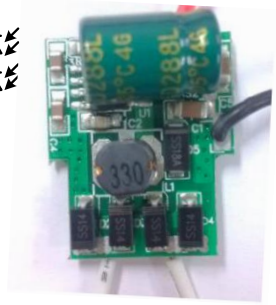
Boost



Buck



Buck-Boost



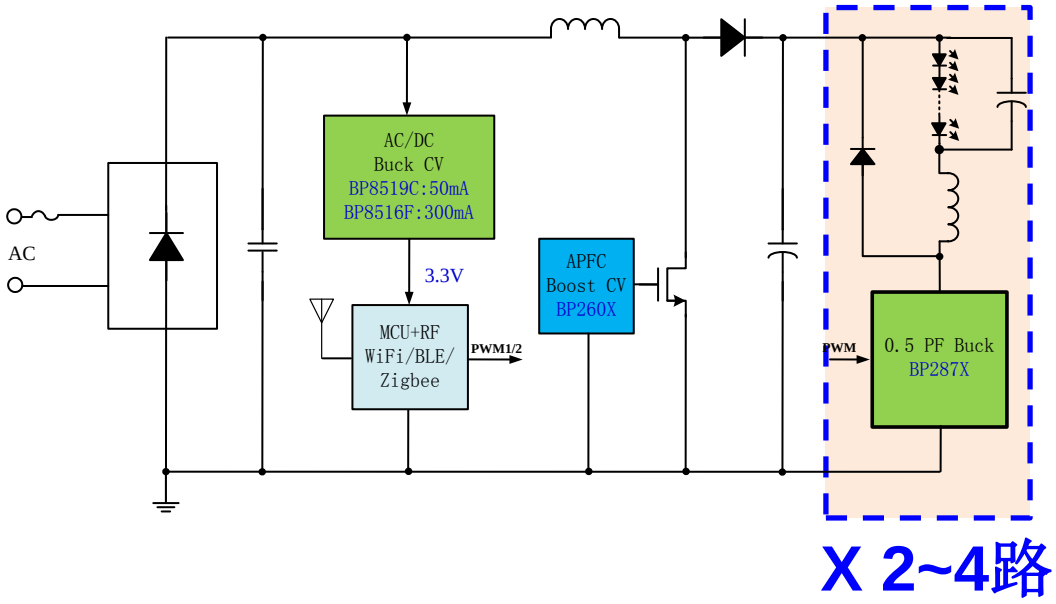
- Boost, Buck, Buck-Boost
- Internal 70V/0.3Ω MOSFET
- PWM/Analog Dimmable
- Thermal Regulation

Part No.	MOS	Package	Io(max)	Topology
BP1808	70V	SOP8-EP	500mA/50V@60V	BUCK
			300mA/22V@15V	BUCKBOOST
			300mA/22V@7V	BOOST

灯具类产品
智能照明方案

高PF无频闪低THD调光调色

- 目标应用：
  国内调光调色吸顶灯，国外大功率灯具
- 方案特点：
  - 低待机功耗：<0.5W ；
  - PF>0.9，THD<10%;
  - 调光深度<1%；
  - 无频闪，无噪音；
  - 调光曲线线性度好，色温一致性高；
  - 两路灯珠全部最亮时输入功率翻倍；



