Integrated Dual Step Down DC-DC

■ General Description

LN5068 series is a group of high efficiency synchronous-rectification type dual-output buck regulator using a constant frequency, current mode architecture. The device is available in an adjustable version and fixed output voltages（1.2V、1.8V、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 1.2MHz, allowing the use of small surface mount inductors and capacitors. 100% duty cycle provides low dropout operation.

■ Applications

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

■ Features

- High Efficiency: 92%
- Input Voltage Range: 2.0 ~ 6.0V
- Dual Output Current: 600mA
- Shutdown Current: <1uA
- Oscillation Frequency: 1.2MHz
- The entire load range with low PSRR output voltage
- Current limiter and thermal shutdown protector

■ Package

- MSOP-10
- DFN3×3-12

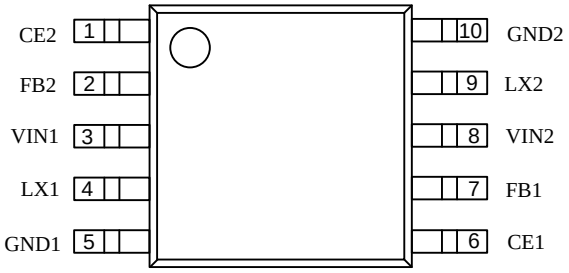
■ Ordering Information

LN5068 ①②③④⑤⑥⑦

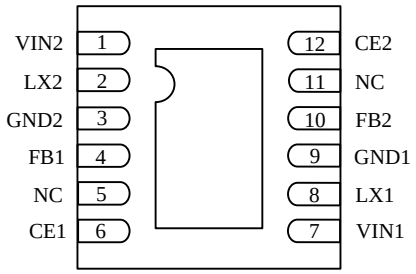
Designator	Symbol				Description
①	B				PWM/BURST Switch Mode
	P				PWM/PFM Switch Mode
②	1	1	3	4	Output Voltage corresponds to 1.2V、1.8V、3.3V、4.2V
③	2	8	3	2	External feedback ②③ fixed 0、0
④	1	1	3	4	Output Voltage corresponds to 1.2V、1.8V、3.3V、4.2V
⑤	2	8	3	2	External feedback ④⑤ fixed 0、0
⑥	D				Package type:DFN3×3-12
	M				Package type:MSOP-10
⑦	S				Embossed Tape :Standard Feed
	R				Embossed Tape :Reverse Feed

（**Eg:** LN5068P1833MR represents built-in PWM / PFM automatic switching function, built-in feedback mode, dual-Output respectively is1.8V and 3.3V,use MSOP-10 package type, reverse feed）

■ Pin Assignment



MSOP-10
(Top View)



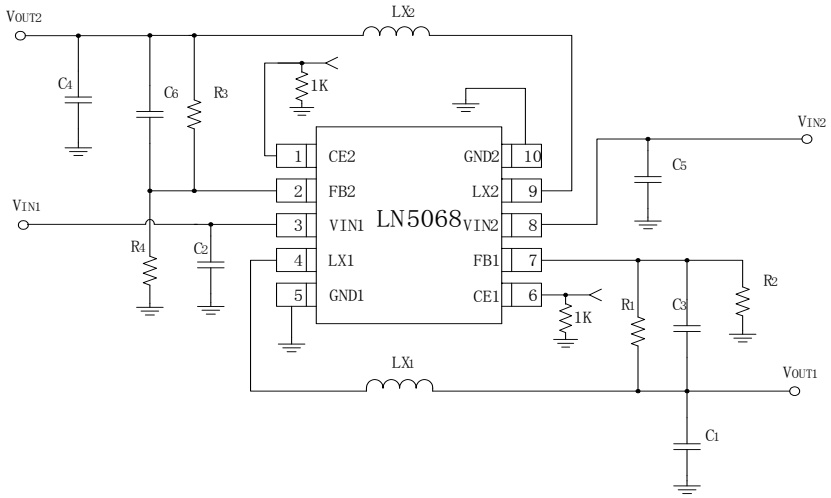
DFN3*3-12
(Top View)

■ Pin Function Description

Pin Number		Pin Name	Function Description
MSOP-10	DFN-12		
1	12	CE2	Enable of channel 2 , high active
2	10	FB2	Feedback of channel 2
3	7	VIN1	Input voltage of channel 1
4	8	LX1	External inductor terminal of Channel 1
5	9	GND1	Ground of channel1
6	6	CE1	Enable of channel 1 , high active
7	4	FB1	Feedback of channel 1
8	1	VIN2	Input voltage of channel 2
9	2	LX2	External inductor terminal of Channel 2
10	3	GND2	Ground of channel2
—	5、11	NC	Not connect

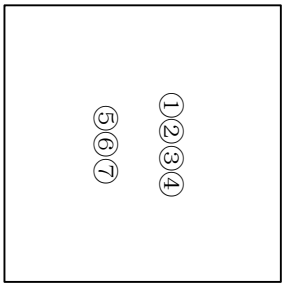
■ Typical Application Circuit

Component parameters：LX1=LX2=3.3uH、C2=C5=4.7uF、C3=C6=22pF，C1=C4=10uF。According to the desired output voltage regulation R1, R2 and R3, R4, making FB1 = FB2 = 0.6V.



