

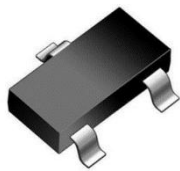
Current 300mA High Voltage 40V Low Power LDO

SSP7901

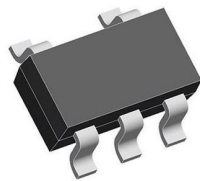
General Description

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.

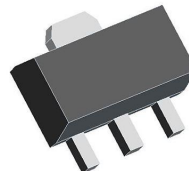
The SSP7901 consists of a high-precision voltage reference, an error amplification circuit, and a current limited output driver. Transient response to load variations have improved in comparison to the existing series.



SOT23-3L



SOR23-5L



SOT89-3L



SOT223

Features

- Low Quiescent Current: 1.6 μ A(type);
- Temperature Stability: ± 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

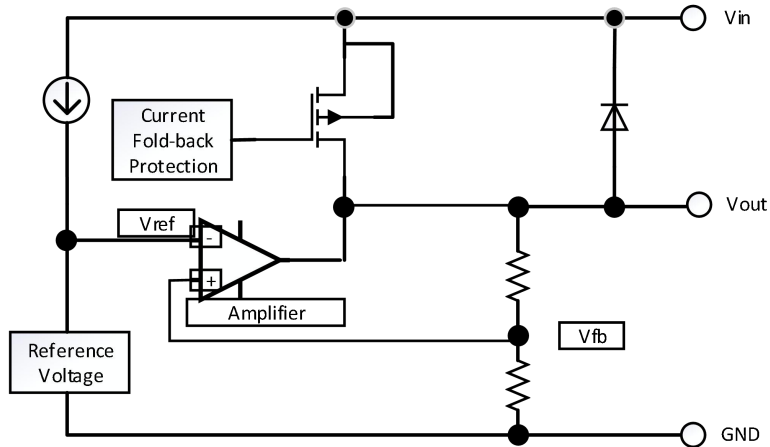
| Product model | Package | Manner of packing | Minimum packing quantity |
|---------------|-------------|-------------------|--------------------------|
| SSP7901PxxMx | SOT23-3L | Reel | 3000 |
| SSP7901PxxM5x | SOT23-5L | | 3000 |
| SSP7901PxxPx | SOT89-3L | | 1000 |
| SSP7901PxxPBx | SOT89-3L(B)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

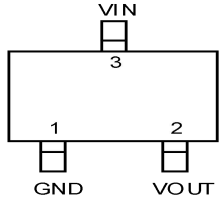
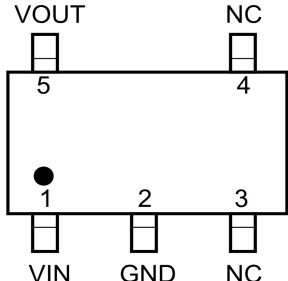
Selection Guide Table

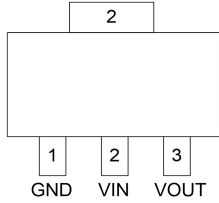
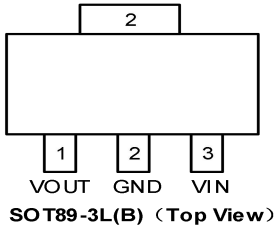
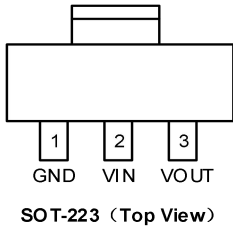
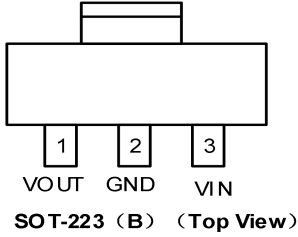
SSP7901P①②③④

| 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)

