

## 1. Description

The AMS1117 is a positive low voltage dropout regulator; typical voltage dropout is only 1.2V at 1A. AMS1117 provides two versions: fixed and adjustable versions. The output accuracy of the adjustable voltage version is 1.5%. The output accuracy of the fixed voltage version is 2%. The AMS1117 offers some key features include thermal shutdown and current limiting. It is suitable for all electronic products.

## 3. Features

- The output accuracy of fixed versions 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V is 2%, and the output accuracy of adjustable versions is 1.5%
- Adjustable output voltage

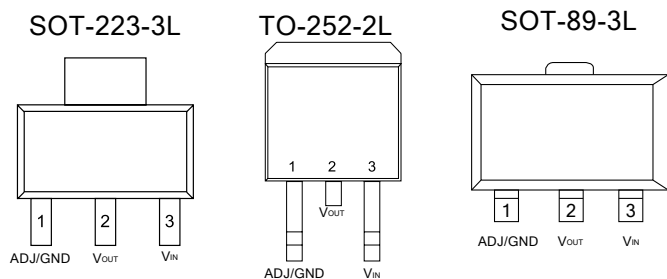
## 4. Pinning information

Pin	Symbol	Description
1	I/O	GND/ADJ
2	O	V <sub>OUT</sub>
3	I	V <sub>IN</sub>

## 2. Applications

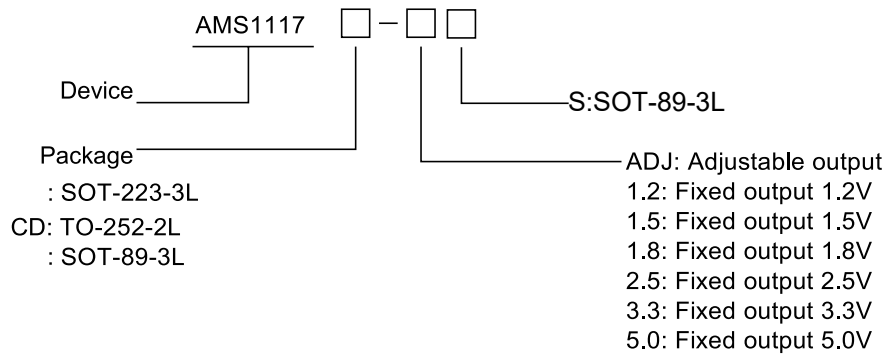
- Laptop, Palmtop, and Notebook Computers
- Battery Charger
- SCSI-II Active Terminator
- Cellular Phone
- Cordless Telephones
- Battery Powered Systems
- Portable Instrumentation
- SMPS Post-Regulator

- Low Dropout Voltage: Typical 1.2V@1A
- Current Limiting
- Thermal Shutdown
- Temperature Range: -40°C to 125°C

