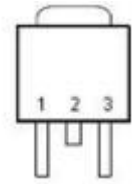


**DESCRIPTION**

This monolithic integrated circuit is an adjustable 3-terminal positive voltage regulator designed to supply more than 1.5A of load current with an output voltage adjustable over a 1.2 to 37V. It employs internal current limiting, thermal shut-down and safe area compensation.



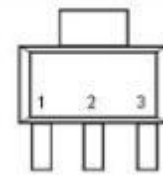
TO-220-3L



TO-252

**FEATURE**

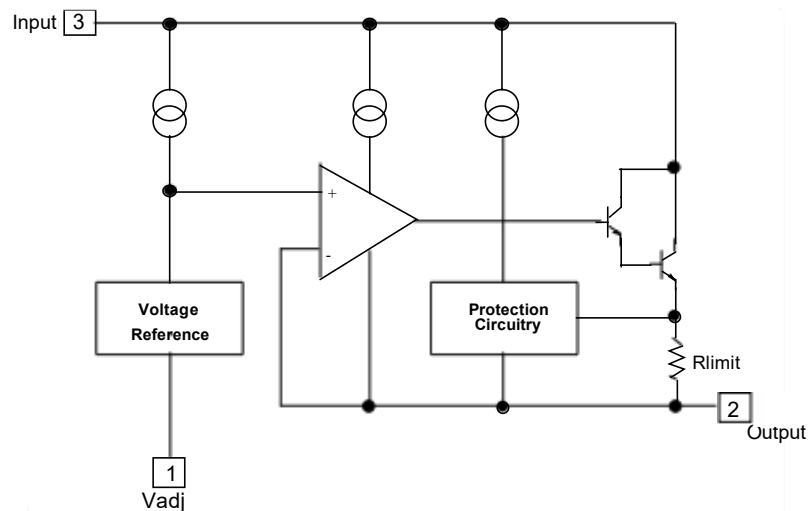
- ⌘ Internal thermal overload protection
- ⌘ Internal short circuit current limiting
- ⌘ Output transistor safe operating area compensation



SOT-223

- 1. Adj
- 2. Output
- 3. Input

**Internal Block Diagram**



**Absolute Maximum Ratings**

Symbol	Parameter		Value	Unit
$V_I-V_O$	Input-Output Voltage Differential		40	V
$T_{LEAD}$	Lead Temperature		230	°C
$P_D$	Power Dissipation	TO-220	Internally limited	W
		TO-252	2	
		SOT-223	1	
$T_J$	Operating Junction Temperature Range		-40°~+125°	°C
$T_{stg}$	Storage Temperature Range		-55~125	
$\Delta V_O/\Delta T$	Temperature Coefficient of Output Voltage		±0.02	%/°C

