

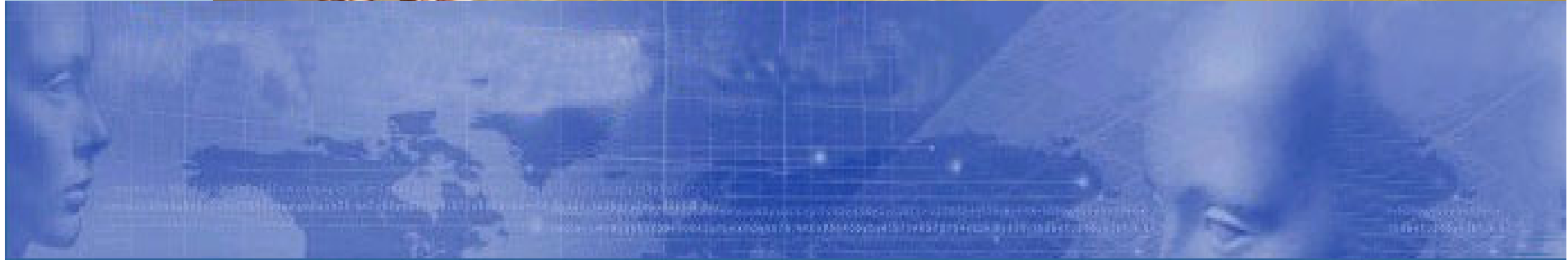


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深圳市四海恒通科技有限公司

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## **AXE**lite Power Solution for Car Plug in Charger 车载充电器解决方案



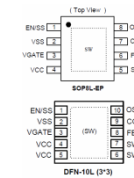
**2010 Oct**



*Car Plug In*



**10V~30Vin**  
**Plug In**



**SOP8 & DFN**  
**small pkg**

*\* System require : Vin 10~30V Vout 5V/1A & 2A  
Vinmax ability 55~58V/200ms*

- EMI ability : -6dB.*
- TMC/RF noise rejection require require.*
- OCP & OVP protect function.*
- Vout voltage +- 5% with line + load regulation.*
- Additional : 3A~4A require for Large Panel GPS.*



\* System require :  $V_{in}$  10~30V  $V_{out}$  5V/1A

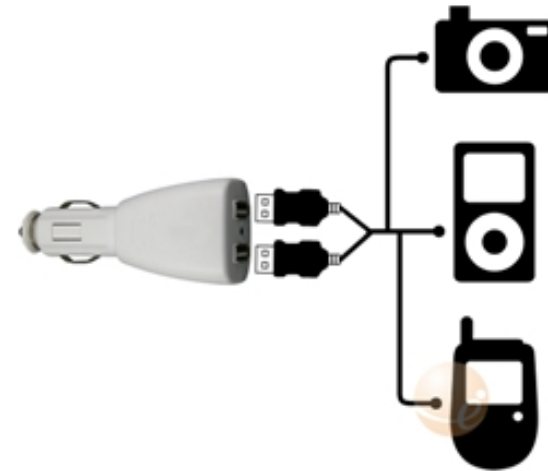
$V_{inmax}$  ability 55~58V/200ms

- EMI ability : -6dB.
- RF noise rejection require.
- OCP & OVP protect function.
- $V_{out}$  voltage +- 5% of line + load regulation.
- Supply CC/CV mode battery Charger.
- Auto detect & restart on Short Circuit released.
- Smart Phone require USB Chargerx2 ports.



\* System require :  $V_{in}$  10~30V  $V_{out}$  5V / 2A

$V_{inmax}$  ability 55~58V/200ms



- *EMI ability : -6dB.*
- *OCP & OVP protect function.*
- *Vout voltage +- 5% with line + load regulation.*
- *Additional : a. supply CC/CV mode battery Charger.*  
*b. require USB Chargerx2 ports. ( 2A+1A )*

### 5V/1A ( 5W ) Single layer PCB :

☆ **AX3007** (52Khz 40V/2A DC/DC ) + **AX358** (OVP+OCP )  
*For GPS 5V/1A ( 5W ) solution*

★ **AX3111A** (50K~380Khz 40V/2A DC/DC ) + **AX358**(OVP+OCP)  
*High Efficiency solution for GPS 5V/1A.*

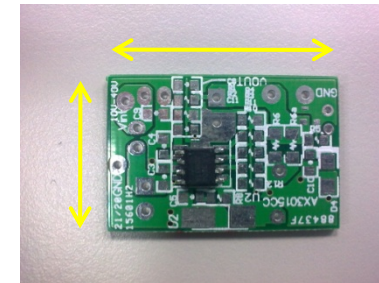
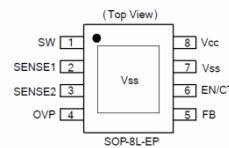
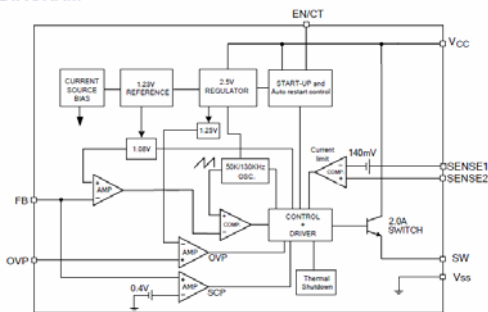
### Single-Chip Solution :

☆ **AX3010** (52Khz 40V/2A + OCP/OVP )      *SOP-8 pkg*  
*For GPS 5V/1A solution*

★ **AX3015** (120/52Khz 40V/2A + OCP/OVP +  
*Line-Com/Battery CC/CV mode )      SOP-8 pkg*  
*For GPS 5V/1A*

