DESCRIPTION

The A7501 Series is a CMOS VFM-control step-up switching regulator that mainly consists of a reference voltage source, an oscillator, and a comparator.

Enabling products with a low ripple over a wide range, high efficiency, and high output current. Products with a fixed duty ratio of 75 %(Lower Output Voltage) or 88%(Higher Output Voltage) are also available. With the A7501 Series, a step-up switching regulator can be configured by using an external coil, capacitor, and diode. A protection circuit turns off the built-in MOSFET when the voltage at the CONT pin exceeds the limit to prevent it from being damaged. This feature, along with the mini package and low current consumption, makes the A7501 Series ideal for applications such as the power supply unit of portable equipment.

A7501 is available in SOT-89-3 and SOT-23 packages.

ORDER INFORMATION

Package Type	Part Number	
SOT-89-3	K3	A7501K3R-XX
		A7501K3VR-XX
SOT-23	E3	A7501E3R-XX
		A7501E3VR-XX
Note	XX: Output Voltage, 27=2.7V, 30=3.0V, R: Tape & Reel V: Halogen free Package	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

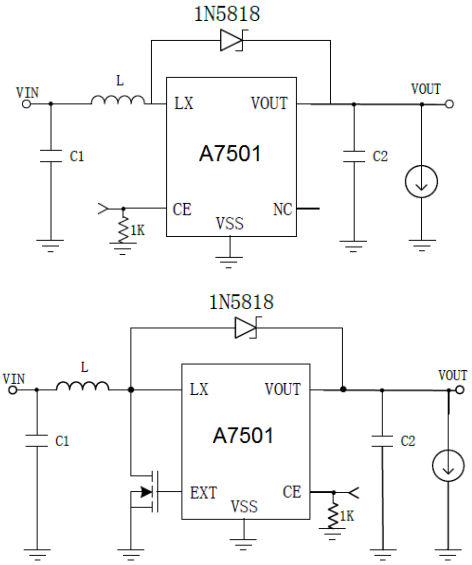
FEATURES

- Low voltage operation: Start up at 0.9V min (I_{OUT}=1mA) guaranteed
- Low input current: During maximum operation: 18μA (V_{OUT}=3.3V, typ.)
- Duty ratio: 77% Built-in fixed-type PFM controller
- External parts: Coil, capacitor, and diode
- Output voltage: Settable to between 2.5V to 5.5V , accuracy of 2%
- Available in SOT-89-3 and SOT-23 Packages

APPLICATION

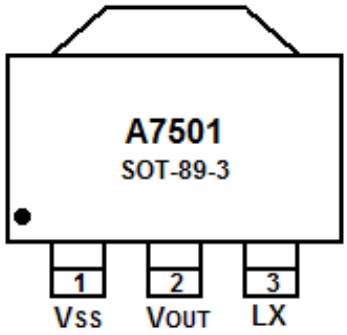
- Power supply for portable equipment such as digital cameras, electronic notebooks, and PDA
- Power supply for audio equipment such as portable CD/MD players
- Constant voltage power supply for cameras, video equipment and communications equipment
- Power supply for microcomputers

TYPICAL APPLICATION CIRCUIT

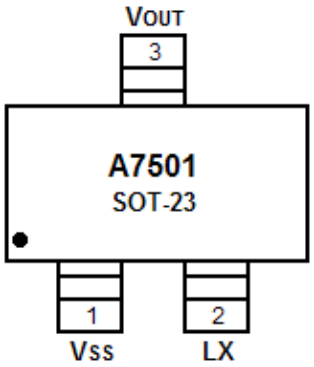


Components Normal Value: C1=10uF, C2=47uF, L=22uH, D1 1N5818

PIN DESCRIPTION



Top View



Top View

Pin #		Symbol	Function
SOT89-3	SOT-23		
1	1	V_{SS}	Ground
2	3	V_{OUT}	Output
3	2	LX	External Coil Connection

ABSOLUTE MAXIMUM RATINGS

V_{DD}, Input Voltage		V_{SS} -0.3V ~ V_{SS}+6.5V
V_{OUT}, Output Voltage		V_{SS}-0.3V ~ V_{SS}+6.5V
V_{CONT}, Output Voltage		V_{SS}-0.3V ~ V_{SS}+6.5V
I_{LX}, Output Current		1000mA
P_D, Power Dissipation	SOT-89-3	500mW
	SOT-23	150mW
T_{OPR}, Operating Ambient Temperature		-40℃ ~ + 80℃
T_{STG}, Storage Ambient Temperature		-40℃ ~ + 125℃

