



Test Report For AP3766 5*1W LED Solution

May 2010



Outline

- Specification of 5*1W LED
- Schematics of AP3766 solution
- Bill of Material
- Transformer Specs
- Test Results

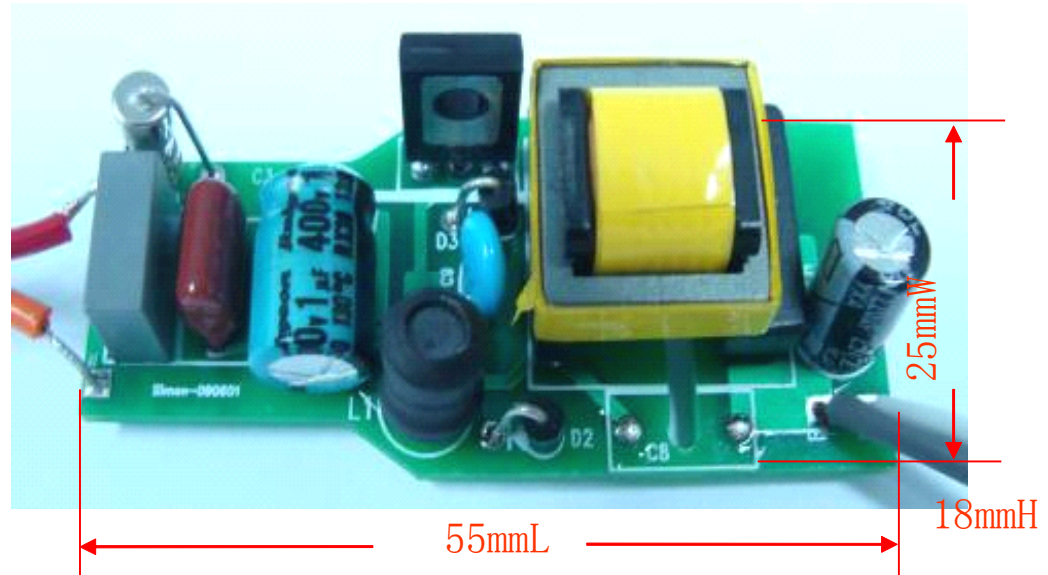
AP3766方案特点如下。(可以通过EMI和CE等认证)

- 采用原边控制方式，无须光耦和副边电流控制电路，实现隔离恒流输出，电路结构简单。通过电阻R5检测原边电流，控制原边电流峰值恒定，同时控制开关占空比，保持输出二极管D1的导通时间和整个开关周期时间比例恒定，实现了输出电流的恒定。
- AP3766采用专有的“亚微安启动电流”技术，仅需0.6 μ A的启动电流，因此降低了启动电阻R1和R2上的功耗，提高了系统效率。典型5W应用效率大于80%，空载功耗小于30mW。
- AP3766采用恒流收紧技术实现垂直的恒流特性，恒流精度高。
- 电路元件数量少，AP3766采用SOT-23-6封装，体积小，整个电路可以安装在常用规格灯杯中，如E27/GU10。
- 安全可靠，隔离输出，具有输出开路保护、过压保护及短路保护功能。
- 功率开关管采用三极管，省去了高压场效应管，系统成本低。