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

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

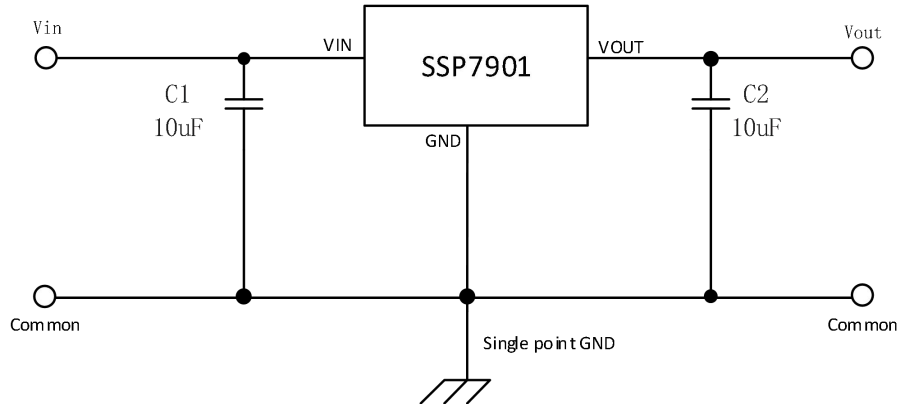
Note: *xx:Output Voltage, "33" stands for 3.3V*

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: $T_a=25^{\circ}\text{C}$)

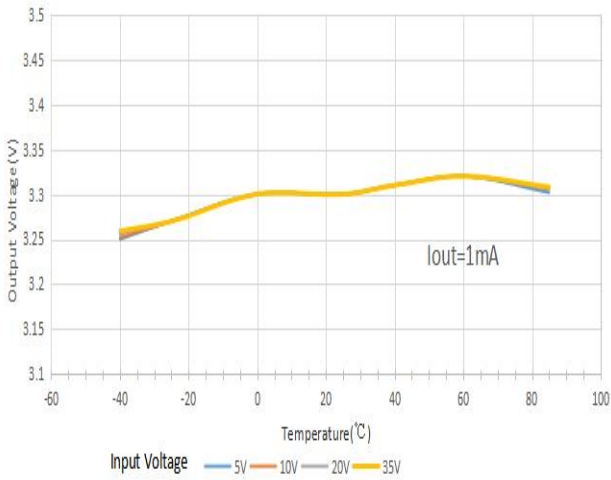
| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT | |
|------------------------------|---|---|--------------------------------|--------------|--------------------------|-------------------------|---------------|
| Output Voltage ¹ | $V_{OUT(S)}$ | $V_{IN}=V_{OUT(S)}+2V, I_{OUT}=10\text{mA}$ | $V_{OUT(S)} \times 0.98$ | $V_{OUT(S)}$ | $V_{OUT(S)} \times 1.02$ | V | |
| Dropout Voltage ² | 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 | ΔV_{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 | $\frac{\Delta V_{OUT}}{\Delta T_a}$ | $V_{IN}=V_{OUT(S)}+2V, I_{OUT}=10\text{mA}$ $-40^{\circ}\text{C} \leq T_a \leq 85^{\circ}\text{C}$ | | ± 50 | | ppm/ $^{\circ}\text{C}$ | |
| Quiescent Current | I_q | no load | $V_{OUT(S)} < 3.0V$ | 0.8 | 1.2 | 2 | μA |
| | | | $3.0 \leq V_{OUT(S)} \leq 40V$ | 1 | 1.6 | 3 | |
| Input Voltage | V_{IN} | --- | 2.2 | | 40 | V | |
| Maximum Output Current | I_{OUTMAX} | | | 300 | | mA | |
| Current Limit ³ | 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 0Ω | | 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:

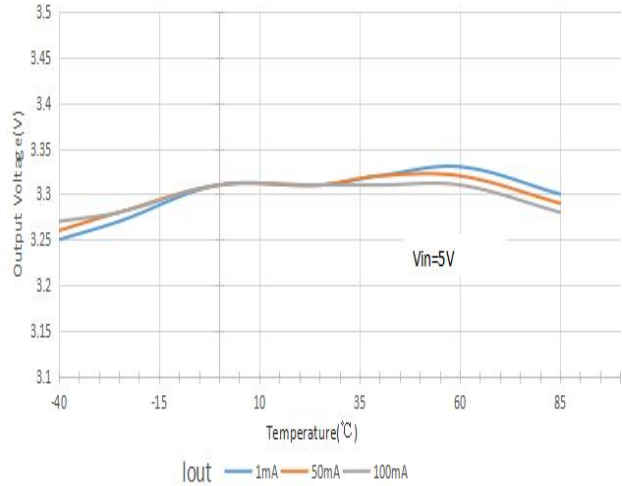
1. $V_{OUT(S)}$: Output voltage when $V_{IN}=V_{out}+2V, I_{out}=1\text{mA}$.
2. $V_{DROP}=V_{in1} - (V_{out(S)} \times 0.98)$ where V_{in1} is the input voltage when $V_{out} = V_{out(S)} \times 0.98$.
3. I_{LIM} : Output current when $V_{in}=V_{out(S)}+1V$ and $V_{out} = 0.98 \times V_{out(S)}$.

