PWM/PFM Automatic Switching Controlled Synchronous DC-DC Converters

■ General Description

LN2408 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: 95%
- Minimum quiescent current: 180μA(typ)
- Maximum Output Current: 600mA
- Small PSRR: <±0.4%
- low-voltage operation: up to 100% duty cycle
- PWM / PFM automatic switching

■ Applications

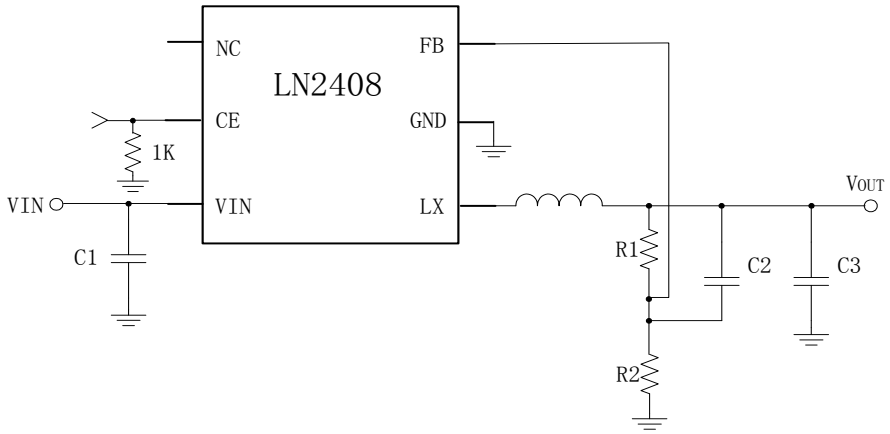
- Digital cameras, electronic notebook, PDA and other mobile devices, power supply
- CD player, MD and other audio devices power
- Cameras, video equipment, communications equipment, power supply
- Computer power supply

■ Package

- DFN2×2-6L

■ Typical Application Circuit

Parameters：LX=3.3uH, C1=4.7uF, C2=22pF, C3=10uF,VFB=0.6V. In the adjustable version, the output voltage is set by a resistive divider according to the following formula: VOUT=0.6V×(1+R2/R1).

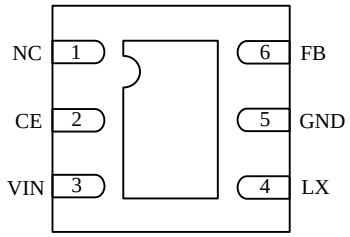


■ Ordering Information

LN2408 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: ①② fixed as AD
③	F				Oscillation Frequency: 1.4MHz
④	D				Package Types: DFN2×2-6
⑤	S				Embossed Tape :Standard Feed
	R				Embossed Tape :Reverse Feed

■ Pin Configuration

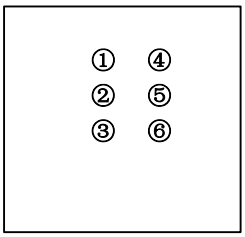


DFN2*2-6
(Top View)

Pin Number	Pin Name	Function
1	NC	No Connect
2	CE	Chip Enable Pin
3	VIN	Power Input
4	LX	Switching Output
5	GND	Common Ground
6	FB	Feedback Pin

