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

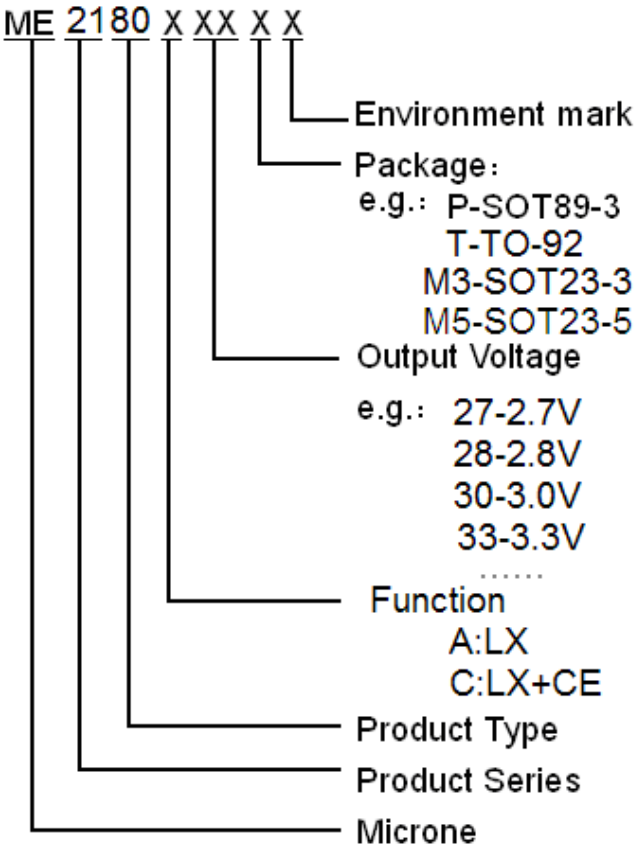
General Description

ME2180 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 2.5~5.0V and maximum frequency is 250KHz(TYP.). A low ripple, high efficiency step-up DC/DC converter can be constructed of ME2180Xxx with only two external components. ME2180Xxx is suitable for use with battery-powered instruments with low noise and low supply current.

Features

- High efficiency：95%
- Maximum frequency：250KHz
- Low Quiescent Current：15uA
- Input Voltage: 0.9V~5.0V
- Output Voltage Range:2.5V to 5.0V
- High Accuracy:± 2%
- Low ripple and Low noise
- Package:SOT89-3 ，SOT23-3 ，TO-92，SOT23-5