高PF Boost 恒压或恒流驱动-BP260X

上海晶丰明源半导体股份有限公司
Bright Power Semiconductor

▼ 目标应用

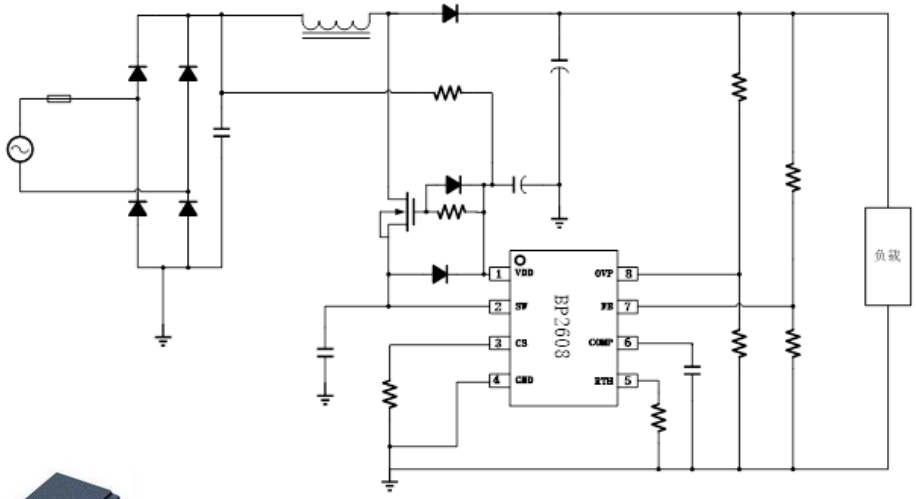
全电压输入、非隔离Boost型恒压或恒流驱动

产品名	封装	PF	拓扑	功率@176-265Vac	MOS
BP2606C	SOP8	0.92	BOOST	<30W	500V/3Ω
BP2606D	ESOP-8	0.92	BOOST	<50W	500V/2Ω
BP2608	SOP8	0.92	BOOST	<120W	外置
BP2605	DIP8	0.92	BOOST	<180W	外置

▼ 主要特性

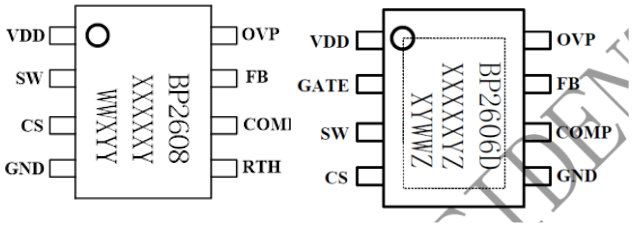
- 单绕组电感；
- 源极驱动，无需高压启动；
- ±1% LED 输出电流精度；
- LED开路保护；
- MOS过流保护；
- 输出过流保护；
- 芯片供电欠压保护；
- RTH电阻外设芯片温度过热调节；