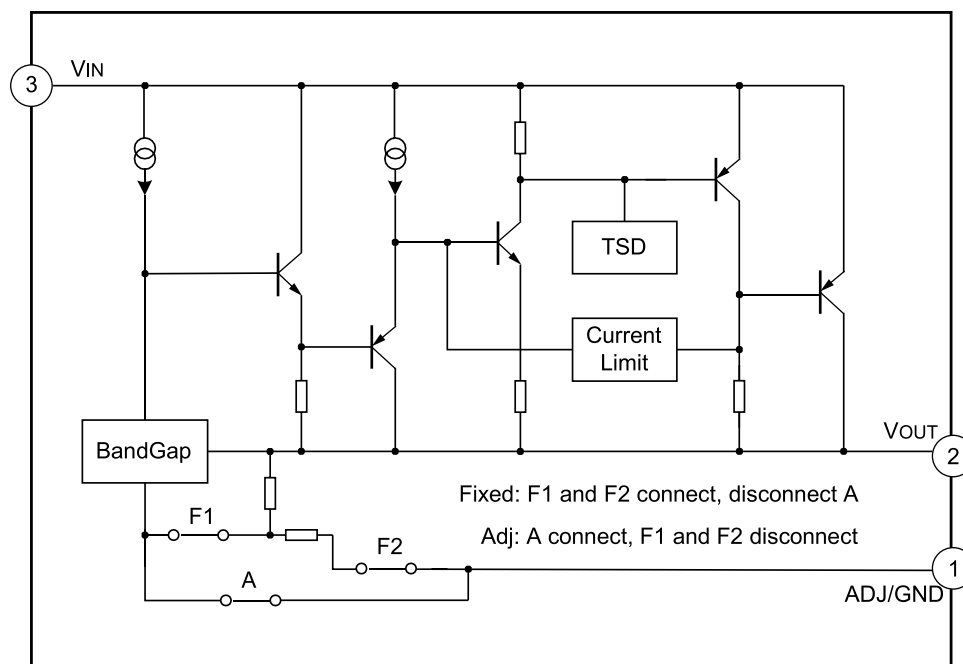




## 5.Nomenclature



## 6.Block Diagram





## 7. Absolute Maximum Ratings

Characteristics		Symbol	Value	Units
Input Supply Voltage		$V_{IN}$	18	V
Lead Temperature (Soldering, 5 seconds)		$T_{Lead}$	260	°C
Junction Temperature Range		$T_J$	150	°C
Storage Temperature Range		$T_{STG}$	-65 to 150	V
Power Dissipation		$P_D$	Internally Limited (Note1)	mW
Thermal Resistance from Junction to Ambient	SOT-223-3L	R <sub>ja</sub>	88	°C/W
	TO-252-2L		86	°C/W
	SOT-89-3L		102	°C/W
ESD Tolerance (Minimum)		ESD	2000	V

## 8. Recommended Operating Conditions

Characteristics	Symbol	Rating	Units
Input voltage	$V_{IN}$	12	V
Junction Temperature Range	$T_J$	-40 to 125	°C



## 9. Electrical Characteristics

Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Reference Voltage	$V_{REF}$	AMS1117-ADJ $I_{OUT}=10mA, V_{IN}-V_{OUT}=2V, T_J=25^{\circ}C$	1.231	1.250	1.269	V
Output Voltage	$V_{OUT}$	AMS1117-1.2 $I_{OUT}=10mA, V_{IN}=3.2V, T_J=25^{\circ}C$	1.176	1.2	1.224	V
		AMS1117-1.5 $I_{OUT}=10mA, V_{IN}=3.5V, T_J=25^{\circ}C$	1.470	1.500	1.530	V
		AMS1117-1.8 $I_{OUT}=10mA, V_{IN}=3.8V, T_J=25^{\circ}C$	1.764	1.800	1.836	V
		AMS1117-2.5 $I_{OUT}=10mA, V_{IN}=4.5V, T_J=25^{\circ}C$	2.450	2.500	2.550	V
		AMS1117-3.3 $I_{OUT}=10mA, V_{IN}=5V, T_J=25^{\circ}C$	3.234	3.300	3.366	V
		AMS1117-5.0 $I_{OUT}=10mA, V_{IN}=7V, T_J=25^{\circ}C$	4.900	5.000	5.100	V
		Output Voltage Temperature Stability	$T_{SOUT}$			0.3
Line Regulation	$R_{line}$	$V_{INMIN} \leq V_{IN} \leq 12V$ $V_{OUT}=\text{Fixed/Adj}, I_{OUT}=10mA$		9	18	mV



Load Regulation	$R_{load}$	$10mA \leq I_{OUT} \leq 1A, V_{OUT} = \text{Fixed/Adj}$		10	18	mV
Dropout Voltage	$V_{drop}$	$I_{OUT} = 100mA$		1	1.20	V
		$I_{OUT} = 500mA$		1.05	1.25	V
		$I_{OUT} = 1A$		1.20	1.30	V
Quiescent Current	$I_q$	$4.25V \leq V_{IN} \leq 6.5V$		5	10	mA
Ripple Rejection	$P_{SRR}$	$f_{RIPPLE} = 120Hz, (V_{IN} - V_{OUT}) = 3V$ $V_{RIPPLE} = 1V_{PP}$	60	75		dB
Adjust pin Current	$I_{adj}$			60	120	$\mu A$
Adjust pin Current Change		$0 \leq I_{OUT} \leq 1A, 1.4V \leq V_{IN} - V_{OUT} \leq 10V$		0.2	5	$\mu A$
Thermal shutdown	TSD			150		$^{\circ}C$
Current limiting	$I_{limit}$		2.1		2.5	A
Temperature Stability				0.5		%
Long Term Stability		$T_A = 125^{\circ}C, 1000Hrs$		0.3		%
RMS Output Noise		% of $V_{OUT}, 10Hz \leq f \leq 10kHz$		0.003		%



## 10.function Description

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The AMS1117 is a LDO regulator, its pass transistor is made up of a single NPN transistor being driven by a PNP.

