

## 1. Description

UMW ME2188 series chips are low quiescent current PFM switching synchronous rectification DC/DC boost converters manufactured using CMOS technology. This series of chips uses advanced circuit design and manufacturing technology, which greatly improves the noise problem inherent in the switching circuit and reduces interference to surrounding circuits. It is very suitable for battery-powered equipment.

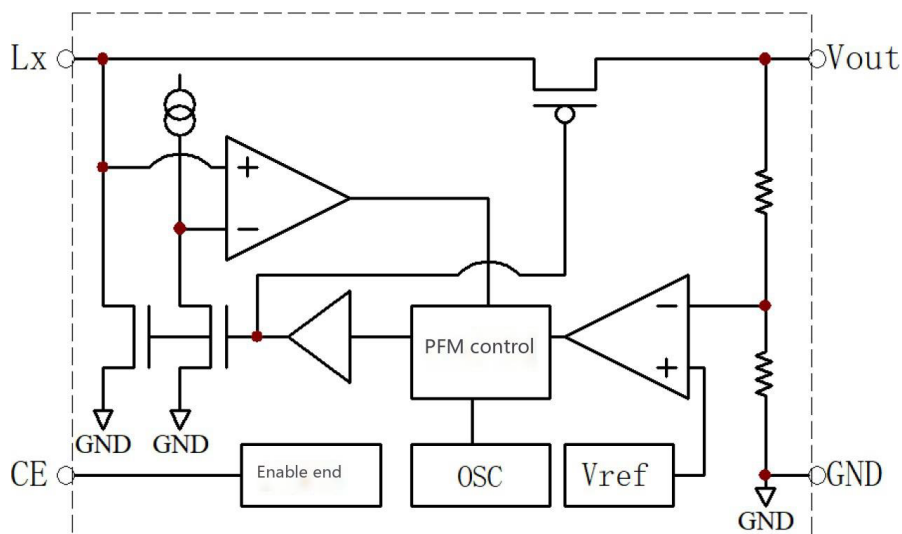
## 2. Features

- Low power consumption: 15μA (typical)
- Wide operating voltage range: 0.9V~5V
- Output voltage range: 1.8V~3.6V (0.1V per step)
- Simple Periphery
- High-precision output: ±2.5%
- Packaging form: SOT23-3, SOT23-5, SOT89-3

## 3. Applications

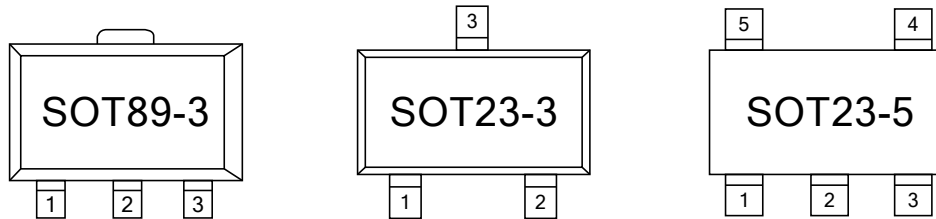
- Wireless mouse, wireless keyboard, camera, camcorder pda, Portable devices such as handheld phones and electric toys
- Electronic devices powered by 1-3 batteries
- LED flashlight, LED light, LED backlight source

## 4. Block Diagram





## 5. Pinning Information



Pin Number			Pin Definition	Functional Description
SOT89-3	SOT23-3	SOT23-5		
1	1	4	GND	Chip Ground Terminal
2	3	2	VOUT	Voltage Output Terminal
3	2	5	Lx	Inductor Access Terminal
-	-	1	CE	Enable Control Terminal
-	-	3	NC	Empty