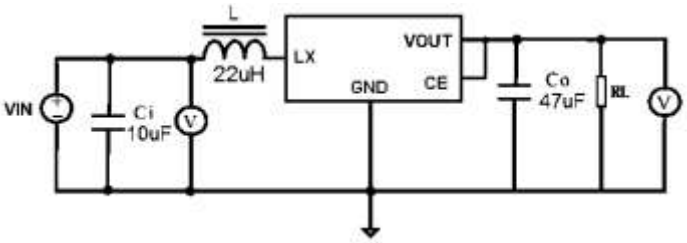
Selection Guide



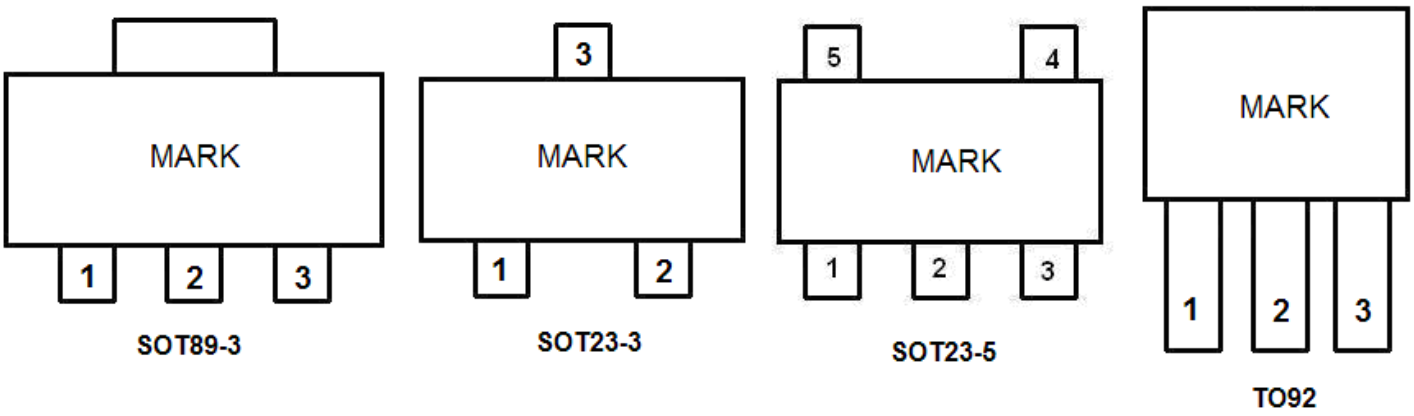
Typical Application

- 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



Pin Assignment

TYPE	POSTFIX	PACKAGE	SWITCHING TRANSISTOR	CE FUNCTION	FEATURES
ME2180Axx	M3	SOT23-3	Build in Transistor	No	Lx
	P	SOT89-3			
	T	TO92			
ME2180Cxx	M5	SOT23-5	Build in Transistor	Yes	LX+CE

ME2180AXX

Pin Number			Pin Name	Description
SOT89-3	SOT23-3	TO-92		
1	1	1	GND	Ground
2	3	2	VOUT	Voltage output
3	2	3	LX	Switch pin

ME2180AXX-DS

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

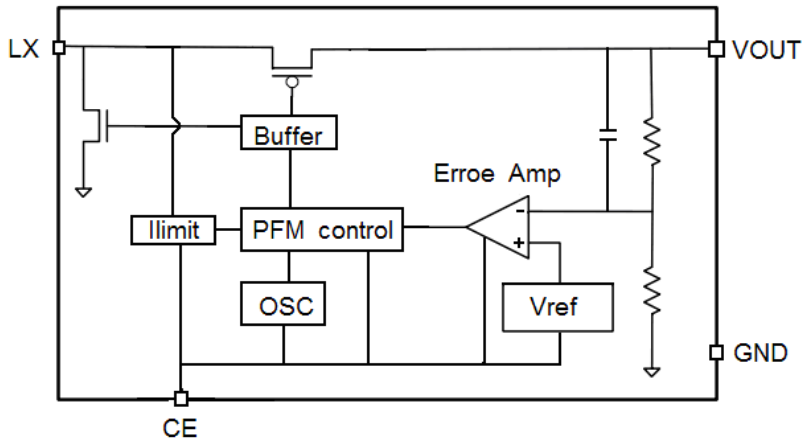
ME2180CXX

PIN Number	Pin Name	Function
SOT23-5		
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		Vesd	2000	V

Block Diagram



Electrical Characteristics

T_A=25^{0}C, V_{in}=Vout×0.6V, L=22uH，Cin=10u，Cout=47u, unless otherwise noted.

ME2180Axx/Cxx

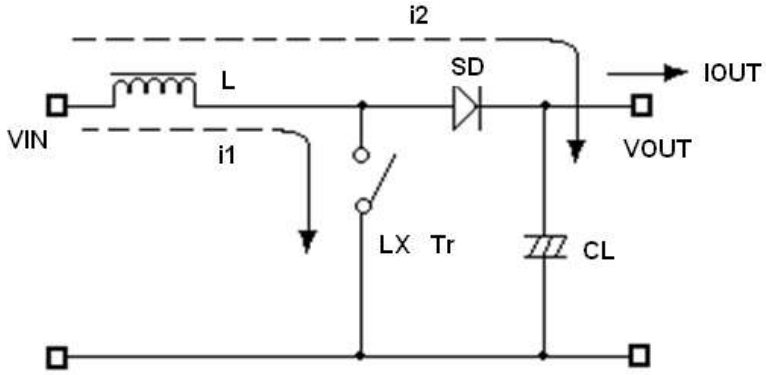
Symbol	Parameter	Test Conditions	MIN	TYP	MAX	UNIT
V_{OUT}	Output Voltage		Vout×0.98	Vout	Vout×1.02	V
V_{in}	Supply Voltage		0.9		5	V
Vstart	Start voltage	Iload=1mA，Vin：0→2V			0.95	V
Vhold	Hold voltage	Iload=1mA，Vin：2→0V	0.5			V
Fosc	oscillation frequency			250		KHz
η	Efficiency			90	95	%
Ilimit	Current limit		800	1000	1200	mA
Iin	Quiescent Current			15		uA

Note：1、Inductor：22μH（r<0.5Ω）

2、Capacitor：Tantalum type

Operation Description

ME2180 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.

