PWM/PFM Automatic Switching Controlled Synchronous DC-DC Converters

■ General Description

LN2406 series is a group of high efficiency synchronous-rectification type buck regulator using a constant frequency, current mode architecture. The device is available in an adjustable version and fixed output voltages of 1.8V and 3.3V. Automatic PWM/PFM mode operation increases efficiency and decreases output voltage ripple at light loads, further extending battery life. Switching frequency is internally set at 1.4MHz, allowing the use of small surface mount inductors and capacitors. 100% duty cycle provides low dropout operation.

■ Features

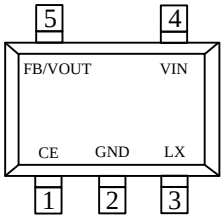
- High Efficiency: 92%
- Input Voltage Range: 2.0 ~ 6.0V
- Output Current: 800mA
- Shutdown Current: <1uA
- Oscillation Frequency: 1.4MHz

■ Applications

- Cellular and Smart Phones
- PDAs
- MP3/MP4 Player
- Digital Still and Video Cameras
- Microprocessors and DSP Core Supplies
- Portable Instruments

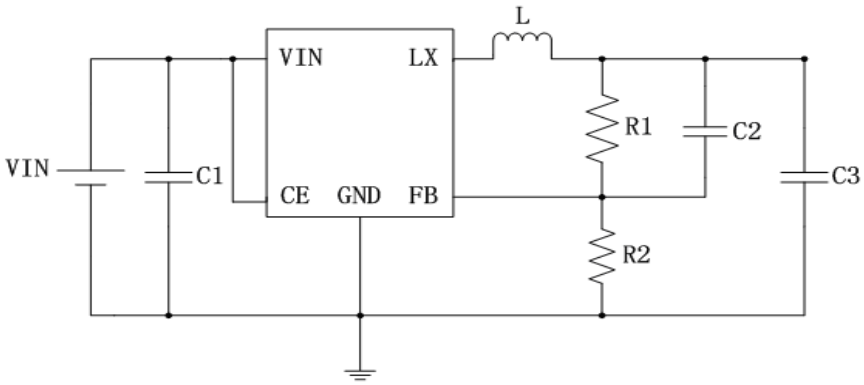
■ Package

- **SOT-23-5L**



(Top View)

■ Typical Application Circuit

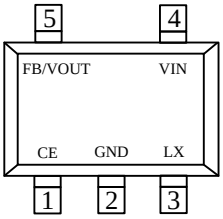


■ Ordering Information

LN2406 ①②③④⑤

Designator	Symbol				Description
①	1	1	3	4	Output Voltage: 1.2V、1.8V、3.3V、4.2V
②	2	8	3	2	Adjustable version: ① ② fixed as 00
③	F				Oscillation Frequency 1.4MHz
④	M				Package Types: SOT-23-5
⑤	R				Embossed Tape :Standard Feed
	L				Embossed Tape :Reverse Feed

■ Functional Pin Description

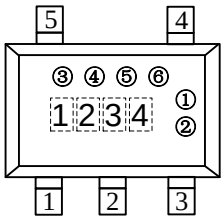


(Top View)

Pin Number	Pin Name	Function
1	CE	Chip Enable Pin
2	GND	Common Ground
3	LX	Switching Output
4	VIN	Power Input
5	FB/VOUT	Feedback/Output Voltage Pin

