



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.

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.

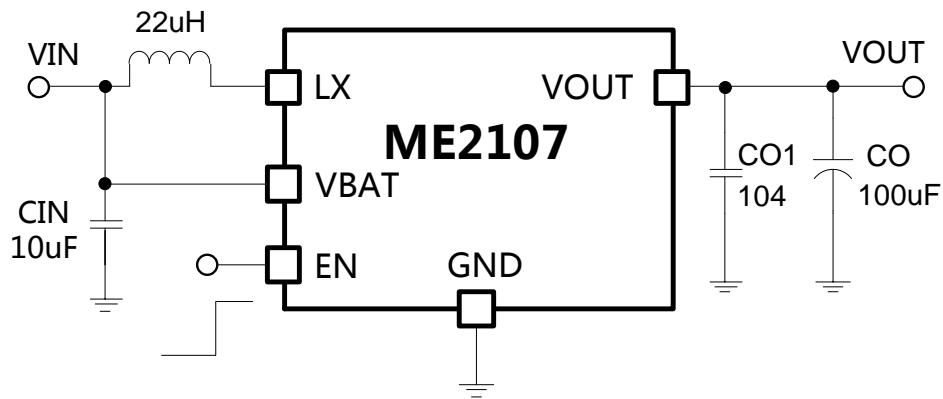
Features

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

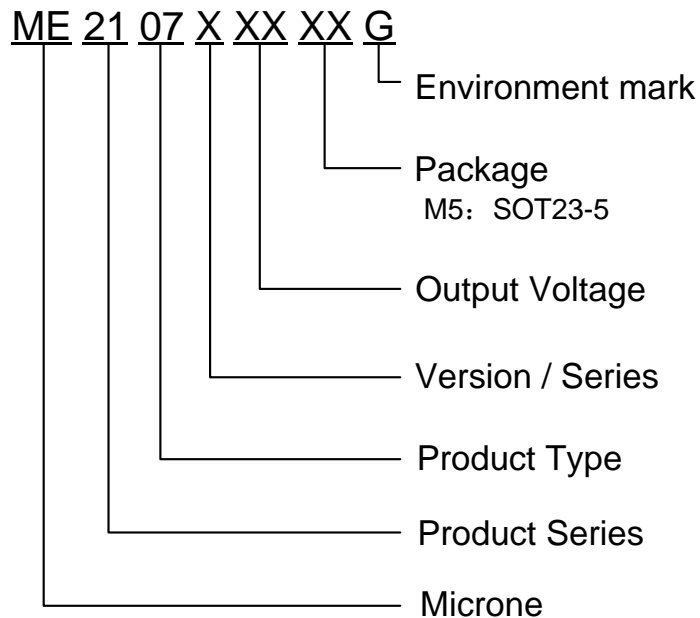
Package

- 5-pin SOT23-5

Typical Application Circuit



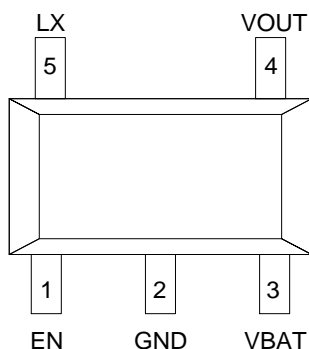
Selection Guide



| 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.

