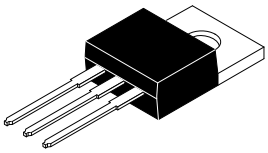
Voltage Regulator - Adjustable Output, Negative, 3-Terminal

1.5 A

KA337/LM337



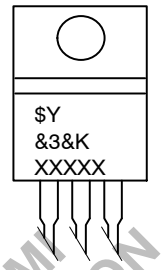
TO−220−3LD
CASE 340AT

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

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.

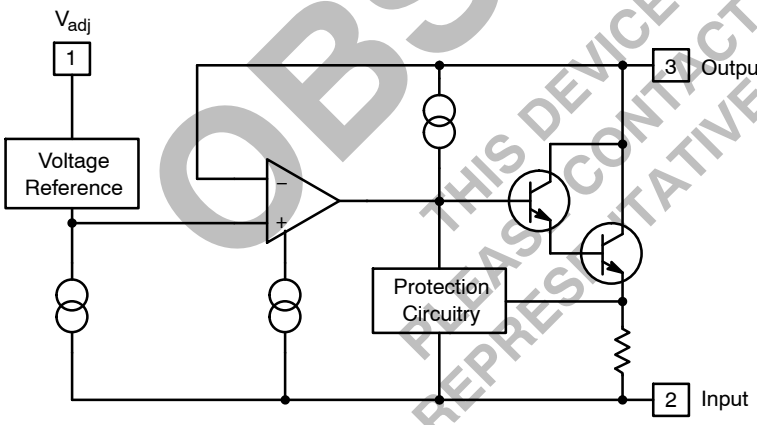


Figure 1. Block Diagram

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ABSOLUTE MAXIMUM RATINGS (Values are at T_A = +25°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	°C/W
T_{OPR}	Operating Temperature Range	0 to +125	°C
T_{STG}	Storage Temperature Range	−65 to +125	°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 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 (Note 1)	T_A = +25°C, 3 V ≤ $\|V_I - V_O\|$ ≤ 40 V	–	0.01	0.04	%/ V
		3 V ≤ $\|V_I - V_O\|$ ≤ 40 V	–	0.02	0.07	
R_{load}	Load Regulation (Note 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 ≤ $\|V_I - V_O\|$ ≤ 40 V	–	2	5	μA
V_{REF}	Reference Voltage	T_A = +25°C	−1.213	−1.250	−1.287	V
		3 V ≤ $\|V_I - V_O\|$ ≤ 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 ≤ $\|V_I - V_O\|$ ≤ 40 V	–	2.5	10.0	mA
		3 V ≤ $\|V_I - V_O\|$ ≤ 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 (Note 2)	66	77	–	
ST	Long−Term Stability	T_J = 125°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.

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TYPICAL PERFORMANCE CHARACTERISTICS

