

LM317

DATASHEET

Specification Revision History:

Version	Date	Description
V1.0	2020/09	New
V1.1	2023/02	Modify Ordering Information
V1.2	2025/02	Modify Ordering Information
V1.3	2025/03	Add application precautions and overall typesetting.

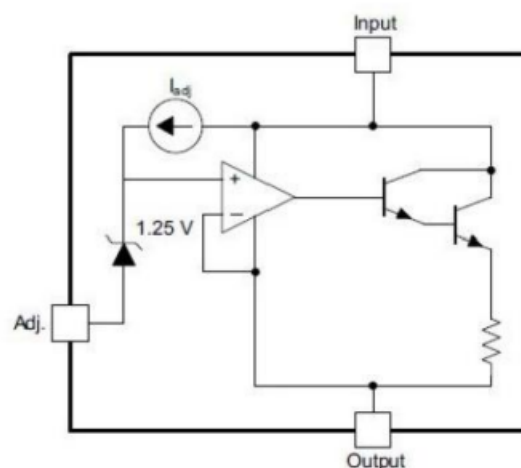
Features

- Output current greater than 1.5A
- Range Output voltage range adjustable from 1.25V to 37V

Applications

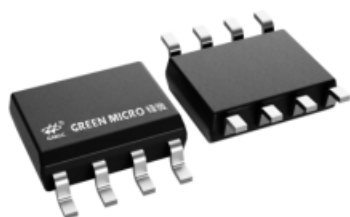
- Power Management for Computer Mother Board, Graphic Card
- LCD Monitor and LCD TV
- DVD Decode Board
- ADSL Modem
- Post Regulators for Switching Supplies

Block Diagram

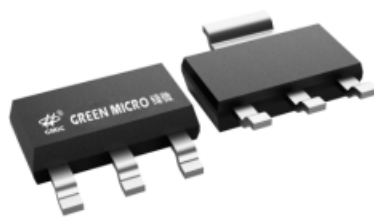


General Description

The 317 device is an adjustable three-terminal positive-voltage regulator capable of supplying more than 1.5A over an output-voltage range of 1.25V to 37V. 317 features a very low standby current 1.5mA.



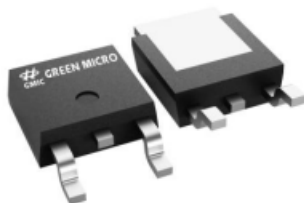
SOP-8



SOT-223



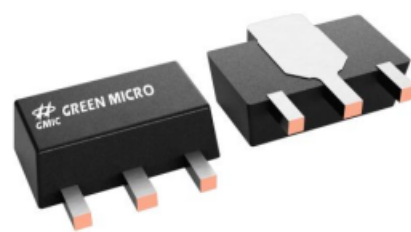
TO-220



TO-252



TO-263



SOT-89

Product Model	Package Type	Marking	Packing	Packing Qty
LM317LDR(GMIC)	SOP-8	LM317 162	REEL	2500PCS/REEL
LM317(GMIC)	SOT-89-3	LM317 162	REEL	1000PCS/REEL
LM317L(GMIC)	SOT-223	LM317 162	REEL	2500PCS/REEL
LM317T(GMIC)	TO-220	LM317 162	TUBE	1000PCS/BOX
LM317M(GMIC)	TO-252-2	LM317 162	REEL	2500PCS/REEL
LM317S(GMIC)	TO-263-3	LM317 162	REEL	800PCS/REEL
LM317LDR(GMIC)	SOP-8	LM317 A62	REEL	2500PCS/REEL
LM317(GMIC)	SOT-89-3	LM317 162	REEL	1000PCS/REEL
LM317L(GMIC)	SOT-223	LM317 162	REEL	2500PCS/REEL
LM317T(GMIC)	TO-220	LM317 162	TUBE	1000PCS/BOX
LM317M(GMIC)	TO-252-2	LM317 A62	REEL	2500PCS/REEL
LM317S(GMIC)	TO-263-3	LM317 162	REEL	800PCS/REEL

