ME2107

Load Disconnection Function，High Efficiency, synchronous PFM step-up DC-DC converter

General Description

ME2107 is a series of high-efficiency, low-power PFM Synchronous Boost DC-DC converters with enabling true turn-off and short-circuit protection functions. enabling real turn-off of input and output, system consumption current is very low, and has short-circuit protection function, improve equipment life and reliability.

ME2107 can provide 1.8V~5.0V output voltage and step 0.1V. 0.9V input can start the output 3.3V voltage with 1mA load. It is suitable for single base, Ni MH battery and lithium power supply equipment. Synchronized boost, SOT23-5 package, peripheral only need four components, can complete the low input battery voltage boost to the required working voltage.

Features

- Enabling true turn-off，Load disconnection
- Short-circuit protection function
- High efficiency：93%
- Low voltage start：0.9V@IOUT=1mA
- Low Quiescent Current：7.5μA
- Frequency：320KHz
- Output voltage：1.8V~5V
- High Accuracy: ±2%
- Output Current (Max)：>300mA
- synchronous

Typical Application

- 1~3 section dry cell electronic equipment, single lithium power supply equipment
- Digital cameras, LED flashlights, LED lights, sphygmomanometer, Remote control toys, wireless headphones, wireless mouse and keyboard, medical devices, Car alarm, charger, VCR, PDA and other handheld electronic devices.
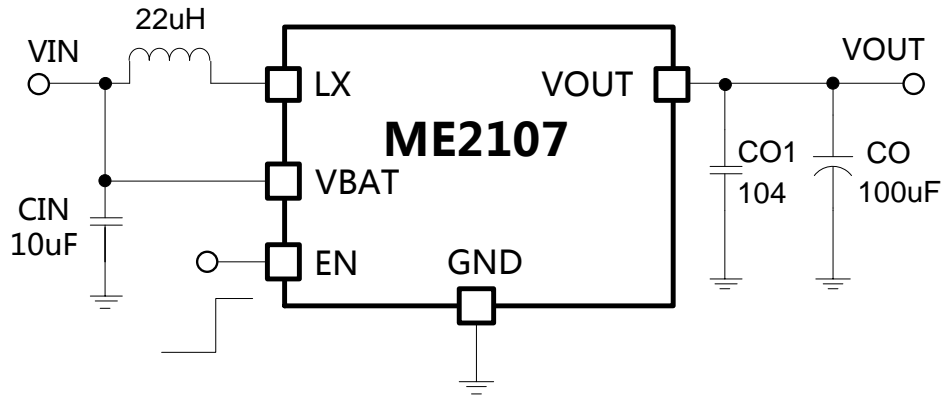
Package

- 5-pin   SOT23-5

Typical Application Circuit

Selection Guide

ME 21 07 X XX XX G

- Environment mark
- Package
  M5：SOT23-5
- Output Voltage
- Version / Series
- Product Type
- Product Series
- Microne
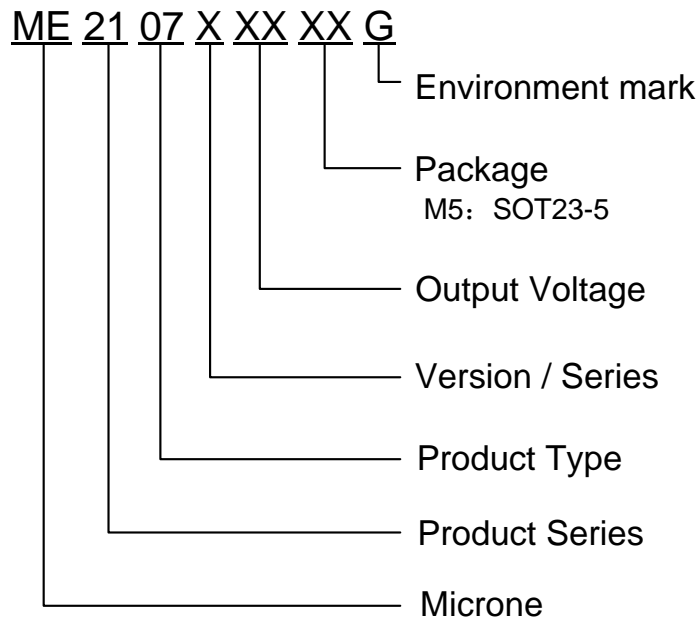
product series	product description
ME2107A30M5G	V_{OUT} =3.0V；Package：SOT23-5
ME2107A33M5G	V_{OUT} =3.3V；Package：SOT23-5
ME2107A50M5G	V_{OUT} =5.0V；Package：SOT23-5

