FAIRCHILD SEMICONDUCTOR®

July 2013

KA337 / LM337
3-Terminal 1.5 A Negative Adjustable Regulator

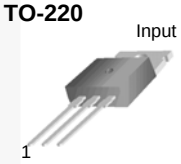
Features

- Output-Current in Excess of 1.5 A
- Output-Adjustable Between -1.25 V and -37 V
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limiting
- Output-Transistor Safe Area Compensation
- Floating Operation for High-Voltage Applications
- Standard 3-Pin TO-220 Package

Description

The KA337 / LM337 are 3-terminal negative adjustable regulators. They supply in excess of 1.5 A over an output voltage range of -1.25 V to -37 V. These regulators require only two external resistors to set the output voltage and employ current limiting, thermal overload protection, and safe area compensation.

TO-220



1. Adj 2. Input 3. Output

Ordering Information

Product Number	Package	Packing Method	Operating Temperature
KA337TU	TO-220 (Dual Gauge)	Rail	0°C to +125°C
LM337T	TO-220 (Single Gauge)		

Block Diagram

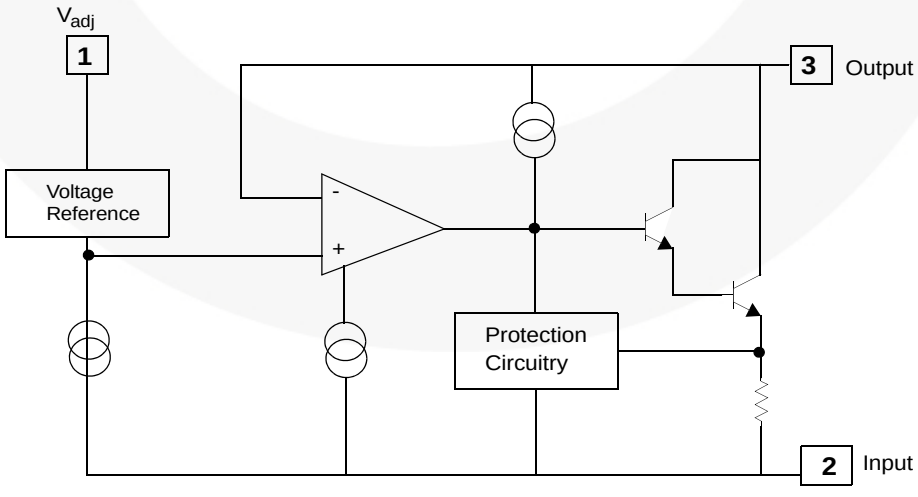


Figure 1. Block Diagram

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Value	Unit
$IV_I - V_OI$	Input-Output Voltage Differential	40	V
P_D	Power Dissipation	Internally Limited	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	4	°C/W
T_{OPR}	Operating Temperature Range	0 to +125	°C
T_{STG}	Storage Temperature Range	-65 to +125	°C

Electrical Characteristics

$V_I - V_O$ = 5 V, I_O = 40 mA, 0°C ≤ T_J ≤ +125°C, P_{DMAX} = 20 W; unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R_{line}	Line Regulation(1)	T_A = +25°C, 3 V ≤ I $V_I - V_O$ I ≤ 40 V		0.01	0.04	%/ V
		3 V ≤ I $V_I - V_O$ I ≤ 40 V		0.02	0.07	
R_{load}	Load Regulation(1)	T_A = +25°C, 10 mA ≤ I_O ≤ 0.5 A		15	50	mV
		10 mA ≤ I_O ≤ 1.5 A		15	150	
I_{ADJ}	Adjustable Pin Current			50	100	µA
ΔI_{ADJ}	Adjustable Pin Current Change	T_A = +25°C, 10 mA ≤ I_O ≤ 1.5 A, 3 V ≤ I $V_I - V_O$ I ≤ 40 V		2	5	µA
V_{REF}	Reference Voltage	T_A =+25°C	-1.213	-1.250	-1.287	V
		3 V ≤ I $V_I - V_O$ I ≤ 40 V, 10 mA ≤ I_O ≤ 1.5 A	-1.200	-1.250	-1.300	
ST_T	Temperature Stability	0°C ≤ T_j ≤ +125°C		0.6		%
$I_{L(MIN)}$	Minimum Load Current to Maintain Regulation	3 V ≤ I $V_I - V_O$ I ≤ 40 V		2.5	10.0	mA
		3 V ≤ I $V_I - V_O$ I ≤ 10 V		1.5	6.0	
e_N	RMS Noise, % of V_{OUT}	T_A =+25°C, 10 Hz ≤ f ≤ 10 kHz		0.003		%
RR	Ripple Rejection Ratio	V_O = -10 V, f = 120 Hz		60		dB
		C_{ADJ} = 10 µF(2)	66	77		
ST	Long-Term Stability	T_J = 125°C, 1000 Hours		0.3	1.0	%

