Ultra low Power Consumption Low Dropout CMOS Voltage Regulators

■ General Description

The LN1121 series are precise, low power consumption, high voltage; positive voltage regulators manufactured using CMOS and laser trimming technologies. The series provides large currents with a significantly small dropout voltage. The LN1121 consists of a current limiter circuit, a driver transistor, a precision reference voltage and an error correction circuit. The series is compatible with low ESR ceramic capacitors. The current limiter's feedback circuit also operates as a short protect for the output current limiter and the output pin. Output voltage can be set internally by laser trimming technologies. It is selectable in 100mV increments within a range of 1.2V to 5.0V. SOT-89-3L, SOT-23-3L, SOT-353 and SOT-23-3B packages are available.

■ Features

Output Voltage Range: 1.2V to 5.0V (selectable in 100mV steps)
Highly Accurate: 2%
Dropout Voltage: 160mV @ 100mA (3.0V type)
Low Power Consumption: 1 A (TYP.)
Maximum Output Current : 250mA (Vin ≥ Vout+1V)
Internal protector: current limiter and short protector
Small packages

■ Package

SOT-89-3L
SOT-353/SC70-5
SOT-23-3L,SOT-23-3B

■ Applications

Battery powered equipment
Reference voltage sources
Cameras, Video cameras
Communication tools

■ Ordering Information

LN1121P

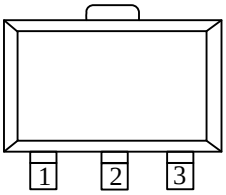
Designator	Symbol	Description	Designator	Symbol	Description
	Integer	Output Voltage: e.g. =3, =0 ⇨ 3.0V		K	SOT353(SC70-5)
				V	SOT-23-3B
	2	Accuracy: within ± 2%		R	Embossed Tape: Standard Feed
	M	SOT-23-3L		L	Embossed Tape: Reverse Feed
	P	SOT89-3L			

■ Pin Assignment

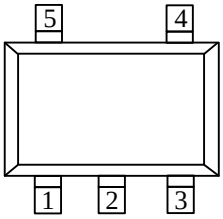
Pin Number			Pin Name	Function
SOT-353/SC70-5	SOT-23-3L/B	SOT-89-3L		
2	3	2	VIN	Supply Power
4	1	1	VSS	Ground
1,3	-	-	NC	No Connection
5	2	3	VOUT	Voltage Output

■ Marking Rule

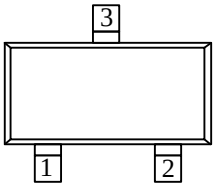
SOT-89-3L,SOT-353,SOT-23-3L/B



SOT-89-3L
(Top View)



SOT-353/SC70-5



SOT-23-3L/SOT-23-3B
(Top View)

Represents the product name

Symbol	Product Name
6/9/S	LN1121P

Represents the range of output voltage

Output Voltage Range V

Symbol	Output Voltage V			Symbol	Output Voltage V		
D	1.4	4.4	-	Y	2.9	5.9	-
E	1.5	4.5	-	Z	3	6.0	-

Represents the assembly lot no.

0~9, A~Z repeated (G, I, J, O, Q, W excepted)

■ Function Block Diagram

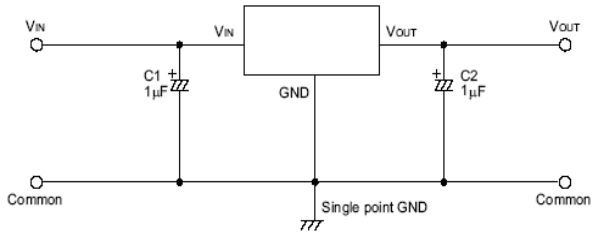
■ Absolute Maximum Ratings

Parameter	Symbol	Maximum Rating		Unit
Input Voltage	V_{IN}	V_{SS}-0.3 V_{SS}+6		V
Output Current	V_{OUT}	V_{SS}-0.3 V_{IN}+0.3		
Power Dissipation	P_D	SOT-23-3L, SOT-23-3LB	250	mW
		SOT353	250	
		SOT-89-3L	500	
Operating Ambient Temperature	Topr	-40 +85		°C
Storage Temperature	Tstg	-40 +125		

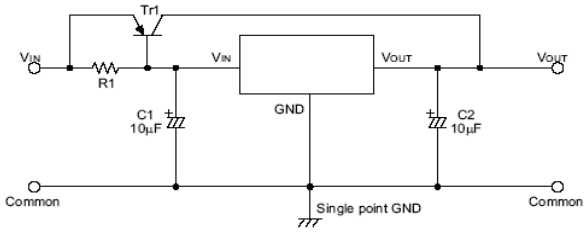
Caution: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