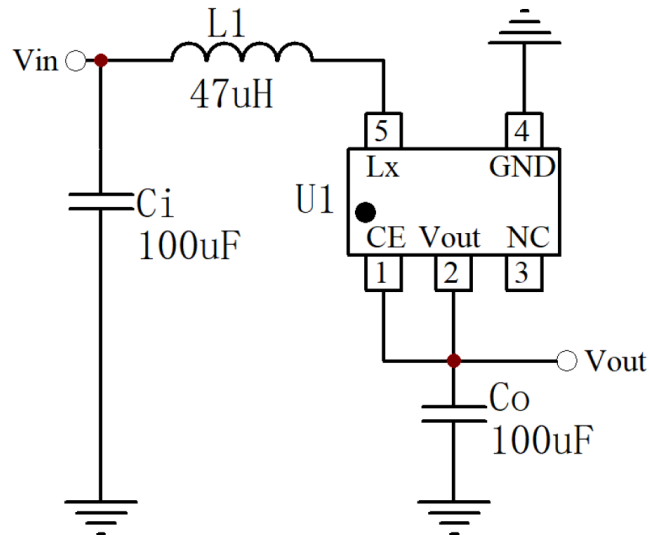


## 6. Model Selection

Name	Model	Maximum input voltage (v)	Output Voltage (V)	Tolerance	Package
UMW ME2188	ME2188X22XXG	5	2.2	±2.5%	SOT23-5 SOT23-3 SOT89-3
	ME2188X25XXG		2.5		
	ME2188X27XXG		2.7		
	ME2188X28XXG		2.8		
	ME2188X30XXG		3		
	ME2188X33XXG		3.3		
Description	<p>UMW ME2188X, XX, XXG, Naming: The First X Represents The Type (A Means Without Ce enable, C Means With Ce Enable); The Second And Third XX Represent The Output Voltage Value; The Fourth And Fifth XX Represent The Package Type (M3 means SOT23-3, M5 means SOT23-5, PR means SOT89-3); G means it meets RoSH requirements.</p> <p>For example: Model UMW ME2188C28M5G means ME2188 series with CE enable, output voltage 2.8V, SOT23-5 package, meets RoSH requirements.</p>				



## 7.Application Circuit



## 8.Limit Parameters

Project	Symbol	Description	Limit Value	Unit
Voltage	$V_{MAX}$	Maximum voltage supplied to $V_{OUT}$ and LX terminals	6	V
Current	$ILX_{MAX}$	Maximum current at LX terminal	1000	mA
Maximum Power Consumption	$P_D$	SOT23-3 Package	250	mW
		SOT23-5 Package	250	mW
		SOT89-3 Package	500	mW
Temperature	$T_W$	Operating Temperature Range	-20 to 70	°C
	$T_C$	Storage Temperature Range	-40 to 150	°C
	$T_H$	Soldering Temperature	260	°C,10s

Note: Limit parameters refer to the limit values that cannot be exceeded under any conditions. Once this limit value is exceeded, it may cause physical damage such as product degradation; at the same time, the chip cannot be guaranteed to work properly when approaching the limit parameters.



## 9. Electrical Characteristics (ME2188CXXM5G, $T_A=25^\circ\text{C}$ )

Parameter	Symbol	Conditions	Min	Typ	Max	Test Diagram	Units
Output voltage <sup>(1)</sup>	$V_{OUT(E)}$	$V_{IN}=1.5\text{V}$ , volume=volume (t)+0.5V and gradually decrease to the voltage when OSC starts oscillating	$V_{OUT}^*$ 0.975	$V_{OUT}$	$V_{OUT}^*$ 1.025	Fig.2	V
Start-up voltage <sup>(2)</sup>	$V_{START}$	$I_{LOAD}=1\text{mA}$ , $V_{IN}: 0 \rightarrow 2\text{V}$	0.5	0.75	1	Fig.1	V
Holding voltage <sup>(3)</sup>	$V_{HOLD}$	$I_{LOAD}=1\text{mA}$ , $V_{IN}: 2 \rightarrow 0\text{V}$				Fig.1	V
Quiescent current	$I_{Q1}$	$V_{IN}=2\text{V}$ , $V_{OUT}=V_{OUT(T)}+0.5\text{V}$		15		Fig.3	$\mu\text{A}$
Enable quiescent current	$I_{stb}$	$V_{IN}=1.5\text{V}$ , $V_{CE}=0\text{V}$ , $V_{OUT}=\text{Open}$		0.4		Fig.4	$\mu\text{A}$
Enable current	$I_{CEL}$	$V_{IN}=V_{OUT}=2\text{V}$ , $V_{CE}=0\text{V}$		0.1		Fig.5	$\mu\text{A}$
	$I_{CEH}$	$V_{IN}=V_{OUT}=V_{CE}=2\text{V}$		0.01		Fig.5	$\mu\text{A}$
Enable effective voltage	$V_{CEH}$	$V_{IN}=1.5\text{V}$ , $V_{OUT}=V_{OUT(T)}*0.98$ $V_{CE}=0 \rightarrow V_{IN}$ , osc starts to vibrate	0.8			Fig.5	V
	$V_{CEL}$	$V_{IN}=1.5\text{V}$ , $V_{OUT}=V_{OUT(T)}*0.98$ $V_{CE}=0.6 \rightarrow \text{GND}$ , Osc Stop Oscillation			0.4	Fig.5	V
Lx switch on resistance	$R_{ON\_SW}$	$V_{IN}=1.5\text{V}$ , $V_{OUT}=2.7\text{V}$		2.5		Fig.6	$\Omega$
Synchronous rectification on-resistance	$R_{OP\_SW}$	$V_{IN}=2.7\text{V}$ , $V_{CE}=0$ , $I_{OUT}=200\text{mA}$		2.8		Fig.7	$\Omega$
Lx switching frequency	f	$V_{IN}=1.5\text{V}$ , $V_{OUT}=V_{OUT(T)}*0.98$		250		Fig.2	kHz
Efficiency	$\eta$	$V_{IN}=1.5\text{V}$ , $I_{OUT}=10\text{mA}$		80		Fig.1	%
Input voltage	$V_{IN}$		0.9				V