Pin Configuration

TO220 Top View SOT223 (Top View)

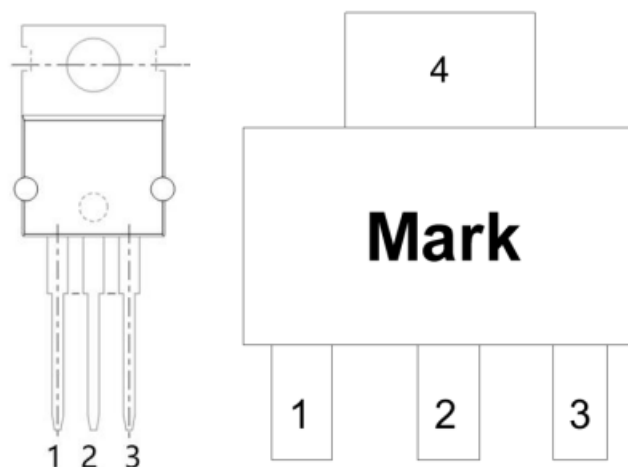


Table1:317 series(TO220 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

Table2:317 series(SOT223 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin
4	VOUT	Output voltage pin

Absolute Maximum Ratings

Max Input Voltage	40V
Max Operating Junction Temperature(Tj)	150°C
Ambient Temperature(Ta).....	-20°C~85°C
Storage Temperature(Ts)	-40°C~150°C

Caution: Exceed these limits to damage to the device. Exposure to absolute maximum rating conditions may affect device reliability.

Thermal Information

Symbol	Parameter	TO220	UNIT
$R_{\theta(JA)}$	Junction-to-ambient thermal resistance	37.9	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	51.1	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	23.2	°C/W
Ψ_{JT}	Junction-to-top characterization parameter	13.0	°C/W
Ψ_{JB}	Junction-to-board characterization parameter	22.8	°C/W
$R_{\theta JC(bot)}$	Junction-to-case(bottom) thermal resistance	4.2	°C/W

Electrical Characteristics

TA=25°C, unless otherwise noted.

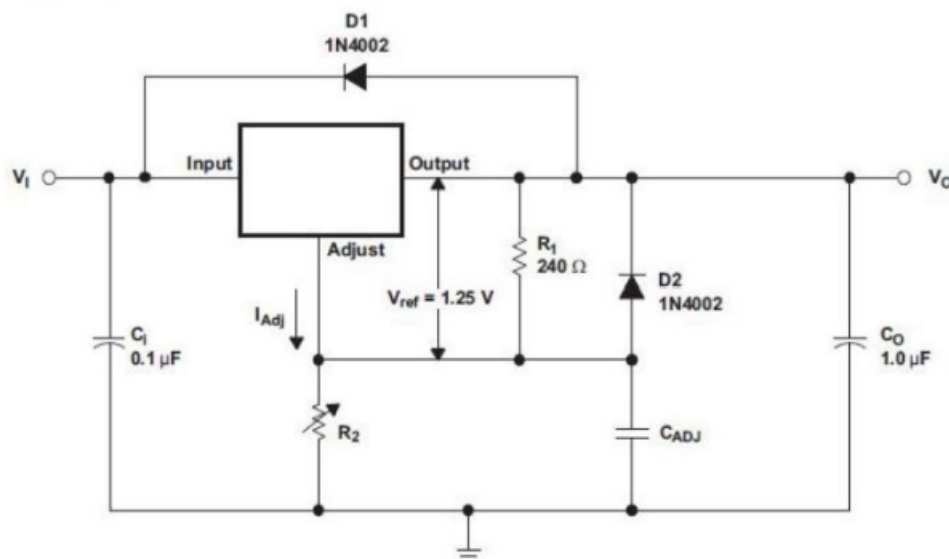
Parameter	Test Conditions		Min	Typ	Max	Unit
Line regulation	VI-V0=3V to 40V	Tj=25°C	-5	--	5	mV
Load regulation	I _o =10mA to 1500mA		-25	--	25	mV
Reference voltage	VI-V _o =3V to 40V, P _d ≤ 20W, I _o =10mA to 1.5A		1.2	1.25	1.3	V
Output-voltage Temperature stability	Tj=0°C to 125°C			0.7		%V _o
Maximum output current	VI-V _o ≤ 15V, Tj=25°C		1.5	2		A

Detailed Description

317 device is an adjustable three-terminal positive-voltage regulator capable of supplying up to 1.5A over an output-voltage range of 1.25V to 37V. It requires only two external resistors to set the output voltage. The device features a typical line regulation of 1mV and typical load regulation of 7 mV.

