1A LOW DROPOUT LINEAR REGULATOR HWD1117

General Description

The HWD1117 is a series of low dropout three-terminal regulators with a dropout of 1.15V at 1A output current capability.

The HWD1117 has an adjustable version, that can provide the output voltage from 1.25V to 12V with only 2 external resistors.

The HWD1117 series provides current limiting and thermal shutdown. Its circuit includes a trimmed bandgap reference to assure output voltage accuracy to be within 1%. Current limit is trimmed to ensure specified output current and controlled short-circuit current. On-chip thermal limiting provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The HWD1117 series is available in the industry standard SOT-223, SOT-89, TO-220 and TO-252 power packages.

Features

- Low dropout voltage: 1.15V at 1A output current
- Trimmed current limit
- On-chip thermal limiting
- Standard SOT-223, SOT89, TO-220 and TO-252 packages
- Three-terminal adjustable or fixed 1.5V, 1.8V, 2.5V, 3.3V, 5V
- Current limit and thermal protection
- Operation junction temp.: $0^{o}C$ to $+125^{o}C$

Applications

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-Video Player
- NIC / Switch
- Telecom Equipment
- High Efficiency Linear Regulator
- Printer and other Peripheral Equipment

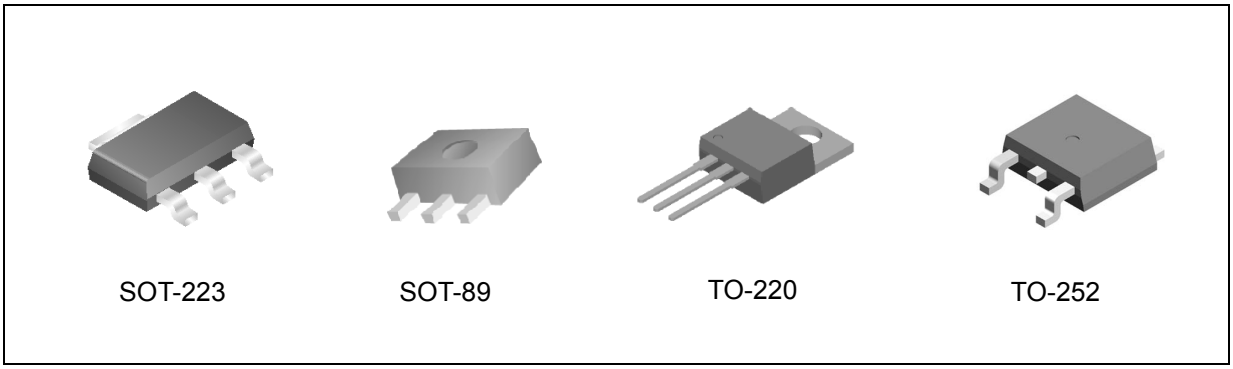


Figure 1. Package Types of HWD1117

Pin Configuration

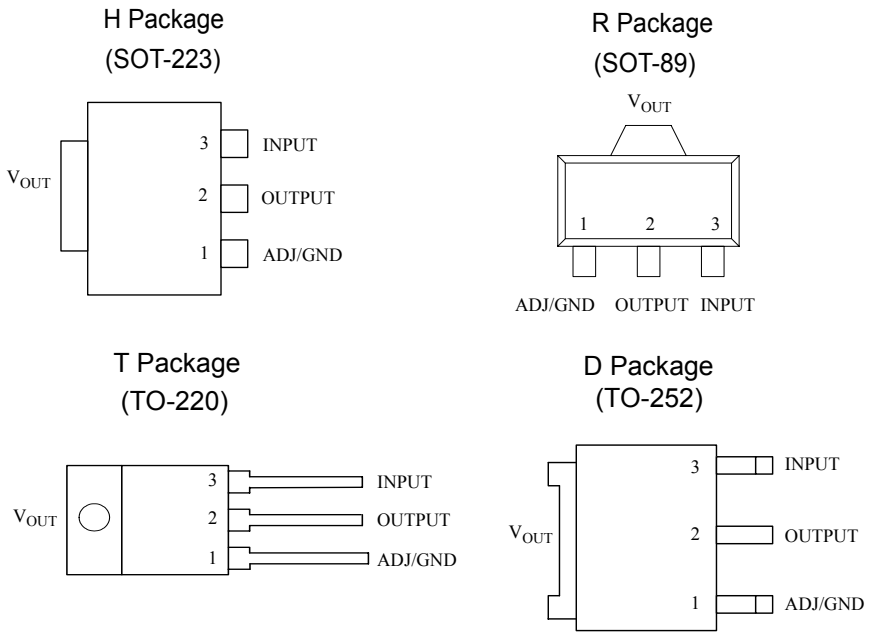


Figure 2. Pin Configuration of HWD1117

Functional Block Diagram