## 10. Test Diagram

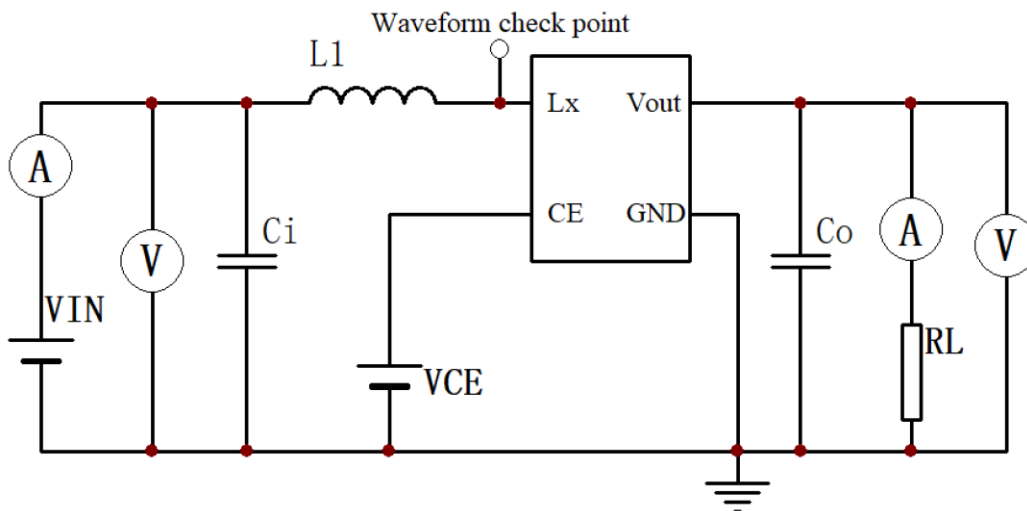


Fig.1  $C_i=100\mu F$ ,  $C_o=100\mu F$ ,  $L_1=47\mu H$ ( 4X6)

