

PWM/PFM Automatic Switching Controlled Synchronous DC-DC Converters

General Description

The LN3406 is a CMOS step-down DC/DC regulator consisting of a reference voltage source, oscillation circuit, comparator, PWM/PFM control circuit, etc. Using PWM/PFM automatic switching control circuit to achieve adjustable duty ratio, it has the characteristics of low ripple, high efficiency and large output current in full input voltage range (1.8-5.5 V)

LN3406 built-in power MOSFET, using overpressure, over current, over heat, short circuit and other protective circuit, automatically disconnects when the control value is exceeded, to protect the chip. This product combines the characteristics of microencapsulation and low consumption current, which is suitable for the internal use of mobile devices.

Features

- High Efficiency: 95%
- Output Current: 800mA
- Minimum quiescent current: 40 μ A(typ)
- Small PSRR: $\leq \pm 0.4\%$
- low-voltage operation: up to 100% duty cycle
- PWM / PFM automatic switching

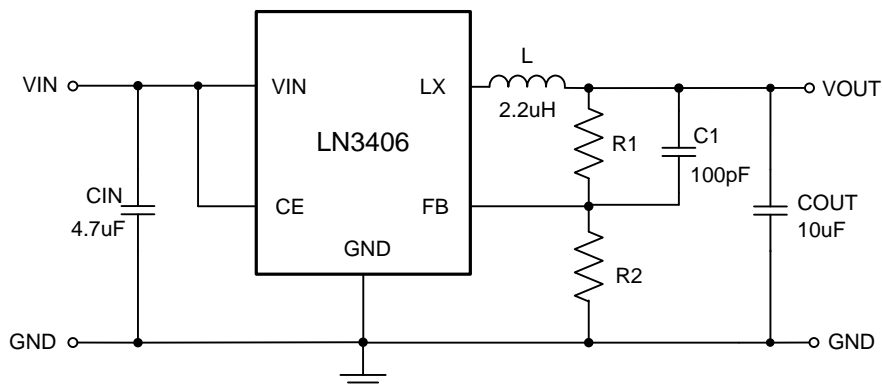
Applications

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

Package

- SOT-23-5L

Typical Application Circuit

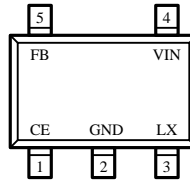


Ordering Information

LN3406 A①②③

Designator	Symbol	Description
①	F	Built-in PWM/PFM automatic switching function
②	M	Package Types: SOT-23-5L
③	R	Embossed Tape :Standard Feed
	L	Embossed Tape :Reverse Feed

■ Functional Pin Description

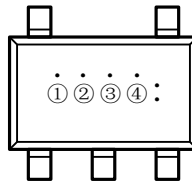


SOT-23-5L
(TOP VIEW)

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

■ Marking Rule

- SOT-23-5L



SOT-23-5L
(TOP VIEW)

