

Voltage Regulator - Adjustable Output, Negative, 3-Terminal

1.5 A

KA337/LM337

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.

Features

- Output Current in Excess of 1.5 A
- Output Adjustable between -1.2 V and -37 V
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limiting
- Output Transistor Safe-Area Compensation
- Floating Operation for High-Voltage Applications
- Eliminates Stocking many Fixed Voltages
- Standard 3-Lead TO-220 Package
- These are Pb-Free Devices

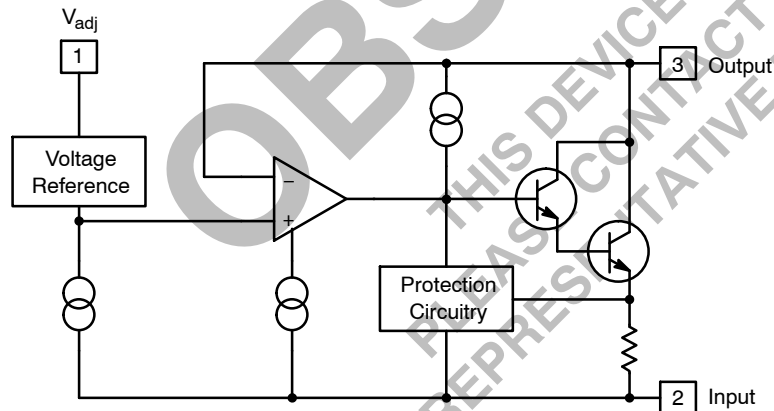
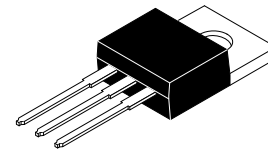
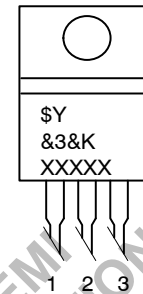


Figure 1. Block Diagram



TO-220-3LD
CASE 340AT

MARKING DIAGRAM



1. Adj.
2. Input
3. Output

\$Y = Logo
 &3 = 3-Digit Date Code
 &K = 2-Digit Lot Run Traceability Code

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

KA337/LM337

ABSOLUTE MAXIMUM RATINGS (Values are at $T_A = +25^{\circ}\text{C}$, unless otherwise noted)

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

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

ELECTRICAL CHARACTERISTICS

($V_I - V_O = 5\text{ V}$, $I_O = 40\text{ mA}$, $0^{\circ}\text{C} \leq T_J \leq +125^{\circ}\text{C}$, $P_{D\text{MAX}} = 20\text{ W}$; unless otherwise specified)

