

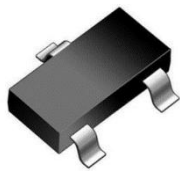
## Current 300mA High Voltage 40V Low Power LDO

### SSP7901

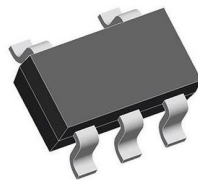
#### General Description

The SSP7901 series is a group of positive voltage output, three-pin regulators, that provide a high current even when the input/output voltage differential is small. Low power consumption and high accuracy is achieved through CMOS and laser trimming technologies.

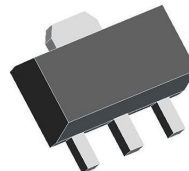
The SSP7901 consists of a high-precision voltage reference, an error amplification circuit, and a current limited output driver. Transient response to load variations have improved in comparison to the existing series.



SOT23-3L



SOR23-5L



SOT89-3L



SOT223

#### Features

- Low Quiescent Current: 1.6 $\mu$ A(type);
- Temperature Stability:  $\pm 50$ ppm/ $^{\circ}$ C ;
- Max input voltage: 40V;
- Output voltage accuracy: tolerance  $\pm 2\%$ ;
- Dropout Voltage: 20mV@Iout=10mA 350mV@Iout=100mA;
- Max Output Current: 300mA;
- Protections Circuits: Current Limiter, Short Circuit, Thermal shutdown
- Packages:SOT23-3L、SOR23-5L、SOT89-3L、SOT223;

#### Applications

- Industrial control
- Consumer electronics
- Battery power equipment
- Wireless communication equipment

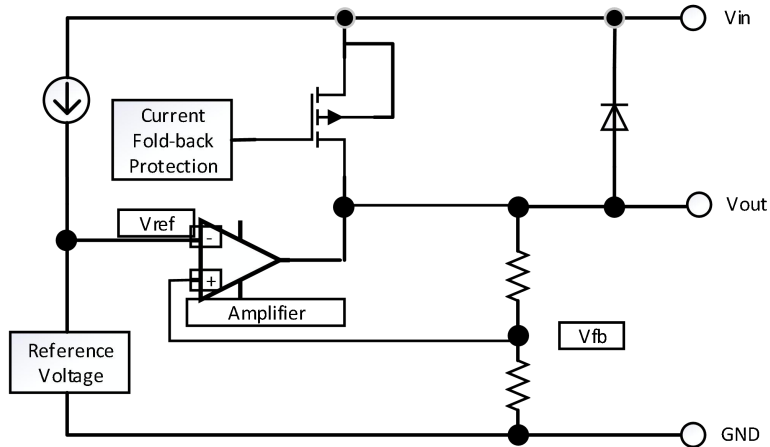
**Order information**

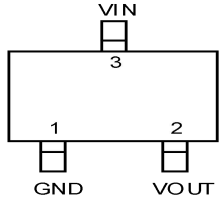
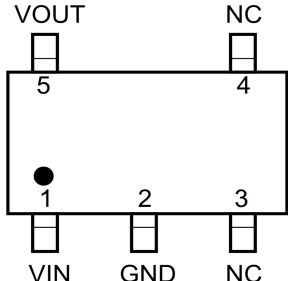
Product model	Package	Manner of packing	Minimum packing quantity
SSP7901PxxMx	SOT23-3L	Reel	3000
SSP7901PxxM5x	SOT23-5L		3000
SSP7901PxxPx	SOT89-3L		1000
SSP7901PxxPBx	SOT89-3L(B)		1000
SSP7901PxxFx	SOT223		2500
SSP7901PxxFBx	SOT223(B)		2500

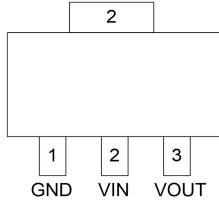
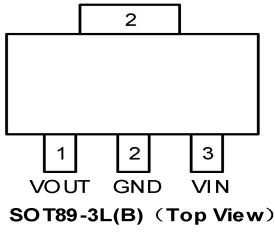
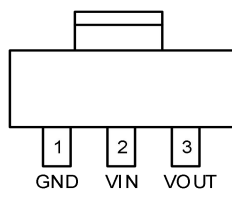
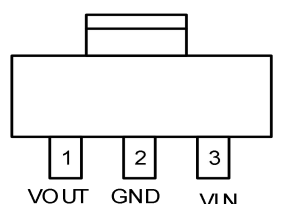
**Selection Guide Table**
**SSP7901P①②③④**

