AUK Semiconductor

# S79xxD

**Fixed Voltage Regulator**

## Descriptions

This series of fixed-negative-voltage monolithic integrated-circuit voltage regulators is designed to complement series S7800 in a wide range of applications. These applications include on-card regulator for elimination of noise and distribution problems associated with single point regulations. Each of these regulators can deliver up to 1.0 amperes of output current. The internal current Limiting and thermal shutdown features of these regulators make them essentially immune to overload. In addition to use as fixed-voltage regulators, these device can be used with external components to obtain adjustable output voltages and also as the power pass element in precision regulators.

## Features

- Output Current UP to 1.0A
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limiting
- No External Components
- Output Transistor Safe-Area Compensations

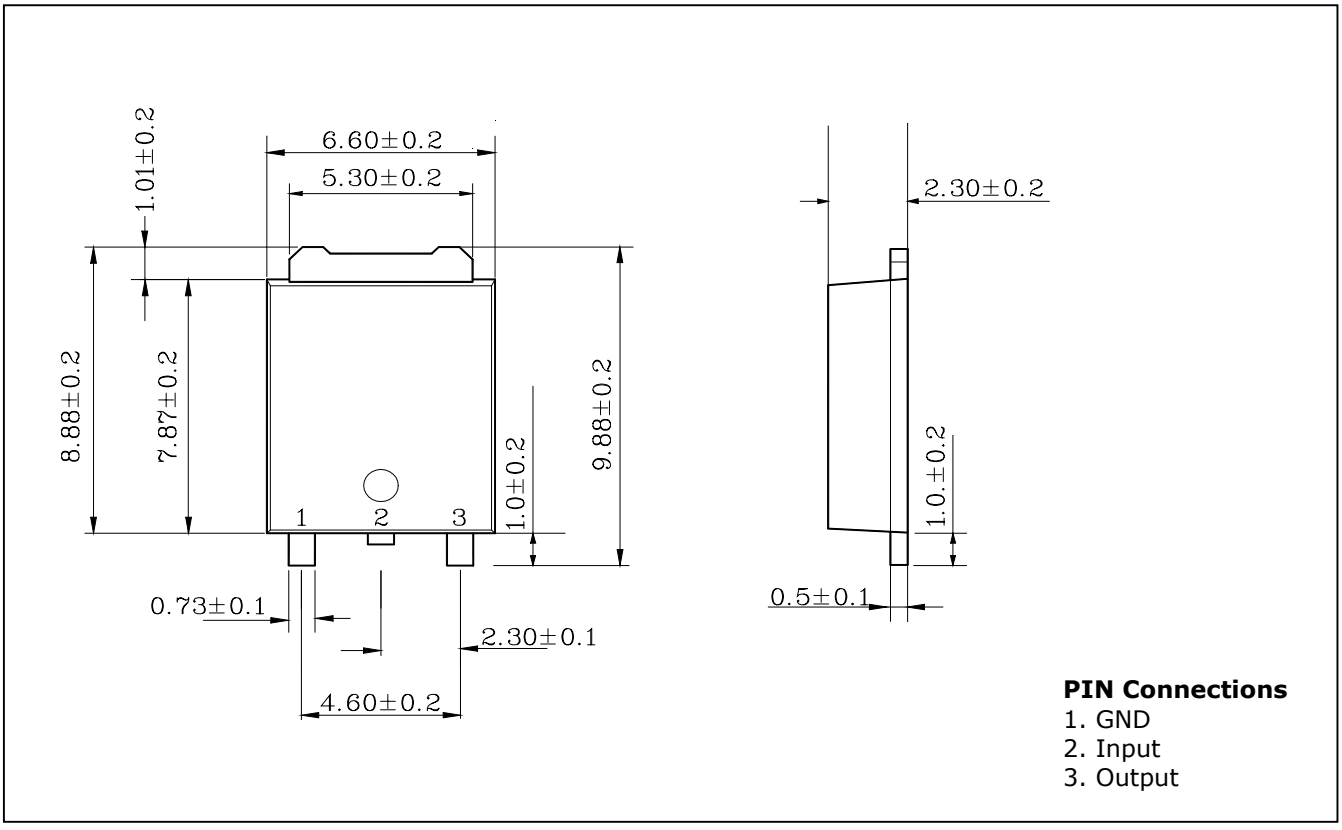
## Ordering Information

| Type NO. | Marking | Package Code |
|---|---|---|
| S79xxD | S79□□D | D-PAK |

□□:Voltage Code (05:-5V, 08:-8V, 09:-9V, 12:-12V,15:-15V)