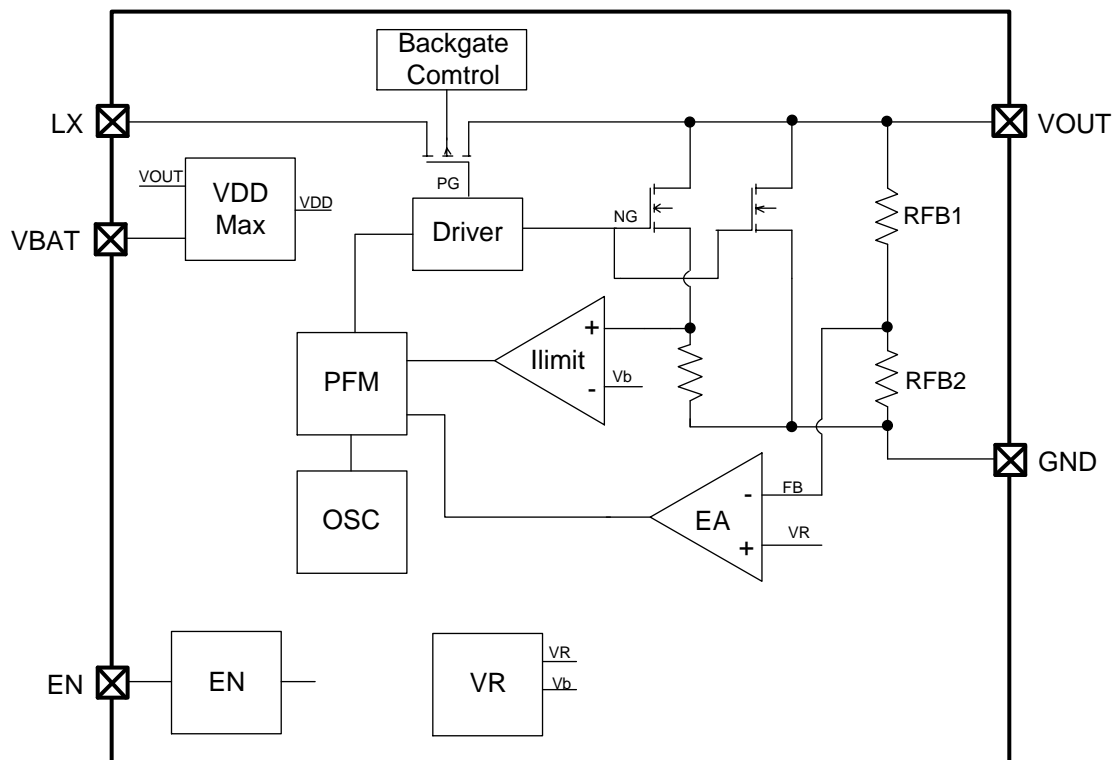**NOTE:** If you need other voltage and package, please contact our sales staff。

ME2107

Pin Configuration

```
        LX              VOUT
        5                4

    1        2        3
    EN      GND      VBAT
```
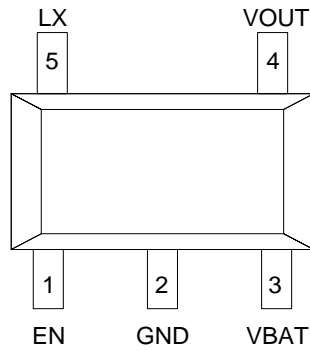
SOT23-5

Pin Assignment

PIN Number	Pin Name	Description
1	EN	Enable
2	GND	Ground
3	VBAT	Chip Input
4	VOUT	Output
5	LX	Power Switch

Block Diagram

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Units
VBAT Input Voltage	VBAT	-0.3~6	V
EN Enable Voltage	EN	-0.3~6	V
LX pin Voltage	LX	-0.3~6	V
LX pin current	ILXmax	1000	mA
VOUT pin voltage	VOUT	-0.3~6	V
Operating Ambient Temperature Range	TOPR	-40~85	ºC
Storage Temperature Range	TSTG	-55~150	ºC
Maximum junction temperature	TJ	-40~150	ºC
Welding temperature	TL	260	ºC
Continuous Total Power Dissipation SOT23-5	PD	0.6	W
Thermal resistance (Junction to air)	θ_{JA}	210	ºC/W

note：The absolute maximum rating is the maximum physical injury limit that the product can withstand. Please do not exceed the rating under any circumstances.