Designator	Symbol	Description
①②	Integer	Output Voltage(3.0V~12.0V)
③	M	Package:SOT23-3L
	M5	Package:SOT23-5L
	P	Package:SOT89-3L
	PB	Package:SOT89-3L(B)
	F	Package:SOT223
	FB	Package:SOT-223(B)
④	R	RoHS / Pb Free
	G	Halogen Free

Note: ①②stands for output voltages. Other voltages can be specially customized.

**Functional Block Diagram**

**PIN CONFIGURATION (Top View)**

<b>SSP7901PxxMx</b>		
NO.	Description	 SOT23-3L (Top View)
1	GND	
2	Vout	
3	Vin	
MARK	01Mxx YWH	
<b>SSP7901PxxM5x</b>		
NO.	Description	 SOT23-5L (Top View)
1	Vin	
2	GND	
3	NC	
4	NC	
5	Vout	
MARK	01M5xx YWH	

<b>SSP7901PxxPx</b>		
NO.	Description	 <p style="text-align: center;">SOT89-3L (Top View)</p>
1	GND	
2	Vin	
3	Vout	
MARK	01Pxx YWH	
<b>SSP7901PxxPBx</b>		
NO.	Description	 <p style="text-align: center;">SOT89-3L(B) (Top View)</p>
1	Vout	
2	GND	
3	Vin	
MARK	01PBxx YWH	
<b>SSP7901PxxFx</b>		
NO.	Description	 <p style="text-align: center;">SOT-223 (Top View)</p>
1	GND	
2	Vin	
3	Vout	
MARK	01Pxx YWH	
<b>SSP7901PxxFBx</b>		
NO.	Description	 <p style="text-align: center;">SOT-223 (B) (Top View)</p>
1	Vout	
2	GND	
3	Vin	
MARK	01FBxx YWH	

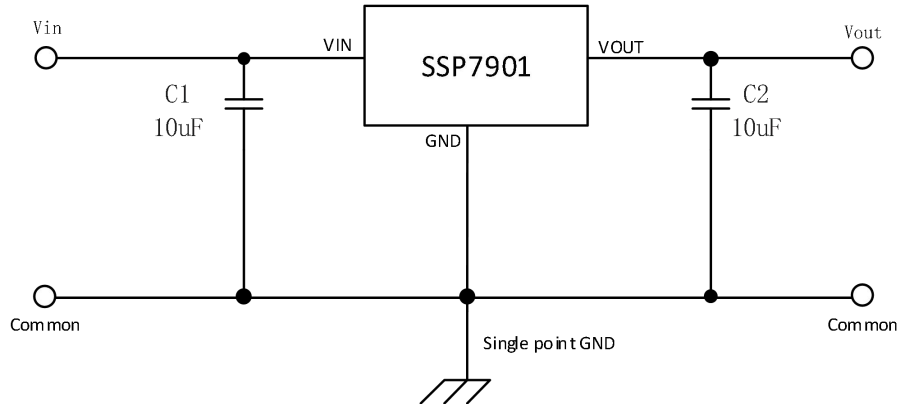
**Note:** *xx:Output Voltage, "33" stands for 3.3V*

*Y: The Year of manufacturing, "2" stands for year 2022;*

*W: The week of manufacturing. "20" stands for week 20;*

*H: Factory Code;*

## Application Circuits



## Absolute Maximum Ratings

(Unless otherwise indicated:  $T_a=25^{\circ}\text{C}$ )

PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Voltage	$V_{IN}$	-0.3	40	V
Output Voltage	$V_{OUT}$	$V_{SS}-0.3$	$V_{IN}+0.3V$	
Output Current	$I_{out}$	-	300	mA
Power Dissipation	$P_D^{(1)}$		SOT23-3 220 SOT23-5 220 SOT-89 650 SOT 223 1000	mW
Operating Ambient Temperature	$T_{opr}$	-40	85	$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	-40	125	
ESD Protection	ESD HBM		2000	V

Note: These are just the limit parameters. Beyond the range specified in the Absolute Maximum Ratings may cause serious damage to the equipment. Long exposure to extreme conditions may affect the reliability of the device.