- ① Represents the product name

Symbol	Product Name
B	LN3406A◆◆◆◆◆

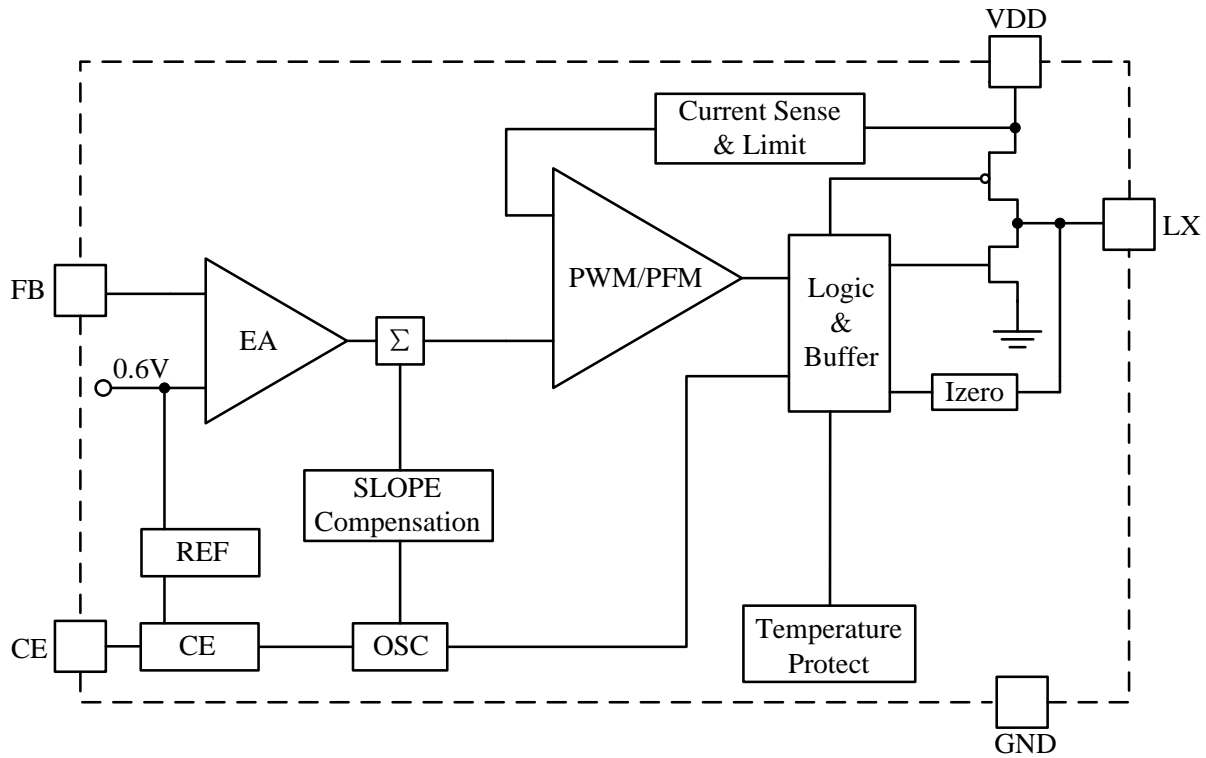
- ② Represents the product model

Symbol	Description
F	PWM/PFM automatic switching

- ③ Represents the package types

Symbol	Package Types
5	SOT-23-5L

- ④ Represents the technological processes change

■ 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~ $V_{IN} + 0.3$	
CE Voltage		V_{CE}	-0.3~ $V_{IN} + 0.3$	V
Peak LX Current		I_{LX}	±1500	mA
Power Dissipation	SOT-23-5L	P_D	250	mW
Operating Temperature Range		T_{opr}	-40~+85	°C
Storage Temperature Range		T_{stg}	-55~+125	

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

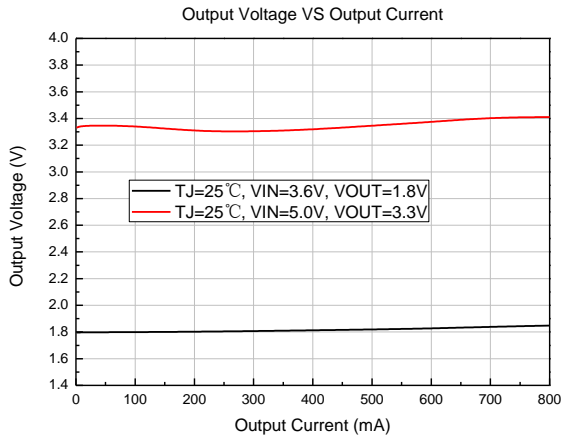
■ Electrical Characteristics
 $V_{IN}=3.6V$, $C_{IN}=4.7\mu F$, $C_L=10\mu F$, $L=2.2\mu H$

(Ta=25°C, unless otherwise noted)

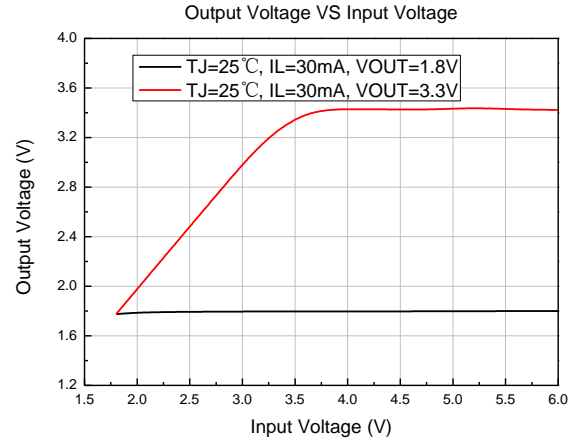
Parameter	Symbol	Conditions	MIN	TYP	MAX	Units
Feedback Voltage	VFB	-	0.59	0.6	0.61	V
Input Voltage Range	VIN	-	1.8	-	5.5	
Load regulation	VOUT	IL _{MAX} =600mA	-	0.5	-	%
Line regulation	ΔV_{OUT}	VIN=2.5V to 5.5V	-	0.45	-	%
Efficiency	EFFI	VIN=2.7V; IL=100mA	-	92	-	%
CE " High" voltage	VCEH	VIN=5V	1.2	-	-	V
CE " Low" voltage	VCEL	VIN=5V	-	-	0.9	V
Stand-by Current	ISTB	VCE=0V、VIN=5.0V	0	-	1	μA
Quiescent Current	IDD	VFB=0.5V or	-	40	-	μA
FB Input Current	I _{FB}	VFB=0.65V	-	-	± 50	nA
Output Current Limit	ILIM	-	-	1000	-	mA
PFM switching point	IL	VIN=3.6V、VOUT=1.8V	-	120	-	mA
Oscillation Frequency	FOSC	-	-	1.5	-	MHz
Maximum Duty Circle	MAXDTY	-	100	-	-	%
Power tube internal resistance _P	RDSON_P	ISW=300mA	-	0.35	0.5	Ω
Power tube internal resistance _N	RDSON_N	ISW=-300mA	-	0.3	0.45	Ω
SW leakage current	ILEAK_SW	CE=0V, VIN=5V	-	± 0.01	± 1	μA

