On-Bright Presentatin

2012-6

Outlines

1. On-Bright company introduction
2. Spec requirement in the PWR
   PWR saving, Efficiency
3. Small & Medium Power <100mW
   Solutions----OB522x Power Switch
   Solutions----OB5269/69B Controller
   Solution----OB2276 Controller
   Solutions----OB2273x Controller
4. Q & A

On-Bright branches location

Over 200 employees

ShenzhenOffice

Guangzhou Office

Shanghai Head Quarter

Taipei office

Dongguan office

HK branch

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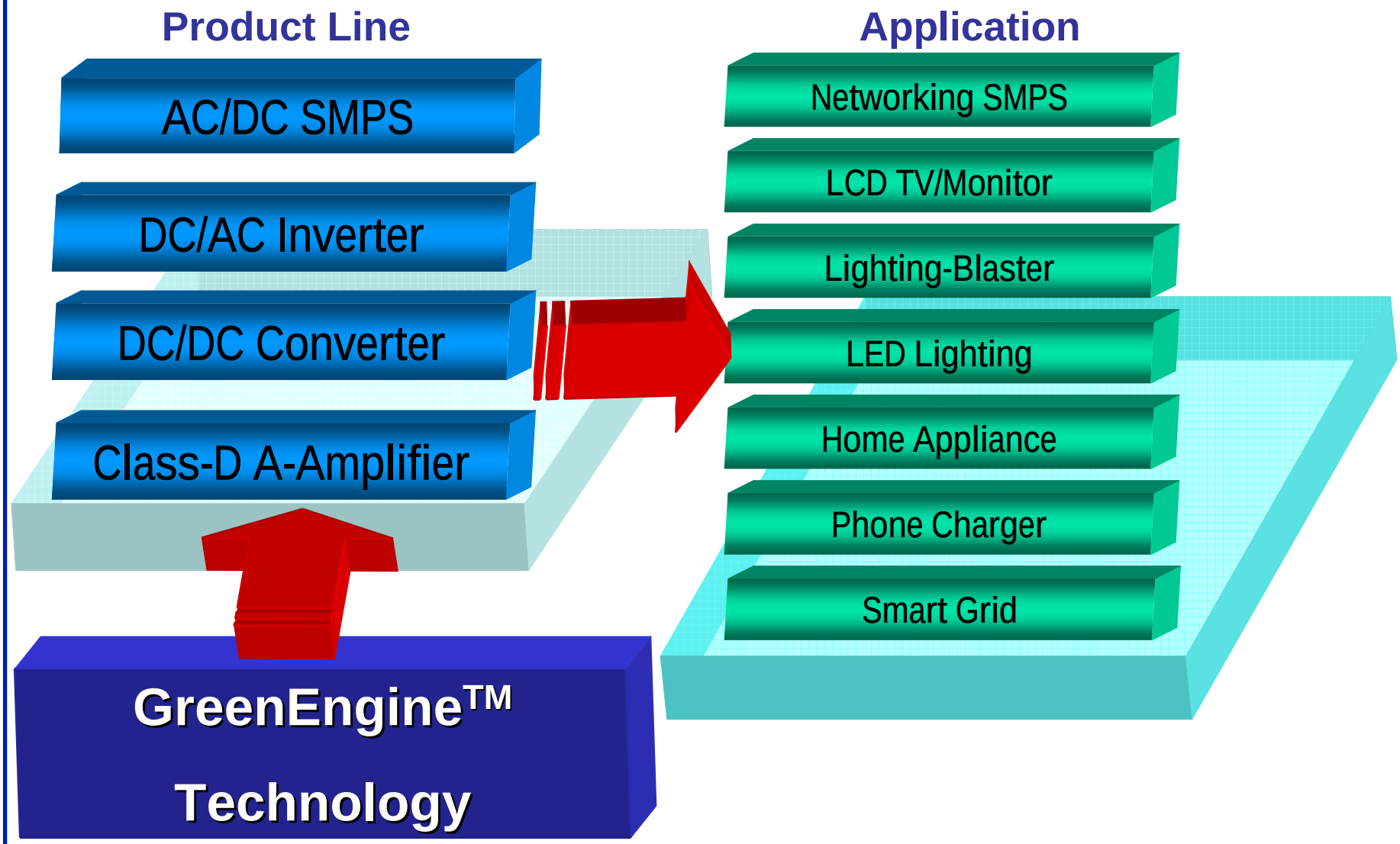
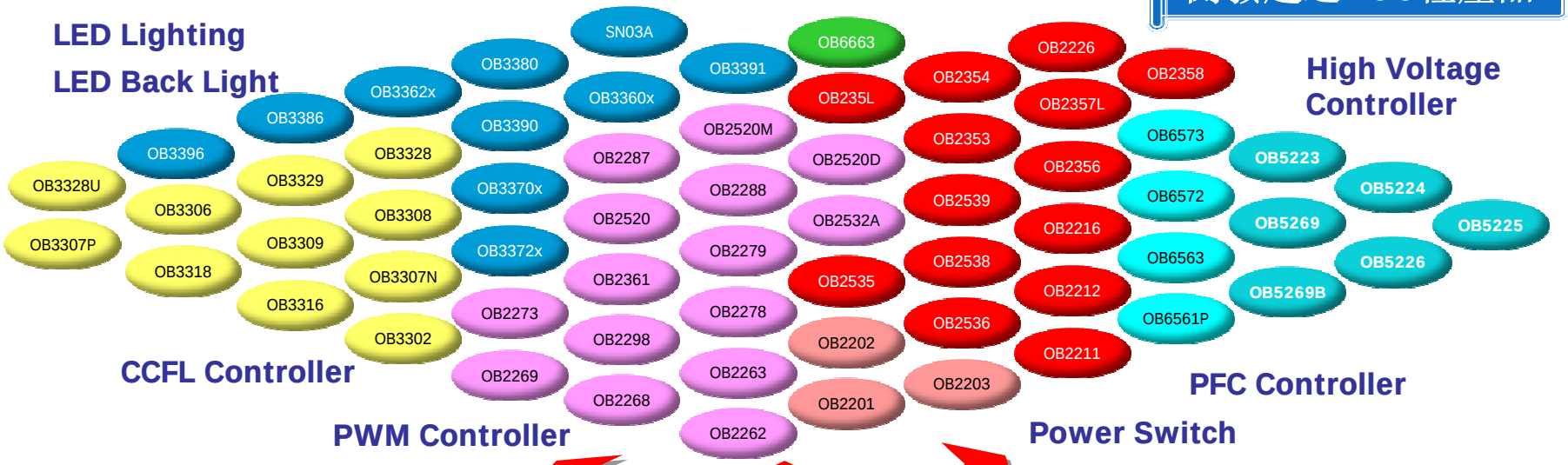
On-Bright Product Strategy



GreenEngine™ 技術平台

開發超過100種產品



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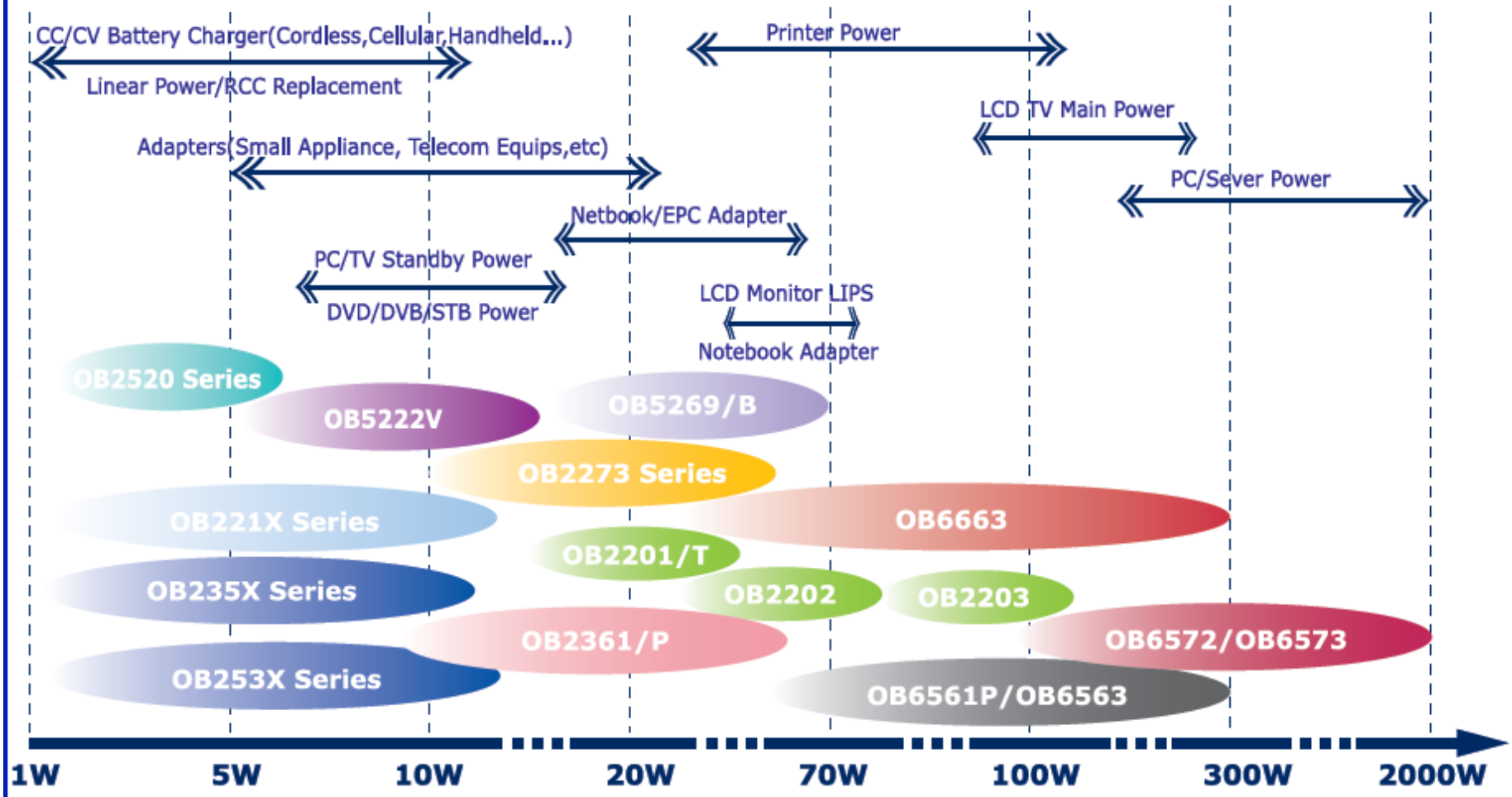
On-Bright AC/DC Product Profile & Applications

AC/DC IC Product Selection Guide



On-Bright LED BLU/Lighting Product

LED Backlight Product Selection Guide

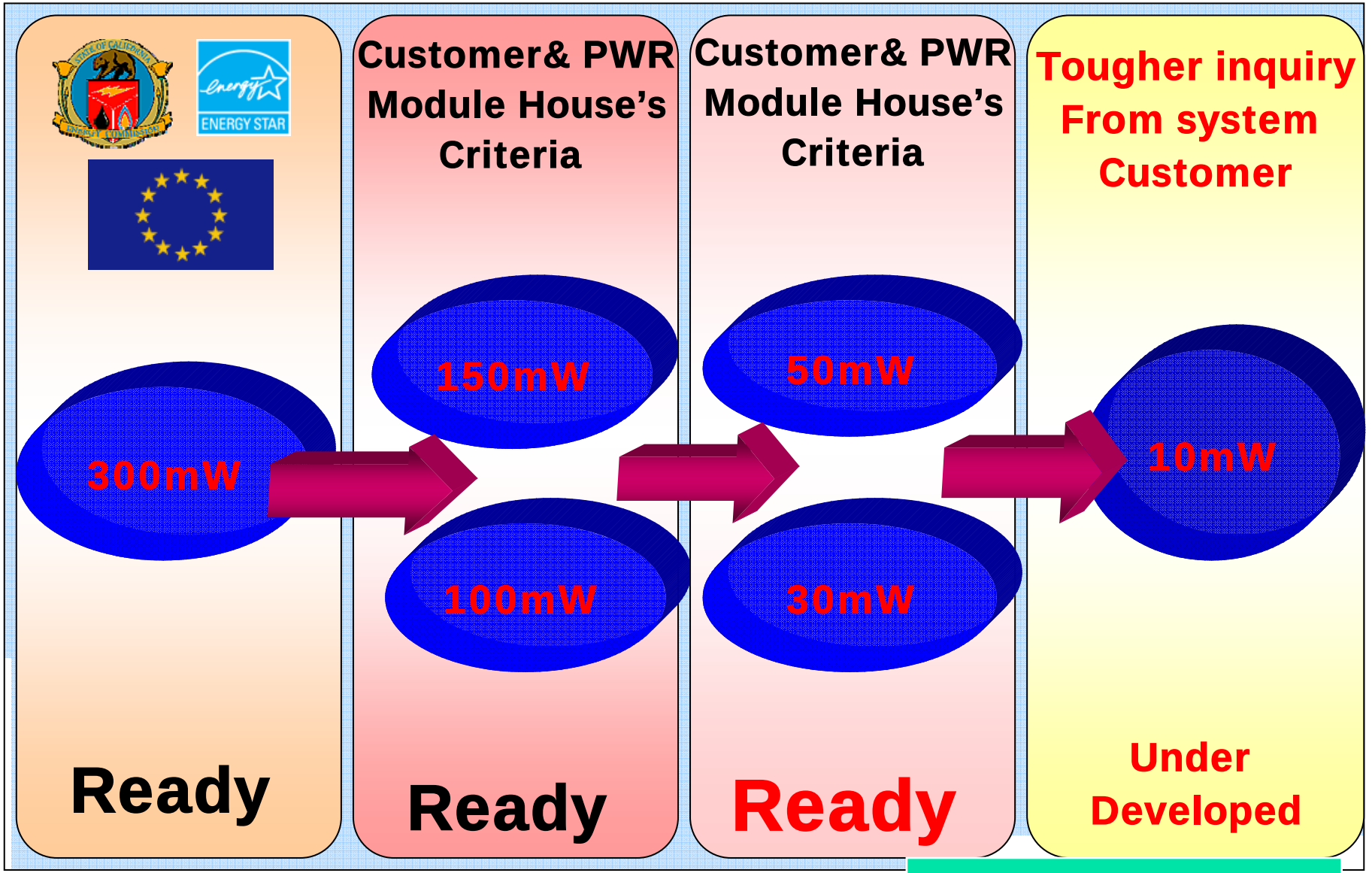
	6.5~8″	8~15″	17~24″	20~32″	32″+
LED TV				OB3370 Series OB3362/F	OB3372
LED Monitor			OB3370 Series OB3362/F		
Notebook Netbook		OB3360 OB3360F			
Automotive Portable	OB3360 OB3360F				

LED Lighting Product Selection Guide

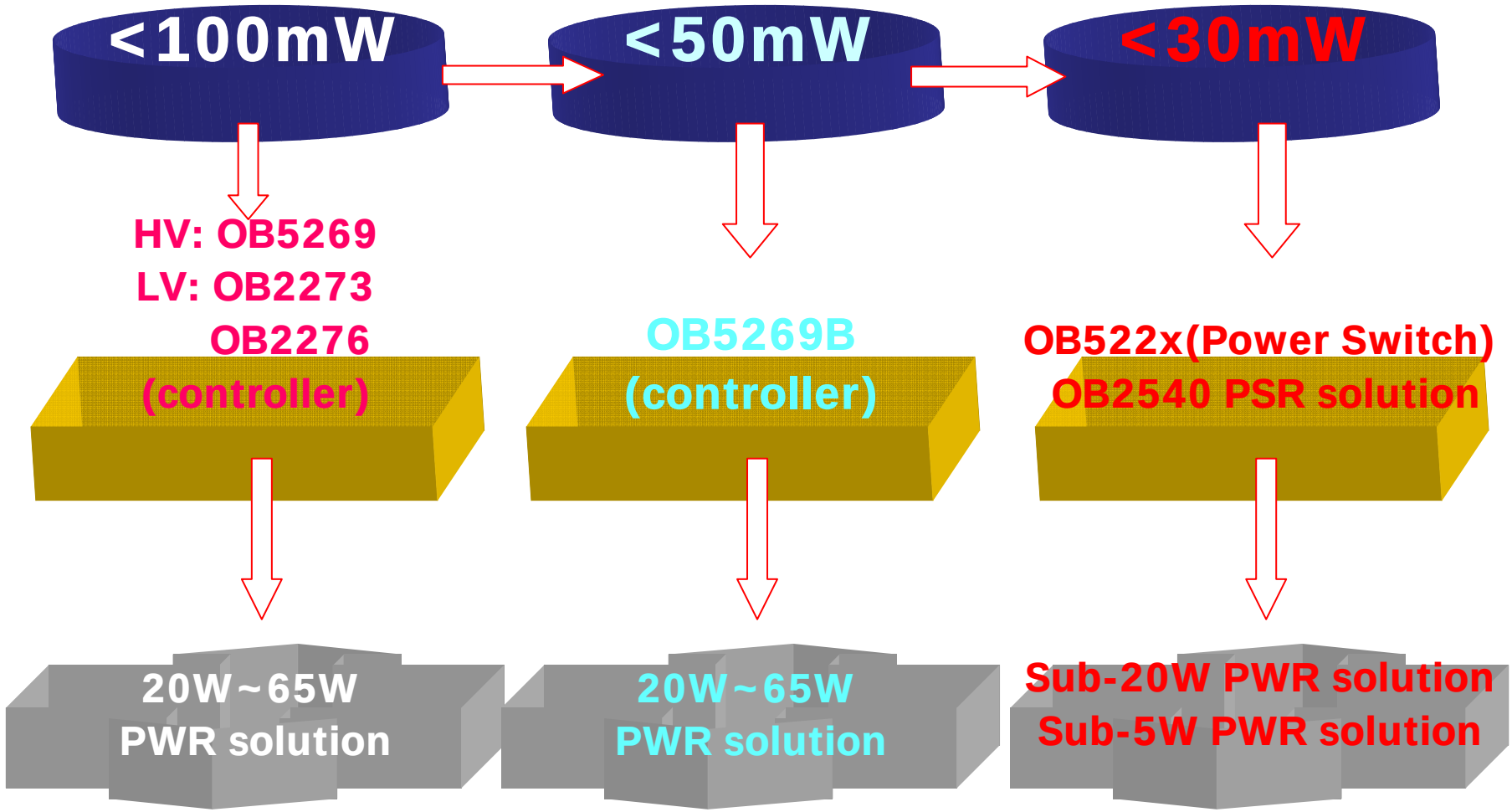
	1~5W	5~10W	10~15W	15~40W	40W+
Street light				OB3380 SN03A	PFC+QR+ OB3380
City Beautify			OB2532A/8 OB3380 SN03A	OB3380 SN03A	
Commercial T-lamp		OB2532A/6 OB3380 SN03A	OB2532A/8 OB3380 SN03A	OB3380 SN03A	
Home lighting Bulb,Spot	OB2520 OB2532A/5 OB3380	OB2532A/6 OB3380 SN03A	OB2532A/8 OB3380 SN03A		