(1) Increasing the welding area of package is beneficial to increase power consumption

## Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Voltage	$V_{IN}$	-0.3	36	V
Operating Ambient Temperature	$T_{opr}$	-40	85	$^{\circ}\text{C}$

Note: Always use semiconductor devices within their recommended operating condition ranges.

Operation outside these ranges may adversely affect reliability

## Electrical Characteristics

 SSP7901 Series (Unless otherwise indicated:  $T_a=25^{\circ}\text{C}$ )

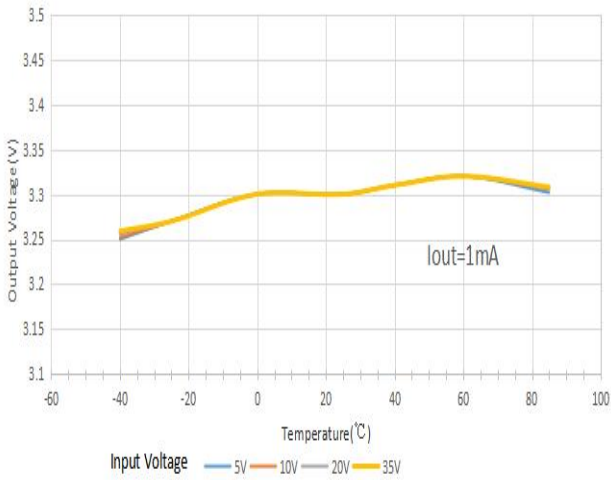
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	
Output Voltage <sup>1</sup>	$V_{OUT(S)}$	$V_{IN}=V_{OUT(S)}+2V, I_{OUT}=10\text{mA}$	$V_{OUT(S)} \times 0.98$	$V_{OUT(S)}$	$V_{OUT(S)} \times 1.02$	V	
Dropout Voltage <sup>2</sup>	$V_{DROP}$	$I_{OUT}=10\text{mA}$	-	20	-	mV	
		$I_{OUT}=100\text{mA}$		350	-		
		$I_{OUT}=200\text{mA}$		770	-		
		$I_{OUT}=300\text{mA}$	-	1380	-		
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$V_{OUT(S)}+2V \leq V_{IN} \leq 36V$ $I_{OUT}=10\text{mA}$	-	0.01	0.02	%/V	
Load Regulation	$\Delta V_{OUT2}$	$V_{IN}=V_{OUT(S)}+2V$ $1\text{mA} \leq I_{OUT} \leq 300\text{mA}$	$V_{OUT(S)} \leq 10V$	40	90	mV	
			$V_{OUT(S)} > 10V$	85	150		
Temperature Stability	$\frac{\Delta V_{OUT}}{\Delta T_a}$	$V_{IN}=V_{OUT(S)}+2V, I_{OUT}=10\text{mA}$ $-40^{\circ}\text{C} \leq T_a \leq 85^{\circ}\text{C}$		$\pm 50$		ppm/ $^{\circ}\text{C}$	
Quiescent Current	$I_q$	no load	$V_{OUT(S)} < 3.0V$	0.8	1.2	2	$\mu\text{A}$
			$3.0 \leq V_{OUT(S)} \leq 40V$	1	1.6	3	
Input Voltage	$V_{IN}$	---	2.2		40	V	
Maximum Output Current	$I_{OUTMAX}$			300		mA	
Current Limit <sup>3</sup>	$I_{LIM}$	$V_{IN}=V_{OUT(S)}+1V,$ $V_{OUT}=0.98 \times V_{OUT(S)}$		340		mA	
Short Circuit Current	$I_{SHORT}$	$V_{IN}=V_{OUT(S)}+2V, V_{out}$ Short to GND with $0\Omega$		140		mA	
Power Supply Rejection Ratio	PSRR	$f=10\text{Hz}, V_{OUT(S)}=3.3V$		70		dB	
		$f=100\text{Hz}, V_{OUT(S)}=3.3V$		70			
		$f=1\text{kHz}, V_{OUT(S)}=3.3V$		55			
Over Temperature Protection	OTP	$I_{OUT}=10\text{mA}$		140		$^{\circ}\text{C}$	

