



AnaSem *Analog Semiconductor IC* VRS Series

High Speed/Low Dropout/High Accuracy CMOS Positive Voltage Regulator

Description

The VRS Series is a positive voltage regulator where low dropout and highly accurate output were achieved by low current consumption. The output voltage guarantees $\pm 1\%$ within the range of all temperatures by V_{ref} that the temperature characteristic is controlled. It corresponds to the low ESR capacitor as an output stabilization capacitor. To make the current capacity of the output transistor not exceeded, the overcurrent protection circuit is built in.

Feature

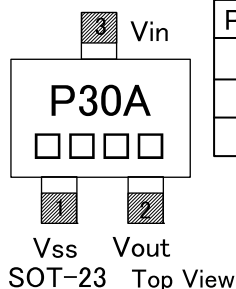
- Output voltage: 1.2 ~ 5.0V (Selectable 0.1V Step)
- High accuracy output voltage: $\pm 1\%$ ($-40 \sim 85^\circ\text{C}$)
- Maximum output current: 300mA
- Dropout voltage: 250mV (Output: 3.0V I_{out} : 100mA)
- Maximum input voltage: 6.0V
- Low current consumption: $1.5 \mu\text{A}/\text{Typ}$, $3.0 \mu\text{A}/\text{Max}$
- Low ESR capacitor : ceramic capacitor
- Operating temperature range: -40 to 85°C
- Built-in overcurrent protector
- Small package: SOT-23(400mW) LLP-6(600mW)

Applications ■ Product Number: VRS3010PTA VRS3010PLA

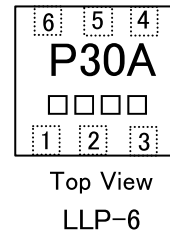
- Battery powered-devices
- Cellular phones
- Digital/Video cameras
- Portable games
- Handheld instruments

| VRP | 3010: Output Voltage Spec | P: Function Spec | T: Package L: Package | A: Version |
|---------------------|---|---------------------------------------|-----------------------|---------------------------------|
| AnaSem V/R P-Series | 30: 3.0V Output 10: 1% Accuracy 20: 2% Accuracy | P: Input/1.8~6.0V Output/+1.2~5.0V | T: SOT-23 L: LLP-6 | A: $-40 \sim +85^\circ\text{C}$ |

Pin Configuration

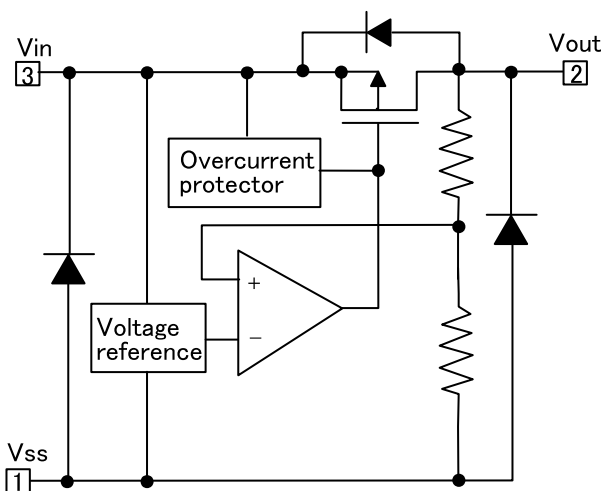


| Pin | Name | Description |
|-----|------|---------------|
| 1 | Vss | Power Ground |
| 2 | Vout | Output |
| 3 | Vin | Input Voltage |

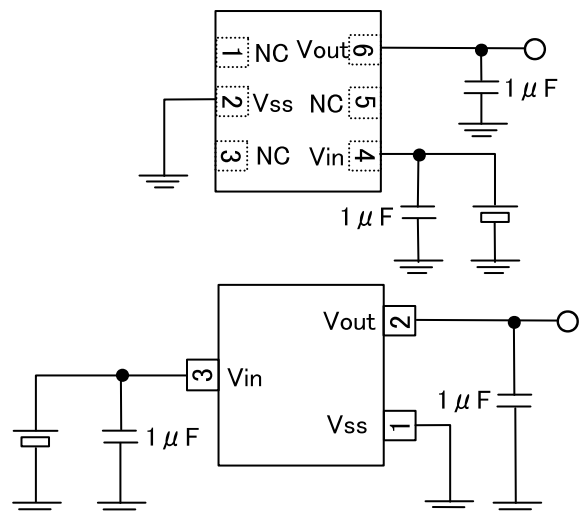


| Pin | Name | Description |
|-----|------|---------------|
| 1 | NC | |
| 2 | Vss | Power Ground |
| 3 | NC | |
| 4 | Vin | Input Voltage |
| 5 | NC | |
| 6 | Vout | Output |

