



## Description

The HLM337 is adjustable 3-terminal negative voltage regulators capable of supplying -1.5 A or more currents 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 HLM337 features internal current limiting, thermal shutdown and safe-area compensation, making it virtually blowout-proof against overloads.

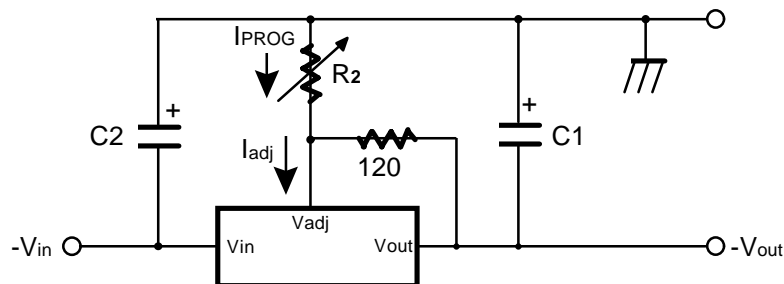
## Features

- 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

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

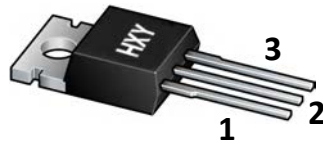
C1 = 1-μF solid tantalum or 10-μF aluminum electrolytic required for stability

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

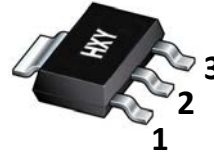
Output capacitors in the range of 1-μF to 1000-μF of aluminum or tantalum electrolytic are commonly used to provide improved output impedance and rejection of transients



### Pin Configuration and Functions



TO-220



SOT-223

PIN No.		Name	Functions Description
SOT-223	TO-220		
1	1	ADJ	Adjustable
2	2	V <sub>OUT</sub>	Output Voltage
3	3	V <sub>IN</sub>	Input 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
HLM337IMP/NOPB	SOT-223	Tape	2500
HLM337BTG	TO-220	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)

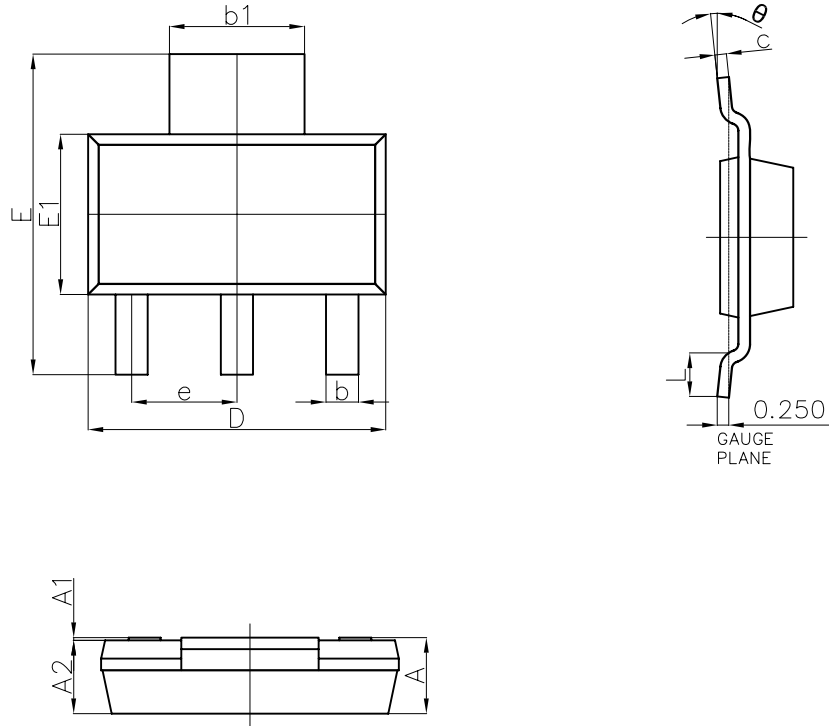
Parameter	Symbol	Conditions	Min	Typ.	Max.	Unit
Line Regulation (Note1)	R <sub>line</sub>	T <sub>A</sub> = +25°C 3V ≤  V <sub>I</sub> - V <sub>O</sub>   ≤ 40V	-	0.01	0.05	% / V
		3V ≤  V <sub>I</sub> - V <sub>O</sub>   ≤ 40V	-	0.02	0.07	
Load Regulation (Note1)	R <sub>load</sub>	T <sub>A</sub> = +25°C 10mA ≤ I <sub>O</sub> ≤ 0.5A	-	0.3%	1%	
		10mA ≤ I <sub>O</sub> ≤ 1.5A	-	0.3%	1.5%	
Adjustable Pin Current	I <sub>ADJ</sub>	-	-	65	100	μA
Adjustable Pin Current Change	ΔI <sub>ADJ</sub>	T <sub>A</sub> = +25°C 10mA ≤ I <sub>O</sub> ≤ 1.5A 3V ≤  V <sub>I</sub> - V <sub>O</sub>   ≤ 40V	-	2	5	μA
Reference Voltage	V <sub>REF</sub>	T <sub>A</sub> = +25°C	-1.225	-1.25	-1.275	V
		3V ≤  V <sub>I</sub> - V <sub>O</sub>   ≤ 40V 10mA ≤ I <sub>O</sub> ≤ 1.5A	-1.2	-1.25	-1.3	
Temperature Stability	ST	0°C ≤ T <sub>J</sub> ≤ +125°C	-	0.6	-	%
Minimum Load Current to Maintain Regulation	I <sub>L(MIN)</sub>	3V ≤  V <sub>I</sub> - V <sub>O</sub>   ≤ 40V	-	2.5	5	mA
		3V ≤  V <sub>I</sub> - V <sub>O</sub>   ≤ 10V	-	1.2	3	
Output Noise	e <sub>N</sub>	T <sub>A</sub> = +25°C 10Hz ≤ f ≤ 10KHz	-	0.003	-	V/10 <sup>6</sup>
Ripple Rejection Ratio	RR	V <sub>O</sub> = -10V, f = 120Hz	-	60	-	dB
		C <sub>ADJ</sub> = 10μF (Note2)	66	77	-	
Long Term Stability	ST	T <sub>J</sub> = 125°C ,1000Hours	-	0.3	1	%
Thermal Resistance Junction to Case	R <sub>θJC</sub>	-	-	4	-	°C/ W