Peripheral components demand list

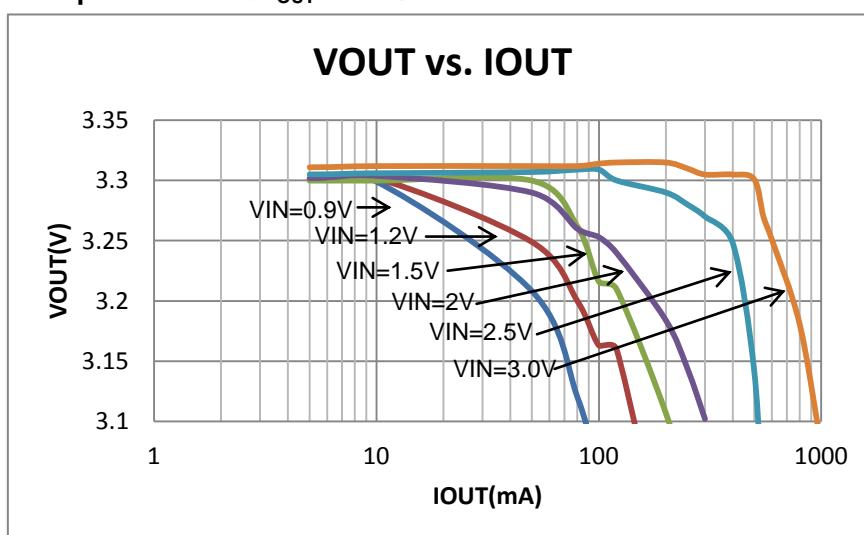| Parameter	Symbol	value	Units
inductance	L	22	µH
Input capacitance	CIN	10	µF
Output capacitance	CO	100	µF
Output capacitance	CO1	0.1	µF

Electrical Characteristics

TA = 25 ºC, VIN =VEN=2V,VOUT=3.3V,L=22uH,CIN=10uF，CO=100uF ，CO1=104, unless otherwise noted

| Parameter	Symbol	Test Conditions	MIN	TYP	MAX	UNIT
Low voltage start	Vstart	ILOAD=1mA, VIN:0→2V	-	0.9	1.0	V
Hold voltage	Vhold	ILOAD=1mA, VIN:2→0V	0.5	-	-	V
Maximum input voltage	Vinmax		0.9	-	5.5	V
Output voltage accuracy	Vout	ILOAD=1mA	-2	-	+2	%
Power adjustment	ΔVout1	VIN=1V-2V,IOUT=10mA	-	5	20	mV
Load adjustment	ΔVout2	IOUT=0-100mA,VIN=2V	-	20	30	mV
Quiescent Current	ISS	VOUT=VOUT+0.5	-	7.5	10	uA
Chip Shutdown current	ISS0	VCE=0V	-	0	0.1	uA
Current limit*	Ilimit		-	1000	-	mA
No load input current*	Iin0	VIN=2V	-	15	-	uA
Enable Off input current	Iin1	VIN=1.5V VEN=0	-	0.45	1	uA
Short Current*	Ishort	VIN=2V,Vout<3.6V	-	300	-	mA
		VIN=2V,3.6V≤Vout≤5V		500		mA
Efficiency		VIN=2V,IOUT=100mA	-	93	96	%
oscillation frequency*		VIN=VOUT=VEN=3V	-	320	-	KHz
Oscillation signal duty Cycle*	DCosc	VIN=VOUT=VEN=3V	-	80	-	%
EN input high level	VENH	VIN=2V,VEN:0→2V	-	-	0.8*VIN	V
		VIN=2V,VEN:0→2V(VOUT=5.0V)	-	1.0	1.5	V
EN input low level	VENL	VIN=2V,VEN:2→0V	0.2* VIN	-	-	V
		VIN=2V,VEN:2→0V(VOUT=5.0V)	0.4V	-	-	V

Note: The parameter of "*" is guaranteed by design.

