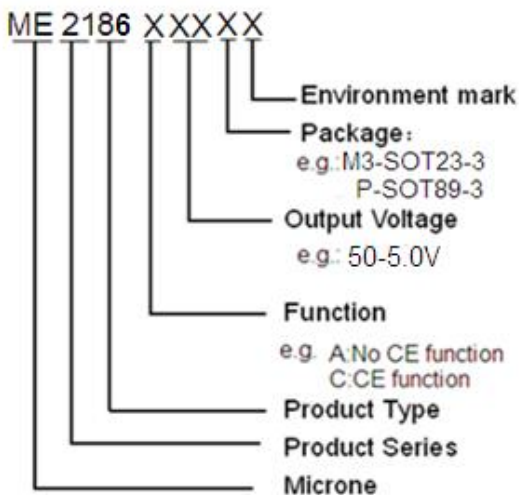


## Synchronous PFM Step-up DC/DC Converter, ME2186 Series

### General Description

ME2186 Series is a Synchronous 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 1.8~6.0V. A low ripple, high efficiency step-up DC/DC converter can be constructed of ME2186Xxx with only three external components. Also available is a CE (chip enable) function that reduce power dissipation during shut-down mode. ME2186Xxx is suitable for use with battery-powered instruments with low noise and low supply current.

### Selection Guide



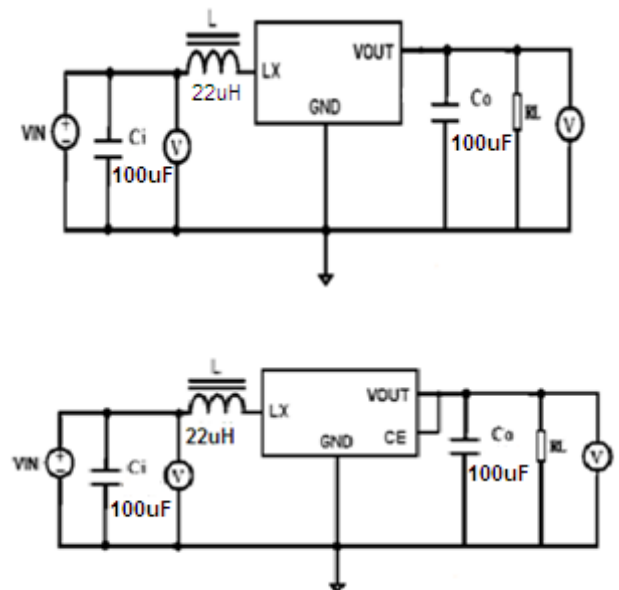
### Features

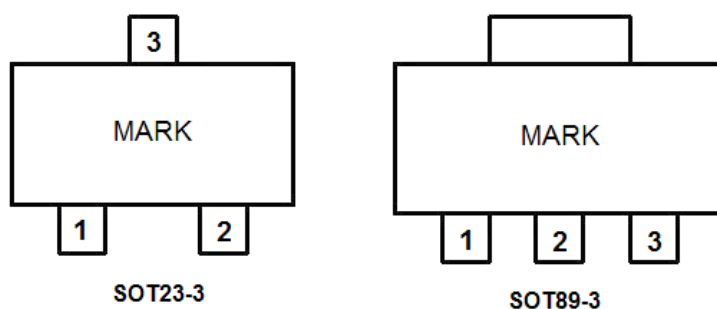
- Low ripple and low noise
- Operating voltage range: 0.9V~6.0V
- Output voltage range: 1.8V~6.0V(step 0.1V)
- Output voltage accuracy:  $\pm 2\%$
- Output Current: If  $V_{IN}=3.0V$  and  $V_{OUT}=5.0V$ , then  $I_{OUT}=500mA$
- Low start voltage:  $\leq 0.9V$ (at  $I_{OUT}=1mA$ )
- Maximum oscillator frequency: 330KHz (TYP. ME2186A50)
- Package: SOT23-3, SOT89-3