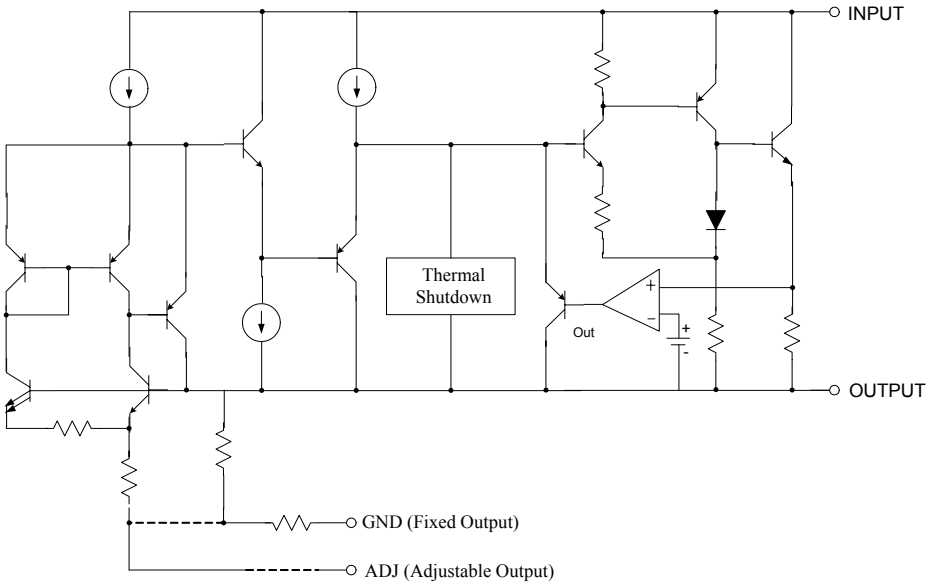


Figure 3. Functional Block Diagram of HWD1117

Ordering Information

Package	Temperature Range	Part Number	Marking ID	Packing Type
SOT-223	0°C~125°C	HWD1117H-ADJ	H11A	Tape/Reel
		HWD1117H-1.5	H12A	Tape/Reel
		HWD1117H-1.8	H13A	Tape/Reel
		HWD1117H-2.5	H14A	Tape/Reel
		HWD1117H-3.3	H16A	Tape/Reel
		HWD1117H-5.0	H17A	Tape/Reel
SOT-89	0°C~125°C	HWD1117R-ADJ	R17A	Tape/Reel
		HWD1117R-1.5	R17B	Tape/Reel
		HWD1117R-1.8	R17C	Tape/Reel
		HWD1117R-2.5	R17D	Tape/Reel
		HWD1117R-3.3	R17E	Tape/Reel
		HWD1117R-5.0	R17F	Tape/Reel
TO-220	0°C~125°C	HWD1117T-AD	HWD1117T	Tube
		HWD1117T-1.5	HWDZ1117T-1.5	Tube
		HWD1117T-1.8	HWD1117T-1.8	Tube
		HWD1117T-	HWD1117T-2.5	Tube
		HWD1117T-3.3	HWD1117T-3.3	Tube
		HWD1117T-5.0	HWD1117T-5.0	Tube
TO-252	0°C~125°C	HWD1117D-ADJ	HWD1117D-ADJ	Tape/Reel
		HWD1117D-1.5	HWD1117D-1.5	Tape/Reel
		HWD1117D-1.8	HWD1117D-1.8	Tape/Reel
		HWD1117D-2.5	HWD1117D-2.5	Tape/Reel
		HWD1117D-3.3	HWD1117D-3.3	Tape/Reel
		HWD1117D-5.0	HWD1117D-5.0	Tape/Reel

Absolute Maximum Ratings (Note 1)

Parameter	Value	Unit
V_{IN}	20	V
Operating Junction Temperature Range	150	^oC
Storage Temperature Range	-65 ~ 150	^oC
Lead Temperature (Soldering, 10 sec.)	300	^oC
ESD (Machine Model)	600	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings " may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operation Ratings " is not implied. Exposure to "Absolute Maximum Ratings " for extended periods may affect device reliability.

