High Efficiency ,synchronous PFM step-up DC-DC converter

General Description

ME2188 Series is a PFM Step-up DC/DC converter IC with low supply current by CMOS process. High frequency noise that occurs during switching is reduced by using advanced circuit designed, output voltage is programmable in 0.1V steps between 1.8V~5.0V and maximum frequency is 350KHz(TYP.). A low ripple, high efficiency step-up DC/DC converter can be constructed of ME2188Xxx with only two external components. ME2188Xxx is suitable for use with battery-powered instruments with low noise and low supply current.

Features

- High efficiency：95%
- Maximum frequency：350KHz
- Low Quiescent Current：15μA
- Input Voltage: 0.9V~5.0V
- Output Voltage Range:1.8V to 5.0V
- High Accuracy:± 2%
- Low ripple and Low noise
- Package:
  SOT23-3, SOT23-5

Selection Guide

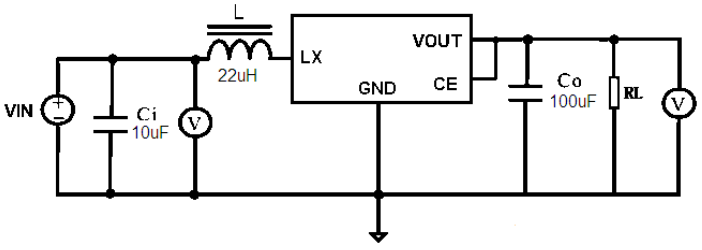
ME 2188 X XX X X X

- Pin defined Type
  T: Normal define
  TF: Reversed define
- Environment mark
- Package:
  e.g.:
  M3: SOT23-3
  M5: SOT23-5
- Output Voltage
  e.g.: 21-2.1V
  2.2-2.2V
  2.8-2.8V
  33-3.3V
  .....
- Function
  A: LX
  C: LX+CE
- Product Type
- Product Series
- Microne

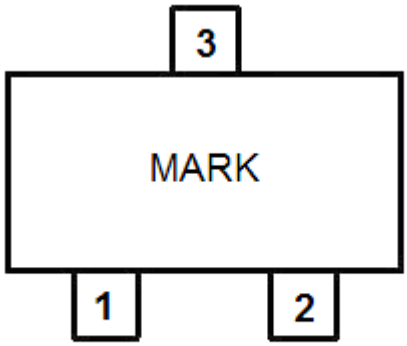
Typical Application

- Power source for battery-powered equipment
- Power source for Wireless mouse,toys, Cameras, VCRs, PDAs, MP3, and Led lighting etc

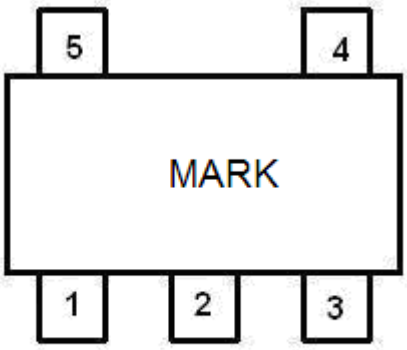
Typical Application Circuit



Pin Configuration



SOT23-3



SOT23-5

Pin Assignment

TYPE	POSTFIX	PACKAGE	SWITCHING TRANSISTOR	CE FUNCTION	FEATURES
ME2188Axx	M3	SOT23-3	Build in Transistor	No	Lx
ME2188Cxx	M5	SOT23-5	Build in Transistor	Yes	LX+CE

ME2188AXX

Pin Number SOT23-3	Pin Name	Description
1	GND	Ground
3	VOUT	Voltage output
2	LX	Switch pin