The 317 device is versatile in its applications, including uses in programmable output regulation and local on-card regulation. Or, by connecting a fixed resistor between the ADJUST and OUTPUT terminals, the 317 device can function as a precision current regulator. An optional output capacitor can be added to improve transient response.

Typical Application

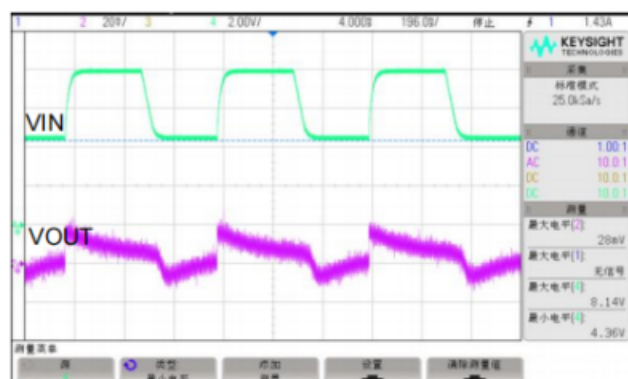


Adjustable Voltage Regulator

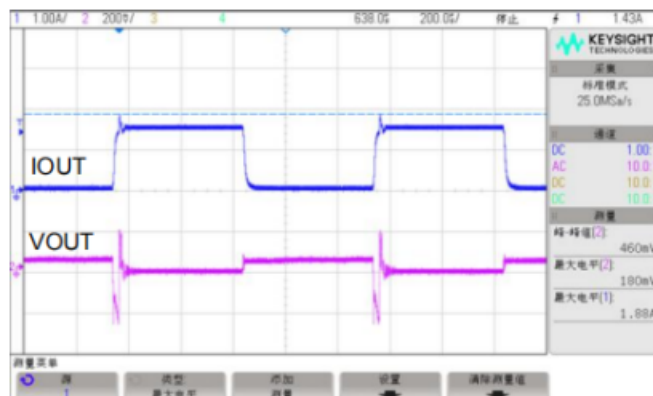
1. R_1 and R_2 are required to set the output voltage.
2. C_{ADJ} is recommended to improve ripple rejection. It prevents amplification of the ripple as the output voltage is adjusted higher.
3. C_I is recommended, particularly if the regulator is not in close proximity to the power-supply filter capacitors. A 0.1μF or 1μF ceramic or tantalum capacitor provides sufficient bypassing for most applications, especially when adjustment and output capacitors are used.
4. C_O improves transient response, but is not needed for stability.
5. Protection diode D_2 is recommended if C_{ADJ} is used. The diode provides a low-impedance discharge path to prevent the capacitor from discharging into the output of the regulator.
6. Protection diode D_1 is recommended if C_O is used. The diode provides a low-impedance discharge path to prevent the capacitor from discharging into the output of the regulator.
7. V_O is calculated as shown: $V_O = V_{REF}(1 + R_2/R_1) + (I_{ADJ} \times R_2)$, I_{ADJ} is typically 50μA and negligible in most applications.