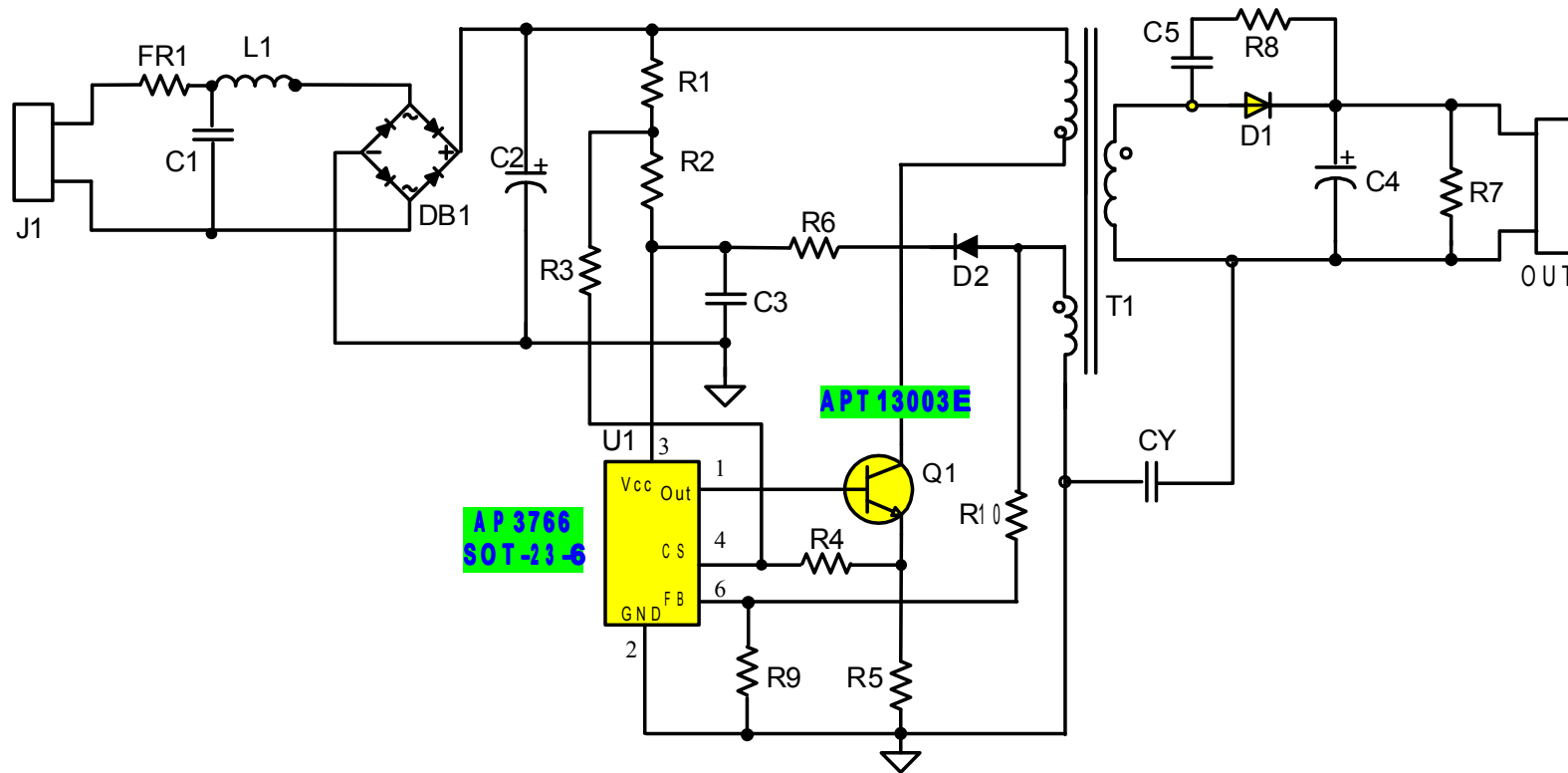
solution compare

Company	BCD		PI	PI	ST
P/N	AP3766		TNY264	LNK605	VIPER12
package	SOT-23-6		DIP-8	DIP-8	DIP-8 SOIC-8
drive	Transistor APT13003		Integrated MOSFET	integrated MOSFET	integrated MOSFET
Secondary controller	no		CC&CV controler	no	CC&CV controler
CC variance	≤ +/-5%		≤ +/-3%	≤ +/-10%	≤ +/-3%
OVP function	OK		bad	OK	bad
efficiency	>80%		75%	75%	75%
Component s	26		31	29	33