Pin Configuration

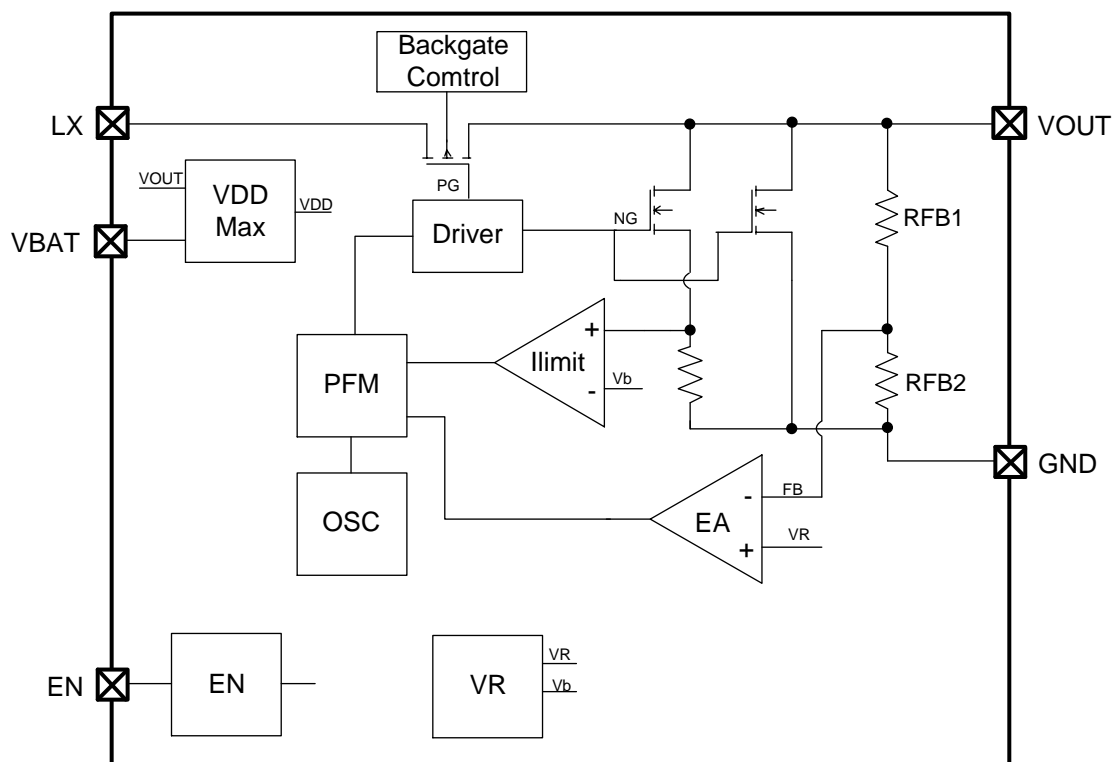


SOT23-5

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 | °C |
| Storage Temperature Range | TSTG | -55~150 | °C |
| Maximum junction temperature | TJ | -40~150 | °C |
| Welding temperature | TL | 260 | °C |
| Continuous Total Power Dissipation SOT23-5 | PD | 0.6 | W |
| Thermal resistance (Junction to air) | θ_{JA} | 210 | °C/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 | μ H |
| Input capacitance | CIN | 10 | μ F |
| Output capacitance | CO | 100 | μ F |
| Output capacitance | CO1 | 0.1 | μ F |

Electrical Characteristics

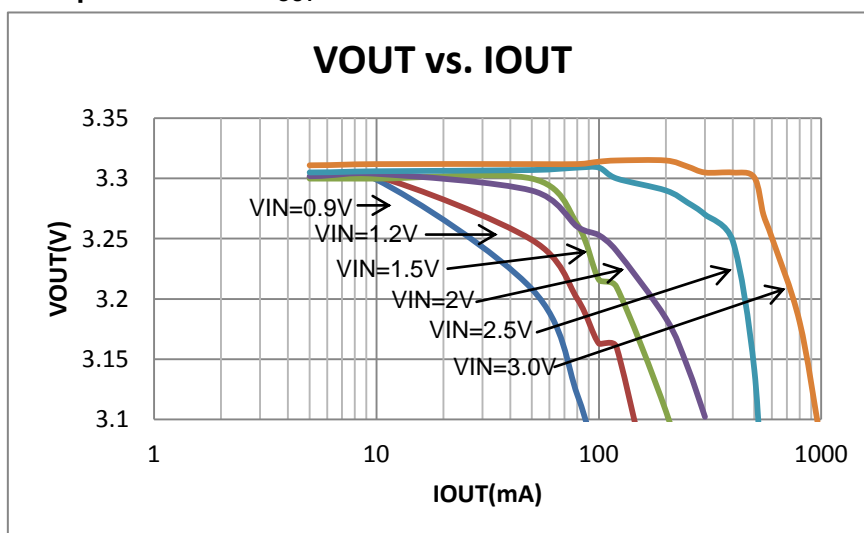
TA = 25 °C, VIN = VEN = 2V, VOUT = 3.3V, L = 22uH, CIN = 10uF, CO = 100uF, CO1 = 104, unless otherwise noted

