

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.

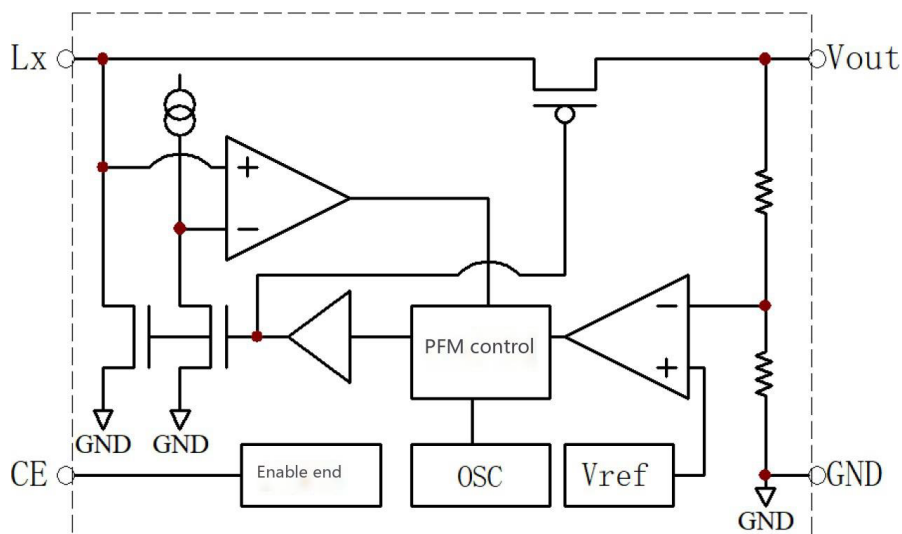
2. Features

- 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

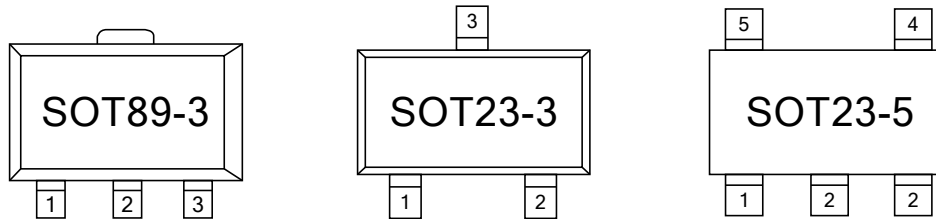
- Wireless mouse, wireless keyboard, camera, camcorder pda, Portable devices such as handheld phones and electric toys
- Electronic devices powered by 1-3 batteries
- LED flashlight, LED light, LED backlight source

