Descriptions:

AMS1309 Series is a PFM Step-up DC/DC converter IC with low supply current by CMOS process. High frequency noise that occurs during switching is reduced by using advanced circuit designed, output voltage is programmable in 0.1V steps between 2.0~7.0V and maximum frequency is 180 KHz(Typ.). A low ripple, high efficiency step-up DC/DC converter can be constructed of AMS1309 with only three external components. Also available is a CE(chip enable) function that reduce power dissipation During shut-down mode. AMS1309 is suitable for use with battery-powered instruments with low noise and low supply current.

Featuers:

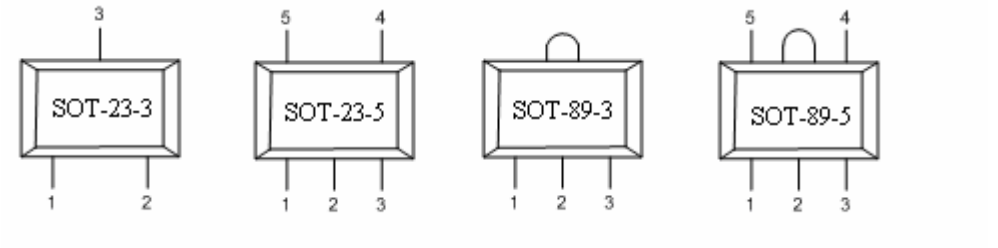
Low ripple and low noise
Operating voltage range: 0.9V~6.5V
Output voltage range: 2.0V~7.0V(step 0.1V)
Output voltage accuracy: ±2.5%
Output Current: if Vin=3.0V and Vout=5.0V,then Iout=400mA
Low start voltage: 0.9V(at Iout=1mA)
Maximum oscillator frequency: 180KHz(Typ.)
High Efficiency: 85%(Typ.)
Packge:SOT23: SOT89

Applications:

Power source for battery-powered equipment
Power source for wireless mouse, wireless keyboard, toys
Power source for Cameras,camcorders, VCRs, PDAs
Power source for hand-held communication equipment

Part No.	Suffix	Package	Transistor	CE	Vdd	FB	Feature
AMS1309Axx	M3	SOT-23-3L	Inside	No	No	No	Standard
	P	SOT-89-3L					
AMS1309Bxx	M3	SOT-23-3L	Outside	No	No	No	External
	P	SOT-89-3L					
AMS1309Cxx	M5	SOT-23-5L	Inside	Yes	No	No	Standard Enable
	P	SOT-89-5L					
AMS1309Dxx	M5	SOT-23-5L	Outside	Yes	No	No	External Enable
	P	SOT-89-5L					
AMS1309F	M5	SOT-23-5L	Outside	No	Yes	Yes	External Adjustable

Package Reference



Pin Functions

AMS1309Axx

Pin #		Symbol	Description
SOT-23-3	**SOT-89-3**		
1	1	Vss	Ground
3	2	Vout	Power Output
2	3	Lx	Switch

AMS1309Bxx

Pin #		Symbol	Description
SOT-23-3	**SOT-89-3**		
1	1	Vss	Ground
3	2	Vout	Power Output
2	3	Ext	External

AMS1309Cxx

Pin #		Symbol	Description
SOT-23-5	**SOT-89-5**		
4	5	Vss	Ground
2	2	Vout	Power Output
5	4	Lx	Switch
1	3	CE	On/Off Control Input.
3	1	NC	null

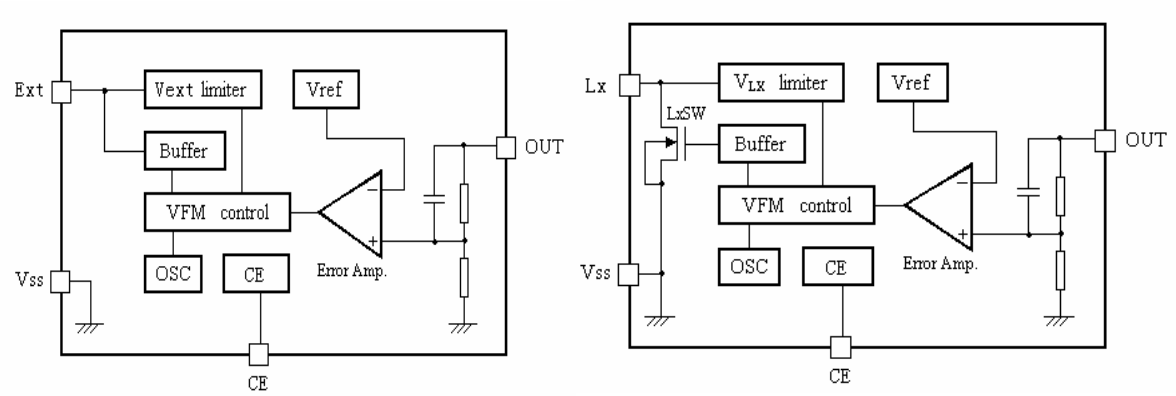
AMS1309Dxx

Pin #		Symbol	Description
SOT-23-5	**SOT-89-5**		
4	5	Vss	Ground
2	2	Vout	Power Output
5	4	Ext	External
1	3	CE	On/Off Control Input.
3	1	NC	null