Notes:

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.

Typical Performance Characteristics

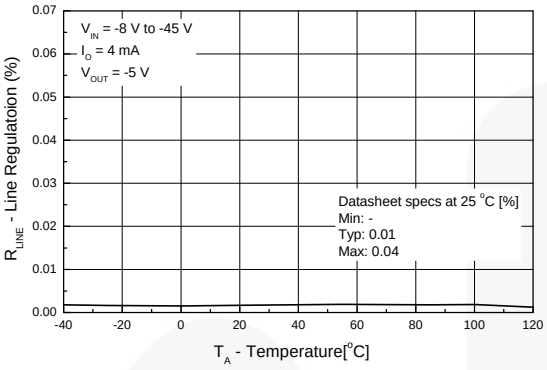


Figure 2. Line Regulation vs. Temperature

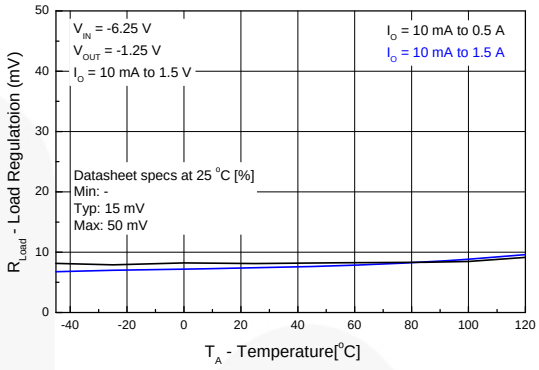


Figure 3. Load Regulations vs. Temperature

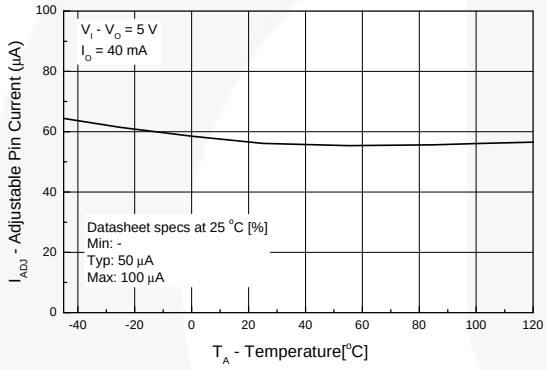


Figure 4. Adjustable Pin Current vs. Temperature

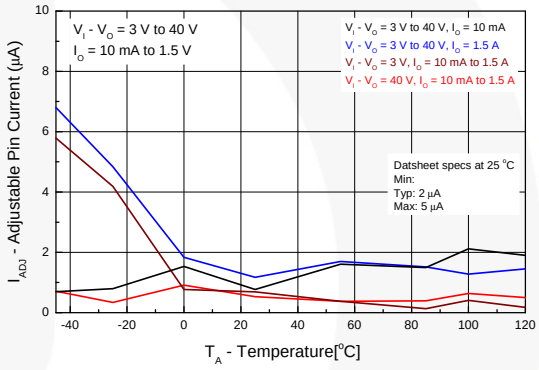


Figure 5. Adjustable Pin Current Change vs. Temperature

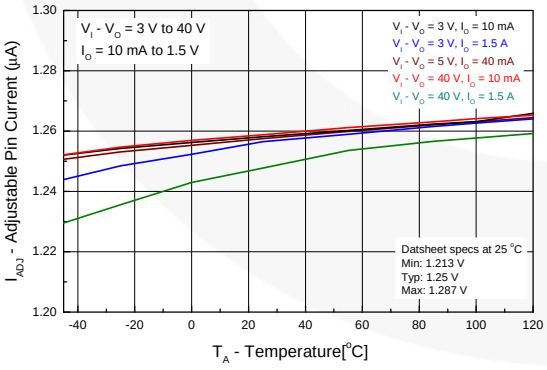


Figure 6. Reference Voltage vs. Temperature