■ Marking Rule

- **SOT-23-5L**



SOT-23-5L

1 **Represents the product name**

Symbol	Product Name
3	LN2406◆◆◆◆◆

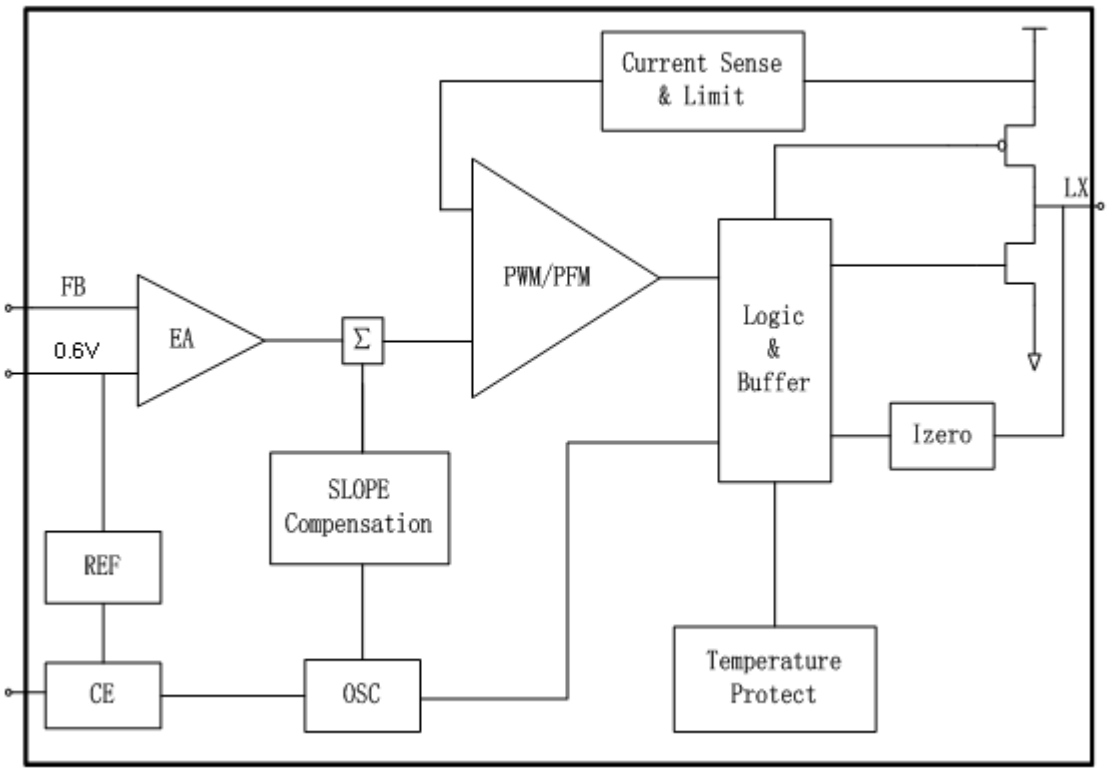
2 **3** **Represents the product classification**

Symbol		Number	Description
2	Feedback mode	0	Adjustable
		2	1.2V
		8	1.8V
		3	3.3V
		4	4.2V
3	Working mode	P	PWM/PFM
		B	PWM/BURST

4 **Represents the technological processes change**

Note: ①②③④⑤⑥ represent code point, represent production lot number.

■ Function Block Diagram



■ Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
Input Supply Voltage		V_{IN}	-0.3～6.5	V
Output Voltage		V_{OUT}	-0.3～6.5	
		V_{LX}	-0.3～VIN + 0.3	
CE Voltage		V_{CE}	-0.3～VIN + 0.3	V
Peak LX Current		I_{LX}	±1000	mA
Power Dissipation	SOT-23-5L	P_D	250	mW
Operating Temperature Range		Topr	-40～＋85	℃
Storage Temperature Range		Tstg	-55～＋125	

Note: Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

■ Electrical Characteristics

VIN=3.6V ,CIN=4.7uF ,CL=10uF ,L=2.2uH (Ta=25℃, unless otherwise noted)

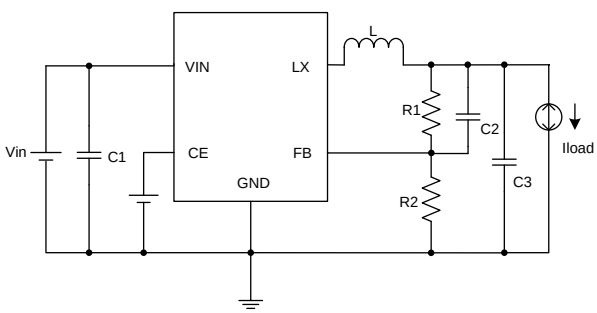
Parameter	Symbol	Cinditons	MIN	TYP	MAX	Units	Test Circuits
Feedback Voltage	VFB	-	0.59	0.6	0.61	V	1
Input Voltage Range	VIN		2	-	6		
Load regulation	VOUT	IL_{MAX}=600mA		2.0		%	
Line regulation	△ VOUT	IL=300mA		0.45		%	
Efficiency	EFFI	VIN=2.7V；IL=100mA	—	92	—	%	
CE ” High” voltage	VCEH	-	1.1			V	
CE ” Low” voltage	VCEL	-			0.7	V	
Stand-by Current	ISTB	VCE=0V、VIN=3.6V	0	-	1	uA	3
Quiescent Current	IDD	VFB=0.6V*0.9	200	300	500	uA	
Output Current Limit	ILIM	-	-	1000	-	mA	
PFM switching point	IL	VIN=3.6V、VOUT=1.8V		150		mA	
Oscillation Frequency	FOSC		-	1.4	-	MHz	2
Maximum Duty Circle	MAXDTY	-	100	-	-	%	