Typical Performance Characteristics

Line Transient Response



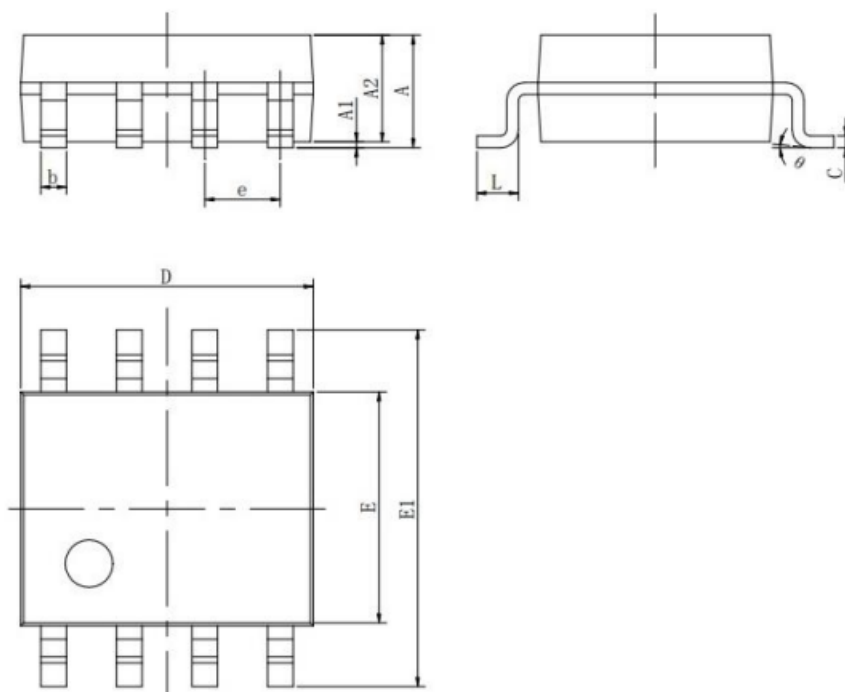
Load Transient Response



Package Information

SOP-8

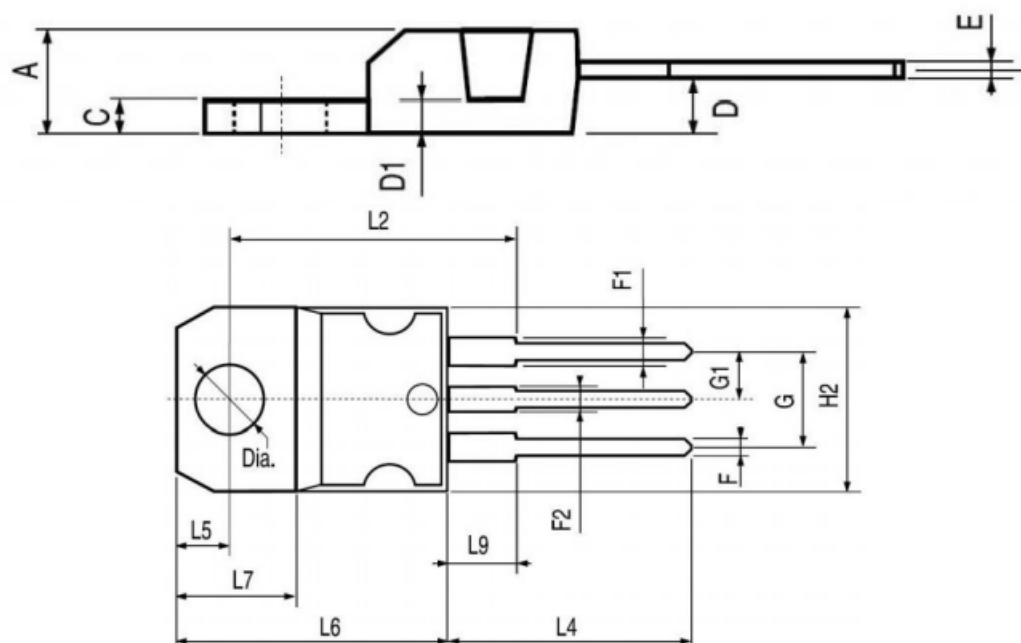
Unit : mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.800	0.053	0.071
A1	0.050	0.250	0.004	0.010
A2	1.250	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
C	0.170	0.250	0.006	0.010
D	4.780	5.000	0.185	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