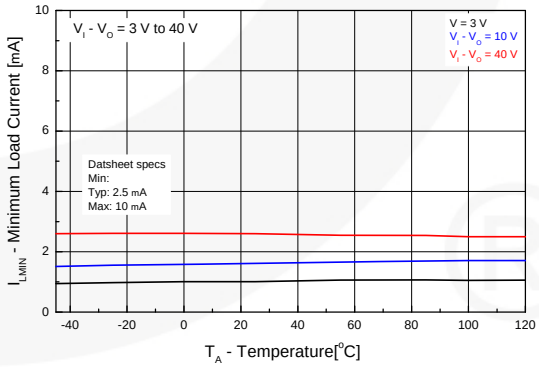


Figure 7. Minimum Load Current vs. Temperature

Typical Performance Characteristics

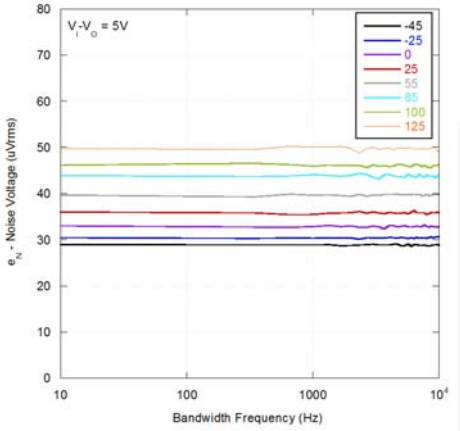


Figure 8. Noise Voltage vs. Temperature

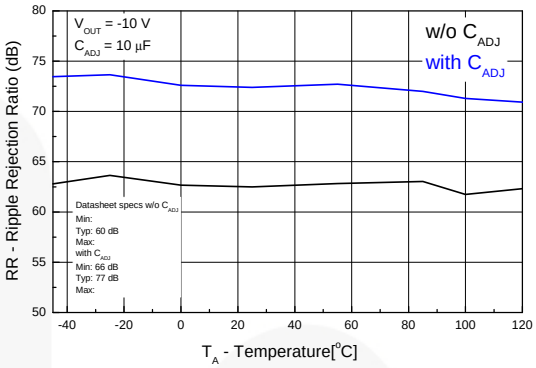


Figure 9. Ripple Rejection vs. Temperature

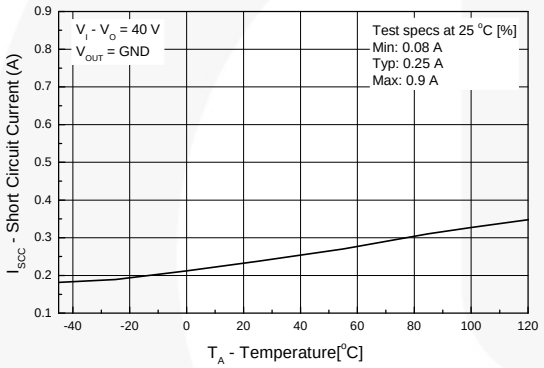


Figure 10. Short-Circuit Currents vs. Temperature

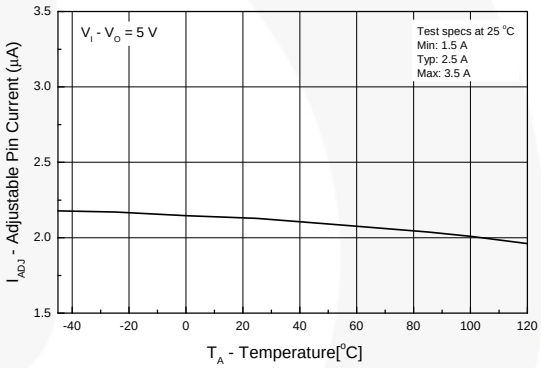


Figure 11. Peak Current vs. Temperature

Typical Application

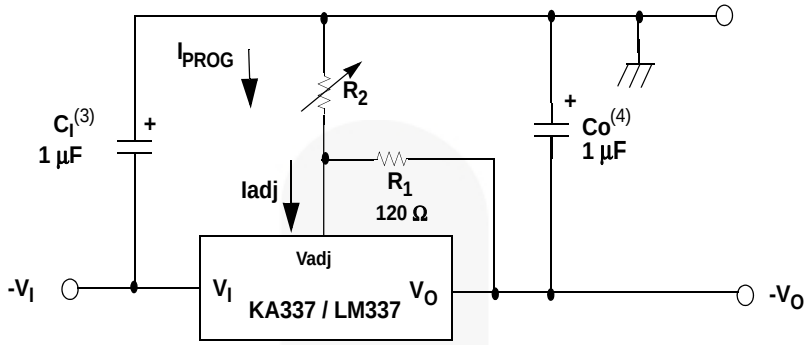


