General Description

The AMS1117 is a series of low dropout three-terminal regulators with a dropout of 1.15V at 1A output cur-rent.

The AMS1117series provides current limiting and thermal shutdown. Its circuit includes a immed bandgap reference to assure output voltage accuracy to be within 1% for 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5.0V and adjustable versions or 2% for 1.2V version. Current limit is immed to ensure specified output current and conolled short-circuit current. On-chip thermal shutdown provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The AMS1117 has an adjustable version, that can provide the output voltage from 1.25V to 12V with only 2 external resistors.

The AMS1117 series is available in the indusy standard SOT-223, SOT-89-3, TO-220-3, TO-252-2 and TO-263-3 power packages.

Features

- Low Dropout Voltage: 1.15V at 1A Output Current
- immed Current Limit
- On-chip Thermal Shutdown
- Three-terminal Adjustable or Fixed 1.2V, 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5.0V
- Operation Junction Temperature: -40 to 125°C

Applications

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-video Player
- NIC/Switch
- Telecom Equipment
- ADSL Modem
- Printer and other Peripheral Equipment

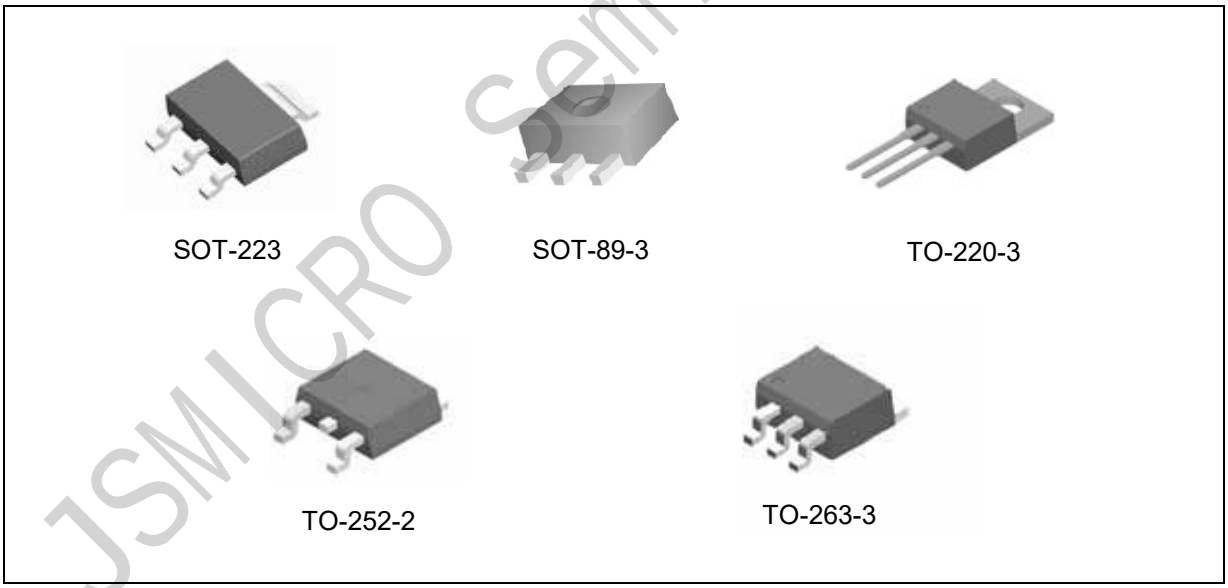


Figure 1. Package Types of AMS1117

Pin Configuration

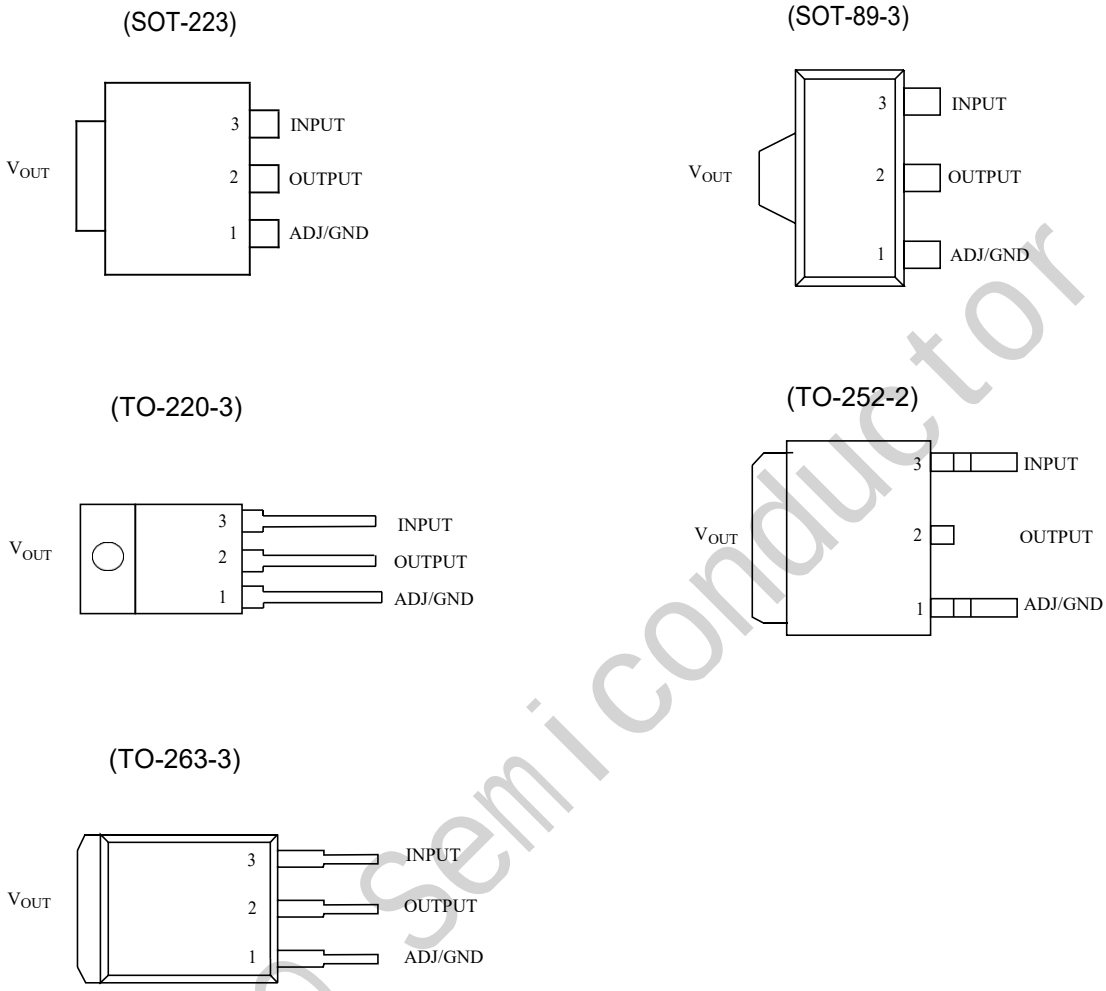


Figure 2. Pin Configuration of AMS1117

Functional Block Diagram

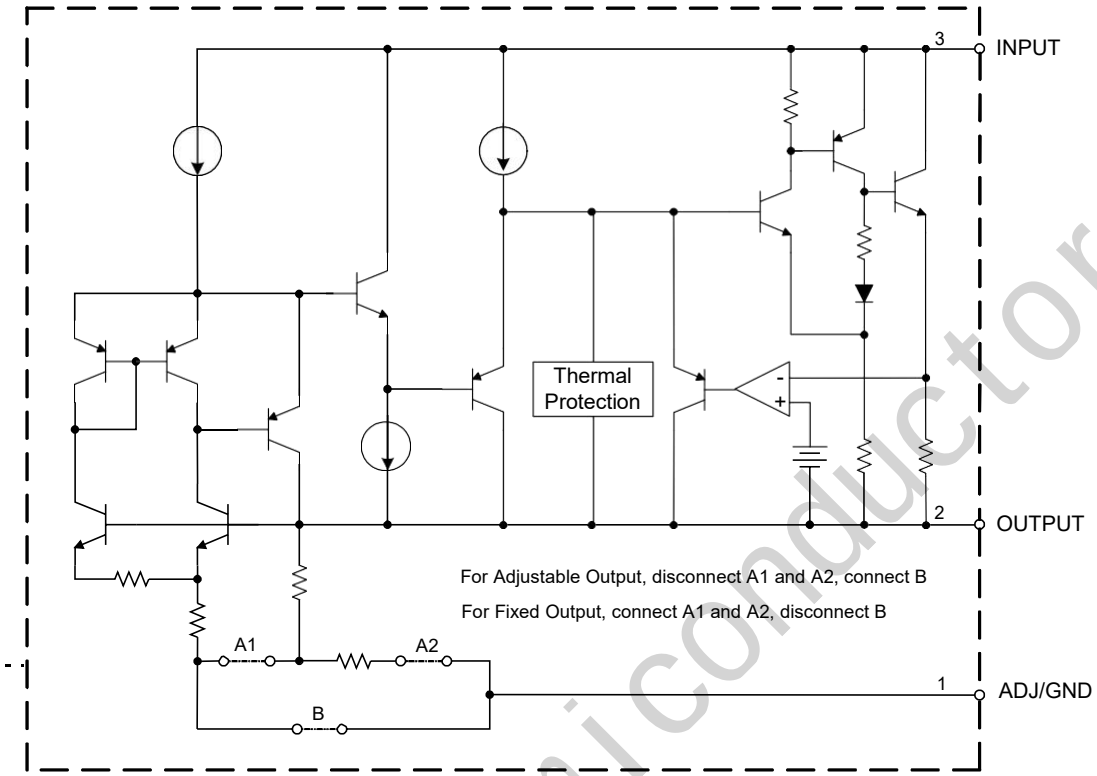
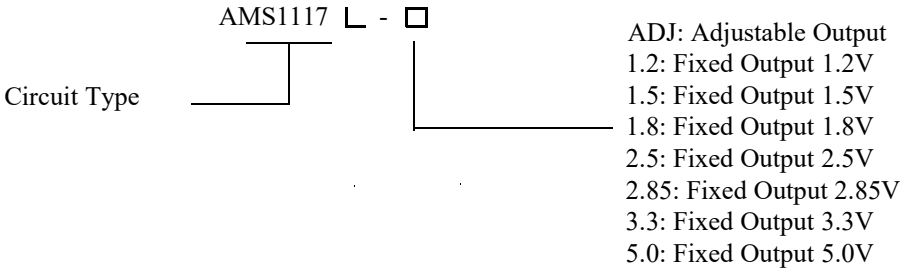


Figure 3. Functional Block Diagram of AMS1117

Ordering Information



Package	Tempera-ture Range	Part No.	Marking ID	Packing Type
		Tin Lead	Tin Lead	
SOT-223	-40 to 125°C	AMS1117ADJ	1117-ADJ	Tape & Reel
		AMS1117-1.2	1117-1.2	Tape & Reel
		AMS1117-1.5	1117-1.5	Tape & Reel
		AMS1117-1.8	1117-1.8	Tape & Reel
		AMS1117-2.5	1117-2.5	Tape & Reel
		AMS1117-2.85	1117-2.85	Tape & Reel
