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 allelectronic products.

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

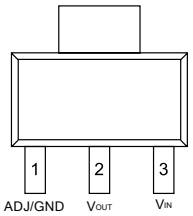
3.Features

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

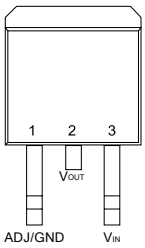
4.Pinning information

Pin	Symbol	Description
1	I/O	GND/ADJ
2	O	V_{OUT}
3	I	V_{IN}

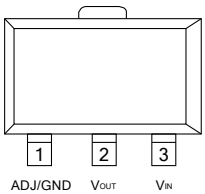
SOT-223



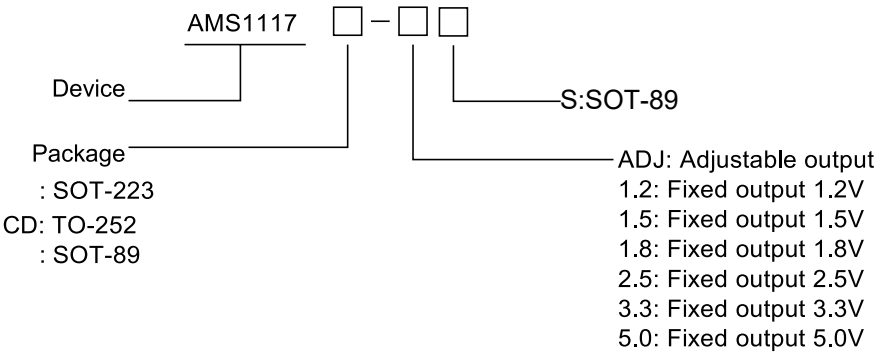
TO-252



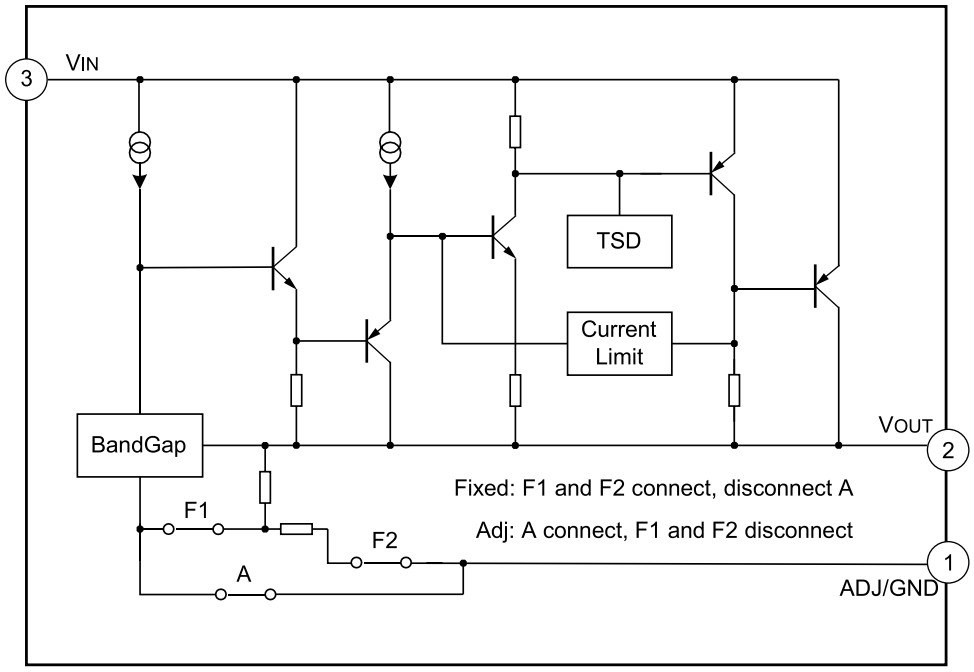
SOT-89



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	°C
Power Dissipation		P_D	Internally Limited (Note1)	mW
Thermal Resistance from Junction to Ambient	SOT-223	Rja	120	°C/W
	TO-252		100	°C/W
	SOT-89		165	°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°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°C	1.176	1.2	1.224	V
		AMS1117-1.5 I_{OUT}=10mA, V_{IN}=3.2V, T_J=25°C	1.470	1.500	1.530	V
		AMS1117-1.8 I_{OUT}=10mA, V_{IN}=3.8V, T_J=25°C	1.764	1.800	1.836	V
		AMS1117-2.5 I_{OUT}=10mA, V_{IN}=4.5V, T_J=25°C	2.450	2.500	2.550	V
		AMS1117-3.3 I_{OUT}=10mA, V_{IN}=5V, T_J=25°C	3.234	3.300	3.366	V
		AMS1117-5 I_{OUT}=10mA, V_{IN}=7V, T_J=25°C	4.900	5.000	5.100	V
Output Voltage Temperature Stability	TS_{OUT}			0.3		%
Line Regulation	R_{line}	V_{INMIN}≤V_{IN}≤12V, V_{OUT}=Fixed/Adj I_{OUT}=10mA		9	18	mV
Load Regulation	R_{load}	10mA≤I_{OUT}≤1A, V_{OUT}=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≤V_{IN}≤ 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	μA
Adjust pin Current Change		0≤ I_{OUT}≤1A, 1.4V ≤V_{IN}-V_{OUT}≤10V		0.2	5	μA
Thermal shutdown	TSD			150		°C
Current limitting	I_{limit}		2.1		2.5	A
Temperature Stabiliy				0.5		%
Long Term Stability		T_A=125°C, 1000Hrs		0.3		%
RMS Output Noise		% of V_{OUT}, 10Hz≤f≤10kHz		0.003		%

10.function Description

The AMS1117 is a LDO regulator, it's pass transistor is made up of a single NPN transistor being driven by a PNP. The dropout voltage is defined as: V_{DROP} = V_{BE}+ V_{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 22μF 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