AMS1309Fxx

Pin #	Symbol	Description
SOT-23-5		
1	FB	Feedback
2	Vdd	Power Input
3	NC	null
4	Vss	Ground
5	EXT	External

Functional Block Diagram



Absolute Maximum Ratings

Parameter		Symbol	Margin	Units
Input Voltage		V_{IN}	6.5	V
Switch Voltage		V_{LX}	6.5	V
EXT Pin Voltage		V_{EXT}	-0.3~Vout+0.3	V
CE Pin Voltage		V_{CE}	-0.3~Vout+0.3	V
Lx Pin Current		I_{LX}	600	mA
EXT Pin Current		I_{EXT}	±30	mA
Power Dissipation	SOT23	Pd	300	mW
	SOT89	Pd	500	mW
Operating Temperature		T_{Opr}	-25~+85	℃
Storage Temperature		T_{stg}	-40~+125	℃
Soldering Temperature and Time		T_{solder}	260℃, 10s	

Electrical Characteristics

（Test Condition: V_{IN}=Vout*0.6，V_{SS}=0V，I_{OUT}=10mA，T_{opt}=25℃。unless otherwise noted.）
Fosc=180kHz

Symbol	Parameters	Condition	MIN	TYP	MAX	Units
V_{OUT}	Output Voltage		Vout*0.975	vout	Vout*1.025	V
V_{start}	Startup Voltage	I_{OUT}=1mA， V_{IN}：0→2V		0.8	0.9	V
V_{hold}	Hold Voltage	I_{OUT}=1mA， V_{IN}：2→0V		0.45		V
I_{DD1}	Input Current 1	No External Component Vout=Vout*0.95		50		μA
I_{DD2}	Input Current 2	Vout=Vout+0.5V		9		μA
I_{LX}	Switch On Current	V_{LX}=0.4V, Vout=Vout*0.95		360		mA
I_{LXleak}	Switch Leak Current	Vout=V_{LX}=6V			0.5	μA
F_{osc}	Oscillator Frequency	Vout=set Vout*0.95		180		kHz
Maxdty	Maximum Duty Cycle	on(V_{LX}"L")side		84		%
η	Efficiency			85		%

AMS1309Bxx/Dxx Fosc=180kHz

Symbol	Parameters	Condition	MIN	TYP	MAX	Units
V_{OUT}	Output Voltage		Vout*0.975	vout	Vout*1.025	V
V_{start}	Startup Voltage	I_{OUT}=1mA， V_{IN}：0→2V		0.8	0.9	V
V_{hold}	Hold Voltage	I_{OUT}=1mA， V_{IN}：2→0V		0.45		V
I_{DD1}	Input Current 1	No External Component Vout=Vout*0.95		80		μA
I_{DD2}	Input Current 2	Vout=Vout+0.5V		12		μA
I_{LX}	Switch On Current	V_{LX}=0.4V, Vout=Vout*0.95		360		mA
I_{LXleak}	Switch Leak Current	Vout=V_{LX}=6V			0.5	μA
F_{osc}	Oscillator Frequency	Vout=set Vout*0.95		180		kHz
Maxdty	Maximum Duty Cycle	on(V_{LX}"L")side		84		%
η	Efficiency			85		%

AMS1309F33 V_{FB}=3.3V , Fosc=180kHz

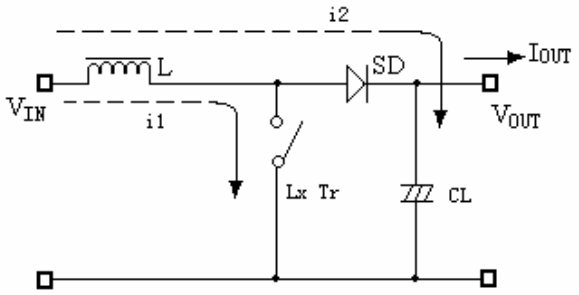
Symbol	Parameters	Condition	MIN	TYP	MAX	Units
Vfb	Feedback Voltage		3.22	3.30	3.38	V
V_{start}	Startup Voltage	I_{OUT}=1mA， V_{IN}：0→2V		0.8	0.9	V
V_{hold}	Hold Voltage	I_{OUT}=1mA， V_{IN}：2→0V		0.45		V
I_{DD1}	Input Current 1	No External Component Vout=Vout*0.95		80		μA
I_{DD2}	Input Current 2	Vout=Vout+0.5V		10		μA
I_{LX}	Switch On Current	V_{LX}=0.4V, Vout=Vout*0.95		360		mA
I_{LXleak}	Switch Leak Current	Vout=V_{LX}=6V			0.5	μA
F_{osc}	Oscillation Frequency	Vout=set Vout*0.95		180		kHz
Maxdty	Maximum Duty Cycle	on(V_{LX}"L")side		84		%
η	Efficiency			85		%

