PWM/PFM Automatic Switching Controlled Synchronous DC-DC Converters

■ General Description

LN5069 series is a group of high efficiency synchronous-rectification type buck regulator using a constant frequency, current mode architecture. 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 1.5MHz, allowing the use of small surface mount inductors and capacitors. 100% duty cycle provides low dropout operation.

■ Package

- **SOT-23-5L**

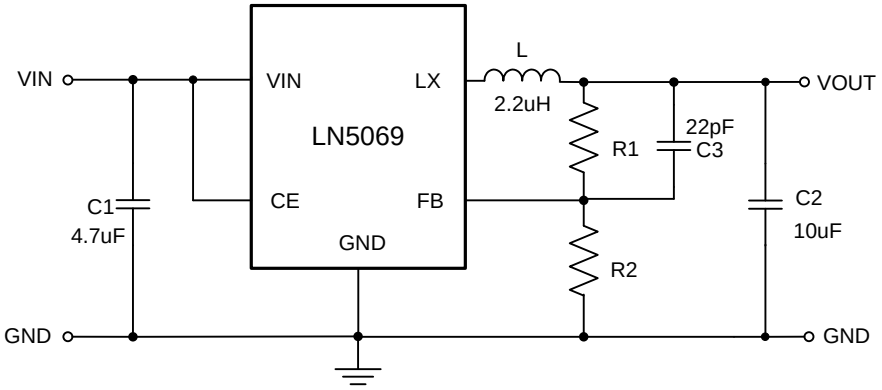
■ Features

- High Efficiency: 95%
- Input Voltage Range: 2 ~ 7.0V
- Output Current: 800mA
- Shutdown Current: <1uA
- Oscillation Frequency: 1.5MHz

■ Applications

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

■ Typical Application Circuit

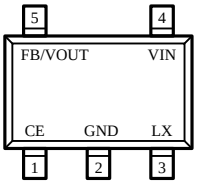


■ Ordering Information

LN5069A①②③

Designator	Symbol	Description
①	F	Oscillation Frequency 1.5MHz
②	M	Package Types: SOT-23-5L
③	L	Embossed Tape :Standard Feed
	R	Embossed Tape :Reverse Feed

■ Pin Configuration



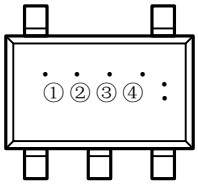
SOT-23-5L
(TOP VIEW)

■ Functional Pin Description

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 Pin

■ Marking Rule

- **SOT-23-5L**



SOT-23-5L
(TOP VIEW)

①Represents the product name

Symbol	Product Name
B	LN5069◆◆◆◆

②Represents the product classification

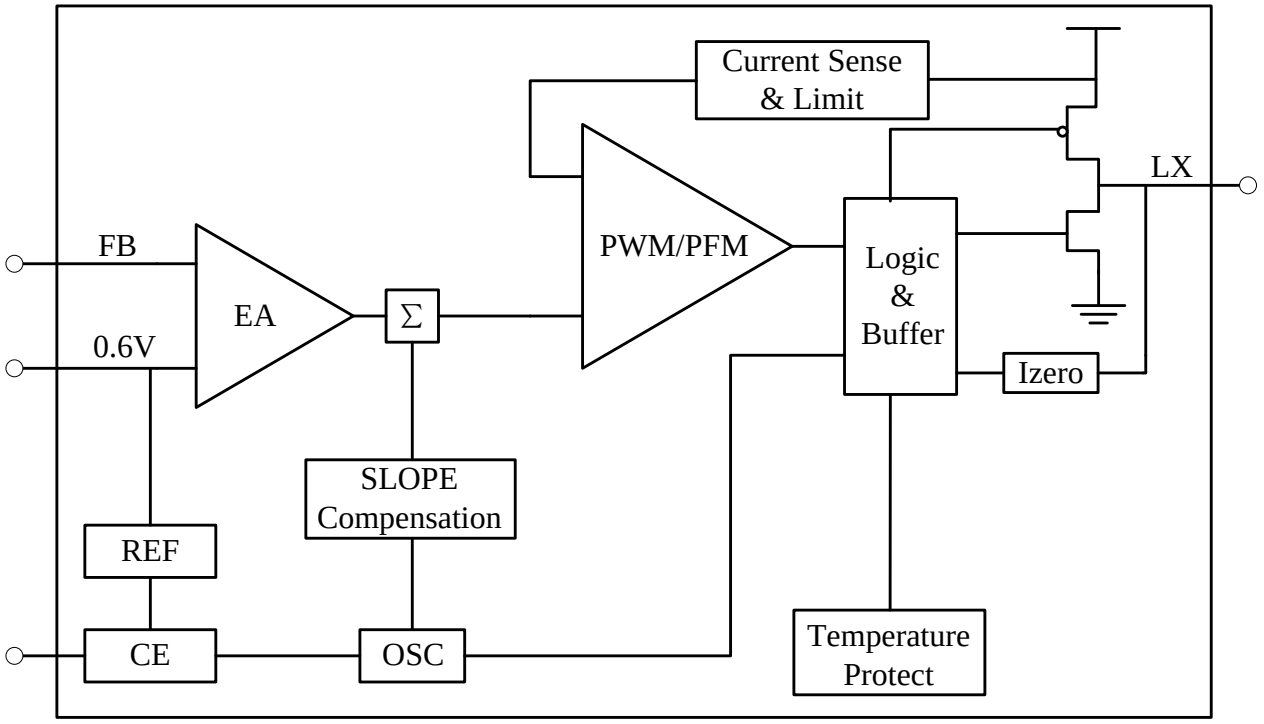
Symbol	Description
F	Oscillation Frequency 1.5MHz