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

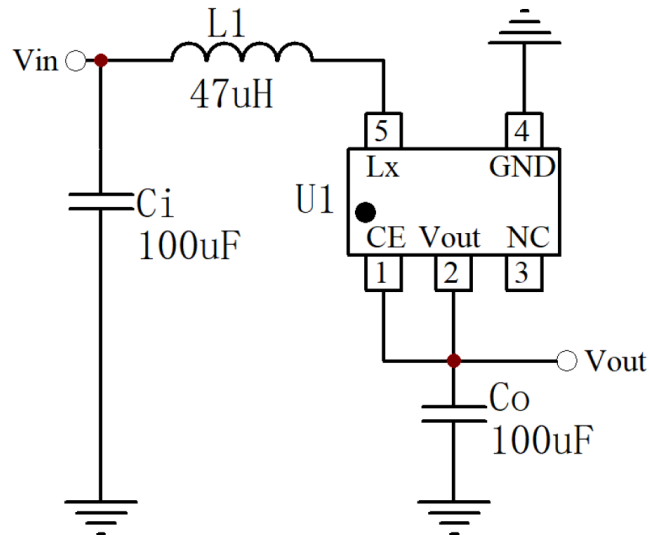


6. Model Selection

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 ⁽¹⁾	$V_{OUT(E)}$	$V_{IN}=1.5\text{V}$, 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 ⁽²⁾	V_{START}	$I_{LOAD}=1\text{mA}$, $V_{IN}: 0 \rightarrow 2\text{V}$	0.5	0.75	1	Fig.1	V
Holding voltage ⁽³⁾	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	μA
Enable quiescent current	I_{stb}	$V_{IN}=1.5\text{V}$, $V_{CE}=0\text{V}$, $V_{OUT}=\text{Open}$		0.4		Fig.4	μA
Enable current	I_{CEL}	$V_{IN}=V_{OUT}=2\text{V}$, $V_{CE}=0\text{V}$		0.1		Fig.5	μA
	I_{CEH}	$V_{IN}=V_{OUT}=V_{CE}=2\text{V}$		0.01		Fig.5	μA
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	Ω
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	Ω
Lx switching frequency	f	$V_{IN}=1.5\text{V}$, $V_{OUT}=V_{OUT(T)}*0.98$		250		Fig.2	kHz
Efficiency	η	$V_{IN}=1.5\text{V}$, $I_{OUT}=10\text{mA}$		80		Fig.1	%
Input voltage	V_{IN}		0.9				V



10. Test Diagram

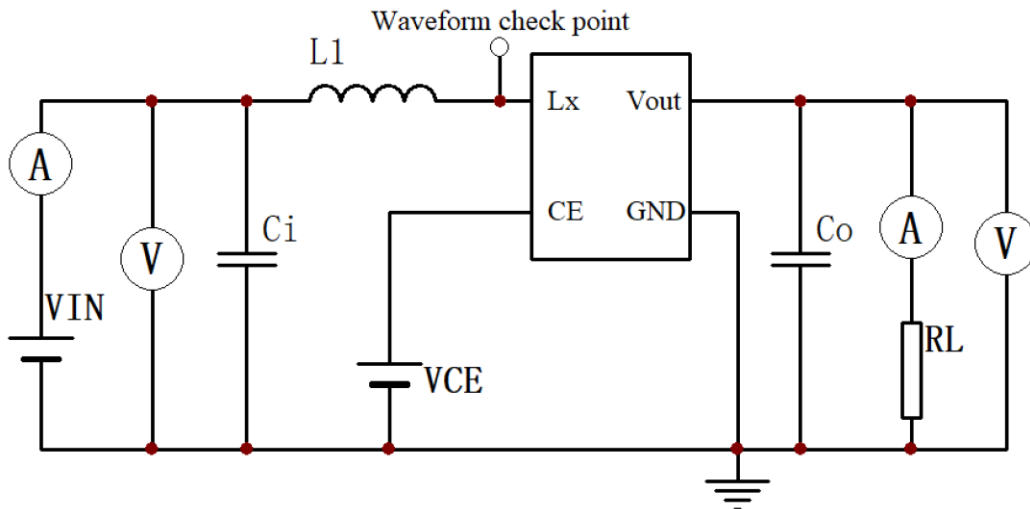


Fig.1 $C_i=100\mu\text{F}$, $C_o=100\mu\text{F}$, $L_1=47\mu\text{H}$ (4X6)