The dropout voltage is defined as:  $V_{\text{DROP}} = V_{\text{BE}} + V_{\text{SAT}}$ .

The AMS1117 series of fixed and adjustable regulators are easy to use. Output voltages are 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V. On-chip thermal shut down provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The AMS1117 requires an output capacitor for device stability. Its value of 22 $\mu$ F tantalum covers all cases of bypassing the adjustment terminal. Without bypassing the adjustment terminal smaller capacitors can be used with equally good results which depend upon the application circuit. In general, linear regulator stability decreases with higher output currents.



## 11. typical Application Circuit

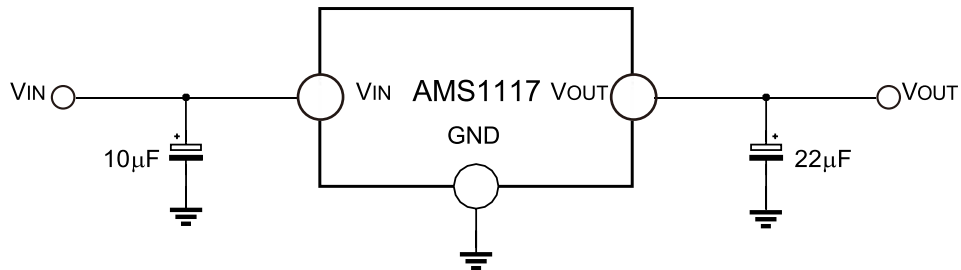


Figure 1. Typical Fixed Output Voltage

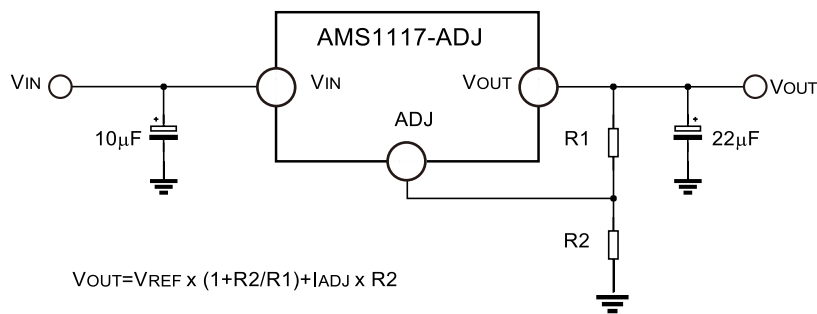


Figure 2. Typical Adjustable Output Voltage

Notes: The circuit and parameters are reference only, please set the parameters of the real application circuit based on the real test.



## 12.1 Typical characteristic

<p>Figure 1: Temperature Stability</p>	<p>Figure 2: Adjust Pin Current</p>
<p>Figure 3: <math>V_{OUT}=5V</math> Load Transient Response</p>	<p>Figure 4: <math>V_{OUT}=5V</math> Line Transient Response</p>
<p>Figure 5: Ripple Rejection VS Current</p>	<p>Figure 6: Power Dissipation VS Ambient Temperature(SOT-223)</p>