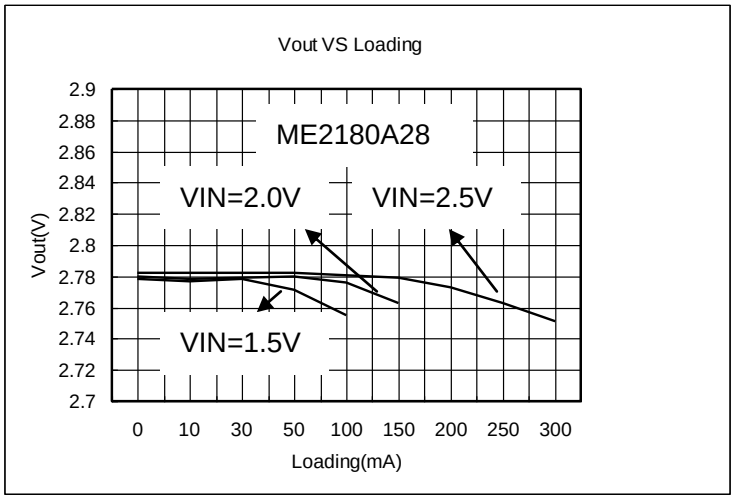


Switching DC/DC Step up Converter operating process

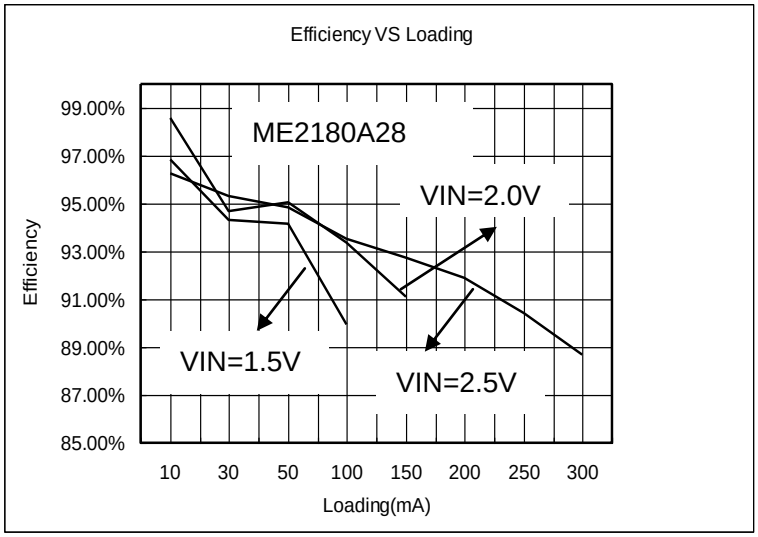
- PCB Layout：
  - ✧ Set external components as close as possible to the IC and minimize the connection between the components and the IC. In particular, when an external component is connected to VOUT Pin, make minimum connection with the capacitor.
  - ✧ Make Vss pin sufficient grounding, otherwise,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