		AMS1117-3.3	1117-3.3	Tape & Reel
		AMS1117-5.0	1117-5.0	Tape & Reel
SOT-89-3	-40 to 125°C	AMS1117-ADJ	1117-ADJ	Tape & Reel
		AMS1117-1.2	1117-1.2	Tape & Reel
		AMS1117-1.5	1117-1.5	Tape & Reel
		AMS1117-1.8	1117-1.8	Tape & Reel
		AMS1117-2.5	1117-2.5	Tape & Reel
		AMS1117-2.85	1117-2.85	Tape & Reel
		AMS1117-3.3	1117-3.3	Tape & Reel
		AMS1117-5.0	1117-5.0	Tape & Reel
TO-220-3	-40 to 125°C	AMS1117T-ADJ	AMS1117T-ADJ	Tube
		AMS1117T-1.2	AMS1117T-1.2	Tube
		AMS1117T-1.5	AMS1117T-1.5	Tube
		AMS1117T-1.8	AMS1117T-1.8	Tube
		AMS1117T-2.5	AMS1117T-2.5	Tube
		AMS1117T-2.85	AMS1117T-2.85	Tube
		AMS1117T-3.3	AMS1117T-3.3	Tube
		AMS1117T-5.0	AMS1117T-5.0	Tube

Ordering Information (Continued)

Package	Tempera-ture Range	Part Number	Marking ID	Packing Type
		Tin Lead	Tin Lead	
TO-252-2	-40 to 125°C	AMS1117-ADJ	AMS1117-ADJ	Tube
		AMS1117-ADJ	AMS1117-ADJ	Tape & Reel
		AMS1117-1.2	AMS1117-1.2	Tube
		AMS1117-1.2	AMS1117-1.2	Tape & Reel
		AMS1117-1.5	AMS1117-1.5	Tube
		AMS1117-1.5	AMS1117-1.5	Tape & Reel
		AMS1117-1.8	AMS1117-1.8	Tube
		AMS1117-1.8	AMS1117-1.8	Tape & Reel
		AMS1117-2.5	AMS1117-2.5	Tube
		AMS1117-2.5	AMS1117-2.5	Tape & Reel
		AMS1117-2.85	AMS1117-2.85	Tube
		AMS1117-2.85	AMS1117-2.85	Tape & Reel
		AMS1117-3.3	AMS1117-3.3	Tube
		AMS1117-3.3	AMS1117-3.3	Tape & Reel
		AMS1117-5.0	AMS1117-5.0	Tube
		AMS1117-5.0	AMS1117-5.0	Tape & Reel
TO-263-3	-40 to 125°C	AMS1117-ADJ	AMS1117-ADJ	Tube
		AMS1117-ADJ	AMS1117-ADJ	Tape & Reel
		AMS1117-1.2	AMS1117-1.2	Tube
		AMS1117-1.2	AMS1117-1.2	Tape & Reel
		AMS1117-1.5	AMS1117-1.5	Tube
		AMS1117-1.5	AMS1117-1.5	Tape & Reel
		AMS1117-1.8	AMS1117-1.8	Tube
		AMS1117-1.8	AMS1117-1.8	Tape & Reel
		AMS1117-2.5	AMS1117-2.5	Tube
		AMS1117-2.5	AMS1117-2.5	Tape & Reel
		AMS1117-2.85	AMS1117-2.85	Tube
		AMS1117-2.85	AMS1117-2.85	Tape & Reel
		AMS1117-3.3	AMS1117-3.3	Tube
		AMS1117-3.3	AMS1117-3.3	Tape & Reel
		AMS1117-5.0	AMS1117-5.0	Tube
		AMS1117-5.0	AMS1117-5.0	Tape & Reel