■ Marking Rule

- **MSOP-10、DFN3×3-12**



MSOP-10/DFN3*3-12
(Top View)

①②③④ Represents the product name

①	②	③	④	Product Name
5	0	6	8	LN5068◆◆◆◆◆◆◆

⑤ Represents the feedback mode

Symbol	Description		
⑤	Feedback Mode	0	External feedback
		2	Output voltage:1.2V
		8	Output voltage:1.8V
		3	Output voltage: 3.3V
		4	Output voltage: 4.2V

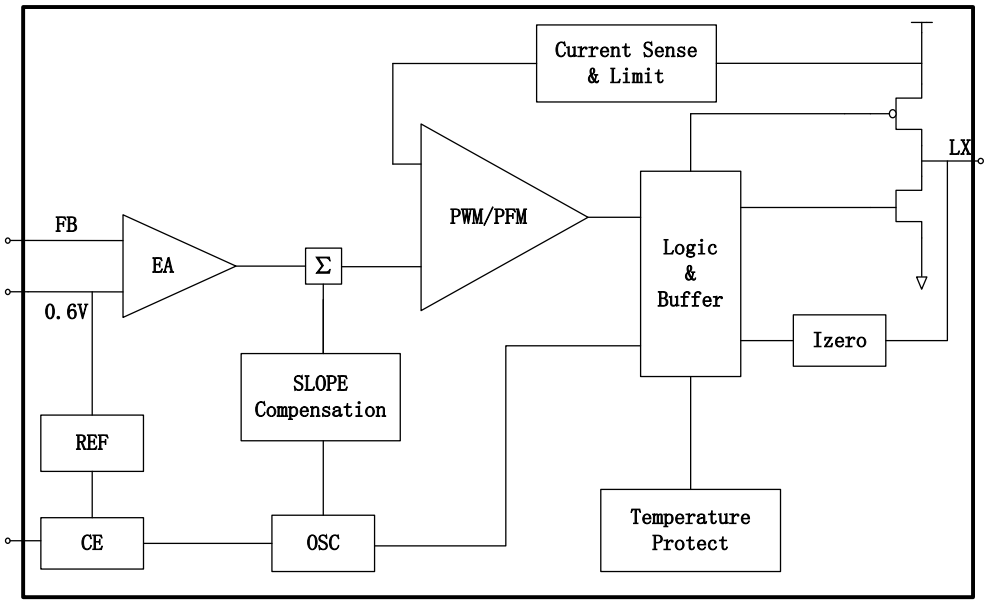
⑥ Represents the package type

Symbol	M	D
Package Type	MSOP10	DFN3×3-12

⑦ Represents the product lot

Numbers 0-9, A-Z, to write down numbers 0-9, A-Z, and then repeat (except G, I, J, O, Q, W)

■ Function Block Diagram



LN5068 half functional block diagram (symmetric structure)

■ Absolute Maximum Ratings

Parameter	Symbol		Maximum Rating	Unit
Input Voltage	VIN		-0.3～6.5	V
output voltage	VOUT		-0.3～6.5	
	VLX		-0.3～VIN + 0.3	
CE voltage	Vce		-0.3～VIN + 0.3	V
Peak LX Current	ILX		±1000	mA
Power dissipation(Ta=25 ℃)	Pd	MSOP-10	500	mW
		DFN-12	250	mW
Operating Temperature Range	Topr		-40～＋85	℃
Storage Temperature Range	Tstg		-55～＋125	