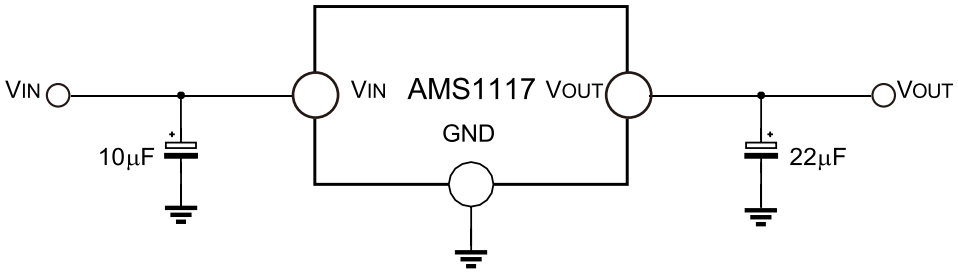


Figure 1. Typical Fixed Output Voltage

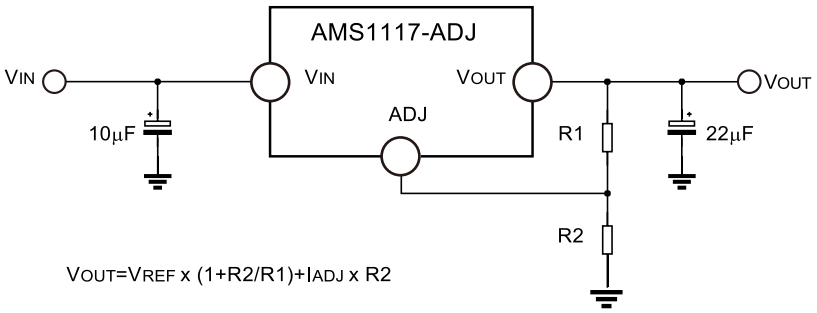


Figure 2. Typical Adjustable Output Voltage

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

12.1Typical characteristic

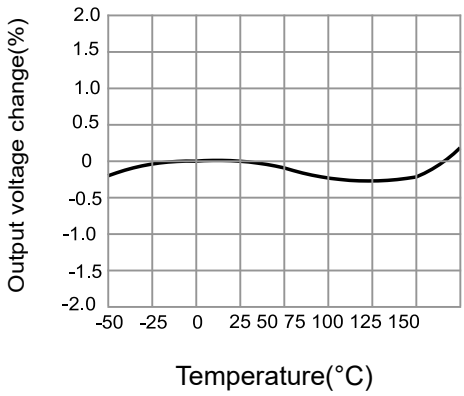


Figure 1: Temperature Stability

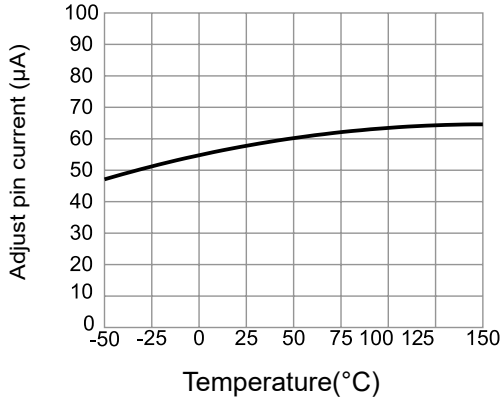


Figure 2: Adjust Pin Current

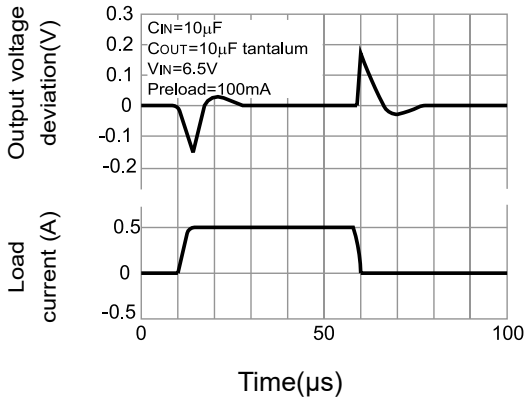


Figure 3: V_{OUT}=5V Load Transient Response

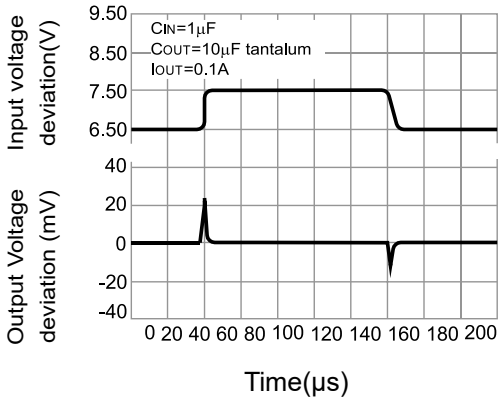


Figure 4: V_{OUT}=5V Line Transient Response

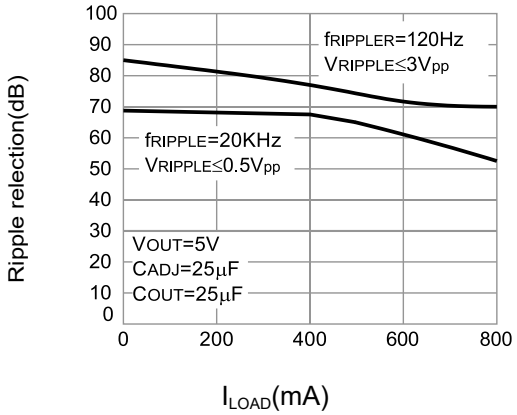


Figure 5: Ripple Rejection VS Current

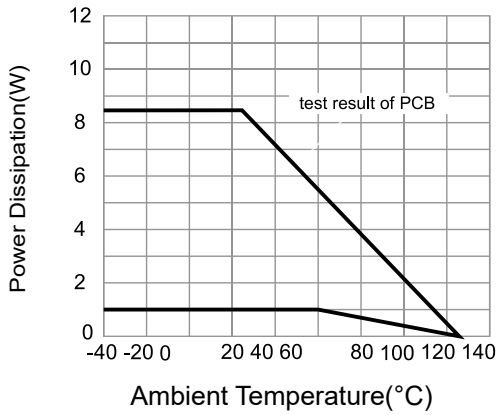


Figure 6: Power Dissipation VS Ambient Temperature(SOT-223)