③Represents the package information

Symbol	Description
5	Package Types: SOT-23-5L

④Represents the technological processes change

■ Function Block Diagram



■ Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
Input Supply Voltage		VIN	-0.3～7.5	V
Output Voltage		VOUT	-0.3～7.5	
		VLX	-0.3～VIN + 0.3	
CE Voltage		VCE	-0.3～VIN + 0.3	V
Peak LX Current		ILX	±1500	mA
Power Dissipation	SOT-23-5L	PD	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, VOUT=1.8V，C1=4.7uF, C3=10uF, L=2.2uH (Ta=25℃, unless otherwise noted)

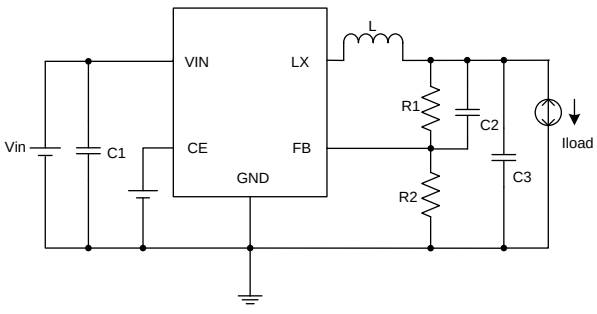
Parameter	Cinditons	MIN	TYP	MAX	Units	Test Circuits
Feedback Voltage	-	0.59	0.6	0.61	V	1
Input Voltage Range	-	2	-	7		
Load regulation	IL=10mA to 800mA		0.5		%	
Line regulation	IL=300mA，VIN=2.5V to 7V		0.23		%	
Efficiency	VIN=5V，IL=300mA	—	95	—	%	
CE ”Low” voltage	-	1			V	
CE ”High” voltage	-			0.9	V	
Stand-by Current	VCE=0V，VIN=6V	0	-	1	uA	3
Active Current	VFB=0.6V*0.9	—	260	-	uA	
Output Current Limit	-	-	1500	-	mA	
PFM switching point	VIN=3.6V、VOUT=1.8V		130		mA	
RDSON of PMOSFET	VIN=5V	-	0.32	-	ohm	
Oscillation Frequency	-	-	1.5	-	MHz	2
Maximum Duty Circle	-	100	-	-	%	
Thermal Shutdown Temperature	Hysteresis = 15°C	-	150	-	℃	

■ Test Circuits

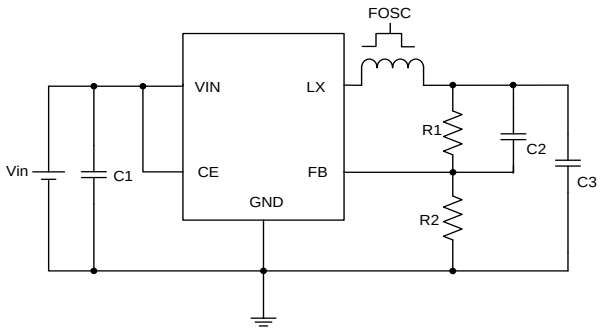
Parameters：LX=2.2uH, C1=4.7uF, C2=22pF, C3=10uF.