■ Typical Application Circuit

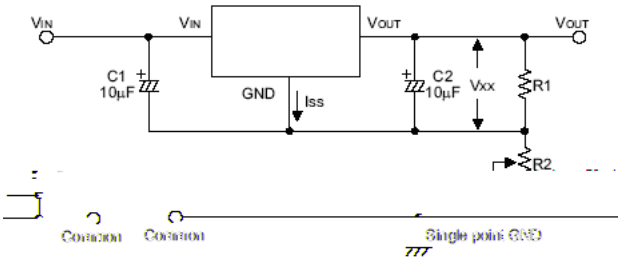
1 Basic circuit



2 High output current positive voltage regulator

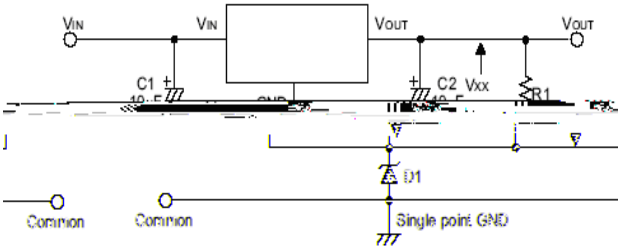


3 Circuit for increasing output voltage



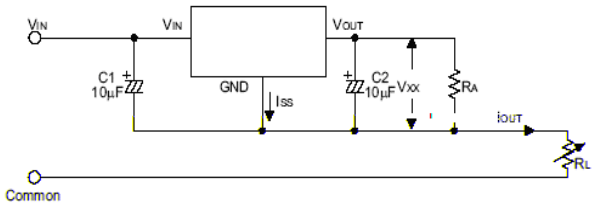
$$V_{OUT} = V_{XX}\left(1 + \frac{R2}{R1}\right) + I_{SS}\,R2$$

4 Circuit for increasing output voltage



$$V_{OUT} = V_{XX} + V_{D1}$$

5 Constant current regulator



$$I_{OUT} = \frac{V_{XX}}{R_A} + I_{SS}$$

6 Dual supply



Caution The above connection diagram and constant will not guarantee successful operation. Perform thorough evaluation using the actual application to set the constant.

■ Application Conditions

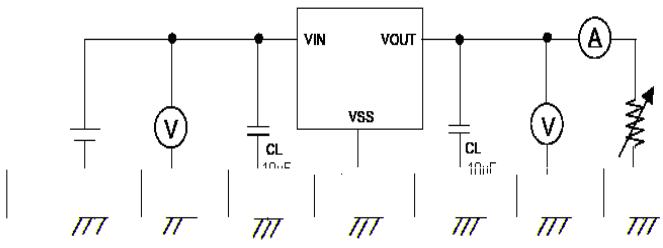
Input capacitor (CIN): 1.0μF or more

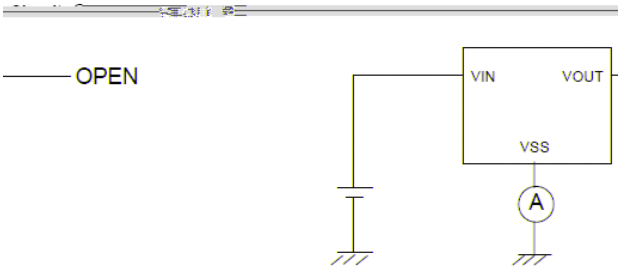
Output capacitor (CL): .01μF or more (tantalum capacitor)

Caution A general series regulator may oscillate, depending on the external components selected. Check that no oscillation occurs with the application using the above capacitor.