■ Marking Rule

- DFN2×2-6L



①②③④ Represents the product name

①	②	③	④	Product Name
2	4	0	8	LN2408◆◆◆◆◆

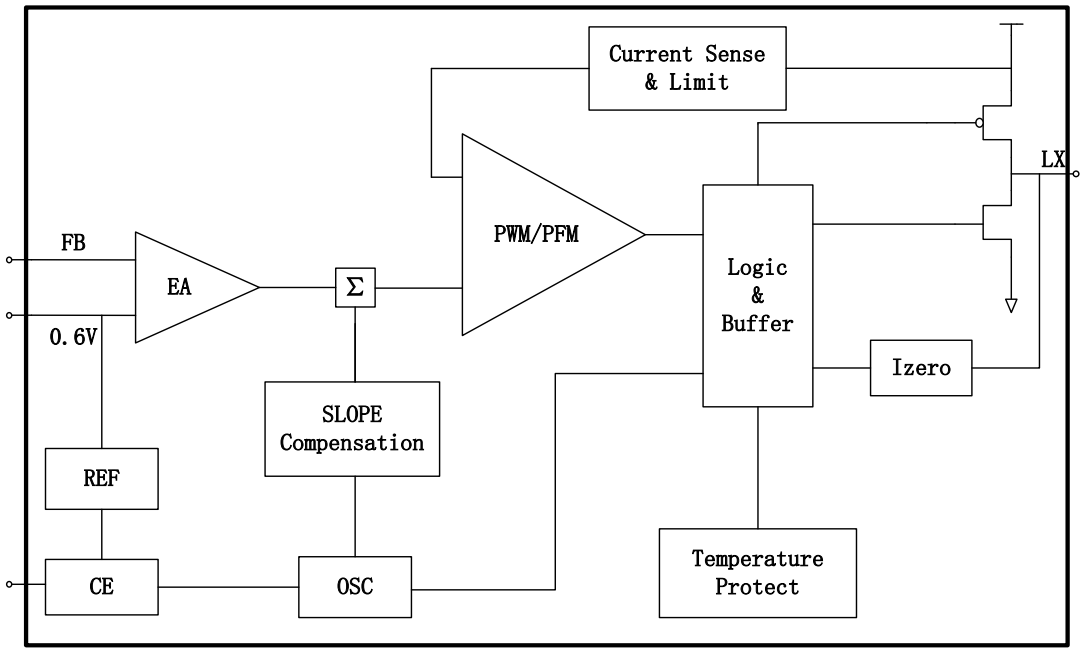
⑤ Represents the working mode

Symbol	Represents	Description	
⑤	Feedback Mode	0	External Feedback
		2	1.2V
		8	1.8V
		3	3.3V
		4	4.2V

⑥ Represents the assembly lot No.

0-9，A-Z; 0-9，A-Z mirror writing，repeated（G，I，J，O，Q，W exception）

■ Function Block Diagram



■ Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
Input Supply Voltage		VIN	-0.3～6.0	V
Output Voltage		VOUT	-0.3～VIN	
		V_{LX}	-0.3～VIN + 0.3	
CE Voltage		V_{CE}	-0.3～VIN + 0.3	V
Peak LX Current		I_{LX}	±1800	mA
Power Dissipation	DFN2×2-6	P_D	1000	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)

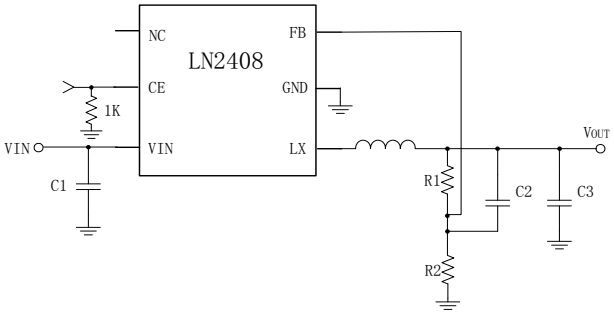
Parameter	Symbol	Conditions	Min	Typ	Max	Units	Test Circuits
Feedback Voltage	VFB	-	0.59	0.6	0.61	V	1
Input Voltage Range	VIN		2	-	6		
Load regulation	VOUT	IL_{MAX}=600mA		0.5		%	
Line regulation	△VOUT	IL=300mA		0.45		%	
Efficiency	EFFI	VIN=2.7V；IL=100mA	—	95	—	%	
CE ”Low” voltage	VCEL	-	1.8			V	
CE ”High” voltage	VCEH	-			1.4	V	
Stand-by Current	ISTB	VCE=0V、VIN=3.6V	0	-	1	uA	3
Quiescent Current	IDD	VFB=0.6V*0.9	—	150	-		
Output Current Limit	ILIM	-	-	1500	-	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

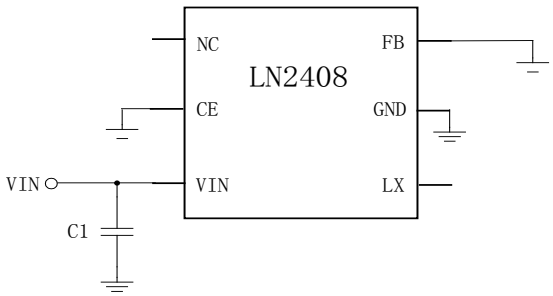
Parameters：LX=3.3uH, C1=4.7uF, C2=22pF, C3=10uF.

