



## Description

The LM337 is adjustable 3-terminal negative voltage regulators capable of supplying -1.5 A or more current over an output voltage range of -1.25 V to -37 V. It requires only two external resistors to set the output voltage and one output capacitor for frequency compensation. The circuit design has been optimized for excellent regulation and low thermal transients. Further, the LM337 features internal current limiting, thermal shutdown and safe-area compensation, making it virtually blowout-proof against overloads.

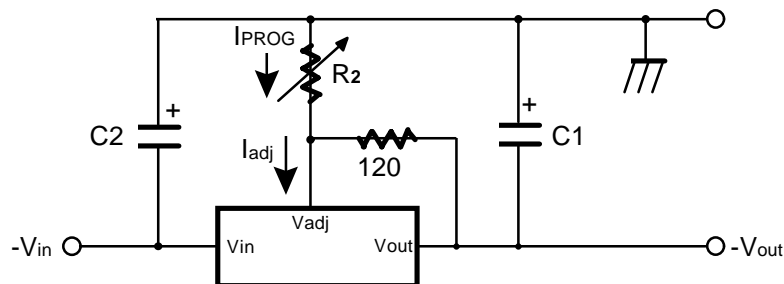
## Features

- 1.5A Output Current
- Line Regulation 0.01%/V(Typical)
- Load Regulation 0.3%(Typical)
- 77-dB Ripple Rejection
- 50ppm/°C Temperature Coefficient
- Thermal Overload Protection
- Internal Short-Circuit Current Limiting Protections

## Applications

- Industrial Power Supplies
- Factory Automation Systems
- Building Automation Systems
- PLC Systems
- Instrumentation
- IGBT Drive Negative Gate Supplies
- Networking
- Set-Top Boxes

## Adjustable Negative Voltage Regulator



Full output current not available at high input-output voltages

$$-V_{OUT} = -1.25V \left( 1 + \frac{R2}{120} \right) + (-I_{ADJ} \times R2)$$

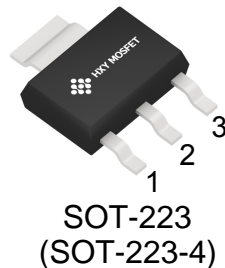
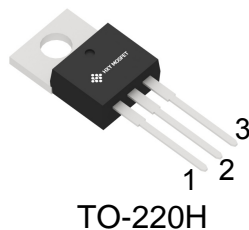
C1 = 1-μF solid tantalum or 10-μF aluminum electrolytic required for stability

C2 = 1-μF solid tantalum is required only if regulator is more than 4" from power-supply filter capacitor

Output capacitors in the range of 1-μF to 1000-μF of aluminum or tantalum electrolytic are commonly used to provide improved output impedance and rejection of transients



## Pin Configuration and Functions



PIN No.		Name	Functions Description
SOT-223 (SOT-223-4)	TO-220H		
1	1	ADJ	Adjustable
2	2	V <sub>IN</sub>	Input Voltage
3	3	V <sub>OUT</sub>	Output Voltage

## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input-Output Voltage Differential	V <sub>I</sub> - V <sub>O</sub>	40	V
Power Dissipation	P <sub>D</sub>	Internally limited	W
Operating Temperature Range	T <sub>OPR</sub>	0 ~ +125	°C
Storage Temperature Range	T <sub>STG</sub>	-65 ~+125	°C

## Ordering Information

Device	Package Type	Packing	Packing Qty
LM337IMP/NOPB	SOT-223(SOT-223-4)	Tape	2500
LM337BTG	TO-220H	Tube	50



### Electrical Characteristics

( $V_I - V_O = 5V$ ,  $I_O = 40mA$ ,  $0^\circ C \leq T_J \leq +125^\circ C$ ,  $P_{DMAX} = 20W$ , unless otherwise specified)