Figure 12. Typical Application

Notes:

3. C_I is required if regulator is located more then 4 inches from power supply filter.
   1.0 µF solid tantalum or 10 µF aluminum electrolytic is recommended.
4. C_O is necessary for stability. 1.0 µF solid tantalum or 10 µF aluminum electrolytic is recommended.
   $V_O = -1.25\ V\ (1 + R_2 / R_1)$.

Physical Dimensions

TO-220 [SINGLE GAUGE]

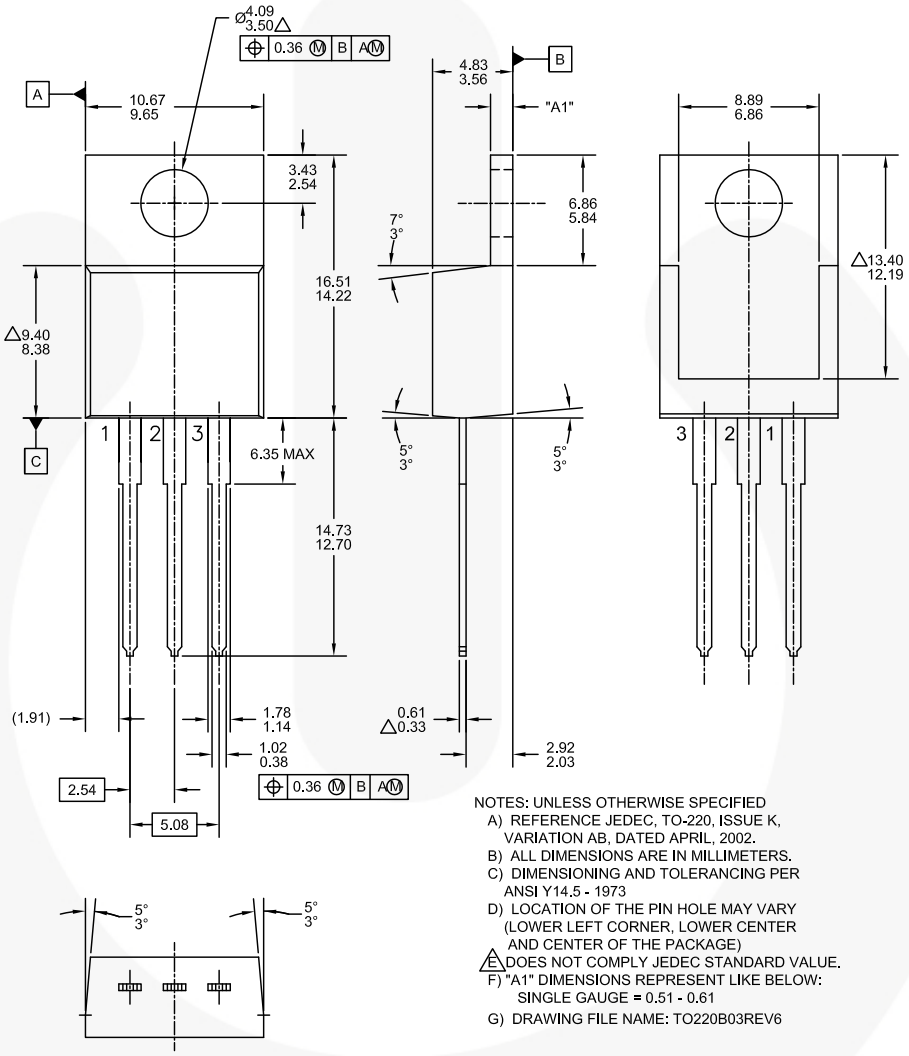


Figure 13. TO220, MOLDED, 3-LEAD, JEDEC, VARIATION AB

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Physical Dimensions (Continued)