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

Circuit 1

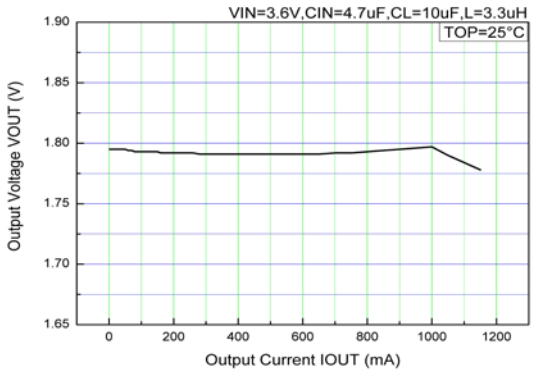


Circuit 2

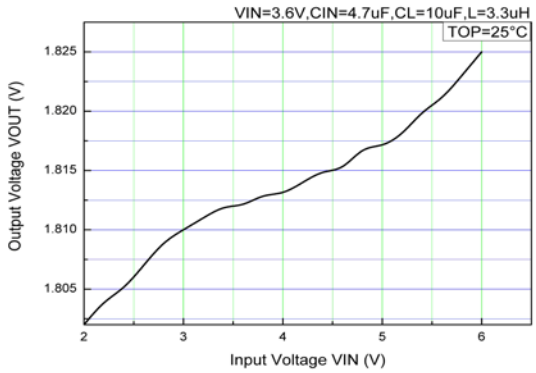


■ Typical Performance Characteristics

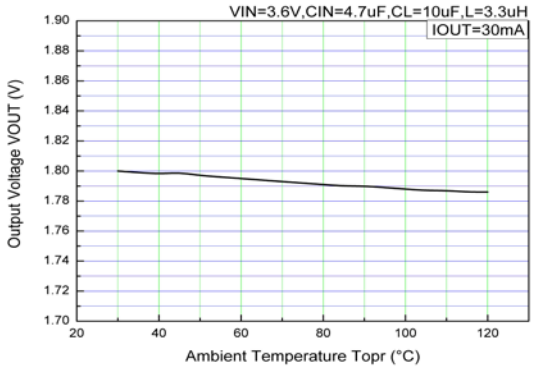
1、 Output voltage vs output current



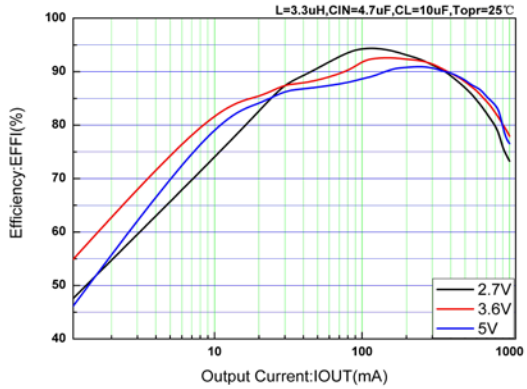
2、 Input voltage vs output voltage



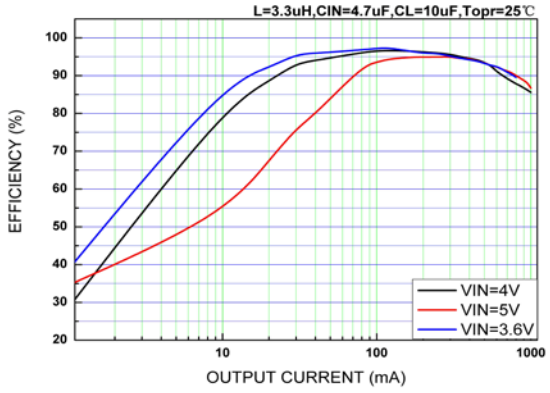
3、 Output voltage vs Temperature



4、1.8V Efficiency vs output current

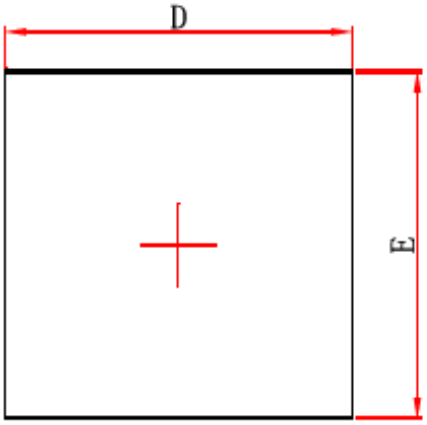


5、3.3V Efficiency vs output current

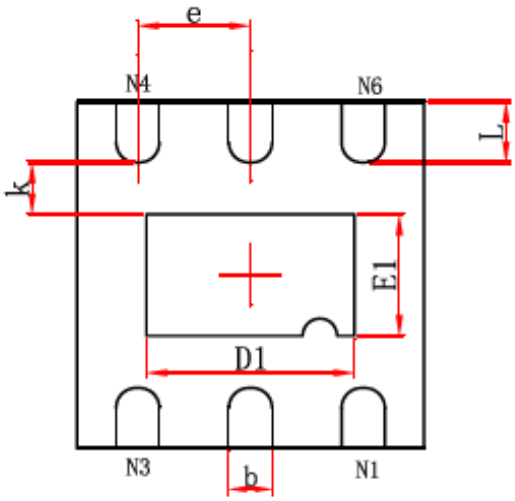


■ Package Information

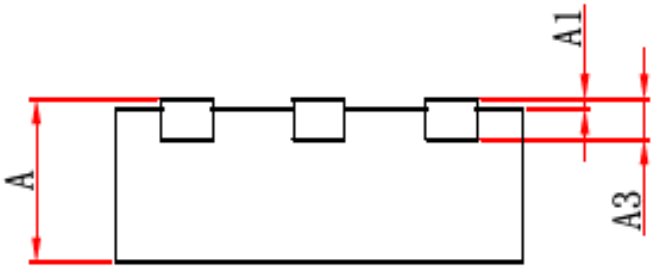
- **DFN2×2-6L**



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	1.900	2.100	0.075	0.083
E	1.900	2.100	0.075	0.083
D1	1.100	1.300	0.043	0.051
E1	0.600	0.800	0.024	0.031
k	0.200MIN.		0.008MIN.	
b	0.180	0.300	0.007	0.012
e	0.650TYP.		0.026TYP.	
L	0.250	0.450	0.010	0.018