On-Bright Product Positioning Green Power

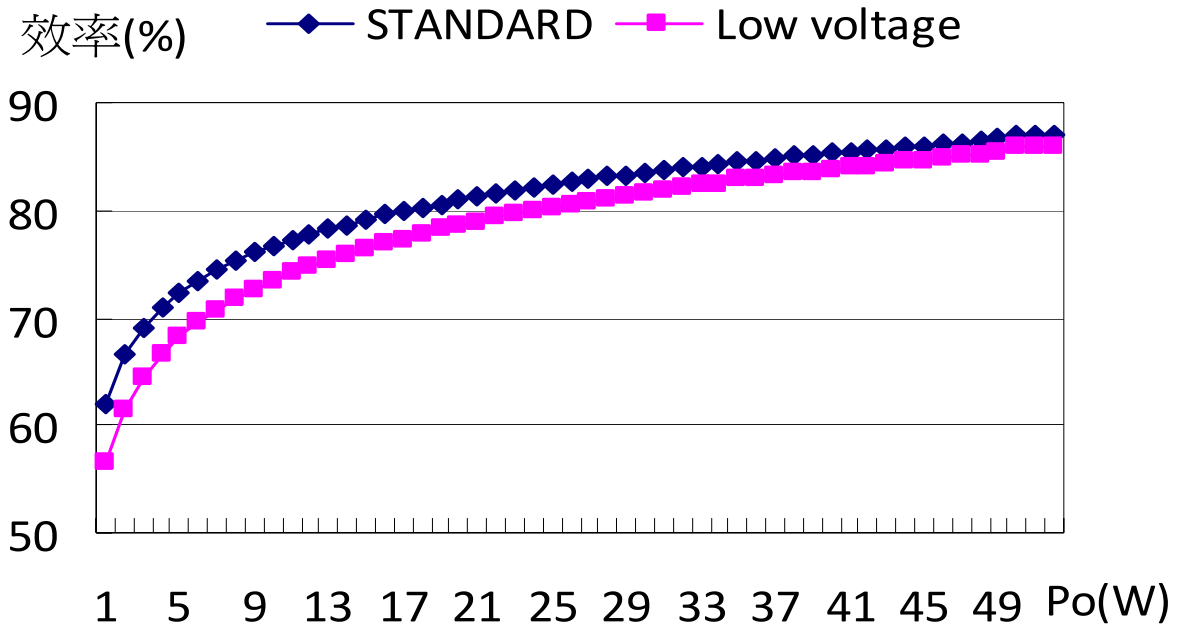
PWR Consumption Trend



No load stand by lower than 100mW solutions



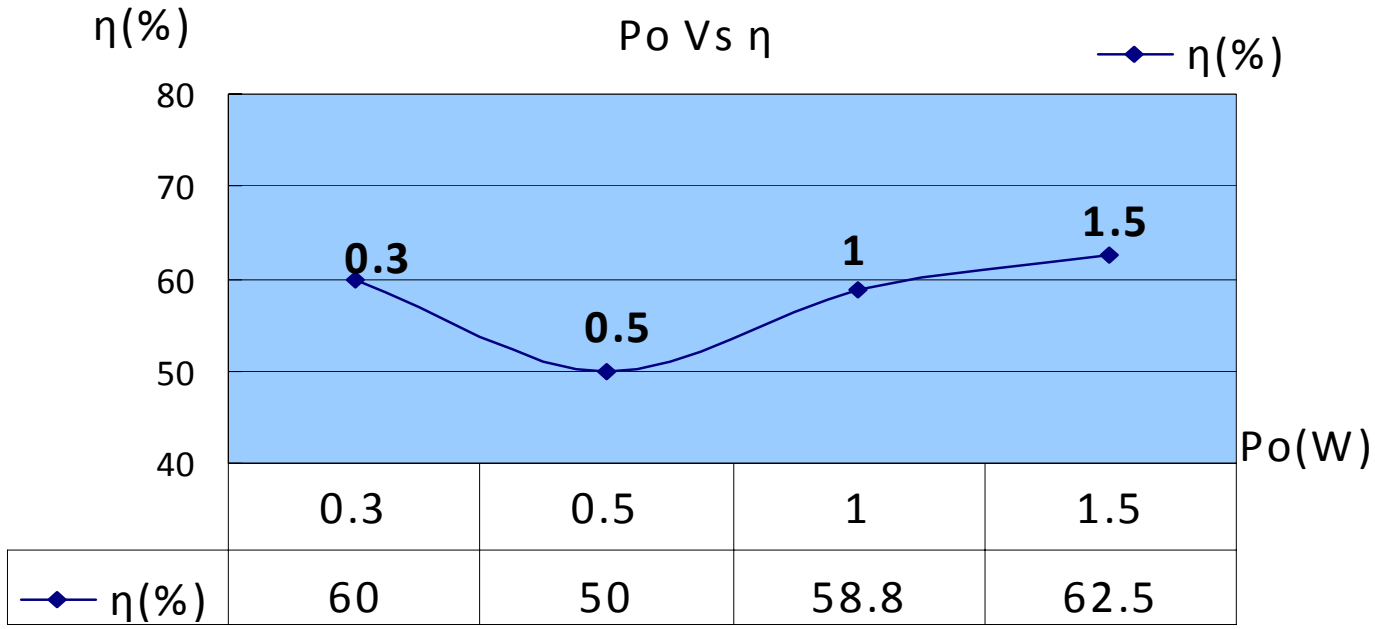
EPS 2.0 Level 5



Light load Efficiency

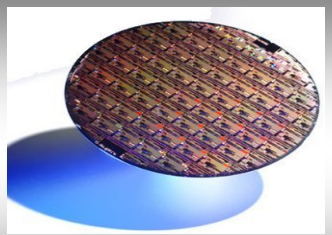
voluntary agreements

Official organization regulation



	0.3	0.5	1	1.5
η(%)	60	50	58.8	62.5

How to achieve Lower PWR Saving



•IC Process

•Adapter system improve

•IC operation current
•IC control modes

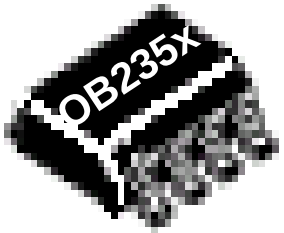
On-Bright
Brighten Your Life

1. IC design team
2. FAE/AE Team
3. Operation and Foundry

1. Decrease PWR Saving
2. Improve light load and average efficiency

Application For Smart phone and Tablet PC Power

- Power Saving <150/30mW
- Tight OCP spec
- High PWR density
- Meet CNS15285
- Low Leakage/No-Y



- DIP8/SOP8 package MOS Included
- Low leakage support
- Achieve 150/30mW
- Enhanced light load efficiency
- adjustable OCP
- HV/LV process

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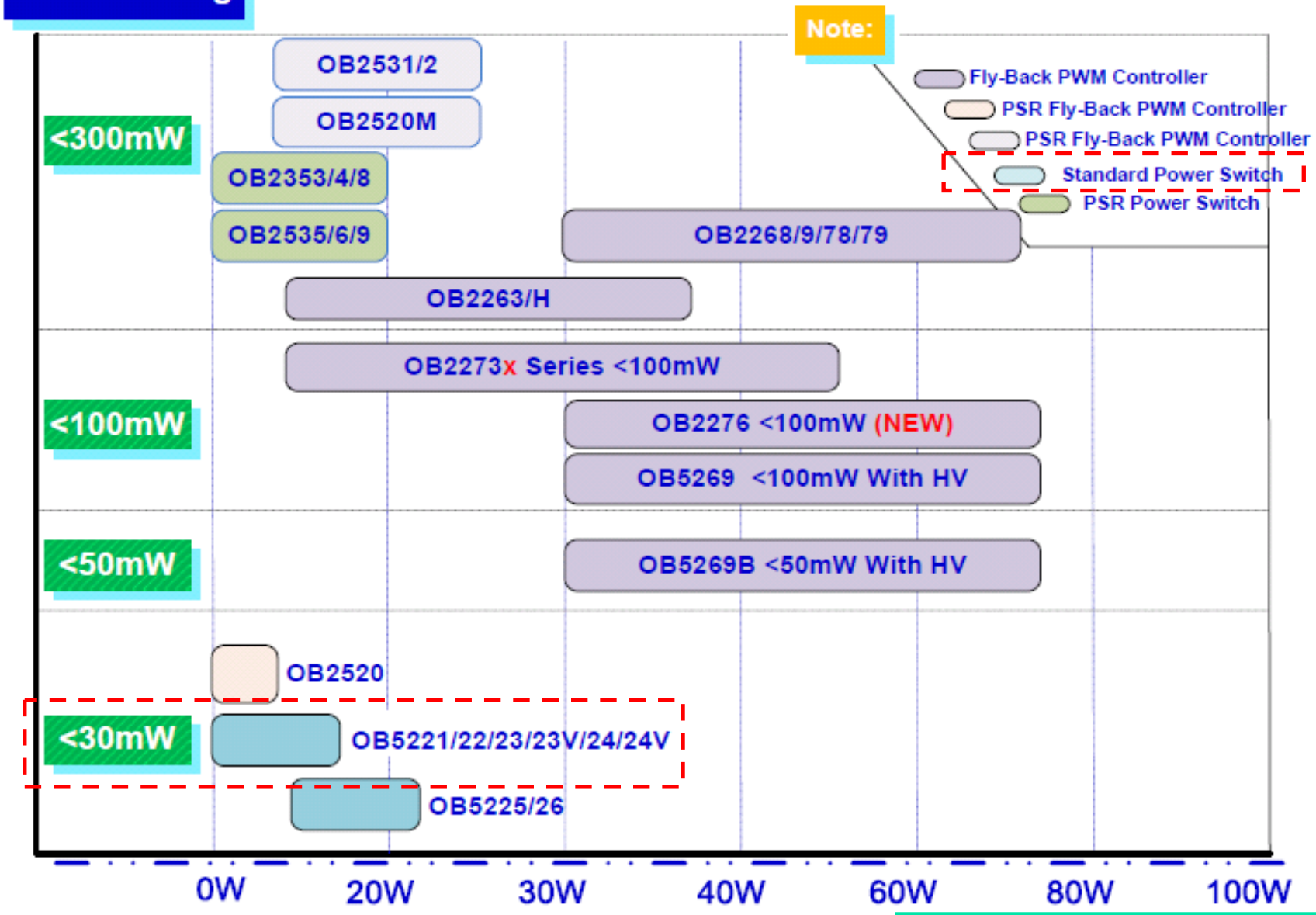
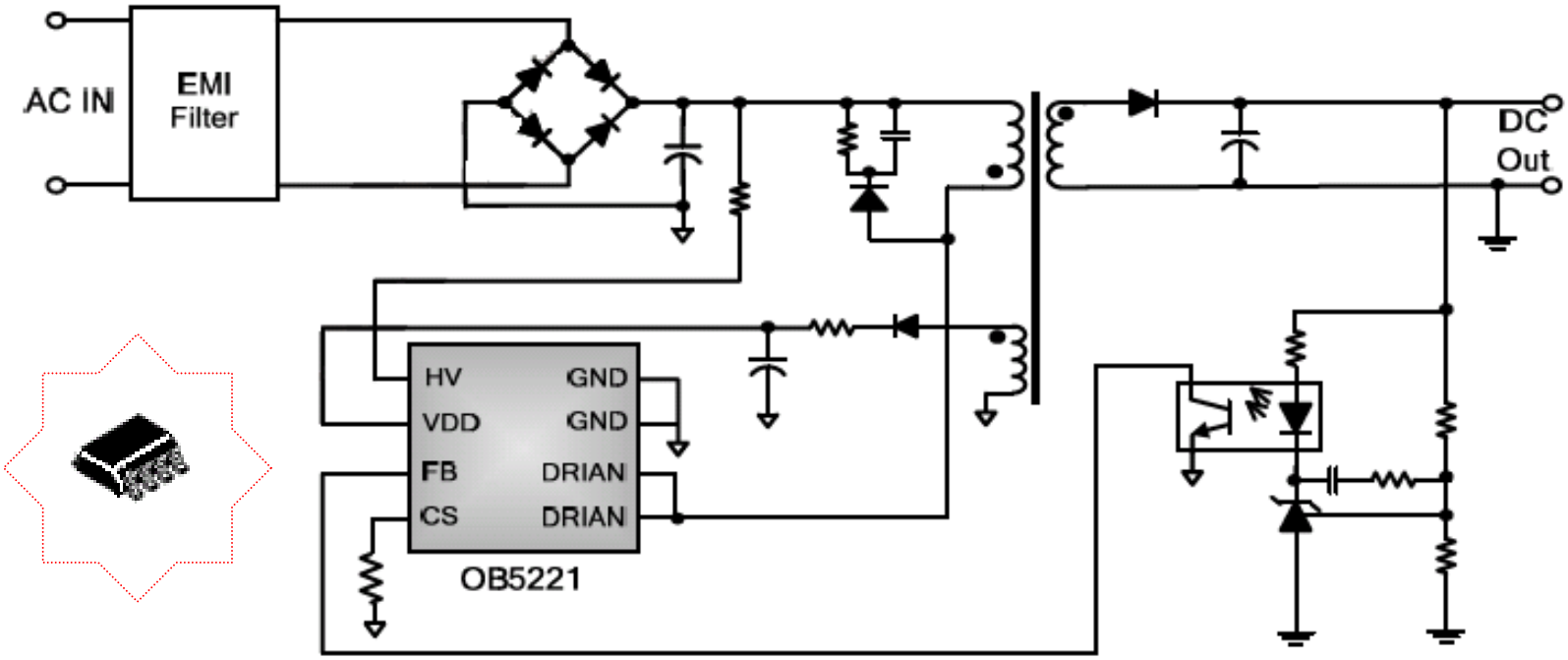
Power Saving



Features

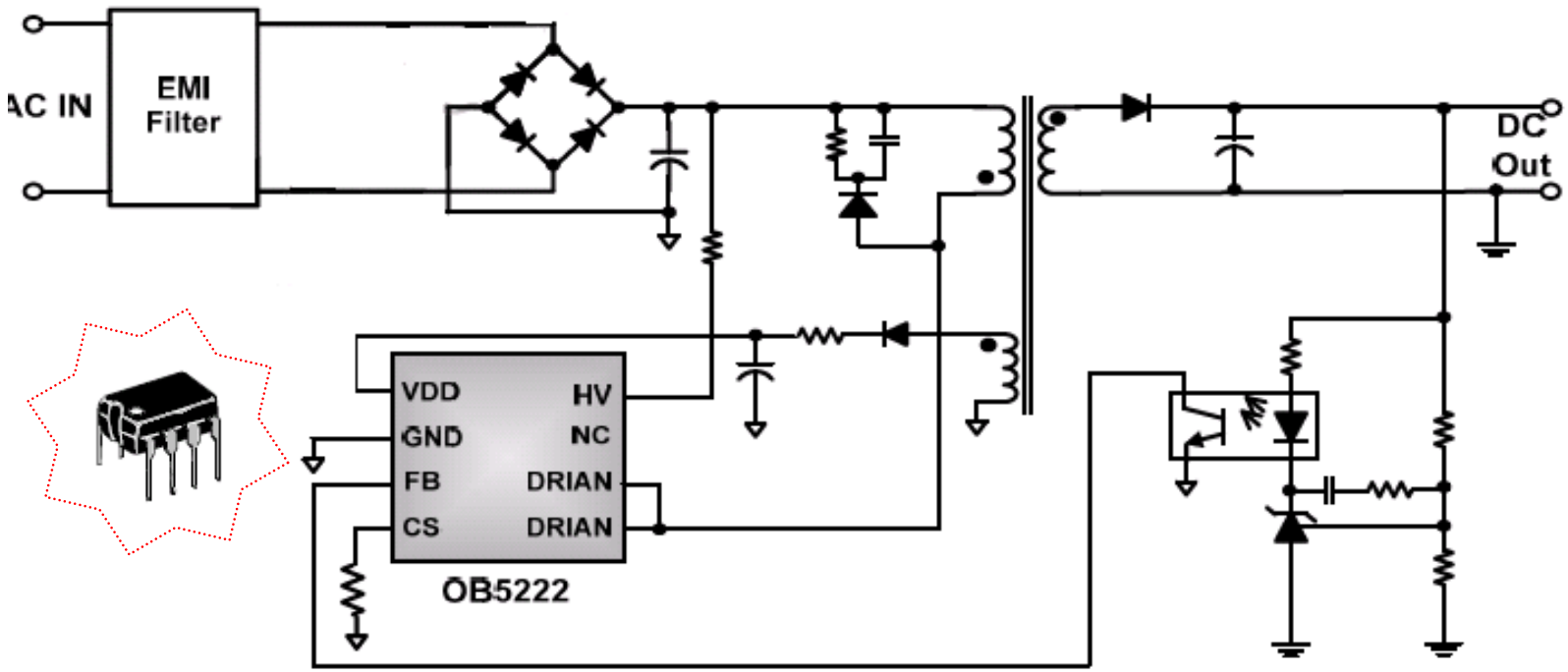
* High Voltage Start-up
* Extra Low Standby (<30mW)
* Integrated With MOSFET 600Vmin and 700Vmin
* Power on Soft Start Reducing MOS Vds Stress
* Frequency Shuffling (Jitter) for Better EMI
* Extended Burst Mode Control For Improved Efficiency and Standby Power
* Fixed 65KHZ/100KHZ Switching Frequency
* VDD Over Voltage (OVP) with Latch
* Over Load Protection (OLP) with auto-recovery
* Over Temperature Protection (OTP) with auto-recovery
* Audio Noise Free Operation

Application Schematic-OB5221



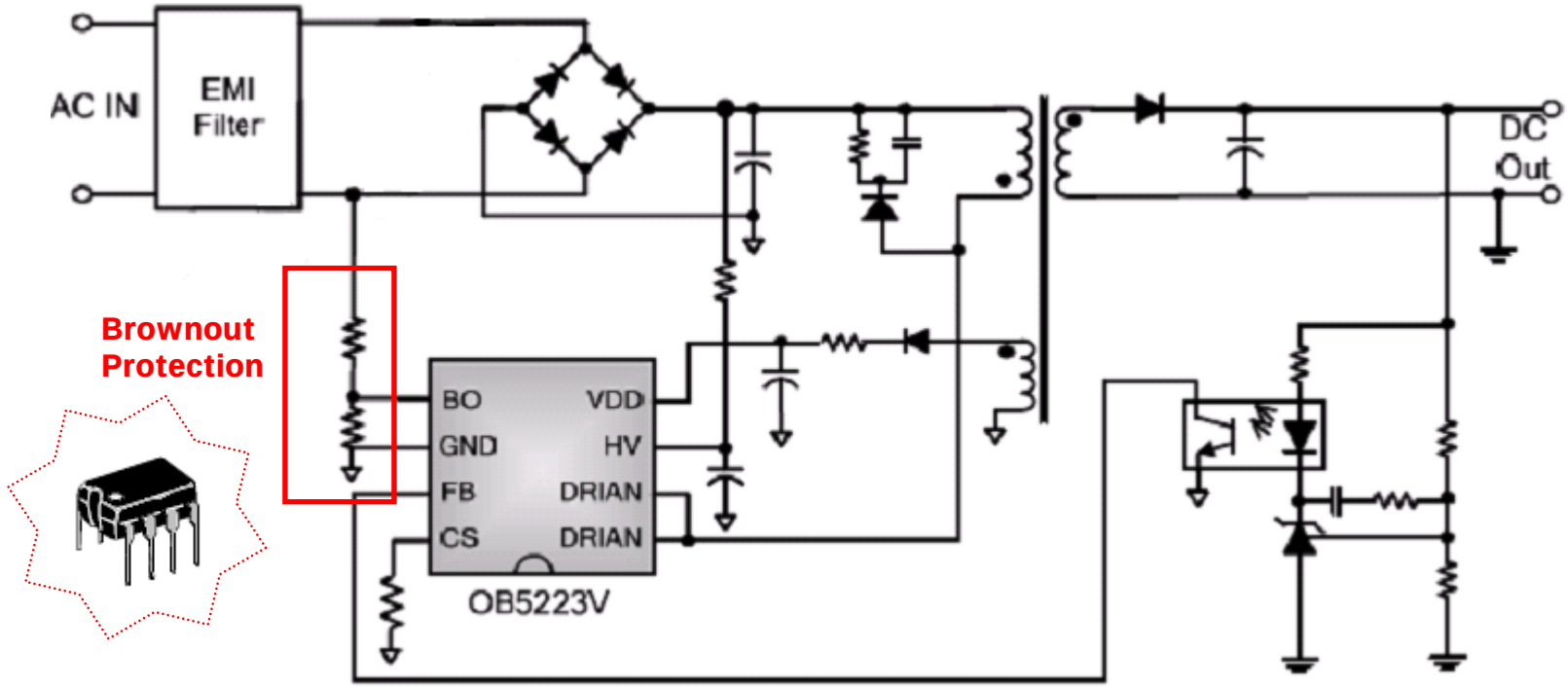
- Build High Voltage MOS 600V/1A(OB5221),
- OB5221 up to 5W
- Power Saving < 30mW
- OVP Latch on VCC

Application Schematic-OB5222/26



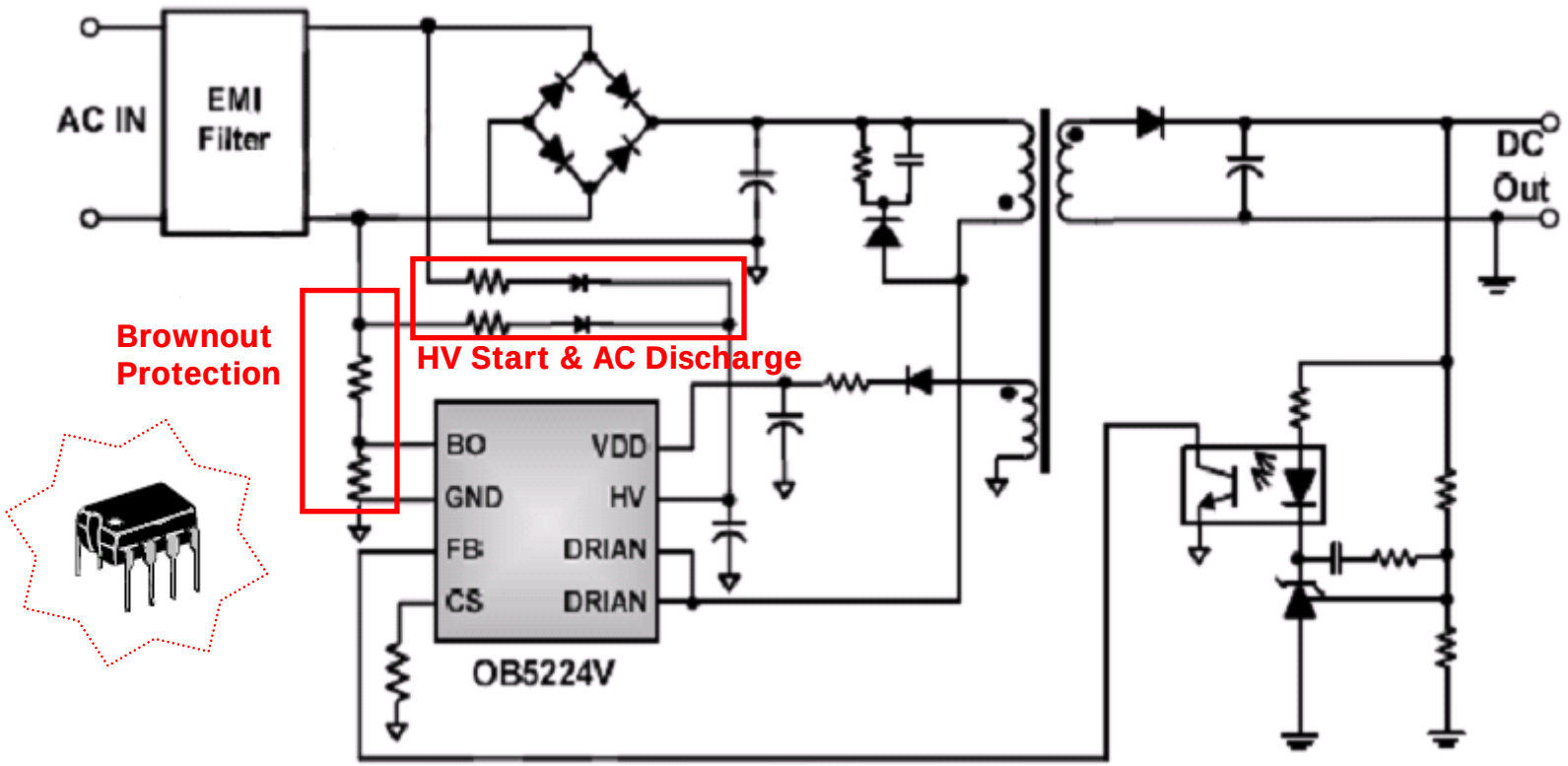
- Build High Voltage MOS 600V/2A(OB5222),600V/5A(OB5226)
- OB5222 up to 12W ; OB5226 up to 20W
- Power Saving < 30mW
- OVP Latch on VCC