### Typical Application

- Power source for battery-powered equipment
- Power source for wireless mouse, wireless keyboard, toys, cameras, camcorders, VCRs, PDAs, and hand-held communication equipment
- Power source for appliances which require higher cell voltage than that of batteries used in the appliances

### Typical Applications



**Pin Configuration**

**Pin Assignment**

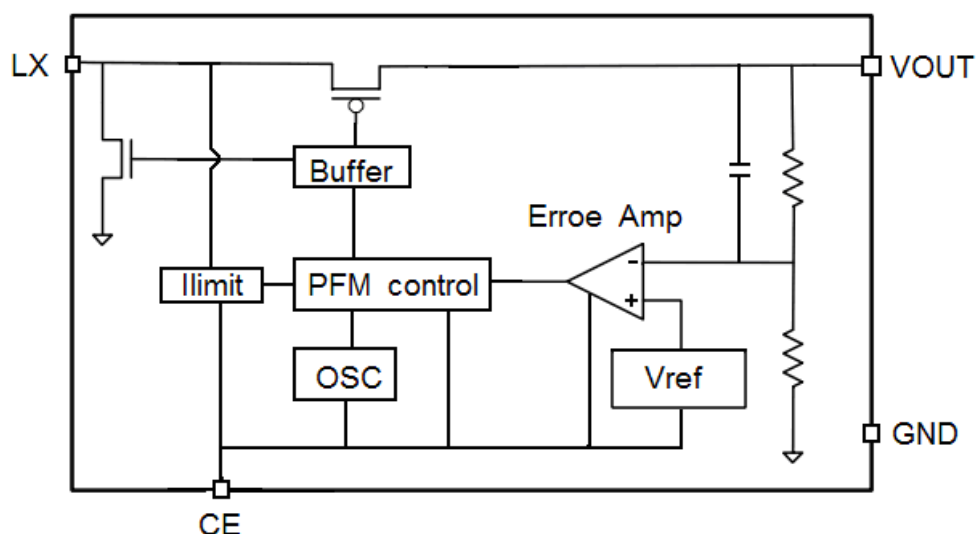
TYPE	POSTFIX	PACKAGE	SWITCHING TRANSISTOR	CE FUNCTION	FEATURE
ME2186Axx	M3	SOT23-3	Build in Transistor	No	Lx
	P	SOT89-3			

**ME2186AXX**

Pin Number		Pin Name	Description
SOT23-3	SOT89-3		
1	1	GND	Ground
3	2	VOUT	Output voltage monitor, IC internal power supply
2	3	LX	Switch pin

**Absolute Maximum Ratings**

PARAMETER	SYMBAL	RATING	UNIT	
$V_{IN}$ Input Voltage	$V_{IN}$	6.5	V	
Lx Pin voltage	$V_{LX}$	6.5	V	
CE Pin voltage	$V_{CE}$	-0.3~ $V_{OUT}$ +0.3	V	
Lx Pin current	$I_{LX}$	2000	mA	
Vdd input voltage		$V_{dd}$	6.5	V
Continuous Total Power Dissipation	SOT23-3	$P_d$	300	mW
	SOT89-3	$P_d$	500	mW
Operating Ambient Temperature	$T_{Opr}$	-25~+85	°C	
Storage Temperature	$T_{stg}$	-40~+125	°C	
Soldering temperature and time	$T_{solder}$	260°C, 10s		

**Block Diagram**

**Electrical Characteristics**
**ME2186A50**  $F_{OSC}=330\text{KHz}$ 
 $(V_{IN}=V_{OUT}\times 0.6, I_{OUT}=5\text{mA}, T=25^{\circ}\text{C})$ . Unless otherwise specified)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
$V_{OUT}$	Output Voltage		$V_{OUT}\times 0.98$	$V_{OUT}$	$V_{OUT}\times 1.02$	V
$V_{START}$	Oscillation Start-up Voltage	$I_{OUT}=1\text{mA}$ , $V_{IN}: 0\rightarrow 2\text{V}$	-	0.80	0.90	V
$V_{HOLD}$	Oscillation Hold Voltage	$I_{OUT}=1\text{mA}$ , $V_{IN}: 2\rightarrow 0\text{V}$	-	0.45	-	V
$I_{DD1}$	Supply Current 1	No external component $V_{OUT}=V_{OUT}\times 0.95$ ,	-	205	-	$\mu\text{A}$
$I_{DD2}$	Supply Current 2	$V_{OUT}=V_{OUT}+0.5\text{V}$	-	8	-	$\mu\text{A}$
$F_{OSC}$	Oscillation Frequency	$V_{OUT}=\text{set } V_{OUT}\times 0.95$	-	330	-	KHz
Maxduty	Duty Ratio	on( $V_{LX}$ "L" side)	-	79	-	%