12.2Typical characteristic

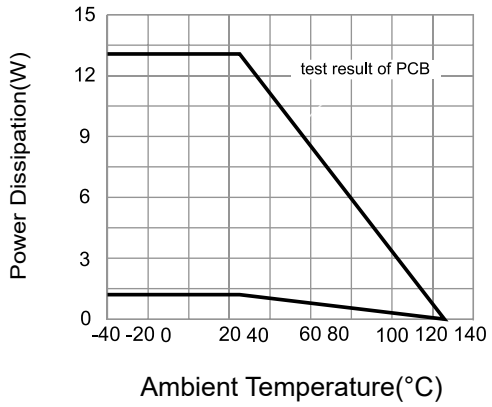
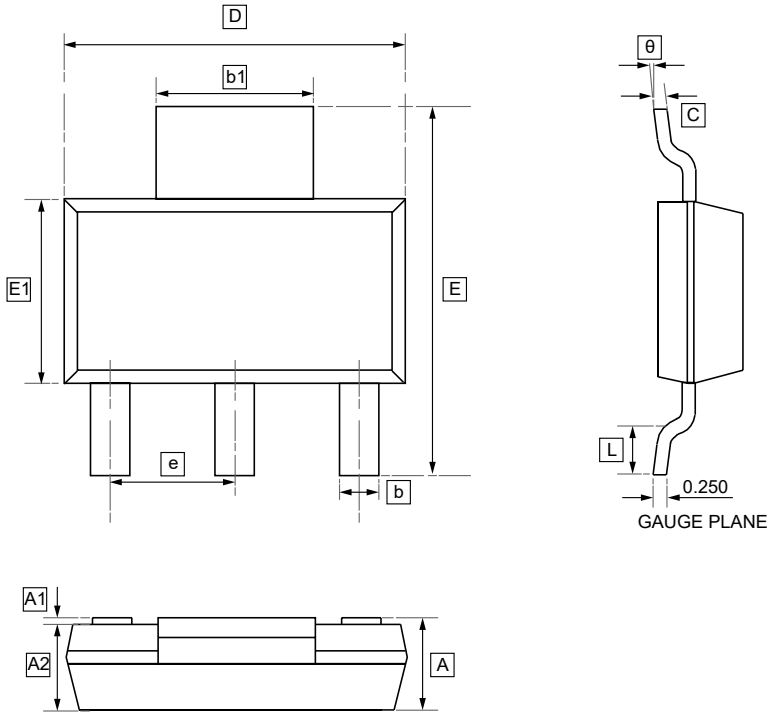


Figure 7: Power Dissipation VS Ambient Temperature(TO-252)