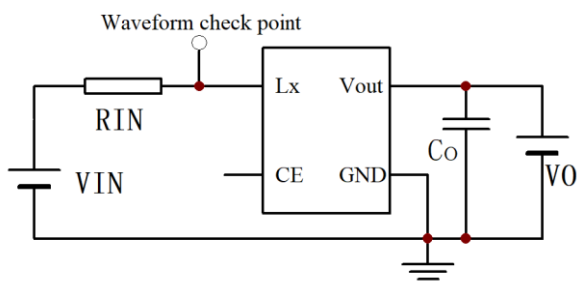


Fig.2 $R_{IN}=100\text{R}$, $C_o=100\mu\text{F}$

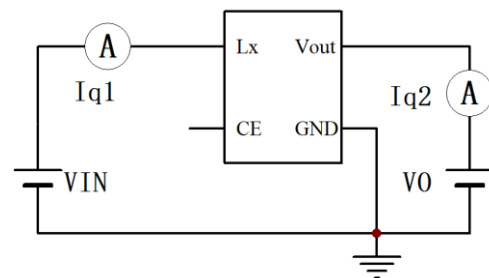


Fig.3

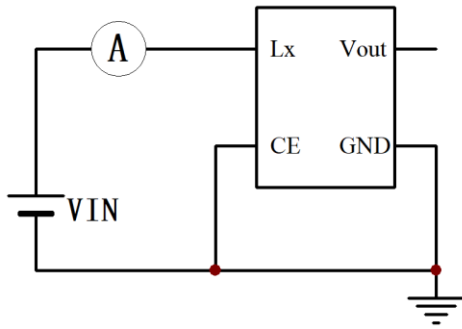


Fig.4

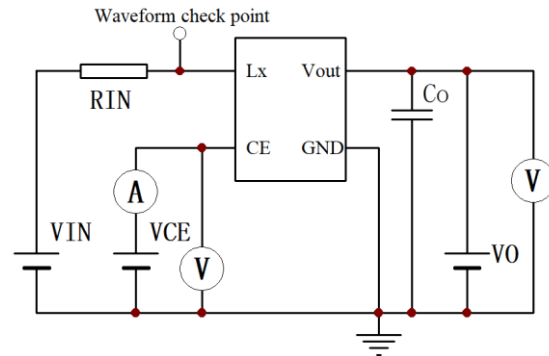