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Min	Max	Unit
Input Voltage	V_{IN}		20	V
Maximum Junction Temperature	T_J		150	°C
Storage Temperature	T_S	-65	150	°C
Lead Temperature (Soldering, 10sec)	T_{LEAD}		300	°C
ESD (Machine Model)	ESD		600	V

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Input Voltage	V_{IN}		15	V
Operating Junction Temperature Range	T_J	-40	125	°C

Elecical Characteristics

LM1117-ADJ Elecical Characteristics

Operating Conditions: V_{IN}≤10V, T_J =25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reference Voltage	V_{REF}	I_{OUT} = 10mA, V_{IN}-V_{OUT} = 2V 10mA≤ I_{OUT} ≤ 1A, 1.4V≤ V_{IN}-V_{OUT} ≤ 8V, P≤ Maximum Power Dissipation	1.238 1.225	1.250 1.250	1.262 1.270	V
Line Regulation	ΔV_{OUT}	I_{OUT} = 10mA, 1.5V≤ V_{IN}-V_{OUT} ≤ 10V		0.035	0.2	%
Load Regulation	ΔV_{OUT}	V_{IN} -V_{OUT} = 2V, 10mA≤ I_{OUT} ≤ 1A		0.2	0.4	%
Dropout Voltage		ΔV_{REF} = 1%, I_{OUT} = 0.1A		1.00	1.1	V
		ΔV_{REF} = 1%, I_{OUT} = 0.5A		1.08	1.18	V
		ΔV_{REF} = 1%, I_{OUT} = 1.0A		1.15	1.25	V
Current Limit	I_{LIMIT}	V_{IN}-V_{OUT} = 2V	1.25	1.35		A
Adjust Pin Current				60	120	μA
Adjust Pin Current Change		1.4V≤ V_{IN}-V_{OUT} ≤ 10V, 10mA ≤ I_{OUT} ≤ 1A		0.2	5	μA
Minimum Load Current (ADJ)		1.5V≤ V_{IN}-V_{OUT} ≤ 10V (ADJ only)		1.7	5	mA
Quiescent Current		V_{IN}=V_{OUT} +1.25V		5	10	mA
Ripple Rejection		f =120Hz, C_{OUT} =22μF Tantalum, V_{IN}-V_{OUT} = 3V, I_{OUT} =1A	60	75		dB
Temperature Stability				0.5		%
Long -Term Stability		T_A=125°C, 1000hrs		0.3		%
RMS Output Noise (% of V_{OUT})		T_A=25°C, 10Hz ≤ f ≤ 10kHz		0.003		%
Thermal Resistance, Junction to Case	θ_{JC}	SOT-223 SOT-89-3 TO-252-2 TO-220-3 TO-263-3		15 75 10 4.5 4		°C/W
Thermal Shutdown		Junction Temperature		150		°C
Thermal Shutdown Hysteresis				25		°C

Elecical Characteristics (Continued)

LM1117-1.2V Elecical Characteristics

Operating Conditions: V_{IN}≤10V, T_J =25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	I_{OUT} = 10mA, V_{IN} = 3.2V 10mA ≤ I_{OUT} ≤ 1A, 3.0V≤ V_{IN}≤ 10V	1.176 1.152	1.2 1.2	1.224 1.248	V
Line Regulation	ΔV_{OUT}	I_{OUT} = 10mA, 1.5V≤ V_{IN}-V_{OUT} ≤ 10V		1	6	mV
Load Regulation	ΔV_{OUT}	V_{IN} -V_{OUT} = 2V, 10mA≤ I_{OUT} ≤1A		1	10	mV
Dropout Voltage		ΔV_{OUT}= 1%, I_{OUT} = 0.1A		1.00	1.1	V
		ΔV_{OUT}= 1%, I_{OUT} = 0.5A		1.08	1.18	V
		ΔV_{OUT} = 1%, I_{OUT} = 1.0A		1.15	1.25	V
Current Limit	I_{LIMIT}	V_{IN}-V_{OUT} = 2V	1.25	1.35		A
Quiescent Current		V_{IN}=V_{OUT} +1.25V		5	10	mA
Ripple Rejection		f =120Hz, C_{OUT} =22μF Tantalum, V_{IN}-V_{OUT} = 3V, I_{OUT} =1A	60	75		dB
Temperature Stability				0.5		%
Long -Term Stability		T_A=125°C, 1000hrs		0.3		%
RMS Output Noise (% of V_{OUT})		T_A=25°C, 10Hz ≤ f ≤ 10kHz		0.003		%
Thermal Resistance, Junction to Case	θ_{JC}	SOT-223 SOT-89-3 TO-252-2 TO-220-3 TO-263-3		15 75 10 4.5 4		°C/W
Thermal Shutdown		Junction Temperature		150		°C
Thermal Shutdown Hysteresis				25		°C

Elecical Characteristics (Continued)

LM1117-1.5V Elecical Characteristics

Operating Conditions: V_{IN}≤10V, T_J =25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	I_{OUT} = 10mA, V_{IN} = 3.5V 10mA ≤ I_{OUT} ≤ 1A, 3.0V≤ V_{IN}≤ 10V	1.485 1.470	1.5 1.5	1.515 1.530	V
Line Regulation	ΔV_{OUT}	I_{OUT} = 10mA, 1.5V≤ V_{IN}-V_{OUT} ≤ 10V		1	6	mV
Load Regulation	ΔV_{OUT}	V_{IN} -V_{OUT} = 2V, 10mA≤ I_{OUT} ≤1A		1	10	mV
Dropout Voltage		ΔV_{OUT}= 1%, I_{OUT} = 0.1A		1.00	1.1	V
		ΔV_{OUT}= 1%, I_{OUT} = 0.5A		1.08	1.18	V
		ΔV_{OUT} = 1%, I_{OUT} = 1.0A		1.15	1.25	V
Current Limit	I_{LIMIT}	V_{IN}-V_{OUT} = 2V	1.25	1.35		A
Quiescent Current		V_{IN}=V_{OUT} +1.25V		5	10	mA
Ripple Rejection		f =120Hz, C_{OUT} =22μF Tantalum, V_{IN}-V_{OUT} = 3V, I_{OUT} =1A	60	75		dB
Temperature Stability				0.5		%
Long -Term Stability		T_A=125°C, 1000hrs		0.3		%
RMS Output Noise (% of V_{OUT})		T_A=25°C, 10Hz ≤ f ≤ 10kHz		0.003		%
Thermal Resistance, Junction to Case	θ_{JC}	SOT-223 SOT-89-3 TO-252-2 TO-220-3 TO-263-3		15 75 10 4.5 4		°C/W
Thermal Shutdown		Junction Temperature		150		°C
Thermal Shutdown Hysteresis				25		°C

Elecical Characteristics (Continued)