Application Schematic-OB5223/23V



- Build High Voltage MOS 600V/2A(OB5223),700V/2A(OB5223V)
- Up to 12W
- Power Saving < 30mW
- OVP Latch on VCC
- Brownout Protection

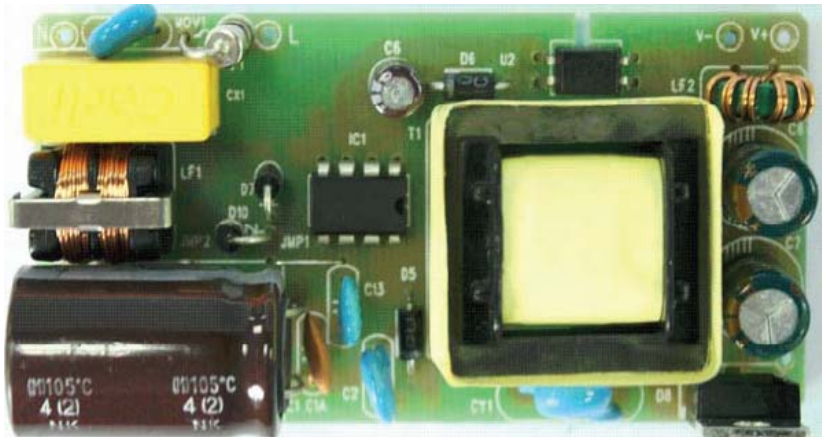
Application Schematic-OB5224/24V/25

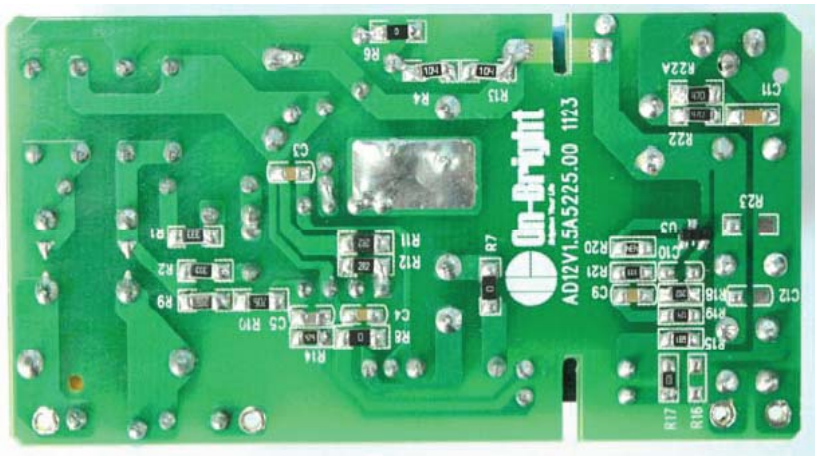


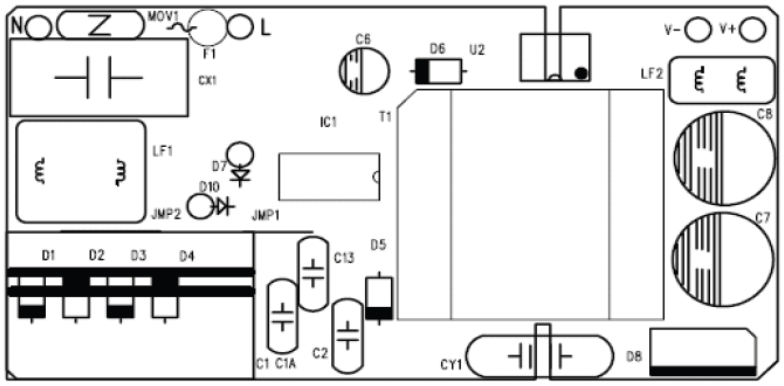
- Build High Voltage MOS 600V/2A(OB5224),700V/2A(OB5224V),600V/5A(OB5225)
- OB5224/24V up to 12W ,OB5225 up to 20W
- Power Saving < 30mW
- OVP Latch on VCC
- Brownout Protection
- AC Discharge Function

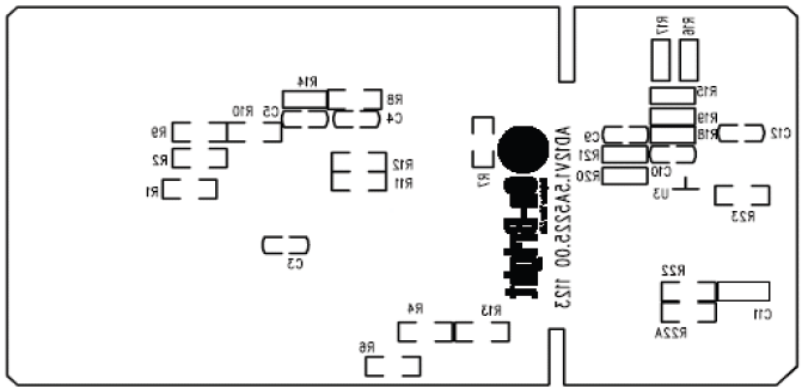
18W 12V/1.5A OB5225 Demo Board Performance

- PCB Layout



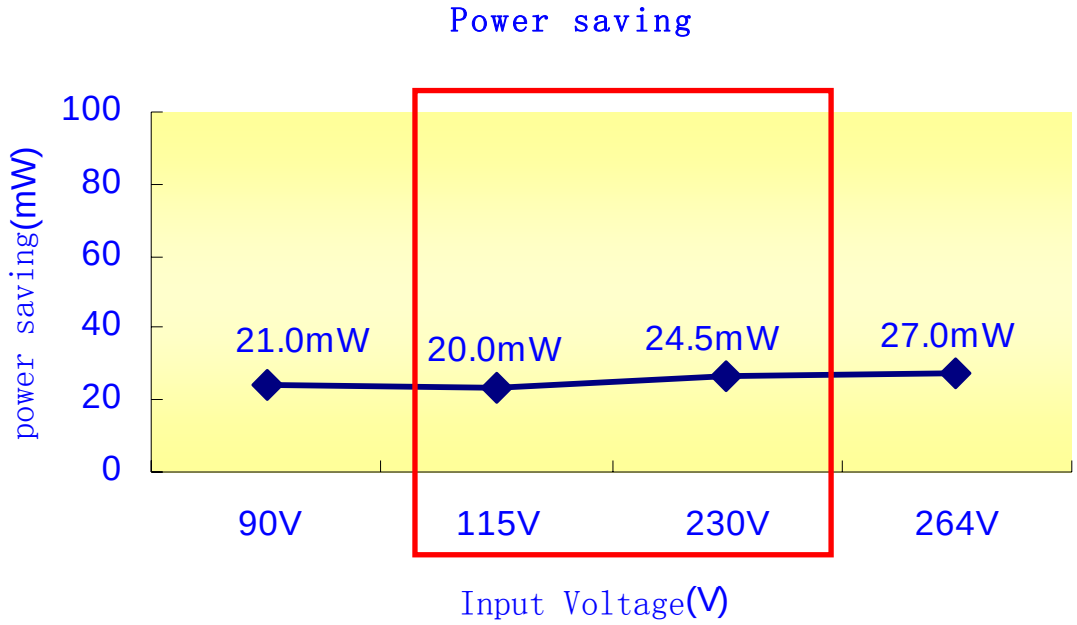






18W 12V/1.5A OB5225 Demo Board Performance

➢ Standby Power

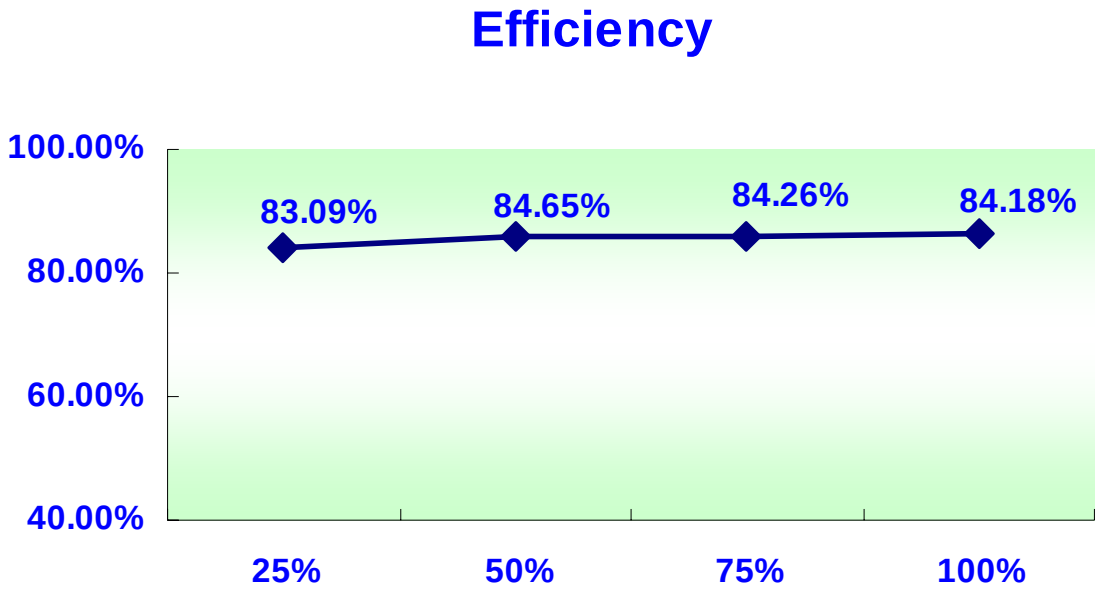


Input Voltage	90V/60Hz	115V/60Hz	230V/50Hz	264V/50Hz
Pin (mW)	21.0	20.0	24.5	27.0

Power Saving Achieve < 30mW

18W 12V/1.5A OB5225 Demo Board Performance

➢ Efficiency AWG#20 1.8m Cable end



Input voltage	25%	50%	75%	100%	Aver. Eff.	Lever 5
115Vac/60Hz	85.06	85.31	85.40	84.30	85.01	>80.29%
230Vac/50Hz	83.09	84.65	84.26	84.18	84.04	

Average Efficiency Margin >3%

18W 12V/1.5A OB5225 Demo Board Performance

➢ Over Current Protection (OCP)

Input Voltage	90V/60Hz	115V/60Hz	180V/50Hz	230V/50Hz	264V/50Hz
OCP (A)	2.16	2.20	2.22	2.27	2.32
Max. start up current (A)	2.15	2.19	2.21	2.26	2.31

The power supply will shut down auto-recovery when output current exceeds OCP and it should recover when the over current condition is removed.

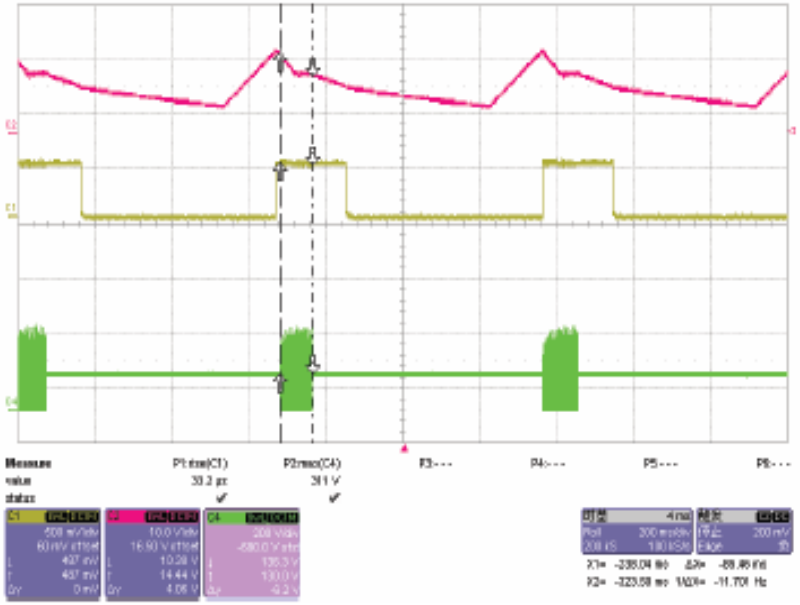


Fig. 17 Vdd, Vfb& Vds OLP waveform @90Vac; over load

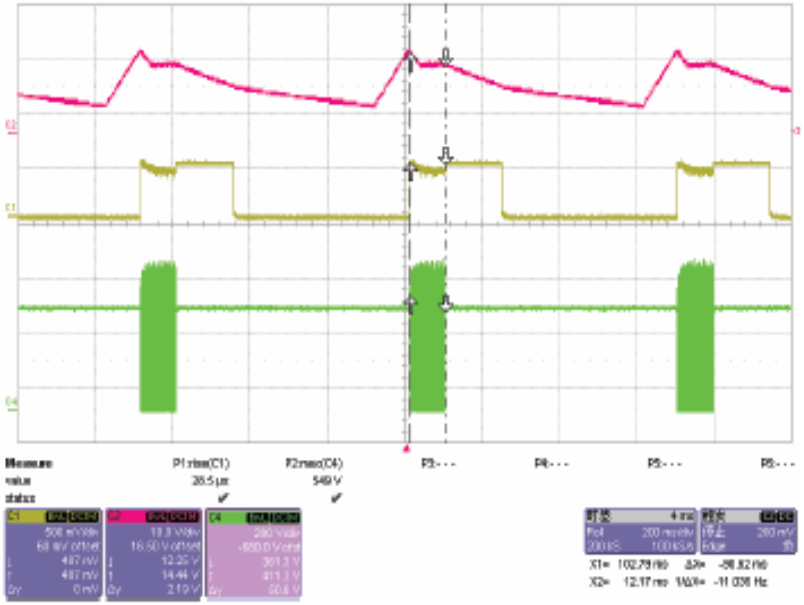


Fig. 18 Vdd, Vfb& Vds OLP waveform @264Vac:over load

18W 12V/1.5A OB5225 Demo Board Performance

➢ Brownout Protection

The power supply shut down when the input voltage below brownout voltage, The unit restart when the input voltage over brownout release voltage.

	Brownout (V)	**Brownout release** (V)
Output no load	69	77.6
Output full load	69	77.6

18W 12V/1.5A OB5225 Demo Board Performance

➢ Input filter capacitor discharge

When the AC input voltage turns off, IC will immediately discharge to the input filter X-Capacitor .

Vin=264V	X-Capacitor discharge time (mS)
Output no load	150
Output full load	66

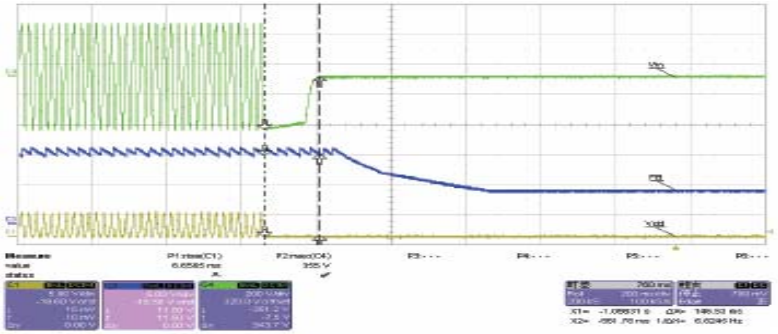


Fig. 19 Vin, Vdd& Vbo waveform @264Vac; no load

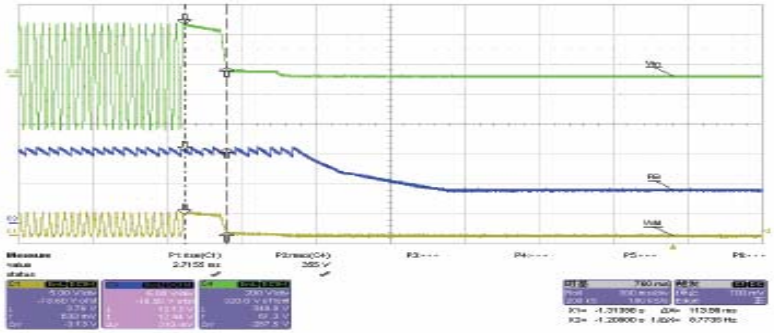


Fig. 20 Vin, Vdd& Vbo waveform @264Vac; no load

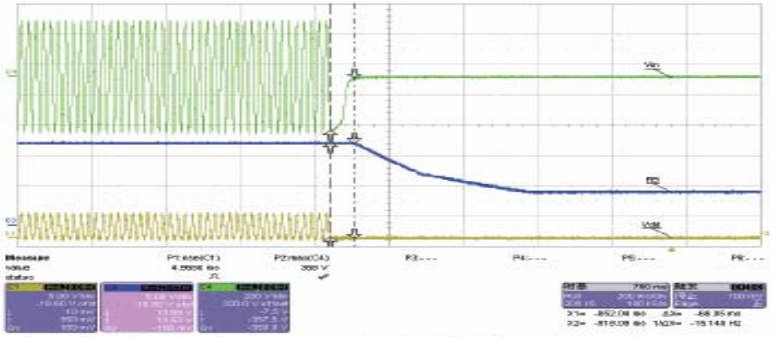


Fig. 21 Vin, Vdd& Vbo waveform @264Vac; full load

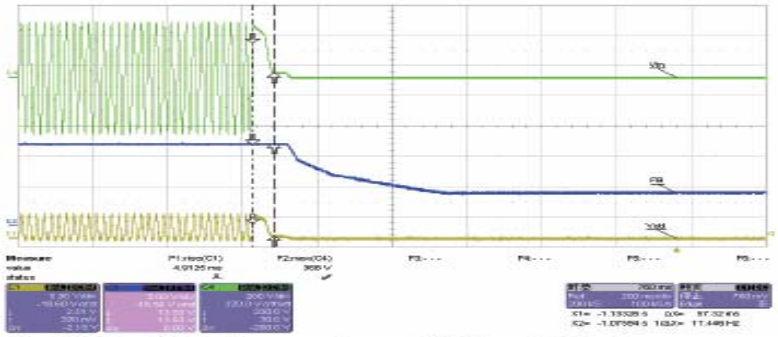
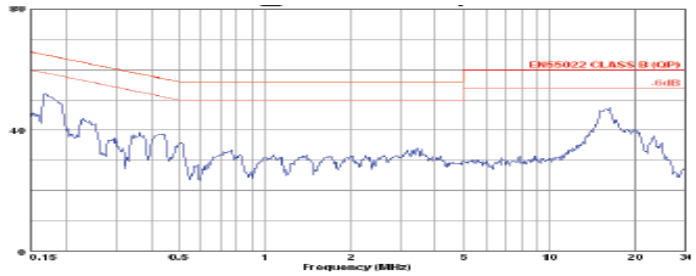


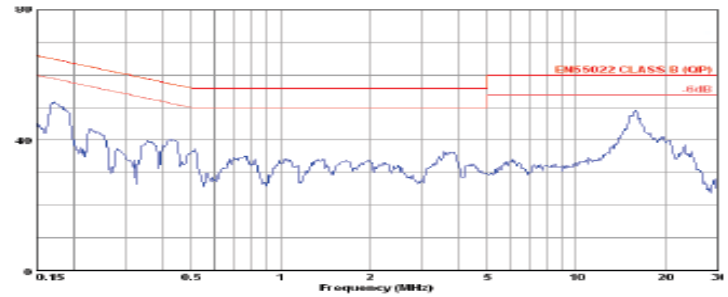
Fig. 22 Vin, Vdd& Vbo waveform @264Vac; full load

18W 12V/1.5A OB5225 Demo Board Performance

- Conduction EMI Test @ EN55022 Class B

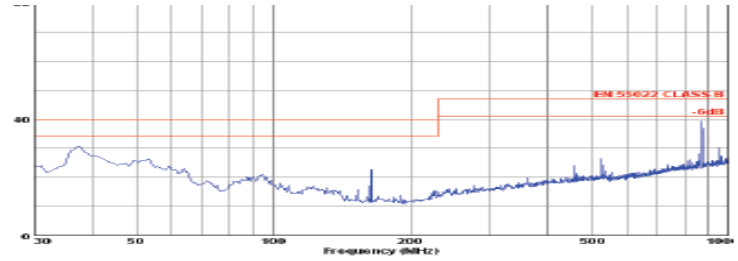



```
Site            : Audix(Shanghai) Shielded1
Condition       : EN55022 CLASS B (QP) ESH2-Z5-11.03.22 LINE
Project No.     :
Applicant       :
EUT             :
M/N             : OB5225
S/N             : 18W
Power Supply    : 230V/50Hz
Ambient         : 22'C 48%RH
Test line       : L
Test Mode       : Working
Test Engineer   : Wency
Memo            : L+
```