## 12.2 Typical characteristic

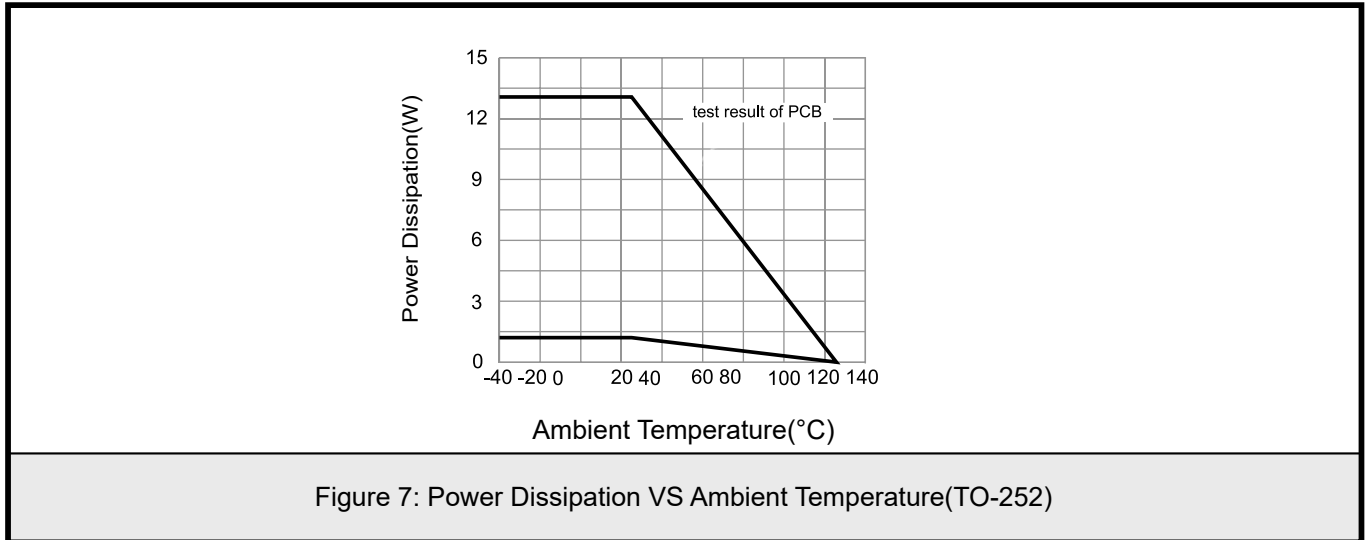
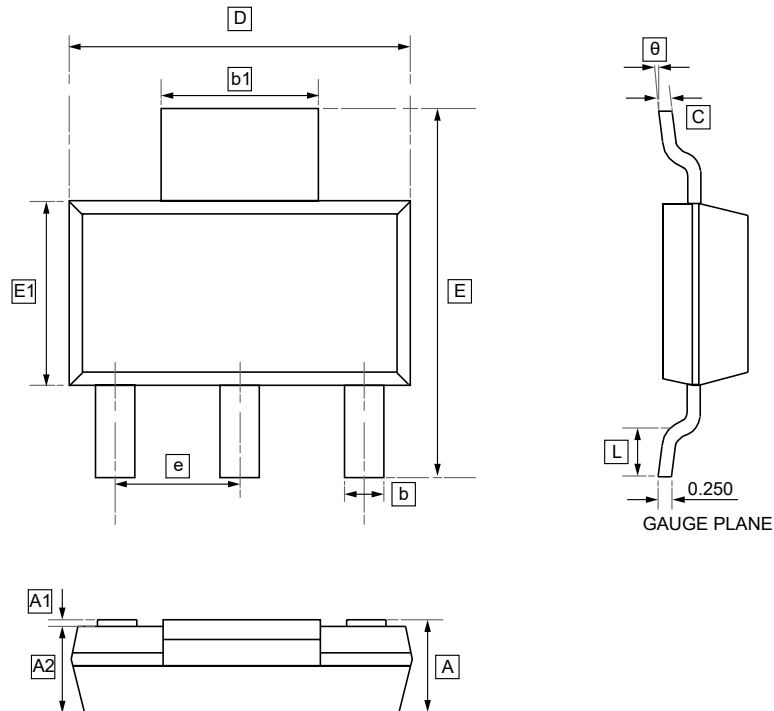


Figure 7: Power Dissipation VS Ambient Temperature(TO-252)