Notes:

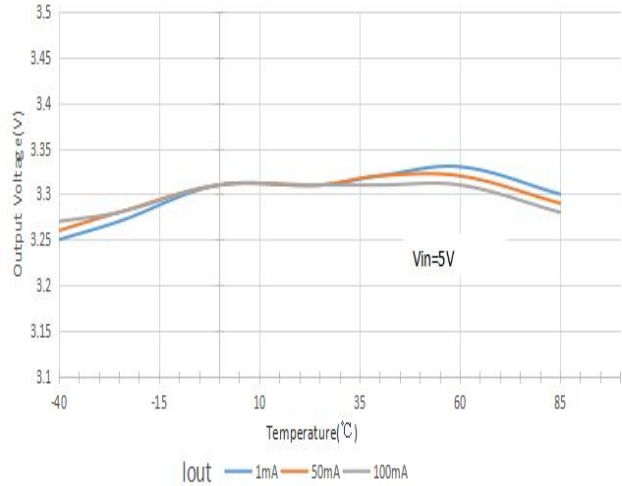
1.  $V_{OUT(S)}$ : Output voltage when  $V_{IN}=V_{out}+2V, I_{out}=1\text{mA}$ .
2.  $V_{DROP}=V_{in1} - (V_{out(S)} \times 0.98)$  where  $V_{in1}$  is the input voltage when  $V_{out} = V_{out(S)} \times 0.98$ .
3.  $I_{LIM}$ : Output current when  $V_{in}=V_{out(S)}+1V$  and  $V_{out} = 0.98 \times V_{out(S)}$ .

## Typical Performance Characteristics

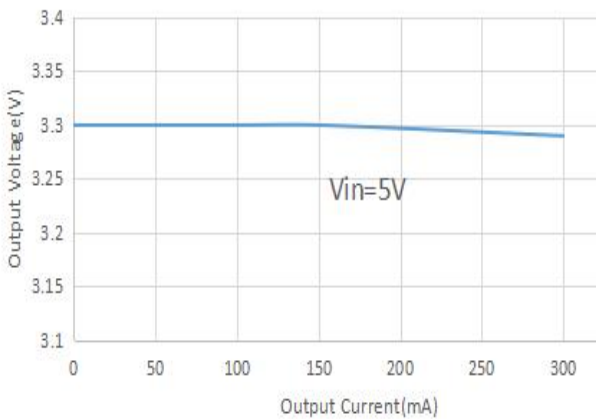
Test Conditions: SSP7901P33P SOT-89 CIN=10μF, COUT=10μF, Ta=25°C, unless otherwise indicated.



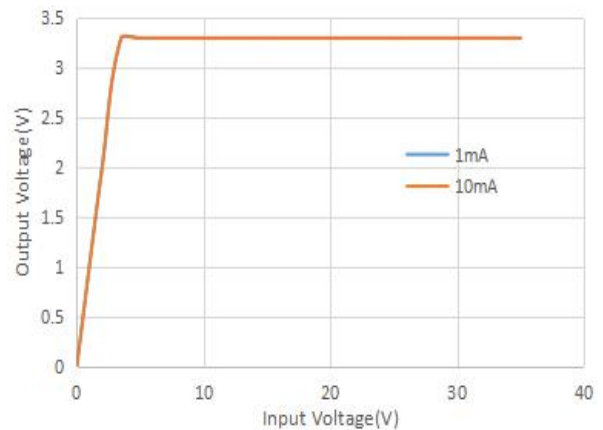
V<sub>OUT</sub> vs Temperature  
SSP7901P33PR