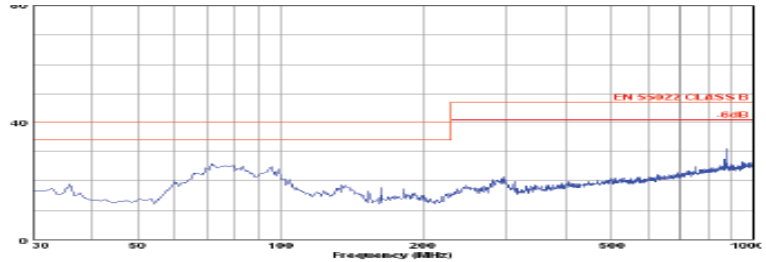



```
Site            : Audix(Shanghai) Shielded1
Condition       : EN55022 CLASS B (QP) ESH2-Z5-11.03.22 NEUTRAL
Project No.     :
Applicant       :
EUT             :
M/N             : OB5225
S/N             : 18W
Power Supply    : 230V/50Hz
Ambient         : 22'C 48%RH
Test line       : N
Test Mode       : Working
Test Engineer   : Wency
Memo            : L+
```

- Radiation EMI Test @ EN55022 Class B




```
ite             : Audix(Shanghai) Chamber3
ondition        : EN 55022 CLASS B VERTICAL
roject No.      :
pplicant        :
UT              :
/N              : OB5225
/N              : 18W
ower Supply     : 230V/50Hz
mbient          : 22'C  60%RH
est Mode        :
est Engineer    : Raven
emo             :
```