LM1117-1.8V Elecical Characteristics

Operating Conditions: V_{IN}≤10V, T_J =25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	I_{OUT} = 10mA, V_{IN} = 3.8V 10mA ≤ I_{OUT}≤ 1A, 3.2V≤ V_{IN} ≤ 10V	1.782 1.746	1.8 1.8	1.818 1.854	V
Line Regulation	ΔV_{OUT}	I_{OUT} = 10mA, 1.5V≤ V_{IN}-V_{OUT} ≤ 10V		1	6	mV
Load Regulation	ΔV_{OUT}	V_{IN} -V_{OUT} = 2V, 10mA≤ I_{OUT} ≤ 1A		1	10	mV
Dropout Voltage		ΔV_{OUT}= 1%, I_{OUT} = 0.1A		1.00	1.1	V
		ΔV_{OUT}= 1%, I_{OUT} = 0.5A		1.08	1.18	V
		ΔV_{OUT} = 1%, I_{OUT} = 1.0A		1.15	1.25	V
Current Limit	I_{LIMIT}	V_{IN}-V_{OUT} = 2V	1.25	1.35		A
Quiescent Current		V_{IN}=V_{OUT} +1.25V		5	10	mA
Ripple Rejection		f =120Hz, C_{OUT} =22μF Tantalum, V_{IN}-V_{OUT} = 3V, I_{OUT} =1A	60	75		dB
Temperature Stability				0.5		%
Long -Term Stability		T_A=125°C, 1000hrs		0.3		%
RMS Output Noise (% of V_{OUT})		T_A=25°C, 10Hz ≤ f ≤ 10kHz		0.003		%
Thermal Resistance, Junction to Case	θ_{JC}	SOT-223 SOT-89-3 TO-252-2 TO-220-3 TO-263-3		15 75 10 4.5 4		°C/W
Thermal Shutdown		Junction Temperature		150		°C
Thermal Shutdown Hysteresis				25		°C

Elecical Characteristics (Continued)

LM1117-2.5V Elecical Characteristics

Operating Conditions: V_{IN}≤10V, T_J =25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	I_{OUT} = 10mA, V_{IN} = 4.5V 10mA ≤ I_{OUT}≤ 1A, 3.9V≤ V_{IN} ≤ 10V	2.475 2.450	2.5 2.5	2.525 2.550	V
Line Regulation	ΔV_{OUT}	I_{OUT} = 10mA, 1.5V≤ V_{IN}-V_{OUT} ≤ 10V		1	6	mV
Load Regulation	ΔV_{OUT}	V_{IN} -V_{OUT} = 2V, 10mA≤ I_{OUT} ≤ 1A		1	10	mV
Dropout Voltage		ΔV_{OUT}= 1%, I_{OUT} = 0.1A		1.00	1.1	V
		ΔV_{OUT}= 1%, I_{OUT} = 0.5A		1.08	1.18	V
		ΔV_{OUT} = 1%, I_{OUT} = 1.0A		1.15	1.25	V
Current Limit	I_{LIMIT}	V_{IN}-V_{OUT} = 2V	1.25	1.35		A
Quiescent Current		V_{IN}=V_{OUT} +1.25V		5	10	mA
Ripple Rejection		f =120Hz, C_{OUT} =22μF Tantalum, V_{IN}-V_{OUT} = 3V, I_{OUT} =1A	60	75		dB
Temperature Stability				0.5		%
Long -Term Stability		T_A=125°C, 1000hrs		0.3		%
RMS Output Noise (% of V_{OUT})		T_A=25°C, 10Hz ≤ f ≤ 10kHz		0.003		%
Thermal Resistance, Junction to Case	θ_{JC}	SOT-223 SOT-89-3 TO-252-2 TO-220-3 TO-263-3		15 75 10 4.5 4		°C/W
Thermal Shutdown		Junction Temperature		150		°C
Thermal Shutdown Hysteresis				25		°C

Elecical Characteristics (Continued)

LM1117-2.85V Elecical Characteristics

Operating Conditions: V_{IN}≤10V, T_J =25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	I_{OUT} = 10mA, V_{IN} = 4.85V 10mA ≤ I_{OUT} ≤ 1A, 4.25V≤ V_{IN}≤ 10V	2.822 2.793	2.85 2.85	2.878 2.907	V
Line Regulation	ΔV_{OUT}	I_{OUT} = 10mA, 1.5V≤ V_{IN}-V_{OUT} ≤ 10V		1	6	mV
Load Regulation	ΔV_{OUT}	V_{IN} -V_{OUT} = 2V, 10mA≤ I_{OUT} ≤1A		1	10	mV
Dropout Voltage		ΔV_{REF} = 1%, I_{OUT} = 0.1A		1.00	1.1	V
		ΔV_{REF} = 1%, I_{OUT} = 0.5A		1.08	1.18	V
		ΔV_{REF} = 1%, I_{OUT} = 1.0A		1.15	1.25	V
Current Limit	I_{LIMIT}	V_{IN}-V_{OUT} = 2V	1.25	1.35		A
Quiescent Current		V_{IN}=V_{OUT} +1.25V		5	10	mA
Ripple Rejection		f =120Hz, C_{OUT} =22μF Tantalum, V_{IN}-V_{OUT} = 3V, I_{OUT} =1A	60	75		dB
Temperature Stability				0.5		%
Long -Term Stability		T_A=125°C, 1000hrs		0.3		%
RMS Output Noise (% of V_{OUT})		T_A=25°C, 10Hz ≤ f ≤ 10kHz		0.003		%
Thermal Resistance, Junction to Case	θ_{JC}	SOT-223 SOT-89-3 TO-252-2 TO-220-3 TO-263-3		15 75 10 4.5 4		°C/W
Thermal Shutdown		Junction Temperature		150		°C
Thermal Shutdown Hysteresis				25		°C

Elecical Characteristics (Continued)

LM1117-3.3V Elecical Characteristics

Operating Conditions: V_{IN}≤10V, T_J =25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	I_{OUT} = 10mA, V_{IN} = 5.0V 10mA ≤ I_{OUT}≤ 1A, 4.75V≤ V_{IN} ≤ 10V	3.267 3.235	3.3 3.3	3. 333 3.365	V
Line Regulation	ΔV_{OUT}	I_{OUT} = 10mA, 1.5V≤ V_{IN}-V_{OUT} ≤ 10V		1	6	mV
Load Regulation	ΔV_{OUT}	V_{IN} -V_{OUT} = 2V, 10mA≤ I_{OUT} ≤ 1A		1	10	mV
Dropout Voltage		ΔV_{OUT}= 1%, I_{OUT} = 0.1A		1.00	1.1	V
		ΔV_{OUT}= 1%, I_{OUT} = 0.5A		1.08	1.18	V
		ΔV_{OUT} = 1%, I_{OUT} = 1.0A		1.15	1.25	V
Current Limit	I_{LIMIT}	V_{IN}-V_{OUT} = 2V	1.25	1.35		A
Quiescent Current		V_{IN}=V_{OUT} +1.25V		5	10	mA
Ripple Rejection		f =120Hz, C_{OUT} =22μF Tantalum, V_{IN}-V_{OUT} = 3V, I_{OUT} =1A	60	75		dB
Temperature Stability				0.5		%
Long -Term Stability		T_A=125°C, 1000hrs		0.3		%
RMS Output Noise (% of V_{OUT})		T_A=25°C, 10Hz ≤ f ≤ 10kHz		0.003		%
Thermal Resistance, Junction to Case	θ_{JC}	SOT-223 SOT-89-3 TO-252-2 TO-220-3 TO-263-3		15 75 10 4.5 4		°C/W
Thermal Shutdown		Junction Temperature		150		°C
Thermal Shutdown Hysteresis				25		°C

Elecical Characteristics (Continued)

