

MNLM137HV-H REV 2A0

 Original Creation Date: 07/12/95
 Last Update Date: 12/21/00
 Last Major Revision Date: 12/20/00

THREE TERMINAL NEGATIVE REGULATOR
General Description

The LM137HVH is an adjustable 3-terminal negative voltage regulators capable of supplying in excess of 0.5A over an output voltage range of -1.2V to -47V. This regulator is exceptionally easy to apply, requiring only 2 external resistors to set the output voltage and 1 output capacitor for frequency compensation. The circuit design has been optimized for excellent regulation and low thermal transients. Further, the LM137HVH features internal current limiting, thermal shutdown and safe-area compensation, making them virtually blowout-proof against overloads.

The LM137HVH serves a wide variety of applications including local on-card regulation, programmable-output voltage regulation or precision current regulation. The LM137HVH is an ideal complement to the LM117HVH adjustable positive regulator.

Industry Part Number

LM137HV

NS Part Numbers

 LM137HVH-MLS
 LM137HVH/883

Prime Die

LM137HV

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (°C)
1	Static tests at	+25
2	Static tests at	+125
3	Static tests at	-55
4	Dynamic tests at	+25
5	Dynamic tests at	+125
6	Dynamic tests at	-55
7	Functional tests at	+25
8A	Functional tests at	+125
8B	Functional tests at	-55
9	Switching tests at	+25
10	Switching tests at	+125
11	Switching tests at	-55

Features

- Output voltage adjustable from -1.2V to -47V
- 0.5A output current guaranteed, -55 C to +150 C
- Line regulation typically 0.01%/V
- Load regulation typically 0.3%
- Excellent thermal regulation, 0.002%/W
- 50 ppm/ C temperature coefficient
- Temperature-independent current limit
- Internal thermal overload protection
- Standard 3-lead transistor package
- Output short circuit protected

(Absolute Maximum Ratings)

(Note 1)

Power Dissipation	Internally Limited
Input-Output Voltage Differential	50V
Operating Junction Temperature Range	-55 C to +125 C
Maximum Junction Temperature (Note 2)	150 C
Storage Temperature	-65 C to +150 C
Lead Temperature (Soldering, 10 seconds)	300 C
Thermal Resistance	
ThetaJA	
H-Pkg (Still Air @ 0.5W)	174 C/W
H-Pkg (500LF/Min Air flow @ 0.5W)	64 C/W
ThetaJC	
H-Pkg (@1.0W)	15 C/W
Package Weight (Typical)	955mg
ESD Rating (Note 3)	4000V

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed. Some performance characteristics may degrade when the device is not operated under the listed test conditions.

Note 2: The maximum power dissipation must be derated at elevated temperatures and is dictated by T_{jmax} (maximum junction temperature), Θ_{JA} (package junction to ambient thermal resistance), and T_A (ambient temperature). The maximum allowable power dissipation at any temperature is $P_{dmax} = (T_{jmax} - T_A) / \Theta_{JA}$ or the number given in the Absolute Maximum Ratings, whichever is lower.

Note 3: Human body model, 100pF discharged through 1.5K Ohms

Electrical Characteristics

DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: $V_i = -40V$, $I_o = 0.53A$, $V_{out} = V_{ref}$

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vout	Reference Voltage	$V_i = -4.25V$, $I_o = 8\text{ mA}$			-1.272	-1.23	V	1
					-1.28	-1.225	V	2, 3
		$V_i = -42V$, $I_o = 8mA$			-1.272	-1.23	V	1
					-1.28	-1.225	V	2, 3
Iq	Minimum Load Current	$V_o = -1.7V$, $V_i = -4.25V$				3	mA	1, 2, 3
		$V_o = -1.7V$, $V_i = -11.75V$				3	mA	1, 2, 3
		$V_o = -1.7V$, $V_i = -42V$				5	mA	1, 2, 3
Rline	Line Regulation	$-42V \leq V_i \leq -4.25V$, $I_o = 8mA$				9.4	mV	1, 2, 3
Iadj	Adjustment Pin Current	$V_i = -42V$, $I_o = 8mA$				100	uA	1, 2, 3
		$V_i = -4.25V$, $I_o = 8mA$				100	uA	1, 2, 3
		$V_i = -54V$, $I_o = 8mA$				100	uA	1
Delta Iadj	Adjustment Pin Current Change	$-42V \leq V_i \leq -4.25V$, $I_l = 8mA$				6	uA	1, 2, 3
		$V_i = -6.25V$, $8mA \leq I_o \leq 0.53A$				5	uA	1, 2, 3
		$-54V \leq V_i \leq -4.25V$, $I_o = 8mA$				6	uA	1
Rload	Load Regulation	$V_{in} = -54V$, $10mA \leq I_o \leq 60mA$				25	mV	1
		$V_{in} = -6.25V$, $8mA \leq I_o \leq 0.53A$				25	mV	1
	Thermal Regulation	$I_o = 0.53A$, $V_{in} = -14.5V$				5	mV	1
Icl	Current Limit	$V_{in} \leq -14.25$	1		0.5	1.6	A	1
		$V_{in} = -51.25V$	1		0.1	0.5	A	1

AC PARAMETERS

Rr	Ripple Rejection	$V_{in} = -6.25V$, $V_{out} = V_{ref}$, $f = 120\text{HZ}$, $e_i = 1V_{rms}$, $I_l = 125mA$	2, 3			66	dB	4, 5, 6
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Electrical Characteristics

DC PARAMETERS: DRIFT VALUES

(The following conditions apply to all the following parameters, unless otherwise specified.)
 DC: "Delta calculations performed on JAN S and QMLV devices at group B, subgroup 5 only".