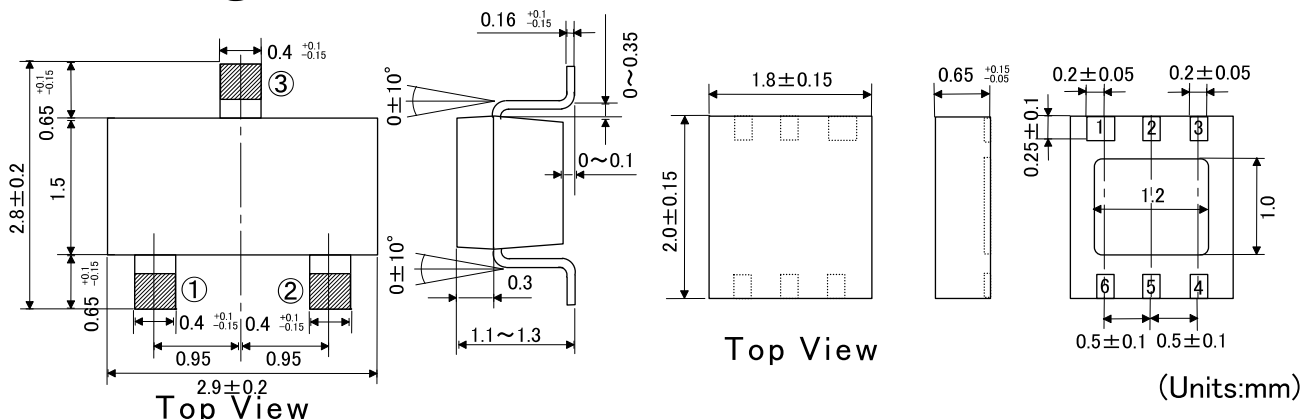
Block Diagram



Typical Application



Package Size



Absolute Maximum Rating

| Item | Sign | Value |
|-----------------------------|--------|-------------------|
| Input Supply Voltage | Vin | -0.3V~+7.0V |
| Output Current | Iout | 500mA |
| Output Voltage | Vout | Vss-0.3V~Vin+0.3V |
| Power Dissipation | SOT-23 | Pd 400mW (ON PCB) |
| | LLP-6 | Pd 600mW (ON PCB) |
| Operating Temperature Range | Topr | -40~+85°C |
| Storage Temperature Range | Tstg | -50~+125°C |

Electric Characteristics

Ta=25°C

| Item | Symbol | Measurement condition | Spec | | | Unit | |
|--|--|---|-------------------|-------------|------|-------------|----|
| | | | Min | Typ | Max | | |
| Output voltage | Vout | Vout+1.0V ≤ Vin ≤ 6.0V Iout=30mA -40°C ≤ Ta ≤ +85°C | Vout ≥ 2.0V | Vout × 0.99 | Vout | Vout × 1.01 | V |
| | | | Vout ≤ 1.9V | Vout - 0.02 | Vout | Vout + 0.02 | V |
| Output current | Iout | Vin ≥ Vout + 1.0V | 1.2 ≤ Vout ≤ 1.5V | | 100 | | mA |
| | | | 1.6 ≤ Vout ≤ 1.9V | | 150 | | mA |
| | | | 2.0 ≤ Vout ≤ 2.4V | | 200 | | mA |
| | | | 2.5 ≤ Vout ≤ 2.9V | | 250 | | mA |
| | | | 3.0 ≤ Vout ≤ 3.9V | | 300 | | mA |
| | | | 4.0 ≤ Vout ≤ 5.0V | | 300 | | mA |
| Dropout voltage | Vdrop | Iout=60mA | 1.2 ≤ Vout ≤ 1.5V | | 600 | 900 | mV |
| | | | 1.6 ≤ Vout ≤ 1.9V | | 500 | 800 | mV |
| | | Iout=100mA | 2.0 ≤ Vout ≤ 2.4V | | 400 | 640 | mV |
| | | | 2.5 ≤ Vout ≤ 2.9V | | 300 | 500 | mV |
| | | | 3.0 ≤ Vout ≤ 3.9V | | 250 | 440 | mV |
| | | | 4.0 ≤ Vout ≤ 5.0V | | 200 | 360 | mV |
| Power dissipation | Idd | Vin=Vout+1.0V, Vout=Open | | 1.5 | 3.0 | μA | |
| Input voltage | Vin | | 1.8 | | 6.0 | μA | |
| Load regulation | ΔVout | Vin=Vout+1.0V, 1mA ≤ Iout ≤ 80mA | | | 40 | mV | |
| Line regulation | $\frac{\Delta V_{out}}{\Delta V_{in} \cdot V_{out}}$ | Vout+0.5V ≤ Vin ≤ 6.0V, Iout=30mA | | 0.05 | 0.20 | %/V | |
| Output voltage temperature coefficient | $\frac{\Delta V_{out}}{\Delta T_a \cdot V_{out}}$ | Vin=Vout+1.0V, Iout=30mA -40 ≤ Ta ≤ +85°C | | ±20 | | ppm/°C | |
| Short circuit current | Ishort | Vin=Vout+1.0V, Vout=0V | | 100 | | mA | |

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