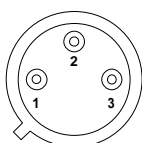


## 0.5 AMP NEGATIVE ADJUSTABLE VOLTAGE REGULATOR



Pin 1 – ADJ.  
Pin 2 –  $V_{OUT}$   
Pin 3 –  $V_{IN}$

H Package – TO-39

### FEATURES

- –1.2V TO 47V OUTPUT VOLTAGE RANGE
- 0.5A OUTPUT CURRENT
- 1% OUTPUT VOLTAGE TOLERANCE
- 0.5% / A LOAD REGULATION
- 0.01% / V LINE REGULATION
- 0.02% / W THERMAL REGULATION
- INTERNAL PROTECTION

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.

### ABSOLUTE MAXIMUM RATINGS ( $T_{case} = 25^{\circ}\text{C}$ unless otherwise stated)

$V_{I-O}$	Input - Output Differential Voltage	– Standard – HV Series	40V 50V
$I_O$	Output Current		Internally limited
$P_D$	Power Dissipation		Internally limited
$T_J$	Operating Junction Temperature Range		–55 to +150°C
$T_{STG}$	Storage Temperature		–65 to 150°C
$T_J$	Lead temperature		300°C

Parameter	Test Conditions	IP137MAHV IP137MA			IP137MHV , IP137M LM137HV , LM137			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
$V_{REF}$ Reference Voltage	$I_{OUT} = 10mA$	-1.238	-1.25	-1.262	-1.225	-1.25	-1.275	V
	$I_{OUT} = 10mA$ to $I_{MAX}$ $V_{IN} - V_{OUT} = 3V$ to $V_{MAX}$ $P \leq P_{MAX}$ $T_J = -55$ to $150^{\circ}C$	-1.220	-1.25	-1.280	-1.200	-1.25	-1.300	V
$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$ Line Regulation 1	$V_{IN} - V_{OUT} = 3V$ to $V_{MAX}$ $T_J = -55$ to $150^{\circ}C$		0.005	0.010		0.010	0.020	%V
			0.010	0.030		0.020	0.050	
$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$ Load Regulation 1	$I_{OUT} = 10mA$ to $I_{MAX}$ $T_J = -55$ to $150^{\circ}C$	$V_{OUT} \leq 5V$		5	25	15	25	mV
		$V_{OUT} \geq 5V$		0.1	0.5	0.3	0.5	%
	$I_{OUT} = 10mA$ to $I_{MAX}$ $T_J = -55$ to $150^{\circ}C$	$V_{OUT} \leq 5V$		10	50	20	50	mV
		$V_{OUT} \geq 5V$		0.2	1	0.3	1	%
Thermal Regulation	$t_p = 10ms$ $T_A = 25^{\circ}C$		0.002	0.020		0.002	0.02	%/W
Ripple Rejection	$V_{OUT} = -10V$ $f = 120Hz$ $T_J = -55$ to $150^{\circ}C$	$C_{ADJ} = 0$		60	66	60		dB
		$C_{ADJ} = 10\mu F$		70	80	66	77	dB
$I_{ADJ}$ Adjust Pin Current	$T_J = -55$ to $150^{\circ}C$		65	100		65	100	$\mu A$
$\Delta I_{ADJ}$ Adjust Pin Current Change	$T_J = -55$ to $+150^{\circ}C$	$I_{OUT} = 10mA$ to $I_{MAX}$		0.2	2	0.5	5	$\mu A$
		$V_{IN} - V_{OUT} = 3V$ to $40V$		1.0	5	2	5	
		$V_{IN} - V_{OUT} = 3V$ to $50V$ <b>(HV SERIES)</b>		2.0	6	3	6	
$I_{MIN}$ Minimum Load Current	$T_J = -55$ to $150^{\circ}C$	$V_{IN} - V_{OUT} \leq 40V$		2.5	5	2.5	5	mA
		$V_{IN} - V_{OUT} \leq 10V$		1.2	3	1.2	3	
$I_{CL}$ Current Limit	$T_J = -55$ to $150^{\circ}C$	$V_{IN} - V_{OUT} \leq 15V$		0.50	0.80	1.5	0.50	A
		$V_{IN} - V_{OUT} = 40V$		0.15	0.17		0.15	
		$V_{IN} - V_{OUT} = 50V$ <b>(HV SERIES)</b>		0.10	0.17	0.5	0.10	
$\frac{\Delta V_{OUT}}{\Delta TEMP}$ Temperature Stability	$T_J = -55$ to $150^{\circ}C$		0.6	1.5		0.6		%
$\frac{\Delta V_{OUT}}{\Delta TIME}$ Long Term Stability	$T_A = +125^{\circ}C$ $t = 1000$ Hrs		0.3	1		0.3	1	%
$e_n$ RMS Output Noise (% of $V_{OUT}$ )	$f = 10$ Hz to $10$ kHz $T_A = 25^{\circ}C$		0.003			0.003		%
$R_{\theta JC}$ Thermal Resistance Junction to Case	H Package		12	15		12	15	$^{\circ}C/W$

1) 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 at a point  $1/8$ " from the bottom of the package for the TO-3 and TO-66 packages, at the junction of the wide and narrow portion of the output lead for the SMD1package, and  $1/8$ " below the base of the package on the output pin of the TO-257 package.

2) Test Conditions unless otherwise stated:  $V_{IN} - V_{OUT} = 5V$ ,  $I_{OUT} = 0.1A$ ,  $P_{MAX} = 2W$ ,  $I_{MAX} = 0.5A$   
 $V_{MAX} = 40V$  for standard series,  $50V$  for HV series.