V<sub>OUT</sub> vs Temperature  
SSP7901P33PR



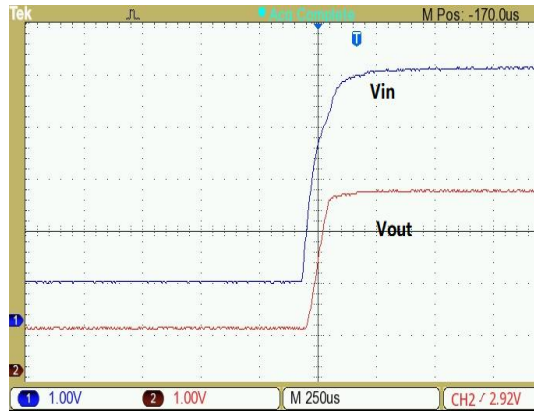
V<sub>OUT</sub> Vs Output Current  
SSP7901P33PR



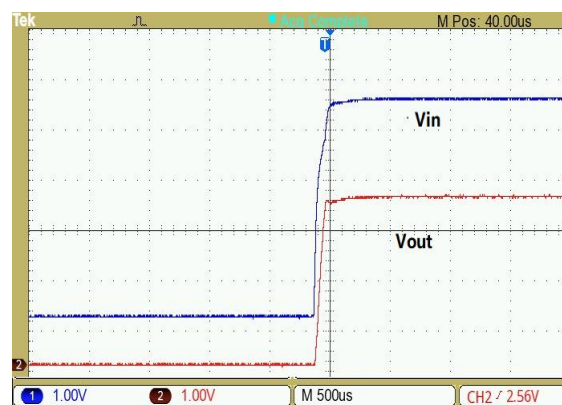
V<sub>OUT</sub> Vs Input Voltage  
SSP7901P33PR

## Typical Performance Characteristics

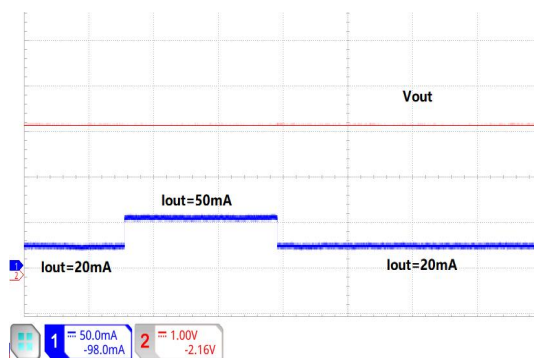
Test Conditions:  $V_{IN}=V_{OUT}+2.0V$ ,  $C_{IN}=10\mu F$ ,  $C_{OUT}=10\mu F$ , unless otherwise indicated.



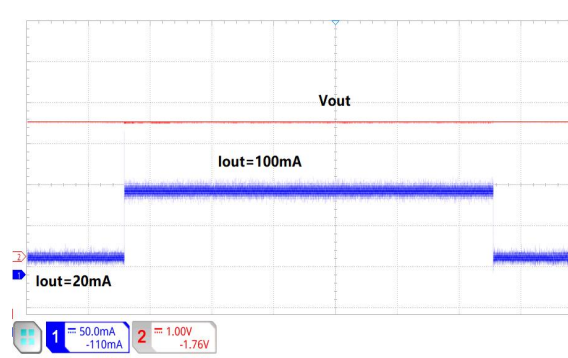
Power-Up at  $V_{OUT}=3.3V$  SSP7901P33PR  
( $I_{OUT}=0mA$ )



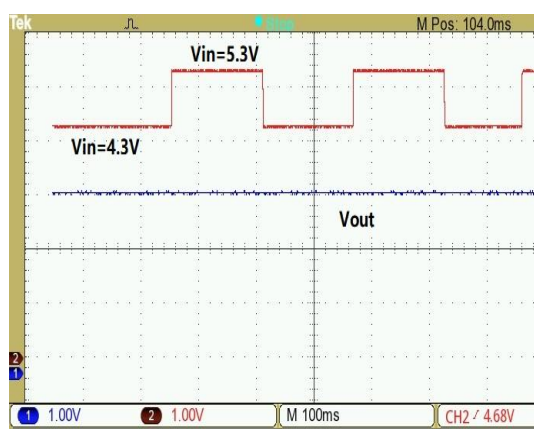
Power-Up at  $V_{OUT}=3.3V$  SSP7901P33PR  
( $I_{OUT}=100mA$ )