Caution: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

■ Electrical Characteristics

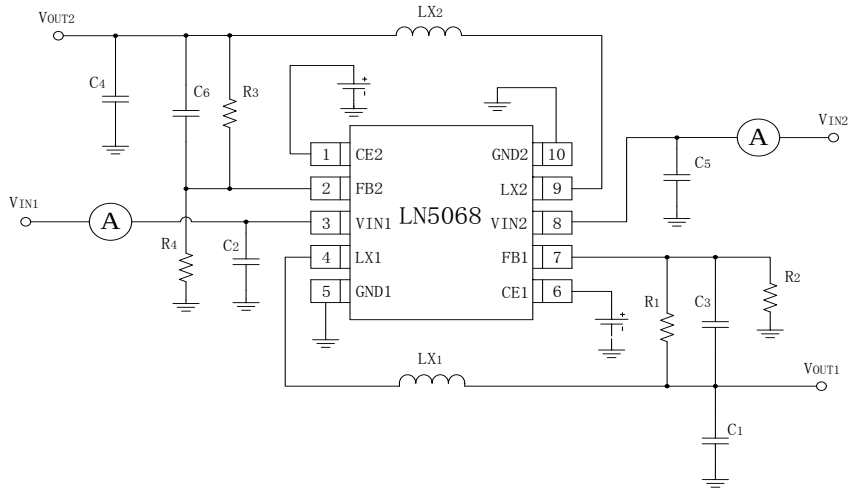
VIN=3.6V ,CIN=4.7uF ,CL=10uF ,L=3.3uH (Ta=25℃, unless otherwise noted)

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		
Output Voltage ripple	△VOUT	IL_{MAX}=600mA		5		mV	
Efficiency	EFFI	VIN=2.7V;IL=60mA	—	92	—	%	
Minimum CE Voltage	VCEH	-	0.8	1	-	V	
Stand-by Current	ISTB	VCE=0V	0	-	1	uA	3
Operating current	IDD1	VFB=0.6V*0.9	-	150	-	uA	
Quiescent current	IDD2	VFB=0.6V*1.1	—	40	-		
Output Current Limit	ILIM	-	-	1200	-	mA	
PFM switching point	IL			40		mA	
Oscillation Frequency	FOSC		-	1.2	-	MHz	2
Maximum Duty Circle	MAXDTY	-	100	-	-	%	

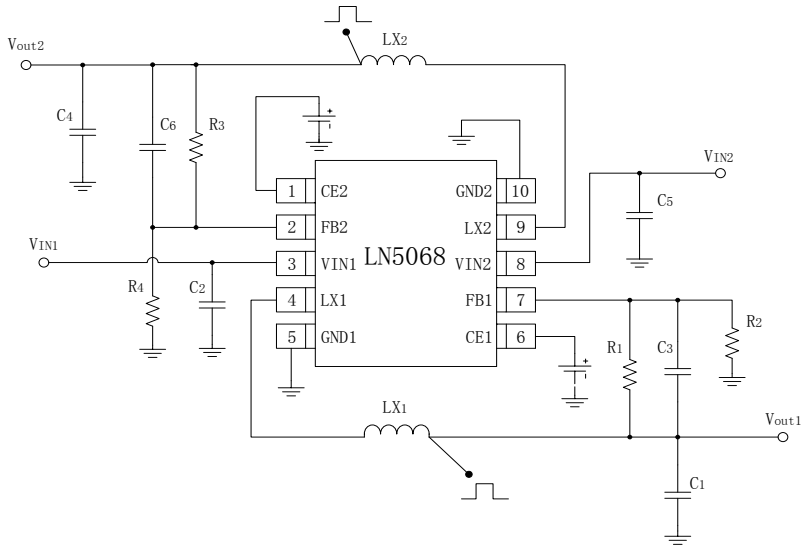
■ Test Circuit

Component parameters：LX1=LX2=3.3uH、C2=C5=4.7uF、C3=C6=22pF，C1=C4=10uF。According to the desired output voltage regulation R1, R2 and R3, R4, making FB1 = FB2 = 0.6V.