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Condition       : EN 55022 CLASS B HORIZONTAL
Project No.     :
Applicant       :
EUT             :
M/N             : OB5225
S/N             : 18W
Power Supply    : 230V/50Hz
Ambient         : 22'C  60%RH
Test Mode       :
Test Engineer   : Raven
Memo            :
```

EMI Margin >6dB

Application For STB

5~15W(Adapter/Open frame)

- Power Saving <300mW
- Surge 6KV/ESD 8K/15K
- Average/light load efficiency
- OB235xL Power Switch
- PSR OB253x Power Switch
- PSR OB221x Power Switch
- OB522x HV Power Switch
- OB2263/73x Controller

25~65W(Adapter/Open frame)

- Power Saving <300mW
- Peak Load (HD, antenna)
- Brown Out Protection
  OVP/OTP latch
- Surge 6KV/ESD 8K/15K
- Low Leakage Current
- OB2273x/OB2276 Controller

Application For Game

12V/1.25A

12V/10.83A(main PWR)
5V/1A(Standby PWR)

OB522x Power Switch

OB2273x Controller

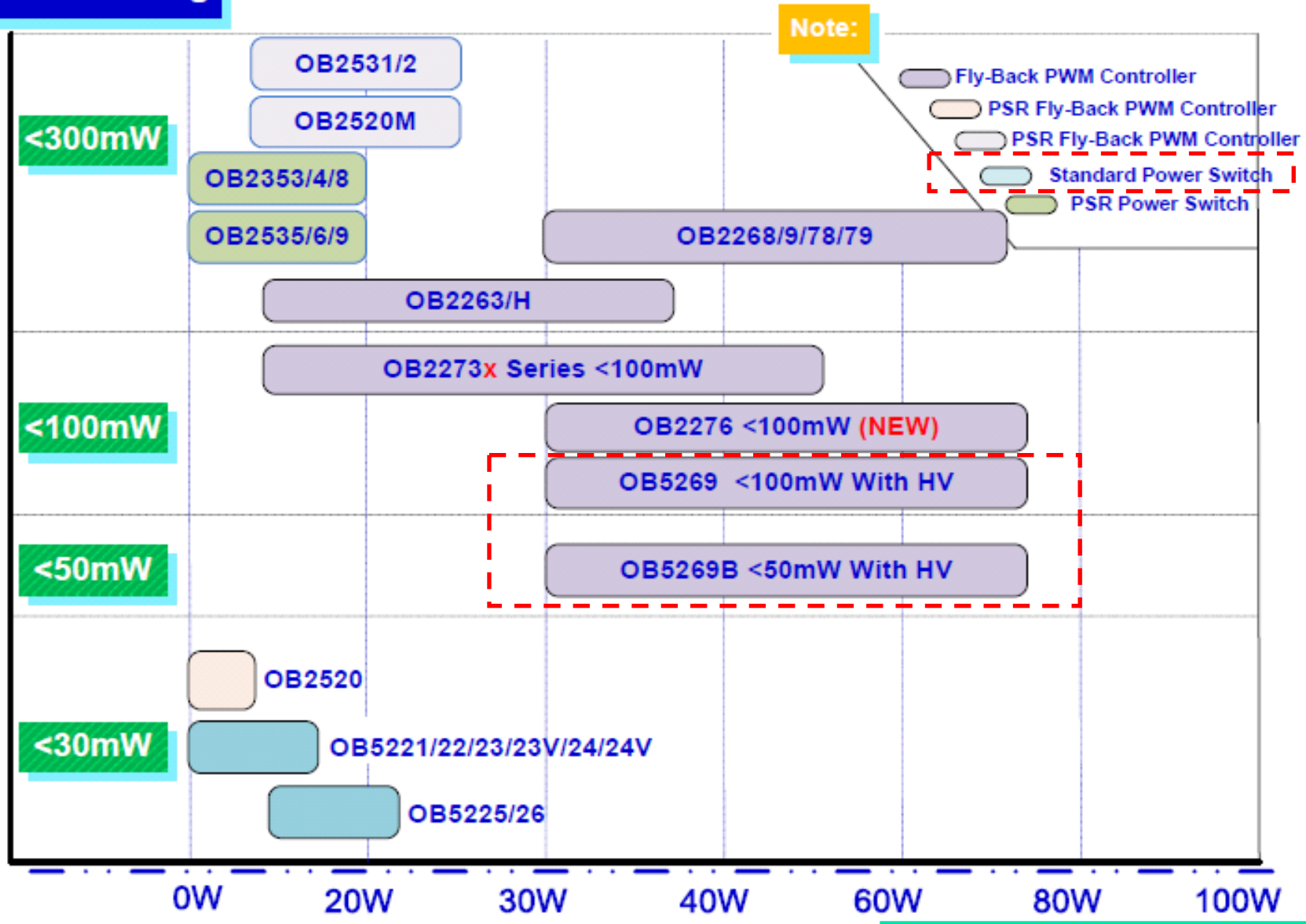
Standby PWR OB5221 Power Switch

Main PWR OB2276/OB2203 Controller

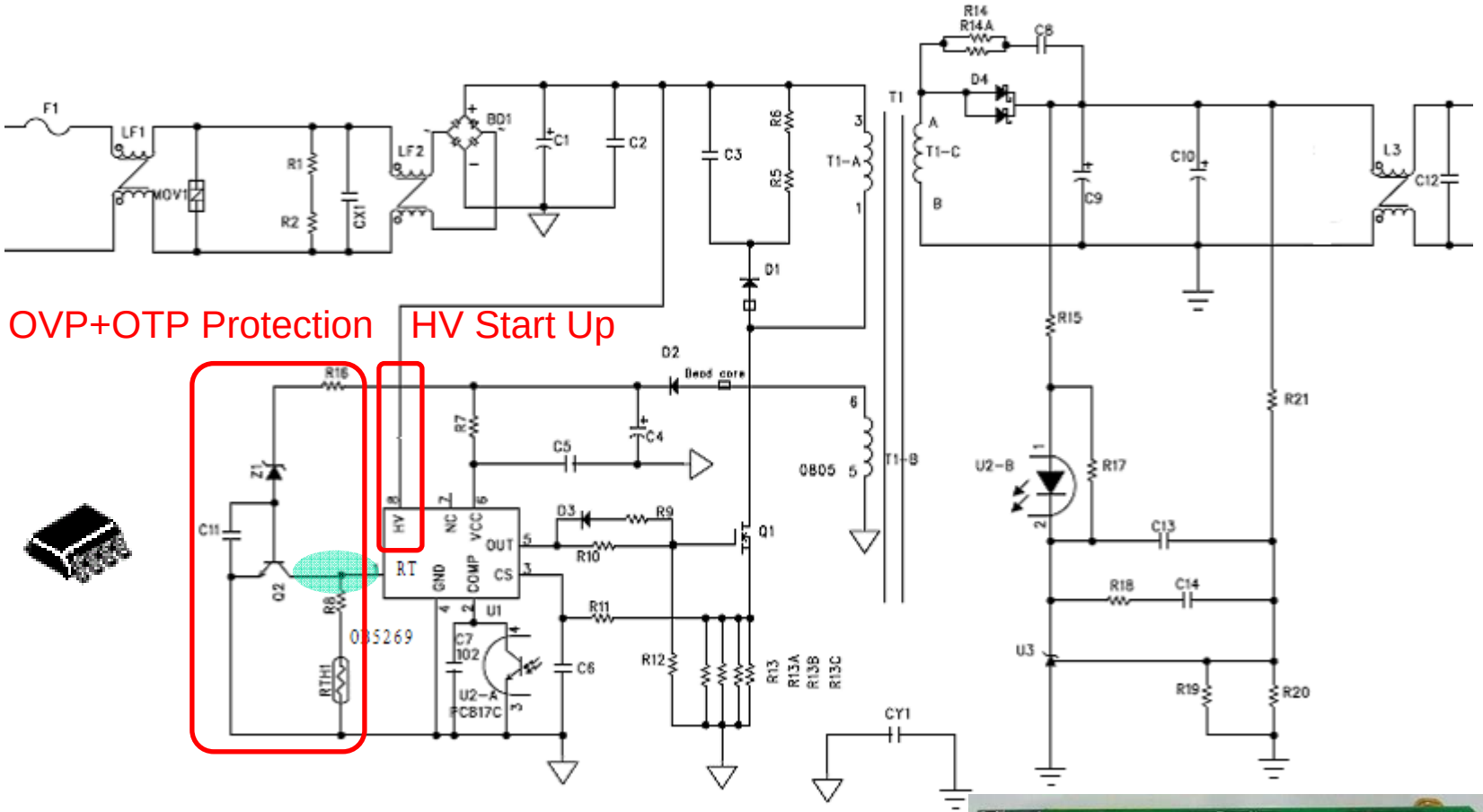
HV Start Up 20W~65W SMPS Solution

------Using OB5269/OB5269B

Power Saving



OB5269 19V/3.42A 原理圖



- Power Saving Achieve 55mW@230VAC
- HV Start Up
- OVP+OTP Latch

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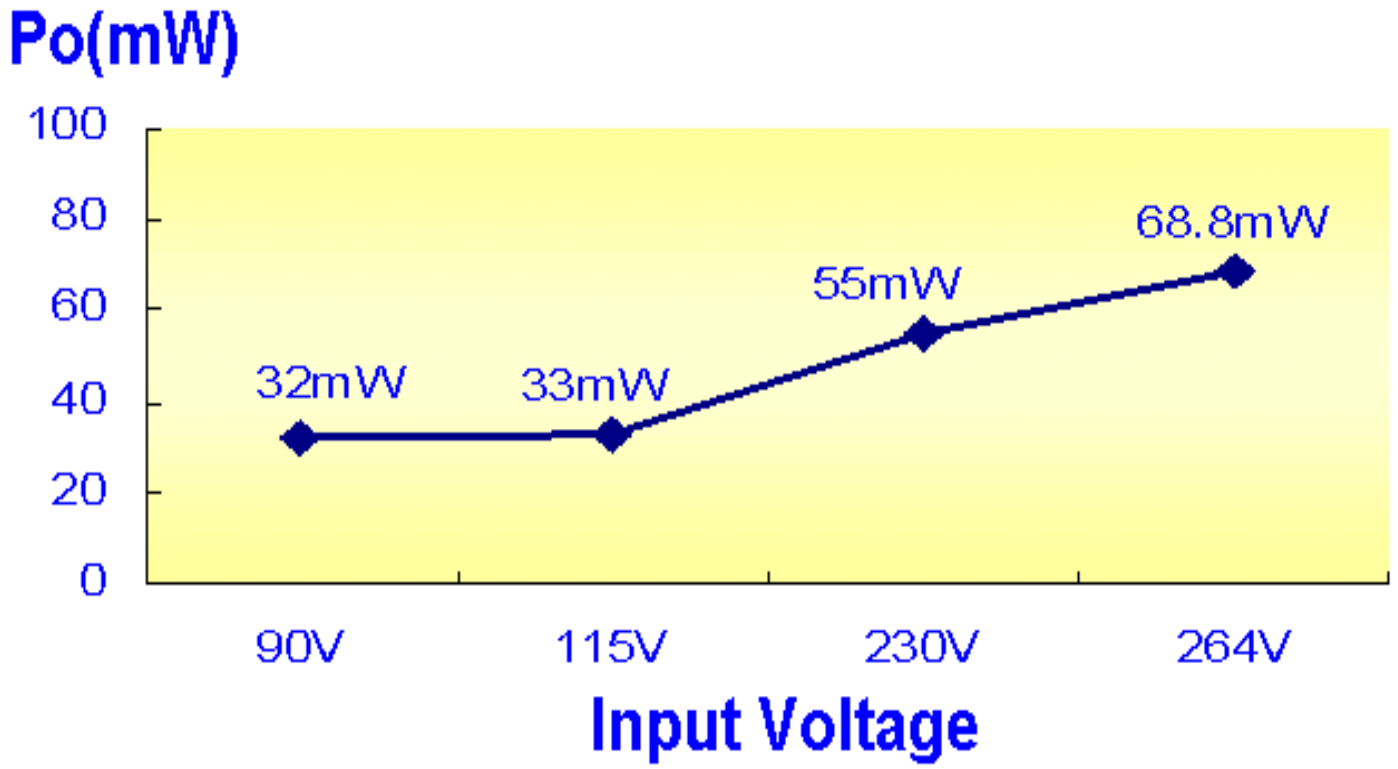
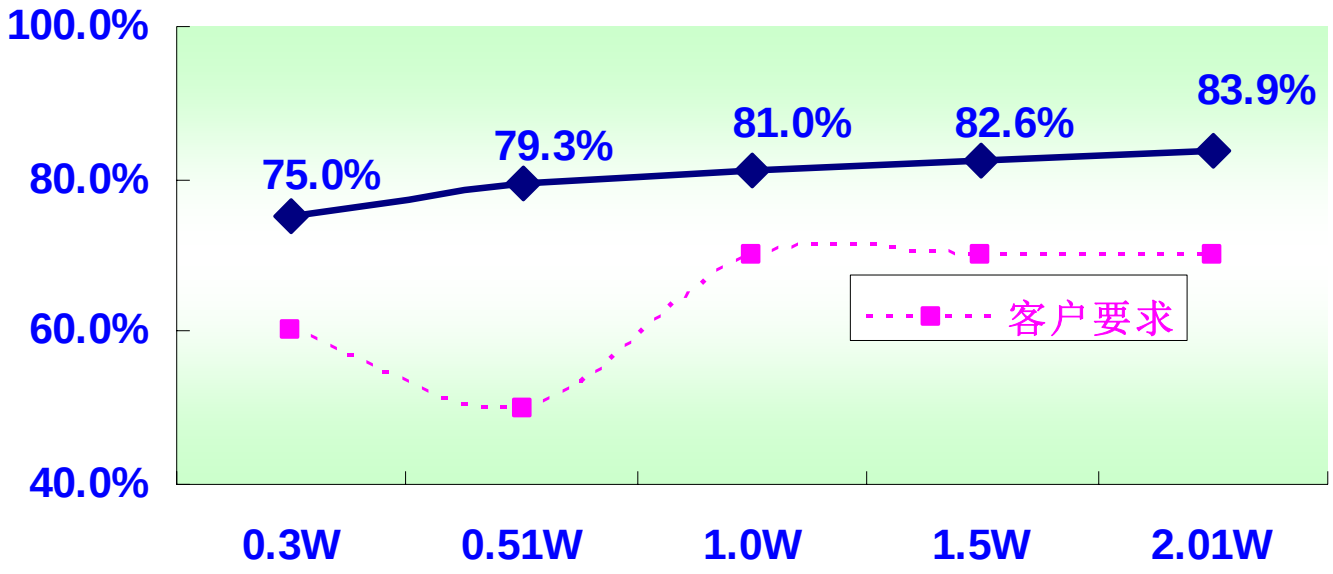
OB5269 19V/3.42A

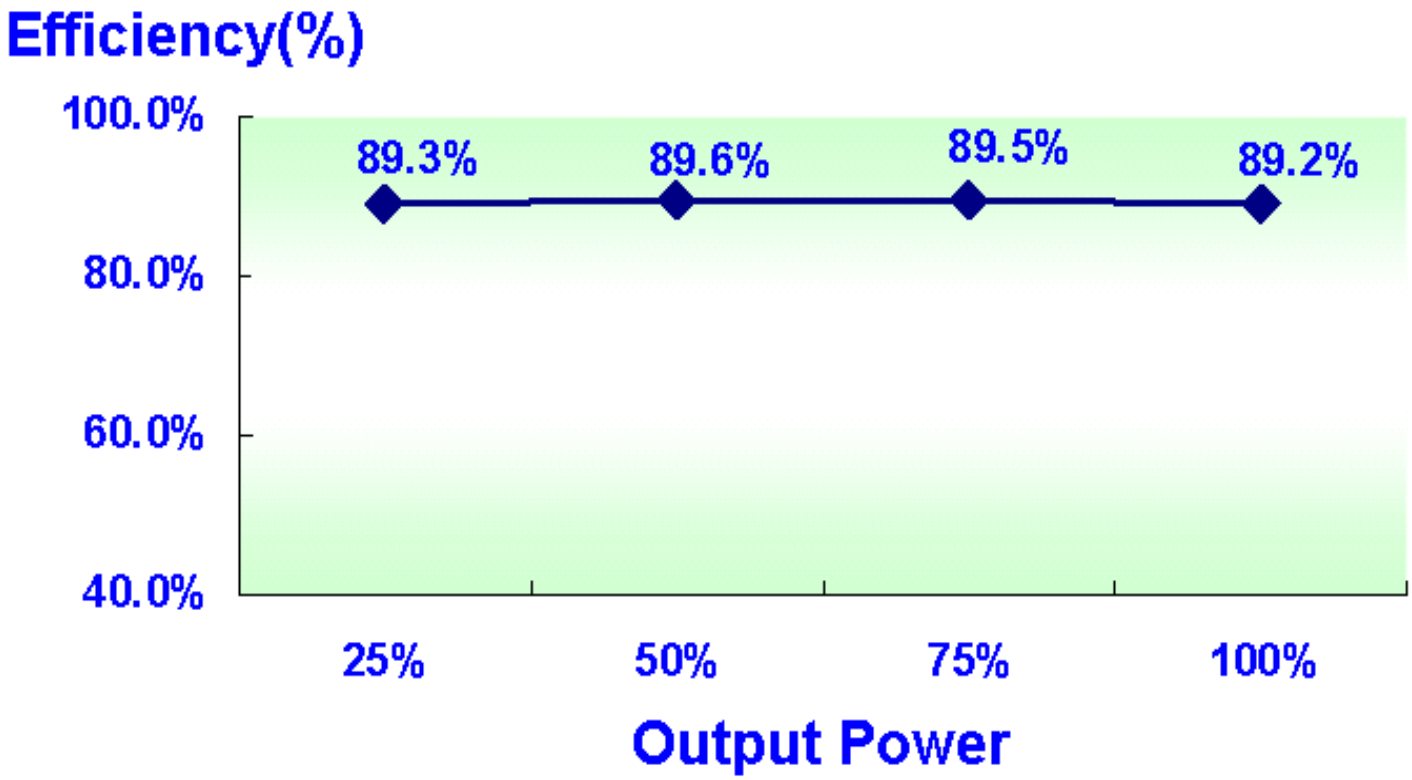


OB5269 19V/3.42A

輕載效率

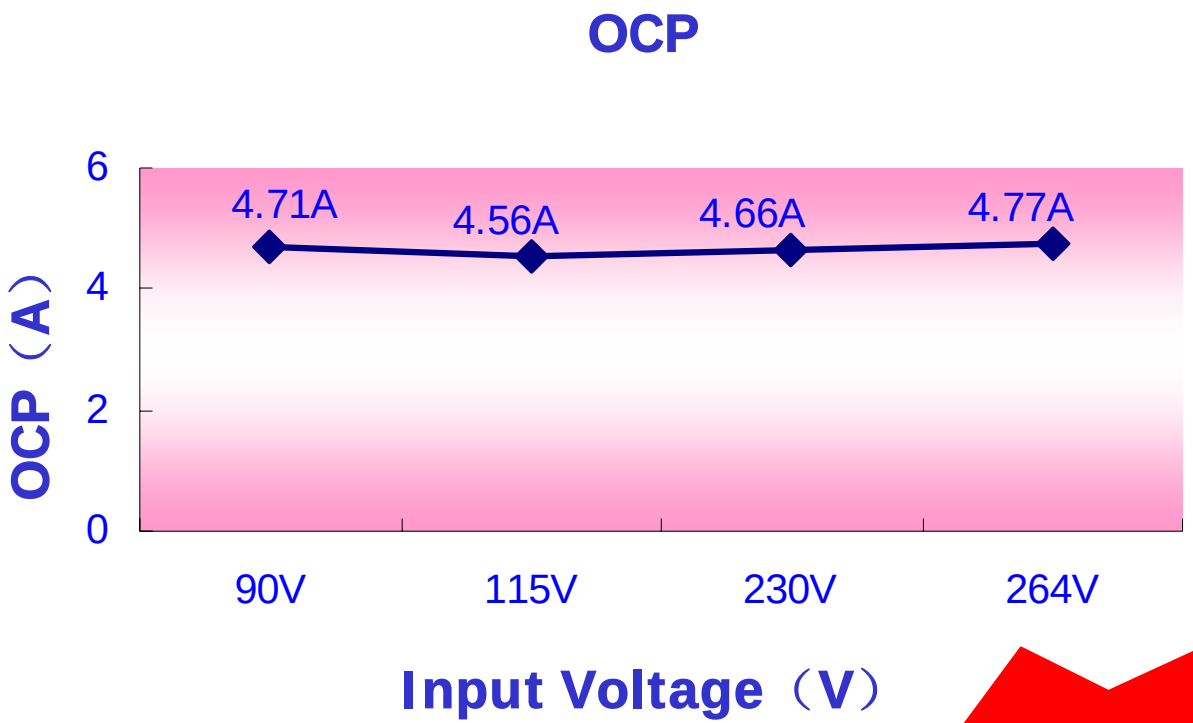


OB5269 19V/3.42A



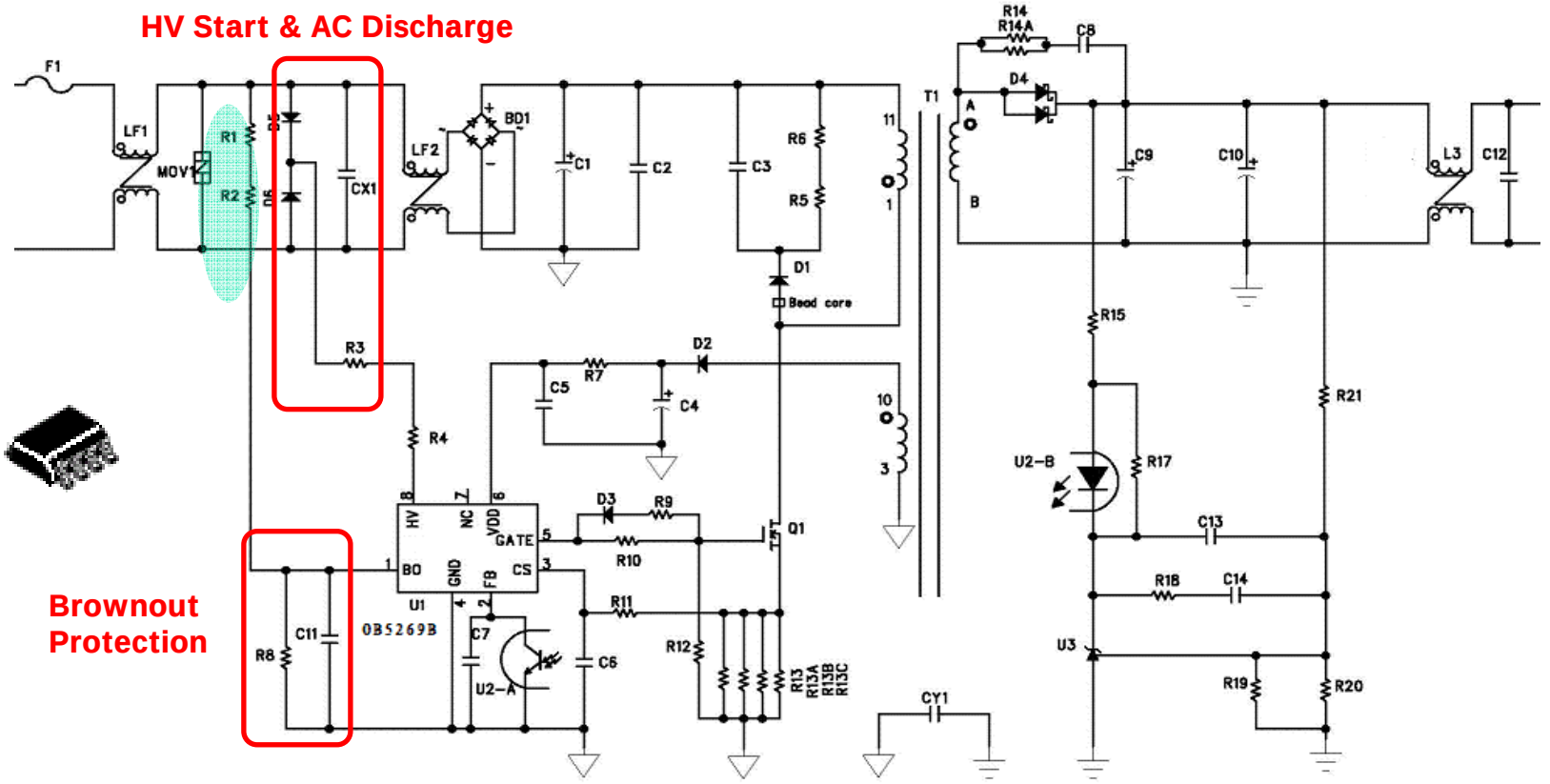
All Data was measurement at AWG 18 1.5M cable end.

OB5269 19V/3.42A



只有不到 **5%** 的誤差!!!

OB5269B Reference Design



- Power Saving Achieve 32mW@230VAC
- HV Start Up
- OVP Latch
- Brown Out Protection
- AC Discharge Function

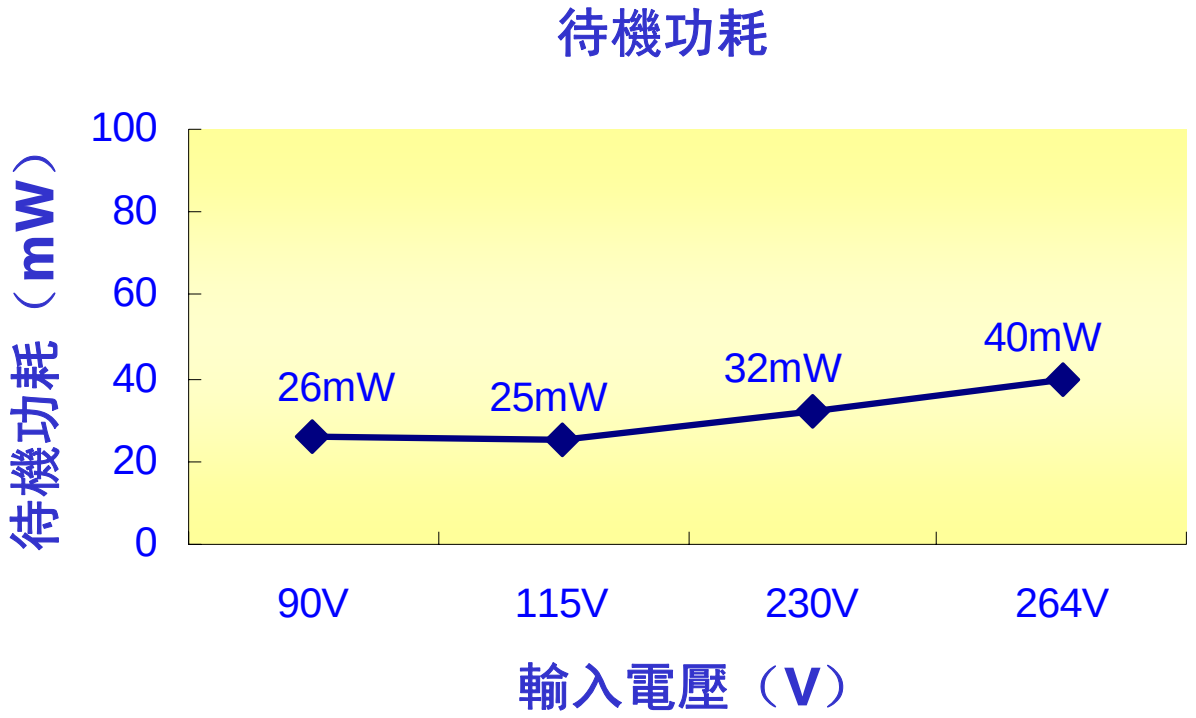
OB5269B Application

X-CAP Discharge Function

IEC60950 標準: X 電容放電只要在 1秒內放電到 SELV 即為安全的

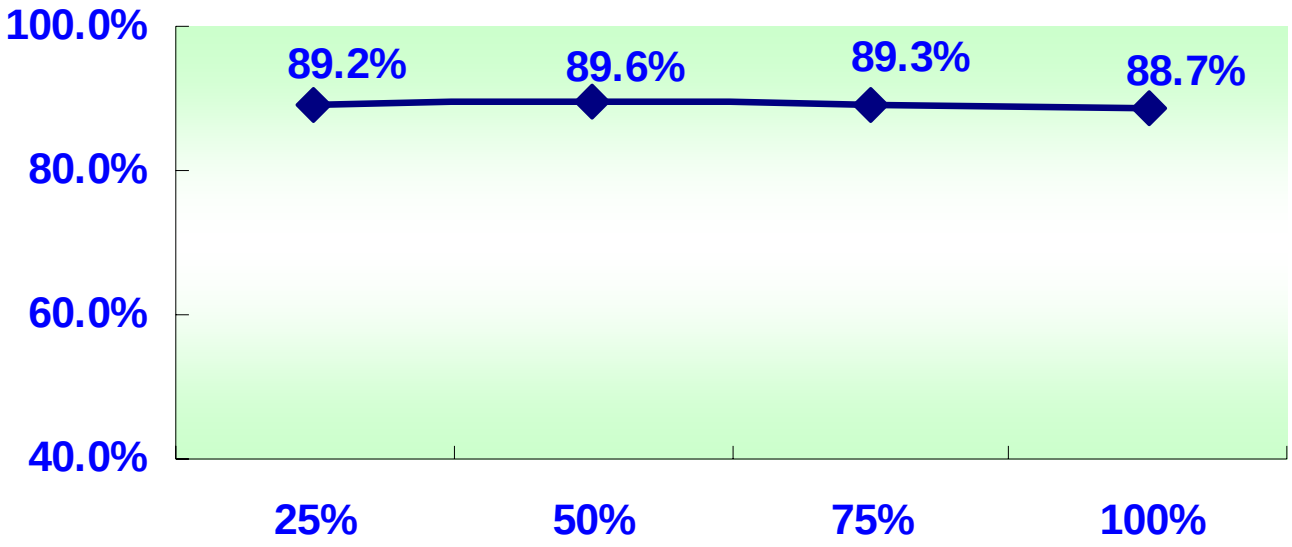
X Cap	264V	
	Full Load	No Load
0.33uF	108mS	198mS
0.47uF	124mS	258mS
0.68uF	113mS	296mS

OB5269B 19V/3.42A Test data



OB5269B 19V/3.42A Test data

效率

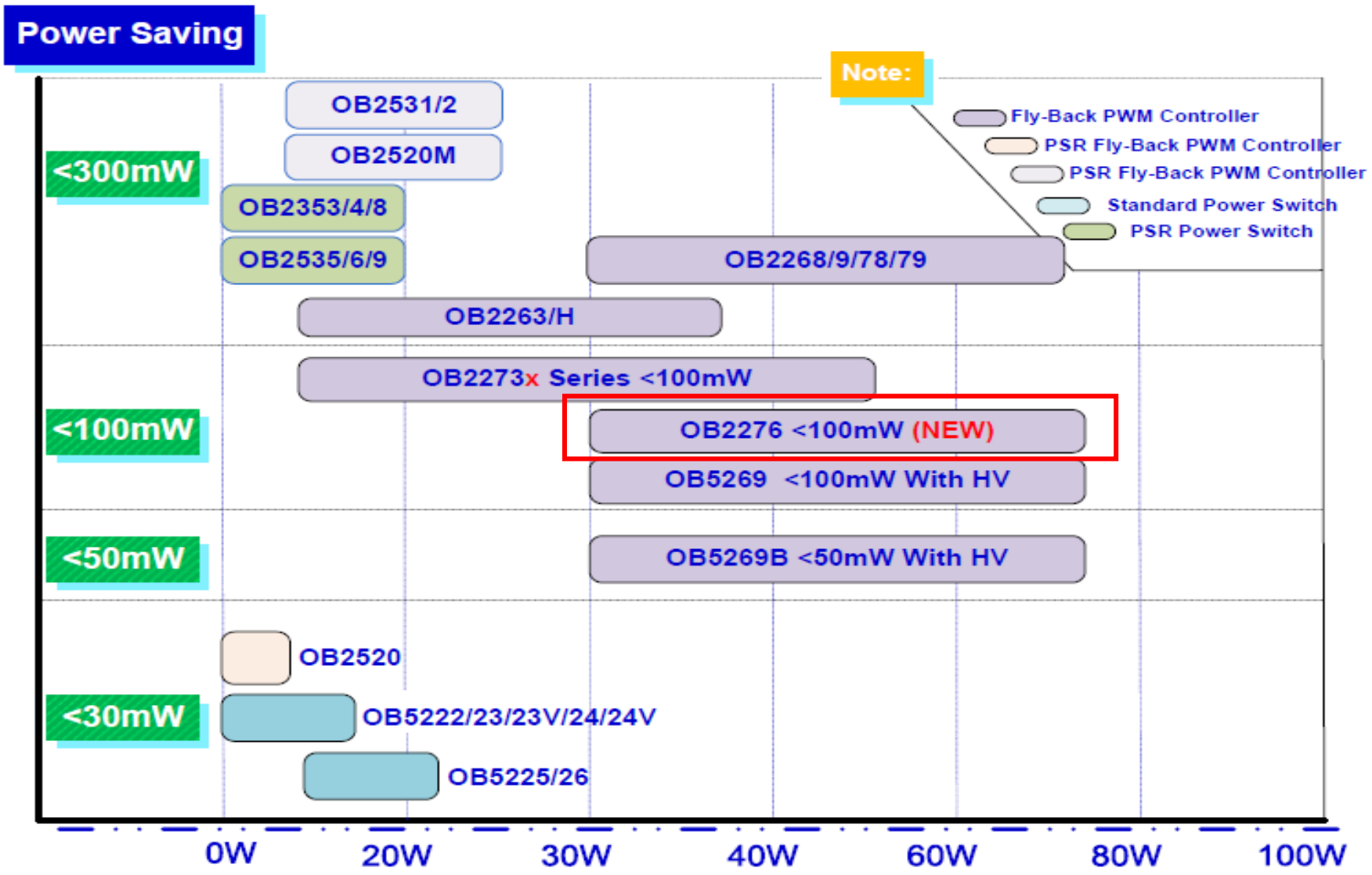


All Data was measurement at AWG 18 1.5M cable end.

Non-HV Startup 40W-65W SMPS Solution

Using OB2276 Series

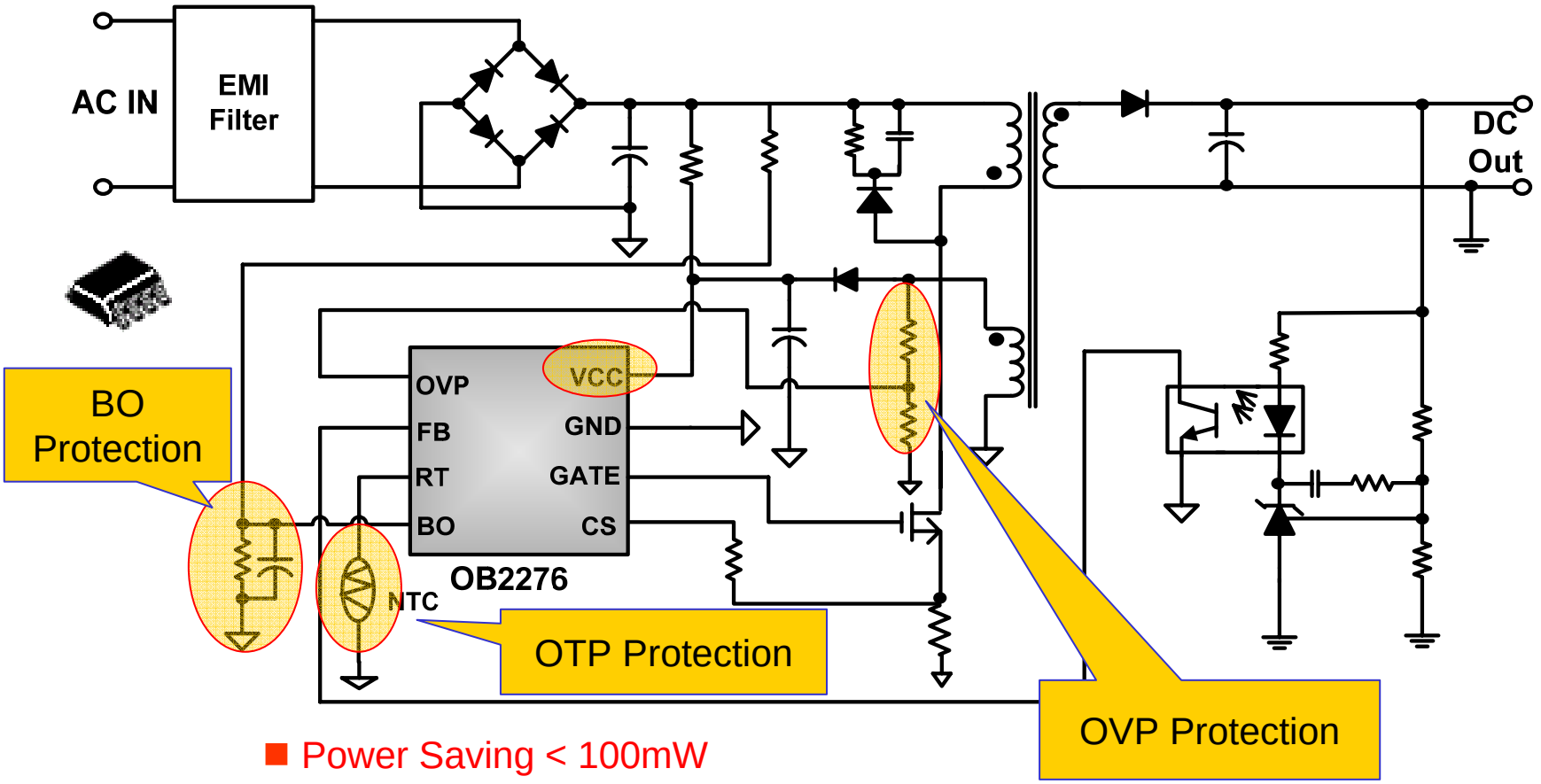
AC/DC Low Standby Solutions



Features

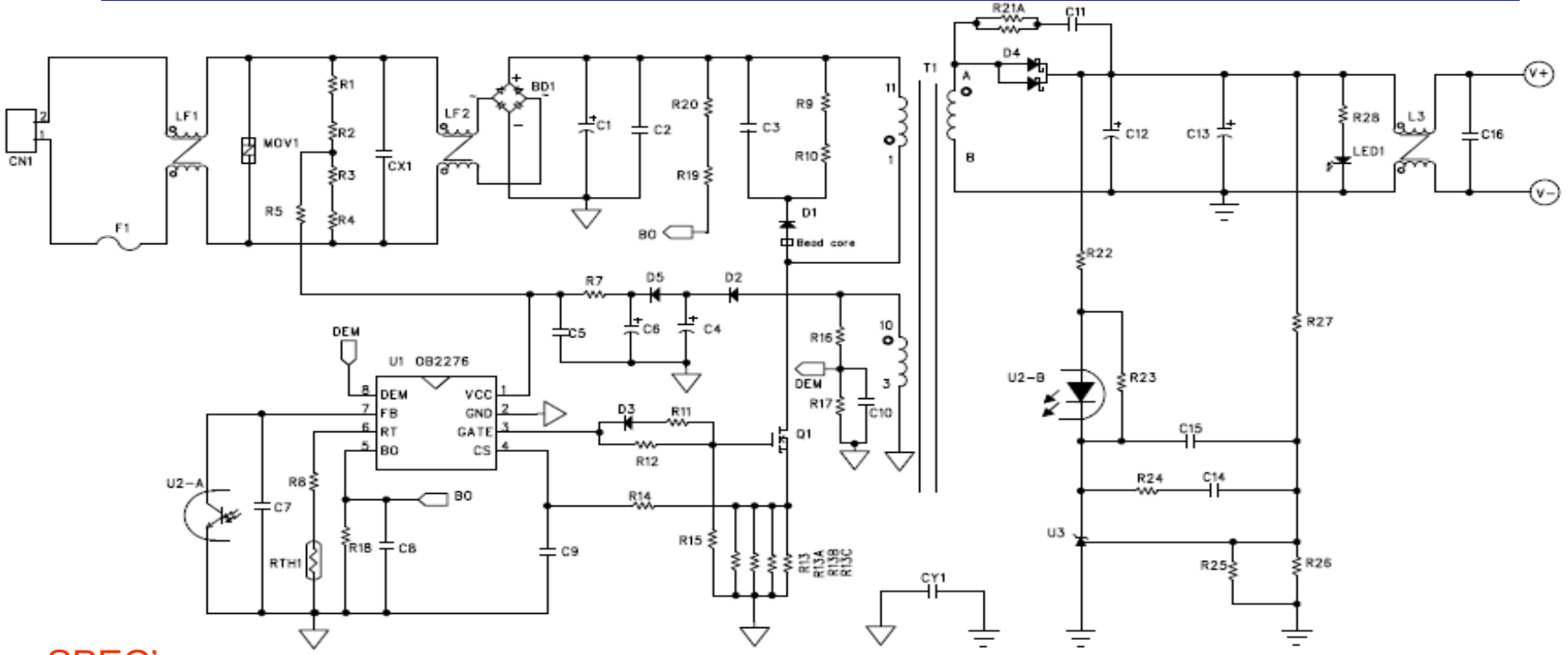
- Extra Low Standby (<100mW)
- Power on Soft Start Reducing MOS Vds Stress
- Frequency Shuffling (Jitter) for Better EMI
- Extended Burst Mode Control For Improved Efficiency and Standby Power