Recommended Operation Ratings

Parameter	Min	Max	Unit
V_{IN}		15	V
Operating Junction Temperature Range	0	125	^oC
Storage Temperature Range	-65	150	^oC

Electrical Characteristics

(Typicals and limits apply for T_J =25°C unless otherwise specified .)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reference Voltage	V_{REF}	V_{IN}-V_{OUT} = 2V, T_J = 25°C 10mA≤I_{OUT}≤1A, 1.4V≤ (V_{IN}-V_{OUT}) ≤10V	1.238	1.250	1.263	V
Output Voltage	V_{OUT}	HWD1117-1.5, T_J= 25°C, 0≤ I_{OUT}≤1A, 3V≤ V_{IN}≤8V	1.485	1.5	1.515	V
		HWD1117-1.8, T_J = 25°C, 0≤ I_{OUT}≤1A, 3.2V≤ V_{IN}≤10V	1.782	1.8	1.818	V
		HWD1117-2.5, T_J = 25°C, 0≤ I_{OUT}≤1A, 3.9V≤ V_{IN}≤10V	2.475	2.5	2.525	V
		HWD1117-3.3, T_J= 25°C, 0≤ I_{OUT}≤1A, 4.75V≤ V_{IN}≤10V	3.267	3.3	3.33	V
		HWD1117-5.0, T_J= 25°C, 0≤ I_{OUT}≤1A, 6.5V≤ V_{IN}≤12V	4.95	5.0	5.05	V
Line Regulation	S_V	I_{OUT} = 10mA, 1.5V≤V_{IN}-V_{OUT}≤10V		0.035		%
Load Regulation	Si	V_{IN} -V_{OUT} = 2V, 10mA≤I_{OUT}≤1A		0.15		%
Dropout Voltage	ΔV	I_{OUT} = 100mA		1.00	1.1	V
		I_{OUT} = 500mA		1.08	1.18	V
		I_{OUT} = 1A		1.15	1.25	V
Current Limit	I_{limit}	(V_{IN}-V_{OUT}) = 2V		1.50		A
Adjust Pin Current				60		μA
Adjust Pin Current Change		1.4V≤(V_{IN}-V_{OUT}) ≤ 7V, 10mA ≤I_{OUT} ≤1A		0.2		μA
Minimum Load Current (ADJ)		1.5V≤ (V_{IN}-V_{OUT}) ≤ 15V		2		mA
Quiescent Current		V_{IN}=V_{OUT} +1.25V		5		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		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		SOT-223 TO-252 TO-220		15 3 10		°C/W
Thermal Shutdown		Junction Temperature		150		°C
Thermal Shutdown Hysteresis				25		°C