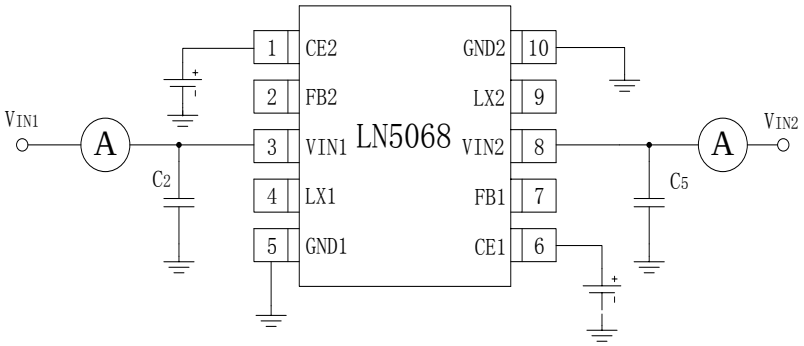
Circuit 1



Circuit 2

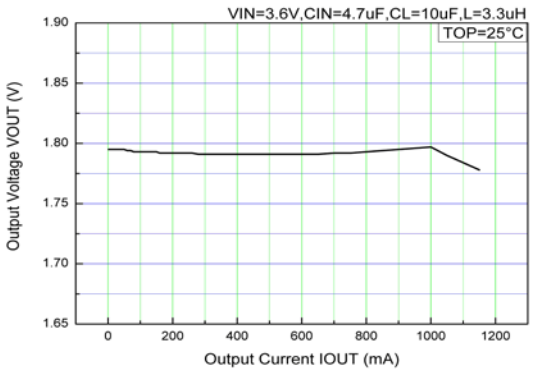


Circuit 3

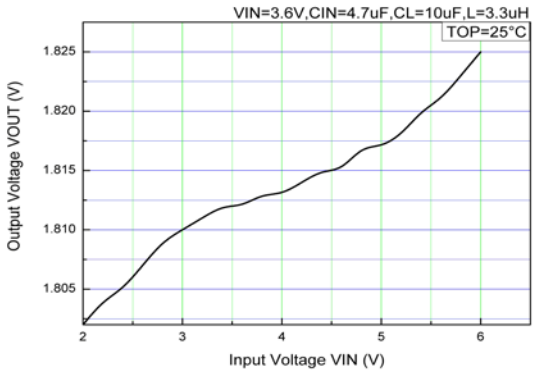


■ Typical Performance Characteristics

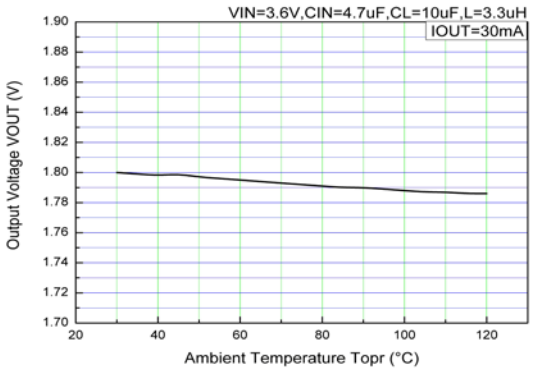
Output voltage-output current



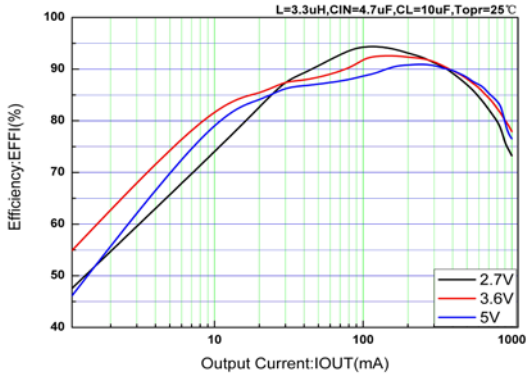
Input voltage-output voltage



Temperature characteristics

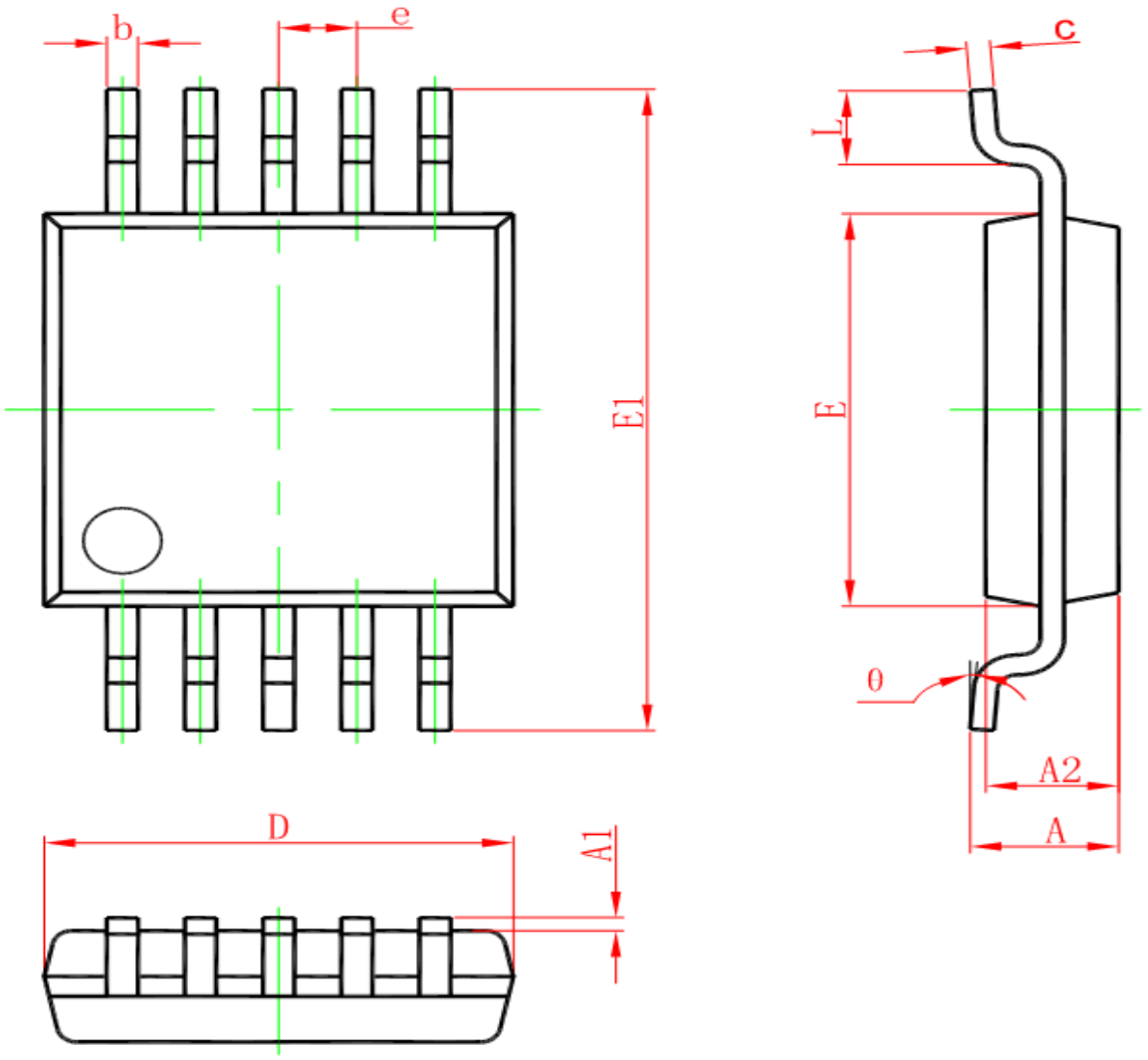


Efficiency



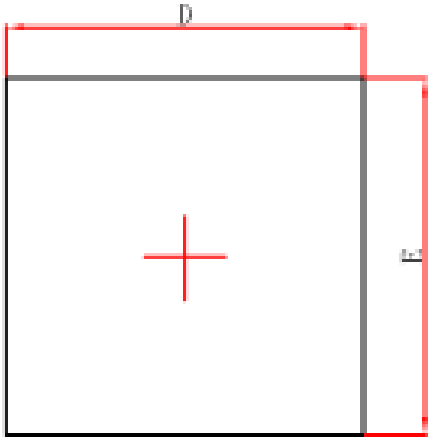
■ Package Information

- **MSOP-10**

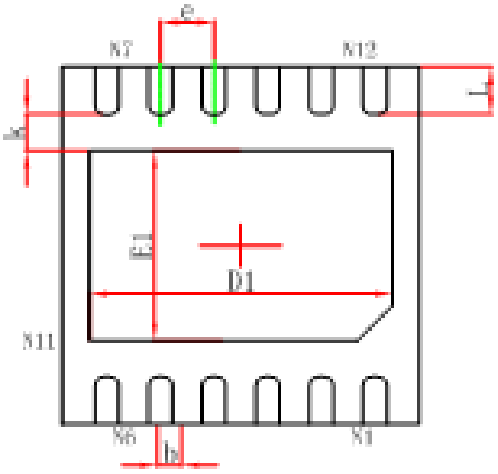


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.180	0.280	0.007	0.011
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.50(BSC)		0.020(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

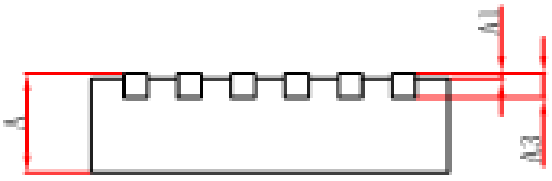
- **DFN3×3-12**



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	2.924	3.076	0.115	0.121
E	2.924	3.076	0.115	0.121
D1	2.450	2.650	0.096	0.104
E1	1.500	1.700	0.059	0.067
k	0.200MIN.		0.008MIN.	
b	0.150	0.250	0.006	0.010
e	0.450TYP.		0.018TYP.	
L	0.324	0.476	0.013	0.019