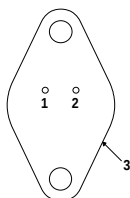


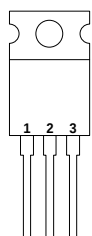
Pin 1 – ADJ.
 Pin 2 – V_{OUT}
 Case – V_{IN}

K Package – TO-3



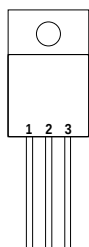
Pin 1 – ADJ.
 Pin 2 – V_{OUT}
 Case – V_{IN}

R Package – TO-66



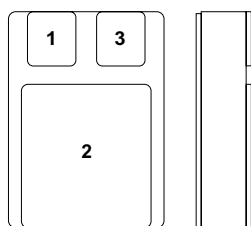
Pin 1 – ADJ.
 Pin 2 – V_{IN}
 Pin 3 – V_{OUT}
 Case – V_{IN}

T Package – TO-220



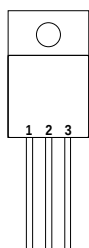
Pin 1 – ADJ.
 Pin 2 – V_{IN}
 Pin 3 – V_{OUT}
 Case – V_{IN}

G Package – TO-257



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

**SG Package – SMD1
 CERAMIC SURFACE
 MOUNT**



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

**IG Package – TO-257
 (Isolated)**

1.5 AMP NEGATIVE ADJUSTABLE VOLTAGE REGULATOR

FEATURES

- OUTPUT VOLTAGE RANGE OF:
 1.25 TO 40V FOR STANDARD VERSION
 1.25 TO 50V FOR –HV VERSION
- 1% OUTPUT VOLTAGE TOLERANCE
- 0.3% LOAD REGULATION
- 0.01% / V LINE REGULATION
- COMPLETE SERIES OF PROTECTIONS:
 - CURRENT LIMITING
 - THERMAL SHUTDOWN
 - SOA CONTROL

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

V_{I-O}	Input - Output Differential Voltage	– Standard	40V
		– HV Series	50V
I_O	Output Current		Internally limited
P_D	Power Dissipation		Internally limited
T_j	Operating Junction Temperature Range		See Order Information Table
T_{stg}	Storage Temperature		-65 to 150°C



IP137 SERIES LM137 SERIES

IP137A SERIES LM137A SERIES

IP337 SERIES

IP337A SERIES

Parameter	Test Conditions	IP137A , IP137AHV LM137A , LM137AHV			IP137 , IP137HV LM137 , LM137HV			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	-1.250	-1.300	V
$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$ 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}	$V_{OUT} \leq 5V$		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	$V_{OUT} = -10V$ $f = 120Hz$	$C_{ADJ} = 0$		60	66	60		dB
		$C_{ADJ} = 10\mu F$ $T_J = -55$ to $150^\circ C$		70	80	66	77	dB
I_{ADJ} Adjust Pin Current	$T_J = -55$ to $150^\circ C$		65	100		65	100	μA
ΔI_{ADJ} Adjust Pin Current Change	$T_J = -55$ to $150^\circ C$	$I_{OUT} = 10mA$ to I_{MAX}		0.2	2	0.5	5	μA
		$V_{IN} - V_{OUT} = 3V$ to $40V$		1.0	5	2	5	
		$V_{IN} - V_{OUT} = 3V$ to $50V$ (HV SERIES)		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 $150^\circ C$	$V_{IN} - V_{OUT} \leq 15V$		1.5	2.2	3.2	1.5	A
		$V_{IN} - V_{OUT} = 40V$		0.24	0.4	1	0.24	
		$V_{IN} - V_{OUT} = 50V$ (HV SERIES)		0.2	0.4	0.8	0.2	
$\frac{\Delta V_{OUT}}{\Delta TEMP}$ 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	K Package		2.3	3		2.3	3	$^\circ C/W$
	R Package		5	7		5	7	
	G Package		3	5		3	5	

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 SMD1 package, and $1/8$ " below the base of the package on the output pin of the TO-257 package.

2) Test Conditions unless otherwise stated: $V_{IN} - V_{OUT} = 5V$, $I_{OUT} = 0.5A$, $P_{MAX} = 20W$, $I_{MAX} = 1.5A$
 $V_{MAX} = 40V$ for standard series, $50V$ for HV series.



