# KA79XX/KA79XXA

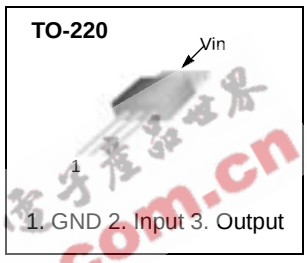
## 3-Terminal 1A Negative Voltage Regulator

### Features

- Output Current in Excess of 1A
- Output Voltages of -5, -6, -8, -9, -10, -12, -15, -18 , -24V
- Internal Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating Area Compensation

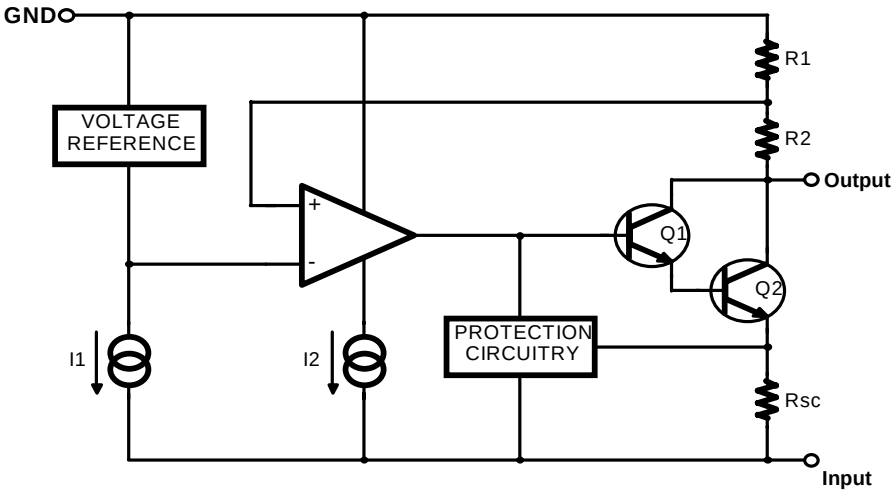
### Description

The KA79XX/KA79XXA series of three-terminal negative regulators are available in TO-220 package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shutdown and safe operating area protection, making it essentially indestructible.






### Internal Block Digram



## Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Input Voltage | $V_I$ | -35 | V |
| Thermal Resistance Junction-Case (Note1) | $R_{\theta JC}$ | 5 | °C/W |
| Thermal Resistance Junction-Air (Note1, 2) | $R_{\theta JA}$ | 65 | °C/W |
| Operating Temperature Range | $T_{OPR}$ | 0 ~ +125 | °C |
| Storage Temperature Range | $T_{STG}$ | - 65 ~ +150 | °C |

**Note:**

1. Thermal resistance test board
   Size: 76.2mm * 114.3mm * 1.6mm(1S0P)
   JEDEC standard: JESD51-3, JESD51-7
2. Assume no ambient airflow

## Electrical Characteristics (KA7905)

($V_I$ = -10V, $I_O$ = 500mA, 0°C ≤ $T_J$ ≤ +125°C, $C_I$ =2.2μF, $C_O$ =1μF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ = +25°C | | -4.8 | -5.0 | -5.2 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤15W<br>$V_I$ = -7V to -20V | | -4.75 | -5.0 | -5.25 | |
| Line Regulation (Note3) | $\Delta V_O$ | $T_J$ = +25°C | $V_I$ = -7V to -25V | - | 35 | 100 | mV |
| | | | $V_I$ = -8V to -12V | - | 8 | 50 | |
| Load Regulation (Note3) | $\Delta V_O$ | $T_J$ = +25°C, $I_O$ = 5mA to 1.5A | | - | 10 | 100 | mV |
| | | $T_J$ =+25°C, $I_O$ = 250mA to 750mA | | - | 3 | 50 | |
| Quiescent Current | $I_Q$ | $T_J$ =+25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -8V to -25V | | - | 0.1 | 0.8 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -0.4 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ = +25°C | | - | 40 | - | μV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ =+25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ =+25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ =+25°C | | - | 2.2 | - | A |