Review



Confidential Schematics of AP3766 Solution



AP3766 相关下载文档（规格书、PCB 版图）

1、AP3766 规格书 PDF格式

AP3766 P1.0 100

点击下载



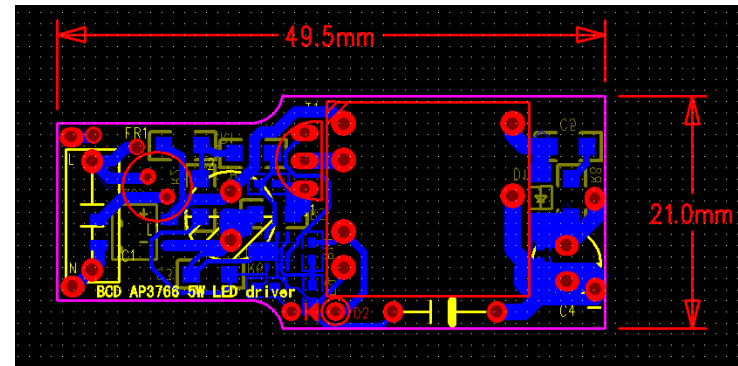
2、AP3766 PCB 版图文件 PAD格式

AP3766 5W LED driver 2f

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3、AP3766 PCB 版示意图

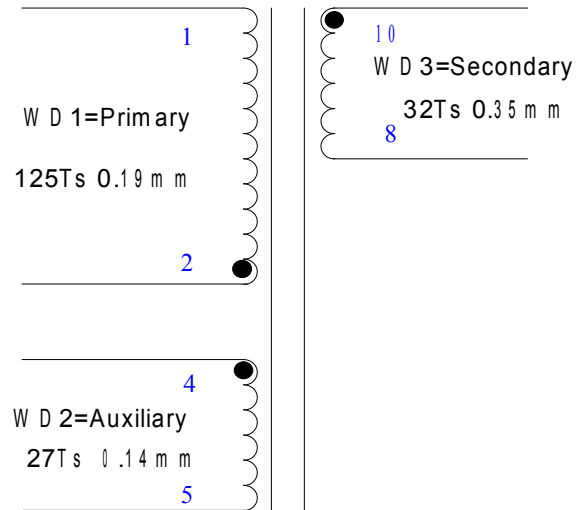


Bill Of Material

Item	Description	Item	Description
C1	100nF/275V~, X capacitor	R1 R2	2M ohm, 5%,1206, resistor
C2	4.7uF/400V, 105°C, 8*11 electrolytic capacitor	R3	5.1M ohm, 5%, 1206, resistor
C3	1 uF/25V,1206, ceramic	R4	3.3k ohm, 5%, 0603, resistor
C4	220uF/25V, 6*11 electrolytic capacitor	R5	1.5 ohm, 1%,1206, resistor
C5	220pF/200V, 1206, ceramic	R6	10 ohm, 5%,0603 , resistor
CY	470pF/250V, Y safety capacitor	R7 R10	20 k ohm, 5%, 0603, resistor
D1	2A/150V, Schottky Diode,SMA	R8	100 ohm, 5%,1206, resistor
D2	Diode, FR107,DO-41	R9	5.1k ohm, 5%,0603, resistor
DB1	Bridge Diode, MB6S, SMD	T1	EE16 8 pin 2.0 mH, 5%,Transformer
L1	3.3mH,Inductor,6mm*10mm	U1	AP3766K6TR-G1, SOT-23-6, BCD's IC
FR1	12 ohm 1W, surge 2kV , Fuse resistor	Q1	APT27 ZTR-E1, TO-92, BCD's Power BJT

Transformer Specification

Electrical Diagram

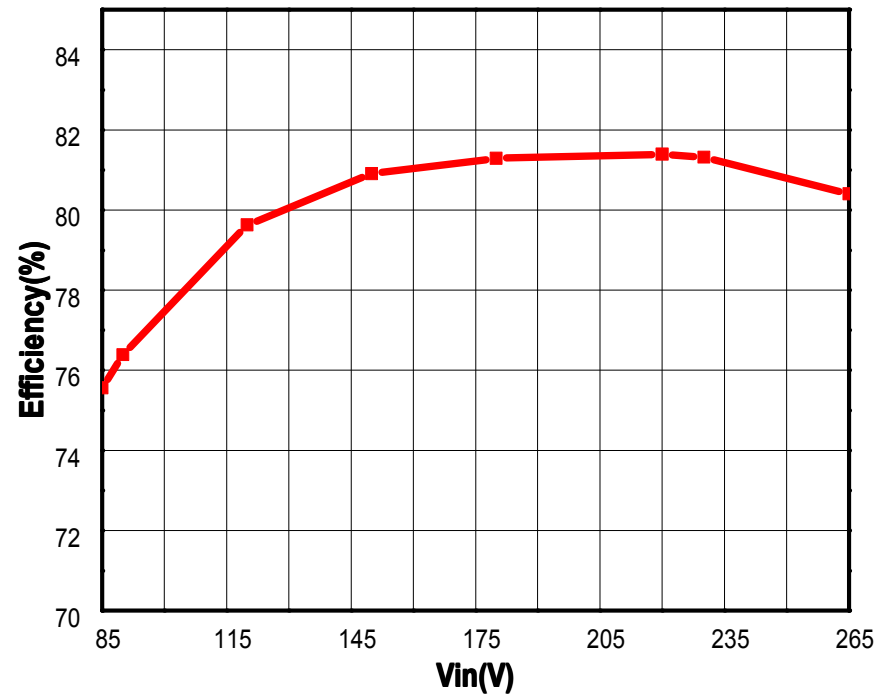


Primary Inductance	Pin 2-1, all other windings open, measured at 1kHz, 0.4VRMS	2.0mH,±7%
Primary Leakage Inductance	Pin2-1,all other windings shorted, measured at 10kHz, 0.4VRMS	50uH (Max)
Electrical Strength	60 seconds, 60HZ, from Pin 2-1 to Pin8-7	3000Vac