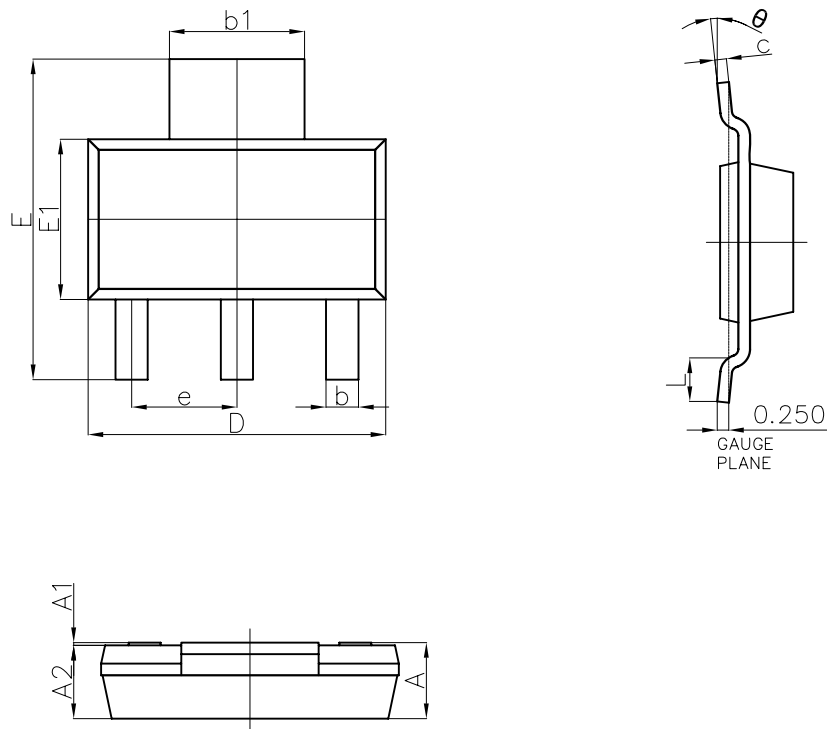
Parameter	Symbol	Conditions	Min	Typ.	Max.	Unit
Line Regulation (Note1)	$R_{line}$	$T_A = +25^\circ C$ $3V \leq  V_I - V_O  \leq 40V$	-	0.01	0.05	% / V
		$3V \leq  V_I - V_O  \leq 40V$	-	0.02	0.07	
Load Regulation (Note1)	$R_{load}$	$T_A = +25^\circ C$ $10mA \leq I_O \leq 0.5A$	-	0.3%	1%	
		$10mA \leq I_O \leq 1.5A$	-	0.3%	1.5%	
Adjustable Pin Current	$I_{ADJ}$	-	-	65	100	$\mu A$
Adjustable Pin Current Change	$\Delta I_{ADJ}$	$T_A = +25^\circ C$ $10mA \leq I_O \leq 1.5A$ $3V \leq  V_I - V_O  \leq 40V$	-	2	5	$\mu A$
Reference Voltage	$V_{REF}$	$T_A = +25^\circ C$	-1.225	-1.25	-1.275	V
		$3V \leq  V_I - V_O  \leq 40V$ $10mA \leq I_O \leq 1.5A$	-1.2	-1.25	-1.3	
Temperature Stability	ST	$0^\circ C \leq T_J \leq +125^\circ C$	-	0.6	-	%
Minimum Load Current to Maintain Regulation	$I_{L(MIN)}$	$3V \leq  V_I - V_O  \leq 40V$	-	2.5	5	mA
		$3V \leq  V_I - V_O  \leq 10V$	-	1.2	3	
Output Noise	$e_N$	$T_A = +25^\circ C$ $10Hz \leq f \leq 10KHz$	-	0.003	-	$V/10^6$
Ripple Rejection Ratio	RR	$V_O = -10V$ , $f = 120Hz$	-	60	-	dB
		$C_{ADJ} = 10\mu F$ (Note2)	66	77	-	
Long Term Stability	ST	$T_J = 125^\circ C$ , 1000Hours	-	0.3	1	%
Thermal Resistance Junction to Case	$R_{\theta JC}$	-	-	4	-	$^\circ C / W$

#### Note:

1. Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.
2.  $C_{ADJ}$ , when used, is connected between the adjustment pin and ground.