LM1117-5.0V Elecical Characteristics

Operating Conditions: V_{IN}≤10V, T_J =25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	I_{OUT} = 10mA, V_{IN} = 7.0V 10mA ≤ I_{OUT}≤ 1A, 6.5V≤ V_{IN} ≤ 12V	4.950 4.900	5.0 5.0	5.050 5.100	V
Line Regulation	ΔV_{OUT}	I_{OUT} = 10mA, 1.5V≤ V_{IN}-V_{OUT} ≤ 10V		1	10	mV
Load Regulation	ΔV_{OUT}	V_{IN} -V_{OUT} = 2V, 10mA≤ I_{OUT} ≤ 1A		1	15	mV
Dropout Voltage		ΔV_{OUT}= 1%, I_{OUT} = 0.1A		1.00	1.1	V
		ΔV_{OUT}= 1%, I_{OUT} = 0.5A		1.08	1.18	V
		ΔV_{OUT} = 1%, I_{OUT} = 1.0A		1.15	1.25	V
Current Limit	I_{LIMIT}	V_{IN}-V_{OUT} = 2V	1.25	1.35		A
Quiescent Current		V_{IN}=V_{OUT} +1.25V		5	10	mA
Ripple Rejection		f =120Hz, C_{OUT} =22μF Tantalum, V_{IN}-V_{OUT} = 3V, I_{OUT} =1A	60	75		dB
Temperature Stability				0.5		%
Long -Term Stability		T_A=125°C, 1000hrs		0.3		%
RMS Output Noise (% of V_{OUT})		T_A=25°C, 10Hz ≤ f ≤ 10kHz		0.003		%
Thermal Resistance, Junction to Case	θ_{JC}	SOT-223 SOT-89-3 TO-252-2 TO-220-3 TO-263-3		15 75 10 4.5 4		°C/W
Thermal Shutdown		Junction Temperature		150		°C
Thermal Shutdown Hysteresis				25		°C

Typical Performance Characteristics

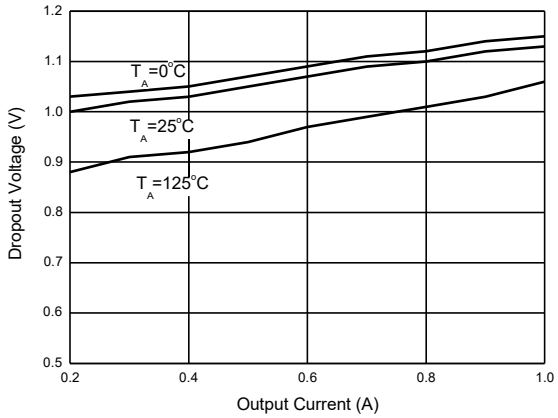


Figure 4. Dropout Voltage vs. Output Current

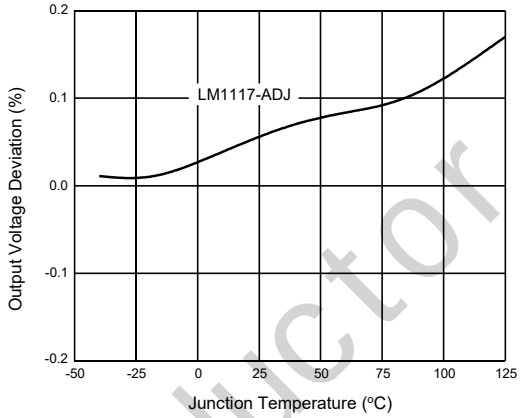


Figure 5. Load Regulation vs. Junction Temperature

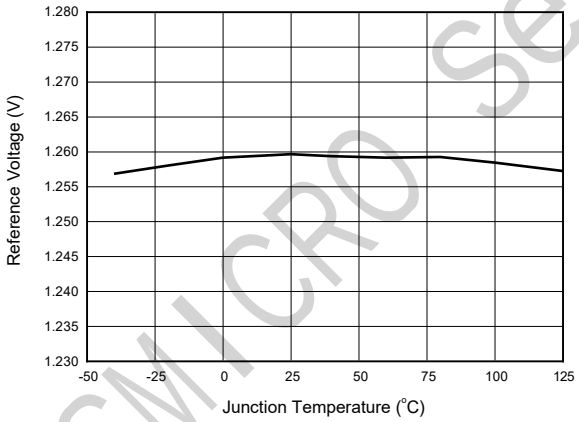


Figure 6. Reference Voltage vs. Junction Temperature

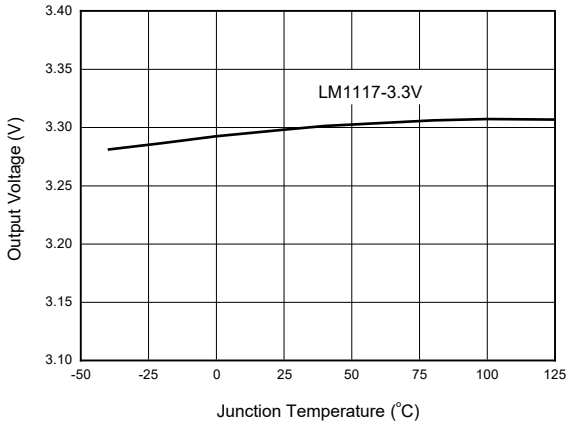


Figure 7. Output Voltage vs. Junction Temperature

Typical Performance Characteristics (Continued)

