

Seagate Microelectronics Limited

0.5A, 3-TERMINAL NEGATIVE ADJUSTABLE REGULATORS

IP137MAHV, IP137MHV, IP137MA, IP137M

T-58-11-23

DESCRIPTION

The IP137M family of negative adjustable regulators will deliver up to 0.5 amps output current over an output voltage range of -1.2V to -47V . Seagate Microelectronics has made significant improvements in these regulators compared to previous devices, such as better line and load regulation, and a maximum output voltage error of 1%.

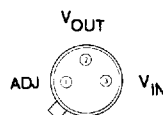
Internal current and power limiting coupled with true thermal limiting prevents device damage due to overloads or shorts, even if the regulator is not fastened to a heat sink.

FEATURES

- 1% Initial voltage tolerance
- 0.01%/V line regulation
- 0.5%/A load regulation
- 0.02%/W thermal regulation

CONNECTIONS

(Bottom View)



TO-39

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ABSOLUTE MAXIMUM RATINGS

Power Dissipation	Internally Limited
Input to output voltage differential	40V
Input to output voltage differential (HV)	50V
Storage Temperature Range	-65°C to $+150^{\circ}\text{C}$
Lead Temperature (Soldering, 10 sec.)	$+300^{\circ}\text{C}$

Operating Junction Temperature Range	
IP137MAHV, IP137MHV	-55°C to $+150^{\circ}\text{C}$
IP137MA, IP137M	-55°C to $+150^{\circ}\text{C}$
LM137, LM137HVH	-55°C to $+150^{\circ}\text{C}$

Absolute maximum ratings are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the device should be operated at these limits. The electrical characteristics provide conditions for actual device operation.

ORDER INFORMATION

Part Number	Temperature Range	Package
IP137MAHVH, IP137MHVH,		
IP137MAH, IP137MH	-55°C to $+150^{\circ}\text{C}$	TO-39
LM137HVH, LM137H	-55°C to $+150^{\circ}\text{C}$	TO-39



IP137MAHV, IP137MHV, IP137MA, IP137M

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ELECTRICAL CHARACTERISTICS (NOTES 1 AND 3)

T-58-11-23

Parameter	Test Conditions	IP137MAHV IP137MA			IP137MHV IP137M LM137HV LM137			Units
		Min	Typ	Max	Min	Typ	Max	
Reference Voltage, V_{REF}	$I_{OUT} = 10 \text{ mA}$	-1.238	-1.250	-1.262	-1.225	-1.250	-1.275	V
	$3\text{V} \leq (V_{IN} - V_{OUT}) \leq V_{MAX}$ $10 \text{ mA} \leq I_{OUT} \leq I_{MAX}$, $P \leq P_{MAX}$	● -1.220	-1.250	-1.280	-1.200	-1.250	-1.300	V
Line Regulation, $\Delta V_{OUT}/\Delta V_{IN}$	$3\text{V} \leq (V_{IN} - V_{OUT}) \leq V_{MAX}$		0.005	0.010		0.010	0.020	%/V
	(See Note 2)	●	0.010	0.030		0.020	0.050	%/V
Load Regulation, $\Delta V_{OUT}/\Delta I_{OUT}$	$10 \text{ mA} \leq I_{OUT} \leq I_{MAX}$ ($V_O \leq 5\text{V}$)		5	25		15	25	mV
	(See Note 2 and 3)		0.1	0.5		0.3	0.5	%
		●	10	50		20	50	mV
		●	0.2	1.0		0.3	1.0	%
Thermal Regulation	$T_A = 25^\circ\text{C}$, 10 msec Pulse		0.002	0.02		0.002	0.02	%/W
Ripple Rejection	$V_{OUT} = -10\text{V}$, $C_{ADJ} = 0$		60	66		60		dB
	$f = 120\text{Hz}$, $C_{ADJ} = 10 \mu\text{F}$	●	70	80	66	77		dB
Adjust Pin Current, I_{ADJ}		●	65	100		65	100	μA
Adjust Pin Current Change, ΔI_{ADJ}	$10 \text{ mA} \leq I_{OUT} \leq I_{MAX}$	●	0.2	2		0.5	5	μA
	$3\text{V} \leq (V_{IN} - V_{OUT}) \leq 40\text{V}$	●	1.0	5		2	5	μA
	$3\text{V} \leq (V_{IN} - V_{OUT}) \leq 50\text{V}$, HV series	●	2.0	6		3	6	μA
Minimum Load Current, I_{MIN}	$(V_{IN} - V_{OUT}) \leq 40\text{V}$	●	2.5	5.0		2.5	5.0	mA
	$(V_{IN} - V_{OUT}) \leq 10\text{V}$	●	1.2	3.0		1.2	3.0	mA
Current Limit, I_{CL}	$(V_{IN} - V_{OUT}) \leq 15\text{V}$	●	0.5	0.8	0.5	0.8	1.5	A
	$(V_{IN} - V_{OUT}) = 40\text{V}$	●	0.15	0.17	0.15	0.17		A
	$(V_{IN} - V_{OUT}) = 50\text{V}$ HV Series	●	0.1	0.17	0.5	0.1	0.17	A
Temperature Stability, $\Delta V_{OUT}/\Delta \text{TEMP}$		●	0.6	1.5		0.6		%
Long Term Stability, $\Delta V_{OUT}/\Delta \text{TIME}$	$T_A = 125^\circ\text{C}$, 1000 Hrs.		0.3	1		0.3	1	%
RMS Output Noise (% of V_{OUT}), e_n	$T_A = 25^\circ\text{C}$, $10\text{Hz} \leq f \leq 10\text{kHz}$		0.003			0.003		%
Thermal Resistance Junction to Case, θ_{jc}	H Package		12	15		12	15	$^\circ\text{C/W}$

The ● denotes the specifications which apply over the full operating temperature range, all others apply at $T_j = 25^\circ\text{C}$ unless otherwise specified.

Note 1: Unless otherwise specified, $(V_{IN} - V_{OUT}) = 5\text{V}$, $I_{OUT} = 0.1\text{A}$ for the TO-39 (H) Package. Although power dissipation is internally limited, these specifications apply for dissipations up to 2W for the TO-39 $I_{MAX} = 0.5\text{A}$ for the TO-39.

Note 2: Regulation is measured at constant junction temperature, using pulse testing at a low duty cycle. Changes in output voltage due to heating effects are covered under thermal regulation specifications. Load regulation is measured $1/8"$ below the base of the package on the output pin of the TO-39.

Note 3: $V_{MAX} = 40\text{V}$ for IP137MA, IP137M, LM137
 $V_{MAX} = 50\text{V}$ for IP137MAHV, IP137MHV, LM137HV