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

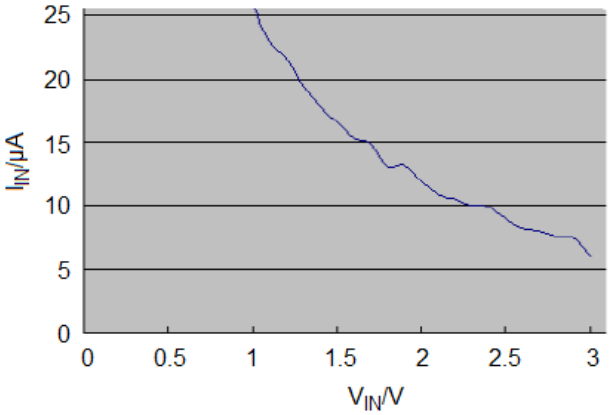
T_A=25℃, V_{IN}=1.5V , V_{OUT}=3.3V, unless otherwise noted

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Test circuit
Output Voltage	V_{OUT}		$V_{OUT(S)}$ ×0.98	$V_{OUT(S)}$	$V_{OUT(S)}$ ×1.02	V	1
Input Voltage	V_{IN}		-	-	6.5		
Operation Start Voltage	V_{ST1}	I_{OUT}=1mA	-	-	1.1		
Active Current	I_{ACT}	V_{OUT} = Output voltage×0.9	-	20	25	uA	2
Input Current Without Load	I_{SS}	V_{OUT} = Output voltage×1.1	-	4.5	7		
Line Regulation	ΔV_{OUT1}	I_{OUT}=30mA	-	0.22	0.4	%	1
Load Regulation	ΔV_{OUT2}	I_{OUT}=10uA~100mA	-	0.35	0.5		
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{\Delta T_A \times V_{OUT}}$	T_A=-40℃ ~ + 85℃	-	±40	-	ppm/℃	
Maximum Oscillation Frequency	fosc	V_{OUT} = Output voltage×0.95	90	120	150	KHz	2
Duty Ratio	Duty	V_{OUT} = Output voltage×0.95	70	77	84	%	
Efficiency	EFFI		-	88	-	%	1

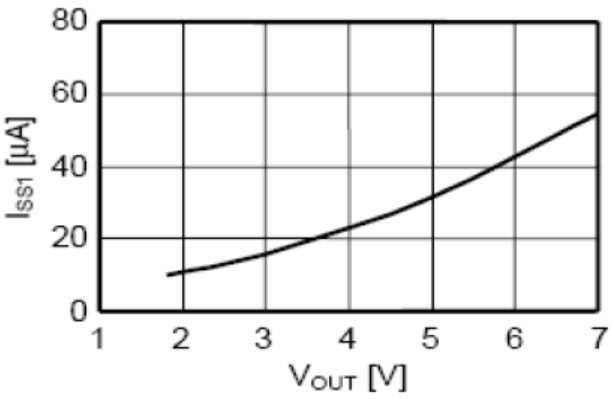
NOTE: $V_{OUT(S)}$ specified above is the set output voltage value, and V_{OUT} is the typical value of the actual output voltage. f_{OSC} is the working frequency.

