With Flash Control LED Driver ME2219 series

Description

ME2219 is a PFM DC/DC LED driver with flash control functions. The chip's inside has PFM DC/DC boost model and digital logic model. The boost model needs a capacitor, a inductor, a Schottky diode to form the boost circuit, to achieve the 3.6V output voltage. The oscillation frequency is 165KHz (typical); The digital logic circuit need another capacitor to achieve the circuit function change. There are three work model(full bright, half bright and flash) sequentially. The chip mainly used in LED Driver with flashing control and it offers expanding output current to improve the load capacity of the system.

Feature

- input voltage:0.9~4.5V
- output voltage:3.6V~3.74V
- load capacity：
  Input 2.4V, without expand output current MOSFET: 400mA
  Input 2.4V, with expand output current MOSFET: 750mA
- low start voltage: maximum 0.9V(output current: 1mA)
- with special shift working state function
- External devices only need: two capacitors, an inductor, a Schottky diode

Applications

- A flashlight with shifting function control

Package

- SOT-23-6

Typical Application Circuit

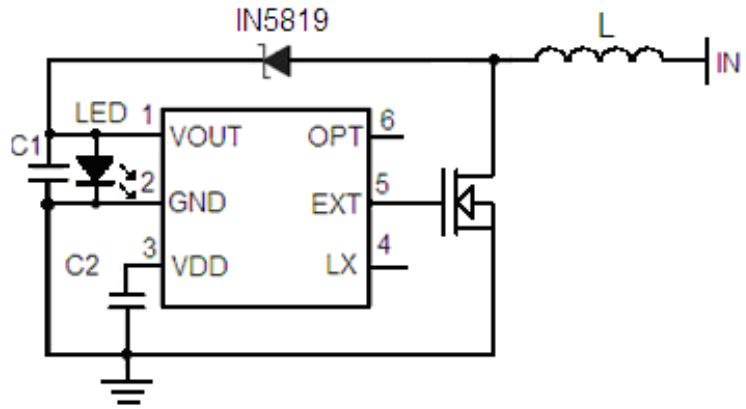


Figure1 without expending output current MOSFET's application (one or two dry batteries)

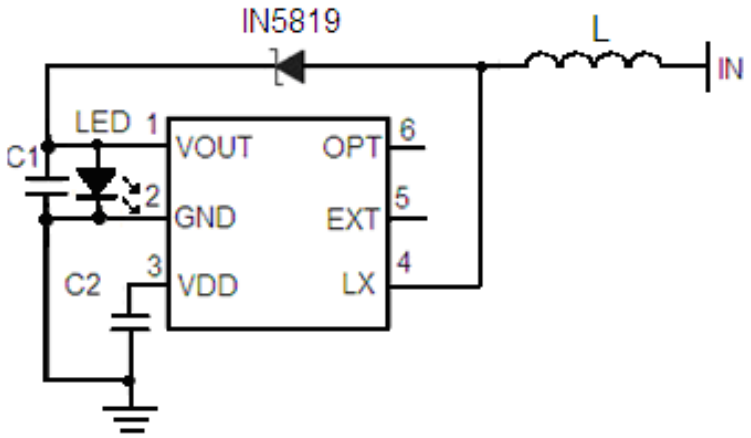
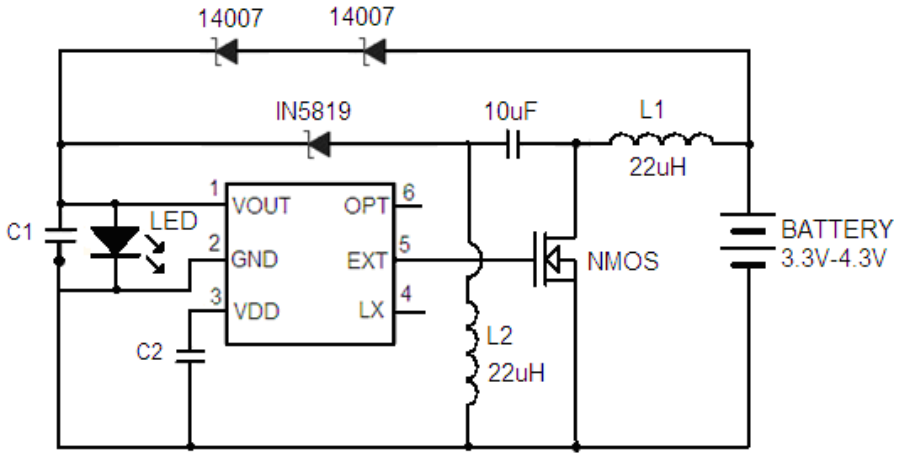


