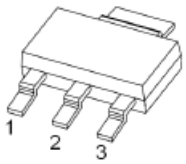
SOT-223 Plastic-Encapsulate Voltage Regulator

Three-terminal positive voltage regulator

Features:

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

SOT-223



1. Adj
2. Output
3. Input

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.

MARKING

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_I-V_O	Input-Output Voltage Differential	40	V
T_{LEAD}	Lead Temperature	230	℃
P_D	Power Dissipation	Internally limited	W
T_J	Operating Junction Temperature Range	-40~+125	℃
T_{stg}	Storage Temperature Range	-55~+150	
ΔV_O /ΔT	Temperature Coefficient of Output Voltage	±0.02	%/℃

Thermal Metric

Thermal Metric	Symbol	LM317	Unit
		SOT-223	
Junction-to-ambient thermal resistance	$R_{\Theta JA}$	100.0	°C/W
Junction-to-board thermal resistance	$R_{\Theta JC}$	5.0	°C/W
Continuous power dissipation for reference	$P_{D\ Ref}$	1.00	W

ELECTRICAL CHARACTERISTICS

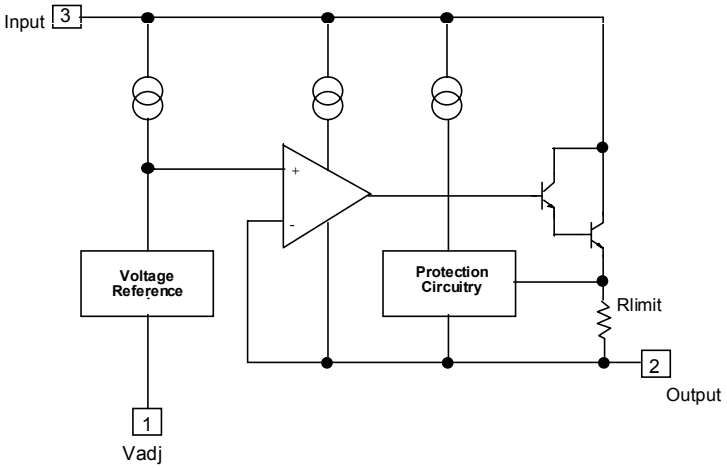
(V_O-V_I=5V,I_O=0.5A,0℃≤T_J≤+125℃,I_{MAX}=1.5A,P_{MAX}=20W,unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Line Regulation(note1)	R_{line}	T_A=25℃ 3V≤V_I-V_O≤40V		0.01	0.04	%/V
		3V≤V_I-V_O≤40V		0.02	0.07	
Load Regulation(note1)	R_{load}	T_A=25℃, 10mA≤I_O≤I_{MAX} V_O<5V V_O⩾5V		18 0.4	25 0.5	mV%/ V_O
		10mA≤I_O≤I_{MAX} V_O<5V V_O≥5V		40 0.8	70 1.5	
Adjustable Pin Current	I_{ADJ}	-		46	100	μA
Adjustable Pin Current Change	ΔI_{ADJ}	3V≤V_I-V_O≤40V 10mA≤I_O≤I_{MAX}, P_D≤P_{MAX}		2.0	5	
Reference Voltage	V_{REF}	3V≤V_{IN}-V_O≤40V 10mA≤I_O≤I_{MAX}, P_D≤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≤15V, P_D≤P_{MAX} V_I-V_O≤40V, P_D≤P_{MAX} T_A=25℃	1.0	2.2 0.3		A
RMS Noise,% of V_{OUT}	e_N	T_A=25℃,10Hz≤f≤10kHz		0.003	0.01	%/ V_O
Ripple Rejection	RR	V_O=10V, f =120Hz without C_{ADJ} C_{ADJ}=10μF(note2)	66	60 75		dB
Long-Term Stability,T_J=T_{HIGH}	ST	T_A=25℃ for end point mesasurements,1000HR		0.3	1	%

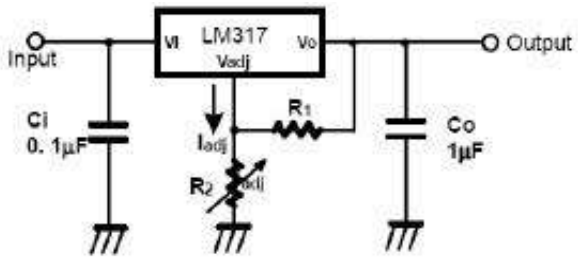
Notes:

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.

Internal Block Diagram



Typical Application



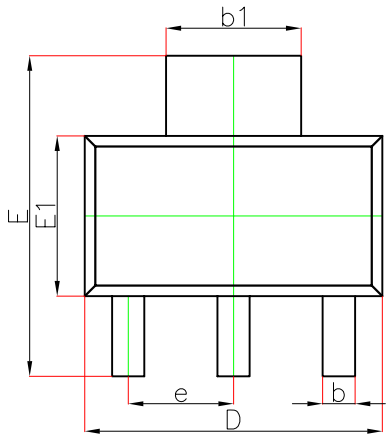
$V_O = 1.25V\,(1+ R_2/ R_1)+I_{adj}\,R_2$

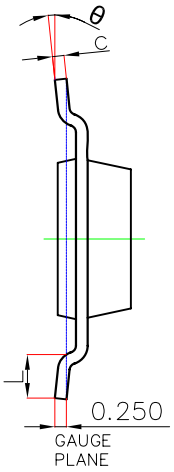
C_i is required when regulator is located an appreciable distance from power supply filter.