1、Diode: Schottky （VF: 0.2V） , For example: IN5817,IN5819

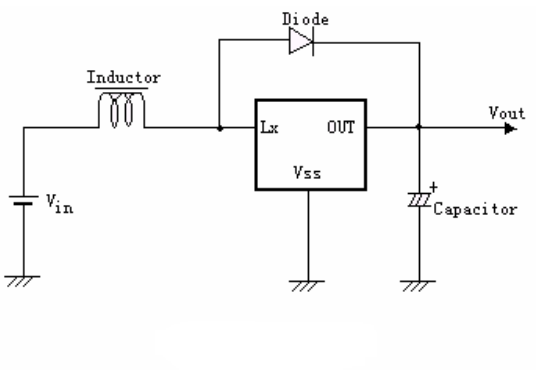
2、Inductor: 33μH（r<0.1Ω）

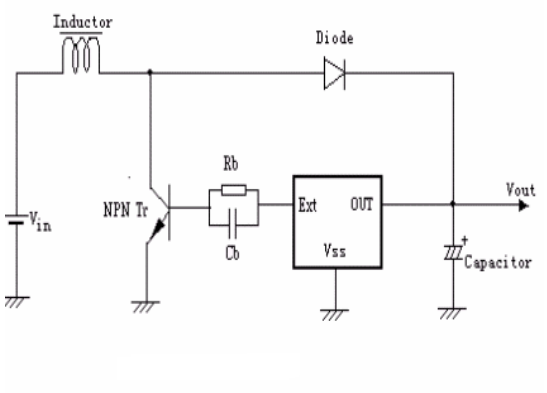
3、Capacitor: 100uF

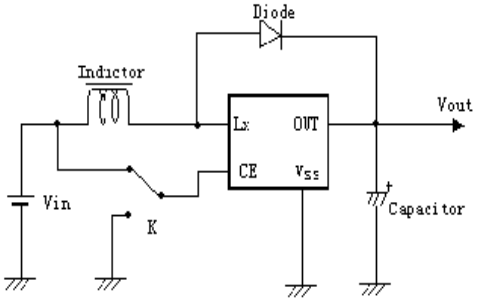
Step-Up Converter

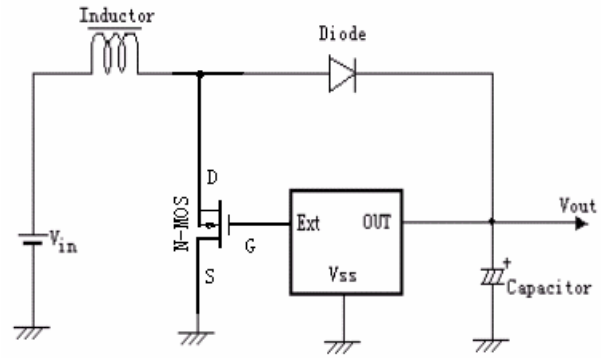


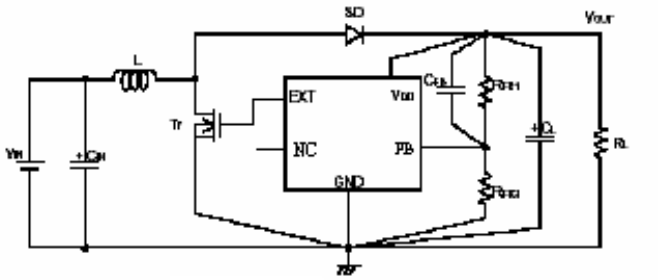
TYPICAL APPLICATION











Inductor： 3 3 u H

Diode： IN5817、IN5819

Capacitor : 100uF/16V(Tantalum Capacitor)