Type Characteristics

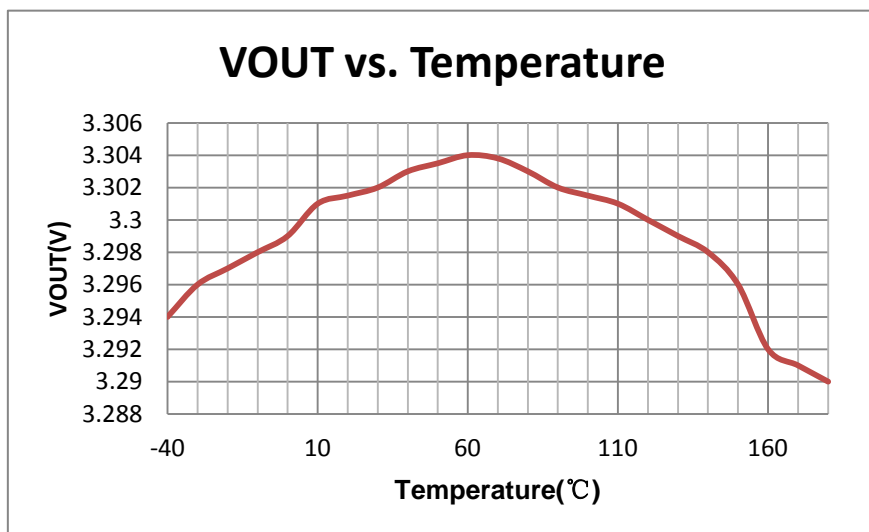1、**Output Voltage VS. Output Current（V$_{OUT}$ =3.3V）**

2、Start Voltage vs. Output Current

VSTART vs. IOUT
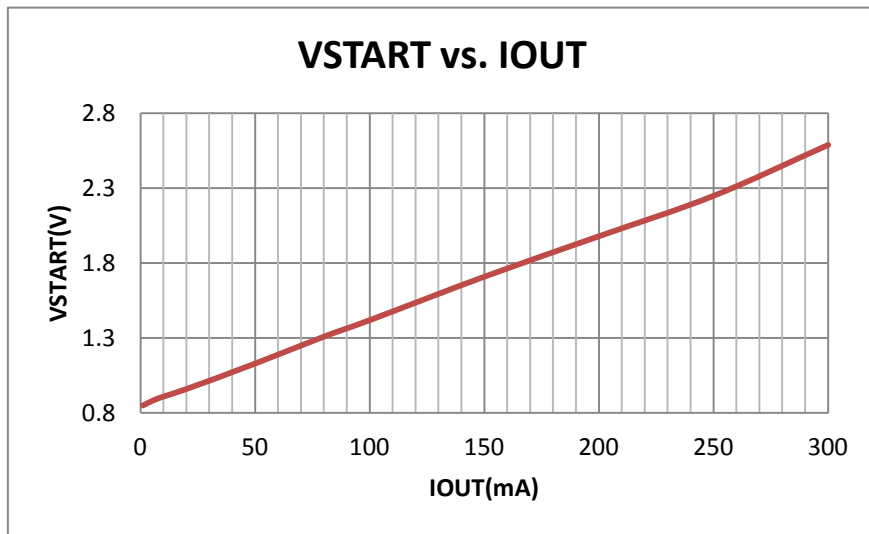
3、Efficiency vs. Output Current

Efficiency vs. IOUT

VIN=2V

VIN=2.5V

VIN=1.5V

VIN=0.9V VIN=1.2V

VIN=3.0V
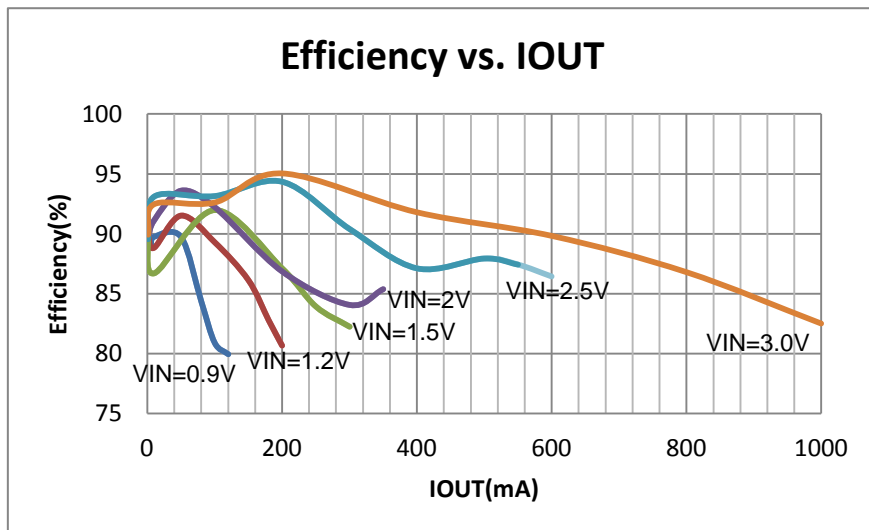
4、Output Voltage vs. Temperature

VOUT vs. Temperature

Selection of external devices and matters needing attention:

Peripheral circuits have great influence on the performance of ME2107，External devices should be selected reasonably：

External capacitance should not be less than 40 uF (too small capacitance will lead to too large output ripple), and have good frequency characteristics (Tantalum capacitance is best used). In addition, due to the peak voltage produced when the LX switch-driven transistor is turned off, the capacitance voltage value of the capacitor is at least three times the designed output voltage; (The ESR value of the ordinary aluminium electrolytic capacitor is too high, so the aluminium electrolytic capacitor specially used in the switched DC/DC converter, such as OS-CON capacitor, can be chosen.)