TYPICAL PERFORMANCE CHARACTERISTICS

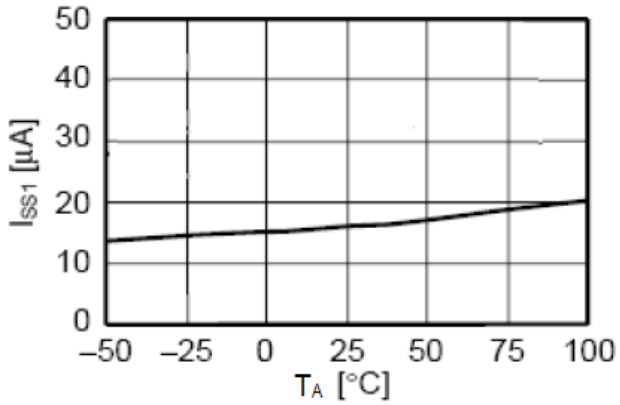
1. Input Voltage vs. Power Supply



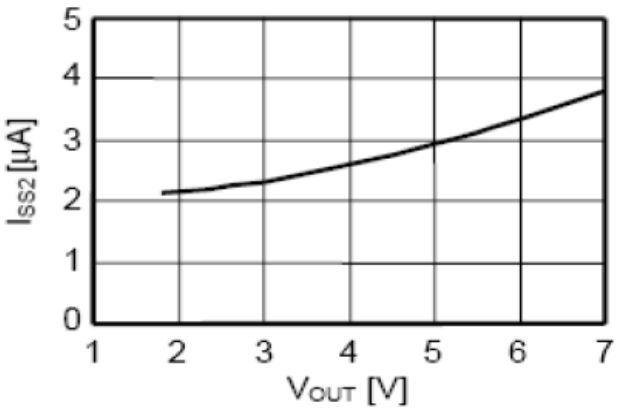
2. Output Voltage vs. Current Consumption(T_A=25°C)



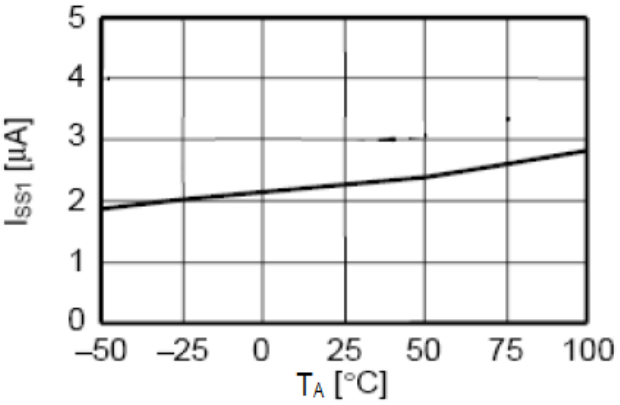
3. Temperature vs. Active Current



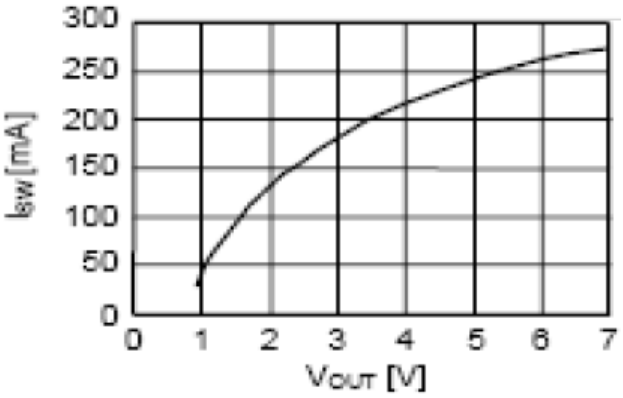
4. Output Voltage vs. Input Current (T_A=25°C)



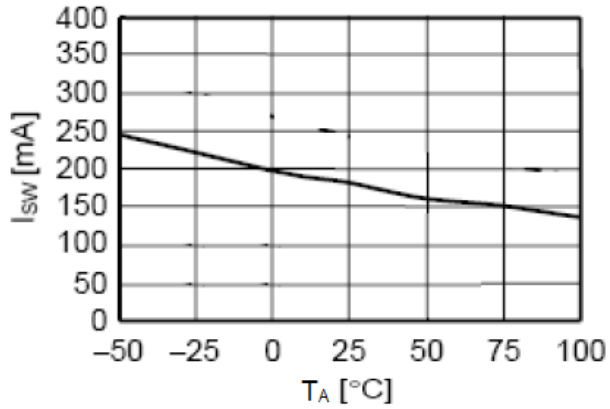
5. Temperature vs. Input Current



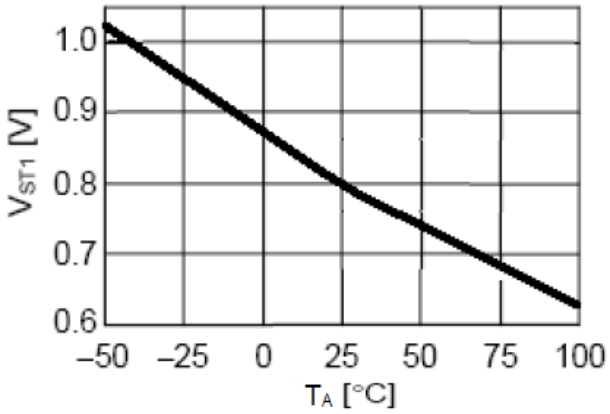
6. Output Voltage vs. Switching Current (T_A=25°C)