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

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

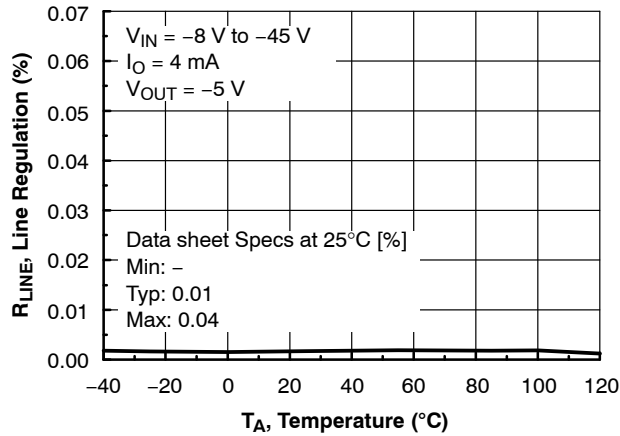


Figure 2. Line Regulation vs. Temperature

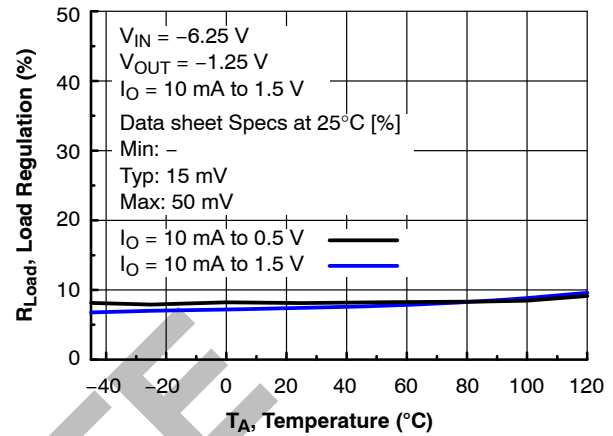


Figure 3. Load Regulation vs. Temperature

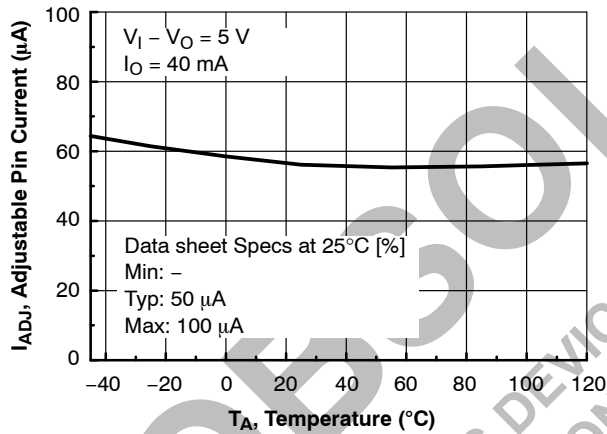


Figure 4. Adjustable Pin Current vs. Temperature

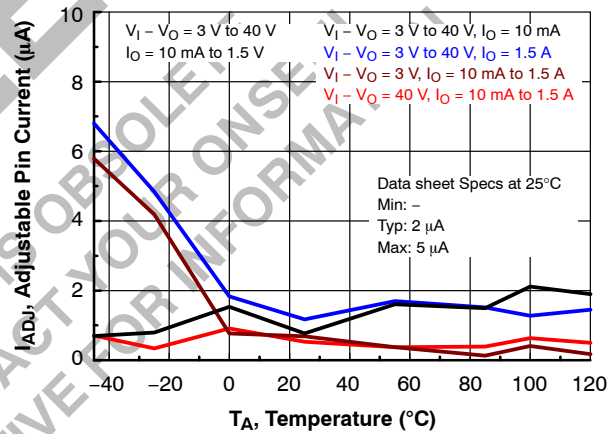


Figure 5. Adjustable Pin Current Change vs. Temperature

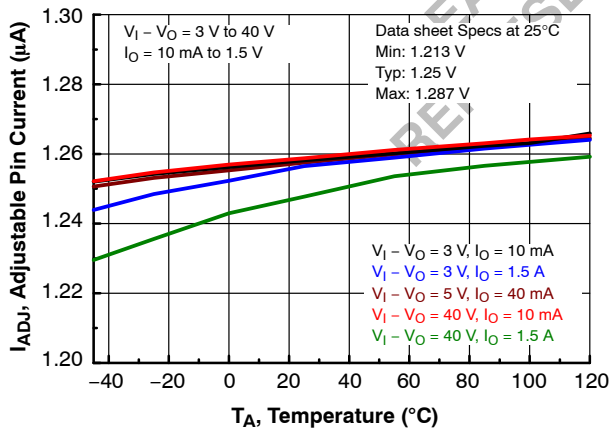


Figure 6. Reference Voltage vs. Temperature

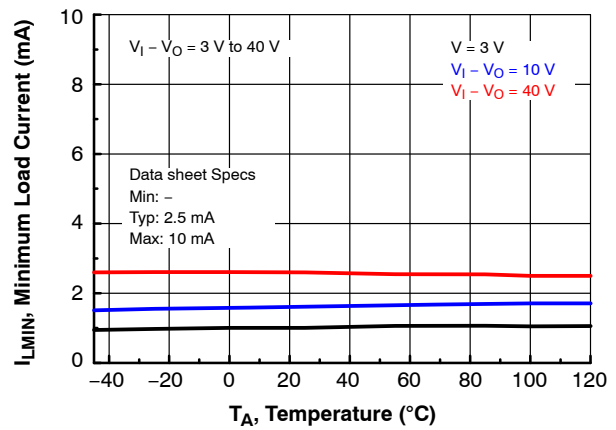


Figure 7. Minimum Load Current vs. Temperature

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

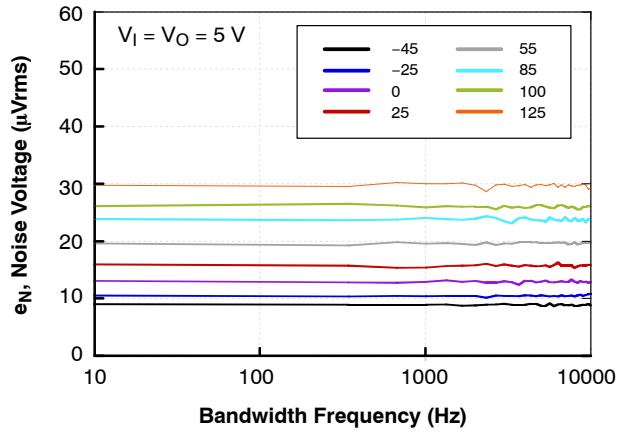