Fig.5 RIN=100R, Co=100μF

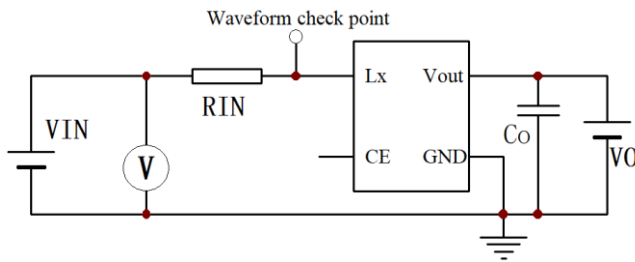


Fig.6 $R_{ON_SW} = RIN \cdot V_{wave_L} / (VIN - V_{wave_L})$
 RIN=10R, Co=100uF

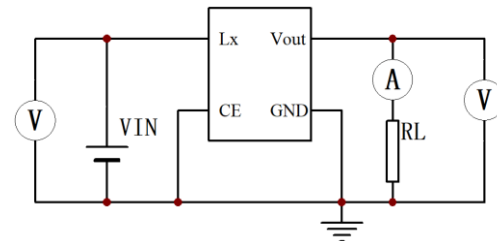
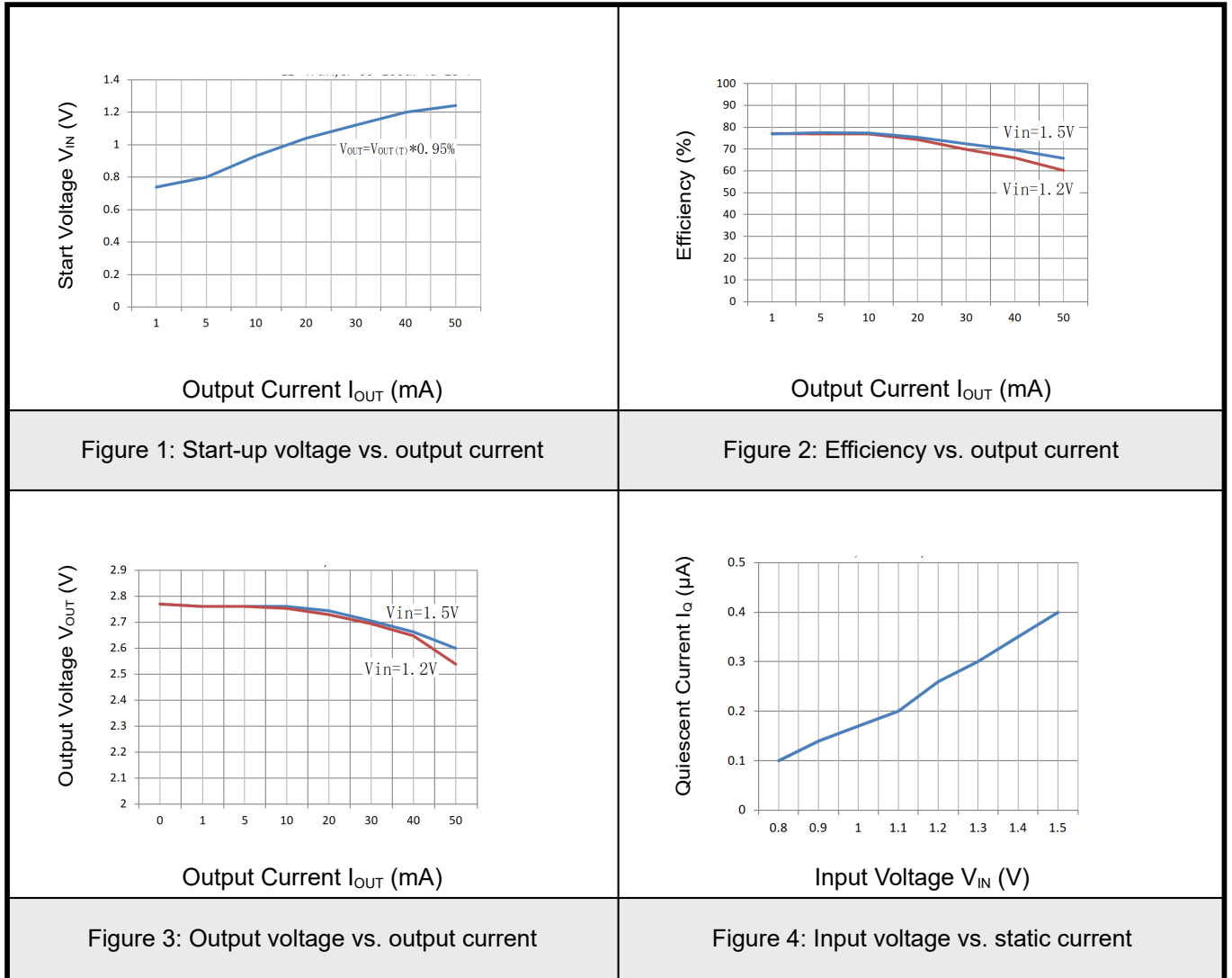