Transistor： 2SD1628G、2SD3279

NMOS：AAT9460、XP151、XP161

Base Resistor : 1KΩ

Base Capacitor： 2200pF

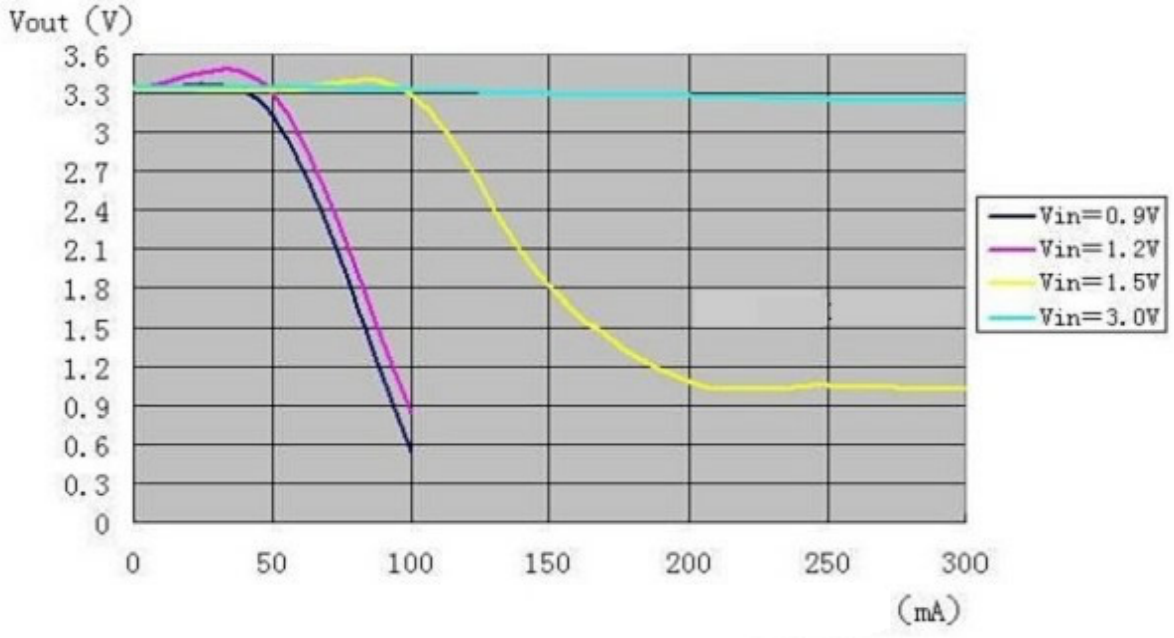
R_{FB} ： RFB1/RFB2=Vout/VFB-1 (Vout= Output Voltage) ， $R_{FB1}+R_{FB2}\leq 2M\Omega$

C_{FB} ： Adjust L,$C_{L.}$， Fzfb=1/(2×π×C_{FB}×R_{FB1})