According to the required output voltage regulate R1, R2, so V FB = 0.6V.

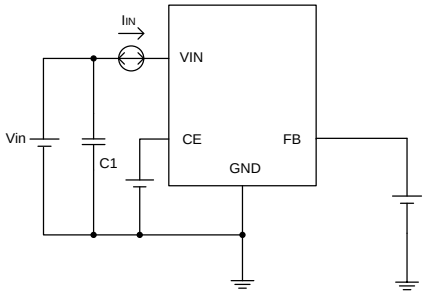
Circuit 1



Circuit 2

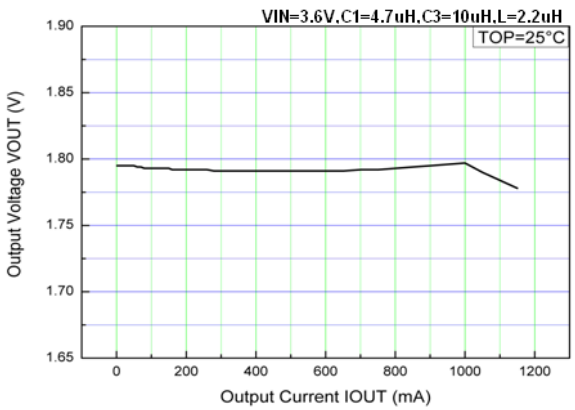


Circuit3

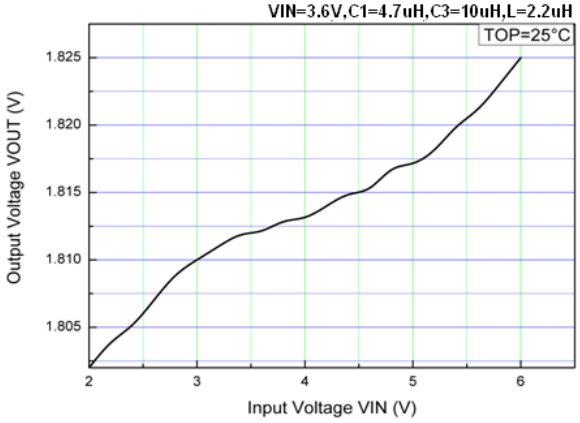


■ Typical Performance Characteristics

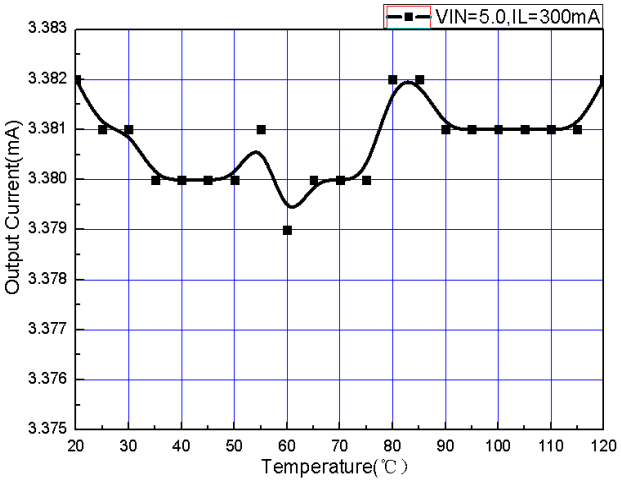
Output voltage vs output current



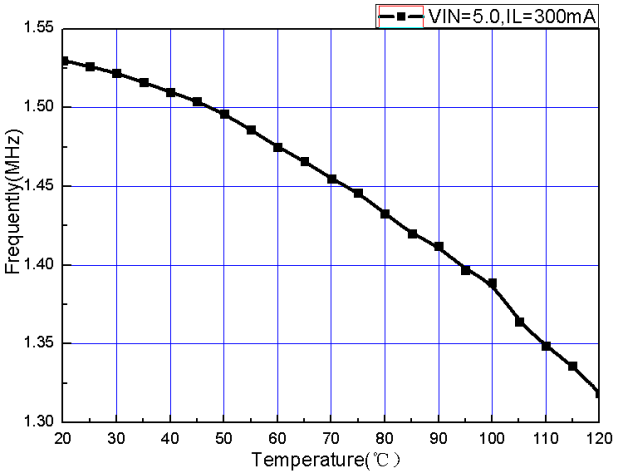
Input voltage vs output voltage