Figure 8. Noise Voltage vs. Temperature

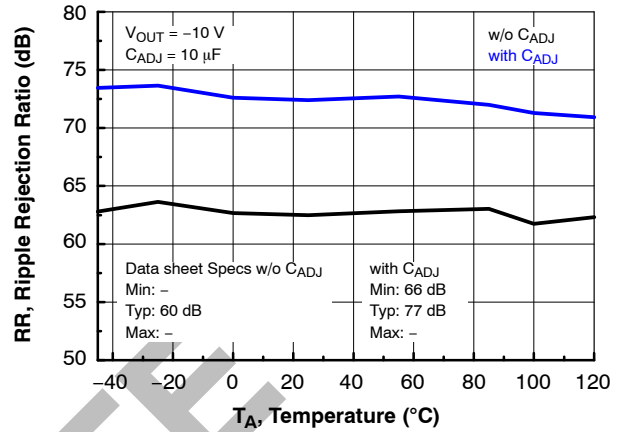


Figure 9. Ripple Rejection vs. Temperature

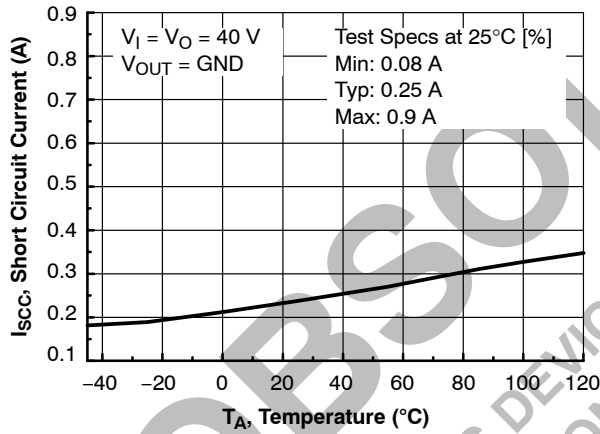


Figure 10. Short-Circuit Currents vs. Temperature

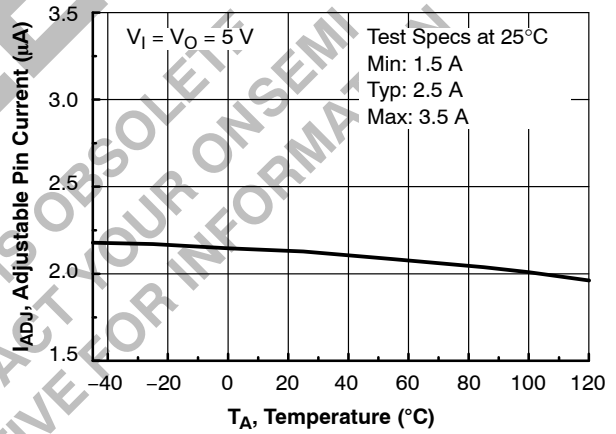
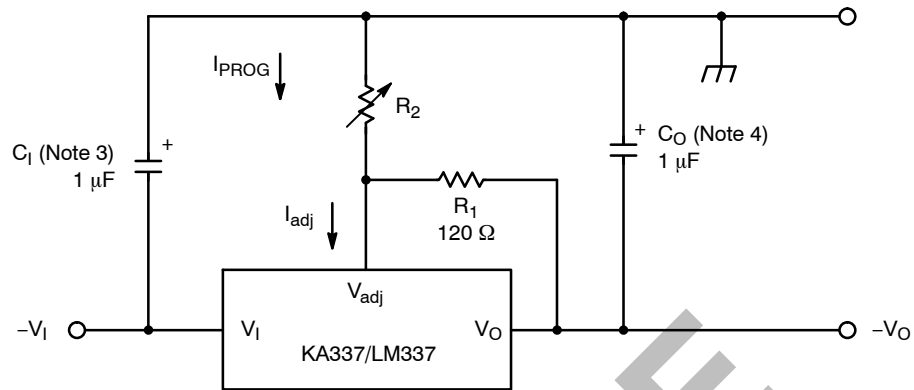


Figure 11. Peak Current vs. Temperature

KA337/LM337

TYPICAL APPLICATION

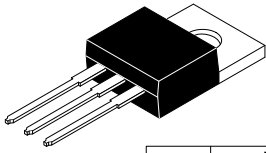


3. C_I is required if regulator is located more than 4 inches from power supply filter.
1.0 μF solid tantalum or 10 μF aluminum electrolytic is recommended.
4. C_O is necessary for stability. 1.0 μF solid tantalum or 10 μF aluminum electrolytic is recommended.
 $V_O = -1.25 \text{ V} (1 + R_2 / R_1)$.

Figure 12. Typical Application

ORDERING INFORMATION

Device	Operating Temperature Range	Package	Shipping
KA337TU	0°C to +125°C	TO-220-3LD, Dual Gauge (Pb-Free)	1000 Units / Tube
LM337T	0°C to +125°C	TO-220-3LD, Single Gauge (Pb-Free)	1000 Units / Tube



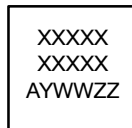
TO-220-3LD
CASE 340AT
ISSUE B

DATE 08 AUG 2022

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	4.00	--	4.70
A1	SEE NOTE "F"		
A2	2.10	--	2.85
b	0.55	--	1.00
b2	1.10	--	1.62
b4	1.42	--	1.62
c	0.36	--	0.60
D	13.90	--	16.30
D1	8.13	--	9.40
D2	11.50	--	14.30
D3	15.42	--	16.51
E	9.65	--	10.67
E1	7.59	--	8.65
e	2.40	--	2.67
H1	6.06	--	6.69
L	12.70	--	14.04
L1	2.70	--	4.10
P	3.50	--	4.00
Q	2.50	--	3.40
z	2.13 REF		
z1	2.06 REF		
θ	3°	--	5°