**Note**

3. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7906) (Continued)

($V_I$ = -11V, $I_O$ = 500mA, 0°C ≤ $T_J$ ≤ +125°C, $C_I$ =2.2µF, $C_O$ = 1µF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ =+25°C | | -5.75 | -6 | -6.25 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -9V to -21V | | -5.7 | -6 | -6.3 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C | $V_I$ = -8V to -25V | - | 10 | 120 | mV |
| | | | $V_I$ = -9V to -13V | - | 5 | 60 | |
| Load Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C, $I_O$ = 5mA to 1.5A | | - | 10 | 120 | mV |
| | | $T_J$ = +25°C, $I_O$ = 250mA to 750mA | | - | 3 | 60 | |
| Quiescent Current | $I_Q$ | $T_J$ = +25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -8V to -25V | | - | 0.1 | 1.3 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -0.5 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ =+25°C | | - | 130 | - | µV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ = +25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ = +25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ = +25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7908) (Continued)

($V_I$ = -14V, $I_O$ = 500mA, 0°C ≤ $T_J$ ≤ +125°C, $C_I$ =2.2µF, $C_O$ =1µF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ =+25°C | | -7.7 | -8 | -8.3 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -10V to -23V | | -7.6 | -8 | -8.4 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C | $V_I$ = -10.5V to -25V | - | 10 | 160 | mV |
| | | | $V_I$ = -11V to -17V | - | 5 | 80 | |
| Load Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C, $I_O$ = 5mA to 1.5A | | - | 12 | 160 | mV |
| | | $T_J$ = +25°C, $I_O$ = 250mA to 750mA | | - | 4 | 80 | |
| Quiescent Current | $I_Q$ | $T_J$ = +25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -10.5V to -25V | | - | 0.1 | 1 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -0.6 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ = +25°C | | - | 175 | - | µV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ =+25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ =+25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ = +25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7909) (Continued)

($V_I$ = -15V, $I_O$ = 500mA, 0°C ≤ $T_J$ ≤ +125°C, $C_I$ =2.2μF, $C_O$ =1μF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ = +25°C | | -8.7 | -9.0 | -9.3 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -1.5V to -23V | | -8.6 | -9.0 | -9.4 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ =+25°C | $V_I$ = -11.5V to -26V | - | 10 | 180 | mV |
| | | | $V_I$ = -12V to -18V | - | 5 | 90 | |
| Load Regulation (Note1) | $\Delta V_O$ | $T_J$ =+25°C, $I_O$ = 5mA to 1.5A | | - | 12 | 180 | mV |
| | | $T_J$ =+25°C, $I_O$ = 250mA to 750mA | | - | 4 | 90 | |
| Quiescent Current | $I_Q$ | $T_J$ = +25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -11.5V to -26V | | - | 0.1 | 1 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -0.6 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ = +25°C | | - | 175 | - | μV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ = +25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ = +25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ = +25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7910) (Continued)

($V_I$ = -17V, $I_O$ = 500mA, 0°C ≤$T_J$ ≤ +125°C, $C_I$ =2.2µF, $C_O$ =1µF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ = +25°C | | -9.6 | -10 | -10.4 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -12V to -28 | | -9.5 | -10 | -10.5 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C | $V_I$ = -12.5V to -28V | - | 12 | 200 | mV |
| | | | $V_I$ = -14V to -20V | - | 6 | 100 | |
| Load Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C, $I_O$ = 5mA to 1.5A | | - | 12 | 200 | mV |
| | | $T_J$ = +25°C, $I_O$ = 250mA to 750mA | | - | 4 | 100 | |
| Quiescent Current | $I_Q$ | $T_J$ = +25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -12.5 to -28V | | - | 0.1 | 1 | |
| Temperature Coefficient of $V_O$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -1 | - | mV/°C |
| Output Noise Voltage | $V_N$ | 10Hz ≤ f ≤ 100kHz, $T_A$ = +25°C | | - | 280 | - | µV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ = +25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ = +25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ = +25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7912) (Continued)