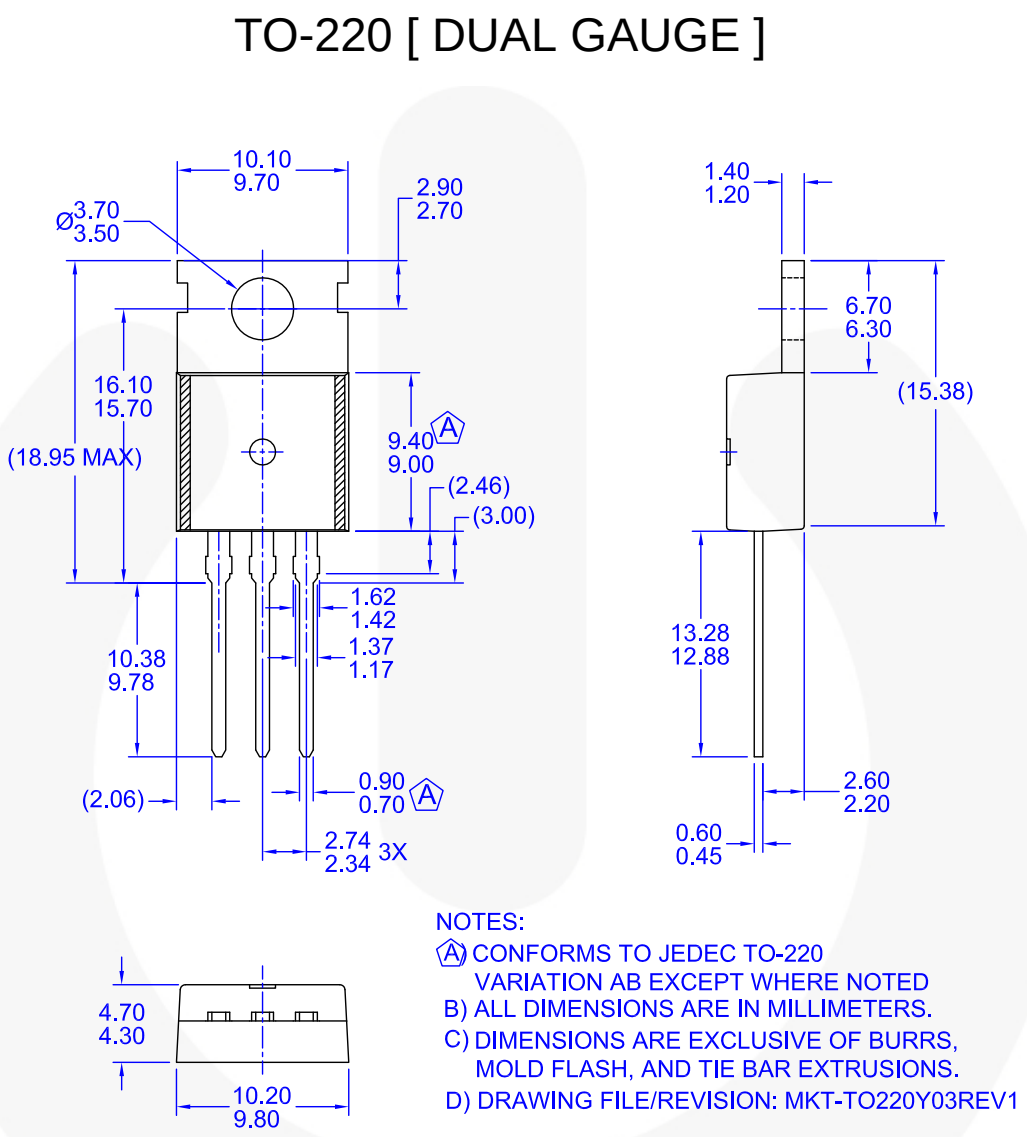

Figure 14. TO220, MOLDED, 3-LEAD, NON-JEDEC, VARIATION AB

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