



## 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.

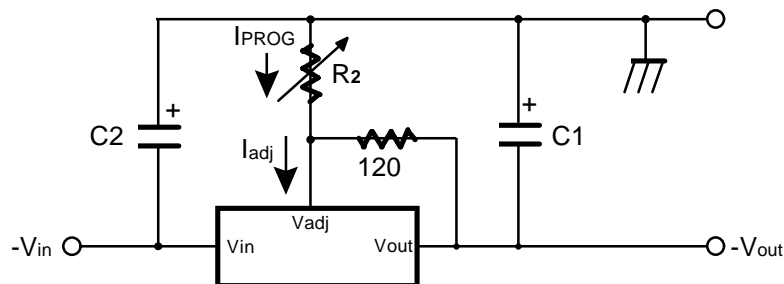
## Features

- 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

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

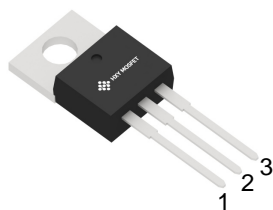
C1 = 1-μF solid tantalum or 10-μF aluminum electrolytic required for stability

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

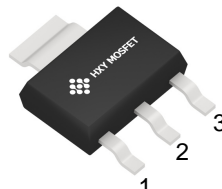
Output capacitors in the range of 1-μF to 1000-μF of aluminum or tantalum electrolytic are commonly used to provide improved output impedance and rejection of transients



## Pin Configuration and Functions



TO-220H



SOT-223

PIN No.		Name	Functions Description
SOT-223	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
HLM337IMP/NOPB	SOT-223	Tape	2500
HLM337BTG	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)

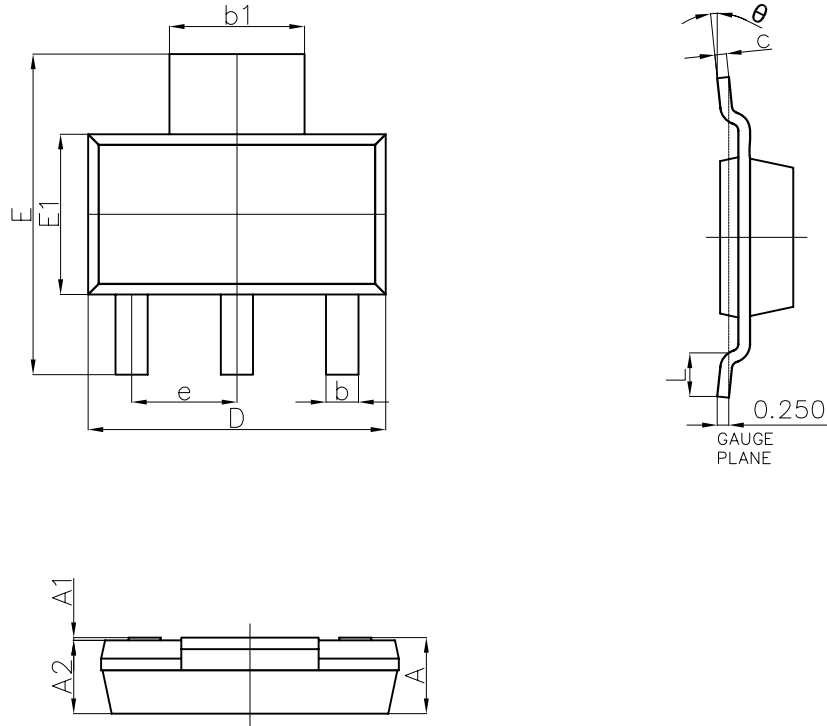
Parameter	Symbol	Conditions	Min	Typ.	Max.	Unit
Line Regulation (Note1)	$R_{line}$	$T_A = +25^\circ C$ $3V \leq  V_I - V_O  \leq 40V$	-	0.01	0.05	% / V
		$3V \leq  V_I - V_O  \leq 40V$	-	0.02	0.07	
Load Regulation (Note1)	$R_{load}$	$T_A = +25^\circ C$ $10mA \leq I_O \leq 0.5A$	-	0.3%	1%	
		$10mA \leq I_O \leq 1.5A$	-	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.



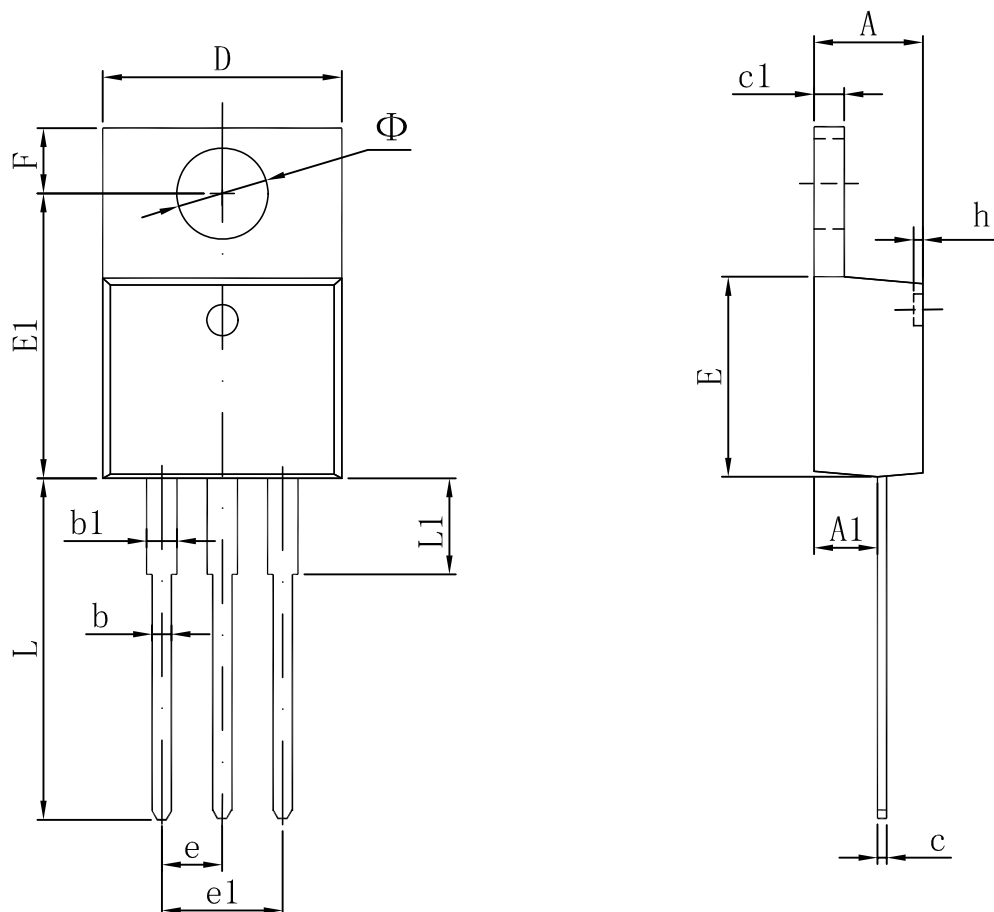
Package Dimensions  
SOT-223



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	—
$\theta$	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
$\Phi$	3.735	3.935	0.147	0.155



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