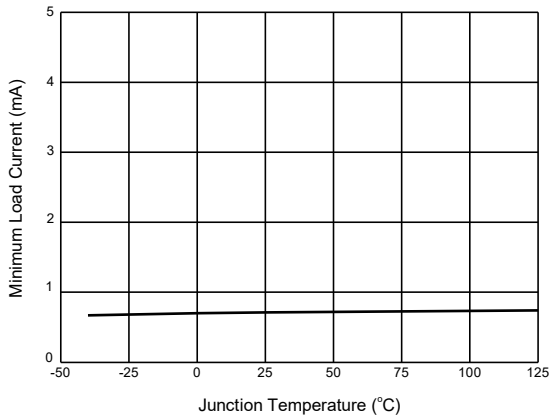


Figure 8. Minimum Load Current vs. Junction Temperature

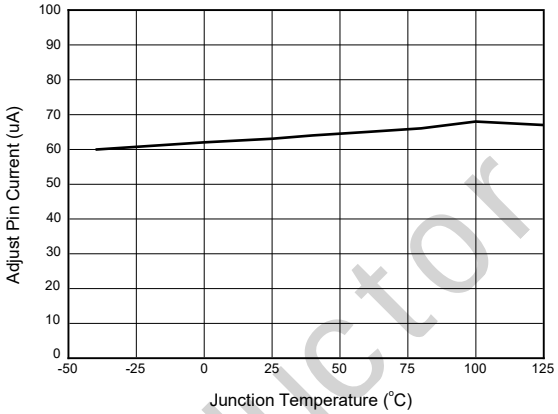


Figure 9. Adjust Pin Current vs. Temperature

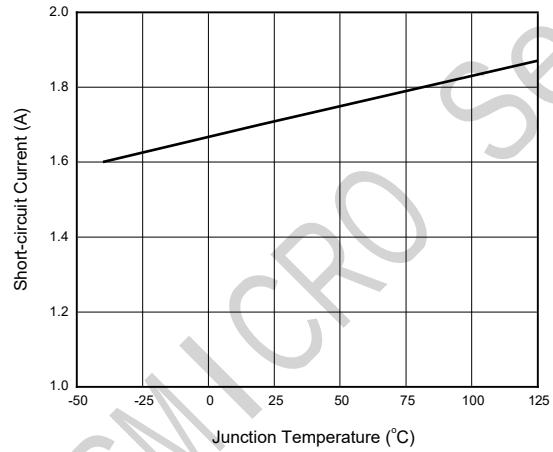


Figure 10. Short-Circuit Current vs. Junction Temperature

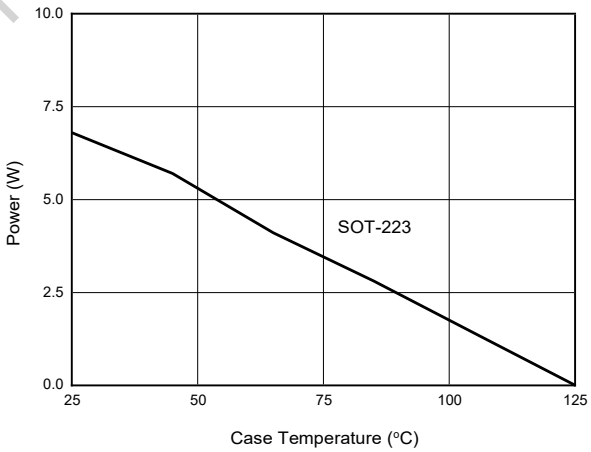


Figure 11. Maximum Power Dissipation