IP137 SERIES LM137 SERIES

IP137A SERIES LM137A SERIES

IP337 SERIES

IP337A SERIES

Parameter	Test Conditions	IP337AHV			IP337HV LM337HV			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
V_{REF} Reference Voltage	$I_{OUT} = 10\text{mA}$	-1.238	-1.25	-1.262	-1.213	-1.25	-1.287	V
	$I_{OUT} = 10\text{mA to } I_{MAX}$ $V_{IN} - V_{OUT} = 3\text{V to } V_{MAX}$ $P \leq P_{MAX}$ $T_J = 0 \text{ to } 125^\circ\text{C}$	-1.220	-1.25	-1.280	-1.200	-1.250	-1.300	V
$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$ Line Regulation 1	$V_{IN} - V_{OUT} = 3\text{V to } V_{MAX}$ $T_J = 0 \text{ to } 125^\circ\text{C}$	0.005	0.010		0.010	0.040		%V
		0.010	0.030		0.020	0.070		
$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$ Load Regulation 1	$I_{OUT} = 10\text{mA to } I_{MAX}$ $V_{OUT} \leq 5\text{V}$	5	25		15	50		mV
	$V_{OUT} \geq 5\text{V}$	0.1	0.5		0.3	1		%
	$I_{OUT} = 10\text{mA to } I_{MAX}$ $T_J = 0 \text{ to } 125^\circ\text{C}$ $V_{OUT} \leq 5\text{V}$	10	50		20	70		mV
	$V_{OUT} \geq 5\text{V}$	0.2	1		0.3	1.5		%
Thermal Regulation	$t_p = 10\text{ms}$ $T_A = 25^\circ\text{C}$	0.002	0.020		0.003	0.04		%/W
Ripple Rejection	$V_{OUT} = 10\text{V}$ $f = 120\text{Hz}$ $C_{ADJ} = 0$	60	66		60			dB
	$C_{ADJ} = 10\mu\text{F}$ $T_J = 0 \text{ to } 125^\circ\text{C}$	70	80		66	77		dB
I_{ADJ} Adjust Pin Current	$T_J = 0 \text{ to } 125^\circ\text{C}$	65	100		65	100		μA
ΔI_{ADJ} Adjust Pin Current Change	$T_J = 0$ $\text{to } 125^\circ\text{C}$ $I_{OUT} = 10\text{mA to } I_{MAX}$	0.2	2		0.5	5		μA
	$V_{IN} - V_{OUT} = 3\text{V to } 40\text{V}$	1.0	5		2	5		
	$V_{IN} - V_{OUT} = 3\text{V to } 50\text{V}$ (HV SERIES)	2.0	6		3	6		
I_{MIN} Minimum Load Current	$T_J = 0 \text{ to } 125^\circ\text{C}$ $V_{IN} - V_{OUT} \leq 40\text{V}$	2.5	5		2.5	10		mA
	$V_{IN} - V_{OUT} \leq 10\text{V}$	1.2	3		1	6		
I_{CL} Current Limit	$T_J = 0 \text{ to } 125^\circ\text{C}$ $V_{IN} - V_{OUT} \leq 15\text{V}$	1.5	2.2	3.5	1.5	2.2	3.5	A
	$V_{IN} - V_{OUT} = 40\text{V}$	0.24	0.4	1	0.15	0.4		
	$V_{IN} - V_{OUT} = 50\text{V}$ (HV SERIES)	0.2	0.4	0.8	0.1	0.4	0.8	
$\frac{\Delta V_{OUT}}{\Delta \text{TEMP}}$ Temperature Stability	$T_J = 0 \text{ to } 125^\circ\text{C}$	0.6	1.5		0.6			%
$\frac{\Delta V_{OUT}}{\Delta \text{TIME}}$ Long Term Stability	$t = 1000 \text{ Hrs}$	0.3	1		0.3	1		%
e_n RMS Output Noise (% of V_{OUT})	$f = 10 \text{ Hz to } 10 \text{ kHz}$ $T_A = 25^\circ\text{C}$	0.003			0.003			%
$R_{\theta JC}$ Thermal Resistance Junction to Case	K Package	2.3	3		2.3	3		$^\circ\text{C/W}$
	T Package	4	5		4			

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 $\frac{1}{8}$ " 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 SMD1 package, and $\frac{1}{8}$ " below the base of the package on the output pin of the TO-257 package.

2) Test Conditions unless otherwise stated: $V_{IN} - V_{OUT} = 5\text{V}$, $I_{OUT} = 0.5\text{A}$, $P_{MAX} = 20\text{W}$, $I_{MAX} = 1.5\text{A}$
 $V_{MAX} = 40\text{V}$ for standard series, 50V for HV series.