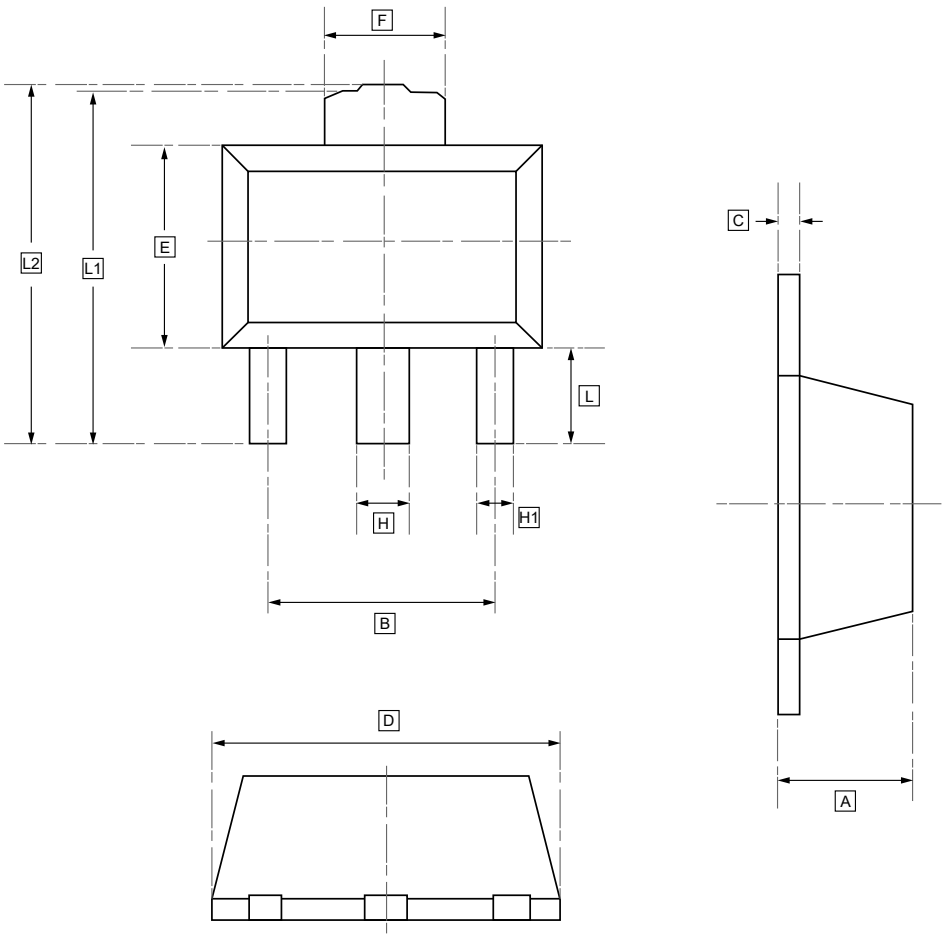
13.1 SOT-223 Package Outline Dimensions



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°

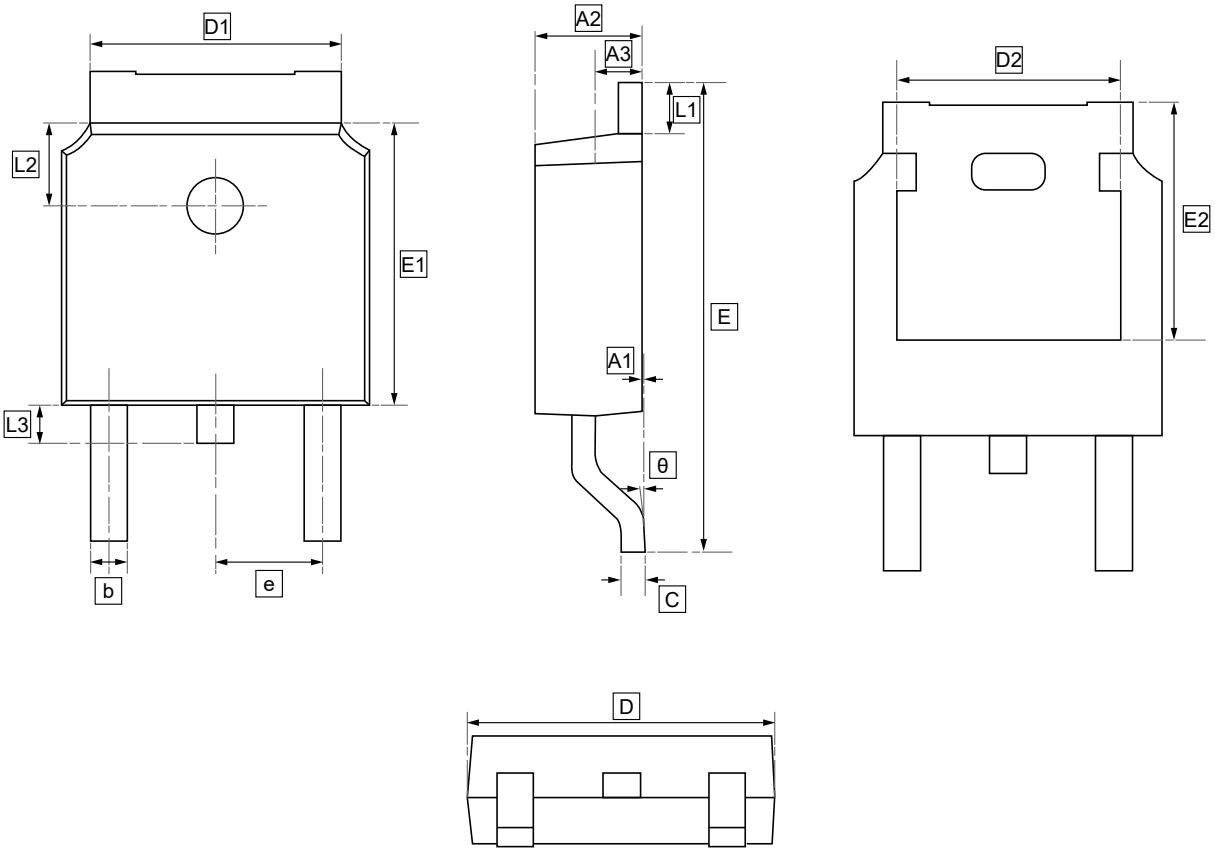
13.2 SOT-89 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	F	H	H1	L	L1	L2
Min	1.40	2.90	0.330	4.40	2.30	1.60	0.40	0.320	0.900	3.900	4.100
Max	1.60	3.10	0.430	4.60	2.60	1.80	0.580	0.520	1.200	4.300	4.350