Typical Performance Characteristics

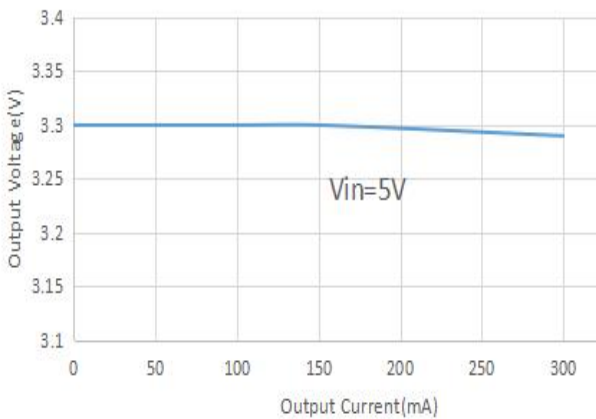
Test Conditions: SSP7901P33P SOT-89 $C_{IN}=10\mu F$, $C_{OUT}=10\mu F$, $T_a=25^\circ C$, unless otherwise indicated.



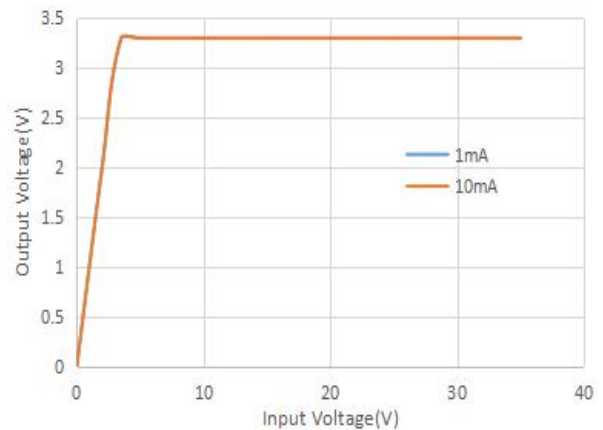
V_{OUT} vs Temperature
SSP7901P33PR



V_{OUT} vs Temperature
SSP7901P33PR



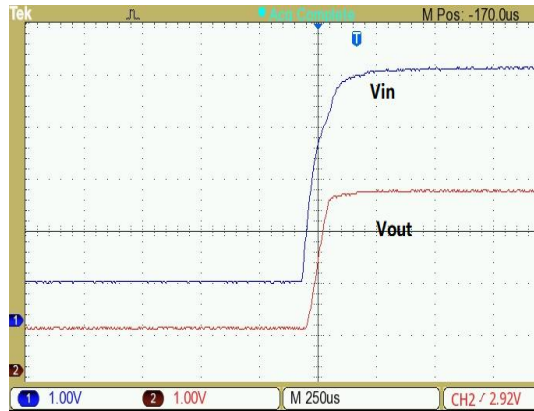
V_{OUT} Vs Output Current
SSP7901P33PR



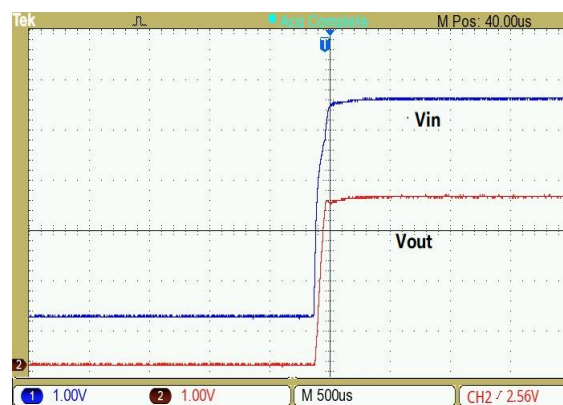
V_{OUT} Vs Input Voltage
SSP7901P33PR