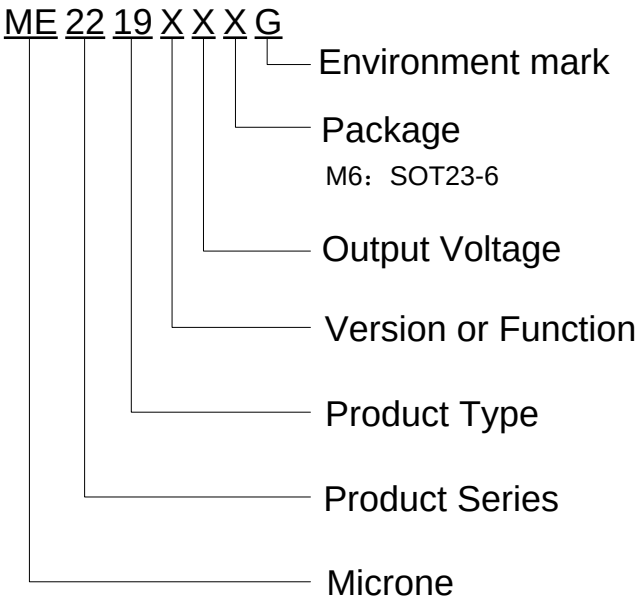
Figure2 with expending output current MOSFET's application (one or two dry batteries)



Note: If need larger than 4.3V to power on, please use 3 14007 series.

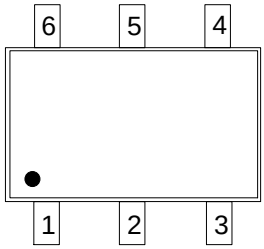
Figure3 Application of lithium battery power supply

Selection Guide



product serise	product description
ME2219A36M6G	V_{OUT} =3.6V,package:SOT23-6

Pin Configuration& Marking Information



Pin Assignment

PIN Number SOT23-6	symbol	Function
1	VOUT	Output
2	GND	Ground
3	VDD	Power
4	LX	Switch
5	EXT	Expending output current
6	OPT	shift control function

Absolute Maximum Ratings:

Parameter	Symbol	Ratings	Units
VOUT pin Voltage	V_{OUT}	6.5	V
LX pin Voltage	V_{LX}	6.5	V
EXT pin Voltage	V_{EXT}	-0.3~Vout+0.3	V
VDD pin Voltage	V_{DD}	-0.3~Vout+0.3	V
OPT pin Voltage	V_{CE}	-0.3~Vout+0.3	V
LX pin Current	I_{LX}	600	mA
EXT pin output current	I_{EXT}	±30	mA
Internal Power Dissipation	P_D	400	mW
Operating Temperature Range	T_{OPR}	-40~+85	℃
Storage Temperature Range	T_{STG}	-55~+150	℃
Welding temperature and time	T_{SOLDER}	260℃, 10s	
Thermal resistance(Junction to air)	θ_{JA}	200	ºC /W
Continuous Total Power Dissipation	P_D	0.63	W

Electrical Characteristic

Parameter	Symbol	Typ		Unit
Input Voltage Range	V_{IN}	0.9-4.5		V
Start-up Voltage		0.9		V
Output Voltage	V_{OUT}	3.6-3.74		V
shifting time	T	10		S
no shifting time	t	30		mS
output current	I_{OUT}	1.2V without MOSFET	130	mA
		1.2V with MOSFET	350	mA
		2.4V without MOSFET	400	mA
		2.4V with MOSFET	750	mA
25% light		100HZ 25% duty		
flash		10HZ 50% duty		
Oscillator Frequency	F_{OSC}	Vout=4V	165	KHz

Functional description

ME2219 is mainly used for LED driving with control function，the specific functions are as follows：

1) OPT suspended (or connected to VOUT), working model: Full bright (the first gear)→ 25% bright (100HZ 25%duty, the second gear)→ flash (10HZ, the third gear).

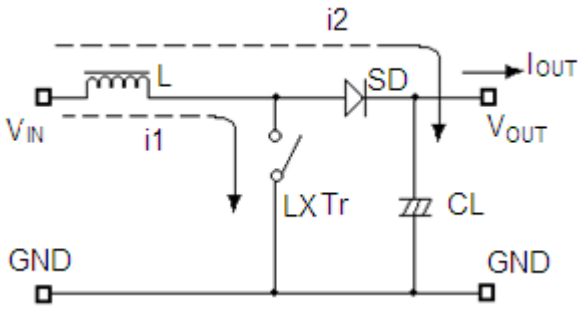
2) OPT connected to GND, working model: Full bright (the first gear)→flash (10HZ, the second gear).