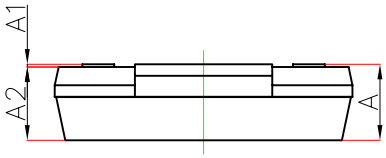
C_o is not needed for stability , however, it does improve transient response.

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

SOT-223 Package Outline Dimensions

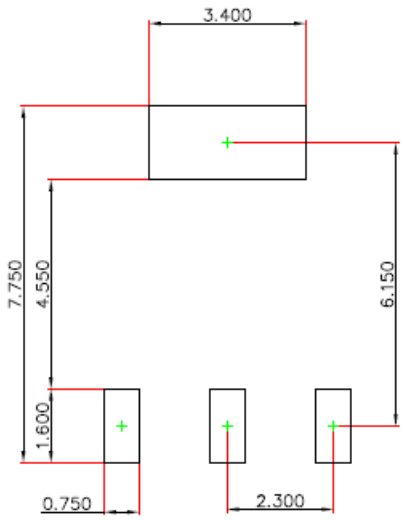






Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	——	1.800	——	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130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

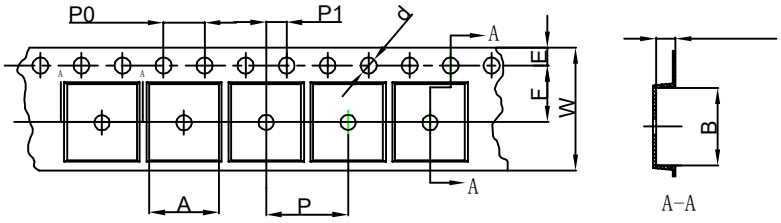
SOT-223 Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.050mm.
3.The pad layout is for reference purposes only.

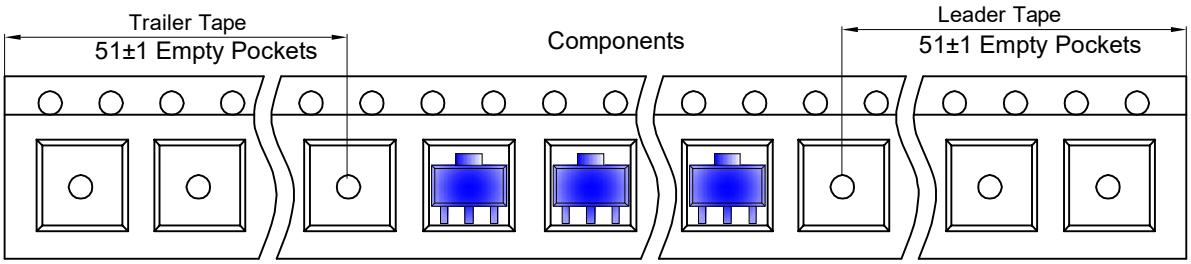
SOT-223 Tape and Reel

SOT-223 Embossed Carrier Tape

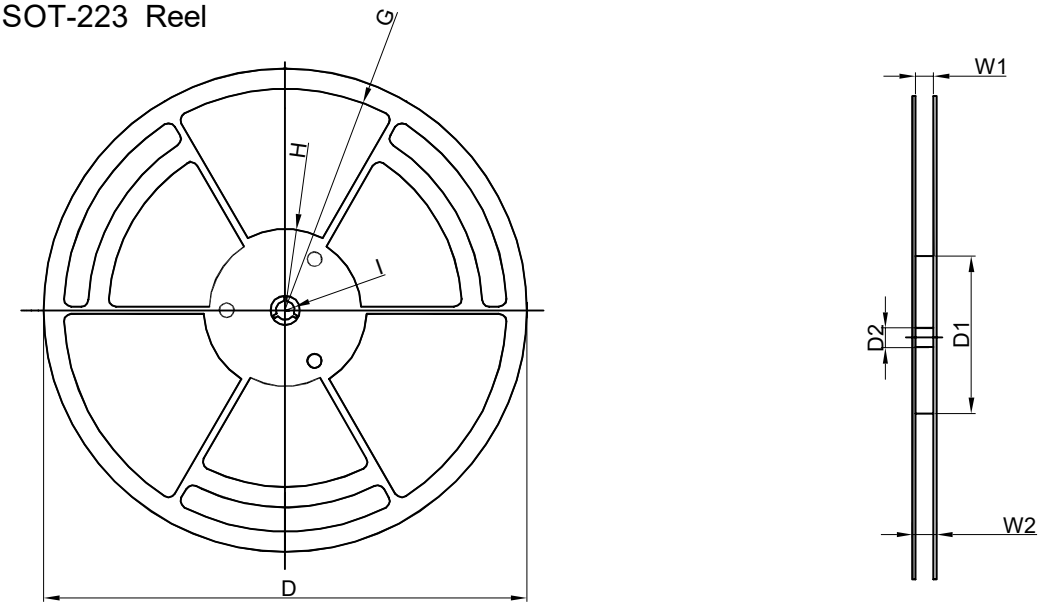


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-223	6.765	7.335	1.88	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

SOT-223 Tape Leader and Trailer



SOT-223 Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
13"Dia	Ø330.00	100.00	13.00	R151.00	R56.00	R6.50	12.40	17.60

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
2,500 pcs	13 inch	2,500 pcs	336×336×48	20,000 pcs	445×355×365	