Typical Characteristics

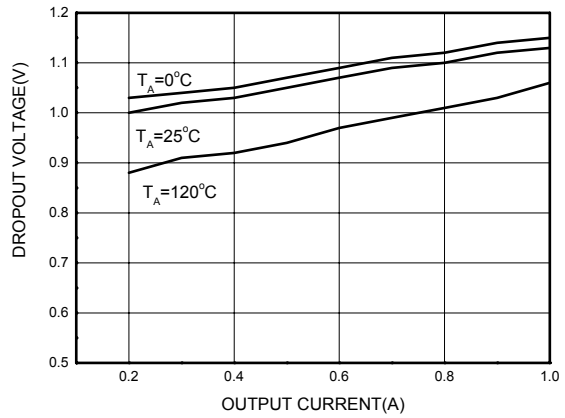


Figure 4. Dropout Voltage vs. Output Current

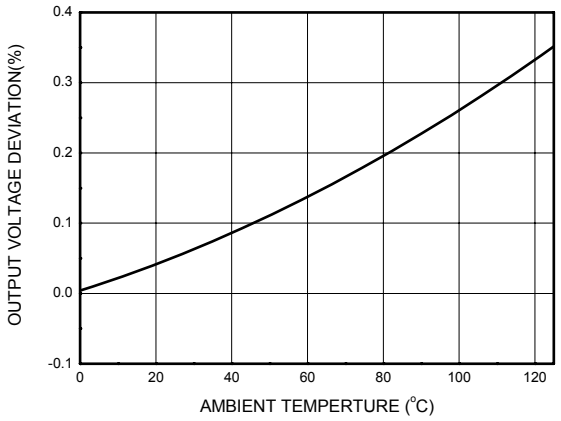


Figure 5. Load Regulation vs. Temperature

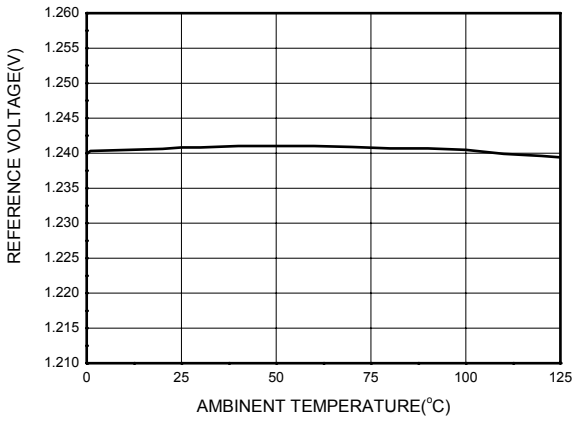


Figure 6. Reference Voltage vs. Temperature

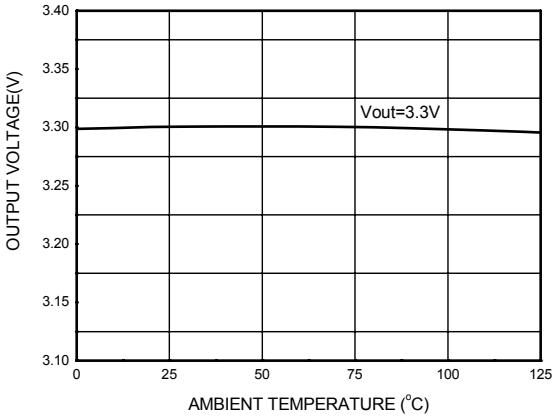


Figure 7. Output Voltage vs. Temperature

Typical Characteristics (Continued)

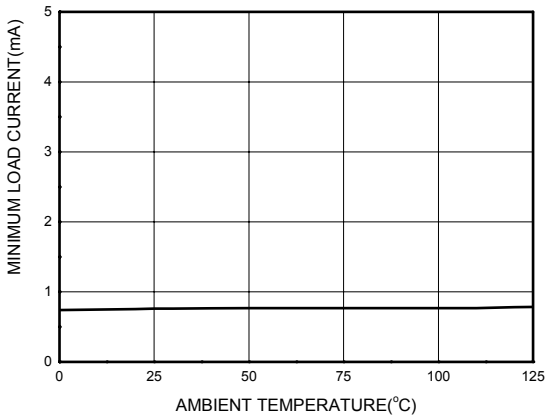


Figure 8. Minimum Load Current vs. Temperature

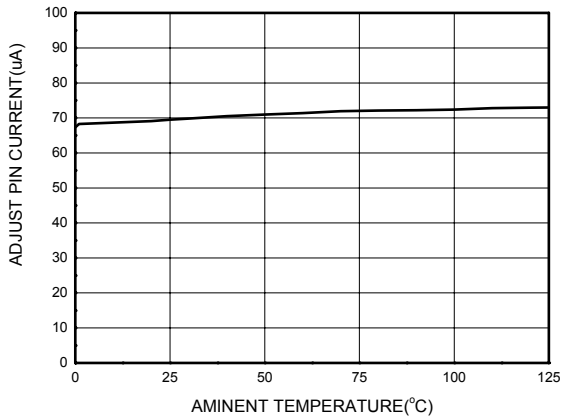


Figure 9. Adjust Pin Current vs. Temperature

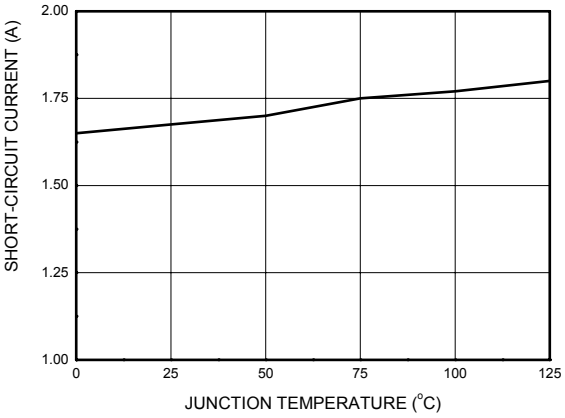


Figure 10. Short-Circuit Current vs. Temperature

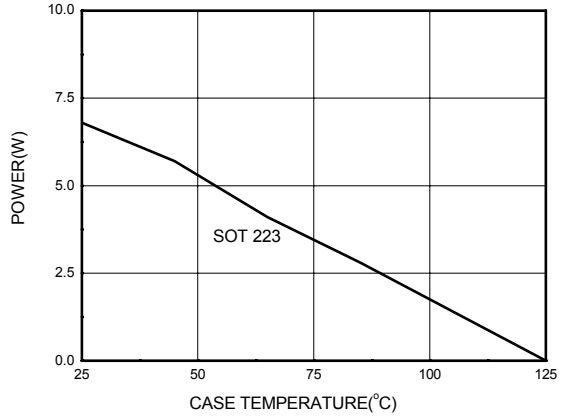


Figure 11. Maximum Power Dissipation

Typical Characteristics (Continued)