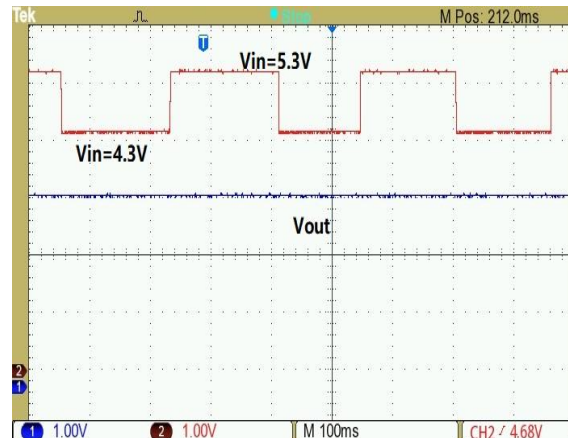
Load transient response  
 $V_{out}=3.3V$ , SSP7901P33PR



Load transient response  
 $V_{out}=3.3V$ , SSP7901P33PR

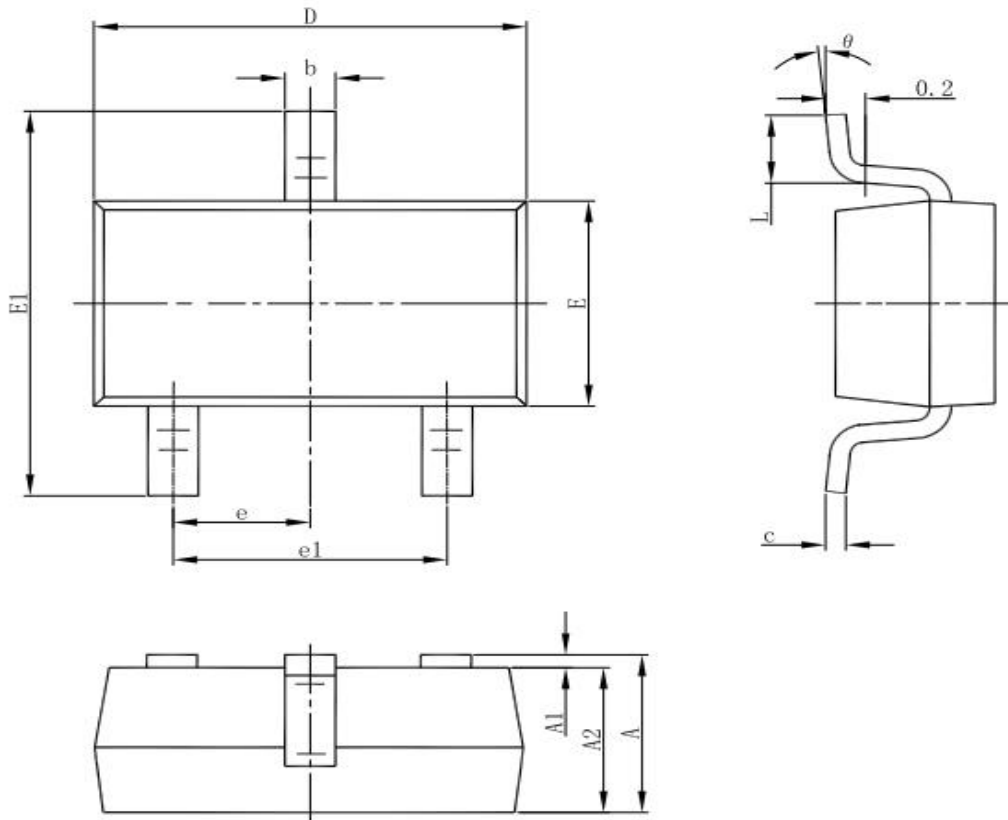


Input Voltage transient response  
 $V_{out}=3.3V$ ,  $I_{out}=10mA$ , SSP7901P33PR