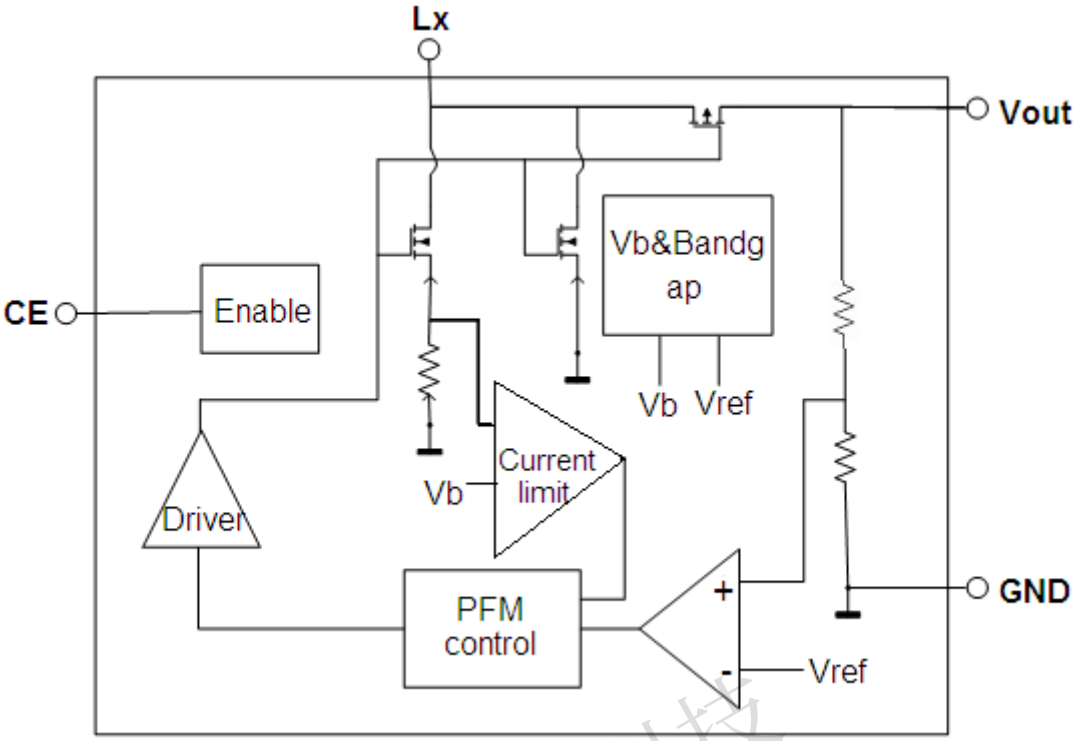
ME2188CXX

PIN Number SOT23-5	Pin Name	Function
1	CE	Chip enable
2	VOUT	Output voltage monitor, IC internal power supply
3	NC	NC
4	GND	Ground
5	LX	Switch

Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
Supply Voltage		V_{MAX}	8	V
LX pin current		ILXmax	1000	mA
Continuous Total Power Dissipation	SOT23	P_D	300	mW
	SOT89	P_D	500	mW
	TO92	P_D	500	mW
Operating Temperature Range		T_{OPR}	-20～＋85	℃
Storage Temperature Range		T_{STG}	-40~125	℃
ESD		V_{ESD}	2000	V

Block Diagram



Electrical Characteristics

T_A=25^{0}C, V_{in}=V_{OUT}×0.6V, L=22μH，C_{IN}=10μF，C_{OUT}=100μF, unless otherwise noted.