Typical Performance Characteristics

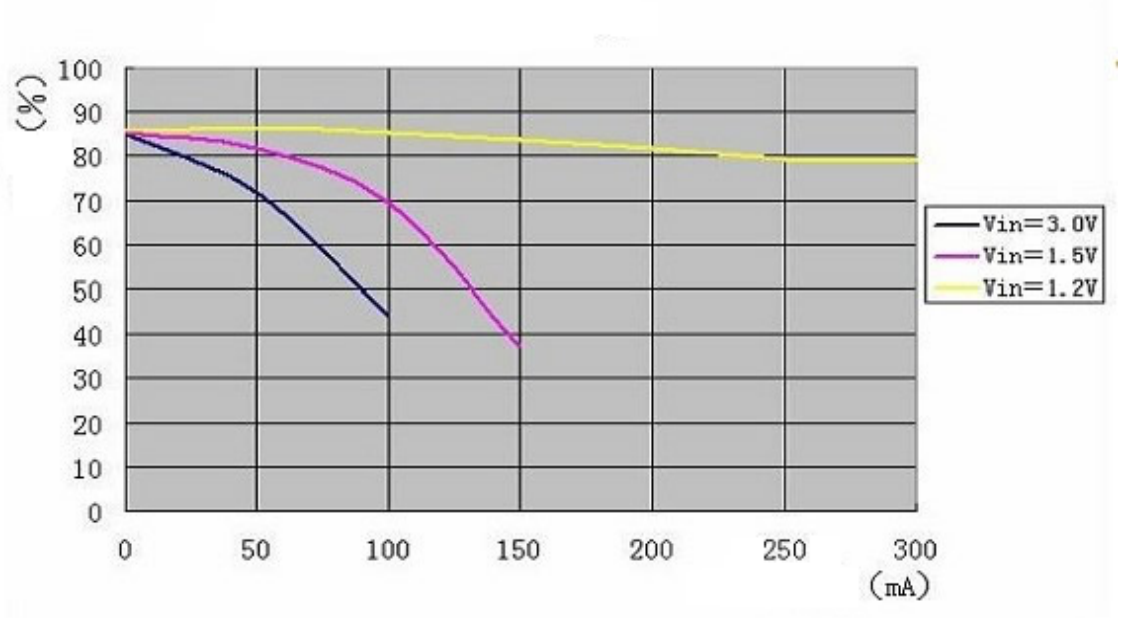
（1） Output Voltage VS Output Current

Topr＝25℃



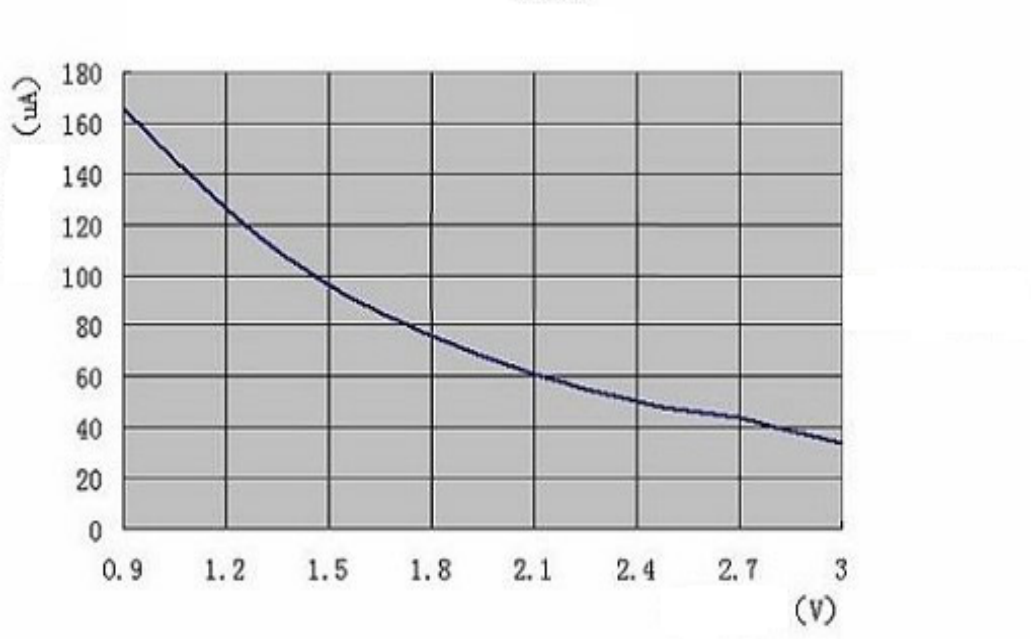
（2） Efficiency VS Output Current