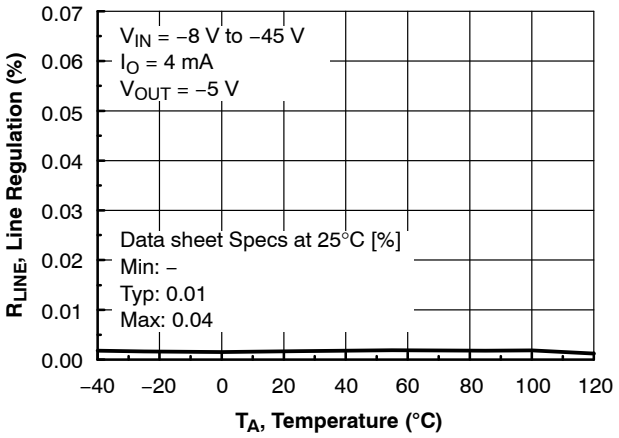

Figure 2. Line Regulation vs. Temperature

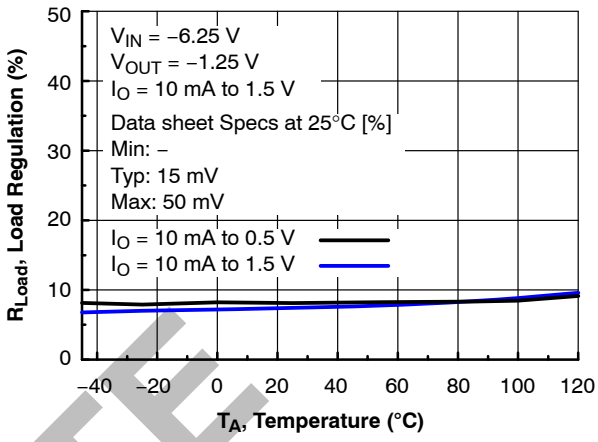

Figure 3. Load Regulation vs. Temperature

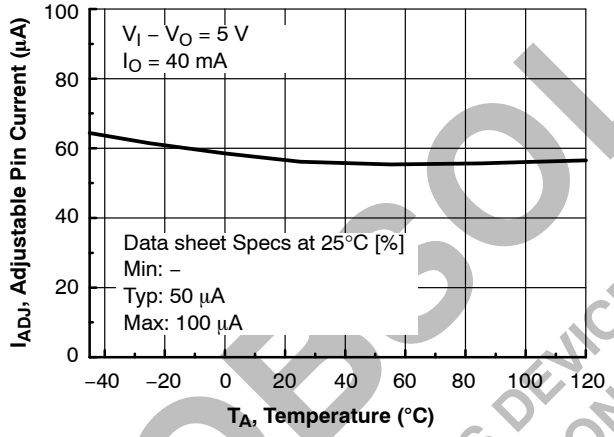

Figure 4. Adjustable Pin Current vs. Temperature

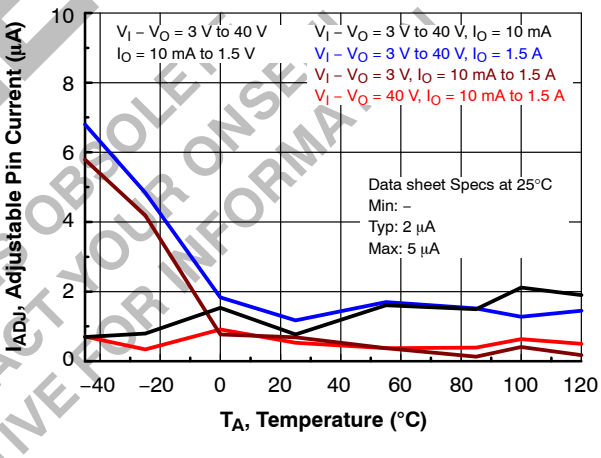

Figure 5. Adjustable Pin Current Change vs. Temperature

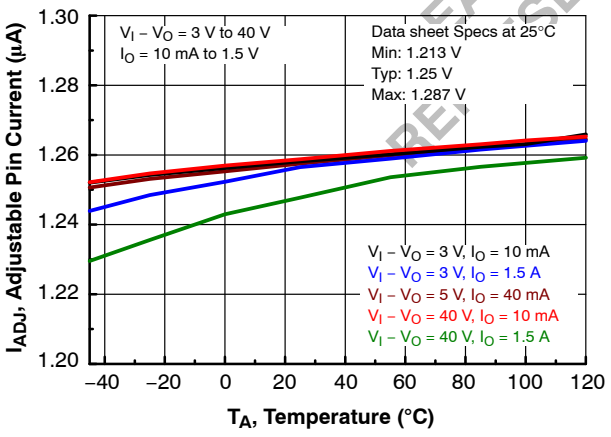

Figure 6. Reference Voltage vs. Temperature

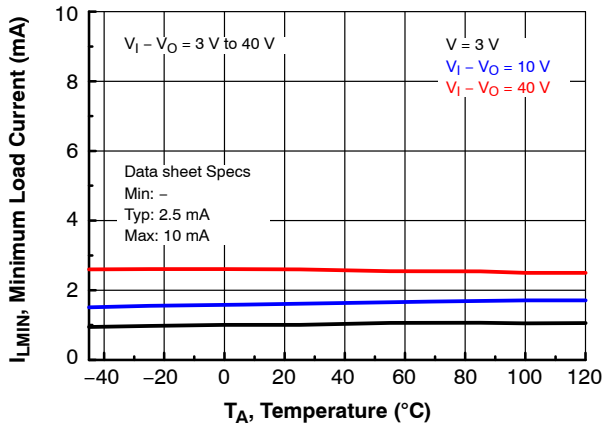

Figure 7. Minimum Load Current vs. Temperature

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TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