■ Test Circuits

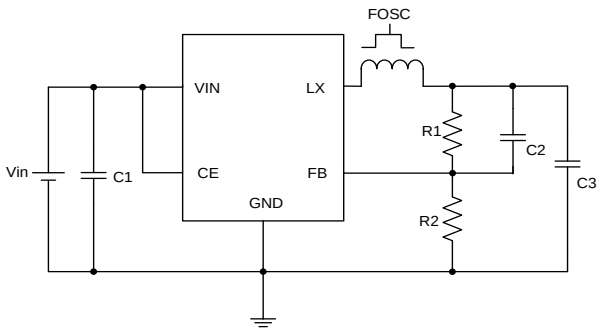
Parameters：LX=2.2uH, C1=4.7uF, C2=22pF, C3=10uF.

According to the required output voltage regulate R1, R2, VOUT=VFB(1+R1/R2)，VFB=0.6V。

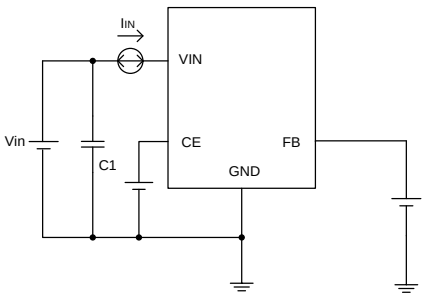
Circuit 1



Circuit 2

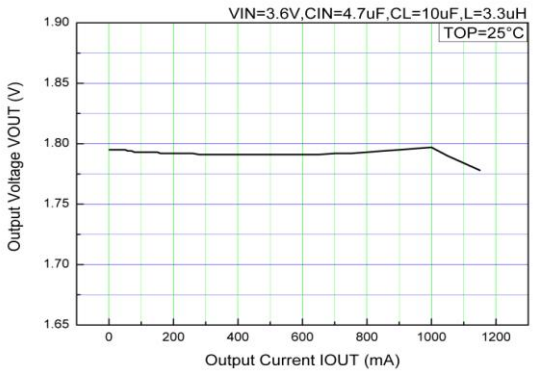


Circuit3

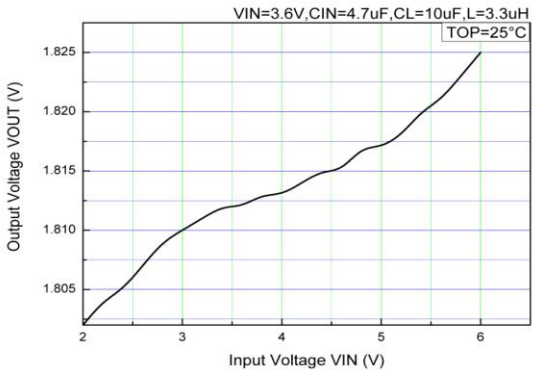


■ Typical Performance Characteristics