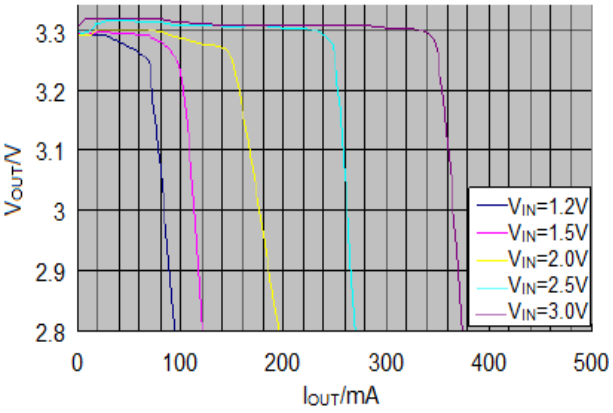
7. Temperature vs. Switching Current



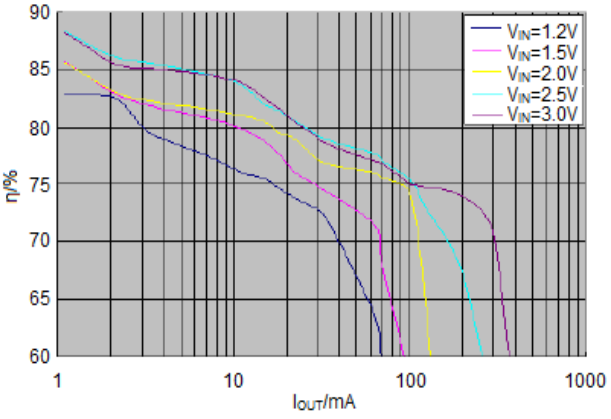
8. Temperature vs. Operation Start Voltage