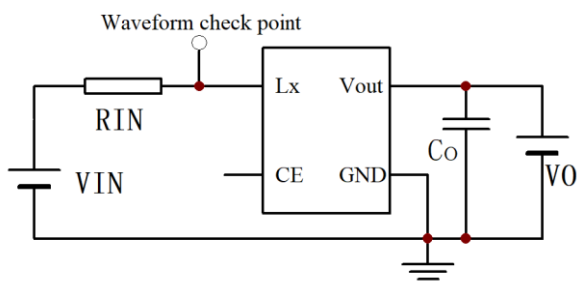


Fig.2  $R_{IN}=100R$ ,  $C_o=100\mu F$

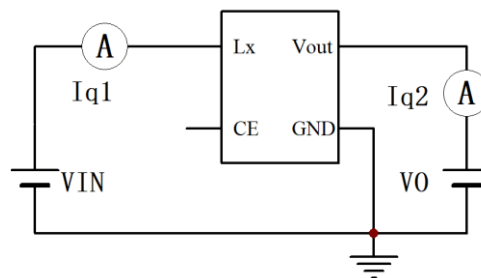


Fig.3

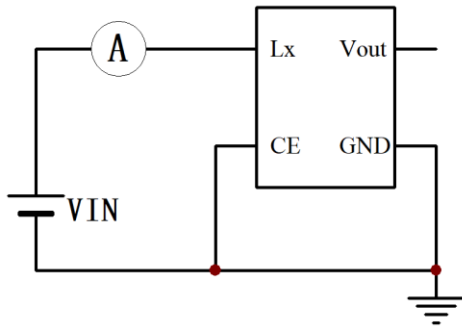


Fig.4

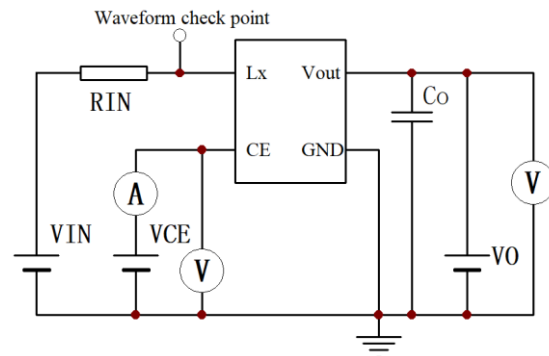


Fig.5  $R_{IN}=100R$ ,  $C_o=100\mu F$

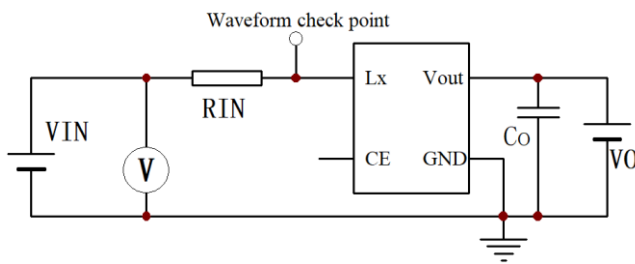


Fig.6  $R_{ON\_SW}=R_{IN} \cdot V_{wave\_L} / (V_{IN} - V_{wave\_L})$   
 $R_{IN}=10R, C_o=100\mu F$