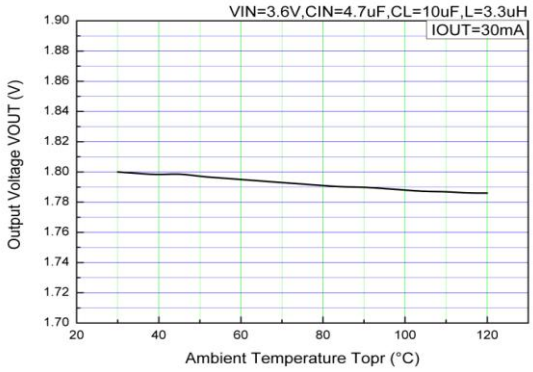
Output voltage vs output current



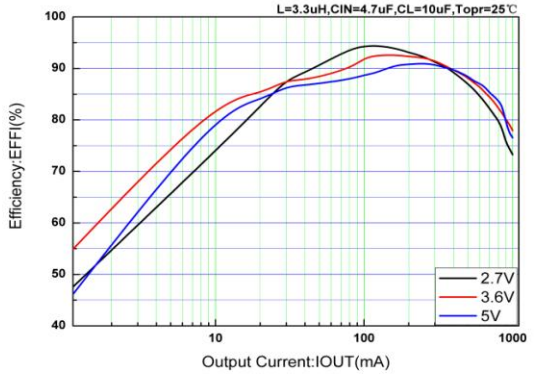
Input voltage vs output voltage



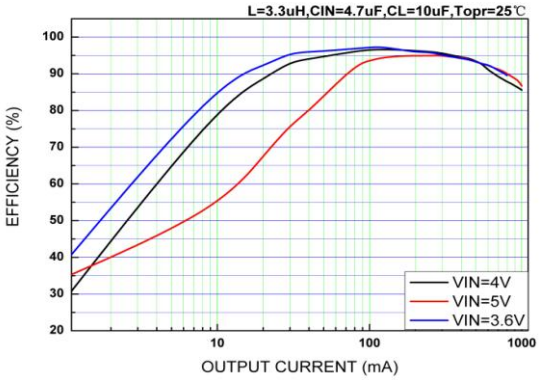
Output voltage vs Temperature



1.8V Efficiency vs output current

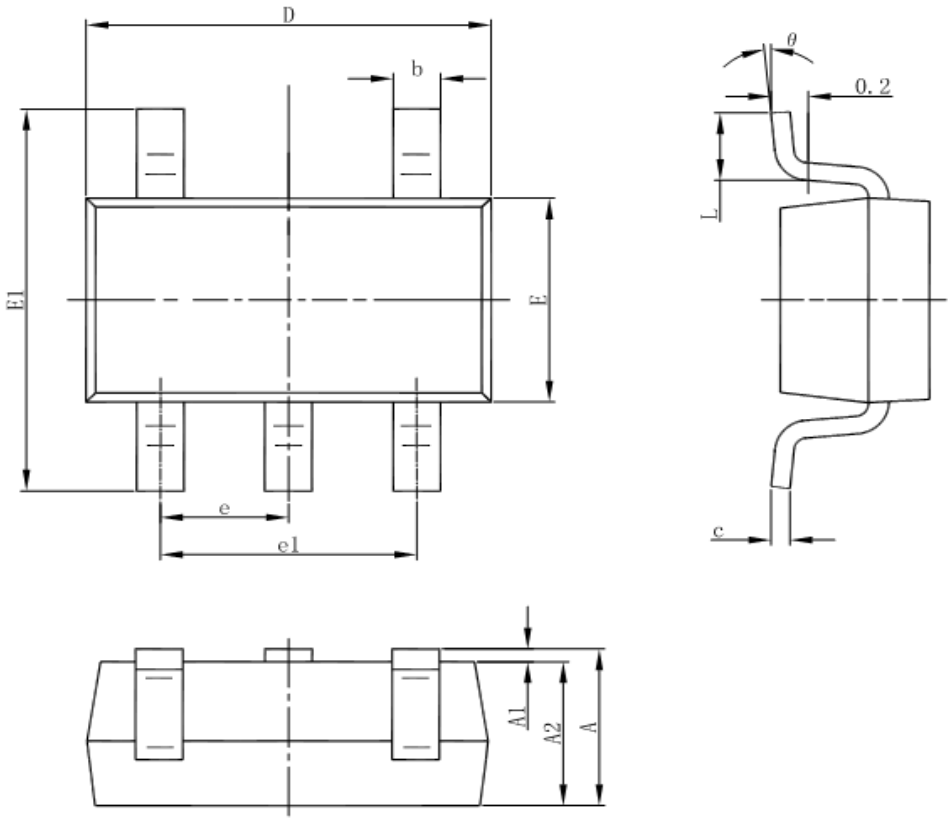


3.3V Efficiency vs output current



■ Package Information

- **SOT-23-5L**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°