Transformer Specification

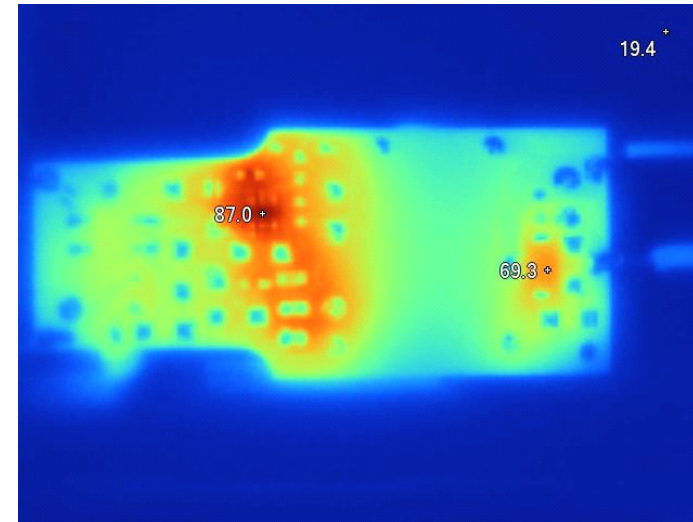
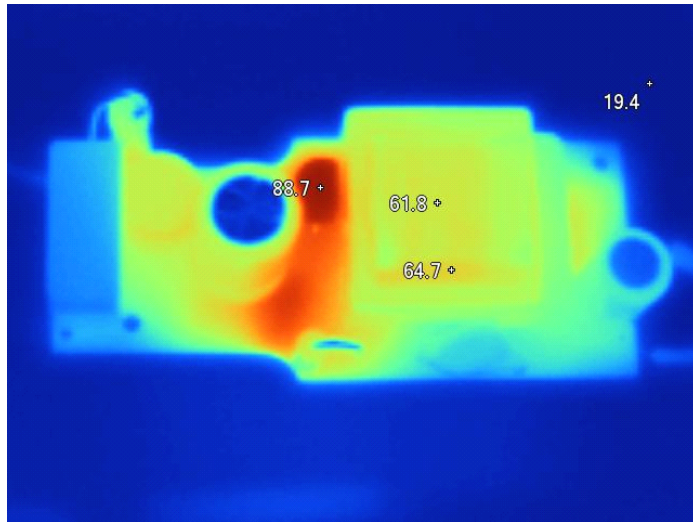
Bobbin Orientation	Place the bobbin on the winding machine with pins 1-5 on the left side and pins 6-8 on the right side.
WD 2 Auxiliary winding	Start at Pin 4. Wind 27 turns of $\varnothing 0.14\text{mm}$ wire [3] from left to right. Finish at Pin 5. Wind tightly & spread evenly.
Insulation	1 Layers of insulation tape [6], 0.05mm thick,7.0mm wide.
WD 1 Primary Winding	Start at Pin 2. Wind 32 turns of $\varnothing 0.19\text{mm}$ wire [4] from left to right. Wind the next 32 turns on the next layer from right to left. Wind the next 31 turns on the next layer from left to right. Wind the last 30 turns from right to left. Finish on Pin 1. Wind tightly & spread evenly.
Insulation	3 Layer of insulation tape [6], 0.05mm thick,7.0mm wide.
WD 3 Secondary winding	Start at Pin 8. Wind 16 turns of $\varnothing 0.35\text{mm}$ Wire [5] from left to right. Wind the next 16 turns on the next layer from right to left. Finish at Pin 6. Wind tightly & spread evenly.
Insulation	1 Layers of insulation tape [6], 0.05mm thick, 7.0mm wide.
Glue	Glue core and bobbin