| 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 |

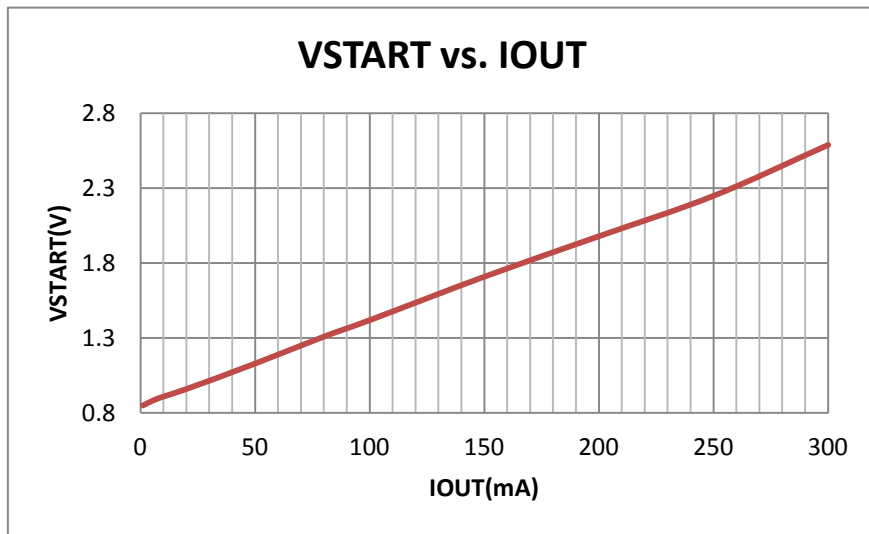
Note: The parameter of "*" is guaranteed by design.

Type Characteristics

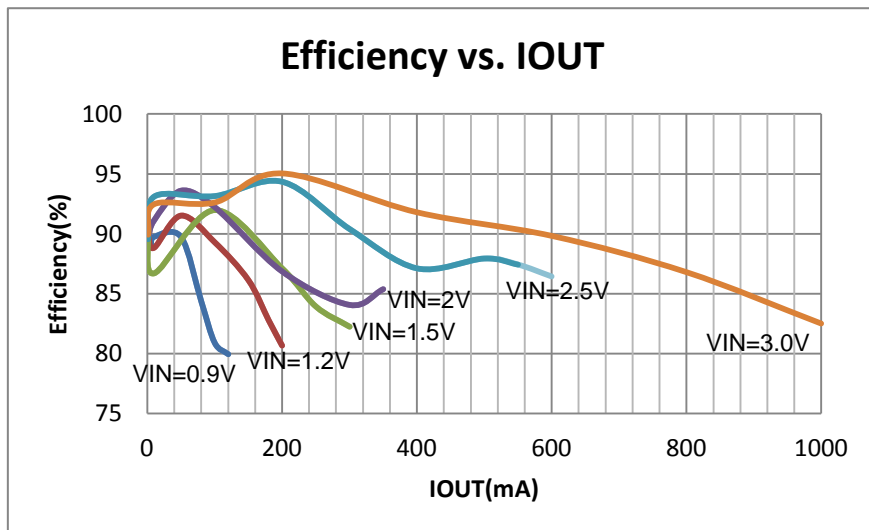
1、Output Voltage VS. Output Current (V_{OUT} = 3.3V)