 Note 1、Inductor: 15~22 $\mu\text{H}$  ( $r<0.5\Omega$ )

 2、Capacitor: Tantalum type 100 $\mu\text{F}$ 

 3、When you measure frequency and duty ratio, only to connect the resistance of 1.2K between  $L_X$  and  $V_{OUT}$ .

## Operation Description

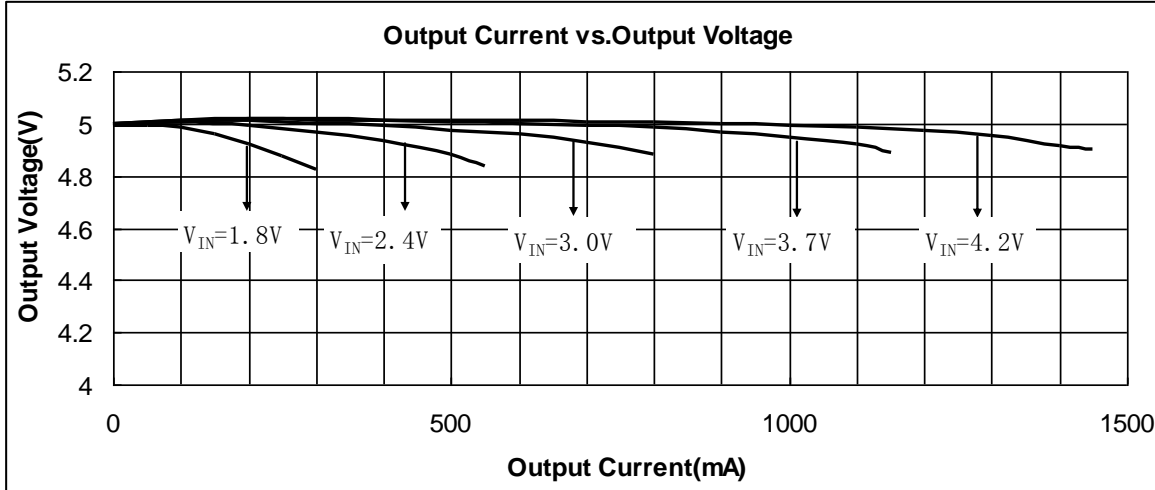
### Selection of Peripheral Components and Application Notes

- Power source for battery-powered equipment
- Power source for wireless mouse, wireless keyboard, toys, cameras, camcorders, VCRs, PDAs, and hand-held communication equipment
- Power source for appliances which require higher cell voltage than that of batteries used in the appliances
- Peripheral components should be selected carefully because they are greatly affect the performances of ME2186:
  - ✧ Use capacitor with a capacity of 100 $\mu$ F or more ( too small capacity will lead to high output ripple), and with good frequency characteristics ( it is better to use Tantalum type). Besides, it is recommended the use of a capacitor with an allowable voltage which is at least three times the output set voltage. This is because there may be the case where a spike-shaped high voltage is generated by the inductor when Lx transistor is turned OFF.
  - ✧ Choose such an inductor that has sufficiently small d.c. resistance and large allowable current, and hardly reaches magnetic saturation. When the inductance value of the inductor is small, there may be the case where ILX exceeds the absolute maximum ratings at the maximum load.
  - ✧ Use a diode of a Schottky type with high switching speed.
- 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 V<sub>OUT</sub> 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.