($V_I$ = -19V, $I_O$ = 500mA, 0°C ≤$T_J$ ≤ +125°C, $C_I$ =2.2µF, $C_O$ =1µF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ = +25°C | | -11.5 | -12 | -12.5 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -15.5V to -27V | | -11.4 | -12 | -12.6 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C | $V_I$ = -14.5V to -30V | - | 12 | 240 | mV |
| | | | $V_I$ = -16V to -22V | - | 6 | 120 | |
| Load Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C, $I_O$ = 5mA to 1.5A | | - | 12 | 240 | mV |
| | | $T_J$ =+25°C, $I_O$ = 250mA to 750mA | | - | 4 | 120 | |
| Quiescent Current | $I_Q$ | $T_J$ =+25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -14.5V to -30V | | - | 0.1 | 1 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -0.8 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ =+25°C | | - | 200 | - | µV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ = +25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ = +25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ = +25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7915) (Continued)

($V_I$ = -23V, $I_O$ = 500mA, 0°C ≤$T_J$ ≤ +125°C, $C_I$ =2.2µF, $C_O$ =1µF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ = +25°C | | -14.4 | -15 | -15.6 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -18V to -30V | | -14.25 | -15 | -15.75 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C | $V_I$ = -17.5V to -30V | - | 12 | 300 | mV |
| | | | $V_I$ = -20V to -26V | - | 6 | 150 | |
| Load Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C, $I_O$ = 5mA to 1.5A | | - | 12 | 300 | mV |
| | | $T_J$ =+25°C, $I_O$ = 250mA to 750mA | | - | 4 | 150 | |
| Quiescent Current | $I_Q$ | $T_J$ =+25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -17.5V to -30V | | - | 0.1 | 1 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -0.9 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ = +25°C | | - | 250 | - | µV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ = +25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ = +25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ = +25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7918) (Continued)

($V_I$ = -27V, $I_O$ = 500mA, 0°C ≤ $T_J$ ≤ +125°C, $C_I$ =2.2μF, $C_O$ =1μF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ = +25°C | | -17.3 | -18 | -18.7 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -22.5V to -33V | | -17.1 | -18 | -18.9 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C | $V_I$ = -21V to -33V | - | 15 | 360 | mV |
| | | | $V_I$ = -24V to -30V | - | 8 | 180 | |
| Load Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C, $I_O$ = 5mA to 1.5A | | - | 15 | 360 | mV |
| | | $T_J$ = +25°C, $I_O$ = 250mA to 750mA | | - | 5 | 180 | |
| Quiescent Current | $I_Q$ | $T_J$ = +25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -21V to -33V | | - | 0.1 | 1 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -1 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ = +25°C | | - | 300 | - | μV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ = +25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ = +25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ =+25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7924) (Continued)

($V_I$ = -33V, $I_O$ = 500mA, 0°C ≤$T_J$ ≤ +125°C, $C_I$ =2.2µF, $C_O$ =1µF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ = +25°C | | -23 | -24 | -25 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -27V to -38V | | -22.8 | -24 | -25.2 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ =+25°C | $V_I$ = -27V to -38V | - | 15 | 480 | mV |
| | | | $V_I$ = -30V to -36V | - | 8 | 180 | |
| Load Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C, $I_O$ = 5mA to 1.5A | | - | 15 | 480 | mV |
| | | $T_J$ = +25°C, $I_O$ = 250mA to 750mA | | - | 5 | 240 | |
| Quiescent Current | $I_Q$ | $T_J$ = +25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -27V to -38V | | - | 0.1 | 1 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -1 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ =+25°C | | - | 400 | - | µV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ =+25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ =+25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ =+25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7905A) (Continued)