■ Typical Performance Characteristics

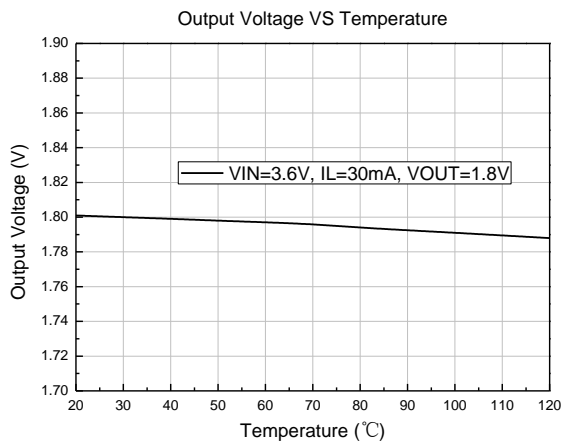
1. Output Voltage VS. Output Current



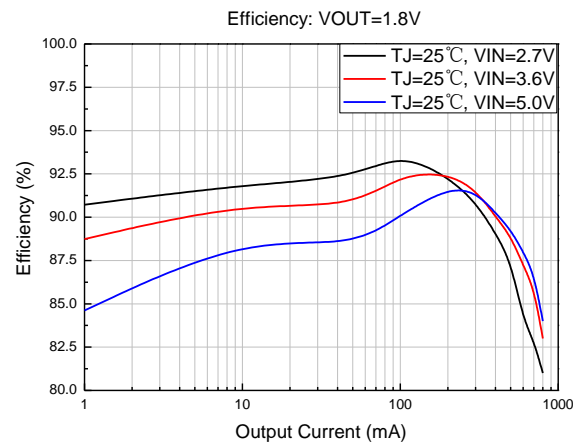
2. Input Voltage VS Output Voltage



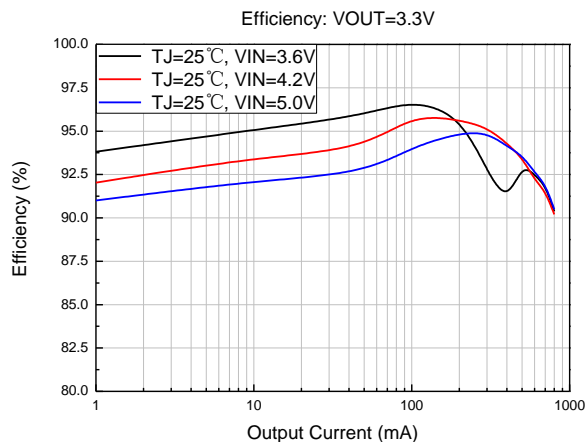
3. Output Voltage VS Temperature



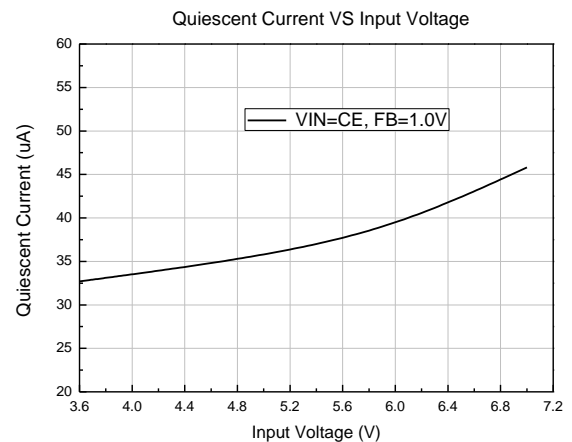