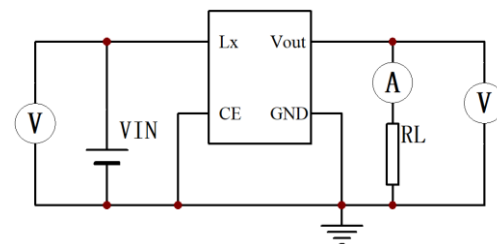
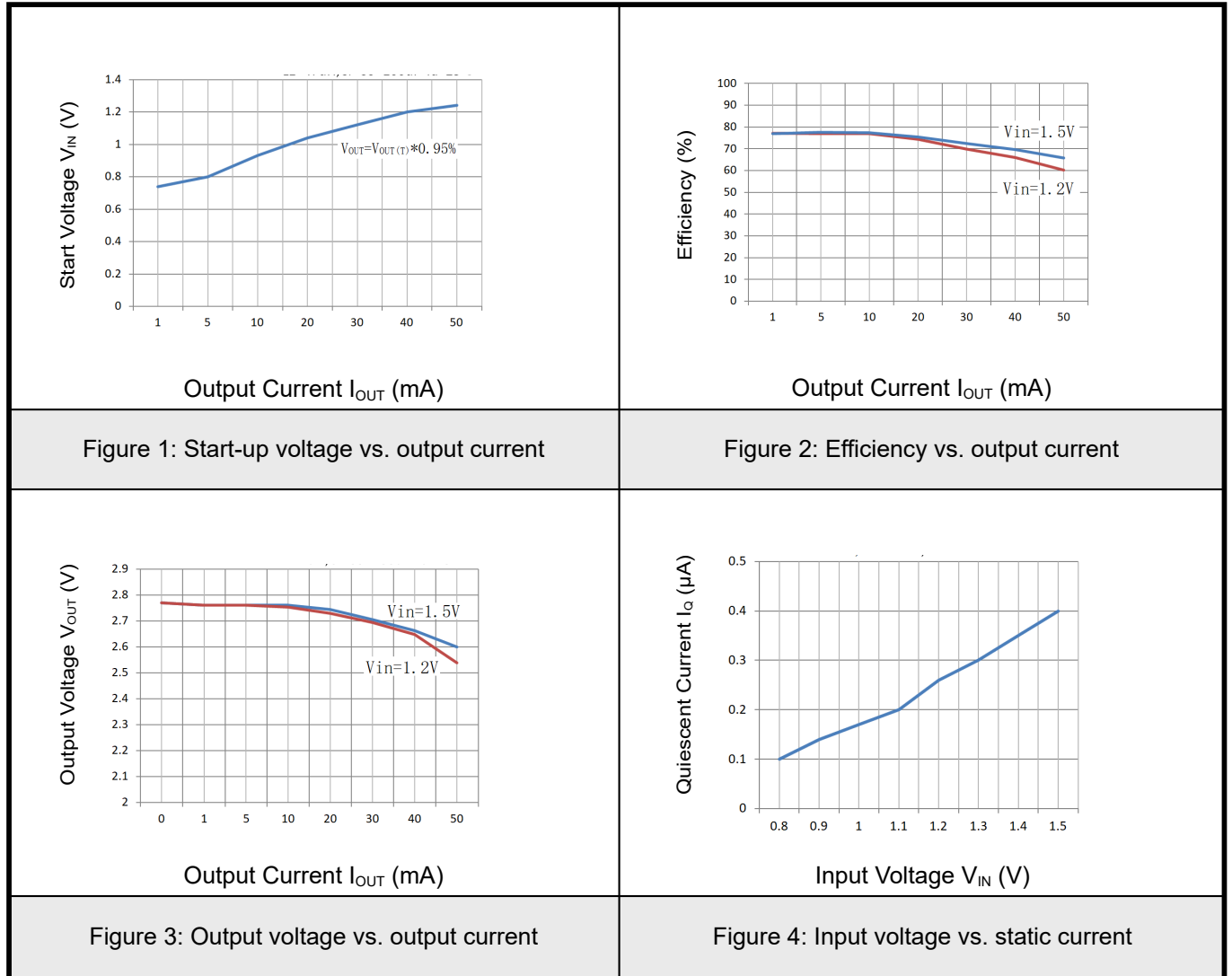