($V_I$ = -10V, $I_O$ = 500mA, 0°C ≤$T_J$ ≤ +125°C, $C_I$ =2.2µF, $C_O$ =1µF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ = +25°C | | -4.9 | -5.0 | -5.1 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -7V to -20V | | -4.8 | -5.0 | -5.2 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C | $V_I$ = -7V to -20V<br>$I_O$ = 1A | - | 5 | 50 | mV |
| | | | $V_I$ = -8V to -12V<br>$I_O$ = 1A | - | 2 | 25 | |
| | | $V_I$ = -7.5V to -25V | | - | 7 | 50 | |
| | | $V_I$ = -8V to -12V, $I_O$=1A | | - | 7 | 50 | |
| Load Regulation (Note1) | $\Delta V_O$ | $I_O$ = 5mA to 1.5A<br>$T_J$ = +25°C | | - | 10 | 100 | mV |
| | | $T_J$ =+25°C, $I_O$ = 250mA to 750mA | | - | 3 | 50 | |
| Quiescent Current | $I_Q$ | $T_J$ =+25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -8V to -25V | | - | 0.1 | 0.8 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -0.4 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ =+25°C | | - | 40 | - | µV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ = +25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ = +25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ = +25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7912A) (Continued)

($V_I$ = -19V, $I_O$ = 500mA, 0°C ≤$T_J$ ≤ +125°C, $C_I$ =2.2µF, $C_O$ =1µF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ =+25°C | | -11.75 | -12 | -12.25 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -15.5V to -27V | | -11.5 | -12 | -12.5 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C | $V_I$ = -14.5V to -27V<br>Io = 1A | - | 12 | 120 | mV |
| | | | $V_I$= -16V to -22V<br>Io = 1A | - | 6 | 60 | |
| | | $V_I$ = -14.8V to -30V | | - | 12 | 120 | |
| | | $V_I$ = -16V to -22V, Io = 1A | | - | 12 | 120 | |
| Load Regulation (Note1) | $\Delta V_O$ | $T_J$ =+25°C, $I_O$ = 5mA to 1.5A | | - | 12 | 150 | mV |
| | | $T_J$ =+25°C, $I_O$ = 250mA to 750mA | | - | 4 | 75 | |
| Quiescent Current | $I_Q$ | $T_J$ =+25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -15V to -30V | | - | 0.1 | 1 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -0.8 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ =+25°C | | - | 200 | - | µV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ =+25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ =+25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ =+25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7915A) (Continued)

($V_I$ = -23V, $I_O$ = 500mA, 0°C ≤$T_J$ ≤ +125°C, $C_I$ =2.2μF, $C_O$ =1μF, unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | $T_J$ = +25°C | | -14.7 | -15 | -15.3 | V |
| | | $I_O$ = 5mA to 1A, $P_O$ ≤ 15W<br>$V_I$ = -18V to -30V | | -14.4 | -15 | -15.6 | |
| Line Regulation (Note1) | $\Delta V_O$ | $T_J$ =+25°C | $V_I$ = -17.5V to -30V<br>Io = 1A | - | 12 | 150 | mV |
| | | | $V_I$ = -20V to -26V<br>Io = 1A | - | 6 | 75 | |
| | | $V_I$ = -17.9V to -30V | | - | 12 | 150 | |
| | | $V_I$ = -20V to -26V, Io = 1A | | - | 6 | 150 | |
| Load Regulation (Note1) | $\Delta V_O$ | $T_J$ = +25°C, $I_O$ = 5mA to 1.5A | | - | 12 | 150 | mV |
| | | $T_J$ = +25°C, $I_O$ = 250mA to 750mA | | - | 4 | 75 | |
| Quiescent Current | $I_Q$ | $T_J$ =+25°C | | - | 3 | 6 | mA |
| Quiescent Current Change | $\Delta I_Q$ | $I_O$ = 5mA to 1A | | - | 0.05 | 0.5 | mA |
| | | $V_I$ = -18.5V to -30V | | - | 0.1 | 1 | |
| Temperature Coefficient of $V_D$ | $\Delta Vo/\Delta T$ | $I_O$ = 5mA | | - | -0.9 | - | mV/°C |
| Output Noise Voltage | $V_N$ | f = 10Hz to 100kHz, $T_A$ =+25°C | | - | 250 | - | μV |
| Ripple Rejection | RR | f = 120Hz, $\Delta V_I$ = 10V | | 54 | 60 | - | dB |
| Dropout Voltage | $V_D$ | $T_J$ = +25°C, $I_O$ = 1A | | - | 2 | - | V |
| Short Circuit Current | $I_{SC}$ | $T_J$ =+25°C, $V_I$ = -35V | | - | 300 | - | mA |
| Peak Current | $I_{PK}$ | $T_J$ =+25°C | | - | 2.2 | - | A |