TO-220

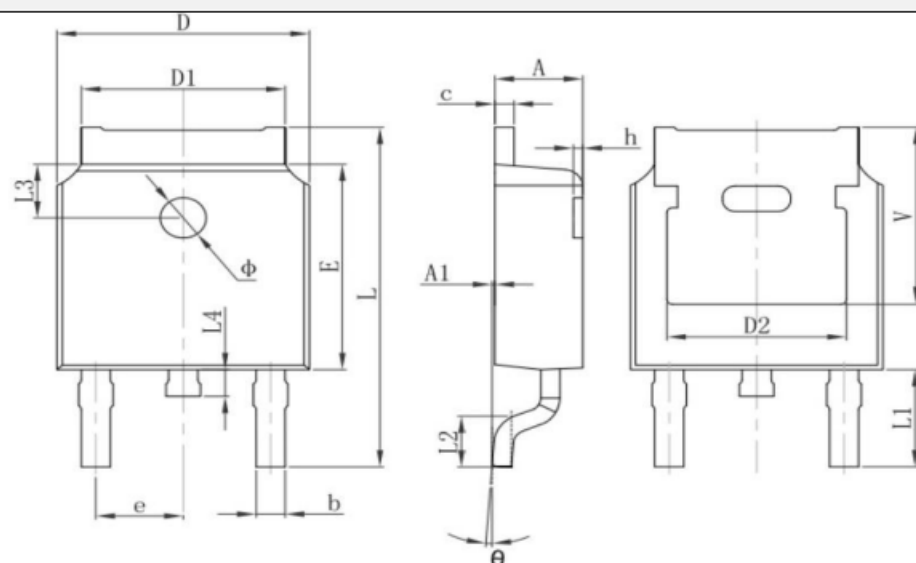
Unit : mm



Symbol	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.70	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151

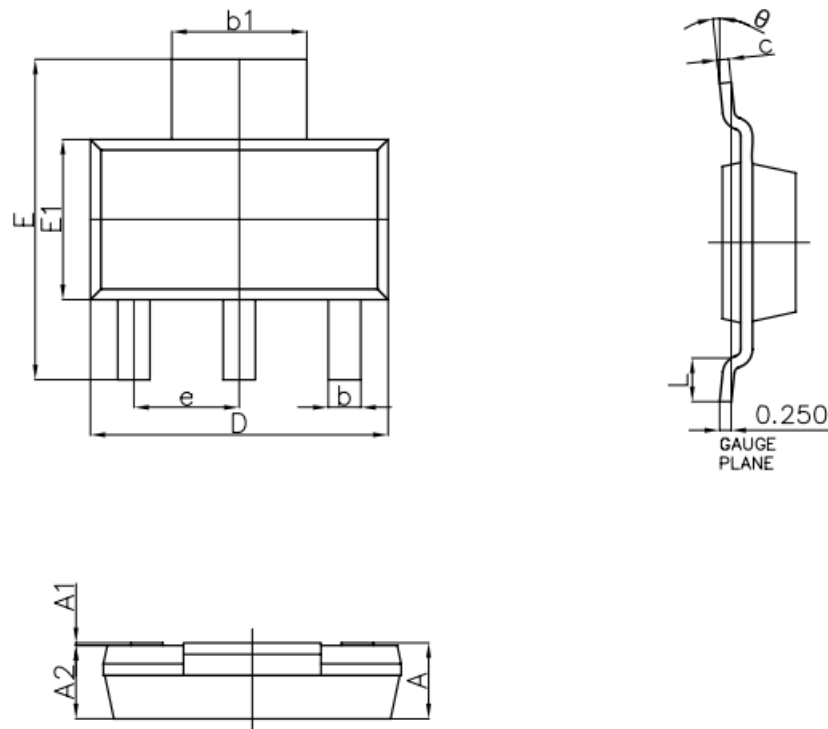
TO-252-2

Unit : mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
phi	1.100	1.300	0.043	0.051
theta	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	

SOT-223



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	---	1.800	---	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091(BSC)	
L	0.750	---	0.030	---
θ	0°	10°	0°	10°

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