## Outline Dimensions

**unit : mm**




**PIN Connections**
1. GND
2. Input
3. Output

## Absolute Maximum Ratings

Ta=25°C

| Characteristic | Symbol | Ratings | Unit |
|---|---|---|---|
| Operating Input voltage | $V_{IN}$ | -35 | V |
| Power Dissipation ($T_C$=25℃) | $P_D$ | 12 | W |
| Power Dissipation (without Heatsink) | $P_D$ | 1.3 | W |
| Operating Junction Temperature | $T_J$ | 30 ~ 125 | °C |
| Storage Temperature | $T_{STG}$ | -55 ~ 150 | °C |

## Electrical Characteristics

( ❊ $V_{IN}$ = -10V, $I_{OUT}$ = 500mA, $T_j$ = 0°C ~ 125°C, Unless otherwise noted)

| Characteristic | Symbol | Test Condition | | S7905D | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Output Voltage | $V_{OUT}$ | | $T_j$ =25℃ | -4.8 | -5.0 | -5.2 | V |
| | | $I_{OUT}$=5mA ~ 1A<br>$V_{IN}$=-7.0V ~ -20V, $P_D$≤ 15W | | -4.75 | -5.0 | -5.25 | |
| Line Regulation | $\triangle V_{OUT}$ | $V_{IN}$=-7.0V ~ -25V | $T_j$ =25℃ | - | 12.5 | 50 | mV |
| | | $V_{IN}$=-8.0V ~ -12V | | - | 4 | 15 | |
| Load Regulation | $\triangle V_{OUT}$ | $I_{OUT}$=5mA ~ 1.0A | $T_j$ =25℃ | - | 15 | 100 | mV |
| | | $I_{OUT}$=250mA ~ 750mA | | - | 5 | 50 | |
| Quiescent Current | $I_B$ | | $T_j$ =25℃ | - | 1.5 | 2.0 | mA |
| Quiescent Current Change | $\triangle I_B$ | $V_{IN}$ = -7.0V ~ -25V | | - | 0.15 | 0.5 | mA |
| | | $I_{OUT}$ = 5mA ~ 1A | | - | 0.08 | 0.5 | |
| Output Noise Voltage | $V_N$ | f=10Hz ~ 100KHz | $T_j$ =25℃ | - | 125 | - | $uV_{rms}$ |
| Ripple Rejection Ratio | RR | f=120Hz, $V_{IN}$ =-8.0V ~ -18V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $I_{OUT}$=1A | $T_j$ =25℃ | - | 2.0 | - | V |
| Temperature coefficient of output Voltage Drift | $T_{CVO}$ | $I_{OUT}$=5mA | | - | -0.4 | - | mV/°C |
| Peak Output Current | $I_{PK}$ | | $T_j$ =25℃ | - | 2.1 | - | A |

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

## Electrical Characteristics

($T_J$ = 0 to 125℃, Vin= -14V, Iout=500mA, unless otherwise specified.)

| Characteristic | Symbol | Test Condition | | S7908D | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Output Voltage | $V_{OUT}$ | | $T_j$ =25℃ | -7.7 | -8.0 | -8.3 | V |
| | | $I_{OUT}$=5mA ~ 1A<br>$V_{IN}$=-10.5V ~ -23V, $P_D \leq$ 15W | | -7.6 | -8.0 | -8.4 | |
| Line Regulation | $\triangle V_{OUT}$ | $V_{IN}$=-10.5V ~ -25V | $T_j$ =25℃ | - | 12.5 | 160 | mV |
| | | $V_{IN}$=-11.0V ~ -17V | | - | 4 | 80 | |
| Load Regulation | $\triangle V_{OUT}$ | $I_{OUT}$=5mA ~ 1.0A | $T_j$ =25℃ | - | 15 | 160 | mV |
| | | $I_{OUT}$=250mA ~ 750mA | | - | 5 | 80 | |
| Quiescent Current | $I_B$ | | $T_j$ =25℃ | - | 1.5 | 2.0 | mA |
| Quiescent Current Change | $\triangle I_B$ | $V_{IN}$ = -10.5V ~ -25V | | - | 0.15 | 1.0 | mA |
| | | $I_{OUT}$ = 5mA ~ 1A | | - | 0.08 | 0.5 | |
| Output Noise Voltage | $V_N$ | f=10Hz ~ 100KHz | $T_j$ =25℃ | - | 200 | - | $uV_{rms}$ |
| Ripple Rejection Ratio | RR | f=120Hz, $V_{IN}$ =-11.5V ~ -21.5V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $I_{OUT}$=1A | $T_j$ =25℃ | - | 2.0 | - | V |
| Temperature coefficient of output Voltage Drift | $T_{CVO}$ | $I_{OUT}$=5mA | $T_j$ =25℃ | - | -0.6 | - | mV/°C |
| Peak Output Current | $I_{PK}$ | | $T_j$ =25℃ | - | 2.1 | - | A |