■ Test Circuits

Circuit ①



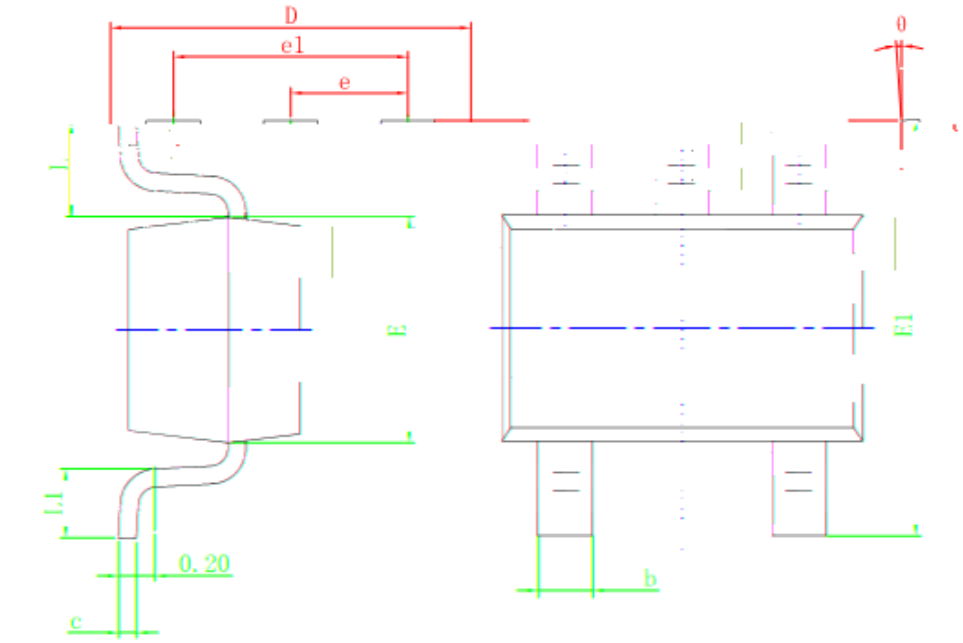


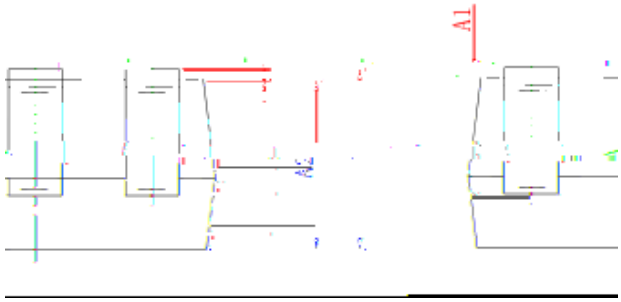
■ Electrical Characteristics

Item	Symbol	Condition	

■ Typical Performance Characteristics

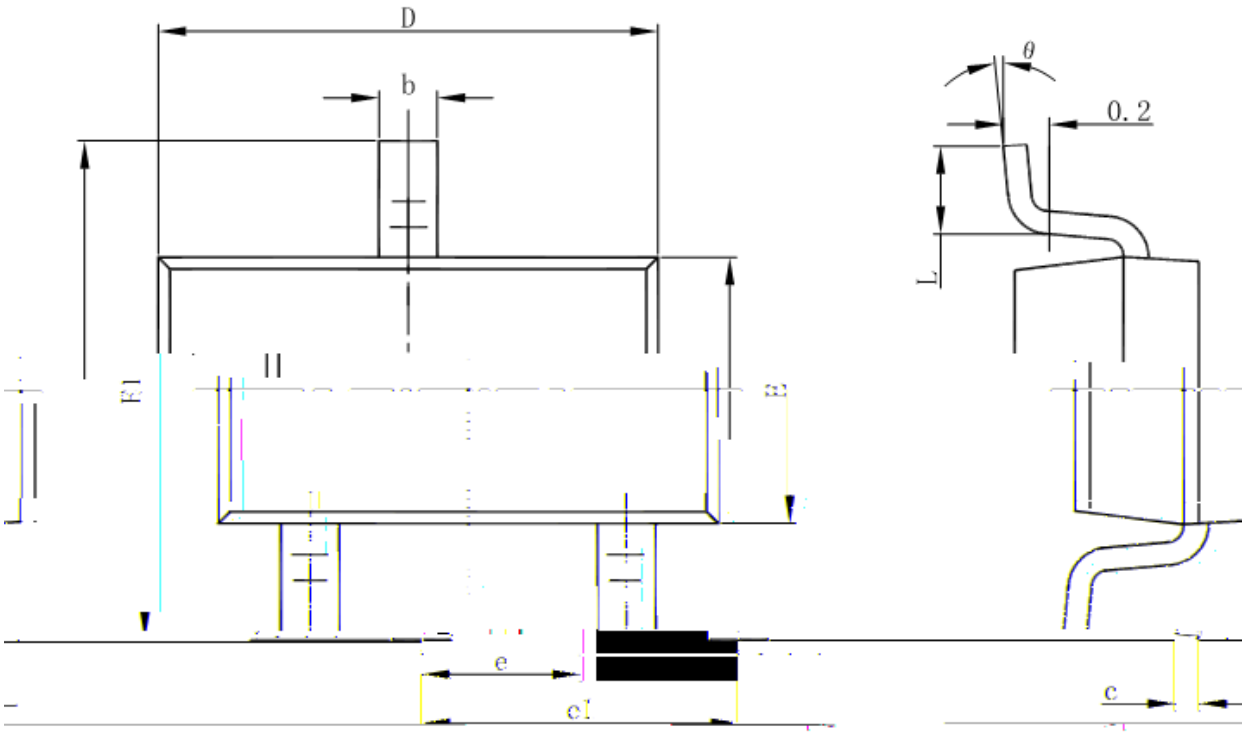
SOT-353/SC70-5





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

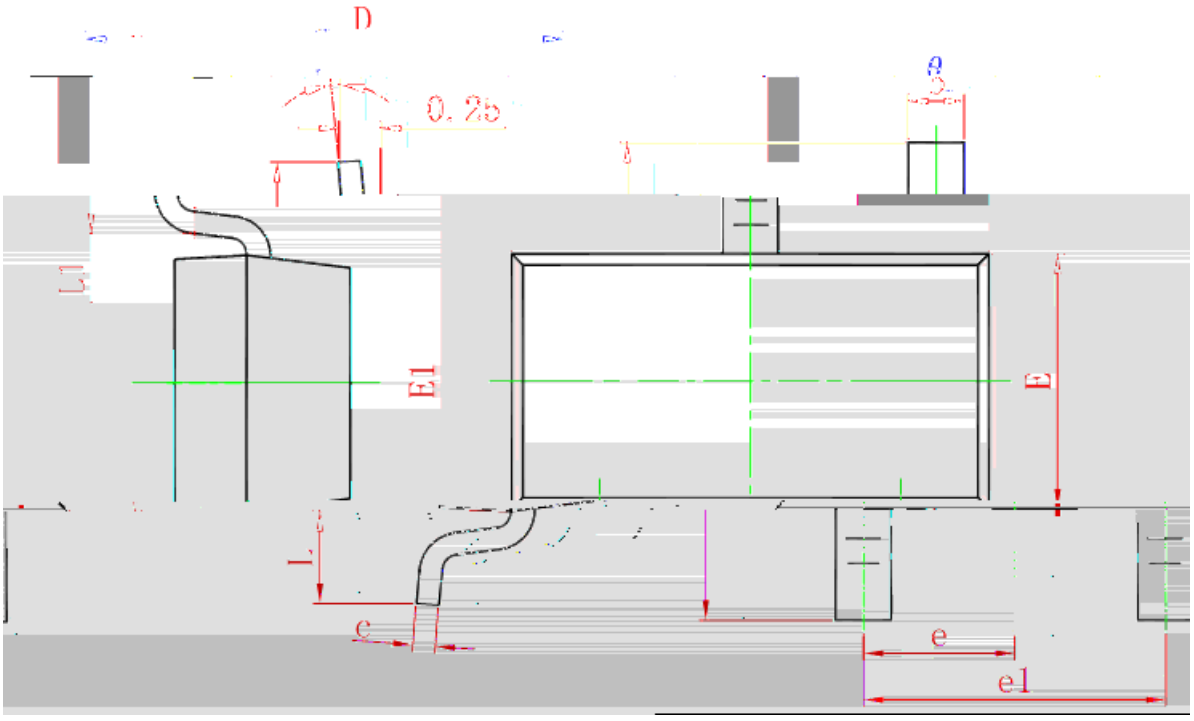
SOT-23-3L

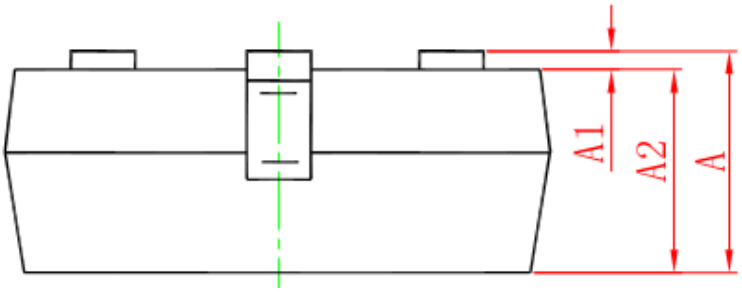




	0.041	0.049	A	1.050	1.250
	0.000	0.004	A1	0.000	0.100
	0.041	0.045	A2	1.050	1.150
	0.012	0.020	b	0.300	0.500
	0.098	0.102	c	0.080	0.150
	0.110	0.118	D	2.820	2.980
	0.059	0.067	E	1.500	1.700
	0.110	0.118	E1	2.650	2.950
	0.037		e	0.950	
	0.074		e1	1.800	2.000
	0.012	0.024	L	0.300	0.600
	0°	8°	θ	0°	8°

SOT-23-3B





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.300	0.500	0.012	0.020
L1	0.525 REF.		0.021 REF.	
θ	0°	8°	0°	8°