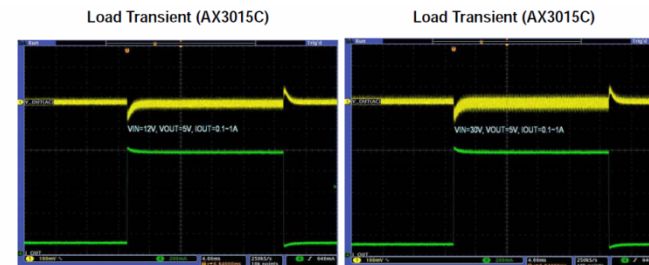
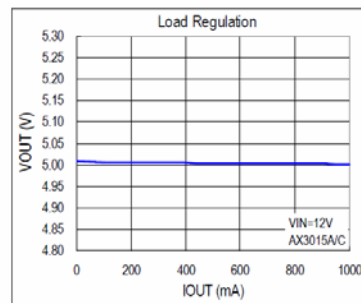
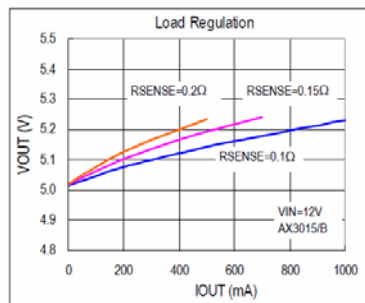
- \* **Input : 45Vin-max.**
- \* **Single Chip on PCB.**
- > *Build in 2A deiver in SOP-8 pkg.*

BLOCK DIAGRAM



**PCB 3.0x2.0 or smaller**

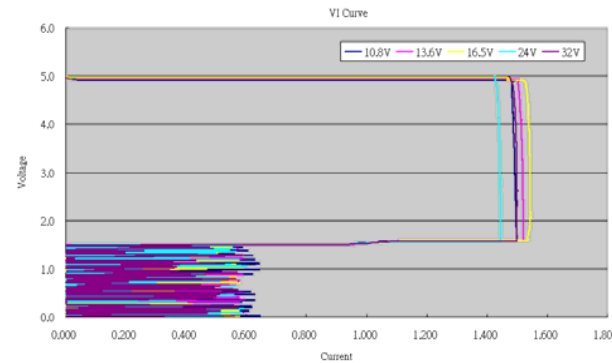
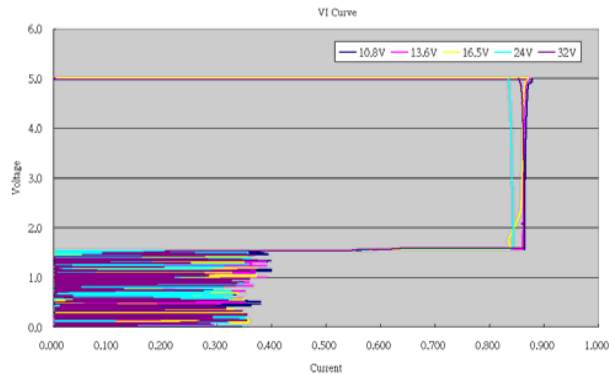
- \* **Vout Line Compensation 0mV/200mV**
- > *Vout voltage will Auto-compensate by dynamic loading.*





## \* CC/CV Mode operation

-> Constant Current & Voltage. Vout Accuracy for Mobile-phone OEM require.

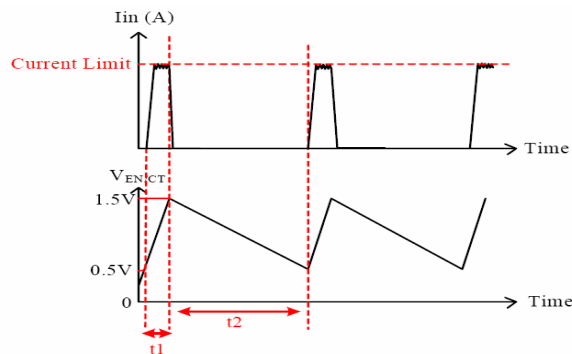


10 VI Curve

## \* SCP & Auto Re-start

-> Shutdown function on 100mA loading. 1/20 Iout current

-> Auto restart on SCP release.



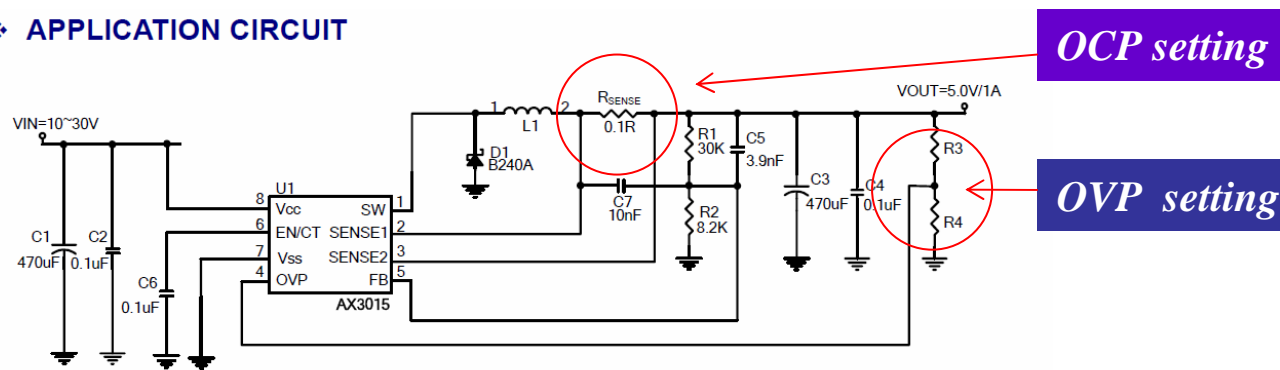
$$t1 = C6 \times \frac{1}{30u} (\text{Sec.})$$

$$t2 = C6 \times \frac{1}{1.3u} (\text{Sec.})$$

## \* OCP/OVP/OTP protection

-> Build in OTP/OCP/OVP ( OVP/OCP adj or original setting )