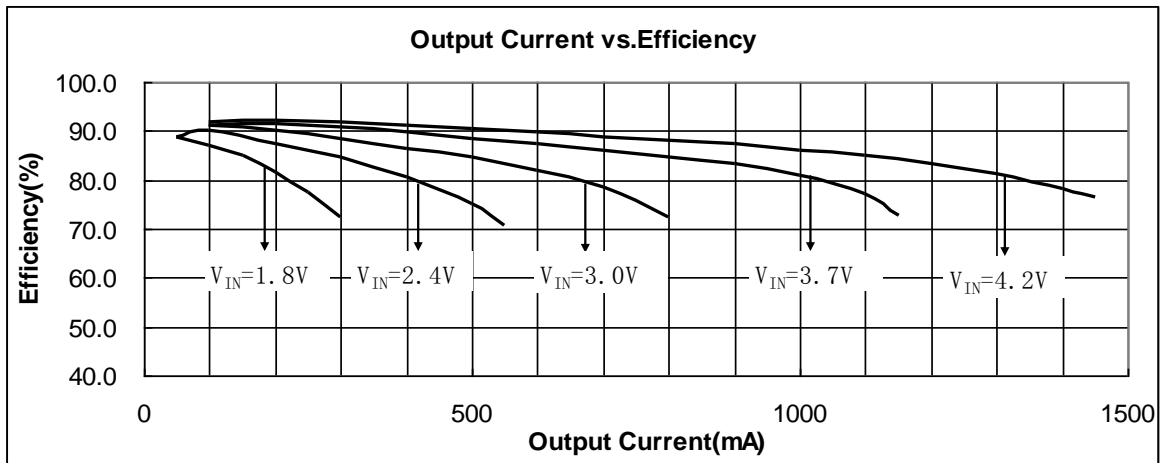
Type Characteristics (Ta = 25 °C)

ME2186A50

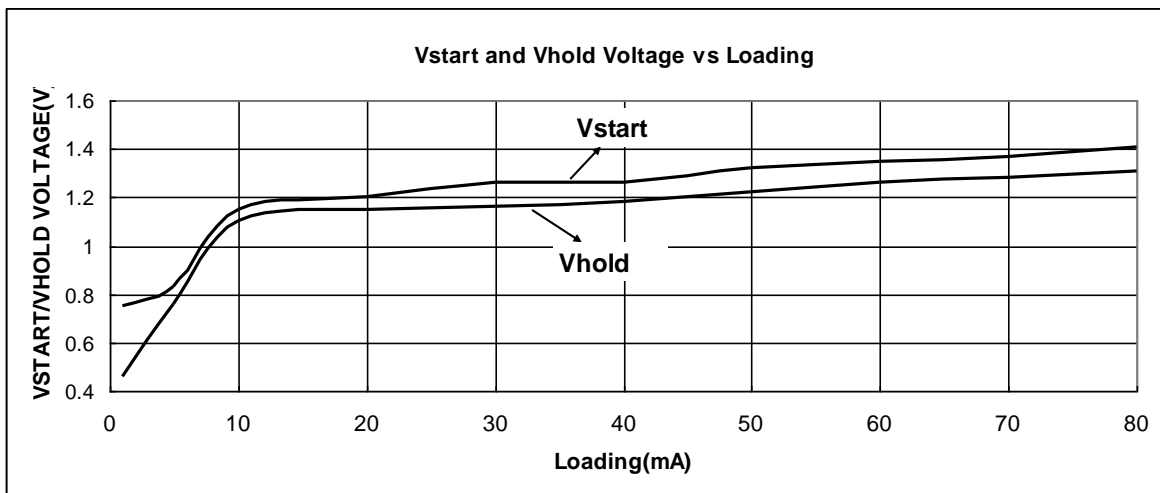
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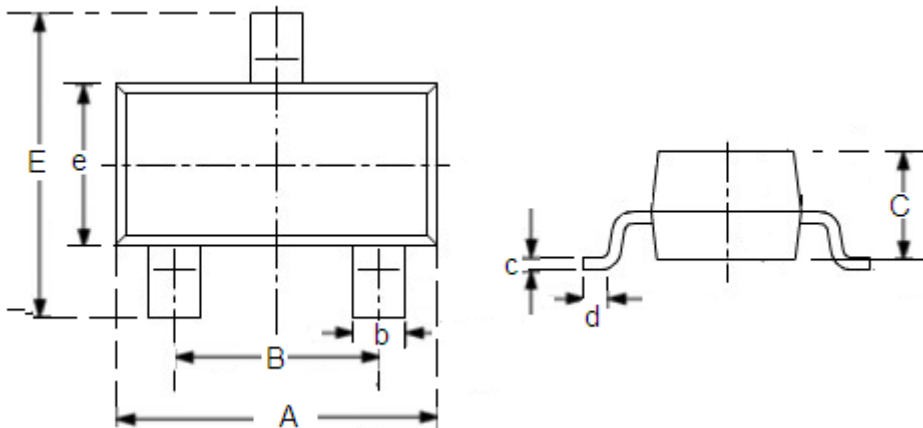