## 13.1SOT-223-3L Package Outline Dimensions

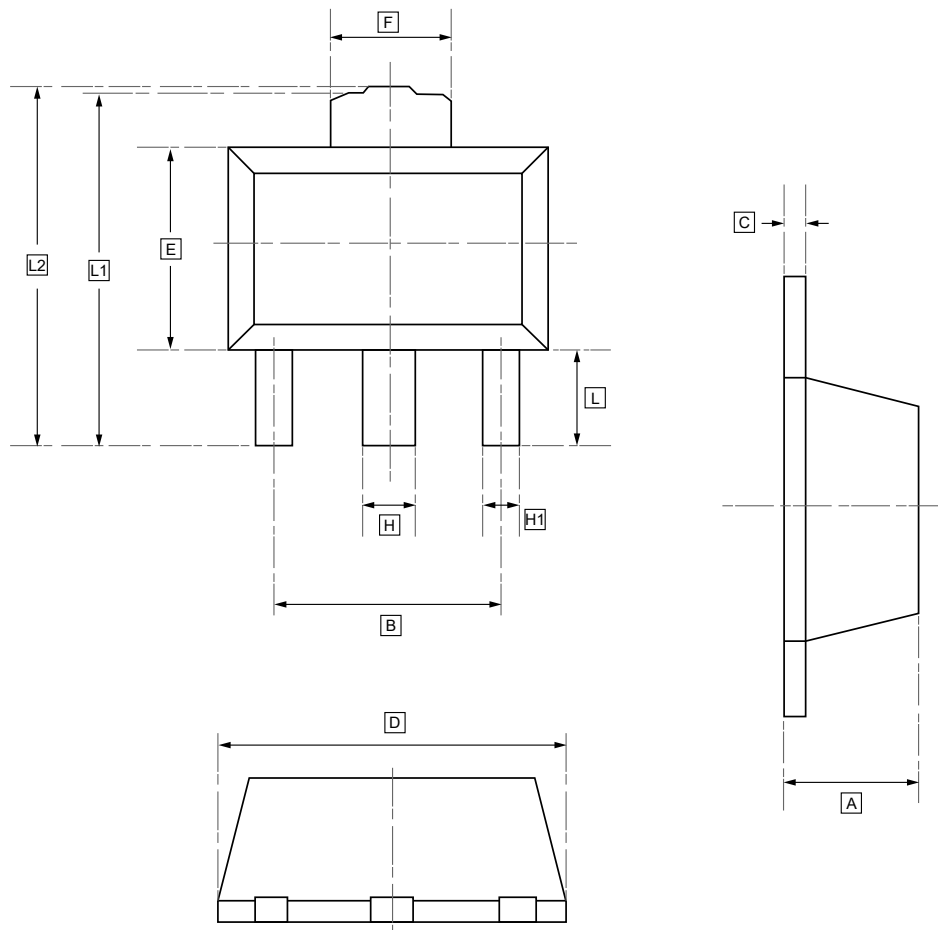


### DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	b1	c	D	E	E1	e	L	θ
Min	-	0.020	1.500	0.660	2.900	0.230	6.300	6.700	3.300	2.300	0.750	0°
Max	1.800	0.100	1.700	0.840	3.100	0.350	6.700	7.300	3.700	BSC	-	10°