### ❖ APPLICATION CIRCUIT

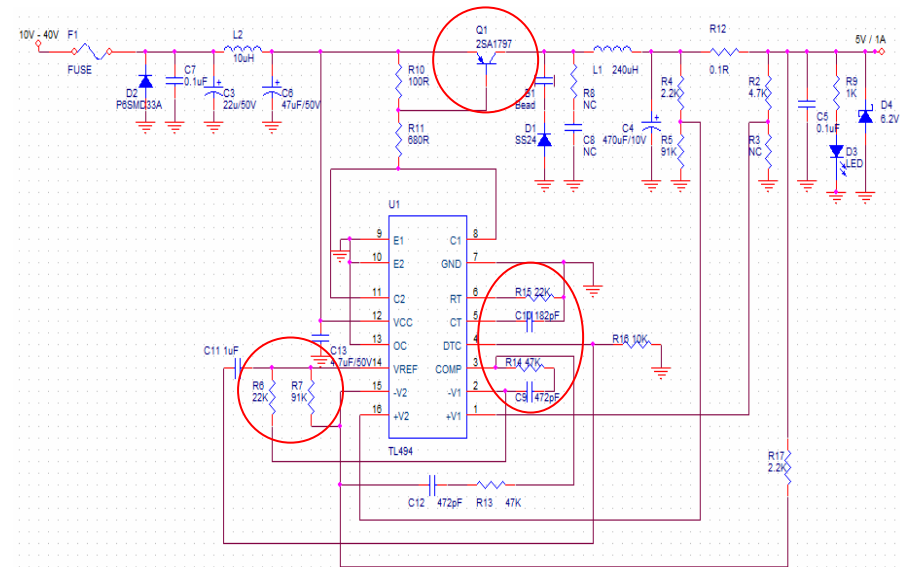
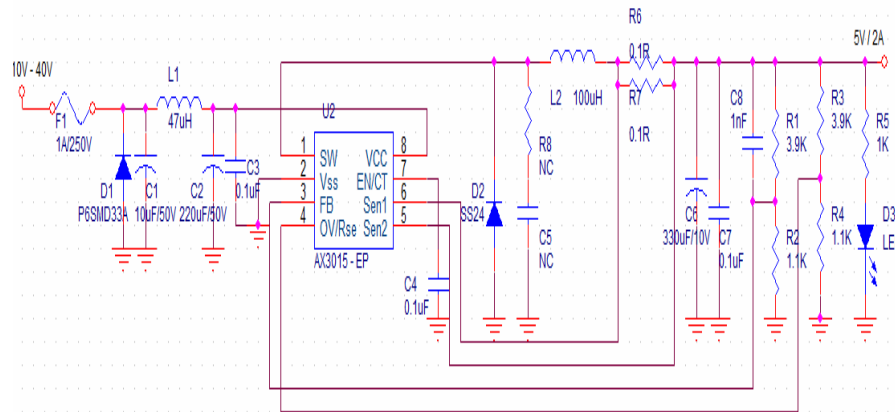


$$V_{OUT} = V_{FB} \times \left(1 + \frac{R1}{R2}\right), V_{FB} = 1.08V, R2 = 5K \sim 15K$$

$$V_{OUT} (OVP) = V_{OVP} \times \left(1 + \frac{R3}{R4}\right), V_{FB} = 1.25V, R4 = 5K \sim 15K$$

## OTP spec :

Thermal shutdown Temp	TSD	-	160	-	°C
Thermal Shutdown Hysteresis	TSH	-	45	-	°C



## AX3015 for 5V/1A ( New )

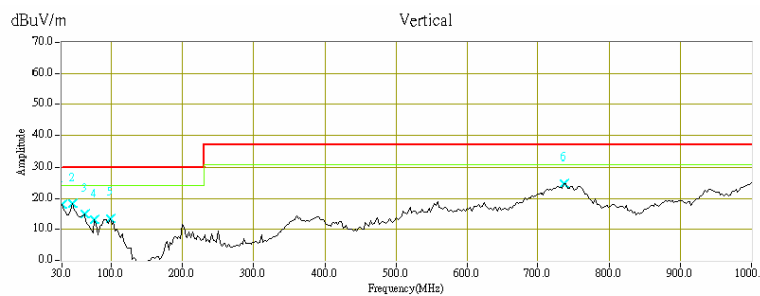
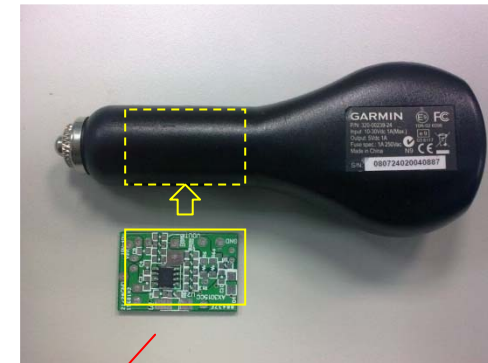
- \* Build in 2A Driver
- \* Build in OCP /OVP + Auto Line Com
- \* Supply CC / CV Li + charger mode
- \* Total component : 20ea
- \* Low cost in BOM production

## TL494 for 5V/1A ( Old )

- \* Need Outside Transistor
- \* Outside component for CC / CV mode.
- \* Total component : 30ea
- \* Without Line compensation of Vout.
- \* Higher cost in BOM production

## AX3015 Design on Single Layer PCB

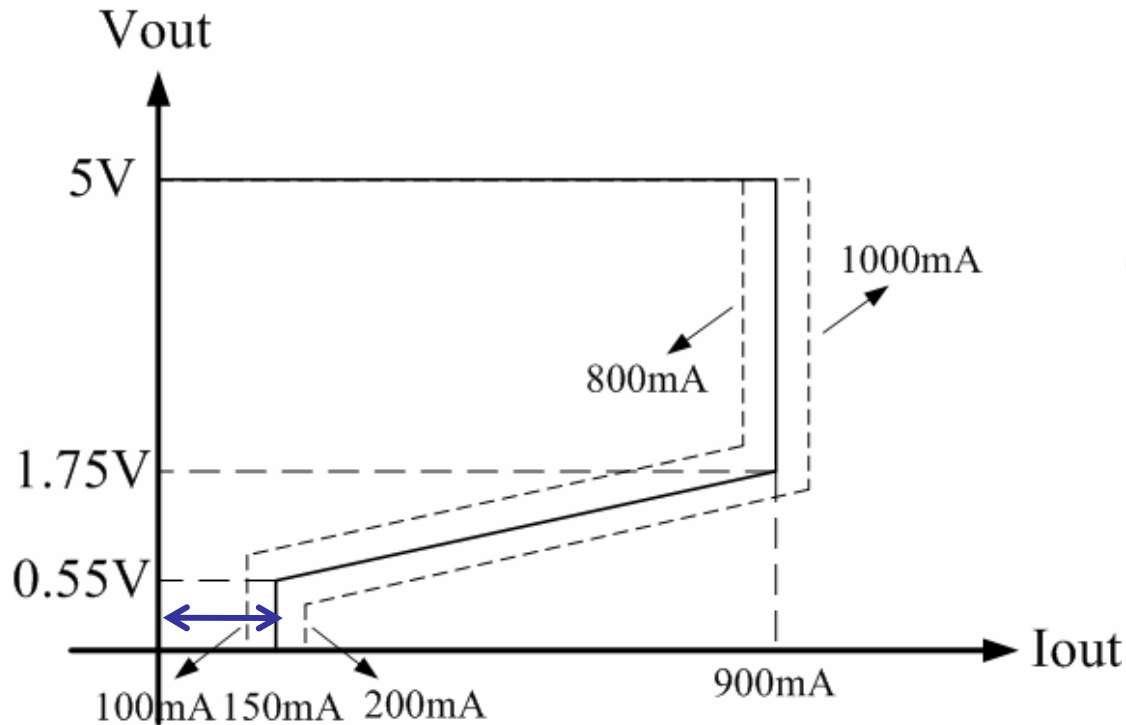
- \* Supply Small PCB Design. Below 3.0x2.0cm
- \* Supply CC / CV Li + charger mode
- \* Total component : 20ea
- \* Low cost in BOM production
- \* Good EMI & TMC performance tested.