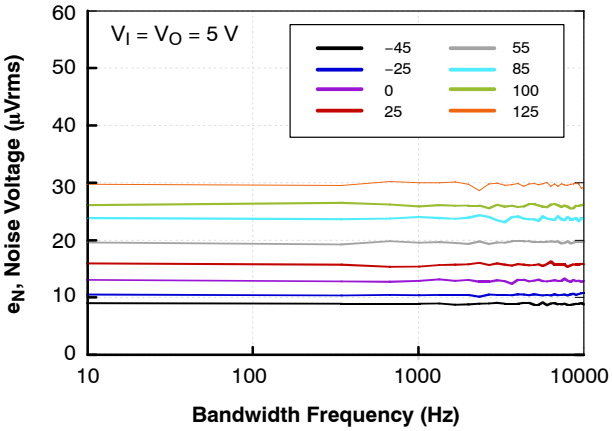

Figure 8. Noise Voltage vs. Temperature

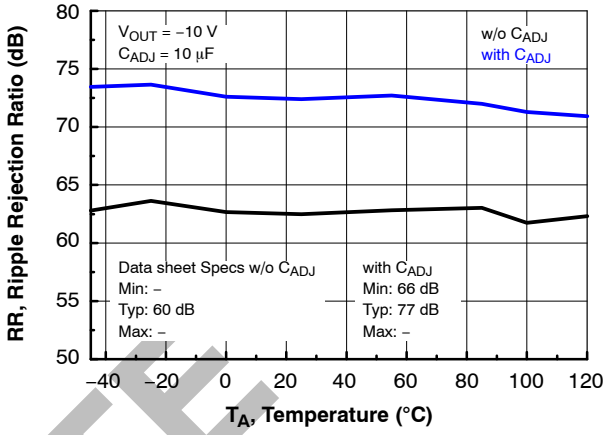

Figure 9. Ripple Rejection vs. Temperature

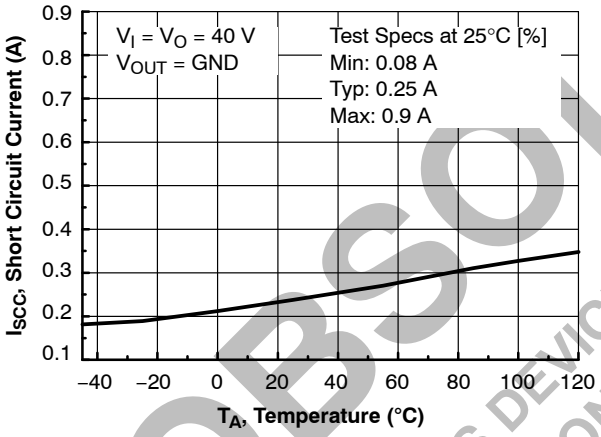

Figure 10. Short−Circuit Currents vs. Temperature

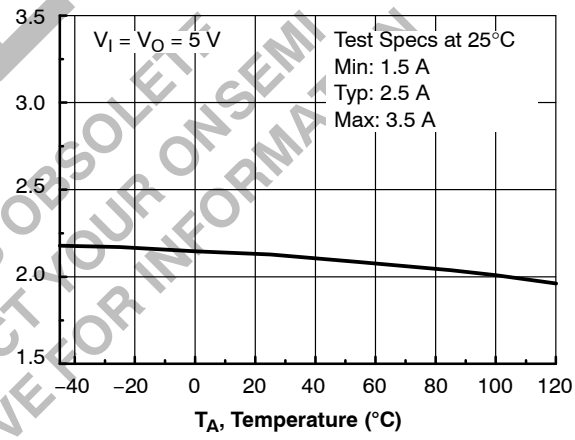

Figure 11. Peak Current vs. Temperature

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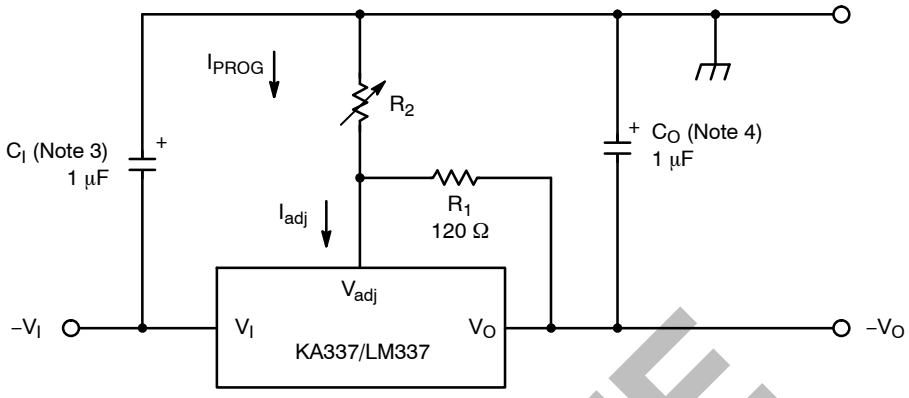
TYPICAL APPLICATION



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. $V_O = -1.25\ V\ (1 + R_2 / R_1)$.