- Fixed 65KHZ Switching Frequency
- Brown-Out Protection (BOP) with auto-recovery.
- VDD Over Voltage (OVP) with Latch
- High Precision Output Protection (OVP) on Demag with Latch
- Over Load Protection (OLP) with auto-recovery
- Over Temperature Protection (OTP) with Latch
- Audio Noise Free Operation

Typical Application Schematic



- Power Saving < 100mW
- Brownout Protection
- OVP on VCC and Precision OVP on Demag with Latch
- OTP Latch.

65W 19V/3.42A OB2276 Demo Board Performance



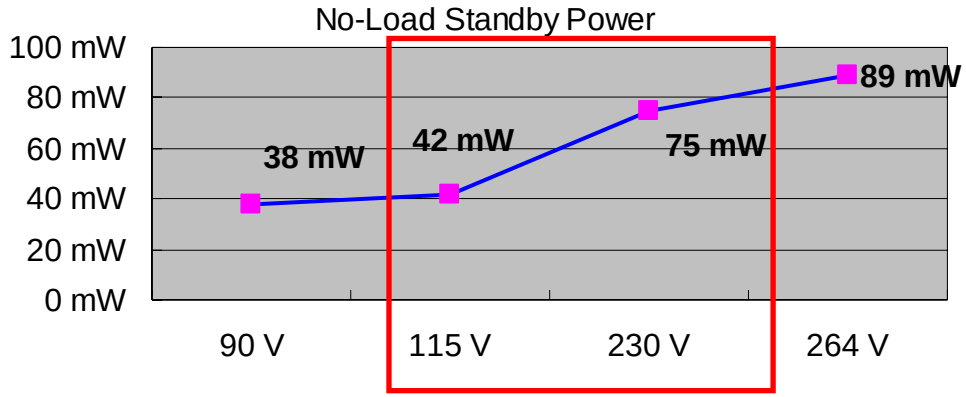
SPEC’

- Power Saving < 100mW
- Average Efficiency >87%.
- Light load Efficiency >60%@230VAC O/P:0.3W
- Brownout Protection.
- OVP 23V±1V @No Load & Full Load
- OVP+OTP Latch

http://skybright.21dianyuan.com

65W 19V/3.42A OB2276 Demo Board Performance

➢ Power Saving



Power Saving <100mw

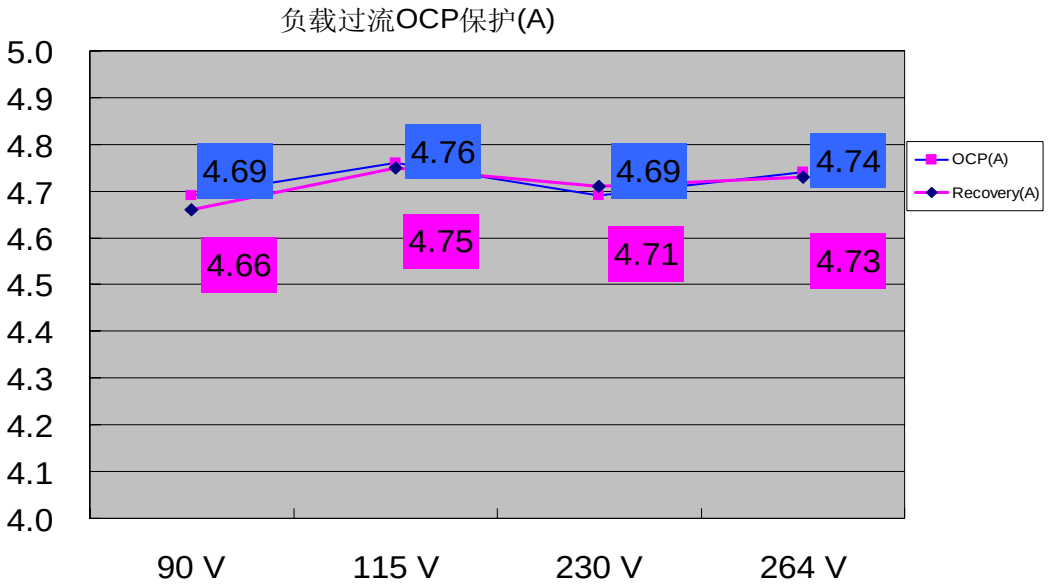
➢ Light Load Efficiency

Pout(W)	P/N	90V(60HZ)		115V(60HZ)		230V(50HZ)		264V(50HZ)		SPEC
		Pin(W)	Eff.(%)	Pin(W)	Eff.(%)	Pin(W)	Eff.(%)	Pin(W)	Eff.(%)	Pin/Eff.
0.3W	OB2276	0.425	70.59%	0.428	70.09%	0.451	66.52%	0.468	64.10%	<0.5W
0.5W	OB2276	0.632	79.11%	0.629	79.49%	0.651	76.80%	0.666	75.08%	<1.0W
1.0W	OB2276	1.232	81.17%	1.228	81.43%	1.252	79.87%	1.265	79.05%	>70%
1.5W	OB2276	1.821	82.37%	1.815	82.64%	1.839	81.57%	1.861	80.60%	>70%
2.0W	OB2276	2.369	84.42%	2.364	84.60%	2.387	83.79%	2.414	82.85%	>70%

Improve Light Load Efficiency

65W 19V/3.42A OB2276 Demo Board Performance

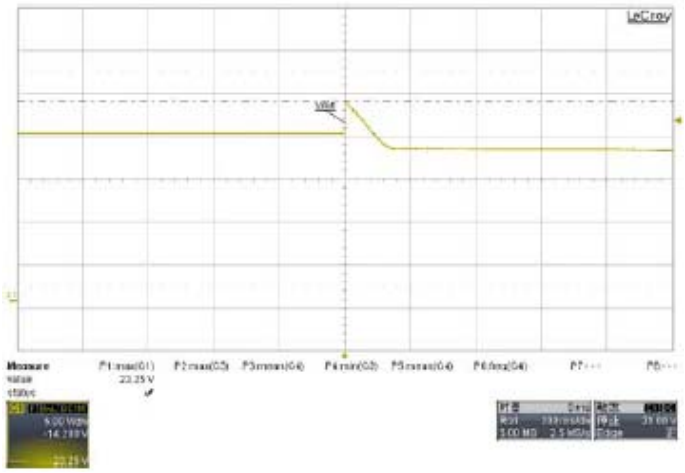
➢ Over Current Protection (OCP)



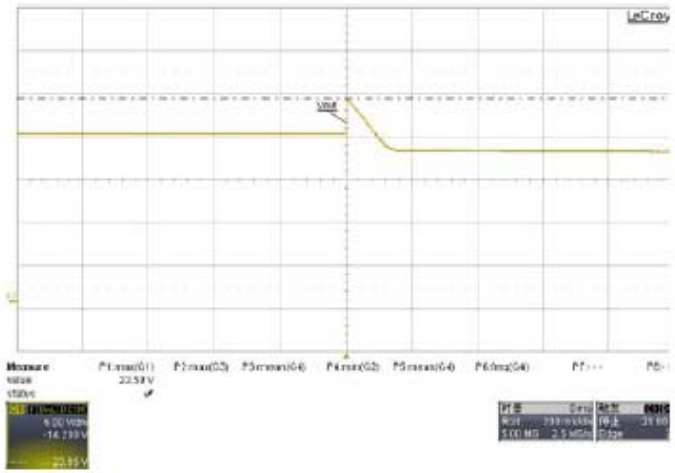
全電壓OCP容差優於10%，可提高系統可靠性，降低客戶系統成本

65W 19V/3.42A OB2276 Demo Board Performance

➢ Over Voltage Protection (OVP)



OVP Waveform @90VAC No Load



OVP Waveform @264VAC No Load

Input Voltage	OVP Trigger Voltage	
	No Load	Full Load
90V/60Hz	23.25V	22.58V
264V/50Hz	23.59V	22.82V

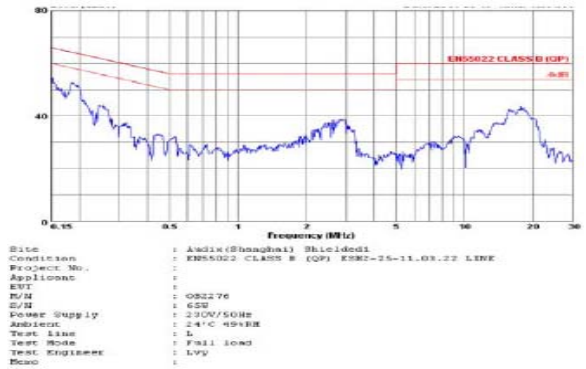
65W 19V/3.42A OB2276 Demo Board Performance

➢ Brown-out Protection (BOP)：

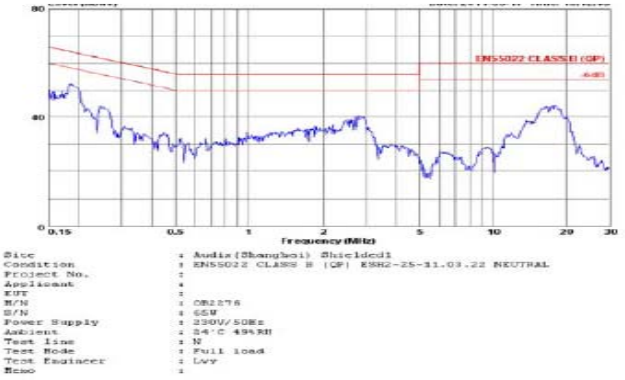
	Brownout Enter	Brownout Exit
Full Load	75V	77V

65W 19V/3.42A OB2276 Demo Board Performance

➢ Conduction EMI Test @ EN55022 Class B

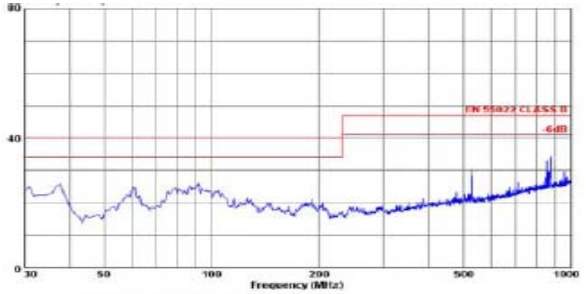


Site : Audix(Shanghai) Shielded1
Condition : EN55022 CLASS B (QP) ESH2-25-11.03.22 LINE
Project No. :
Applicant :
EUT :
M/N : OB2276
S/N : 65W
Power Supply : 230V/50Hz
Ambient : 24'C 49%RH
Test Line : L
Test Mode : Full load
Test Engineer : LVY
Memo :

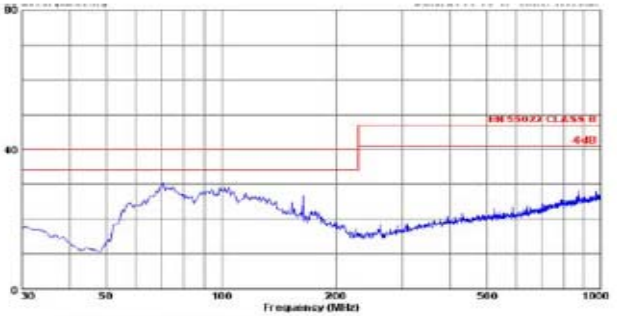


Site : Audix(Shanghai) Shielded1