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vout	Output Voltage	Vin = -4.25V, Io = 8mA			-0.01	0.01	V	1
		Vin = -42V, Io = 8mA			-0.01	0.01	V	1
Vrline	Line Regulation	$-42V \leq V_i \leq -4.25V$, Io = 8mA			-4	4	mV	1
Iadj	Adjust Pin Current	Vin = -4.25V, Io = 8mA			-10	10	uA	1
		Vin = -42V, Io = 8mA			-10	10	uA	1

Note 1: Guaranteed parameter not tested.

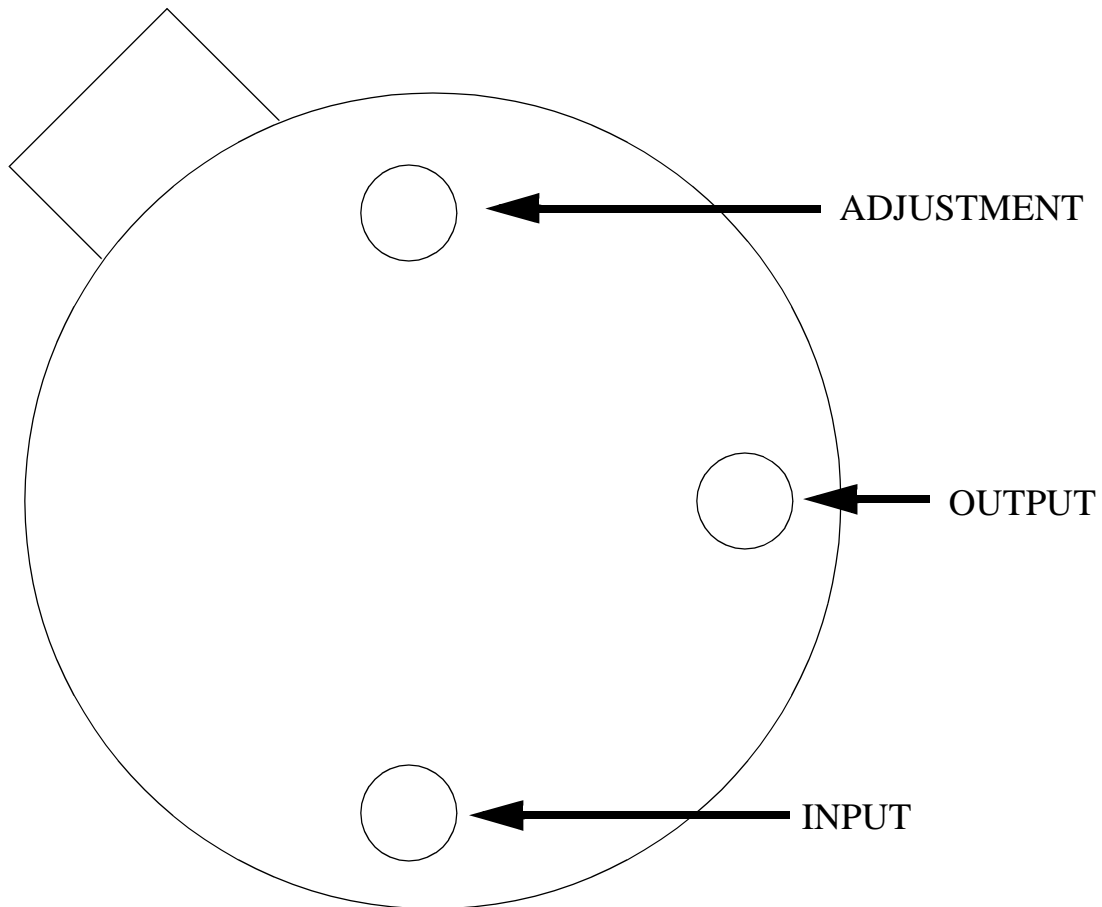
Note 2: Tested at +25C, guaranteed, but not tested at +125 C and -55C.

Note 3: Bench test per (SG) RPI-3-362.

Graphics and Diagrams

GRAPHICS#	DESCRIPTION
05192HRB2	METAL CAN (H), TO-39, 3LD, .200 DIA P.C. (P/P DWG)
H03ARD	METAL CAN (H), TO-39, 3LD, .200 DIA P.C. (P/P DWG)
P000199A	METAL CAN (H), TO-39, 3LD, .200 DIA P.C. (PINOUT)

See attached graphics following this page.



LM137H, LM137HVH
3 - LEAD TO-39
CONNECTION DIAGRAM
BOTTOM VIEW
P000199A



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Revision History

Rev	ECN #	Rel Date	Originator	Changes
0A0	M0003367	04/27/99	Rose Malone	Updated MDS: MNL137HV-H, Rev. 0B1 to MNL137HV-H, Rev. 0A0. Added Features Section, Package Weight, Graphics to graphics section, Notes to Absolute section and ESD limit. Updated to fully released MDS.
0B0	M0003396	08/04/00	Rose Malone	Update MDS: MNL137HV-H, Rev. 0A0 to MNL137HV-H, Rev. 0B0. Corrected Minor typo errors in Note 2 for Absolute notes.
1A0	M0003731	12/21/00	Rose Malone	Update MDS: MNL137HV-H, Rev. 0B0 to MNL137HV-H, Rev. 1A0. Update to Main Table, adding reference to MLS Part Number. Under NS Part Numbers listing as follows LM137HVH-MLS. Added Drift Values Table to Electrical Section.
2A0	M0003779	12/21/00	Rose Malone	Update MDS: MNL137HV-H, Rev. 1A0 to MNL137HV-H, Rev. 2A0. Corrected Drift Table conditions.