### 13.2SOT-89-3L Package Outline Dimensions

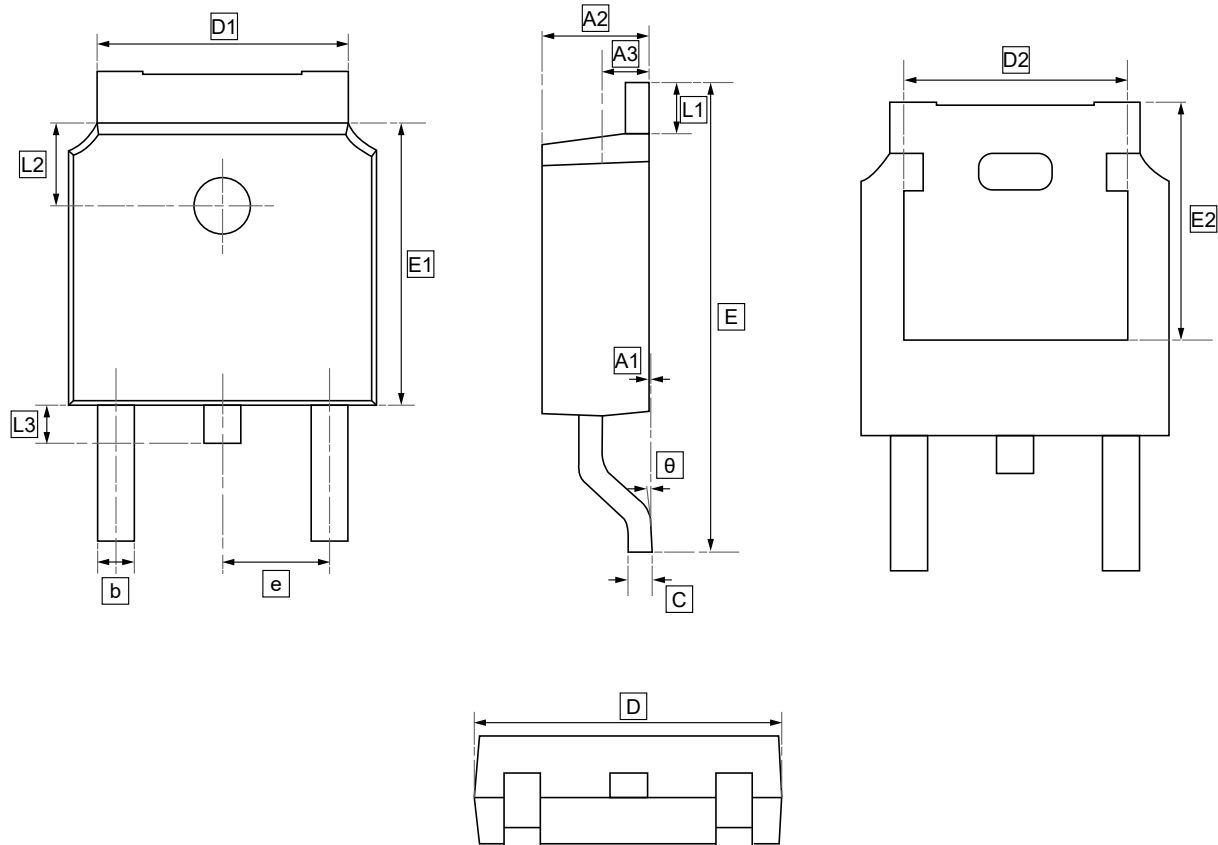


#### DIMENSIONS (mm are the original dimensions)

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



### 13.3TO-252-2L Package Outline Dimensions

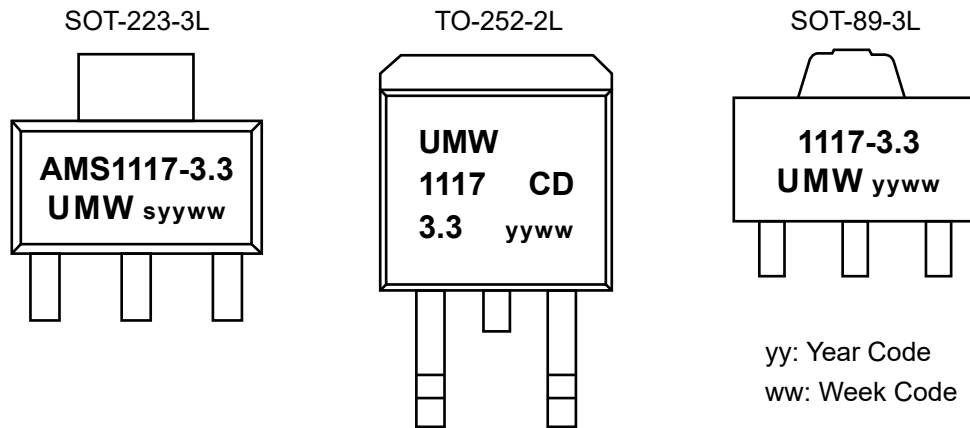


#### DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38	BSC	1.27	1.90	1.00	8.00



## 14. Ordering information



Order Code	Package	Base QTY	Delivery Mode
UMW AMS1117-1.2	SOT-223	2500	Tape and reel
UMW AMS1117-1.2S	SOT-89	1000	Tape and reel
UMW AMS1117-1.5	SOT-223	2500	Tape and reel
UMW AMS1117-1.8	SOT-223	2500	Tape and reel
UMW AMS1117-2.5	SOT-223	2500	Tape and reel
UMW AMS1117-3.3	SOT-223	2500	Tape and reel
UMW AMS1117-3.3s	SOT-89	1000	Tape and reel
UMW AMS1117-5.0	SOT-223	2500	Tape and reel
UMW AMS1117-5.0S	SOT-89	1000	Tape and reel
UMW AMS1117-ADJ	SOT-223	2500	Tape and reel
UMW AMS1117-ADJS	SOT-89	1000	Tape and reel
UMW AMS1117CD-1.2	TO-252	2500	Tape and reel
UMW AMS1117CD-1.8	TO-252	2500	Tape and reel
UMW AMS1117CD-3.3	TO-252	2500	Tape and reel
UMW AMS1117CD-5.0	TO-252	2500	Tape and reel
UMW AMS1117CD-ADJ	TO-252	2500	Tape and reel



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