No.	Frequency (MHz)	Reading (dBuV/m)	Correctio Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°C)	Height (cm)	Remark
1	30.00	26.38	-8.35	18.03	30.00	-11.97	183.80	150.00	Peak
2	44.55	24.68	-6.37	18.31	30.00	-11.69	142.60	150.00	Peak
3	61.52	20.54	-5.61	14.93	30.00	-15.07	135.00	150.00	Peak
4	76.07	24.95	-11.78	13.17	30.00	-16.83	178.50	150.00	Peak
5	97.90	21.70	-8.10	13.60	30.00	-16.40	57.60	150.00	Peak
6	735.67	20.49	4.25	24.74	37.00	-12.26	163.10	150.00	Peak



**\* Good performance on EMI tested**



**Suitable Solution : Single Chip SOP-8 pkg**

**AX3015. ( 120Khz/52Khz . 40V/2A )**

**AX3017. ( 120Khz/52Khz . 40V/2A )**

**AX3112. ( 50~380Khz . 40V/3A )**

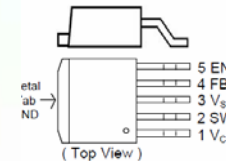
- **Input : a. 10V~36Vin ( 45Vin-max )**  
**b. 24V~48Vin ( 60Vin-max )**

\* **Single Chip on PCB.**

-> AX3161 60V/2A Build in 2A driver in TO263-5 pkg.



3-5L ( Side View )



Operating voltage can be up to 60V.

Output load current: 2A.

TO263-5L Pb-Free package.

## Bipolar

24V

AX3022

40V

AX3007/A/B/C

AX3010/11

AX3015

AX3016 NEW

60V

AX3161 NEW

## HV CMOS

40V

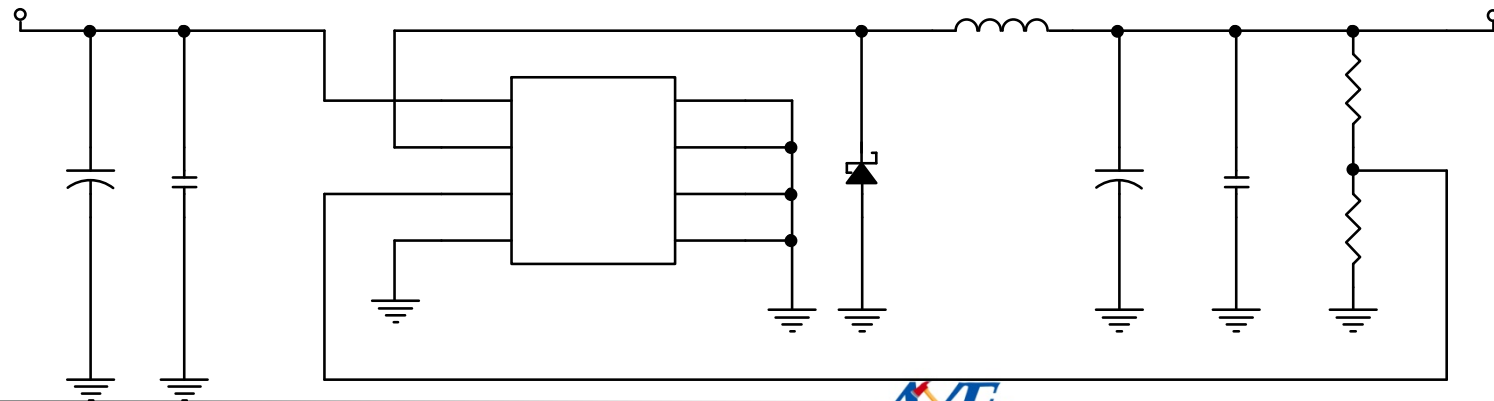
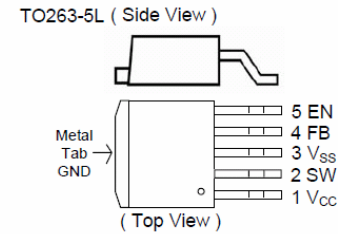
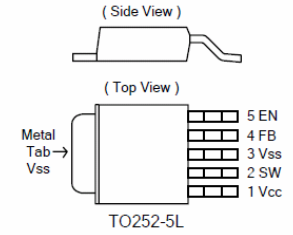
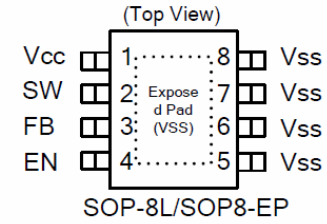
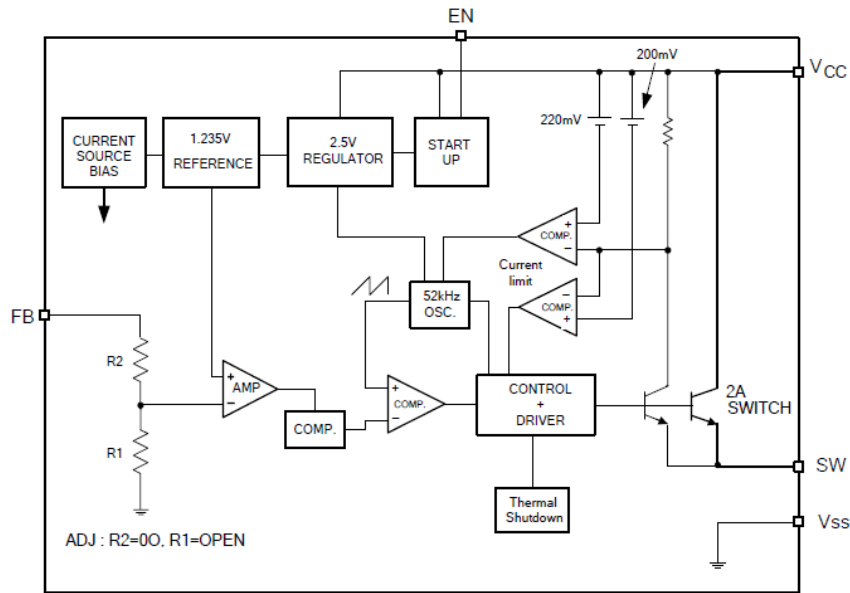
AX3111/A