Active mode efficiency



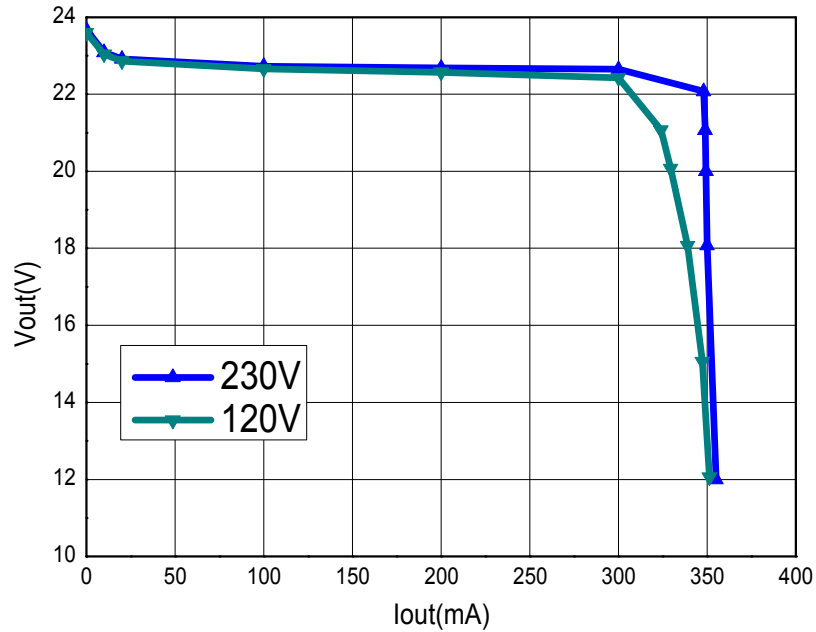
full load Efficiency vs input voltage

Thermal performance

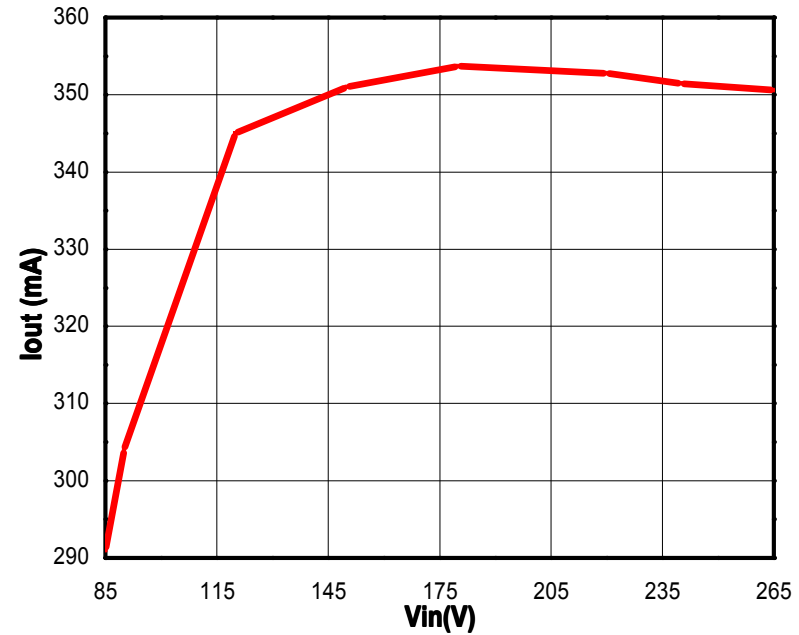


Item	120Vac
U1(AP3766)	87°C
Q1(APT13003E)	88.7°C
D1(schottky)	64.7°C
T1(transformer)	64.6 C
TA	20 C