▼ 典型应用图：



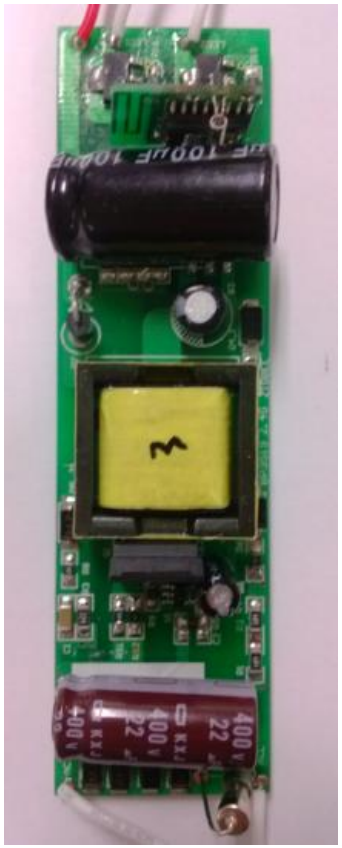
Boost升压架构 （恒压）

▼ 引脚说明



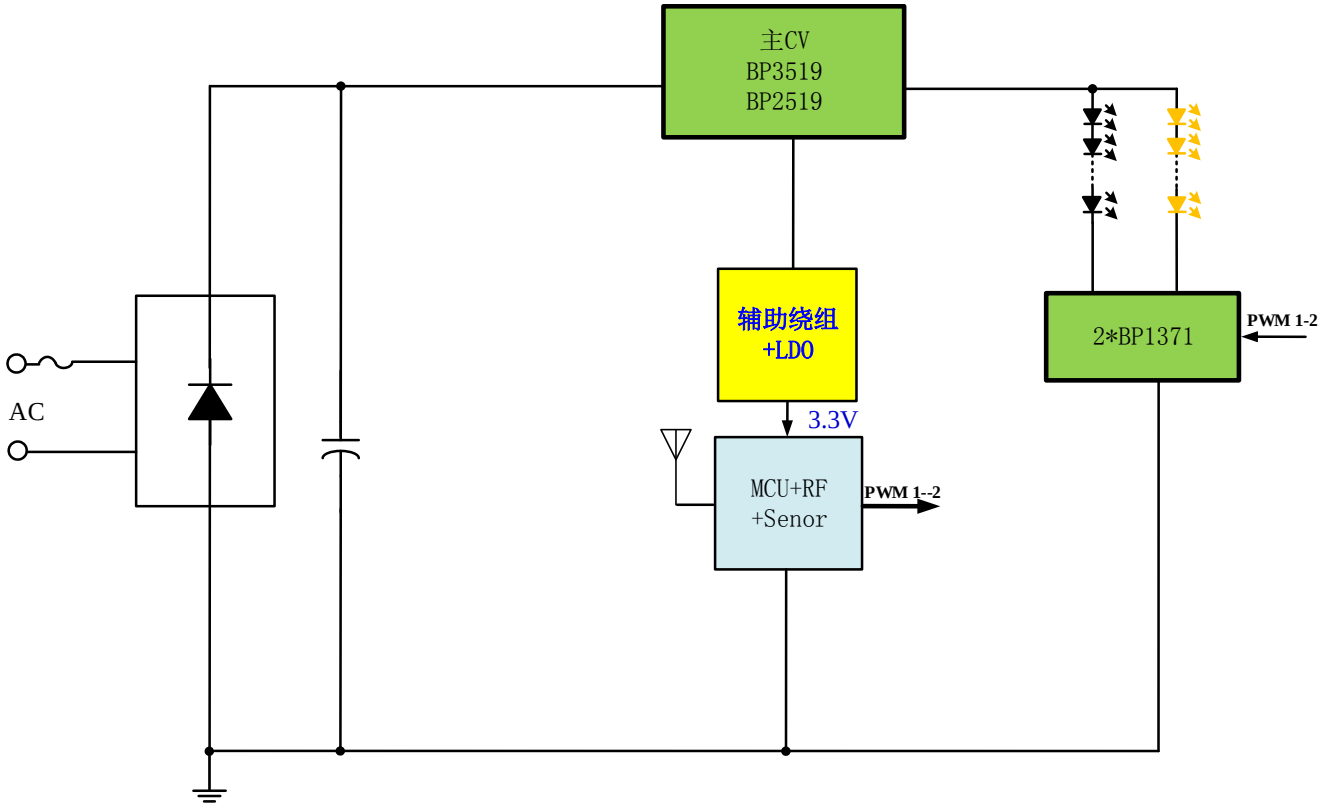
隔离低PF调光调色-BP3519

➢ 目标应用：
双路调色吸顶灯



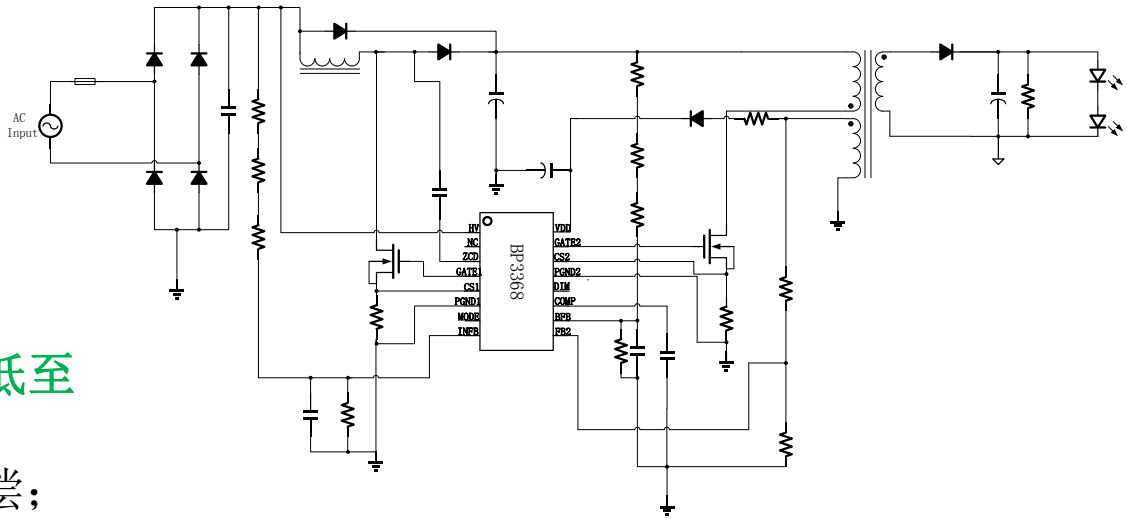
➢ 方案特点：

- 调光深度<1%；
- 低端电流一致性好；
- 调光无频闪；
- 两路灯珠全部最亮时输入功率达到2倍



主要特性

- 宽电压输入85VAC~305VAC，可用于隔离
- 集成高压启动，启动时间<0.5s；
- **输出电流精度<+/-3%；**
- **OVP精度<+/-3%；**
- Boost级无需辅助绕组；
- **支持模拟调光，调光深度低至5%，且低端可关断；**
- 内置线电压补偿和负载补偿；
- 各种保护功能
  - LED负载开路/短路保护
  - CS2短路保护
  - Boost输出过压保护
  - 输入Brown out检测
  - 过温保护



BP3368

Boost+Flyback

Thanks!