AX3112 NEW

Part number	Package Type	Features	Output Current	Output Voltage	Frequency
AX3007	SOP8/EP	b,c,e,f	2A	12,5,3.3,Adj(1.23)	150Khz
AX3007A	SOP8/EP	b,c,e,f	2A	12,5,3.3,Adj(1.23)	85Khz
AX3007B	SOP8/EP	b,c,e,f	2A	12,5,3.3,Adj(1.23)	52Khz
AX3007c	SOP8/EP	b,c,e,f	2A	Adj(1.23)	52Khz
AX3010	SOP8 EP	b,c,d,f,k,o	2.0A	Adj(1.155)	50Khz
AX3011	SOP8 EP	b,d,f,k,o	2.0A	Adj(1.155)	50Khz
AX3015/A/B/C	SOP8 EP	b,c,d,f,i,o	2.0A	Adj(1.08)	130/50Khz
AX3016/A/B/C	SOP8 EP	b,c,d,e,f,i,o	2.0A	Adj(1.08)	130/50Khz
AX3022	SOT89-5L	b,c,e,f	1.5A	Adj(0.75)	200Khz
AX3111/A	SOP8-EP	b,c,e,f,i,k,m,p	3A/2A	Adj(0.815)	50~350Khz
AX3112	SOP8-EP	b,c,d,f,i,o	3A/2A	Adj(1.08)	130/50Khz

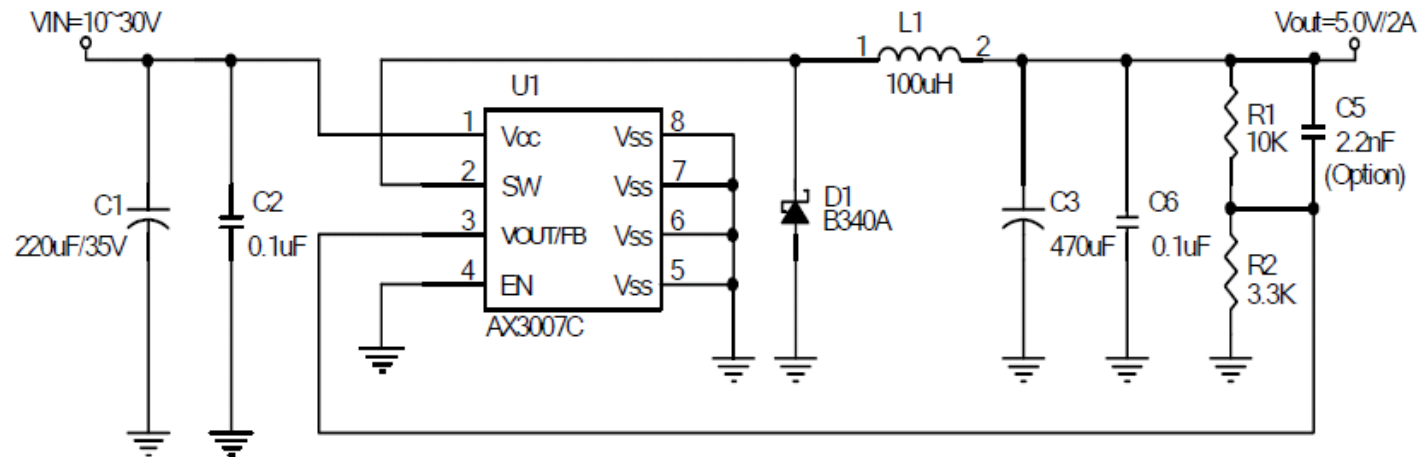
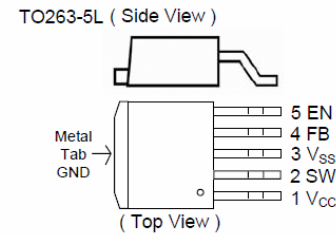
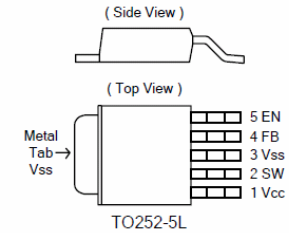
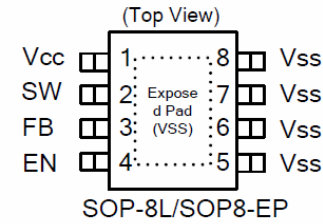
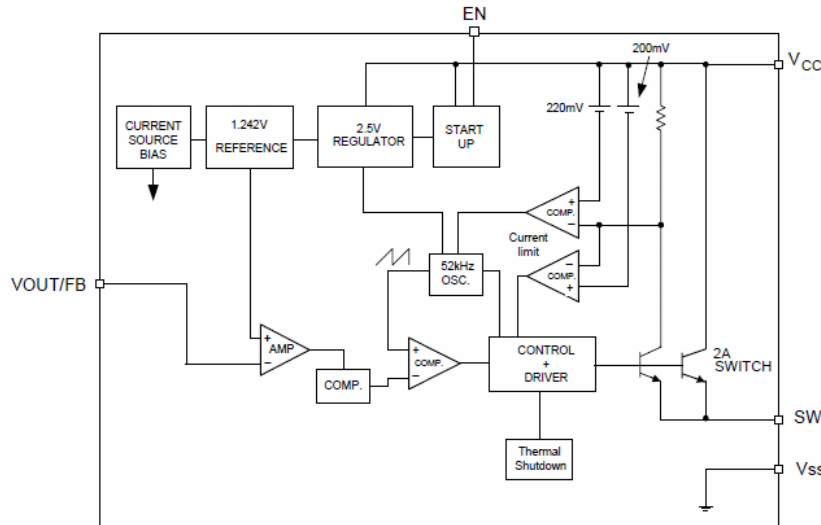
a:Synchronous b:Internal switch c:Enable Pin d:Current limit setting e:Internal current limit f: Thermal Shutdown g:Power saving mode h:Voltage Reference i:UVLO j:Boost Pin k:External Compensation l:Dual channel m:External soft start n:with LDO o:External OVP setting p:adjustable frequency