Typical Performance Characteristics (Continued)

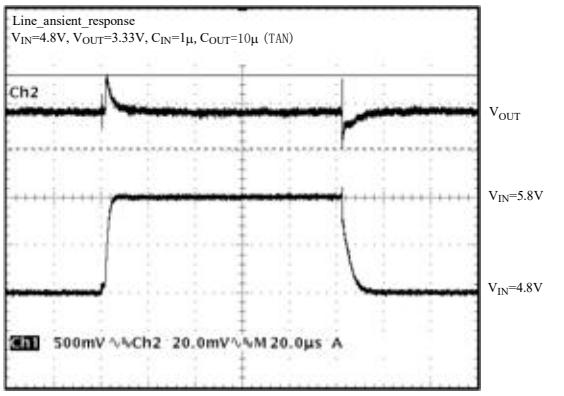


Figure 12. Line ansient Response

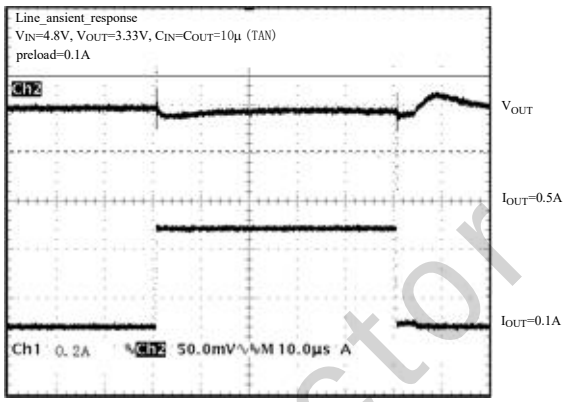


Figure 13. Load ansient Response

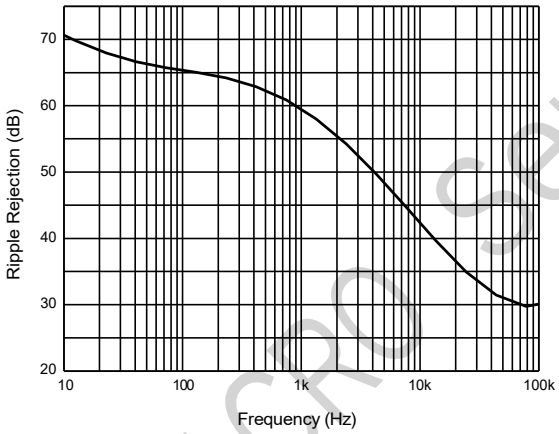


Figure 14. Ripple Rejection vs. Frequency

Typical Applications

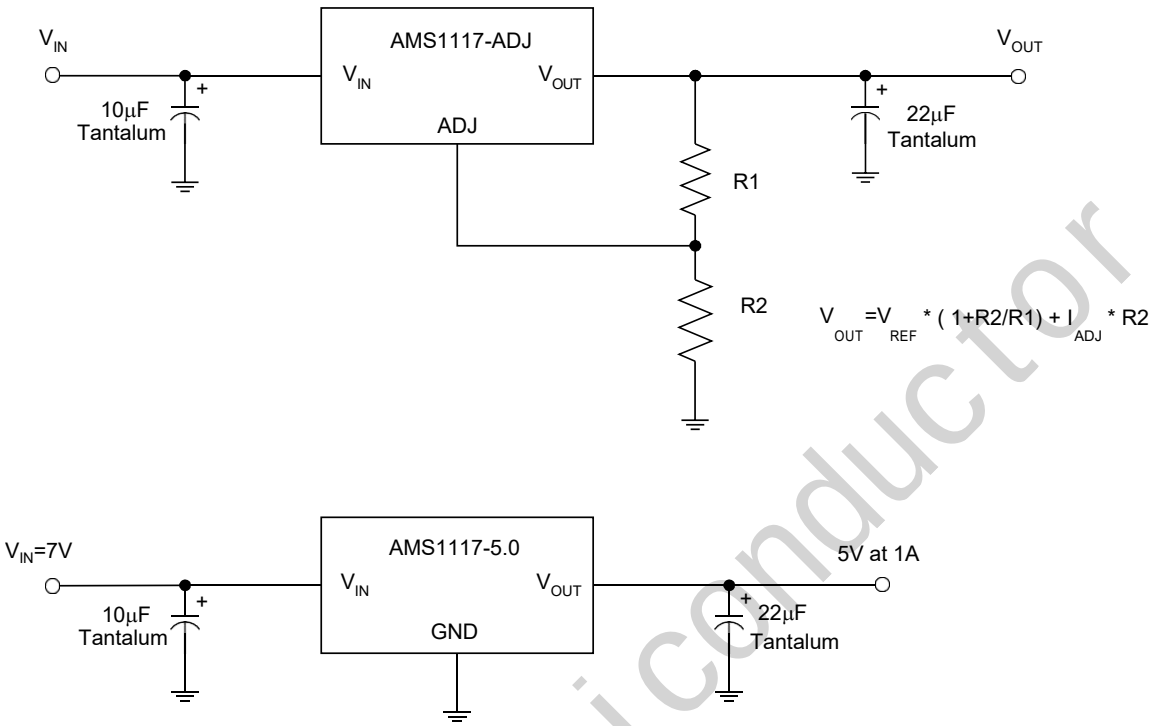
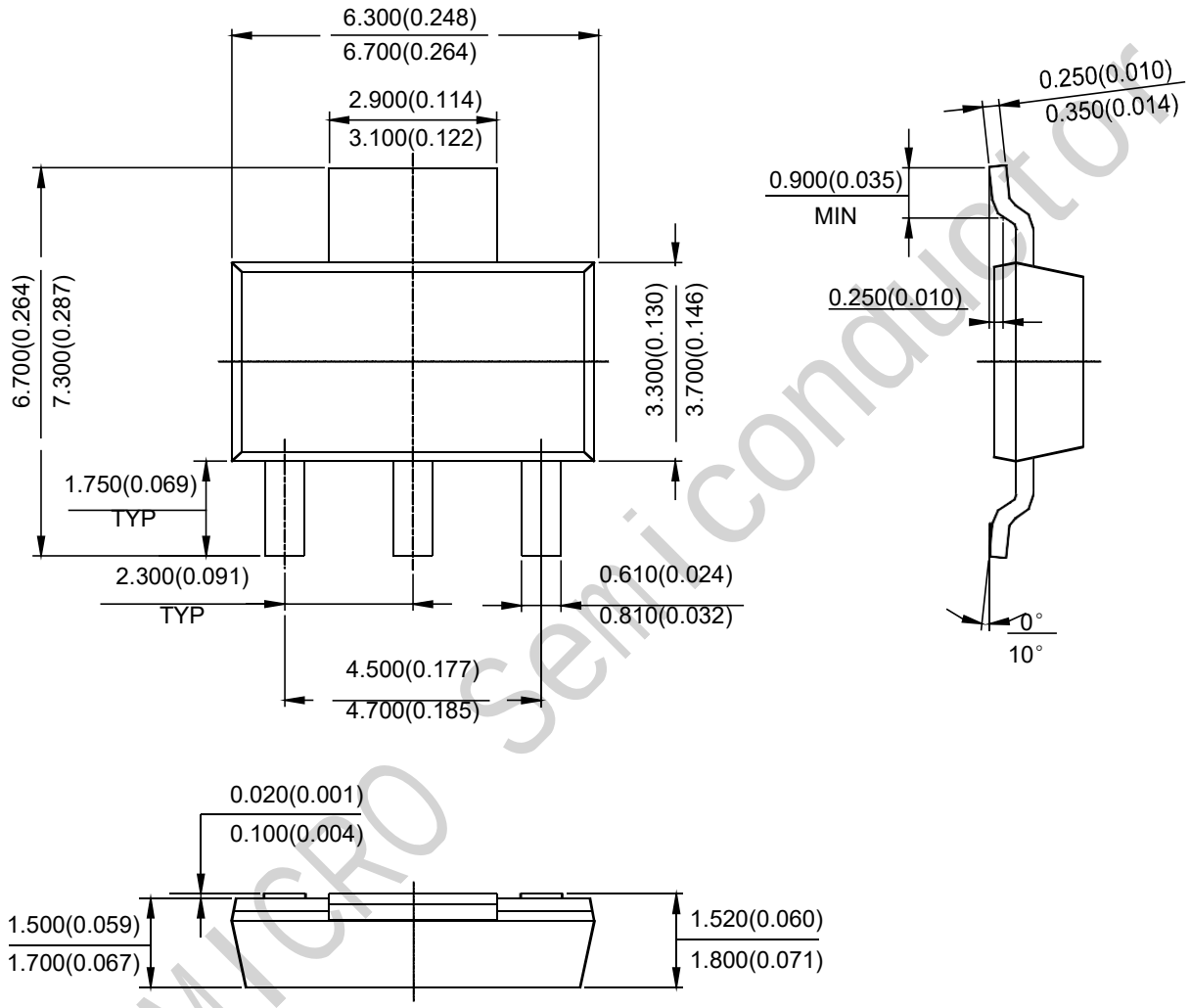