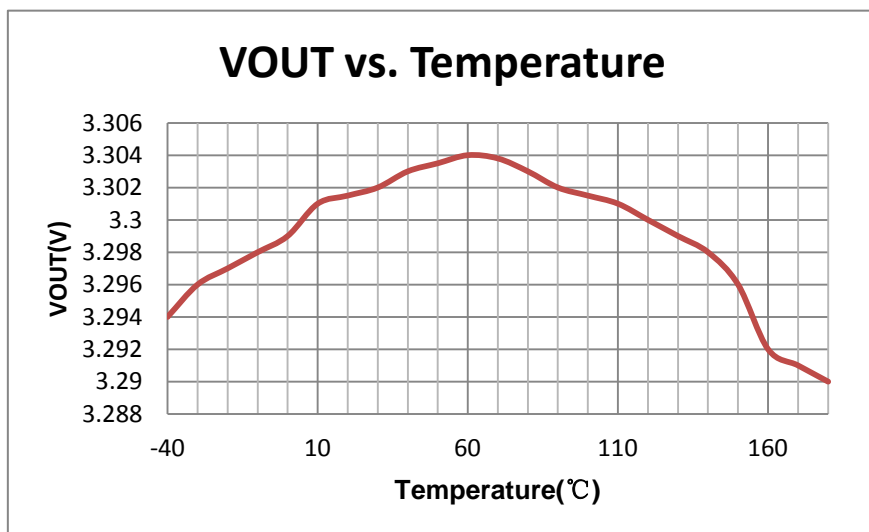
2、Start Voltage vs. Output Current



3、Efficiency vs. Output Current



4、Output Voltage 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.)

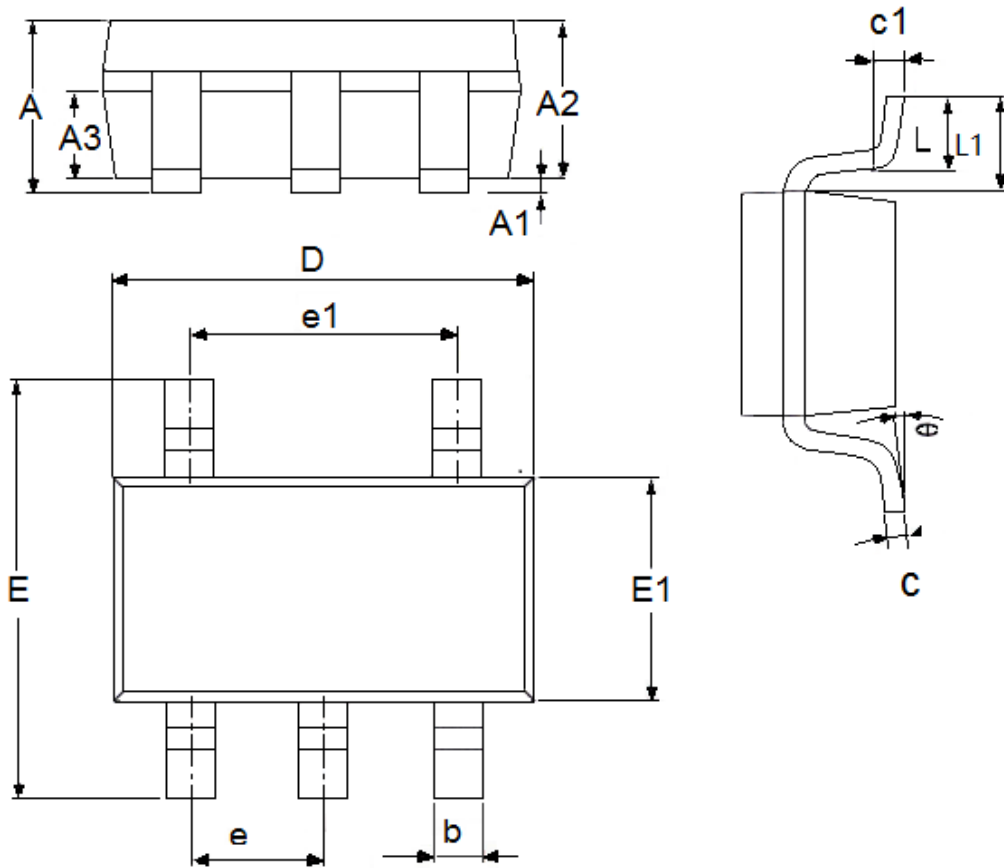
The external inductance should be small enough to store enough energy even at the lowest input voltage and the shortest LX switching time, while the inductance should be large enough to prevent ILXMAX from exceeding the maximum rating at the highest input voltage and the longest LX switching time. In 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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