Fig.7 $R_{OP_SW} = (VIN - V_o) / I_{out}$

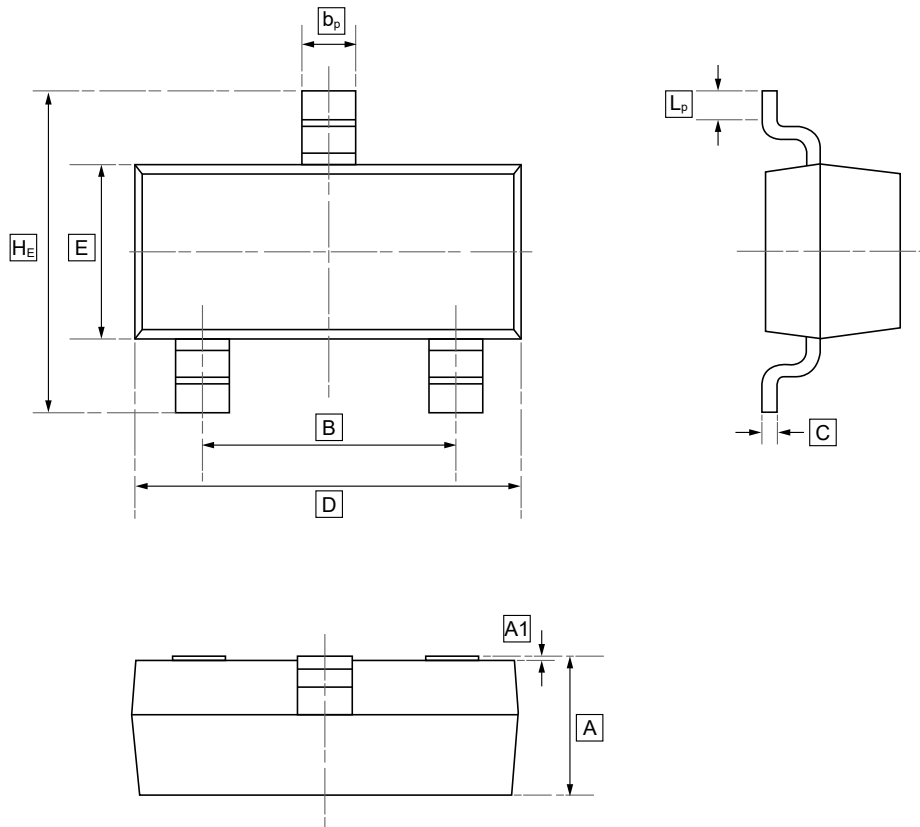


11. Typical Characteristics





12.1 SOT-23 Package Outline Dimensions

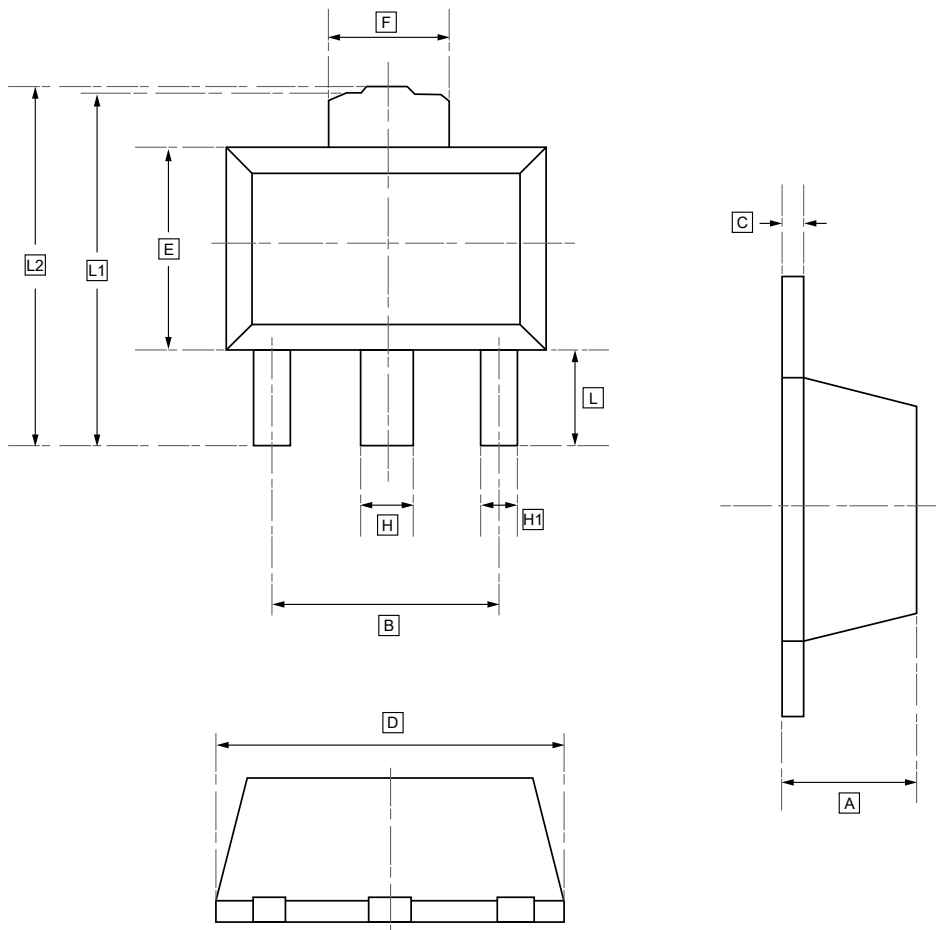


DIMENSIONS (mm are the original dimensions)

Symbol	A	B	b _p	C	D	E	H _E	A1	L _p
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

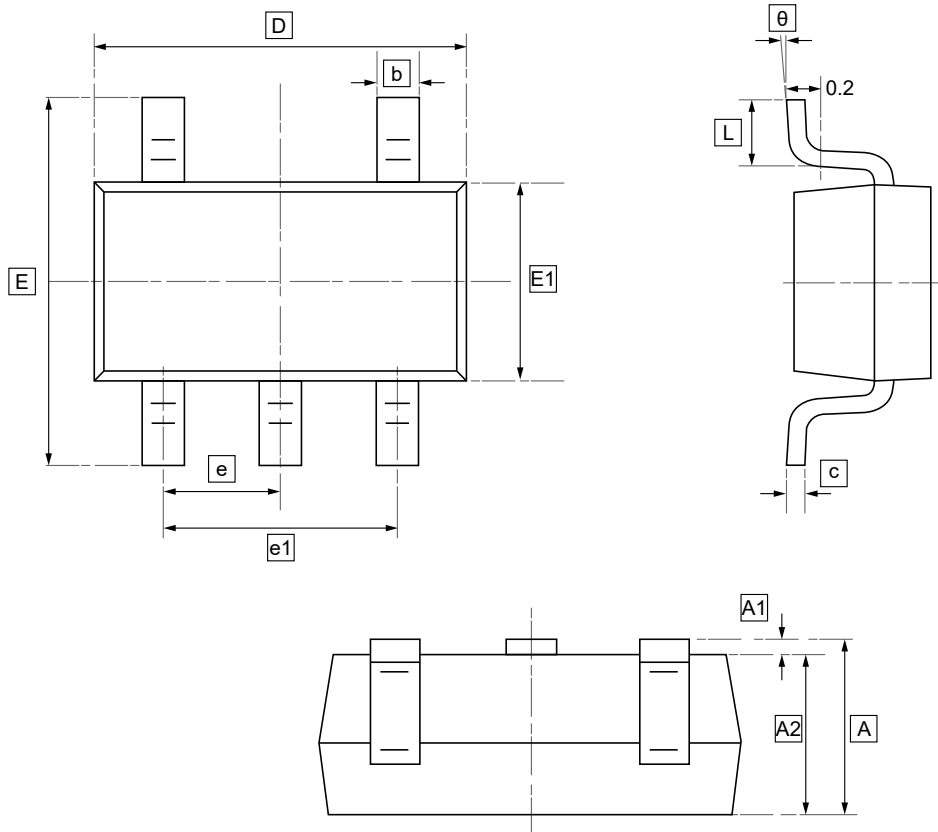


DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	F	H	H1	L	L1	L2
Min	1.450	2.950	0.330	4.450	2.450	1.650	0.450	0.370	0.900	4.100	4.100
Max	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

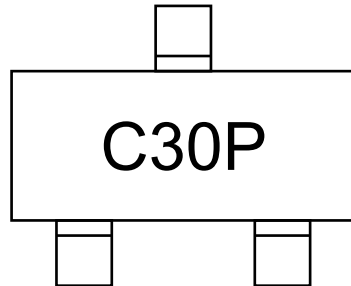


DIMENSIONS (mm are the original dimensions)

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



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