Typical Performance Characteristics

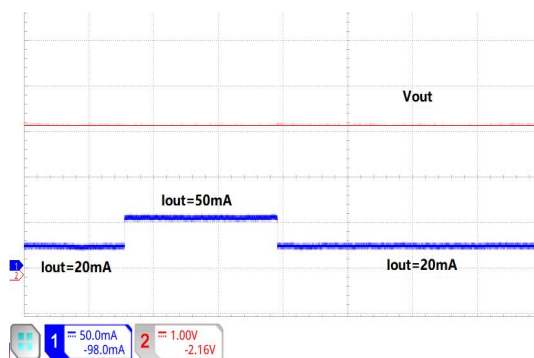
Test Conditions: $V_{IN}=V_{OUT}+2.0V$, $C_{IN}=10\mu F$, $C_{OUT}=10\mu F$, unless otherwise indicated.



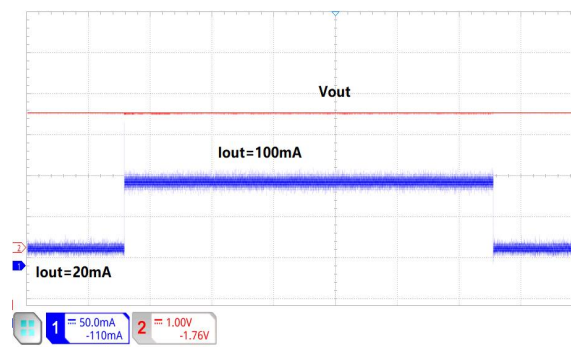
Power-Up at $V_{OUT}=3.3V$ SSP7901P33PR
($I_{OUT}=0mA$)



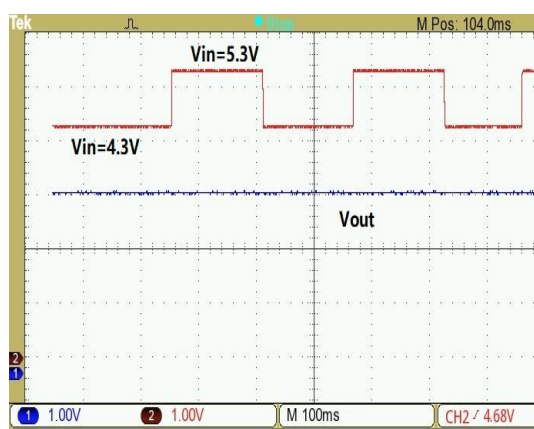
Power-Up at $V_{OUT}=3.3V$ SSP7901P33PR
($I_{OUT}=100mA$)



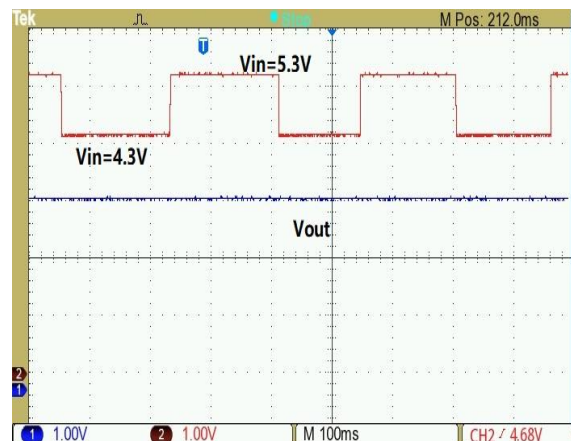
Load transient response
 $V_{out}=3.3V$, SSP7901P33PR