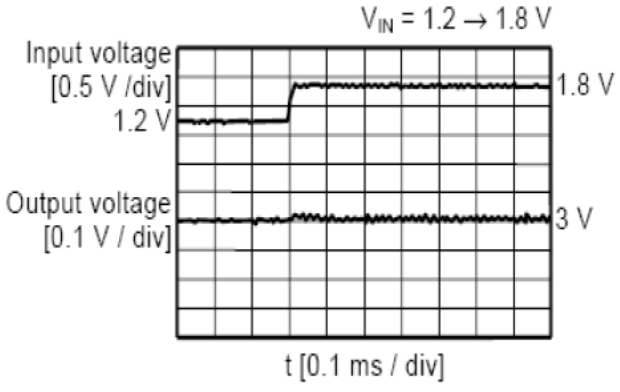
9. Output Current vs. Output Voltage

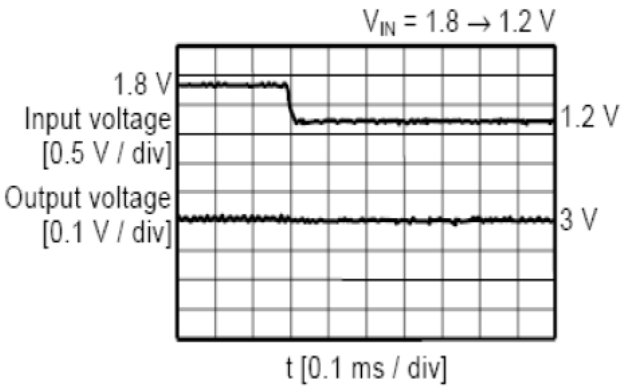


10. Output Current vs. Efficiency

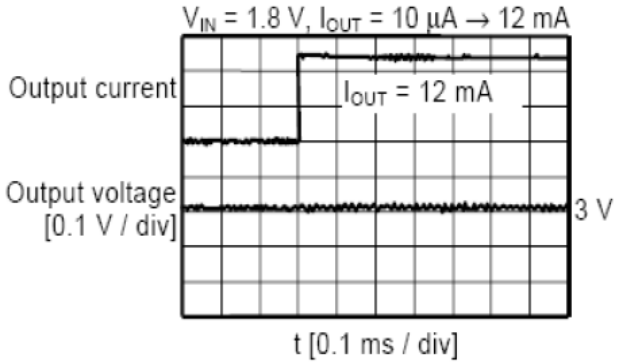


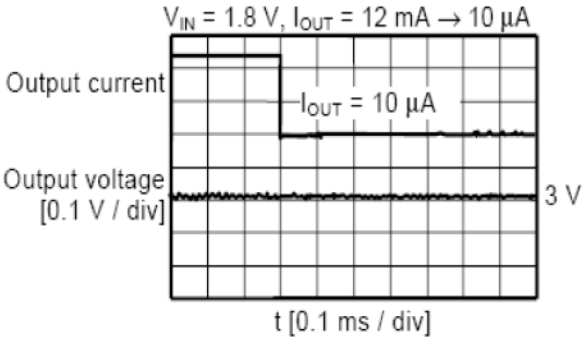
11. Power Supply Voltage Fluctuation (T_A=25℃, R_L=250Ω)