**Note:**

1. Load and line regulation are specified at constant junction temperature. Change in V<sub>O</sub> due to heating effects must be taken into account separately. Pulse testing with low duty is used.
2. C<sub>ADJ</sub>, when used, is connected between the adjustment pin and ground.



**Package Dimensions**  
**SOT-223**

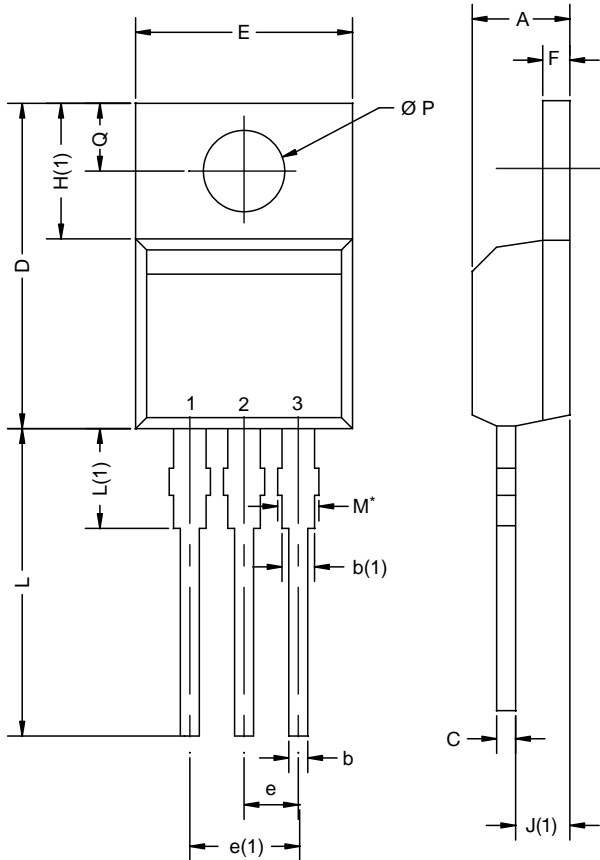


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	—	1.800	—	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130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



Package Dimensions

TO-220



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
ØP	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118

ECN: X12-0208-Rev. N, 08-Oct-12  
DWG: 5471

Notes

\* M = 1.32 mm to 1.62 mm (dimension including protrusion)  
Heatsink hole for HVM



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