# AX3007B ( 40V/ 2A/ 52Khz )



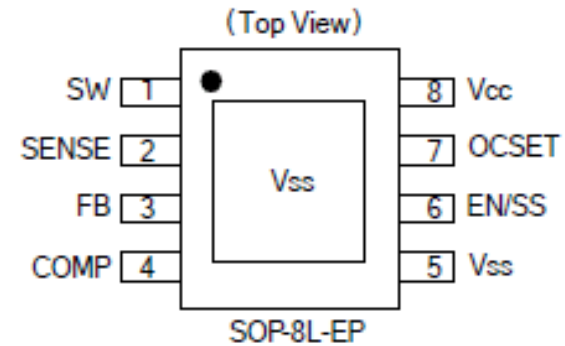
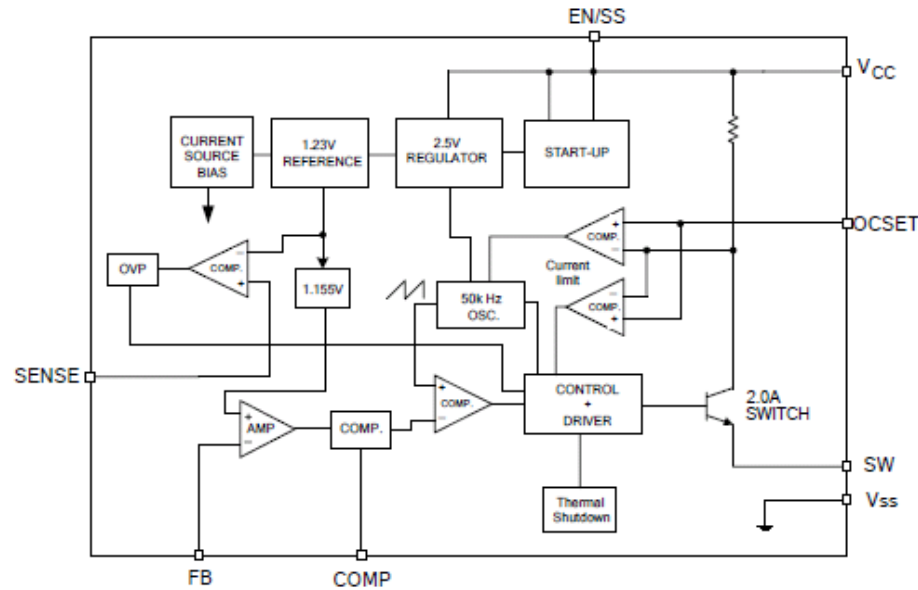


# AX3007C (40V/2A/52Khz)

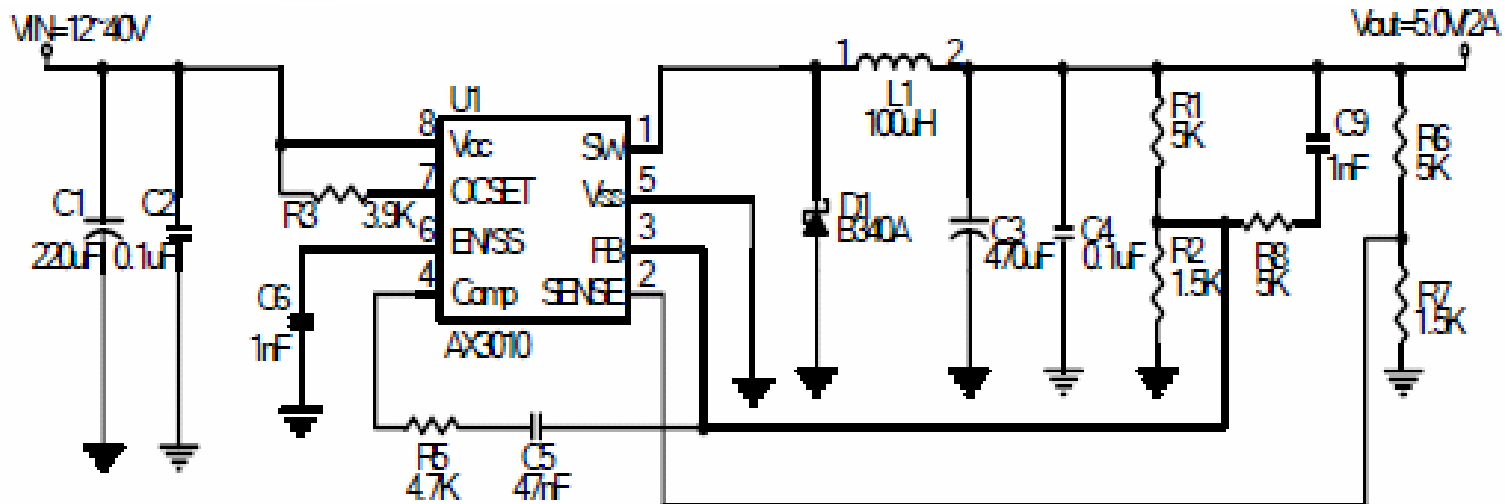


$$V_{out} = V_{FB} \times \left(1 + \frac{R1}{R2}\right), V_{FB} = 1.242V, R2 = 1K \sim 3.9K$$