The external inductance should be small enough to store enough energy even at the lowest input voltage and the shortest LX switching time, while the inductance should be large enough to prevent ILXMAX from exceeding the maximum rating at the highest input voltage and the longest LX switching time. In addition, the DC impedance of the external inductor is small, the capacitance current value is high, and the magnetic saturation is not reached at work.

PCB Layout Matters needing attention：

The smaller the distance between external components and chips, the better. In particular, components connected to the VOUT terminal should be as short as possible as possible, and it is suggested that ceramic capacitors of 0.1 F be joined at both ends of the chip VOUT and GND. The GND terminal should be fully grounded, otherwise the zero potential inside the chip will change with the switching current, resulting in unstable working state.

Package Information

- **Package type:SOT23-5**
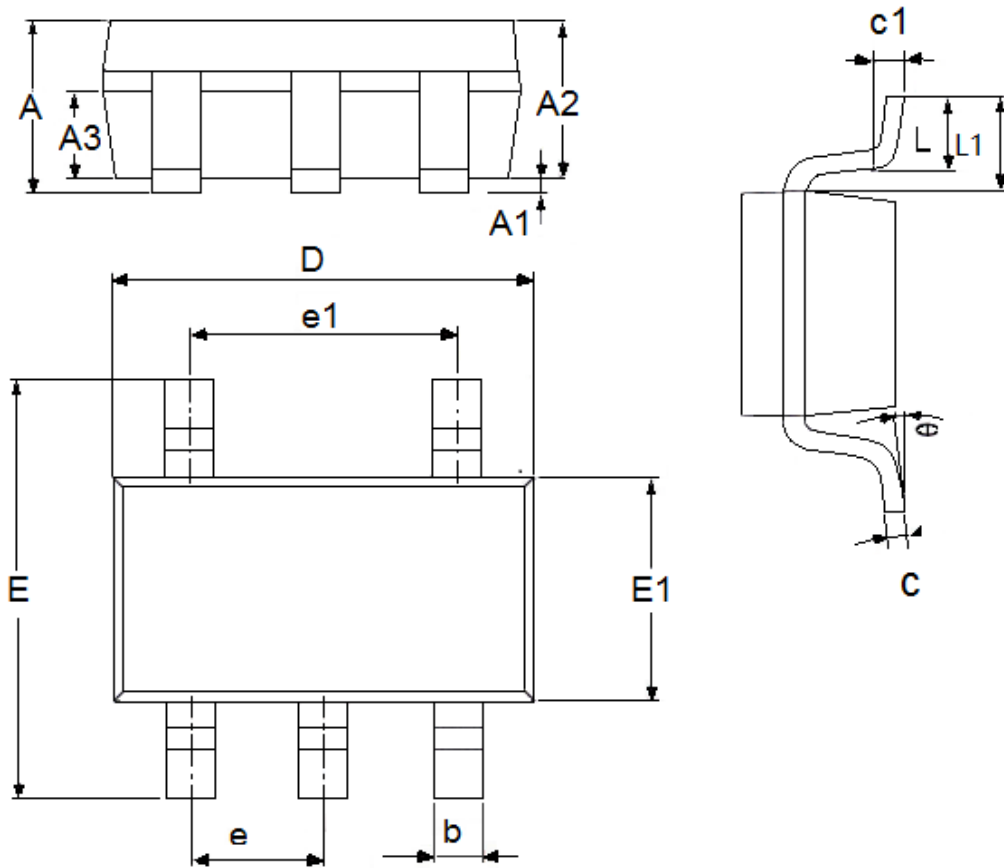
DIM	Millimeters		Inches	
	Min	**Max**	**Min**	**Max**
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.23	0.0039	0.0091
D	2.82	3.05	0.1110	0.1201
e1	1.9(TYP)		0.0748(TYP)	
E	2.6	3.05	0.1024	0.1201
E1	1.5	1.75	0.0512	0.0689
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	

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