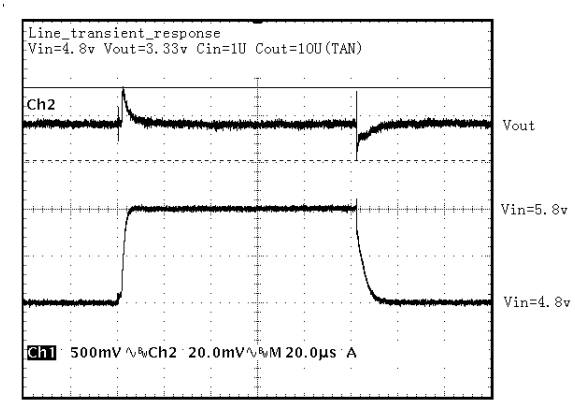


Figure 12.Line Transient Response

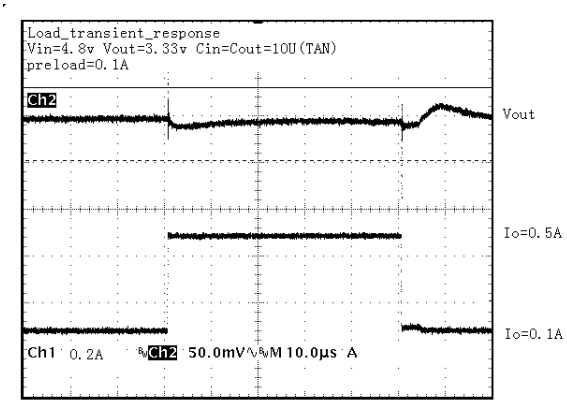


Figure 13. Load Transient Response

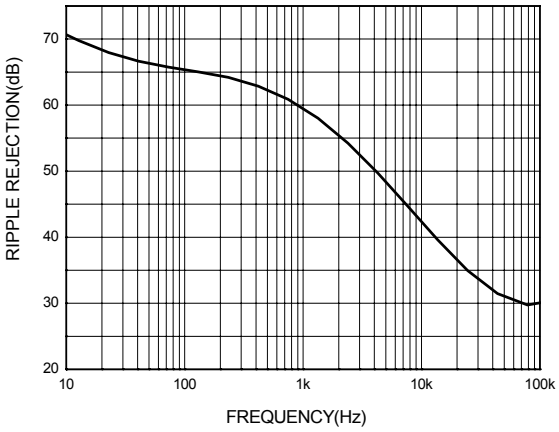


Figure 14. Ripple Rejection vs. Frequency

Typical Applications

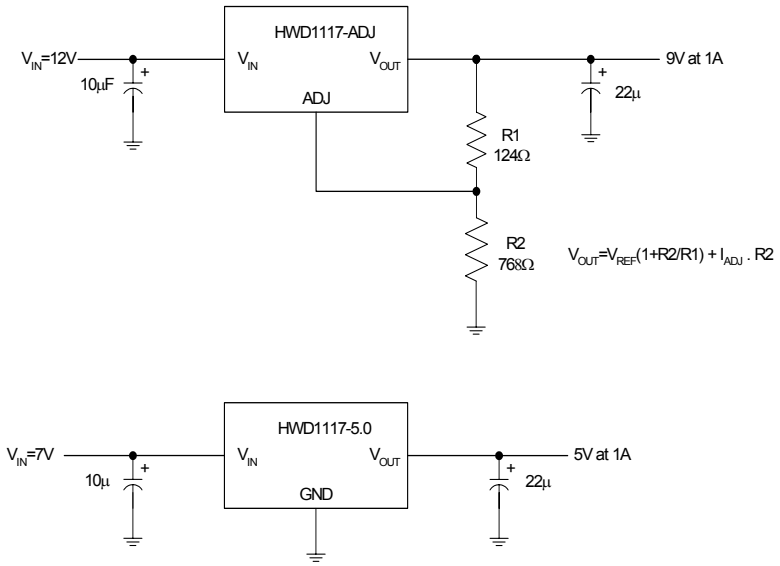
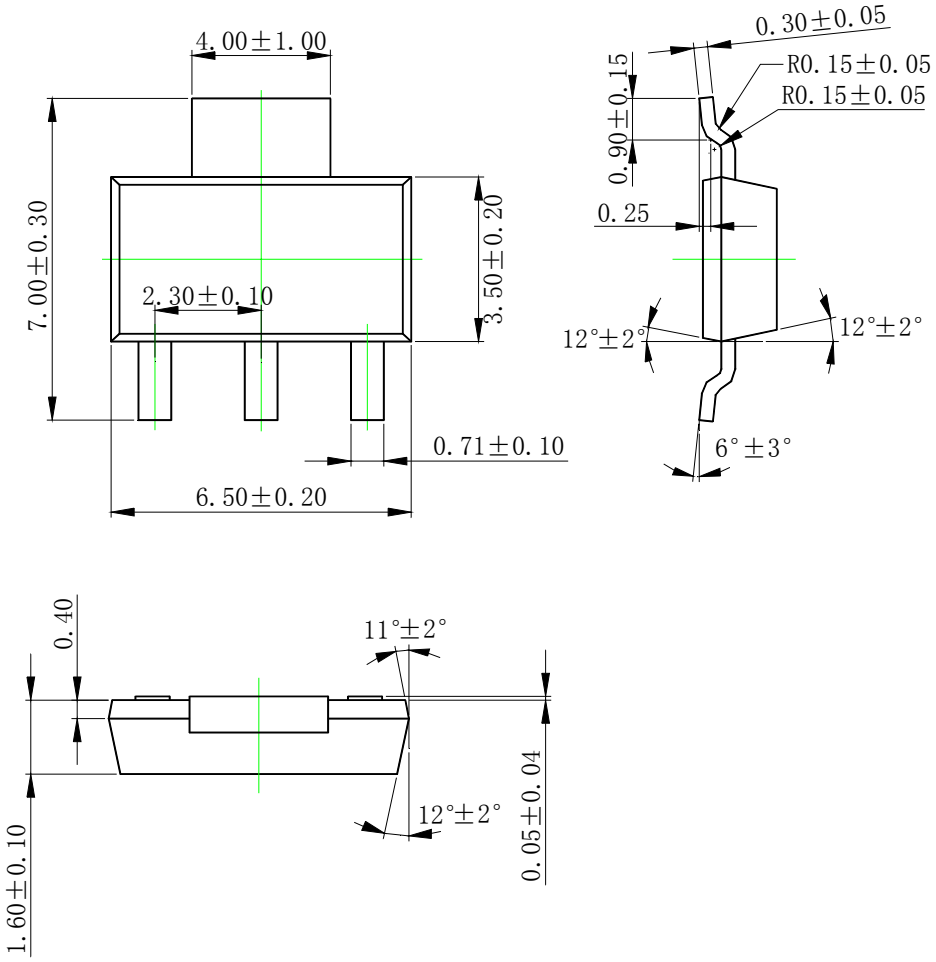