**ELECTRICAL CHARACTERISTICS**

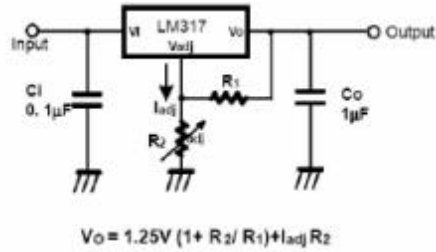
( $V_O-V_I=5V, I_O=0.5A, 0^\circ C \leq T_J \leq +125^\circ C, I_{MAX}=1.5A, P_{DMAX}=20W$ , unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Line Regulation(note1)	$R_{line}$	$T_A=25^\circ C$ $3V \leq V_I-V_O \leq 40V$		0.01	0.04	%V
		$3V \leq V_I-V_O \leq 40V$		0.02	0.07	
Load Regulation(note1)	$R_{load}$	$T_A=25^\circ C, 10mA \leq I_O \leq I_{MAX}$ $V_O < 5V$ $V_O \geq 5V$		18 0.4	25 0.5	mV
		$10mA \leq I_O \leq I_{MAX}$ $V_O < 5V$ $V_O \geq 5V$		40 0.8	70 1.5	% $V_O$
Adjustable Pin Current	$I_{ADJ}$	-		46	100	$\mu A$
Adjustable Pin Current Change	$\Delta I_{ADJ}$	$3V \leq V_I-V_O \leq 40V$ $10mA \leq I_O \leq I_{MAX}, P_D \leq P_{MAX}$		2.0	5	
Reference Voltage	$V_{REF}$	$3V \leq V_I-V_O \leq 40V$ $10mA \leq I_O \leq I_{MAX}, P_D \leq P_{MAX}$	1.20	1.25	1.30	V
Temperature Stability	$ST_T$	-		0.7		%/ $V_O$
Minimum Load Current to Maintain Regulation	$I_{L(MIN)}$	$V_I-V_O=40V$		3.5	12	mA
Maximum Output Current	$I_{O(MAX)}$	$V_I-V_O \leq 15V, P_D \leq P_{MAX}$ $V_I-V_O \leq 40V, P_D \leq P_{MAX}$ $T_A=25^\circ C$	1.0	2.2 0.3		A
RMS Noise,% of $V_{OUT}$	$e_N$	$T_A=25^\circ C, 10Hz \leq f \leq 10KHz$		0.003	0.01	%/ $V_O$
Ripple Rejection	RR	$V_O=10V, f=120Hz$ without $C_{ADJ}$ $C_{ADJ}=10\mu F$ (note2)	66	60 75		dB
Long-Term Stability, $T_J=T_{HIGH}$	ST	$T_A=25^\circ C$ for end point measurements, 1000 HR		0.3	1	%
Thermal Resistance Junction to case	$R_{\theta JC}$	-		25.2		°C/W

**Notes:**

1. Load and line regulation are specified at constant junction temperature. Change in  $V_D$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.( $P_{MAX}=20W$ )
2.  $C_{ADJ}$  - when used, is connected between the adjustment pin and ground.