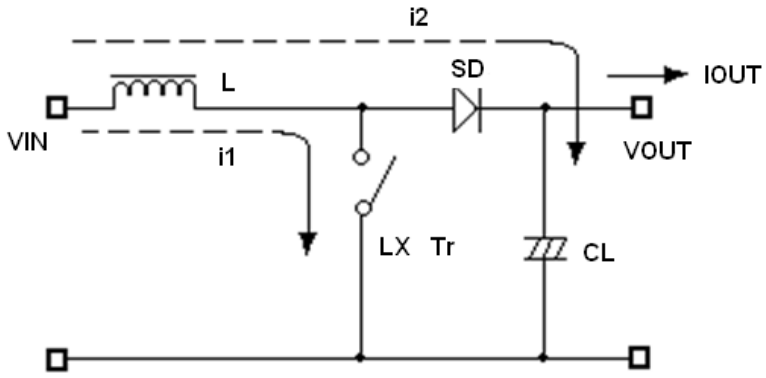
ME2188Axx/Cxx

Symbol	Parameter	Test Conditions	MIN	TYP	MAX	UNIT
V_{OUT}	Output Voltage		V_{OUT}×0.98	V_{OUT}	V_{OUT}× 1.02	V
V_{IN}	Supply Voltage		0.9	-	5	V
V_{START}	Start voltage	Iload=1mA，Vin：0→2V	-	-	0.95	V
Vhold	Hold voltage	Iload=1mA，Vin：2→0V	0.5	-	-	V
F_{OSC}	oscillation frequency		-	350	-	KHz
η	Efficiency		-	90	95	%
Ilimit	Current limit		800	1000	1200	mA
I_{IN}	Quiescent Current		-	15	-	μA

Note：1、Inductor：22μH（r<0.5Ω）
2、Capacitor：Tantalum type

Operation Description

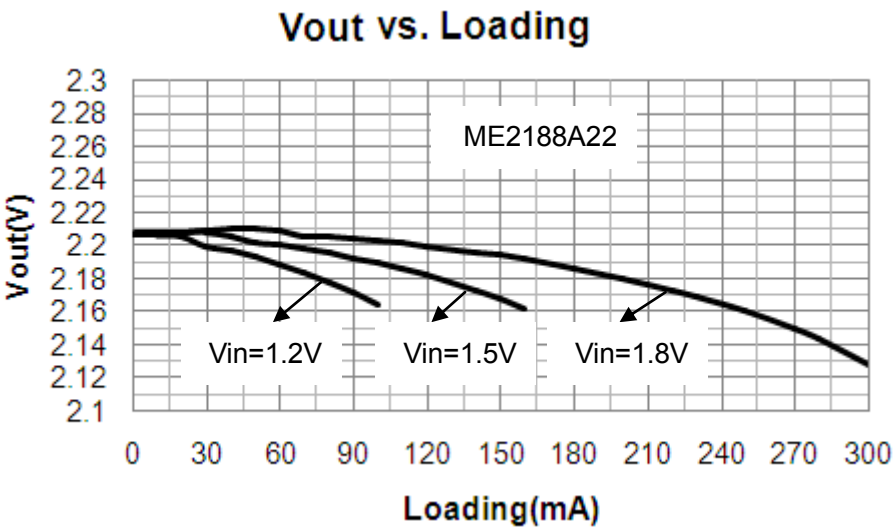
ME2188 step-up DC/DC converter charges energy in the inductor when Lx Transistor is on, and discharges the energy with the addition of the energy from input power source thereto, so that a higher output voltage than the input voltage is obtained. Following is the operation diagram.