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

## Electrical Characteristics

($T_J$ = 0 to 125℃, Vin= -15V, Iout=500mA, unless otherwise specified.)

| Characteristic | Symbol | Test Condition | | S7909D | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Output Voltage | $V_{OUT}$ | | $T_j$ =25℃ | -8.70 | -9.0 | -9.30 | V |
| | | $I_{OUT}$=5mA ~ 1A<br>$V_{IN}$=-11.5V ~ -23V, $P_D \leq$ 15W | | -8.60 | -9.0 | -9.40 | |
| Line Regulation | $\triangle V_{OUT}$ | $V_{IN}$=-10.5V ~ -25V | $T_j$ =25℃ | - | 10 | 180 | mV |
| | | $V_{IN}$=-110V ~ -17V | | - | 5 | 90 | |
| Load Regulation | $\triangle V_{OUT}$ | $I_{OUT}$=5mA ~ 1.0A | $T_j$ =25℃ | - | 12 | 180 | mV |
| | | $I_{OUT}$=250mA ~ 750mA | | - | 4 | 90 | |
| Quiescent Current | $I_B$ | | $T_j$ =25℃ | - | 3 | 6 | mA |
| Quiescent Current Change | $\triangle I_B$ | $V_{IN}$ = -11.5V ~ -25V | | - | 0.1 | 1.0 | mA |
| | | $I_{OUT}$ = 5mA ~ 1A | | - | 0.08 | 0.5 | |
| Output Noise Voltage | $V_N$ | f=10Hz ~ 100KHz | $T_j$ =25℃ | - | 175 | - | $uV_{rms}$ |
| Ripple Rejection Ratio | RR | f=120Hz, $V_{IN}$ =-9.0V ~ -19V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $I_{OUT}$=1A | $T_j$ =25℃ | - | 2.0 | - | V |
| Temperature coefficient of output Voltage Drift | $T_{CVO}$ | $I_{OUT}$=5mA | $T_j$ =25℃ | - | -0.4 | - | mV/°C |
| Peak Output Current | $I_{PK}$ | | $T_j$ =25℃ | - | 2.1 | - | A |

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

## Electrical Characteristics

($T_J$ = 0 to 125℃, Vin= -19V, Iout=500mA, unless otherwise specified.)

| Characteristic | Symbol | Test Condition | | S7912D | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Output Voltage | $V_{OUT}$ | | $T_j$ =25℃ | -11.5 | -12.0 | -12.5 | V |
| | | $I_{OUT}$=5mA ~ 1A<br>$V_{IN}$=-14.5V ~ -27V, $P_D \leq$ 15W | | -11.4 | -12.0 | -12.6 | |
| Line Regulation | $\triangle V_{OUT}$ | $V_{IN}$=-14.5V ~ -30V | $T_j$ =25℃ | - | 5 | 80 | mV |
| | | $V_{IN}$=-16.0V ~ -22V | | - | 3 | 30 | |
| Load Regulation | $\triangle V_{OUT}$ | $I_{OUT}$=5mA ~ 1.0A | $T_j$ =25℃ | - | 15 | 200 | mV |
| | | $I_{OUT}$=250mA ~ 750mA | | - | 5 | 75 | |
| Quiescent Current | $I_B$ | | $T_j$ =25℃ | - | 2.0 | 3.0 | mA |
| Quiescent Current Change | $\triangle I_B$ | $V_{IN}$ = -14.5V ~ -30V | | - | 0.04 | 0.5 | mA |
| | | $I_{OUT}$ = 5mA ~ 1A | | - | 0.08 | 0.5 | |
| Output Noise Voltage | $V_N$ | f=10Hz ~ 100KHz, | $T_j$ =25℃ | - | 300 | - | $uV_{rms}$ |
| Ripple Rejection Ratio | RR | f=120Hz, $V_{IN}$ =-15V ~ -25V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $I_{OUT}$=1A | $T_j$ =25℃ | - | 2.0 | - | V |
| Temperature coefficient of output Voltage Drift | $T_{CVO}$ | $I_{OUT}$=5mA | $T_j$ =25℃ | - | -0.8 | - | mV/°C |
| Peak Output Current | $I_{PK}$ | | $T_j$ =25℃ | - | 2.1 | - | A |