# AX3010 40V/2A (OVP/OCSET/EN/SS)



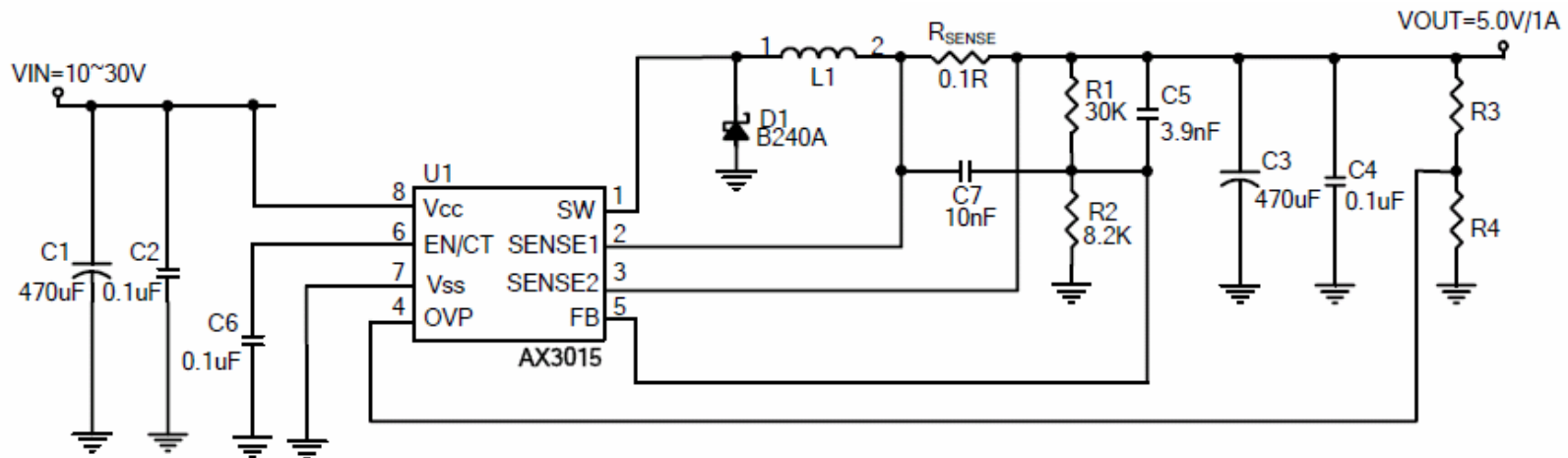
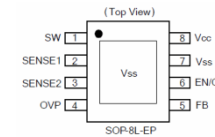
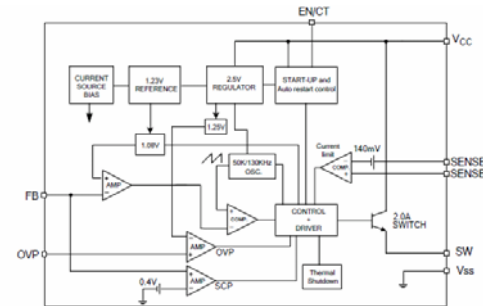
$$V_{out} = V_{FB} \times \left(1 + \frac{R1}{R2}\right), \quad V_{FB} = 1.155V, \quad R2 = 0.7K \sim 1.8K$$





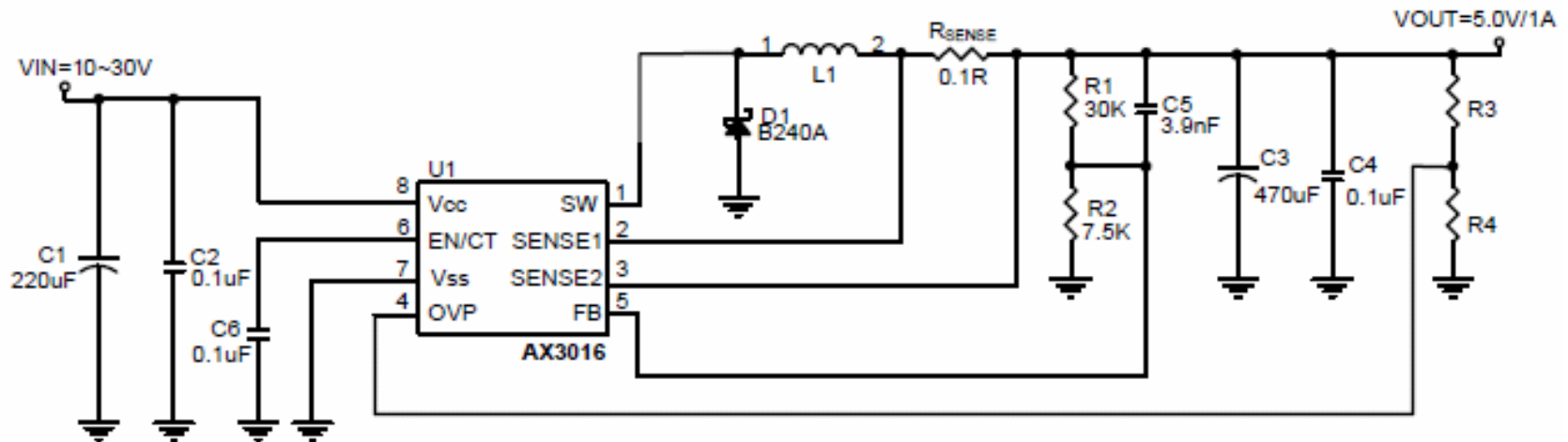
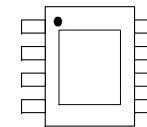
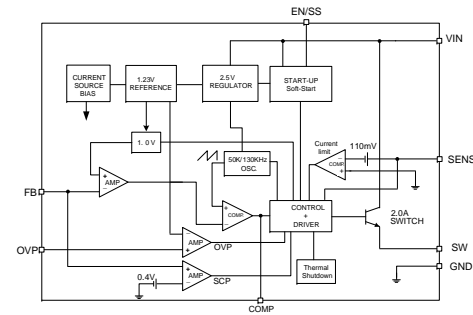
## FEATURES

- Operating voltage can be up to 40V.
- Adjustable version output voltage range form 1.2V to 30V.
- Output load current: 2A.
- External OVP setting function.
- Operating Frequency:  
AX3015/A: 130KHz  
AX3015B/C: 50KHz
- Voltage mode non-synchronous PWM converter
- Thermal-shutdown and current-limit protection.
- Shutdown function and auto restart control.