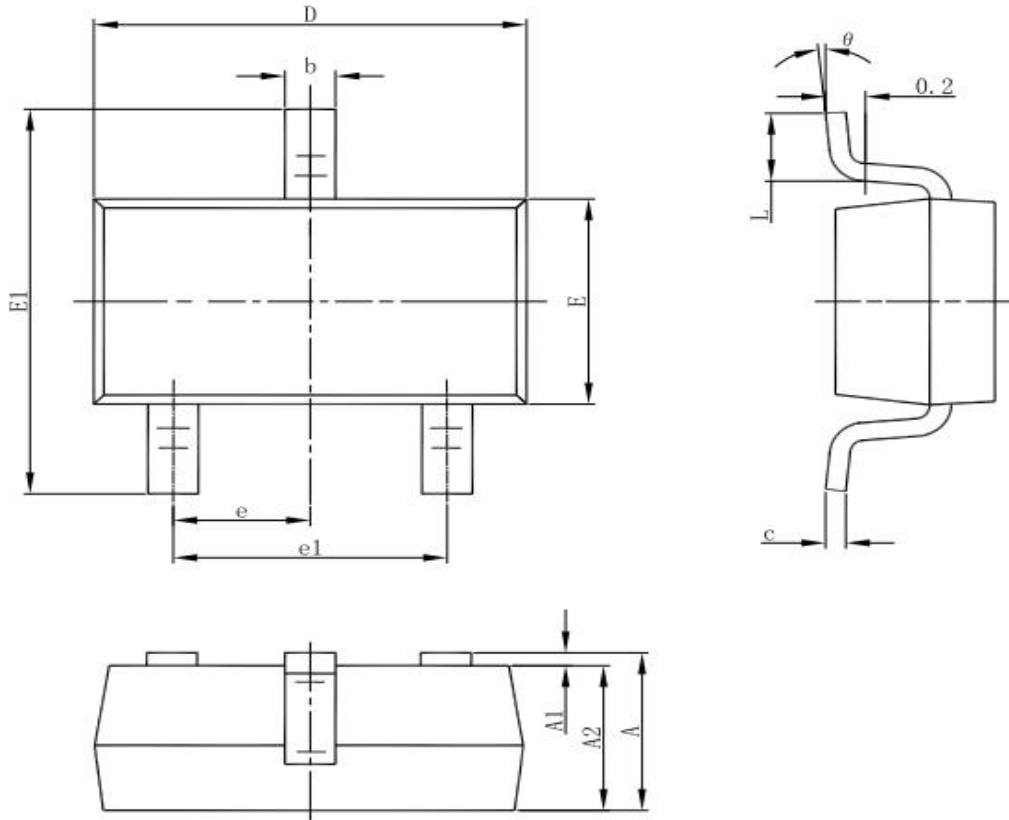
Load transient response
 $V_{out}=3.3V$, SSP7901P33PR



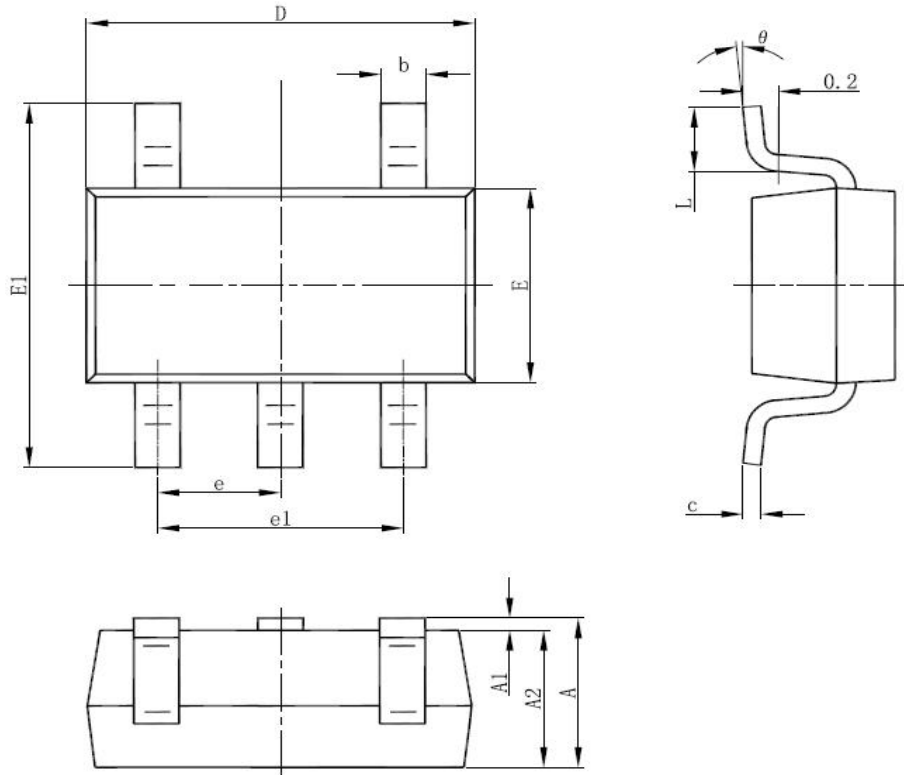
Input Voltage transient response
 $V_{out}=3.3V$, $I_{out}=10mA$, SSP7901P33PR