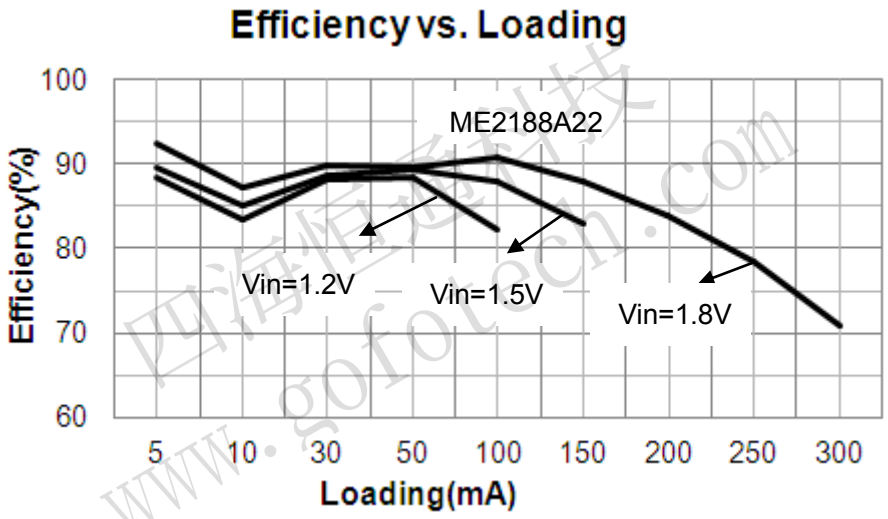


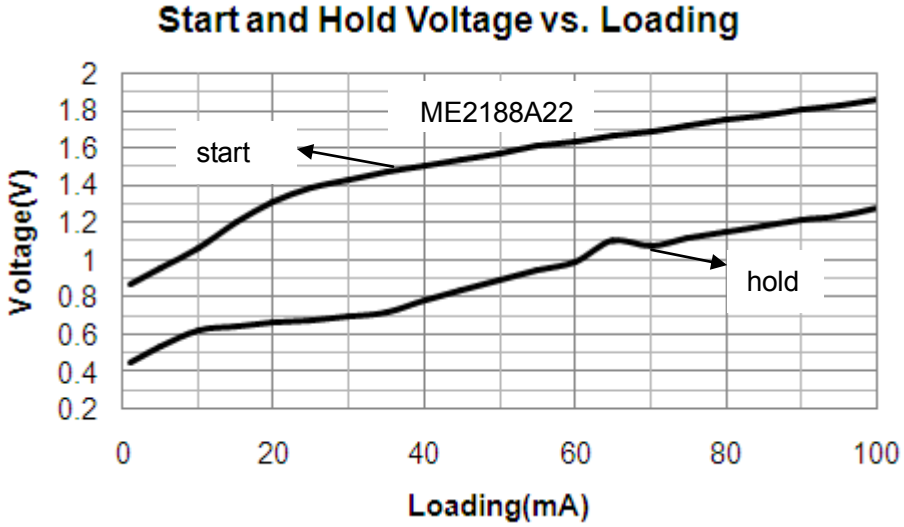
Switching DC/DC Step up Converter operating process

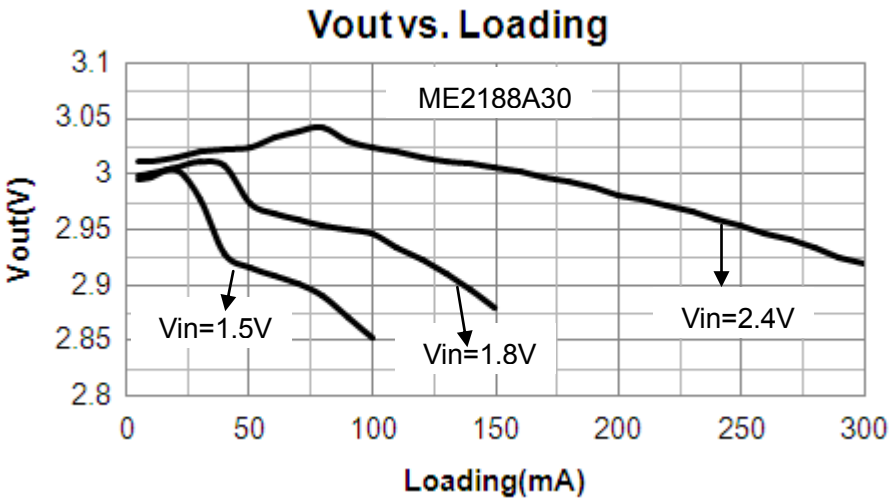
- PCB Layout：
  - Set external components as close as possible to the IC and minimize the connection between the components and the IC. In particular, when an external component is connected to VOUT Pin, make minimum connection with the capacitor.
  - Make Vss pin sufficient grounding, otherwise, the zero level within IC will varied with the switching current. This may result in unstable operation of IC.