## Typical Application

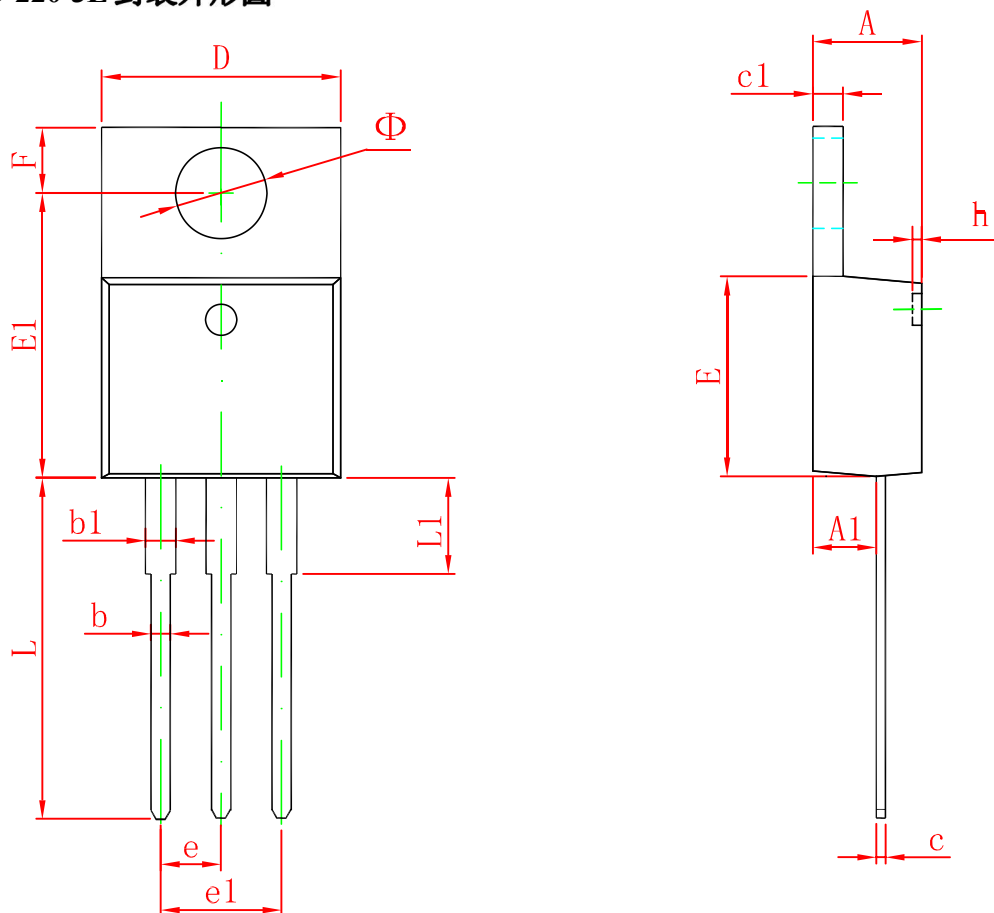


$C_i$  is required when regulator is located an appreciable distance from power supply filter.

$C_o$  is not needed for stability, however, it does improve transient response.

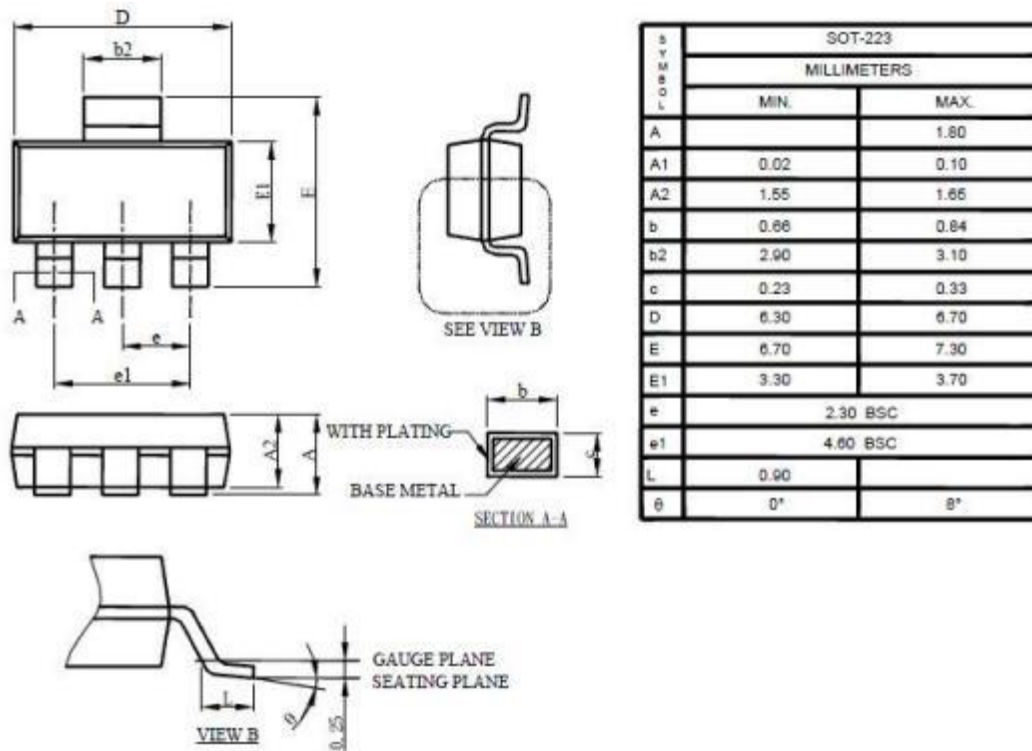
Since  $I_{ADJ}$  is controlled to less than  $100\mu A$ , the error associated with this term is negligible in most applications.