Topr＝25℃



（3）Quiescent Current VS Input Current

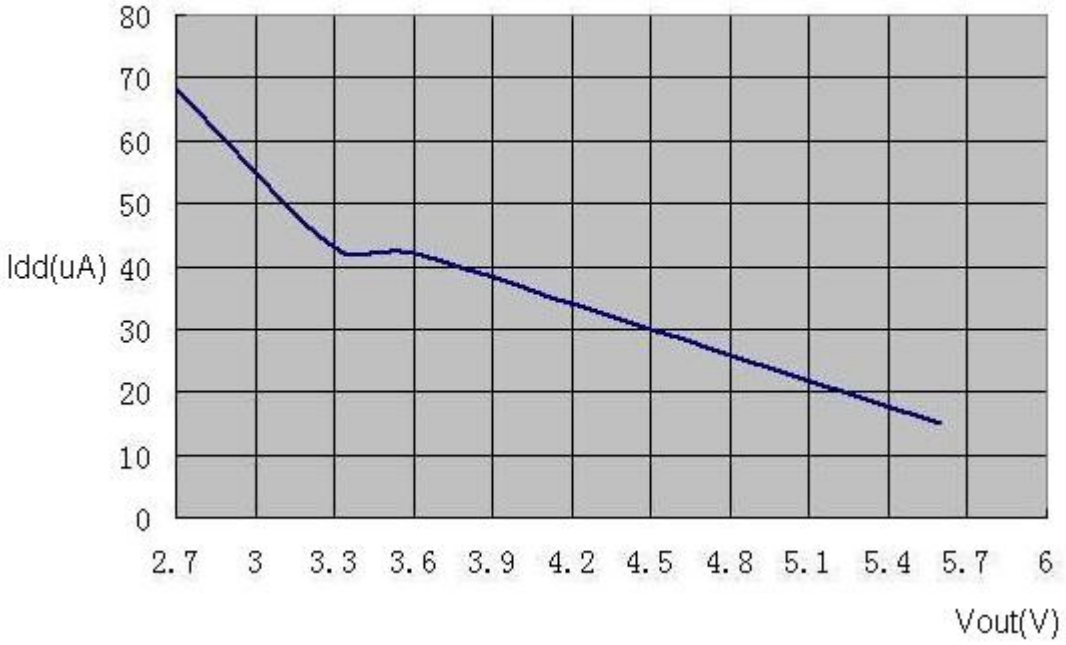
Topr＝25℃



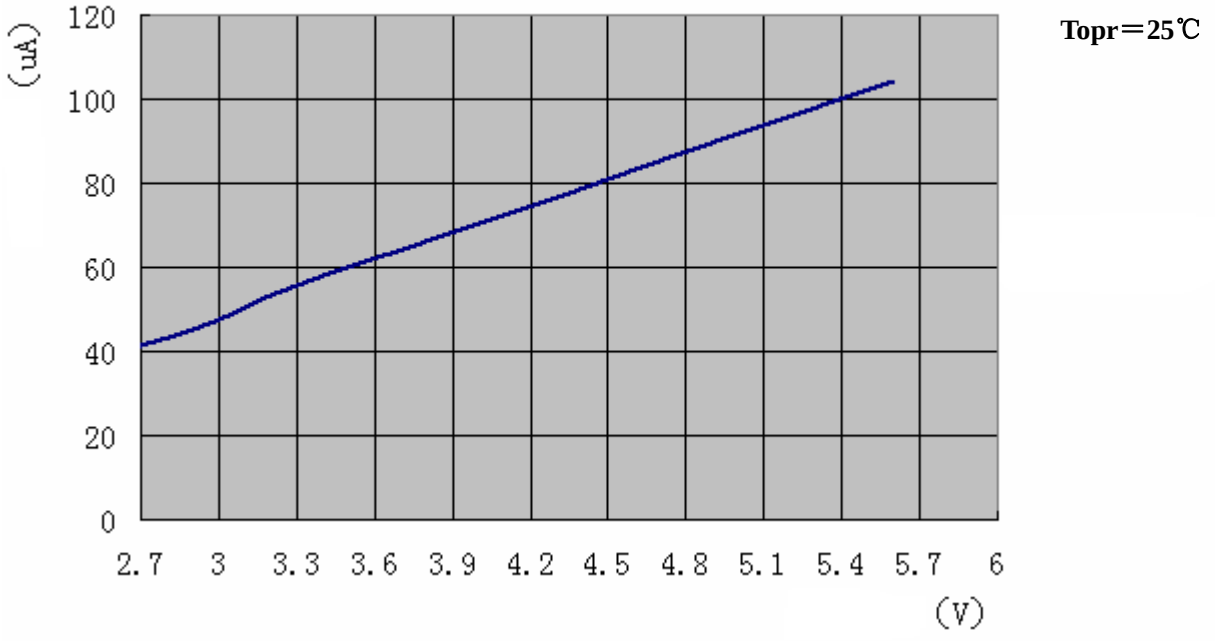
（4）Input Current(No Load) VS Output Voltage