13.3 TO-252 Package Outline Dimensions

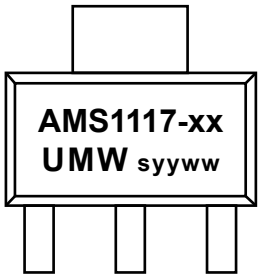


DIMENSIONS (mm are the original dimensions)

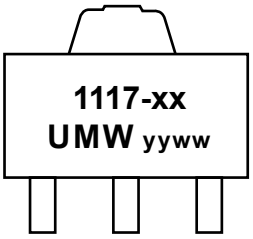
Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38	BSC	1.27	1.90	1.00	8.00

14.Ordering information

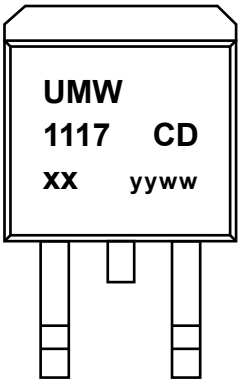
SOT-223



SOT-89



TO-252



yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW AMS1117-1.2	AMS1117-1.2	SOT-223	2500	Tape and reel
UMW AMS1117-1.5	AMS1117-1.5	SOT-223	2500	Tape and reel
UMW AMS1117-1.8	AMS1117-1.8	SOT-223	2500	Tape and reel
UMW AMS1117-2.5	AMS1117-2.5	SOT-223	2500	Tape and reel
UMW AMS1117-3.3	AMS1117-3.3	SOT-223	2500	Tape and reel
UMW AMS1117-5.0	AMS1117-5.0	SOT-223	2500	Tape and reel
UMW AMS1117-ADJ	AMS1117-ADJ	SOT-223	2500	Tape and reel
UMW AMS1117-1.2S	1117-1.2	SOT-89	1000	Tape and reel
UMW AMS1117-3.3s	1117-3.3	SOT-89	1000	Tape and reel
UMW AMS1117-5.0S	1117-5.0	SOT-89	1000	Tape and reel
UMW AMS1117-ADJS	1117-ADJ	SOT-89	1000	Tape and reel
UMW AMS1117CD-1.2	1117CD-1.2	TO-252	2500	Tape and reel
UMW AMS1117CD-1.8	1117CD-1.8	TO-252	2500	Tape and reel
UMW AMS1117CD-3.3	1117CD-3.3	TO-252	2500	Tape and reel
UMW AMS1117CD-5.0	1117CD-5.0	TO-252	2500	Tape and reel
UMW AMS1117CD-ADJ	1117CD-ADJ	TO-252	2500	Tape and reel

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