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

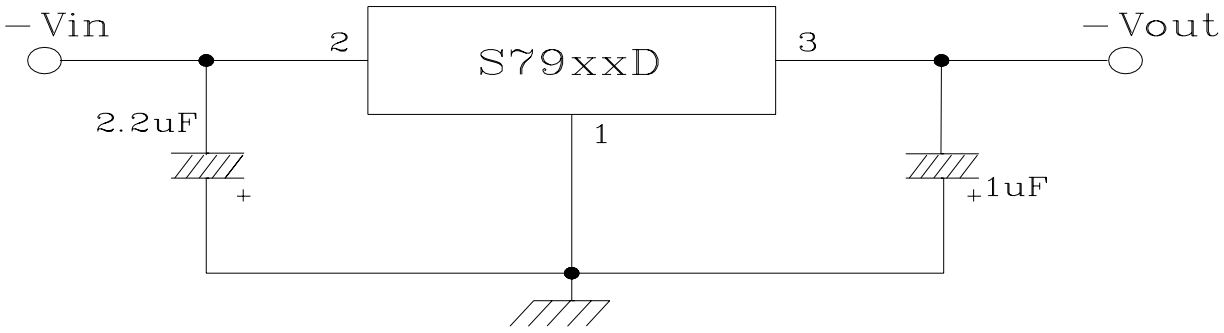
## Electrical Characteristics

($T_J$ = 0 to 125℃, Vin= -23V, Iout=500mA, unless otherwise specified.)

| Characteristic | Symbol | Test Condition | | S7915D | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Output Voltage | $V_{OUT}$ | | $T_j$ =25℃ | -14.4 | -15.0 | -15.6 | V |
| | | $I_{OUT}$=5mA ~ 1A<br>$V_{IN}$=-17.5V ~ -30V, $P_D \leq$ 15W | | -14.25 | -15.0 | -15.75 | |
| Line Regulation | $\Delta V_{OUT}$ | $V_{IN}$=-17.5V ~ -30V | $T_j$ =25℃ | - | 5 | 100 | mV |
| | | $V_{IN}$=-20V ~ -26V | | - | 3 | 50 | |
| Load Regulation | $\Delta V_{OUT}$ | $I_{OUT}$=5mA ~ 1.0A | $T_j$ =25℃ | - | 15 | 200 | mV |
| | | $I_{OUT}$=250mA ~ 750mA | | - | 5 | 75 | |
| Quiescent Current | $I_B$ | | $T_j$ =25℃ | - | 2.0 | 3.0 | mA |
| Quiescent Current Change | $\Delta I_B$ | $V_{IN}$ = -17.5V ~ -30V | | - | 0.04 | 0.5 | mA |
| | | $I_{OUT}$ = 5mA ~ 1A | | - | 0.08 | 0.5 | |
| Output Noise Voltage | $V_N$ | f=10Hz ~ 100KHz, | $T_j$ =25℃ | - | 375 | - | $uV_{rms}$ |
| Ripple Rejection Ratio | RR | f=120Hz, $V_{IN}$ =-18.5V ~ -28.5V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $I_{OUT}$=1A | $T_j$ =25℃ | - | 2.0 | - | V |
| Temperature coefficient of output Voltage Drift | $T_{CVO}$ | $I_{OUT}$=5mA | $T_j$ =25℃ | - | -1.0 | - | mV/°C |
| Peak Output Current | $I_{PK}$ | | $T_j$ =25℃ | - | 2.1 | - | A |

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

## ■Test circuit

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# Electrical Characteristic Curves