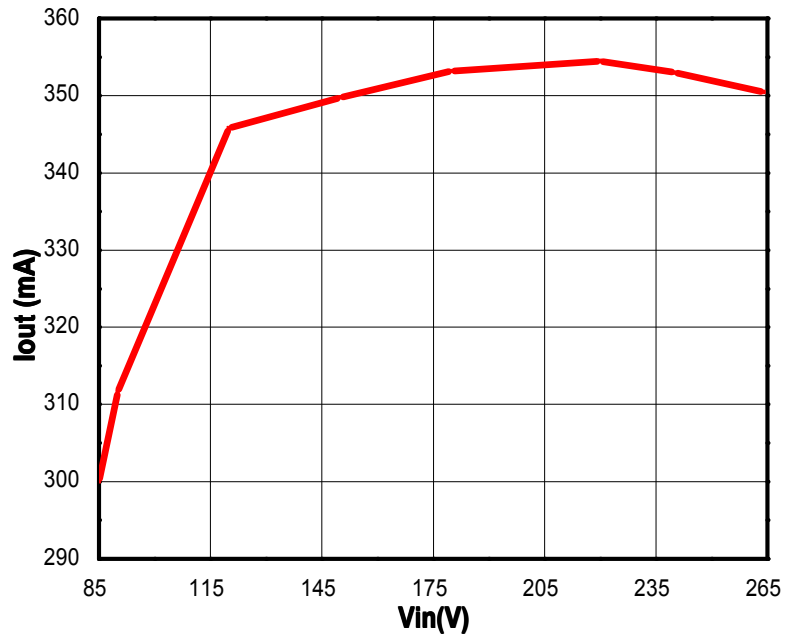
Output I-V and regulation



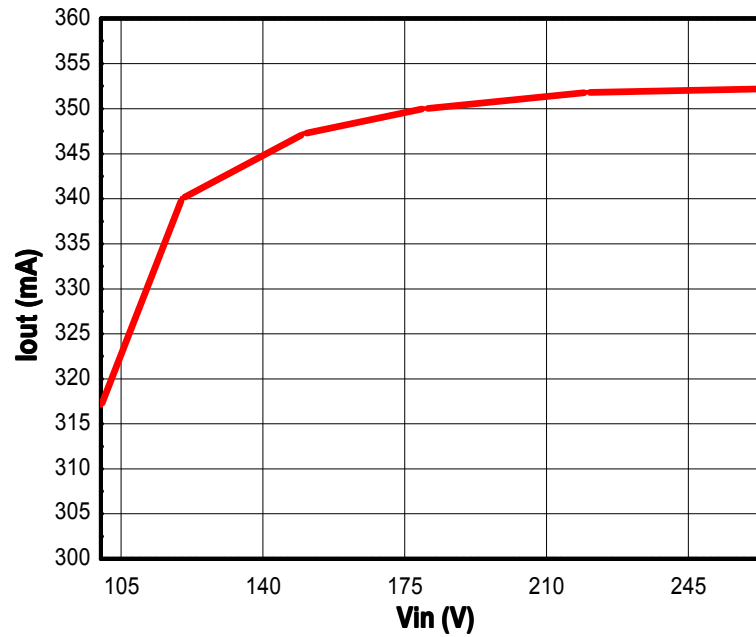
CV/CC Characteristic at 25°C



Line Regulation of Output Current at 25°C