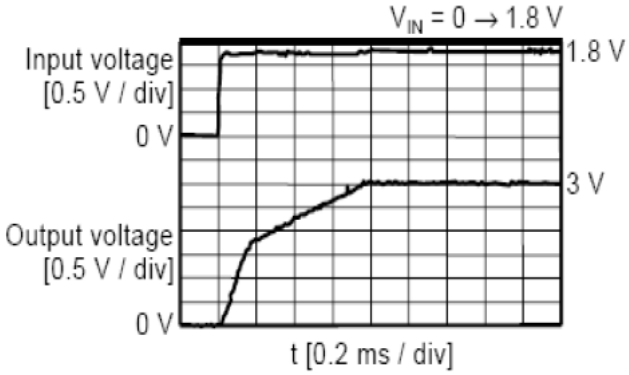


12. Load Current Fluctuation (T_A=25℃)



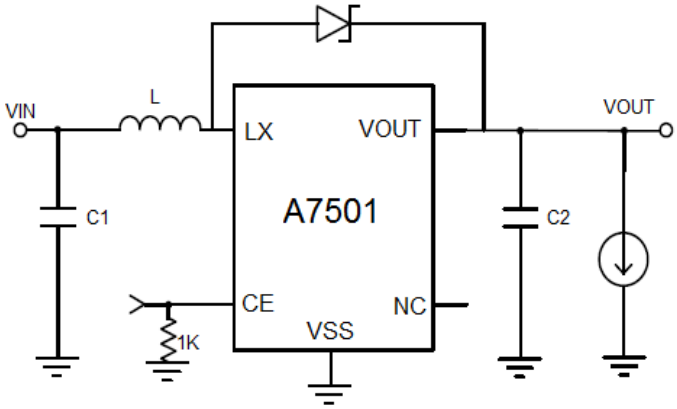


13. 13. Power On

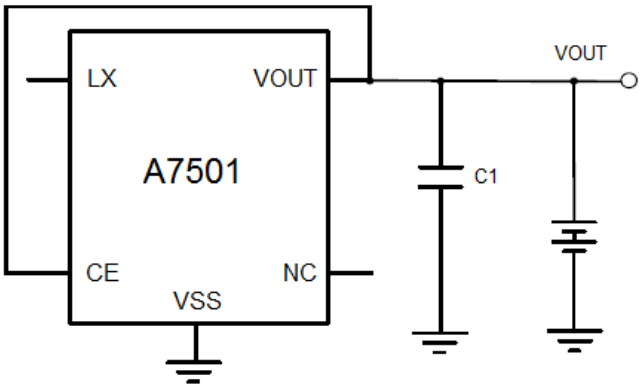


TEST CIRCUITS

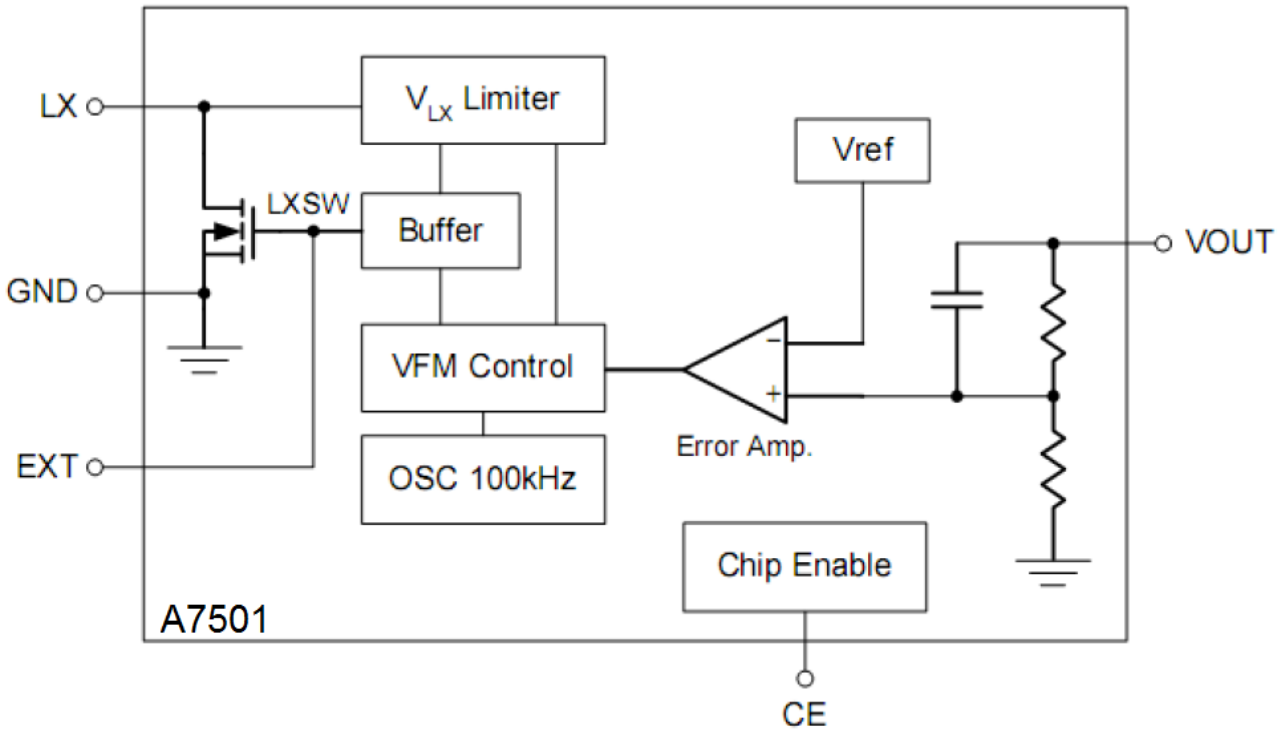
Test circuits 1



Test circuits 2

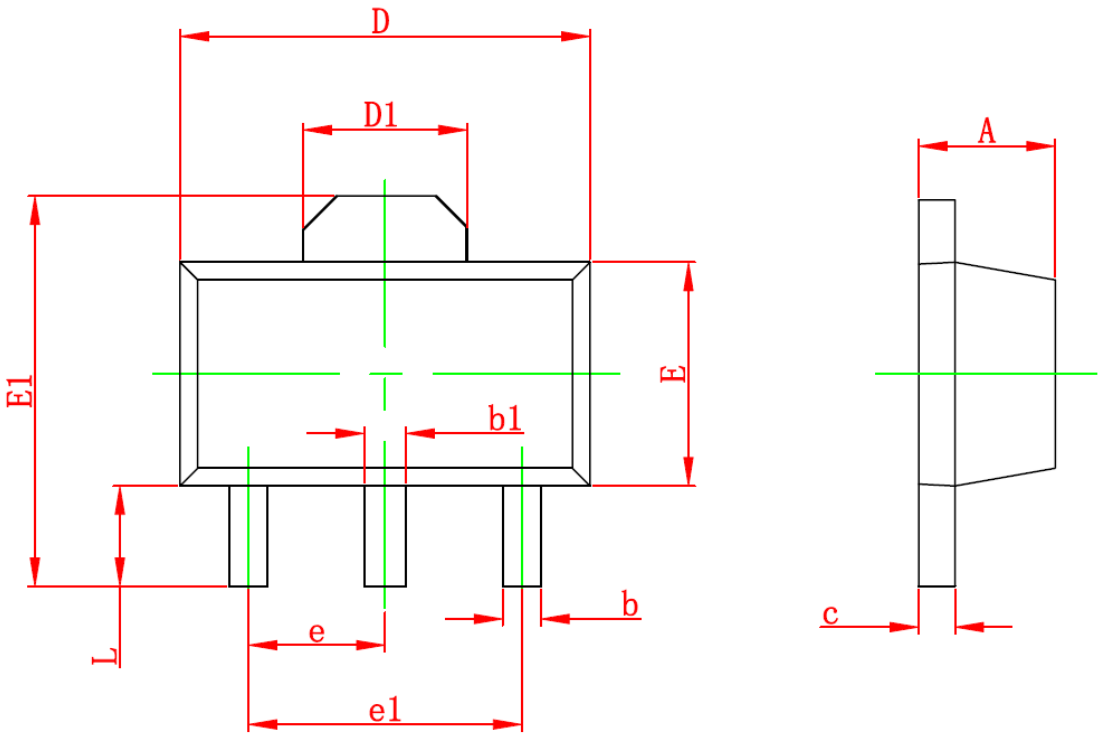


BLOCK DIAGRAM



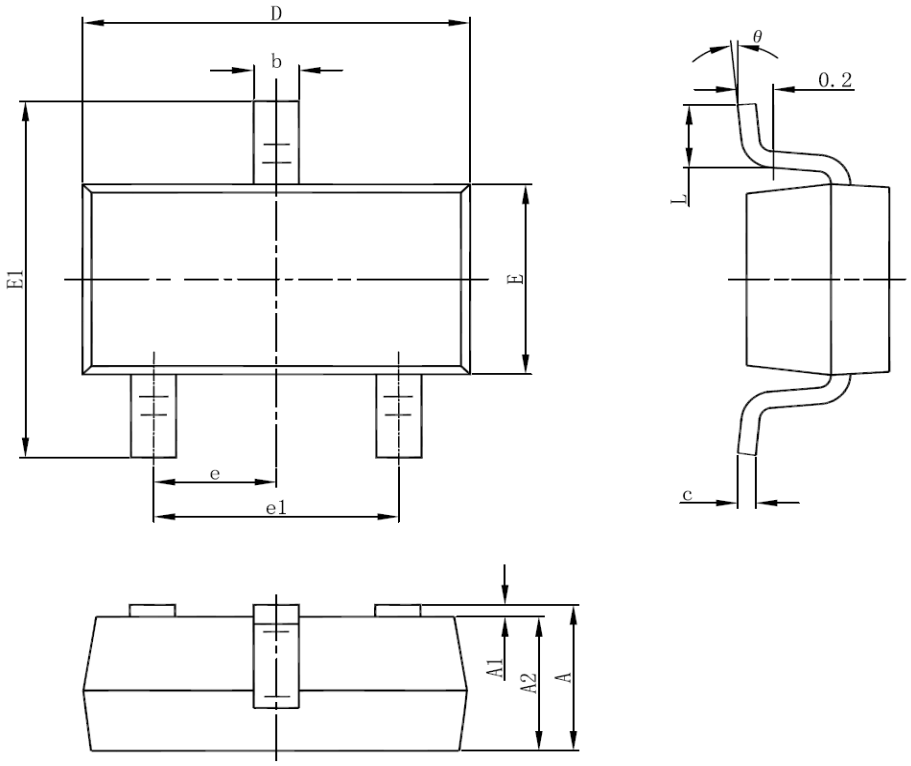
PACKAGE INFORMATION

Dimension in SOT-89-3 (Unit: mm)



Symbol	Min	Max
A	1.400	1.600
b	0.320	0.520
b1	0.400	0.580
c	0.350	0.440
D	4.400	4.600
D1	1.550 REF	
E	2.300	2.600
E1	3.940	4.250
e	1.500 TYP	
e1	3.000 TYP	
L	0.900	1.200

Dimension in SOT-23 Package (Unit: mm)



SYMBOL	MIN	MAX
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

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