Figure 15. Typical Applications of HWD1117

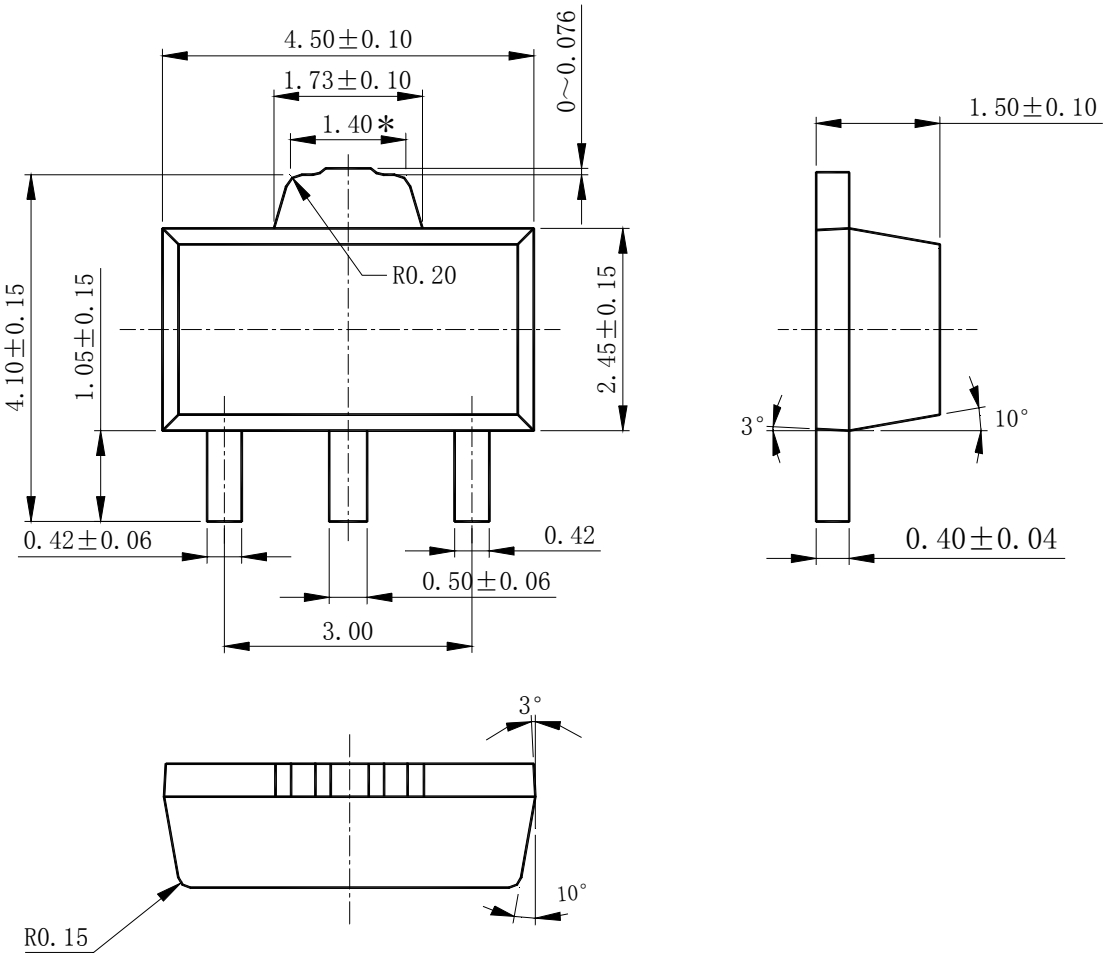
Mechanical Dimensions