（L＝47uH，Cout＝47uF，Vout=100uF，SD：1N5717/5819）

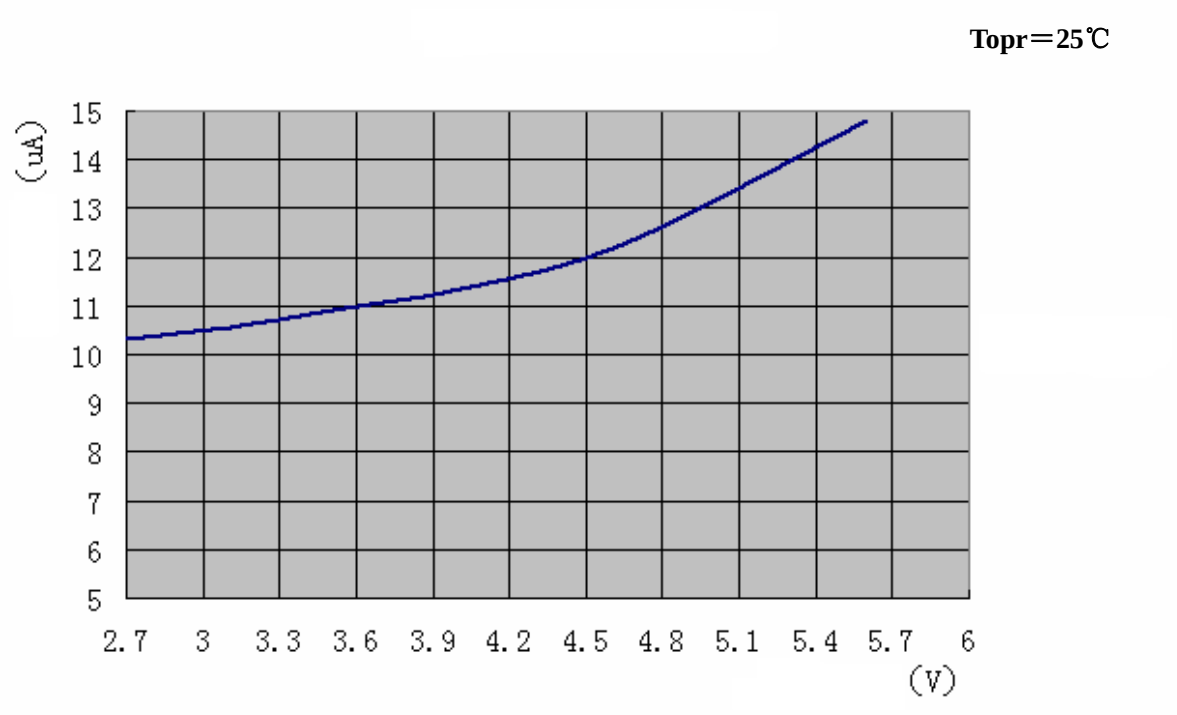
Topr＝25℃



（5）Input Current 1 VS Output Voltage （$V_{DD}=V_{OUT}*0.95$）

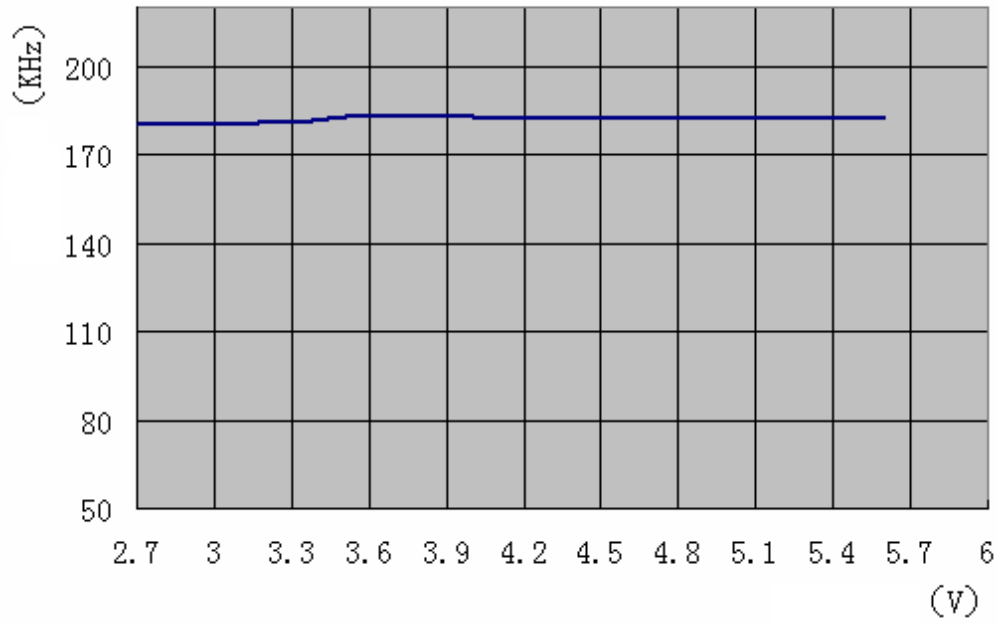


（6）Input Current 2 VS Output Voltage （$V_{DD}=V_{OUT}+0.5$）



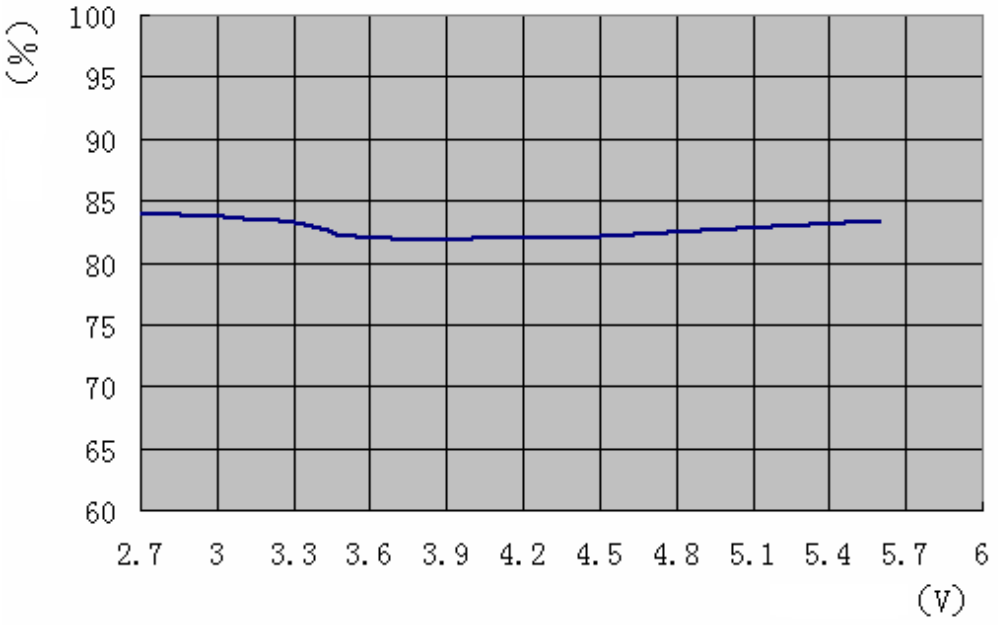
（7）Maximum Oscillation Frequency VS Output Voltage （V_{DD}=V_{OUT}*95%）