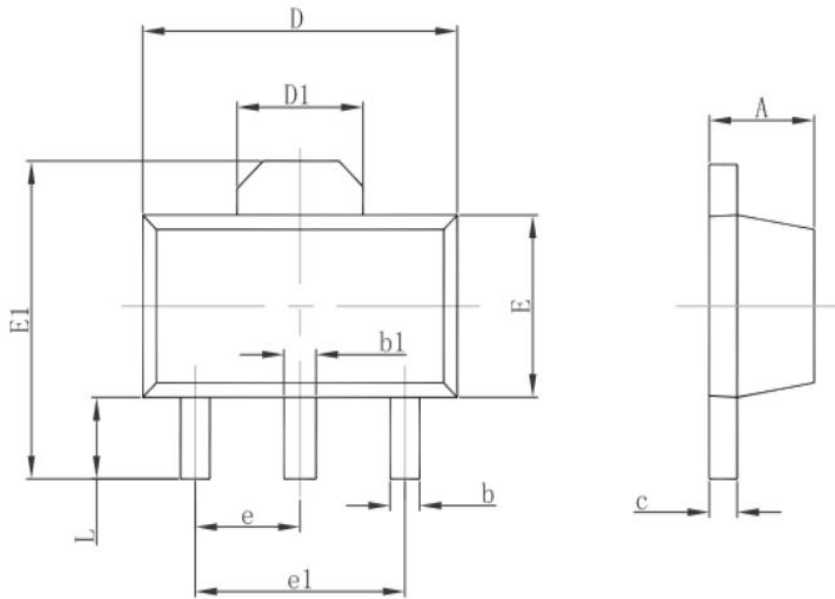
Input Voltage transient response
 $V_{out}=3.3V$, $I_{out}=100mA$, SSP7901P33PR

Package Information
SOT23-3 Outline Dimensions


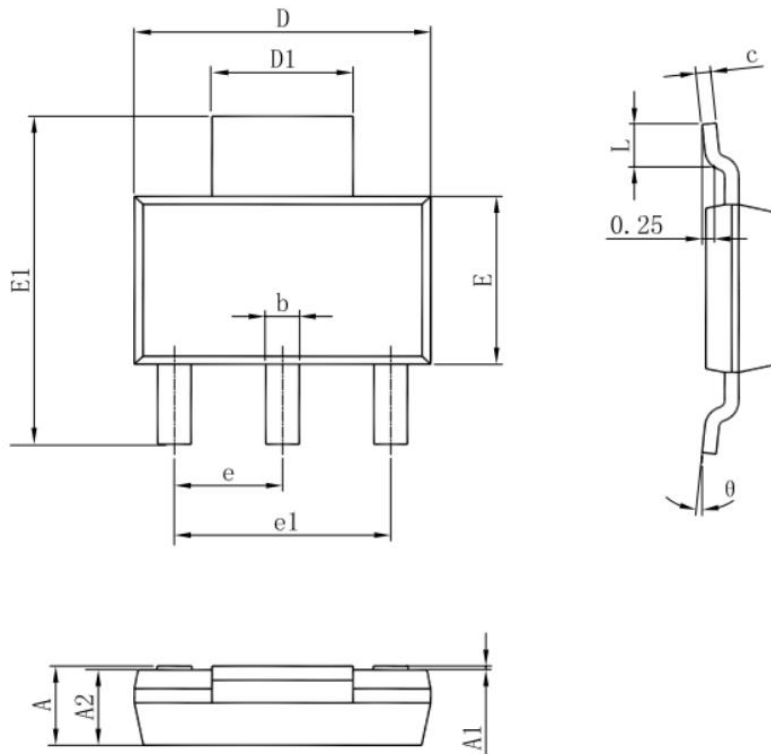
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 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 |
| θ | 0° | 8° | 0° | 8° |

SOT89-3L Package Outline Dimensions


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

SOT223 Package Outline Dimensions


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

The information in the usage specification is correct at the time of publication, Shanghai Siproin Microelectronics Co. has the right to change and interpret the specification, and reserves the right to modify the product without prior notice. Users can obtain the latest version information from our official website or other effective channels before confirmation, and verify whether the relevant information is complete and up to date.

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.