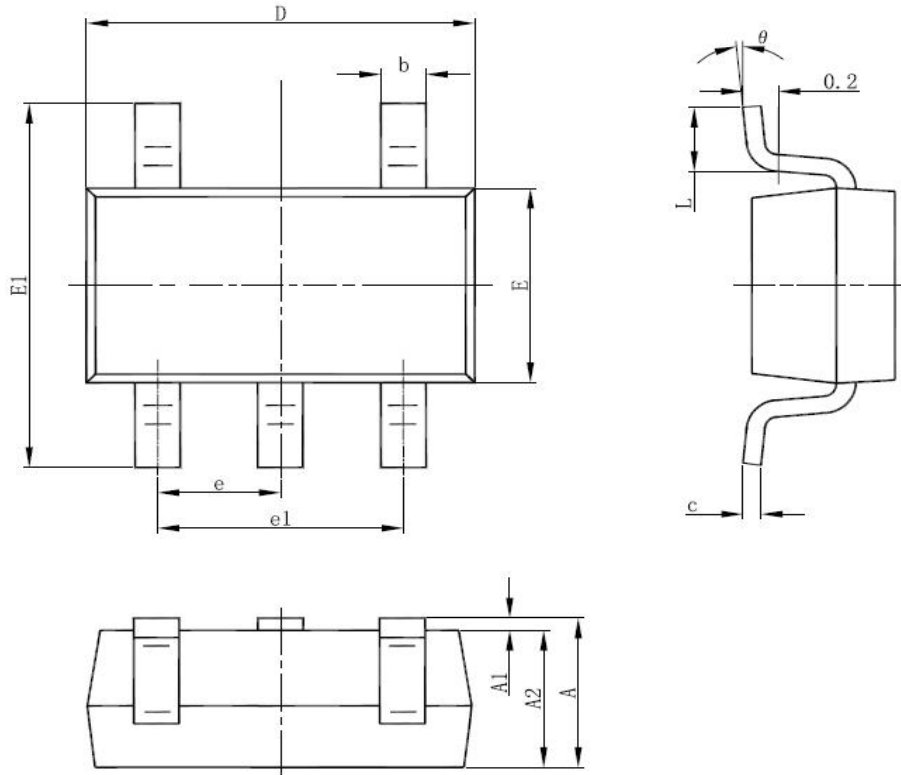


Input Voltage transient response  
 $V_{out}=3.3V$ ,  $I_{out}=100mA$ , SSP7901P33PR