Condition : EN55022 CLASS B (QP) ESH2-25-11.03.22 NEUTRAL
Project No. :
Applicant :
EUT :
M/N : OB2276
S/N : 65W
Power Supply : 230V/50Hz
Ambient : 24'C 49%RH
Test Line : N
Test Mode : Full load
Test Engineer : LVY
Memo :

➢Radiation EMI Test @ EN55022 Class B



Site : Audix(Shanghai) Chamber3
Condition : EN 55022 CLASS B VERTICAL
Project No. :
Applicant :
EUT :
M/N : OB2276
S/N : 65W 400UE
Power Supply : 230V/50Hz
Ambient : 22'C 50%RH
Test Mode :
Test Engineer : Raven
Memo :



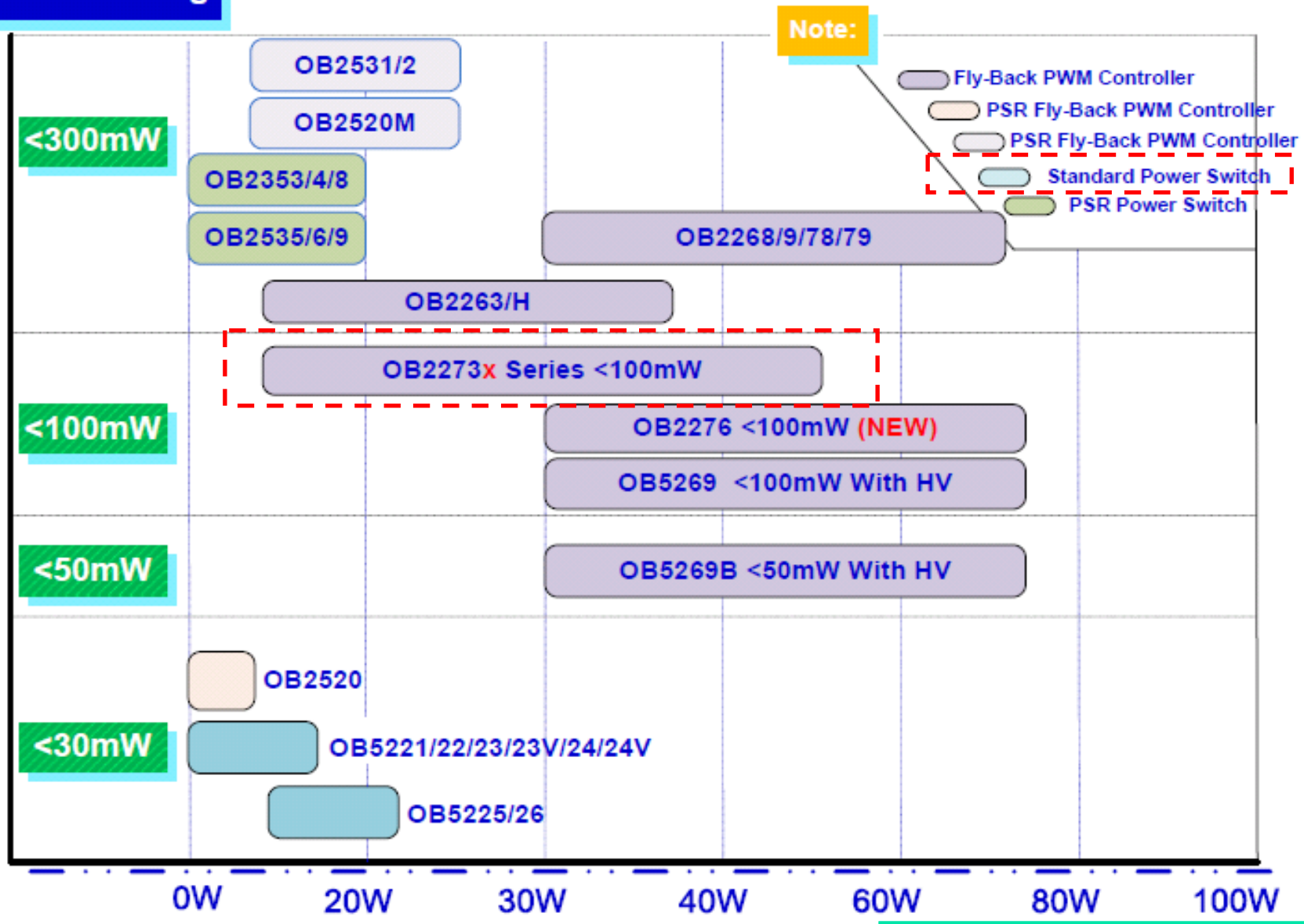
Site : Audix(Shanghai) Chamber3
Condition : EN 55022 CLASS B HORIZONTAL
Project No. :
Applicant :
EUT :
M/N : OB2276
S/N : 65W 400UE
Power Supply : 230V/50Hz
Ambient : 22'C 50%RH
Test Mode :
Test Engineer : Raven
Memo :

➢ **EMI Margin >6dB.**

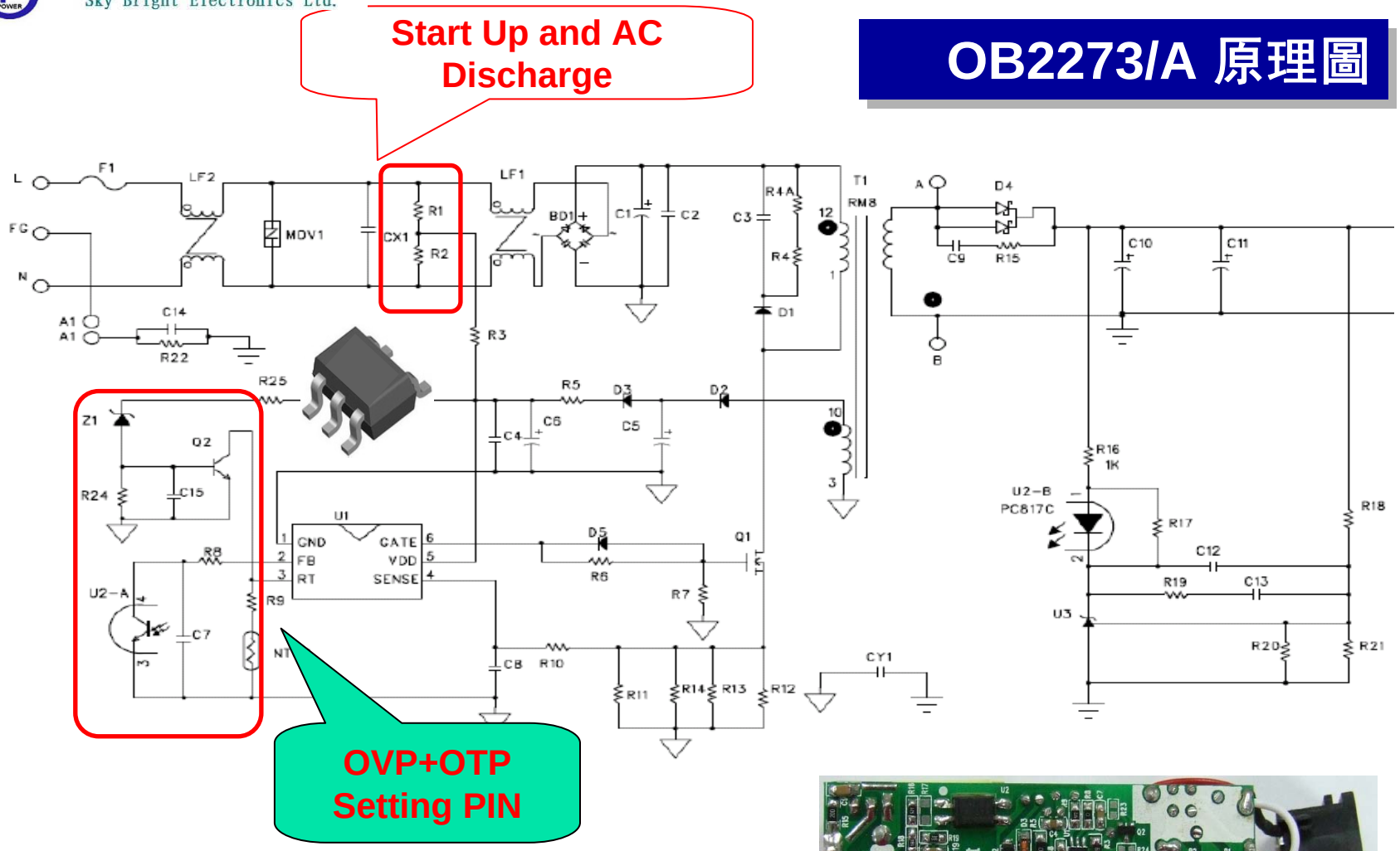
Non-HV Startup 20W-65W SMPS Solution

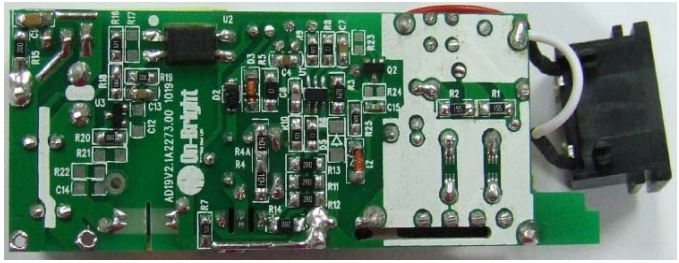
Using OB2273X Series

Power Saving



OB2273/A 原理圖

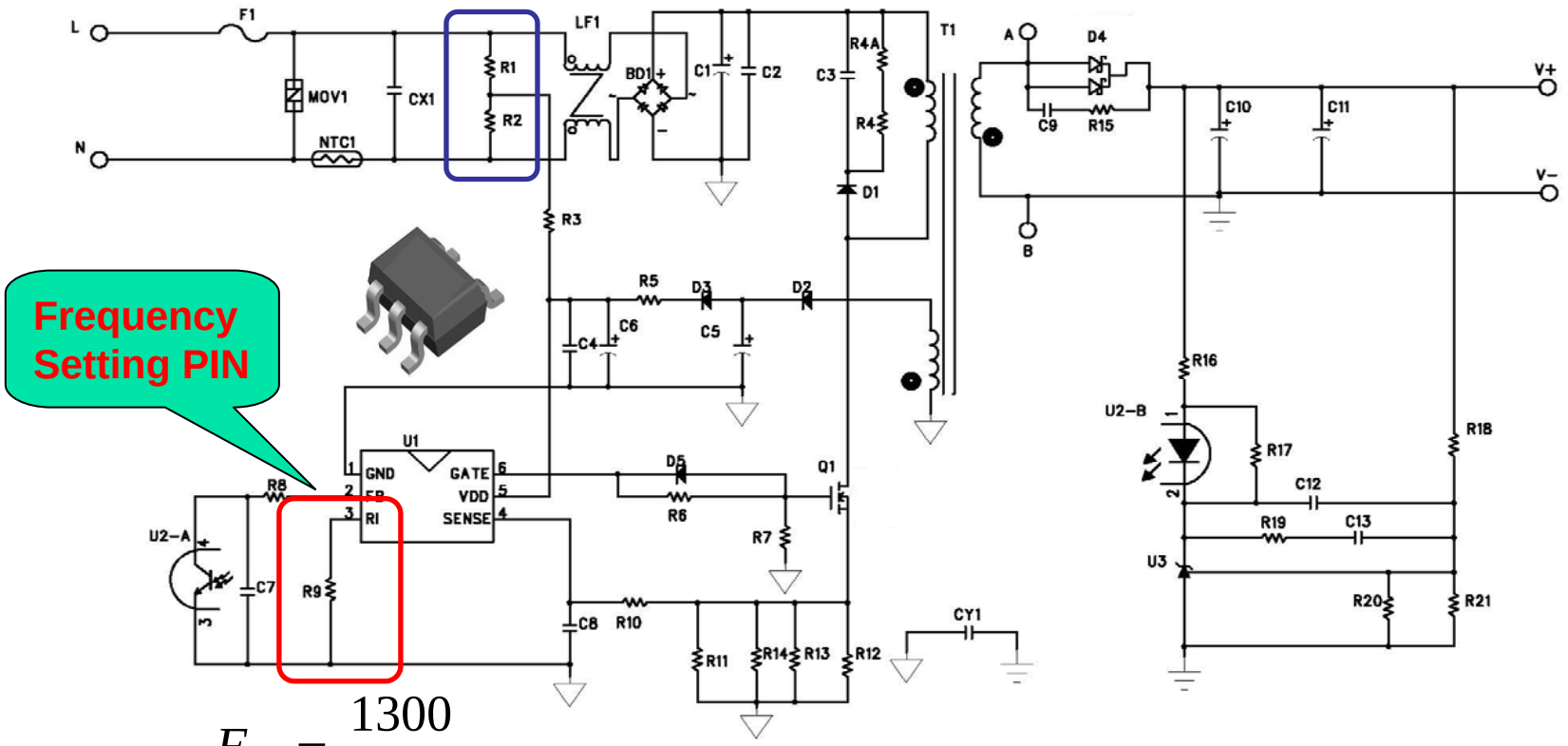




- Power Saving < 100mW
- OVP+OTP Auto-Recovery(OB2273A)
- OVP+OTP Latch(OB2273)

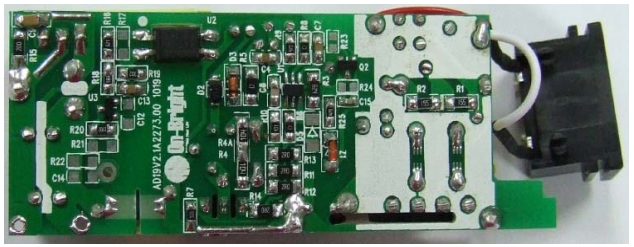
OB2273F Reference Design

Start Up and AC Discharge



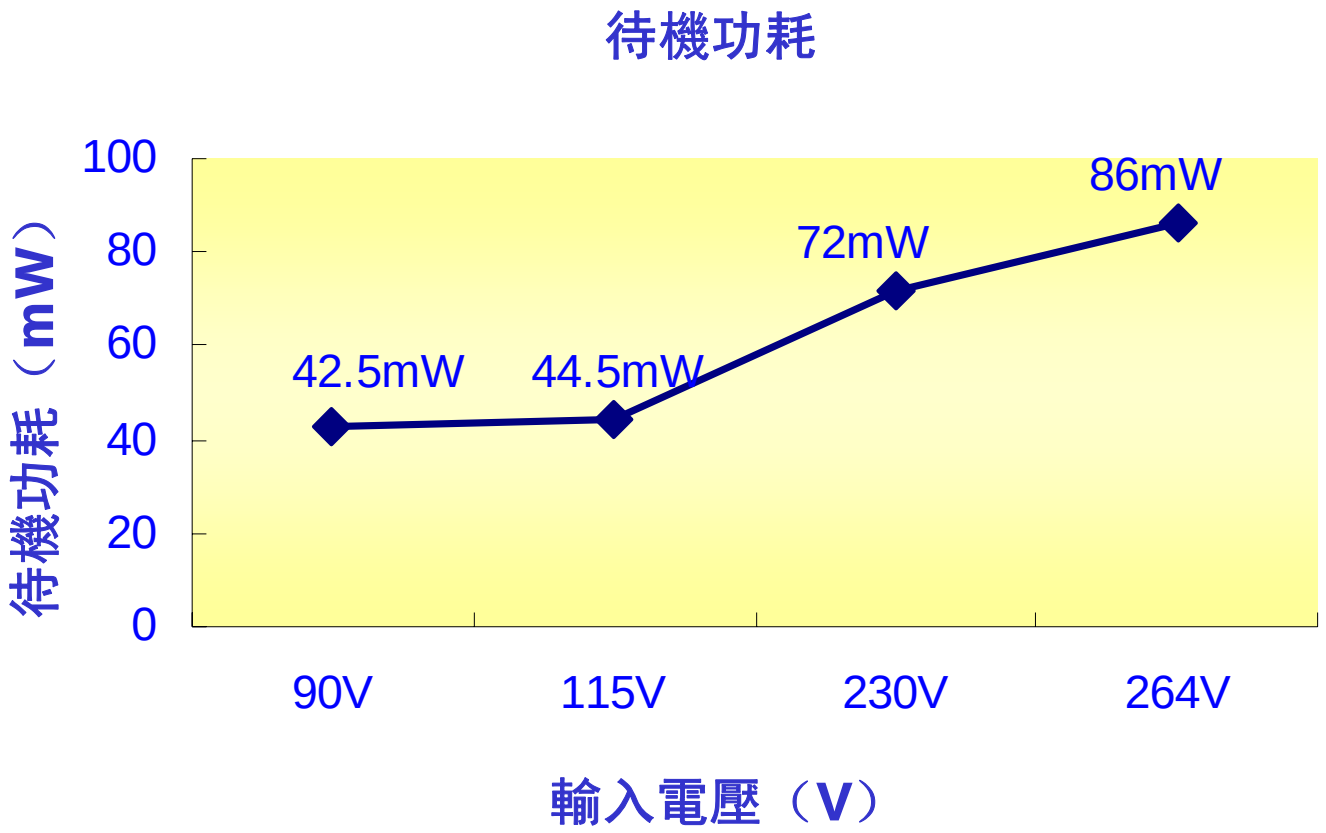
Frequency Setting PIN

$$F_S = \frac{1300}{R_9}$$

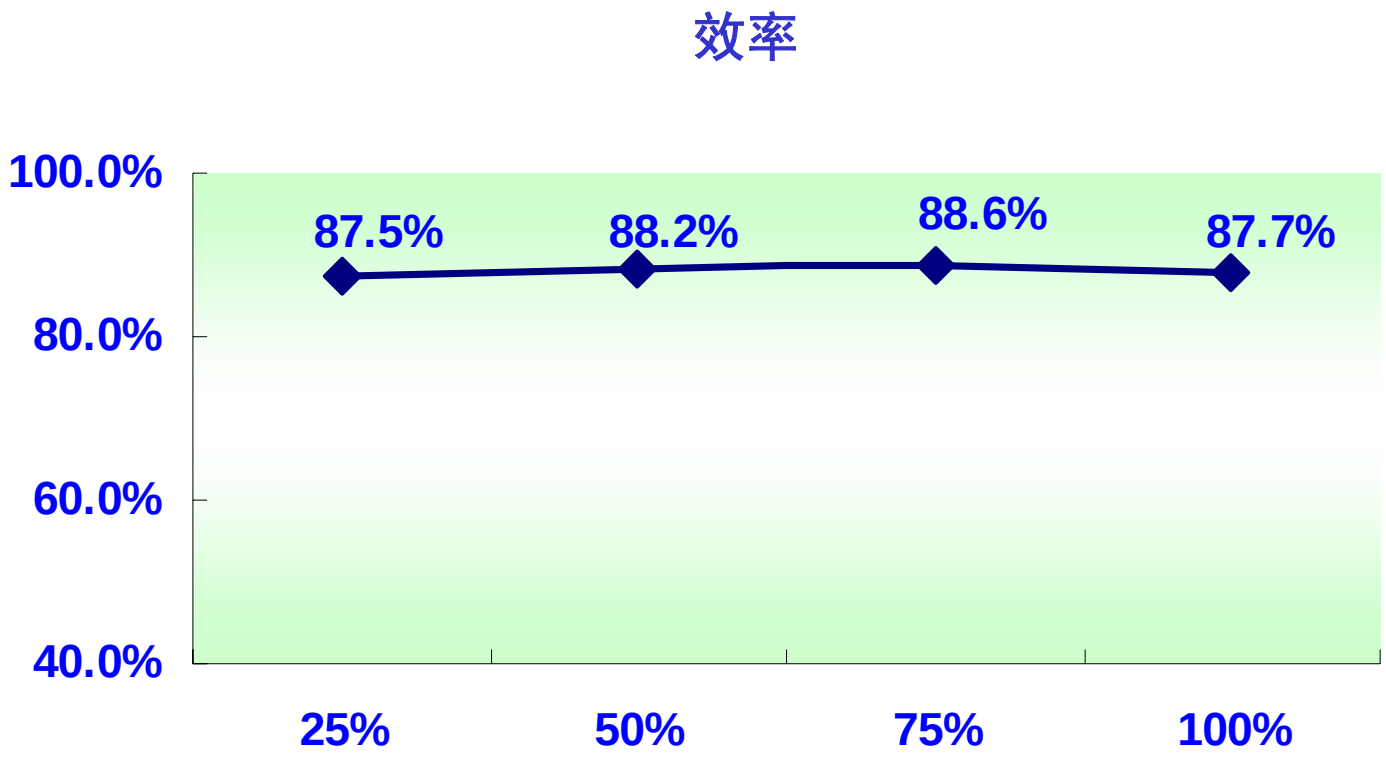


- **Power Saving < 100mW**
- OVP on VCC with Auto-Recovery
- Adj. Frequency

OB2273/A/F 19V/2.1A Test Data



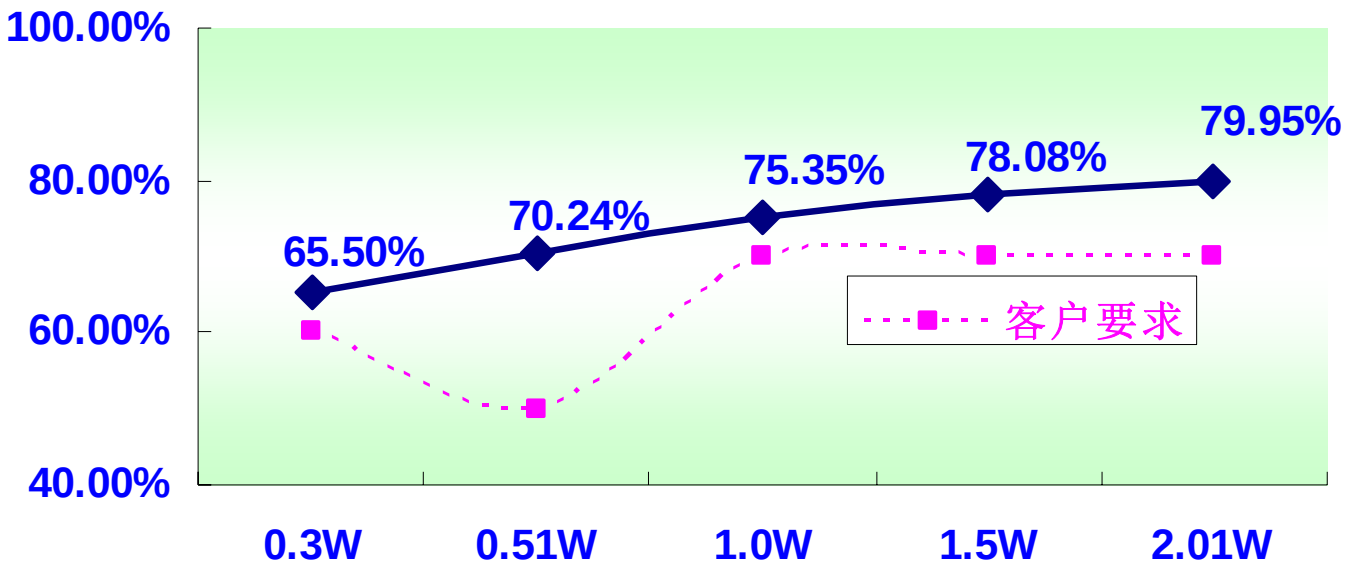
OB2273/A/F 19V/2.1A Test Data



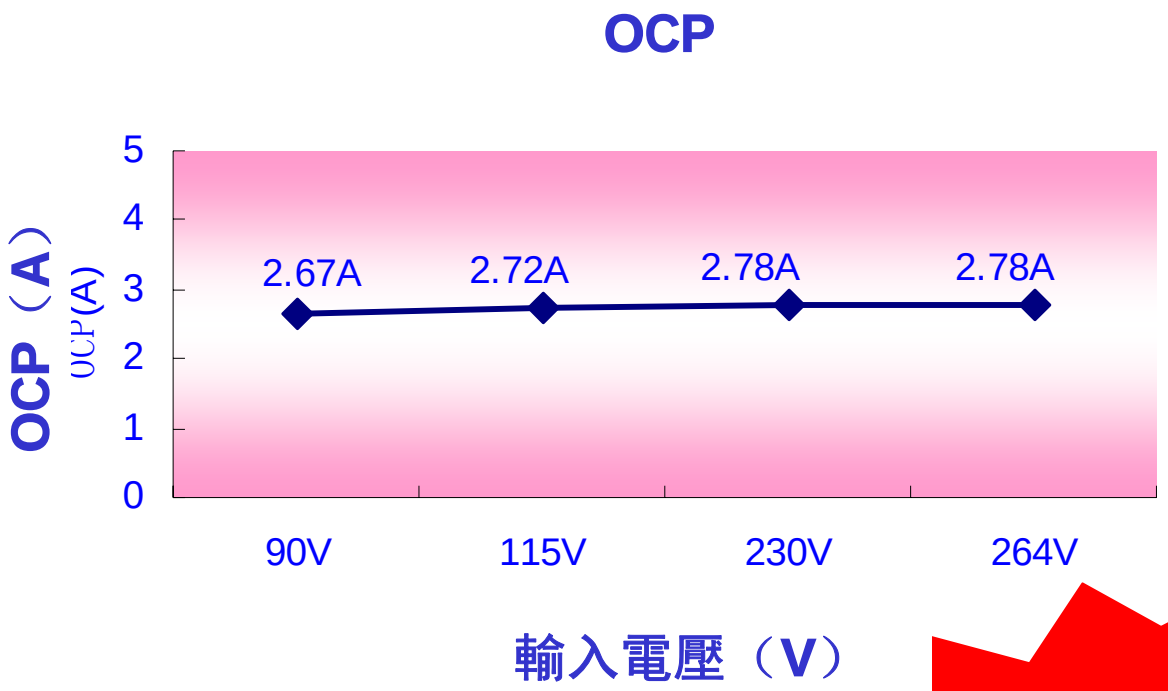
230V輸入，輸出線為 AWG20 1.8米

OB2273/A/F 19V/2.1A Test Data

輕載效率



OB2273/A 19V/2.1A Test Data

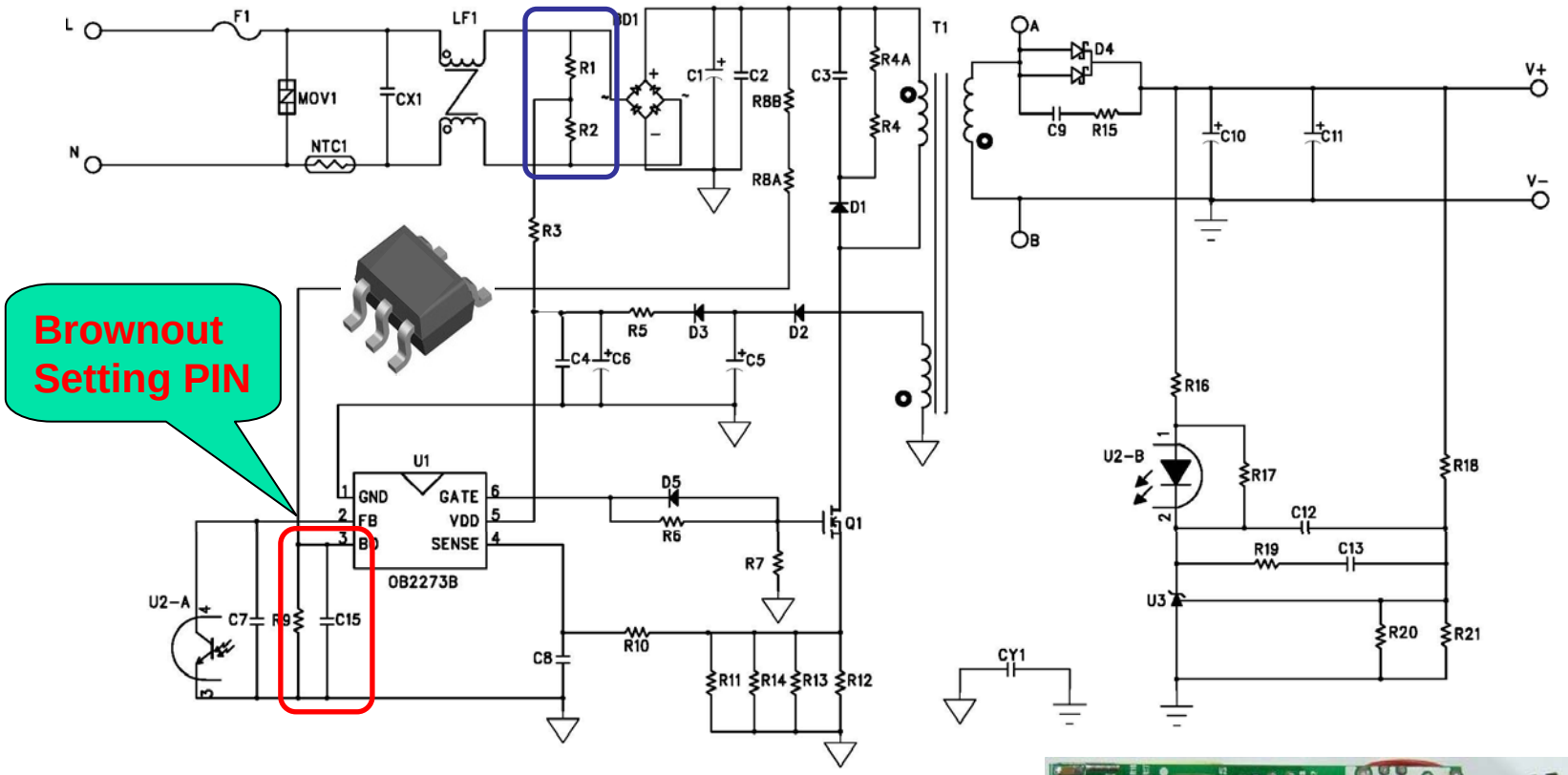


只有不到5%的誤差!!!

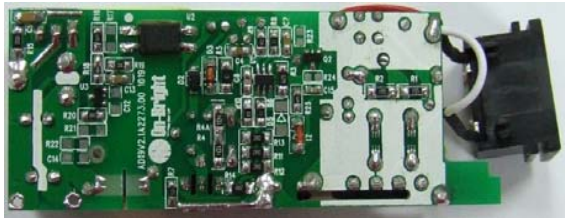
OB2273B Reference Design

Start Up and AC Discharge

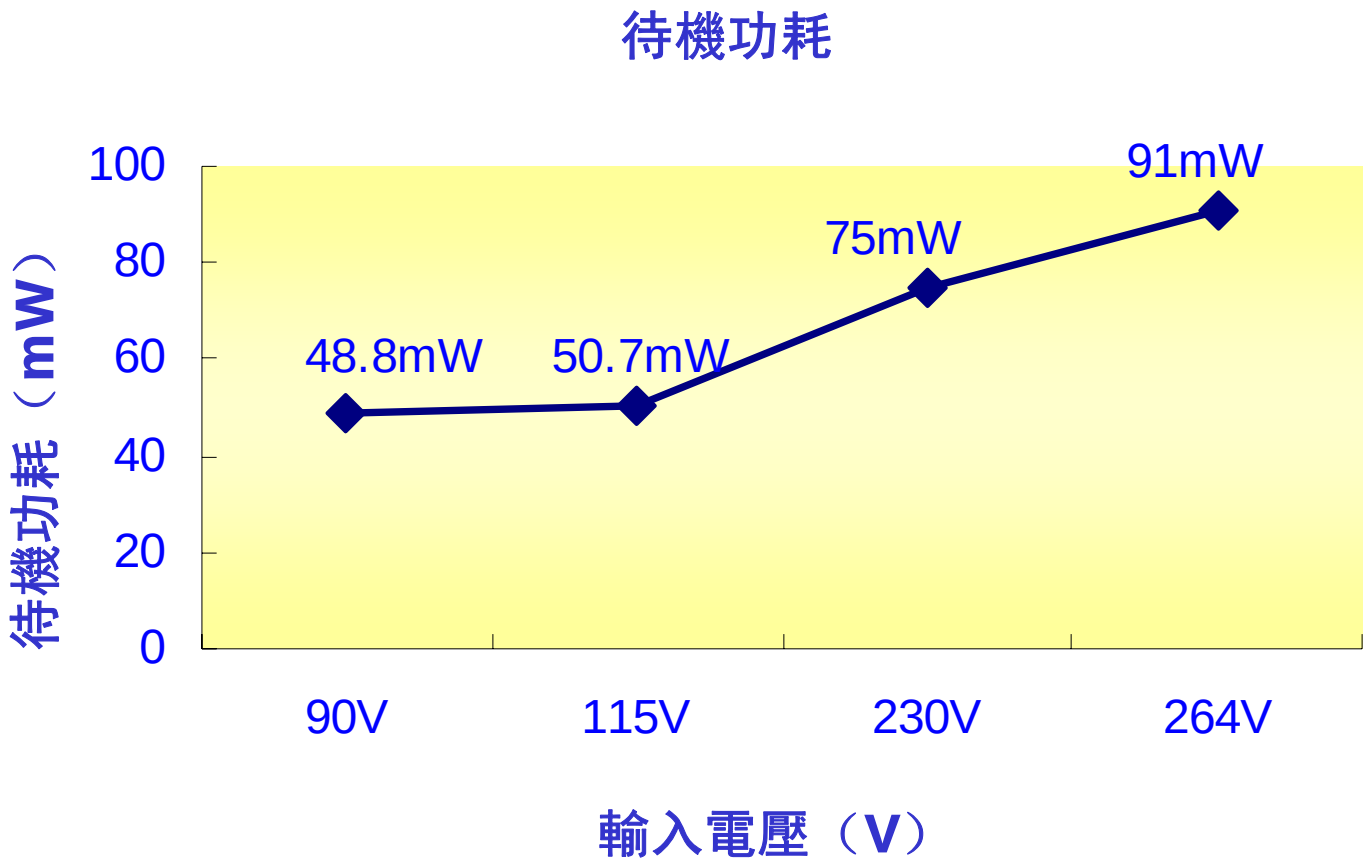
Brownout Setting PIN



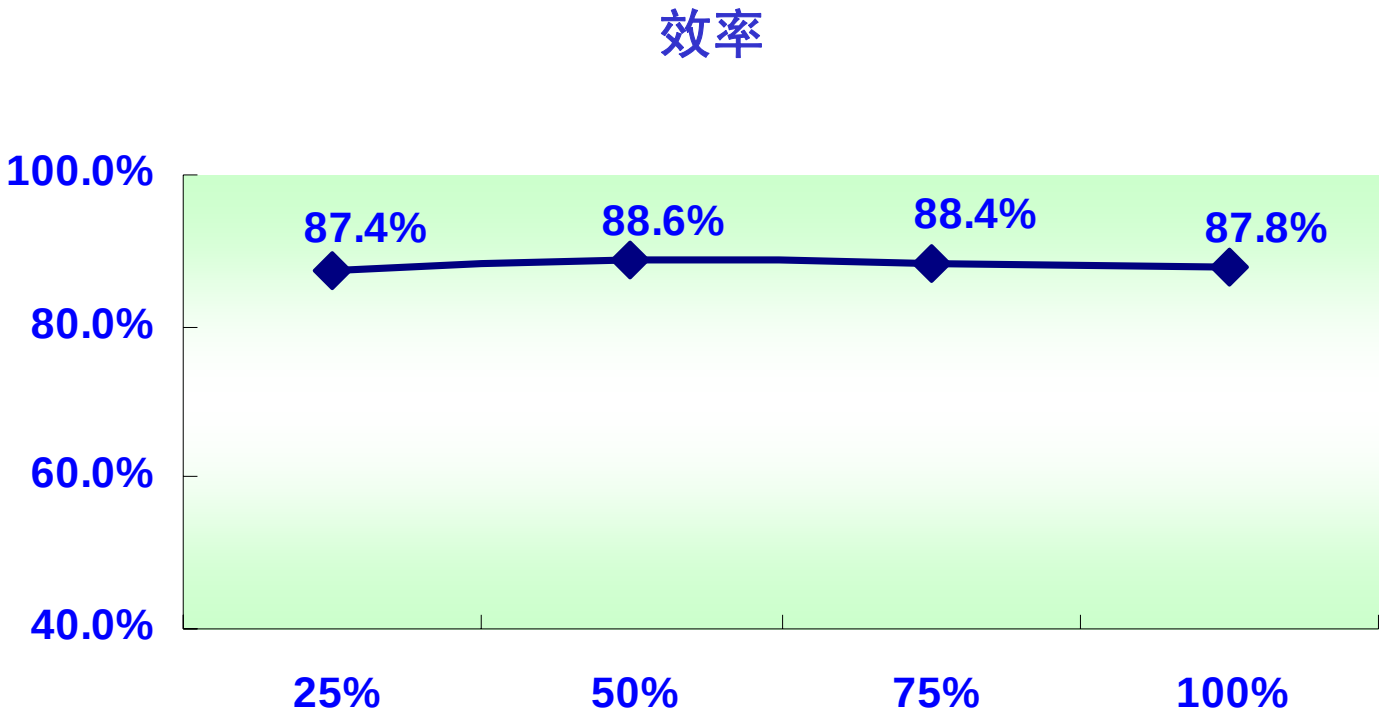
- **Power Saving < 100mW**
- OVP on VCC with Latch
- Brownout Protection



OB2273B 19V/2.1A Test Data

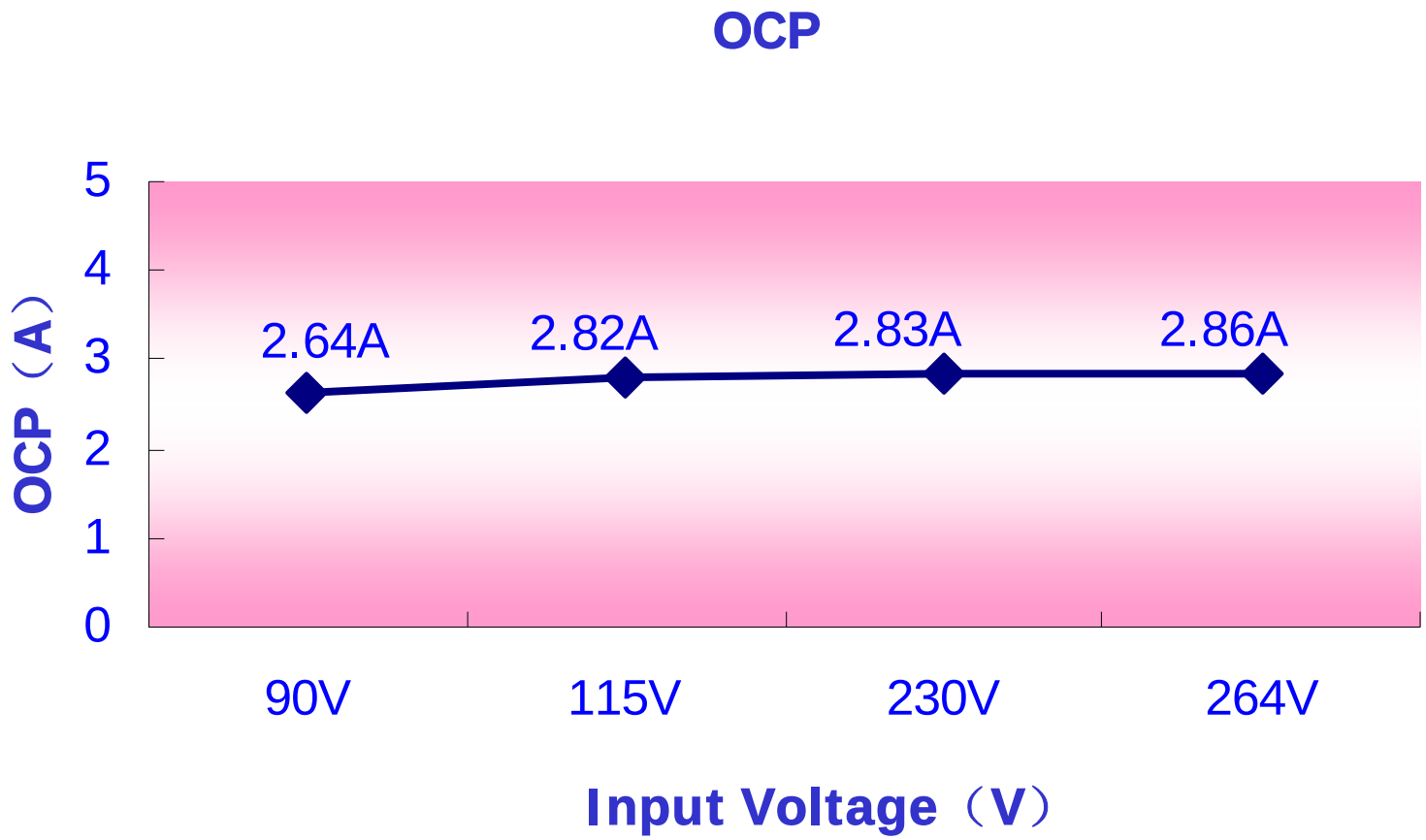


OB2273B 19V/2.1A Test Data



230V輸入，輸出線為 AWG20 1.8米

OB2273B 19V/2.1A Test Data



OB2273 Functional Matrix

	OB2273	OB2273A	OB2273B	OB2273F
Power loss@no load	<100mW	<100mW	<100mW	<100mW
Frequency	65K	65K	65K	Programmable
Brown out	NO	NO	Auto-Recovery	NO
OLP/SCP/OPP	Auto-Recovery	Auto-Recovery	Auto-Recovery	Auto-Recovery
VDD OVP	Latch	Auto-Recovery	Latch	Auto-Recovery
OTP	Latch	Auto-Recovery	No	No

DOE Level 6

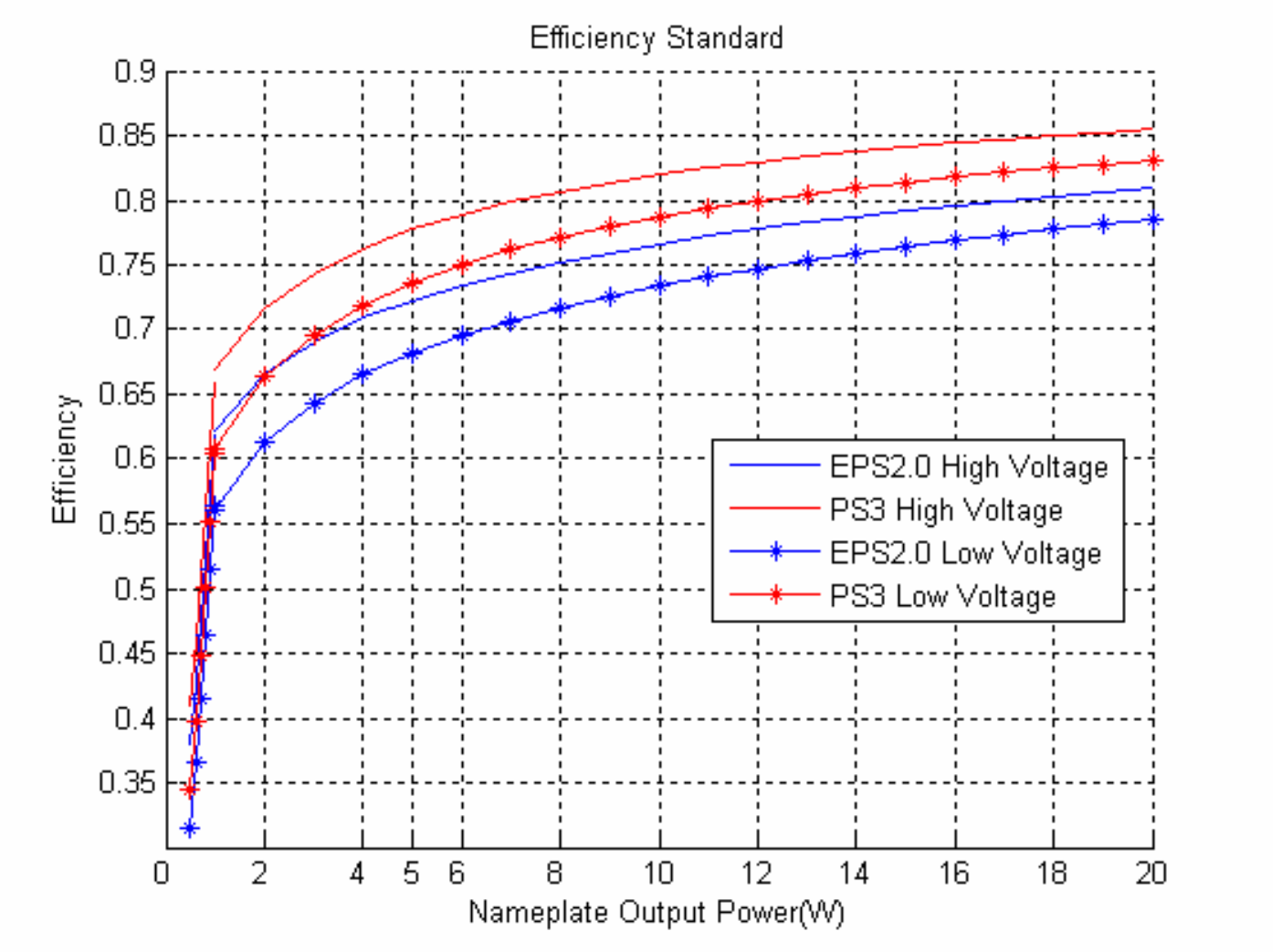
DOE Level 6

	Standard Voltage PS3	Low Voltage PS3