4. 1.8V Efficiency VS Output Current



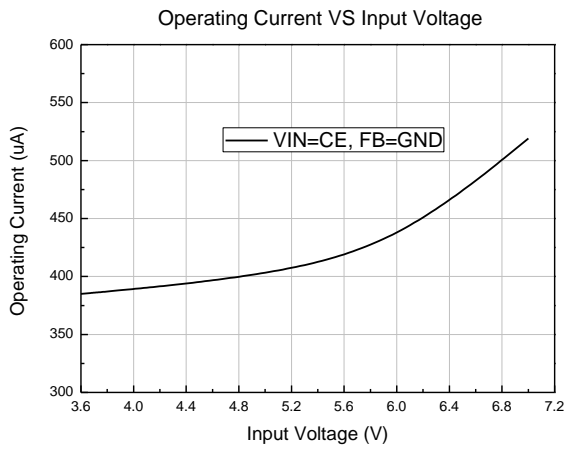
5. 3.3V Efficiency VS Output Current



6. Quiescent Current VS Input Voltage

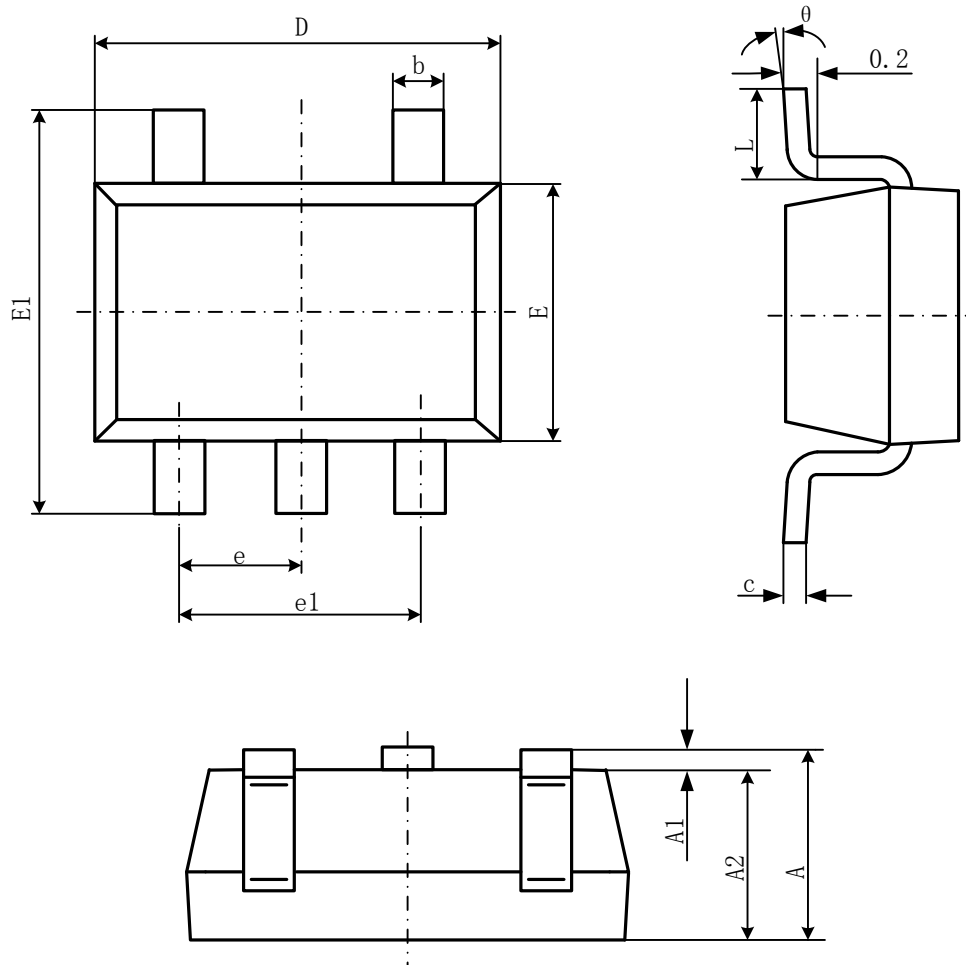


7. Operating Current VS Input Voltage



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°