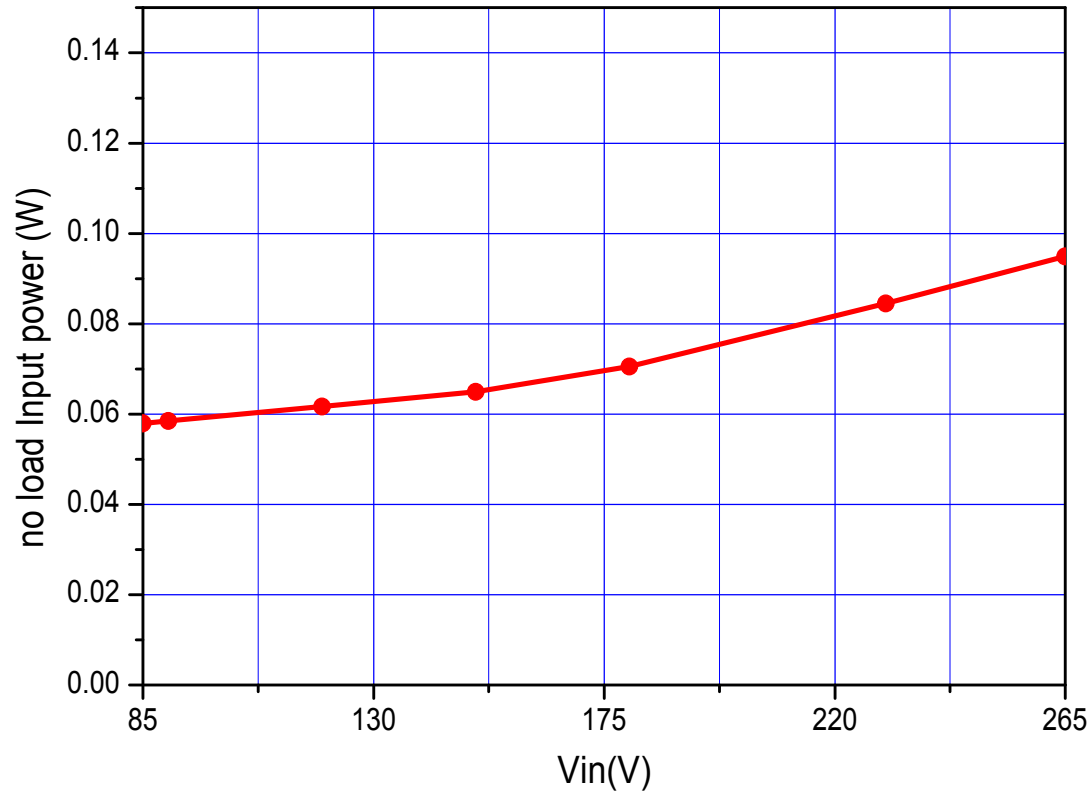


Line Regulation of Output Current at 70°C



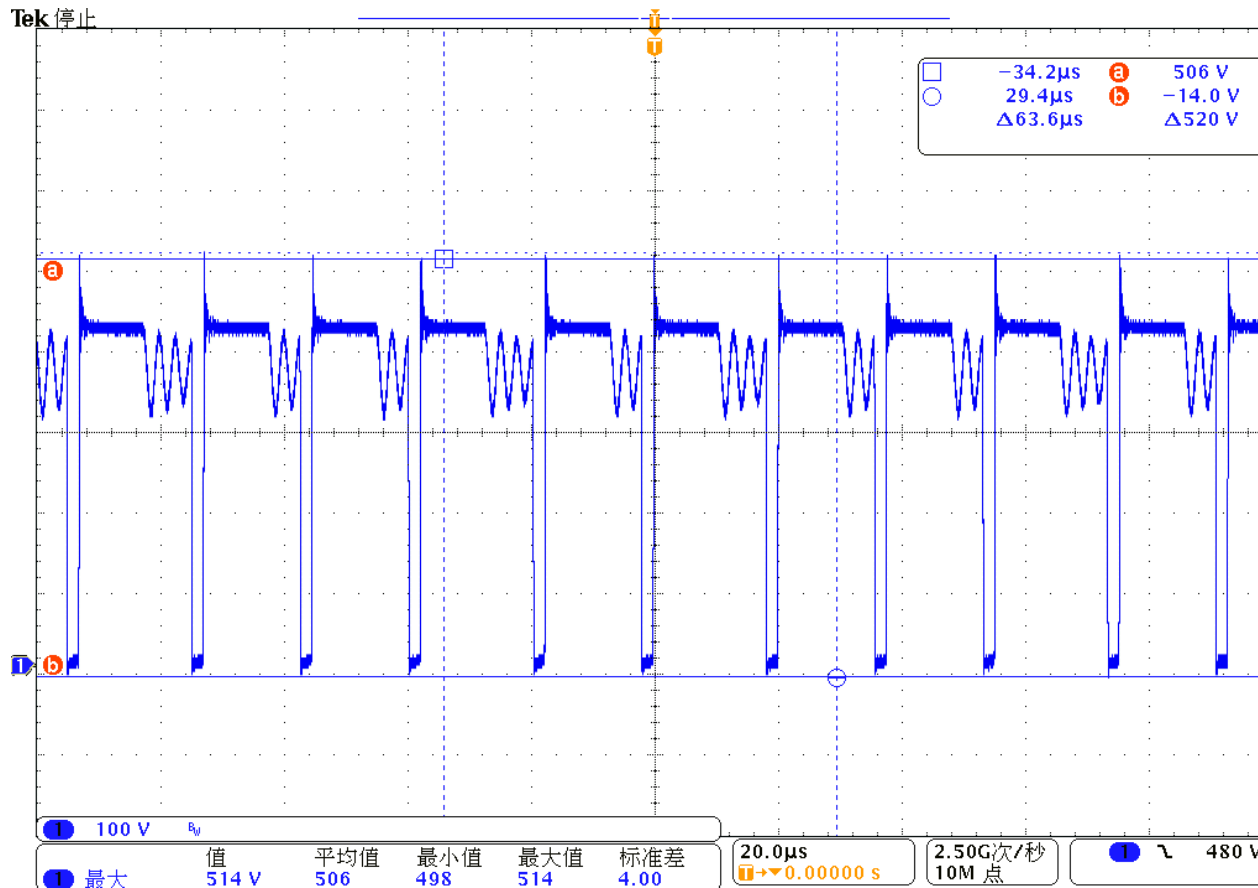
Line Regulation of Output Current at -25°C