Fig.7  $R_{OP\_SW} = (V_{IN} - V_o) / I_{out}$

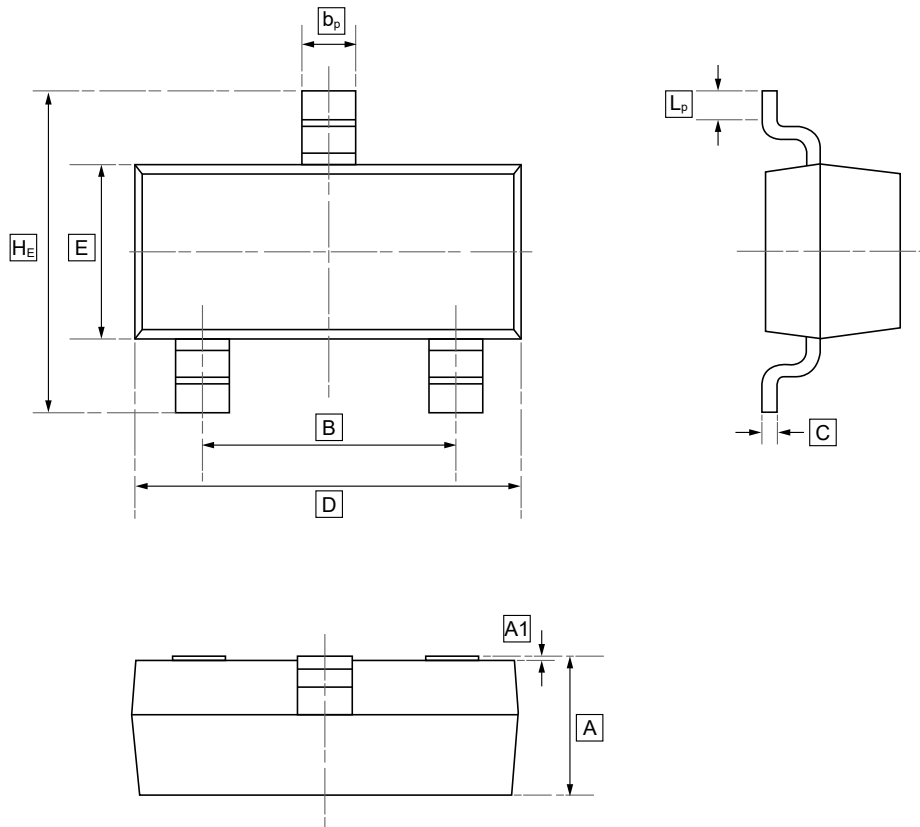


## 11. Typical Characteristics





## 12.1 SOT-23 Package Outline Dimensions

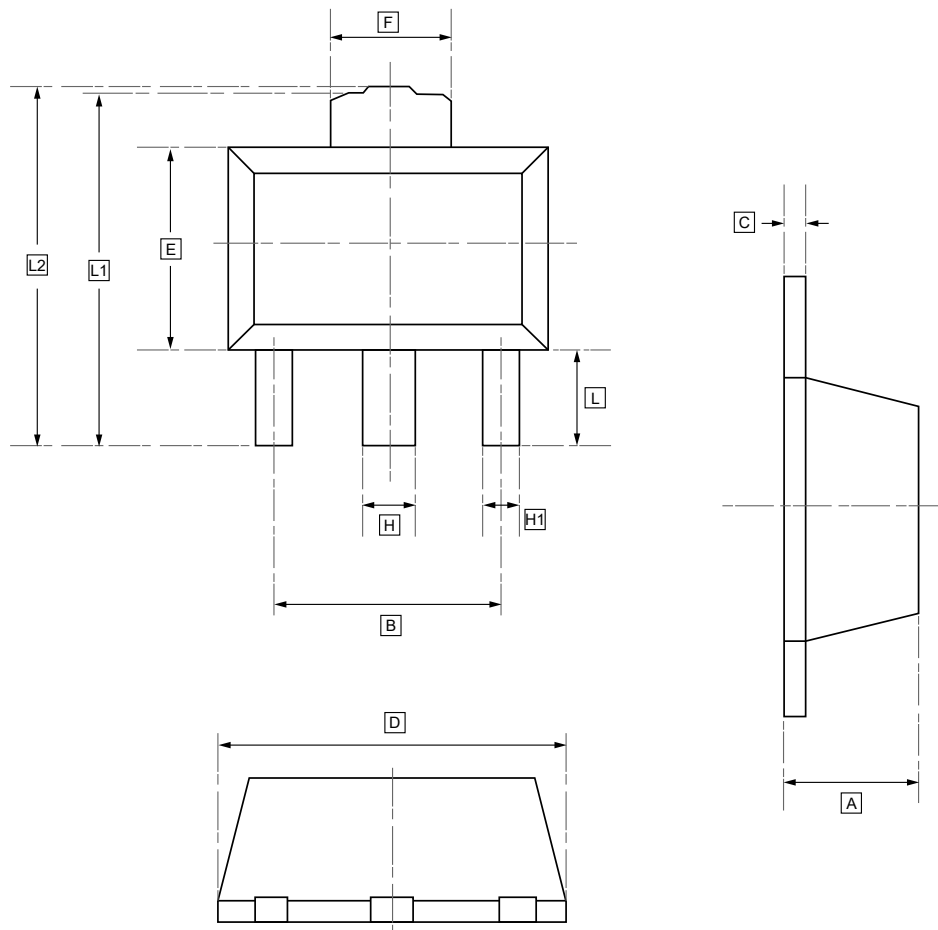


### DIMENSIONS (mm are the original dimensions)

Symbol	A	B	b <sub>p</sub>	C	D	E	H <sub>E</sub>	A1	L <sub>p</sub>
Min	0.95	1.78	0.35	0.08	2.70	1.20	2.20	0.013	0.20
Max	1.40	2.04	0.50	0.19	3.10	1.65	3.00	0.100	0.50