■ TO-220-3L 封装外形图



Symbol	D imensions In Millimeters		D imensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
$\Phi$	3.735	3.935	0.147	0.155

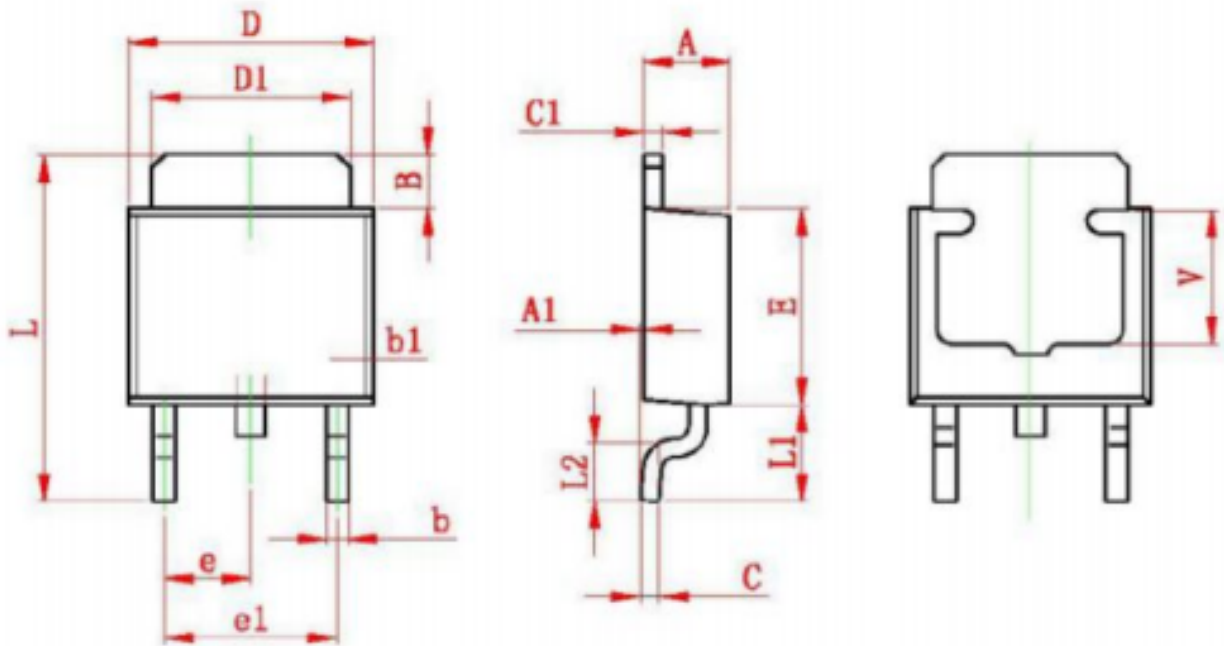
■ SOT223 封装外形图



SOT-223		
MILLIMETERS		
SYMBOL	MIN.	MAX.
A		1.80
A1	0.02	0.10
A2	1.55	1.65
b	0.66	0.84
b2	2.90	3.10
c	0.23	0.33
D	6.30	6.70
E	6.70	7.30
E1	3.30	3.70
e	2.30 BSC	
e1	4.60 BSC	
L	0.90	
$\theta$	0°	8°

- Note:
1. Refer to JEDEC TO-261AA.
  2. Dimension D and E1 are determined at the outermost extremes of the plastic body exclusive of mold flash, tie bar burrs, gate burrs, and interlead flash, but including any mismatch between the top and bottom of the plastic body.
  3. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

■ TO-252 封装外形图



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	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP		0.091 TYP	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
V	3.80 REF		0.150 REF	

## Ordering information

Order code	Package	Baseqty	Deliverymode	Marking
UMW LM317DCYR	SOT-223	2500	Tape and reel	LM317
UMW LM317G	SOT-223	2500	Tape and reel	LM317G
UMW LM317MDT	TO-252	2500	Tape and reel	LM317M
UMW LM317T	TO-220	1000	Tube and box	LM317T

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