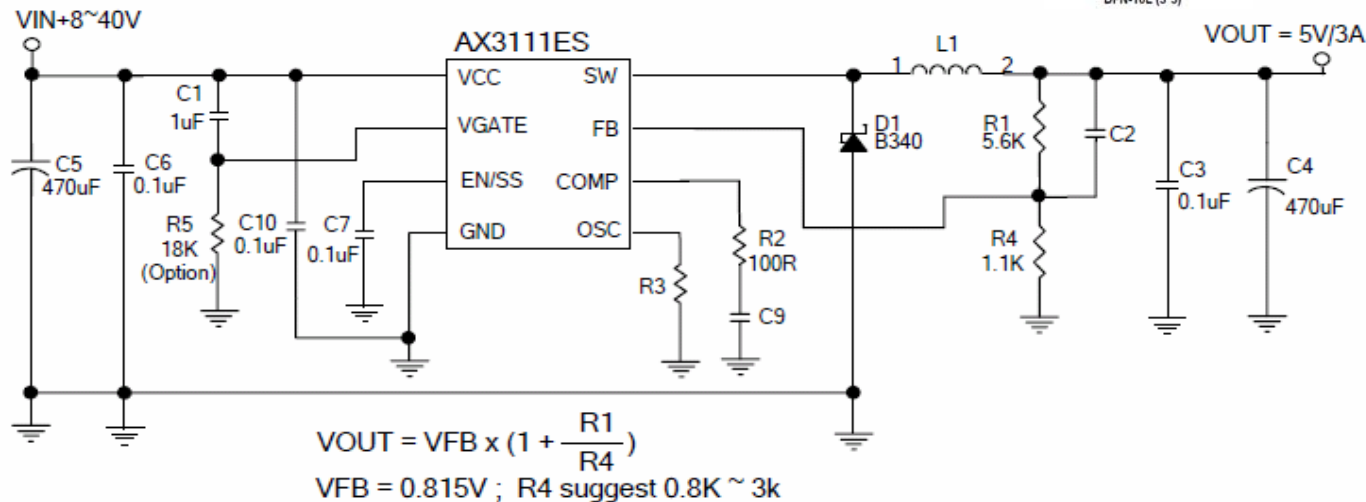
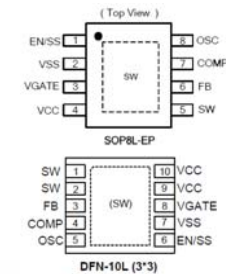
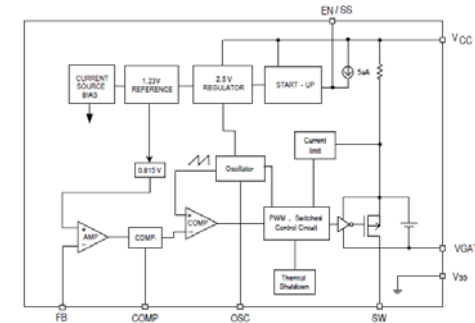
## FEATURES

- Operating voltage can be up to 40V.
- Adjustable version output voltage range form 3.3V to 30V.
- Output load current: 2A.
- External OVP setting function.
- Operating Frequency: 50K/130KHz
- Current mode non-synchronous PWM converter
- Thermal-shutdown and current-limit protection.
- Shutdown function and soft-start function.
- Short Circuit Protect (SCP).



## FEATURES

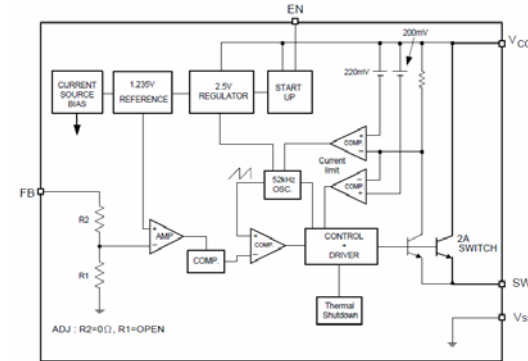
- Input voltage : 8V to 40V
- Output voltage : 3.3V to 38V
- Duty ratio : 0% to 100% PWM control
- Oscillation frequency range is 50K~350KHz by outside resistance setting
- Enable with Soft-Start function
- Current Limit, Short Circuit Protect (SCP) and Thermal Shutdown protection
- Built-in internal SW P-channel MOS.
- SOP-8L-EP and TDFN-10L Pb-Free packages.



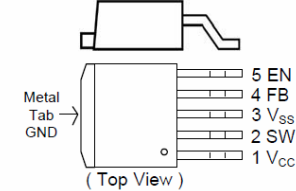


## FEATURES

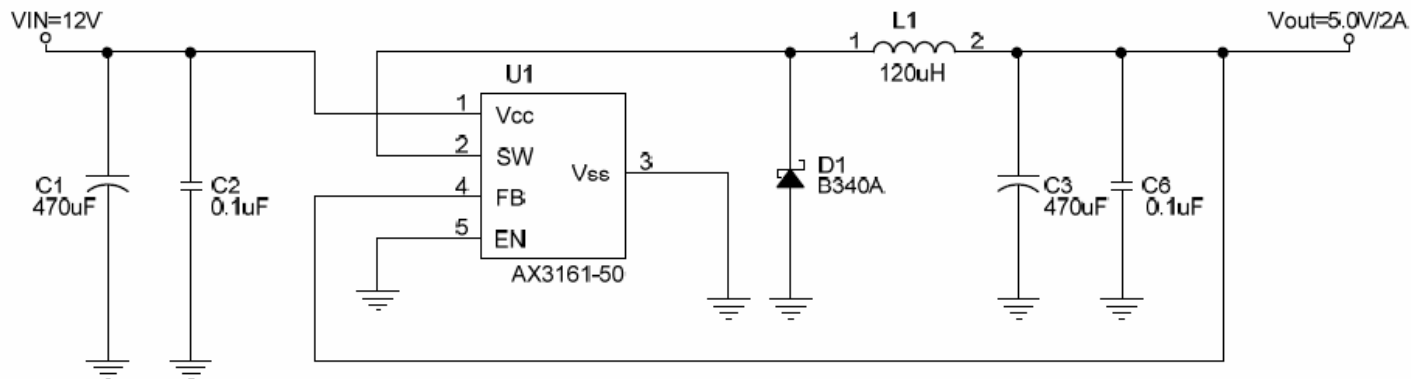
- Output voltage: 5V and adjustable output version.
- Adjustable version output voltage range, 1.23V to 57V.
- 52KHz fixed switching frequency.
- Voltage mode non-synchronous PWM control.
- Thermal-shutdown and current-limit protection.
- ON/OFF shutdown control input.
- Short Circuit Protect (SCP).
- Operating voltage can be up to 60V.
- Output load current: 2A.
- TO263-5L Pb-Free package.



TO263-5L ( Side View )



## (1) Fixed Output Voltage Versions







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深圳市四海恒通科技有限公司

地址：深圳市福田区福虹路鼎盛时代A座9楼9B

电话：0755-8398 3377 135 9011 2223

E-mail: [sales@gofotech.com](mailto:sales@gofotech.com)

网站: [www.gofotech.com](http://www.gofotech.com)