Figure 15. Typical Applications of AMS1117

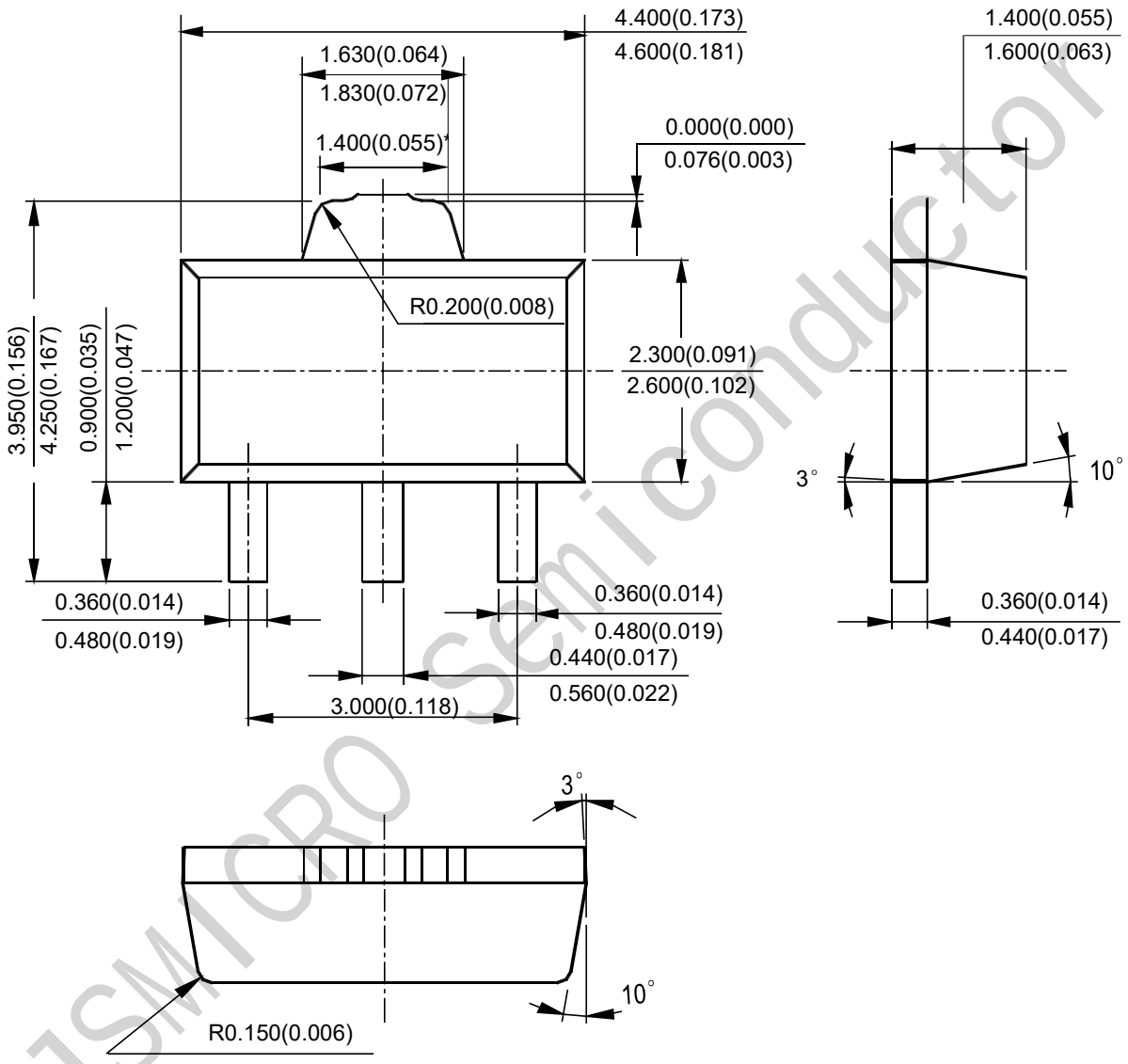
Mechanical Dimensions

SOT- 223 **Unit: mm(inch)**



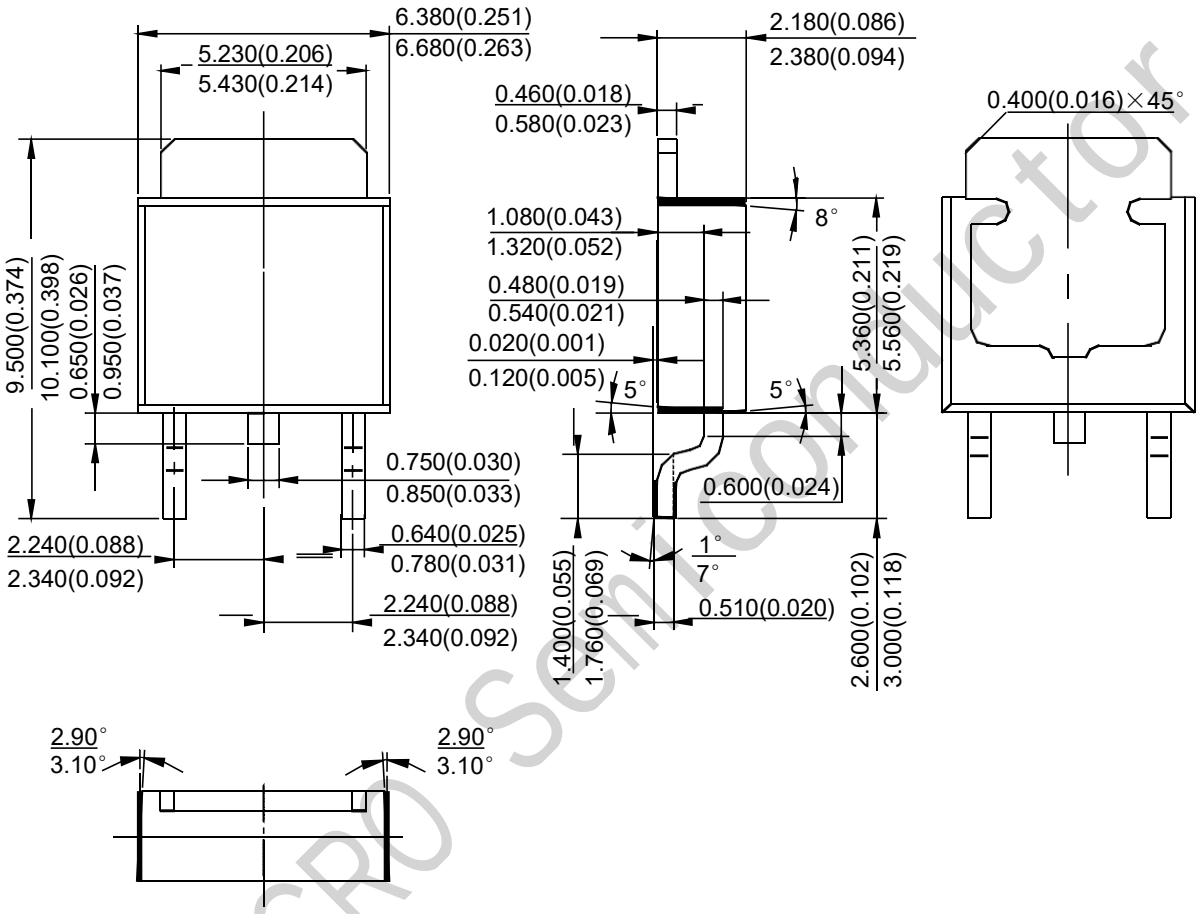
Mechanical Dimensions (Continued)

SOT-89-3 **Unit: mm(inch)**



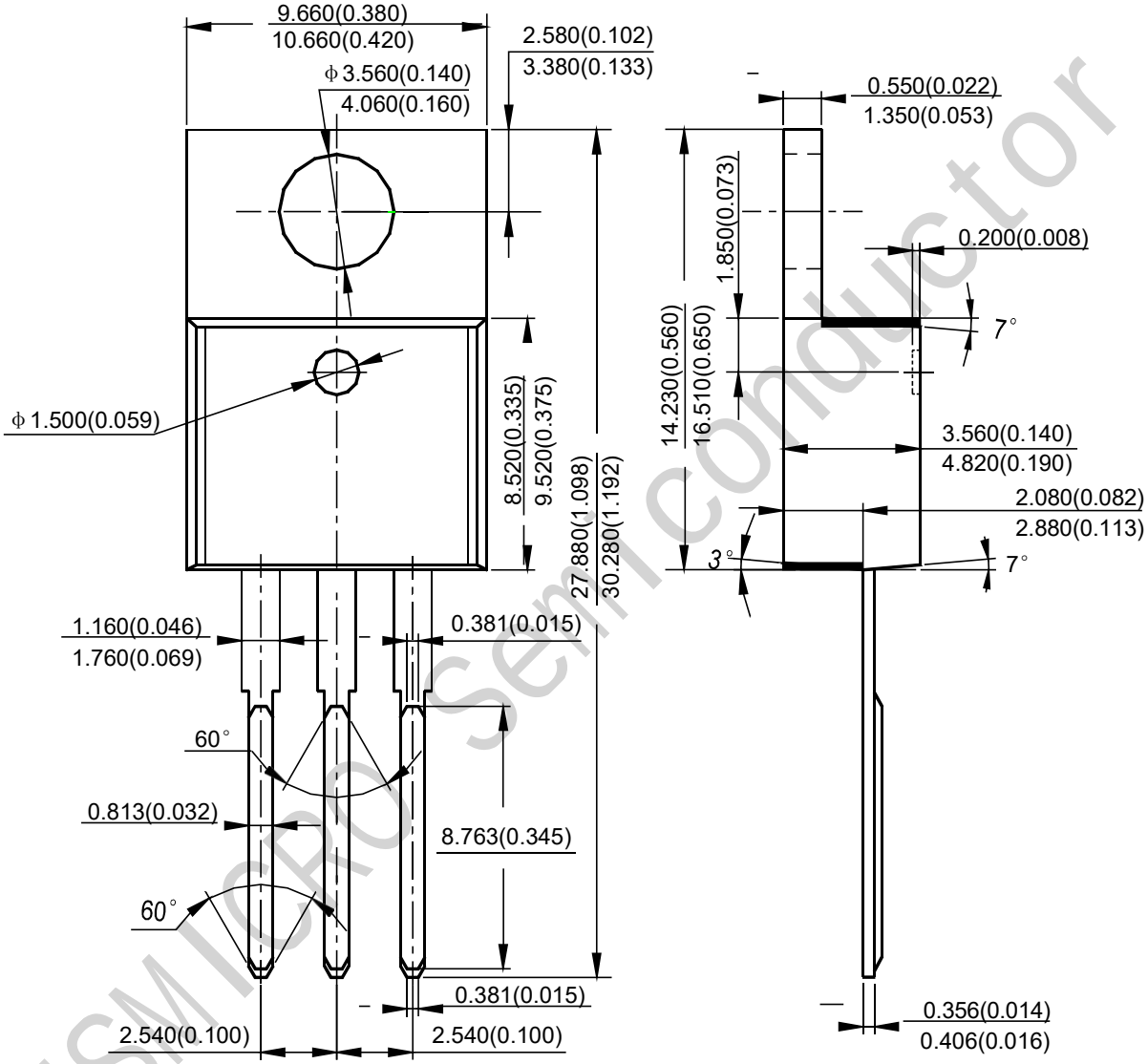
Mechanical Dimensions (Continued)

TO-252-2 **Unit: mm(inch)**



Mechanical Dimensions (Continued)

TO-220-3



Mechanical Dimensions (Continued)

TO-263-3 **Unit: mm(inch)**