**Fig. 1 $V_{OUT}$ - $V_{IN}$**

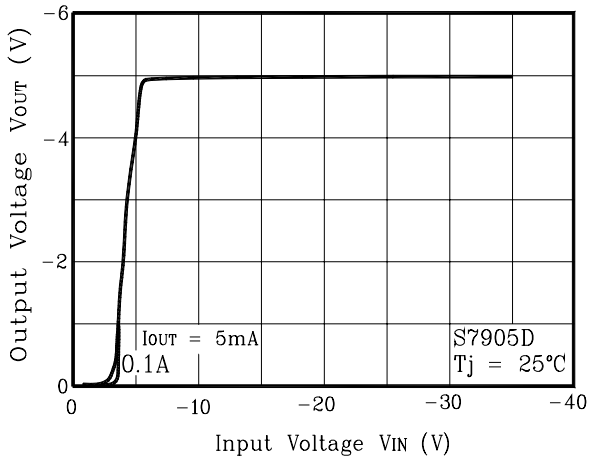



**Fig. 2 Dropout - Voltage**

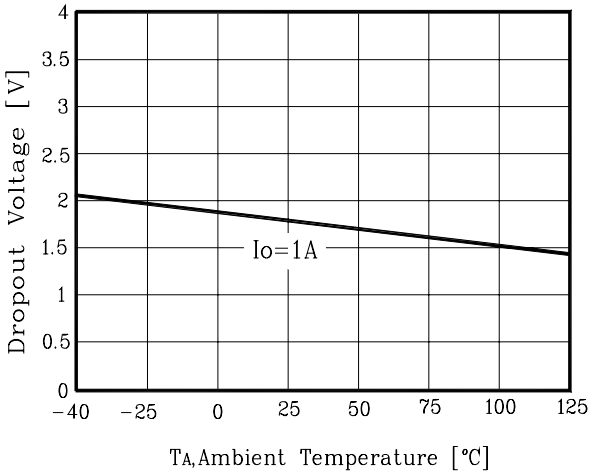



**Fig. 3 $I_B$ - $T_j$**

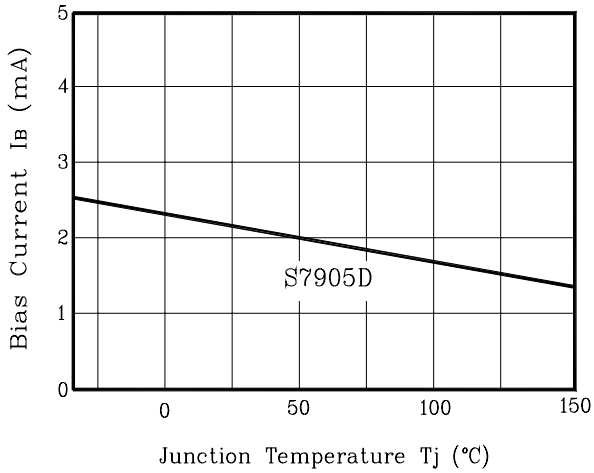



**Fig. 4 $V_{OUT}$ - $T_j$**

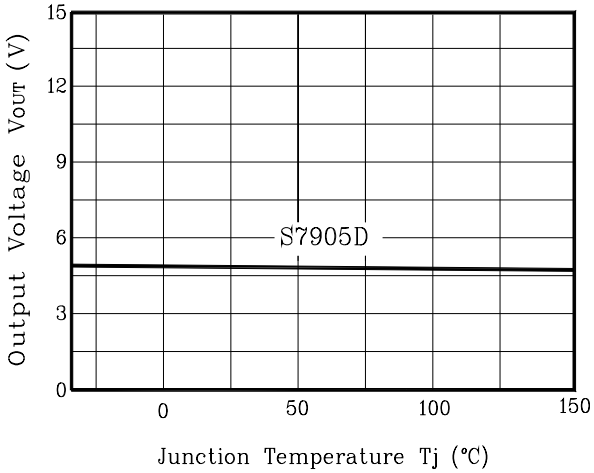
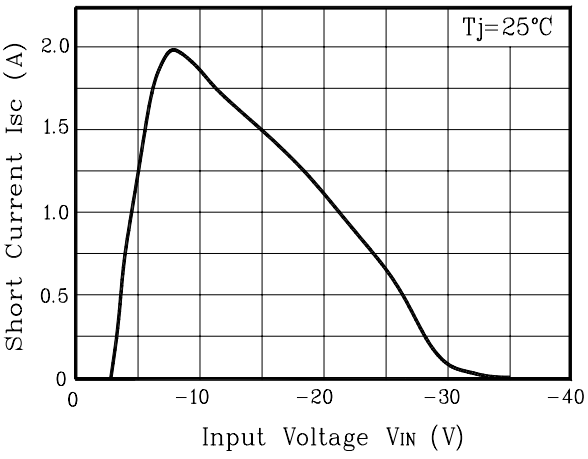



**Fig. 5 $I_{SC}$ - $V_{IN}$**



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