SOT - 223



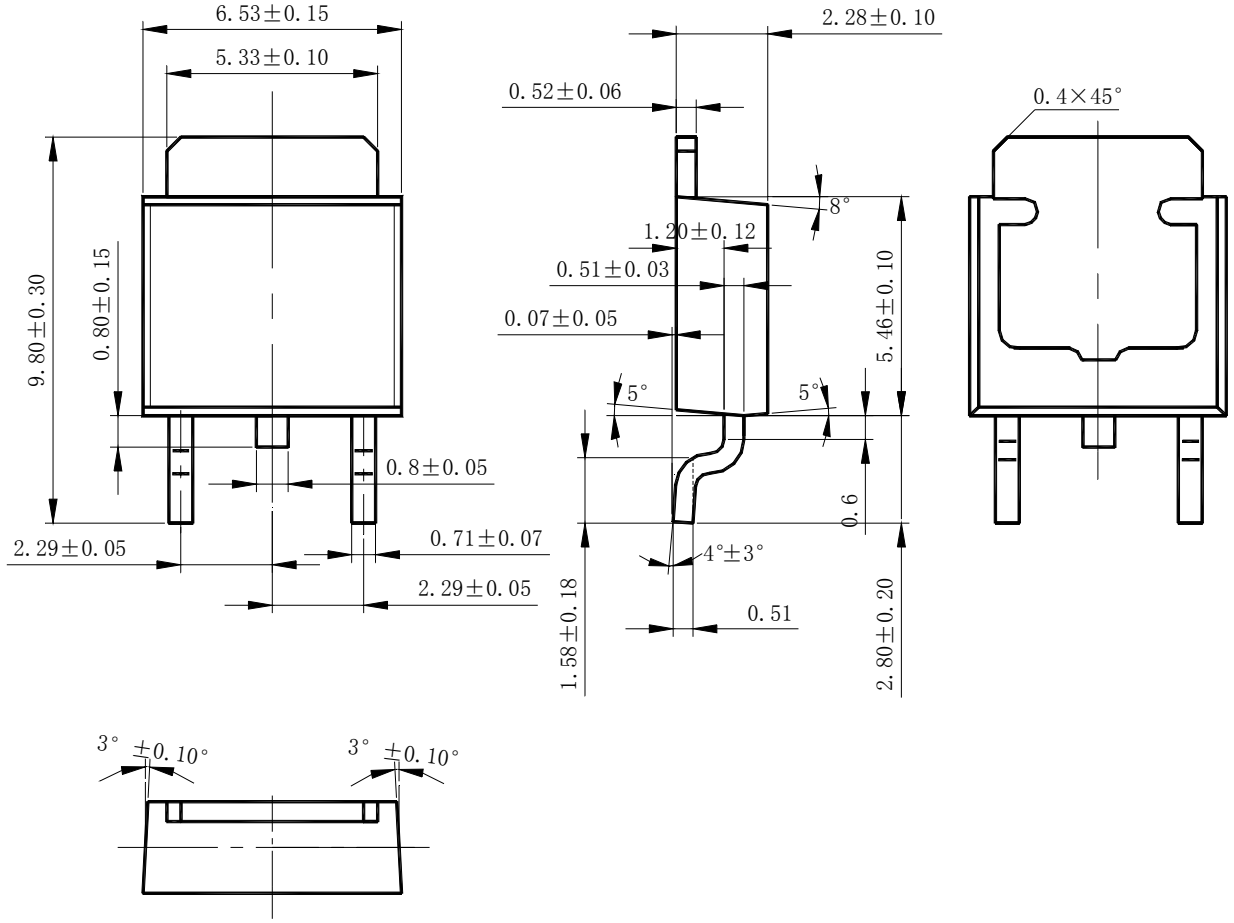
Mechanical Dimensions (Continued)