Topr=25℃

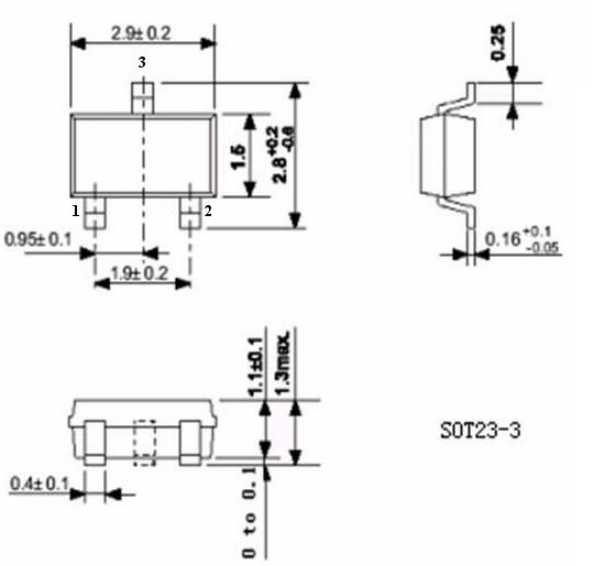


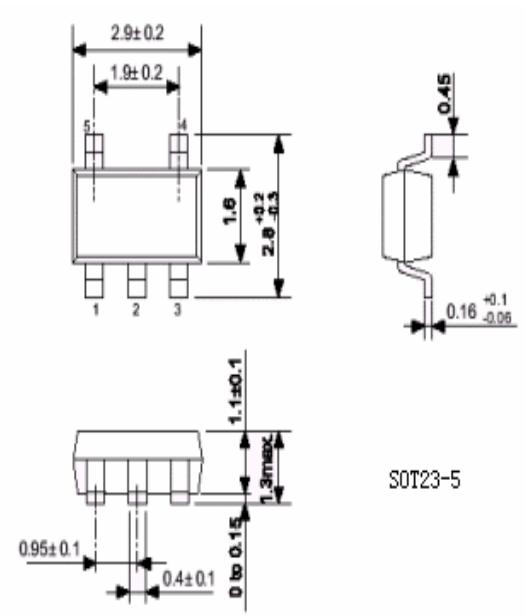
（8）Duty Circle VS Output Voltage （V_{DD}=V_{OUT}*95%）

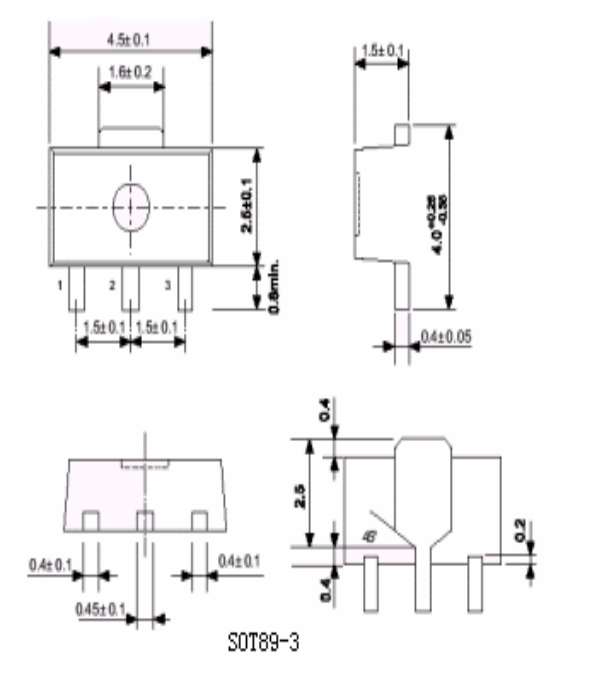
Topr=25℃

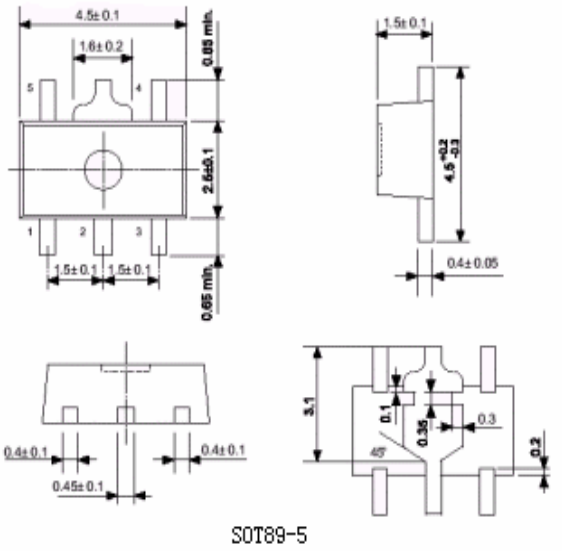


Package


2.9± 0.2
3
1.6
2.8 +0.2 -0.6
1
2
0.95± 0.1
1.9± 0.2
0.25
0.16 +0.1 -0.05
1.1±0.1
1.3max.
0.4± 0.1
0 to 0.1
SOT23-3


2.9± 0.2
1.9± 0.2
5
4
1.6
2.8 +0.2 -0.3
1
2
3
0.45
0.16 +0.1 -0.06
1.1±0.1
1.3max.
0.95± 0.1
0.4± 0.1
0 to 0.15
SOT23-5


4.5± 0.1
1.6± 0.2
2.6±0.1
0.8min.
1
2
3
1.5± 0.1
1.5± 0.1
1.5± 0.1
4.0 +0.25 -0.35
0.4± 0.05
0.4
2.5
45°
0.2
0.4± 0.1
0.4± 0.1
0.45± 0.1
SOT89-3


4.5± 0.1
1.6± 0.2
0.65 min.
5
4
2.6±0.1
1
2
3
1.5± 0.1
1.5± 0.1
0.65 min.
1.5± 0.1
4.5 +0.2 -0.3
0.4± 0.05
0.4± 0.1
0.4± 0.1
0.45± 0.1
3.1
0.1
0.35
0.3
45°
0.3
SOT89-5