3) In the first time powered on, the IC enter into the first gear, after powered off within 10s powered on again, the IC enter into second gear; after powered off, within 10s powered on again, the IC enter into the third gear, sequentially. If powered off time exceeding 10s, then the IC enter into the first gear (when OPT connected to GND, there are only two shifting gears.

4) When fast shifting, it will not disorder or non shift (after powered off within 30ms, powered on again, no shift).Full bright-half bright output current is 4:1.

eration Principles

ME2219 series boost convertor use inductor to storage energy, and through the input source to achieve the high input voltage than the output voltage.



Boost DC/DC operation principle

External Parts Selection

output capacitor	C1	10	μF
input capacitor	C2	1	μF
inductor	L	22	μH
Schottky diode		like IN5817,IN5819	

External Parts Selection：(external parts' influence to ME2219 is very big. It's necessary to select reasonable external parts)

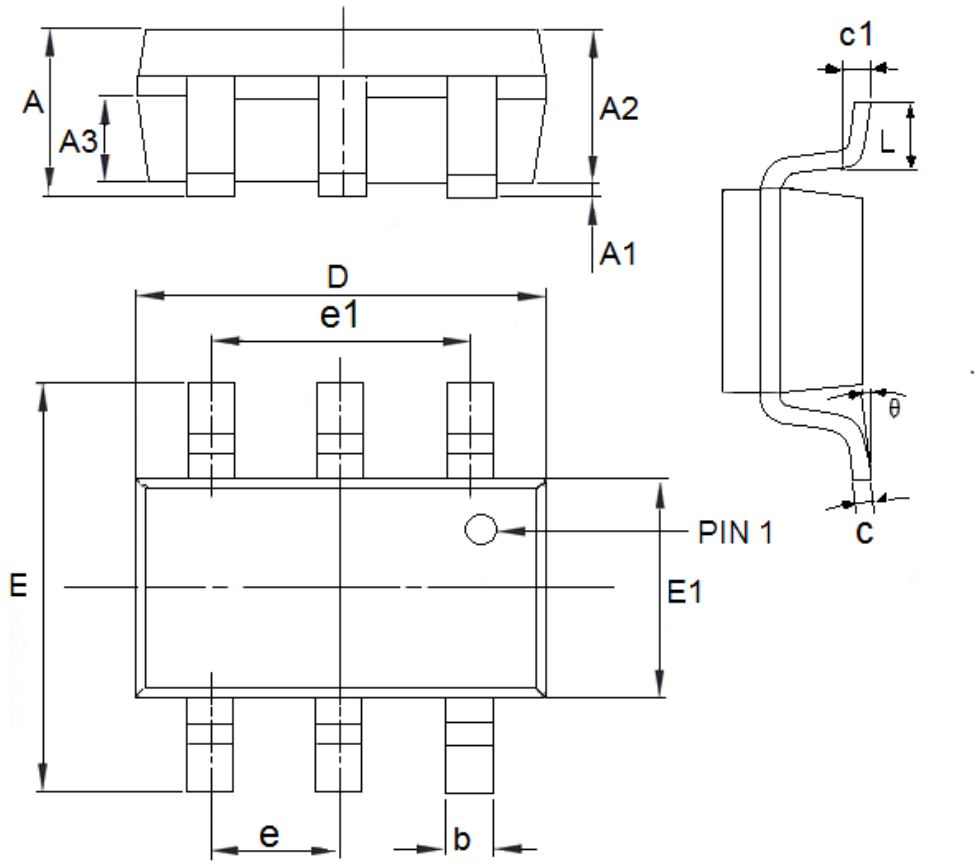
- If VDD's pin no C2, it will no shift function, and will in full bright .
- The shifting time is related to C2's value, if the user want to extend shift time, you can add the C2's value.
- if use two dry batteries, the inductor's current is large, it is suggest to use large value inductor L (22μH) and the parasitic resistance is little (r<50mΩ), to reduce the heat of inductor and to prevent magnetic saturation.
- The output capacitors C1 is better lager than 10μF (if capacitor's value small, it will lead to larger output ripple), and nice frequency characteristic.
- It's better to use Schottky diode.

PCB Layout Guidelines

- The out devices must close to the chip, and the connection shorter.
- GND must connect to gnd fully, or the internal zero level will change with the switching current, make the system's stability.

Package Information

- **Package type:SOT23-6**



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	0.55	0.75	0.0217	0.0295
b	0.25	0.5	0.0098	0.0197
c	0.1	0.25	0.0039	0.0098
D	2.7	3.12	0.1063	0.1228
e1	1.9(TYP)		0.0748(TYP)	
E	2.6	3.1	0.1024	0.1220
E1	1.4	1.8	0.0551	0.0709
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	

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