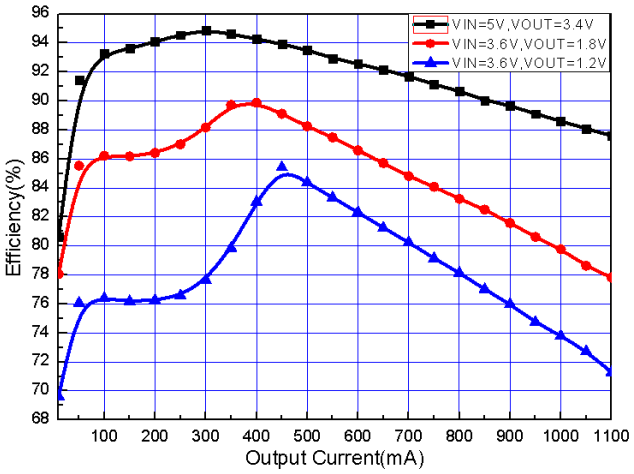
Output voltage vs Temperature



Switching Frequency vs Temperature

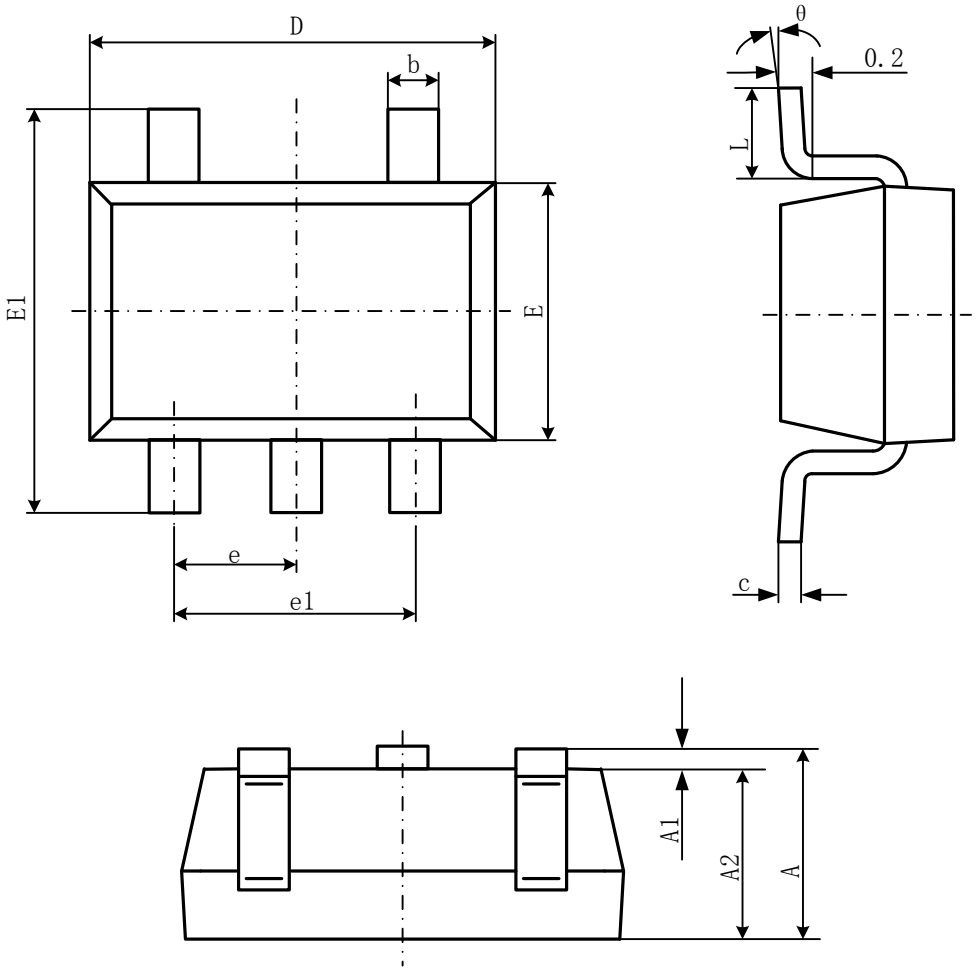


CONVERSION EFFICIENCY


VIN=5V,VOUT=3.4V
VIN=3.6V,VOUT=1.8V
VIN=3.6V,VOUT=1.2V
Efficiency(%)
Output Current(mA)
96
94
92
90
88
86
84
82
80
78
76
74
72
70
68
100
200
300
400
500
600
700
800
900
1000
1100

■ 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°