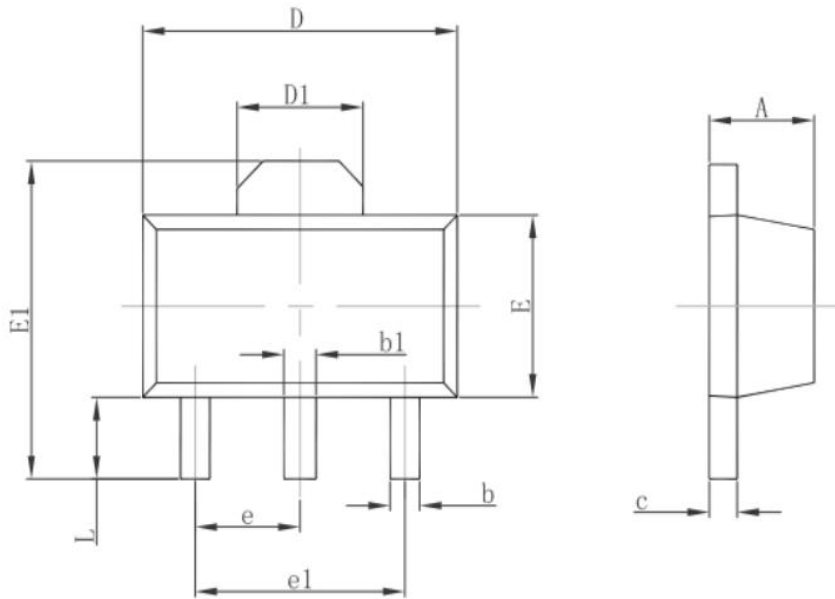


**Package Information**
**SOT23-3 Outline Dimensions**


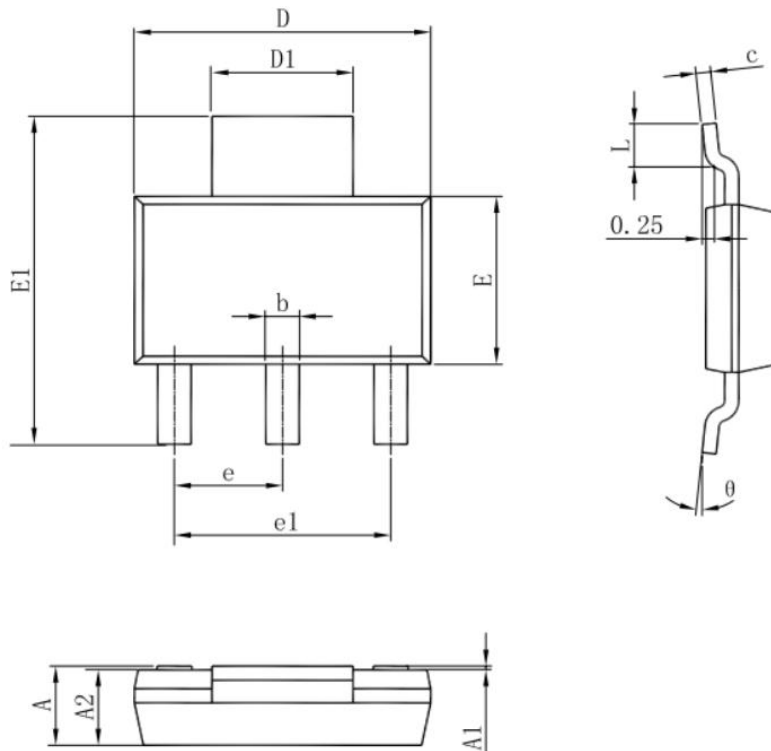
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 (BSC)		0.037 (BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

**SOT23-5 Outline Dimensions**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 (BSC)		0.037 (BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

**SOT89-3L Package Outline Dimensions**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
<b>A</b>	1.400	1.600	0.055	0.063
<b>b</b>	0.320	0.520	0.013	0.020
<b>b1</b>	0.400	0.580	0.016	0.023
<b>c</b>	0.350	0.440	0.014	0.017
<b>D</b>	4.400	4.600	0.173	0.181
<b>D1</b>	1.550 REF		0.061 REF	
<b>E</b>	2.300	2.600	0.091	0.102
<b>E1</b>	3.940	4.250	0.155	0.167
<b>e</b>	1.500 TYP		0.060 TYP	
<b>e1</b>	3.000 TYP		0.118 TYP	
<b>L</b>	0.900	1.200	0.035	0.047

**SOT223 Package Outline Dimensions**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
<b>A</b>	1.520	1.800	0.060	0.071
<b>A1</b>	0.000	0.100	0.000	0.004
<b>A2</b>	1.500	1.700	0.059	0.067
<b>b</b>	0.660	0.820	0.026	0.032
<b>c</b>	0.250	0.350	0.010	0.014
<b>D</b>	6.200	6.400	0.244	0.252
<b>D1</b>	2.900	3.100	0.114	0.122
<b>E</b>	3.300	3.700	0.130	0.146
<b>E1</b>	6.830	7.070	0.269	0.278
<b>e</b>	2.300(BSC)		0.091(BSC)	
<b>e1</b>	4.500	4.700	0.177	0.185
<b>L</b>	0.900	1.150	0.035	0.045
<b>θ</b>	0°	10°	0°	10°

## Special Version

The company reserves the right of final interpretation of this specification.

## Version Change Description

Versions: V1.0

Writer: XinCHun Li

Time: 2022.05.20

## Statement

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With any semiconductor product, there is a certain possibility of failure or failure under certain conditions. The buyer is responsible for complying with safety standards and taking safety measures when using the product for system design and complete machine manufacturing. The product is not authorized to be used as a critical component in life-saving or life-sustaining products or systems, in order to avoid potential failure risks that may cause personal injury or property loss.