No load input power



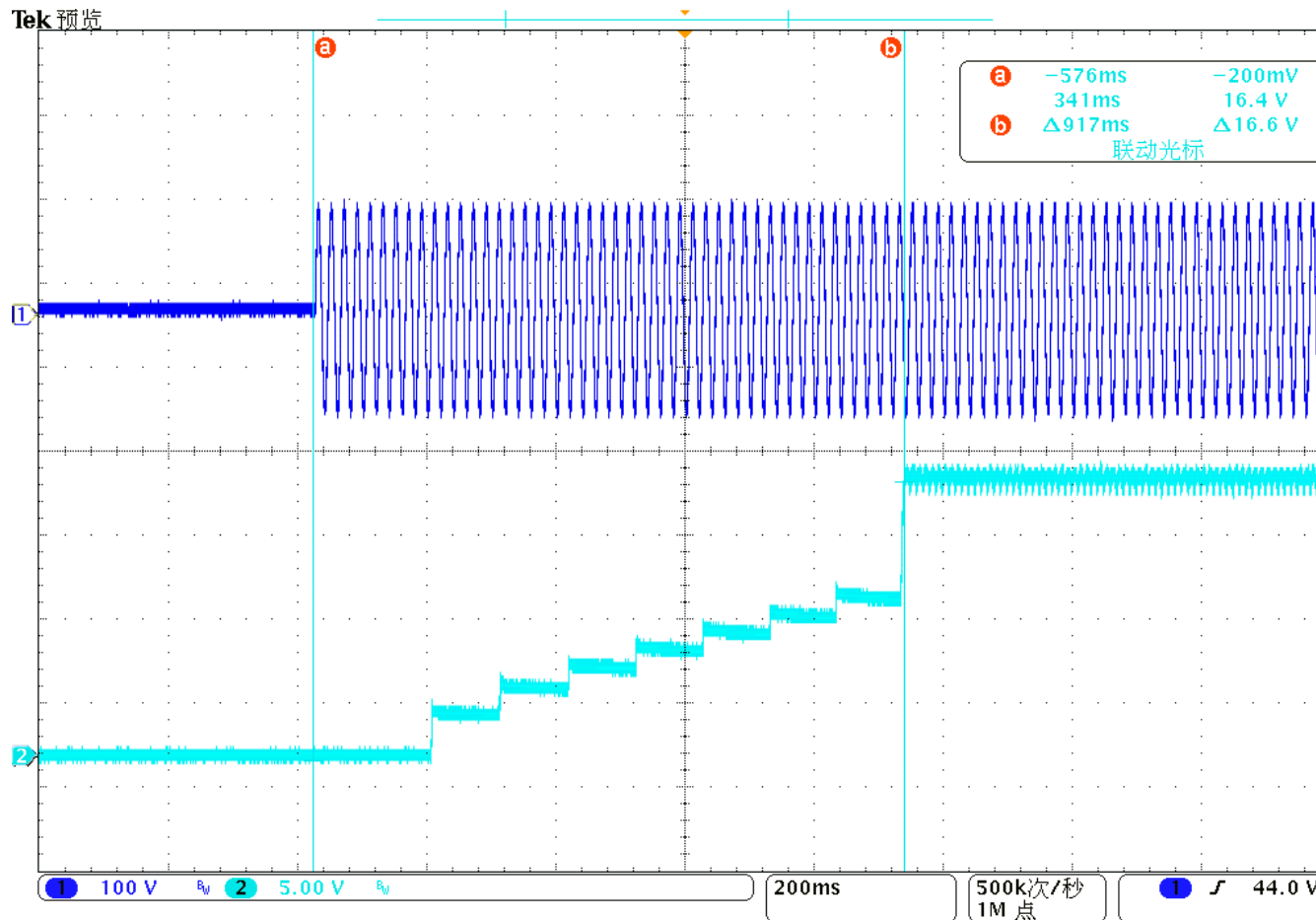
No Load Input Power Vs. Input Voltage

Collector voltage of power transistor



Collector voltage max 520V@ $V_{in}=265V_{ac}$, full load

Startup characterize



Vo start up time@85Vac, Full Load. Vo start up time less than 1s

Conducted EMI

150 kHz

Date: 21.APR.2010 10:23:34

Date: 21.APR.2010 10:23:24

Conducted EMI, 230VAC/50Hz, full load, Line

Conducted EMI

150 kHz

Date: 21.APR.2010 10:24:35

Date: 21.APR.2010 10:24:27

Conducted EMI, 230VAC/50Hz, full load, Neutral

Test Summary

Description	Min	Typ	Max	Units	Tested results
Input					
Voltage	176		264	VAC	86mW at 230Vac
Frequency	47	50/60	63	Hz	
No Load Input Power			150	mW	
Output					
Output Voltage	15	16.5	25	V	Pass
Output Ripple Voltage			1	V _{pp}	Pass
Output Current	332	350	368	Ma	Pass from 120Vac to 264Vac
Output Power (P _{no})		5.78		W	Pass
Efficiency(η)	80			%	81.3% at 230Vac
EMI	Pass EN55022 Class B with 6dB margin				Over 3 dB margin

谢谢！！

AP3766相关资料、样品、样板索取联系方式：

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