Type Characteristics

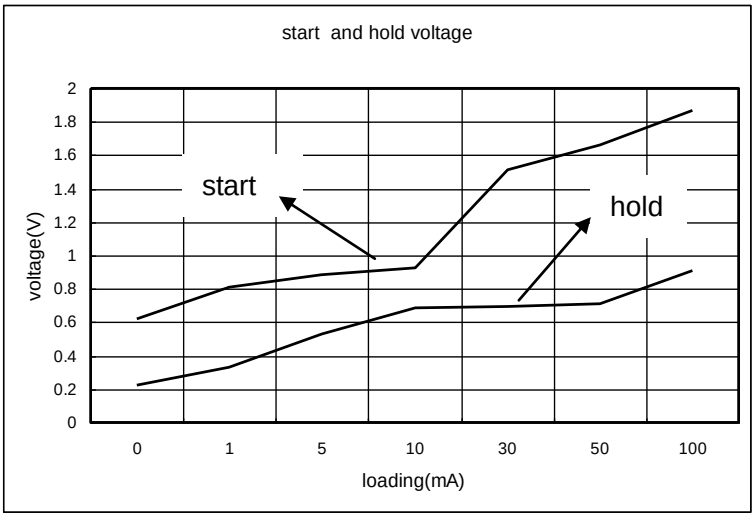
1、 output voltage VS output current



2、 efficiency VS output current

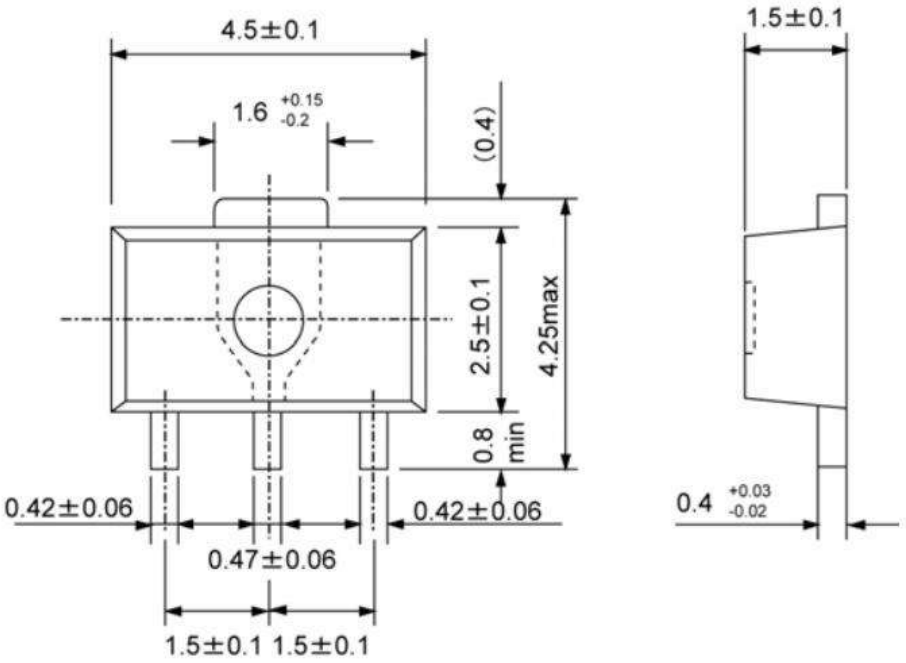


3、 Start & Hold voltage VS output current

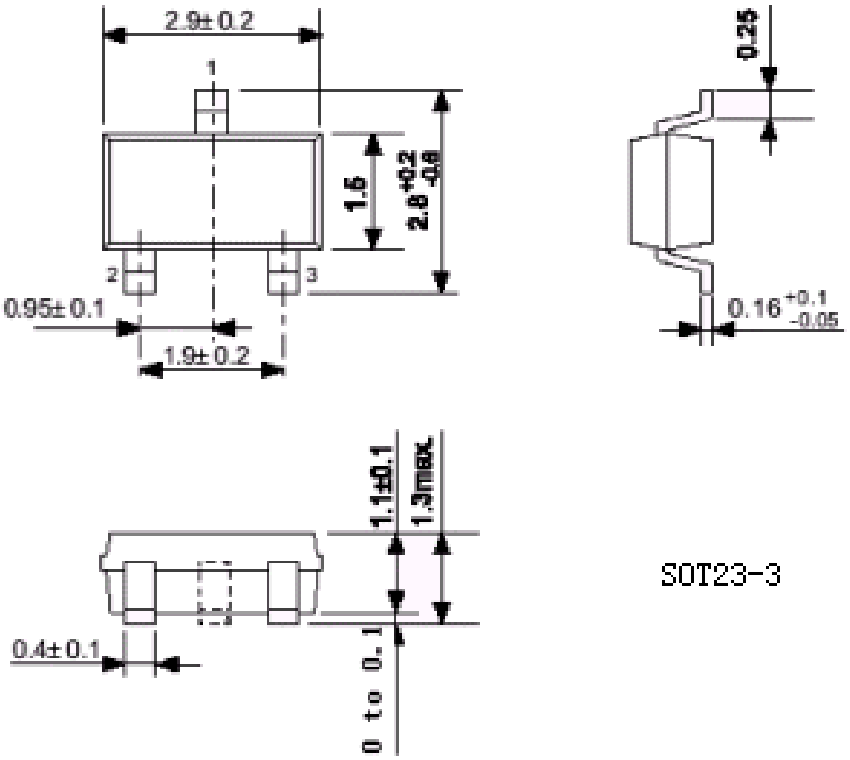


Packaging Information

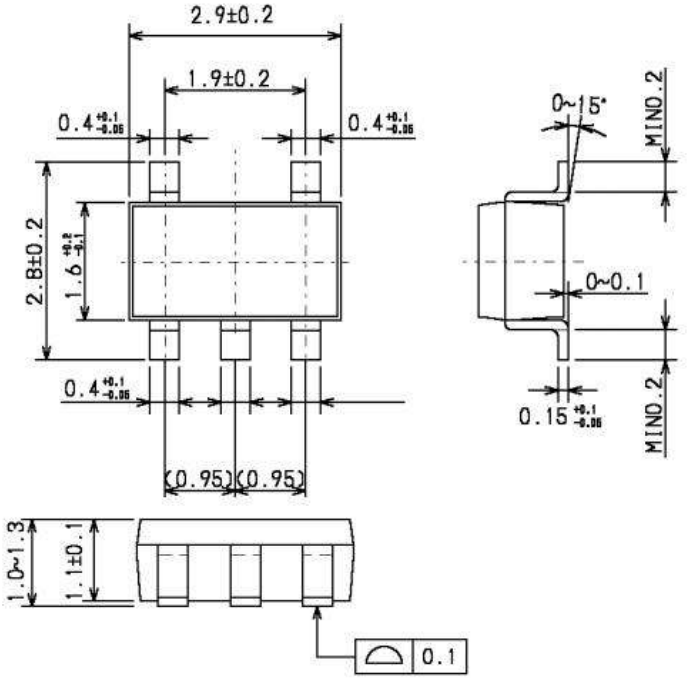
● SOT89-3



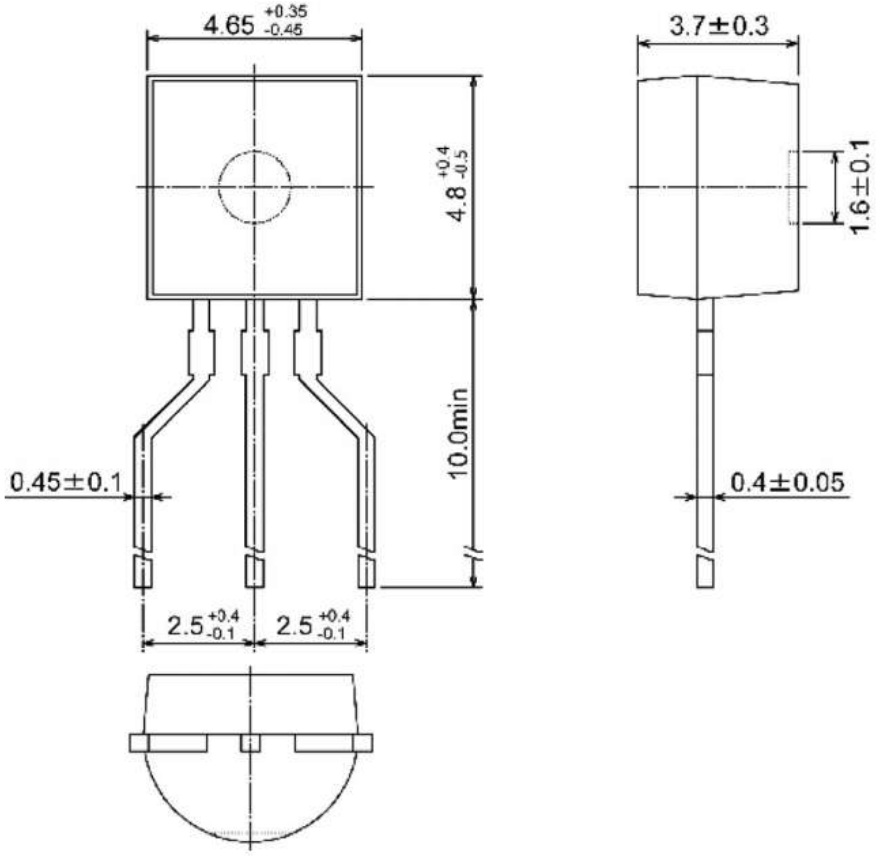
● SOT23-3



●SOT23-5


2.9±0.2
1.9±0.2
0.4 +0.1 -0.05
0.4 +0.1 -0.05
2.8±0.2
1.6 +0.2 -0.1
0.4 +0.1 -0.05
(0.95)(0.95)
1.0~1.3
1.1±0.1
0.1
0~15°
MIN0.2
0~0.1
0.15 +0.1 -0.05
MIN0.2

● TO-92


4.65 +0.35 -0.45
4.8 +0.4 -0.5
10.0min
0.45±0.1
2.5 +0.4 -0.1
2.5 +0.4 -0.1
3.7±0.3
1.6±0.1
0.4±0.05

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