Nameplate Output Power (Pno)	Minimum Average Efficiency, Active Mode	Minimum Average Efficiency, Active Mode
⩽ 1 W	⩾ 0.5 * Pno + 0.16	⩾ 0.517 * Pno + 0.087
> 1 to ⩽ 49 W	⩾ 0.071 * Ln(Pno) - 0.0014 * Pno +0.67	⩾ 0.0834 * Ln(Pno) - 0.0014 * Pno + 0.609
> 1 to ⩽ 51 W	--	--
> 49 to ⩽ 250 W	⩾ 0.880	⩾ 0.870
> 51 to ⩽ 250 W	--	--
> 250 W	0.875	0.875
	No-Load Power[1,2,4]	No-Load Power[2,4]
< 50 W	⩽ 0.100 W	⩽ 0.100 W
⩾ 50 to ⩽ 250 W	⩽ 0.210 W	⩽ 0.210 W
> 250 W	⩽ 0.500 W	⩽ 0.500 W

DOE Level 6 VS EPS2.0

Nameplate Output Power (Pno)	U.S. DoE March 2012 NOPR Active Mode Efficiency (Ave.)	EC Ecodesign Directive Active Mode Efficiency (Ave.)
3.5 W (low voltage)	70.8%	65.5%
5 W (standard voltage)	77.7%	72.3%
5 W (low voltage)	73.6%	68.2%
10 W (Low voltage)	78.7%	73.4%
12 W (standard voltage)	83%	77.8%
20 W (standard voltage)	85.5%	81%
40 W (standard voltage)	87.6%	85.3%
60 W (standard voltage)	88.0%	87.0%
	No-load power consumption	No-load power consumption
< 50 W	⩽ 0.100 W	⩽ 0.3 W / 0.15 W
⩾ 50 to ⩽ 250 W	⩽ 0.210 W	⩽ 0.5 W

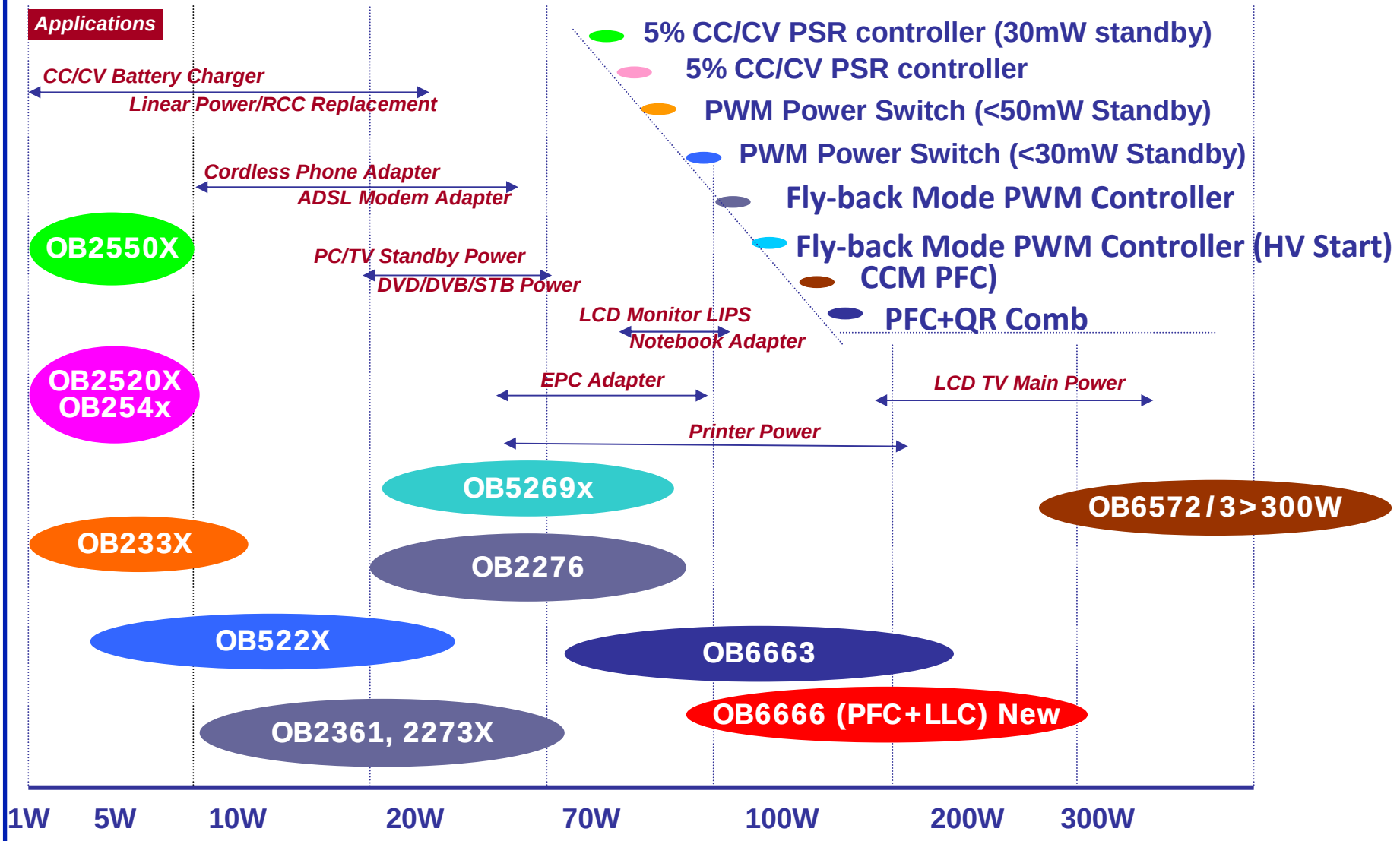
DOE Level 6


Efficiency Standard
Efficiency
Nameplate Output Power(W)
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0
2
4
5
6
8
10
12
14
16
18
20
EPS2.0 High Voltage
PS3 High Voltage
EPS2.0 Low Voltage
PS3 Low Voltage

Outline

- Company and Products Introduction
- OB2550(<30mW)/OB2550D(<100mW)
- OB522X (<30mW)
- OB233x (<50mW)
- OB2273X(<100mW)
- OB2276X(<100mW)
- OB5269(<100mW)
- OB5269B(<50mW)

Current On-Bright Solutions



Examples of Current On-Bright Solutions

Product	Power range	Application	Reference Design	Max Standby	Minimum Efficiency
OB2550	1-5W	Charger/Adaptor	5V/1A	24mW<30mW	75.5%>73.6%
OB2550D	1-10W	Charger/Adaptor	5V/1.5A	58mW<100mW	77.3%>76.6%
OB2333	1-6W	Adaptor	5V/1A	32mW<50mW	76.9%>73.6%
OB2334	1-9W	Adaptor/STB	5V/1.5A	34mW<50mW	79.4%>76.6%
OB2338	1-13W	Adaptor/STB/TV Standby	12V/1A	38mW<50mW	84.3%>83.2%
OB522X	1-20W	Adaptor/PSU & TV standby	12V/1.5A	25mW<30mW	85.9%>85%
OB2201T	20-100W	Adaptor/open frame	12V/3A		87.9%>87.4%
OB2273	20-65W	Adaptor/Open Frame	19V/2.1A	72mW<100mW	88.5%>87.6%
OB2276	30-100W	Adaptor/Open frame	19V/3.42A	75mW<100mW	88.9%88%
OB5269	30-100W	Adaptor/Open frame	19V/3.42A	55mW	88.9%>88%
OB5269B	30-100W	Adaptor/Open frame	19V/3.42A	32mW<50mW	88.8%>88%

谢谢观赏　期待合作

SKY BRIGHT ELECTRONICS LIMITED

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香港公司：天晖电子有限公司

香港地址：香港九龙观塘伟业街101号海景中心13楼 TEL：(852) 23450802 FAX：(852) 23458028

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