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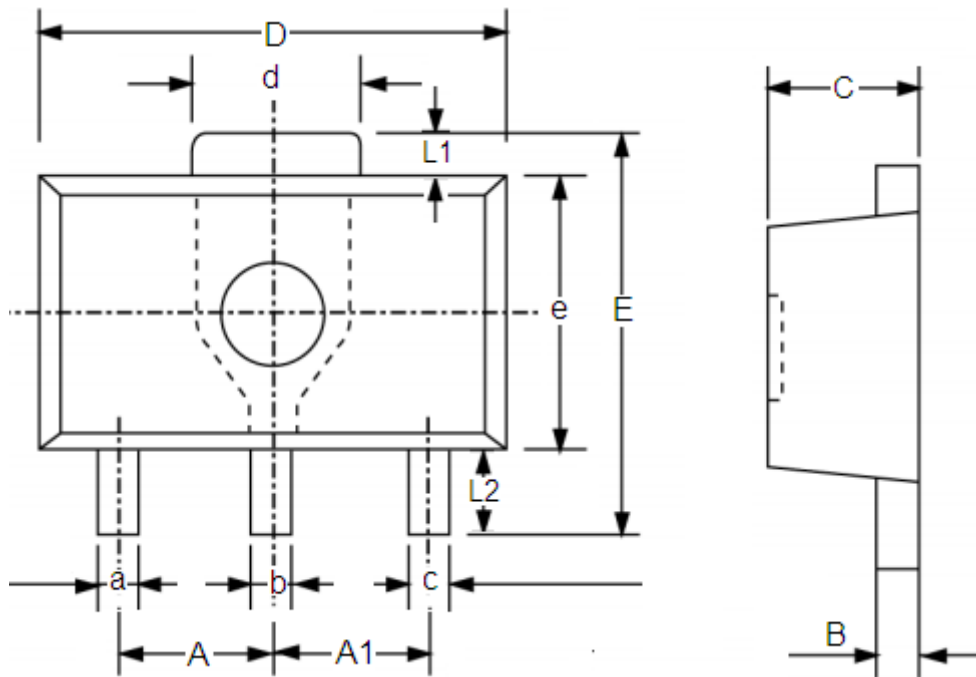
(3)



**Packaging Information: Unit: mm (inch)**
**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

• SOT-89-3



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.4	1.6	0.0551	0.0630
A1	1.4	1.6	0.0551	0.0630
a	0.36	0.48	0.0142	0.0189
b	0.41	0.53	0.0161	0.0209
c	0.36	0.48	0.0142	0.0189
d	1.4	1.75	0.0551	0.0689
B	0.38	0.43	0.015	0.0169
C	1.4	1.6	0.0551	0.0630
D	4.4	4.6	0.1732	0.181
E	-	4.25	-	0.1673
e	2.4	2.6	0.0945	0.1023
L1	0.4	-	0.0157	-
L2	0.8	-	0.0315	-