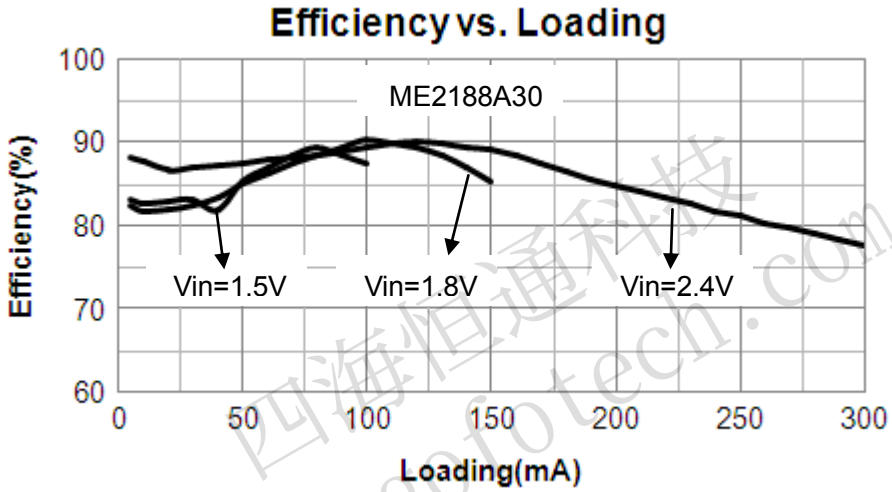
Type Characteristics

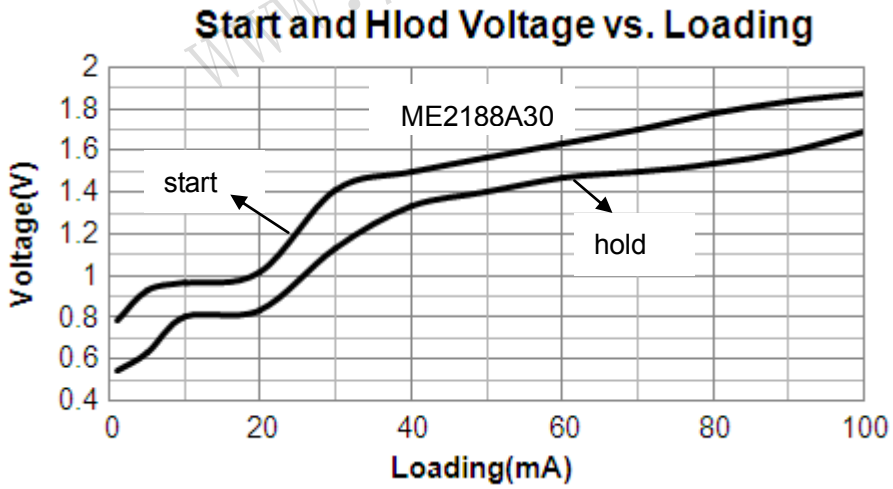






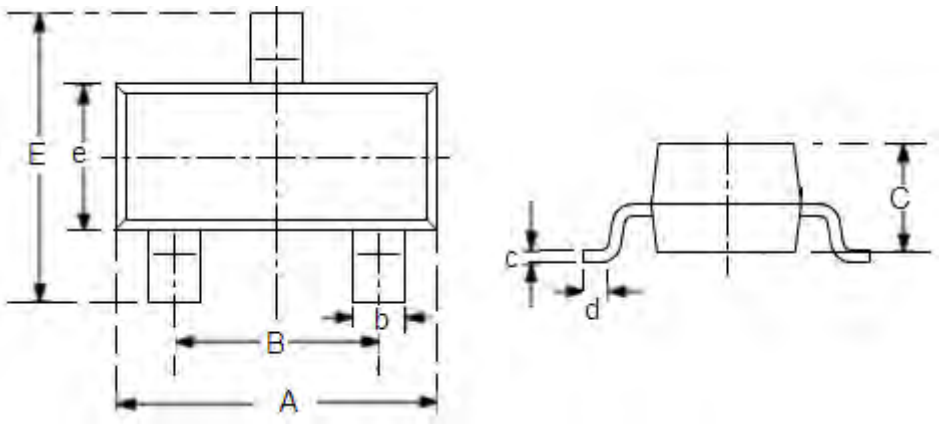






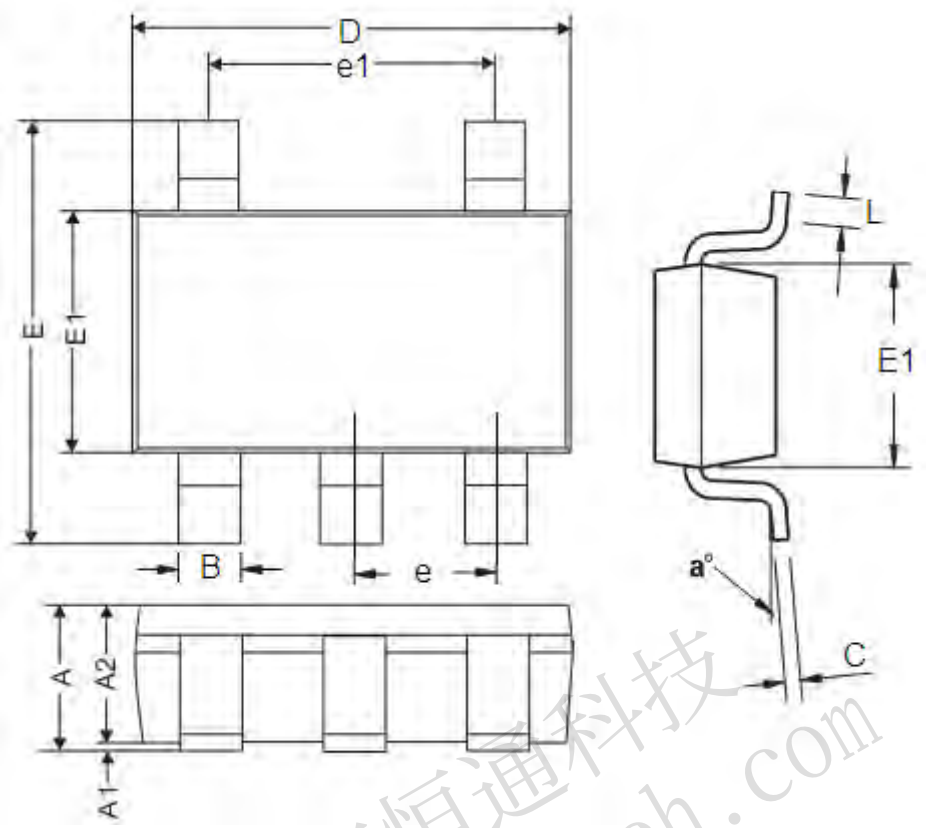
Packaging Information

Packaging Type: SOT23-3



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.7	3.1	0.1063	0.122
B	1.7	2.1	0.0669	0.0827
b	0.35	0.5	0.0138	0.0197
C	1.0	1.2	0.0394	0.0472
c	0.1	0.25	0.0039	0.0098
d	0.2	-	0.0079	-
E	2.6	3.0	0.1023	0.1181
e	1.5	1.8	0.059	0.0708

Packaging Type: SOT23-5



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.9	1.45	0.0354	0.0570
A1	0	0.15	0	0.0059
A2	0.9	1.3	0.0354	0.0511
B	0.2	0.5	0.0078	0.0196
C	0.09	0.26	0.0035	0.0102
D	2.7	3.10	0.1062	0.1220
E	2.2	3.2	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
e	0.95REF		0.0374REF	
e1	1.90REF		0.0748REF	
L	0.10	0.60	0.0039	0.0236
a^0	0^0	30^0	0^0	30^0

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