SOT-89



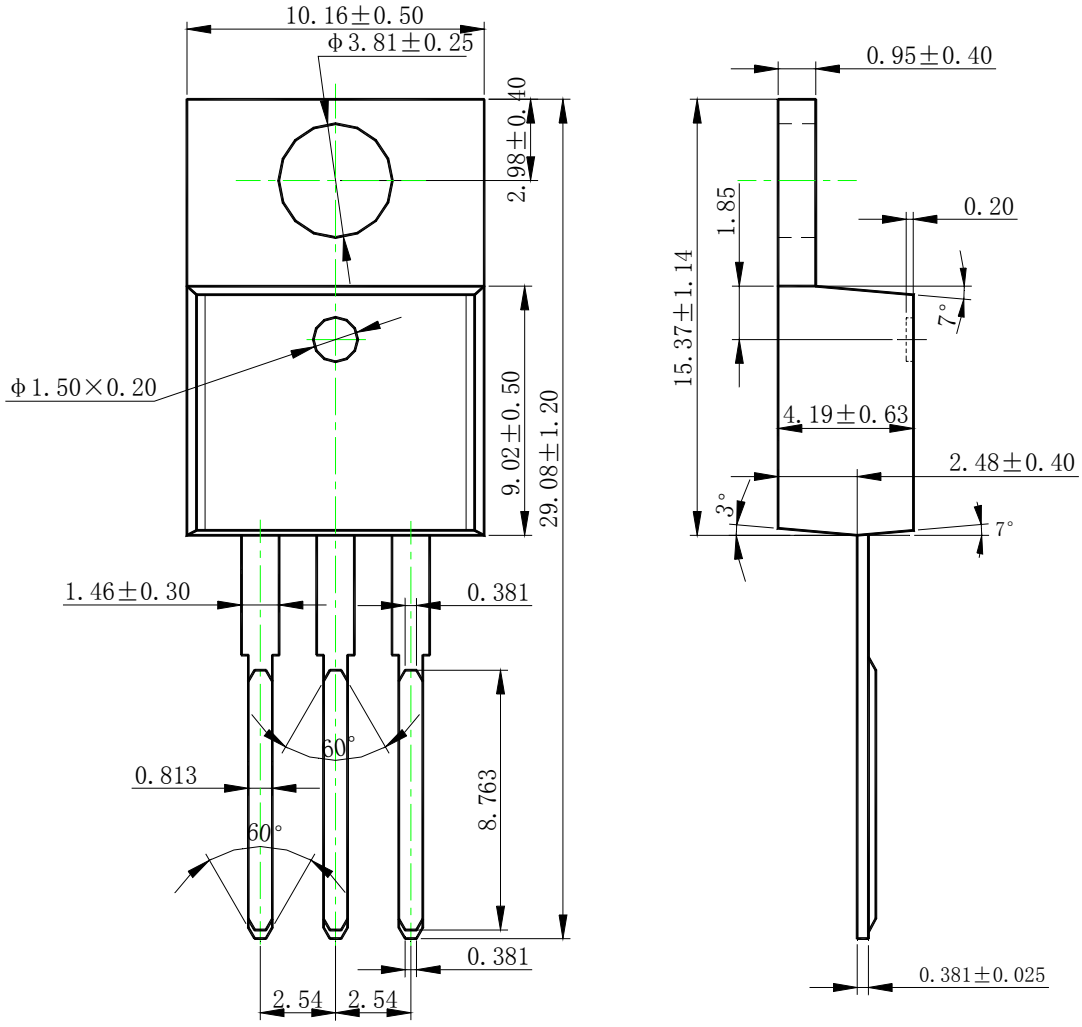
Mechanical Dimensions (Continued)

TO - 252



Mechanical Dimensions (Continued)

TO - 220



Chengdu Sino Microelectronics System Co.,Ltd

(Http://www.csmsc.com)

Headquarters of CSMSC

Address: 2nd floor, Building D, Science & Technology Industrial Park, 11 Gaopeng Avenue, Chengdu High-Tech Zone,Chengdu City, Sichuan Province, P.R.China

PC: 610041

Tel: +86-28-8517-7737

Fax: +86-28-8517-5097

Beijing Office:

Address: Room 505, No. 6 Building, Zijin Garden, 68 Wanquanhe Rd., Haidian District, Beijing, P.R.China

PC: 100000

Tel: +86-10-8265-8662

Fax: +86-10-8265-8663

Shenzhen Office:

Address: Room 1110-1112, Building A, Zhongshen Garden, Caitian Rd., Futian District, Shenzhen, P.R.China

PC: 518000

Tel: +86-775-8299-5768

+86-775-8299-2622

Fax: +86-775-8299-6142

+86-775-8299-1022

Shanghai Office:

Address: Room B-906, High-Tech King World, Beijing East Rd. , Shanghai, P.R.China

PC: 200001

Tel: +86-21-5308-2272 ext. 210

+86-21-5308-2273 ext. 210

Fax: +86-21-5308-2863