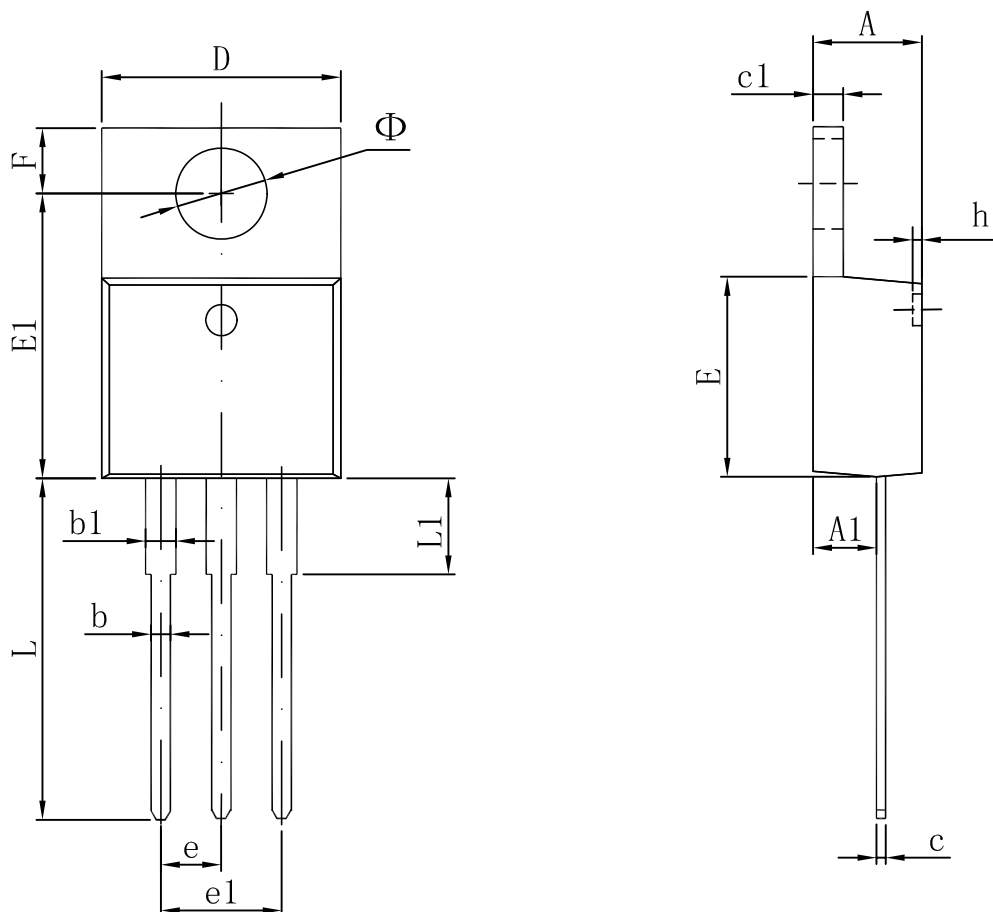
Package Dimensions  
SOT-223(SOT-223-4)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	—	1.800	—	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091(BSC)	
L	0.750	—	0.030	—
θ	0°	10°	0°	10°



Package Information  
TO-220H



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155



### **Attention**

- Any and all HUA XUAN YANG ELECTRONICS products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your HUA XUAN YANG ELECTRONICS representative nearest you before using any HUA XUAN YANG ELECTRONICS products described or contained herein in such applications.
- HUA XUAN YANG ELECTRONICS assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein.
- Specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- HUA XUAN YANG ELECTRONICS CO.,LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all HUA XUAN YANG ELECTRONICS products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of HUA XUAN YANG ELECTRONICS CO.,LTD.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. HUA XUAN YANG ELECTRONICS believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the HUA XUAN YANG ELECTRONICS product that you intend to use.