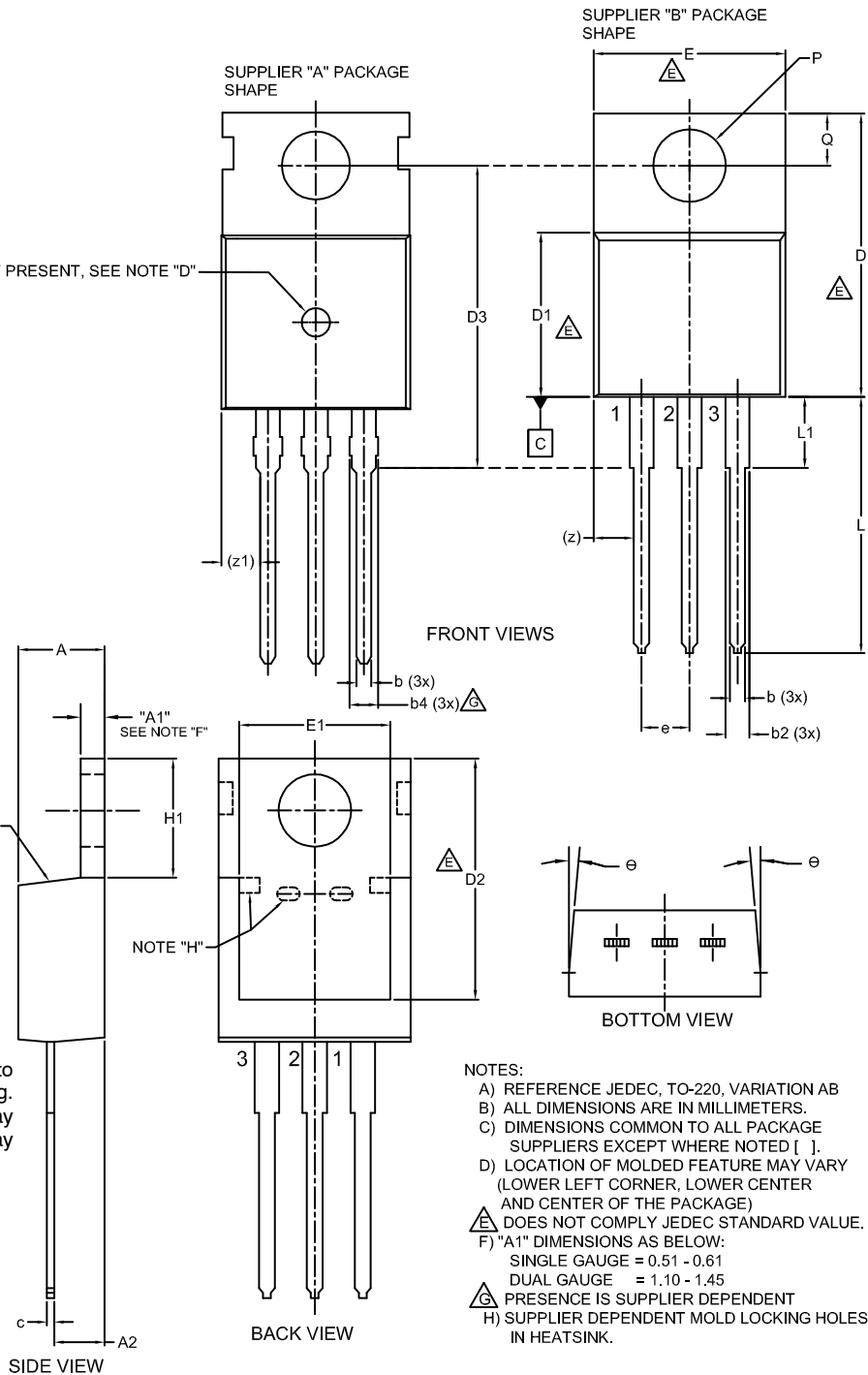
IF PRESENT, SEE NOTE "D"

GENERIC
MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
ZZ = Assembly Lot Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



NOTES:

- A) REFERENCE JEDEC, TO-220, VARIATION AB
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS COMMON TO ALL PACKAGE SUPPLIERS EXCEPT WHERE NOTED [].
- D) LOCATION OF MOLDED FEATURE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)
- E) DOES NOT COMPLY JEDEC STANDARD VALUE.
- F) "A1" DIMENSIONS AS BELOW:
SINGLE GAUGE = 0.51 - 0.61
DUAL GAUGE = 1.10 - 1.45
- G) PRESENCE IS SUPPLIER DEPENDENT
- H) SUPPLIER DEPENDENT MOLD LOCKING HOLES IN HEATSINK.

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