## 12.2 SOT-89 Package Outline Dimensions

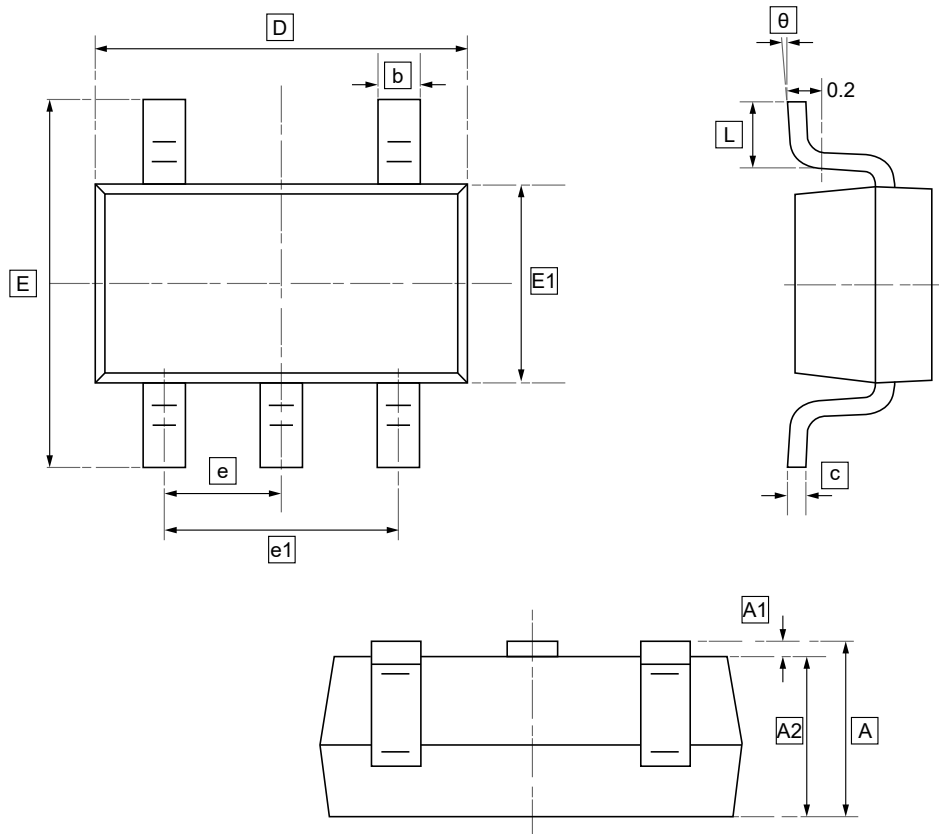


### DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	F	H	H1	L	L1	L2
<b>Min</b>	1.450	2.950	0.330	4.450	2.450	1.650	0.450	0.370	0.900	4.100	4.100
<b>Max</b>	1.550	3.050	0.430	4.550	2.550	1.750	0.580	0.480	1.000	4.300	4.350



## 12.3 SOT-23-5 Package Outline Dimensions

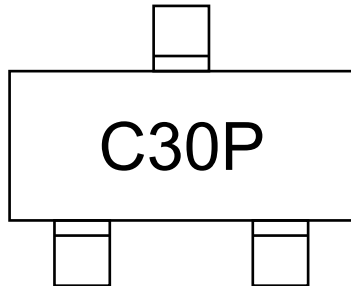


### DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E1	E	e	e1	L	θ
Min	1.050	0.000	1.050	0.300	0.100	2.820	1.500	2.650	0.950	1.800	0.300	0°
Max	1.250	0.100	1.150	0.500	0.200	3.020	1.700	2.950	BSC	2.000	0.600	8°



## 13. Ordering Information



Order Code	Marking	Package	Base QTY	Delivery Mode
UMW ME2188A28M3G	C30P	SOT-23	3000	Tape and reel
UMW ME2188A30M3G	C30P	SOT-23	3000	Tape and reel
UMW ME2188A33M3G	C30P	SOT-23	3000	Tape and reel



## **14.Disclaimer**

---

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.