Figure 12. Typical Application

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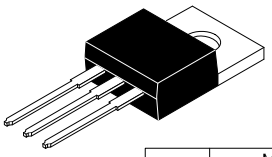
ORDERING INFORMATION

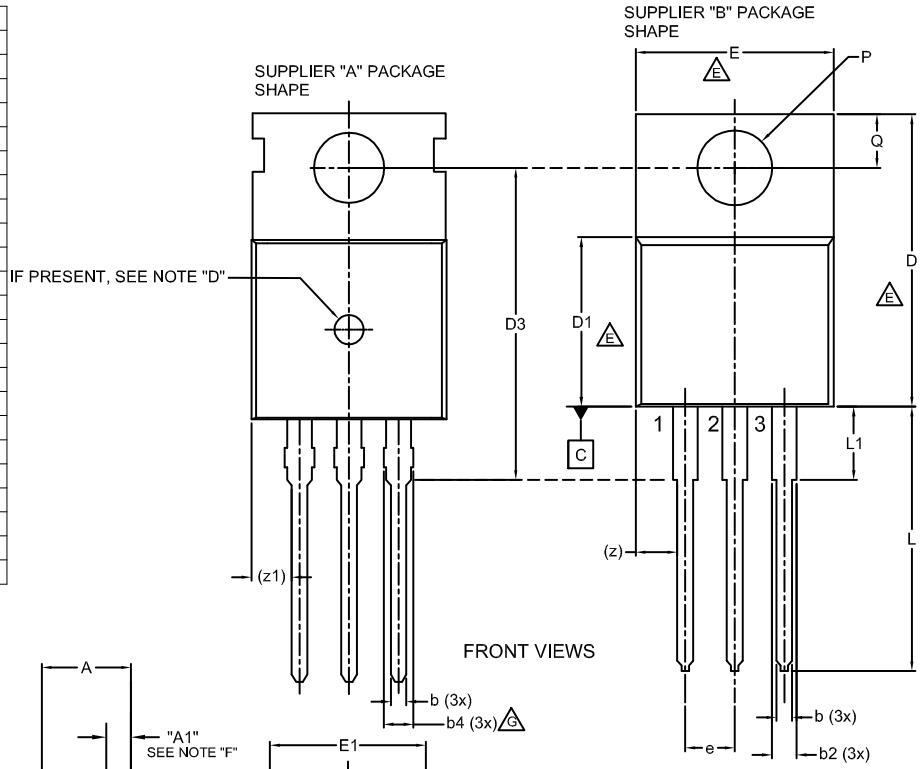
Device	Operating Temperature Range	Package	Shipping
KA337TU	0°C to +125°C	TO−220−3LD, Dual Gauge (Pb−Free)	1000 Units / Tube
LM337T	0°C to +125°C	TO−220−3LD, Single Gauge (Pb−Free)	1000 Units / Tube

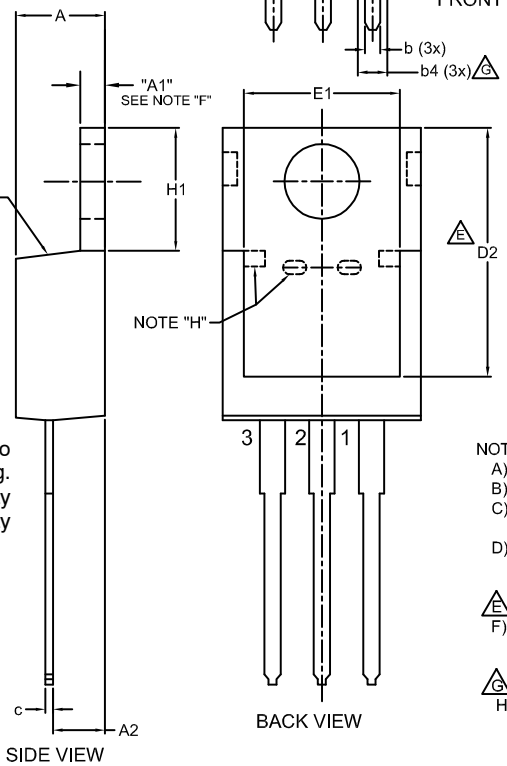


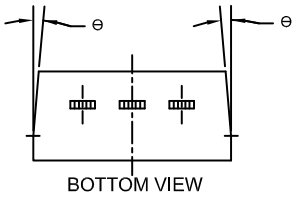
TO−220−3LD
CASE 340AT
ISSUE B

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°







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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