**Note**

1. Load and line regulation are specified at constant junction temperature. Changes in $V_O$ due to heating effects must be taken into account separately. Pulse testing with low duty is used.

# Typical Performance Characteristics

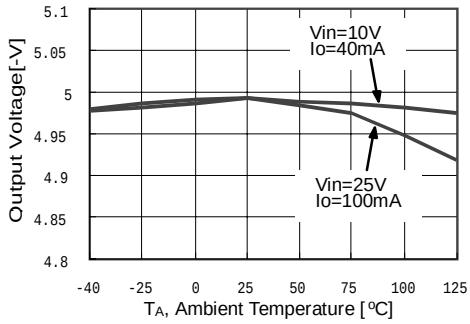



**Figure 1. Output Voltage**

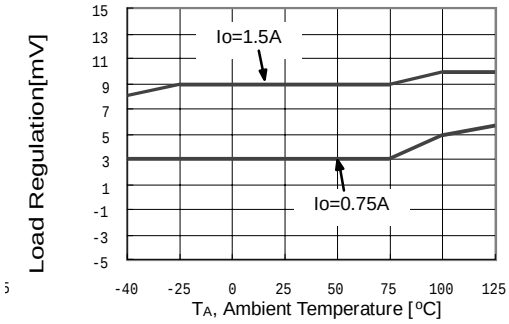



**Figure 2. Load Regulation**

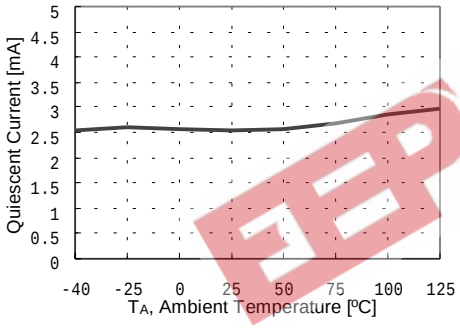



**Figure 3. Quiescent Current**

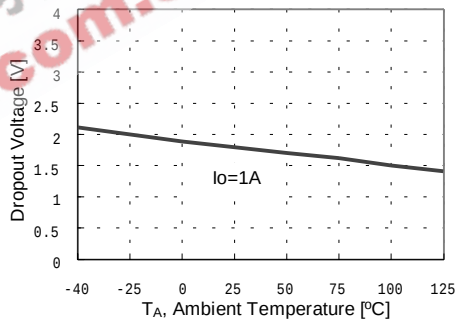



**Figure 4. Dropout Voltage**

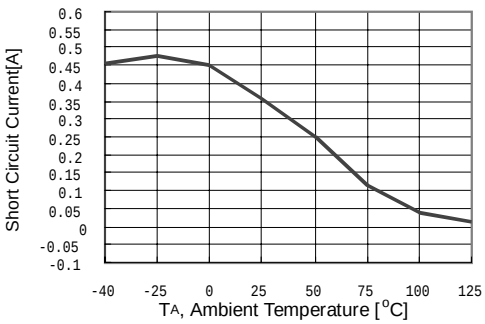



**Figure 5. Short Circuit Current**

# Typical Applications

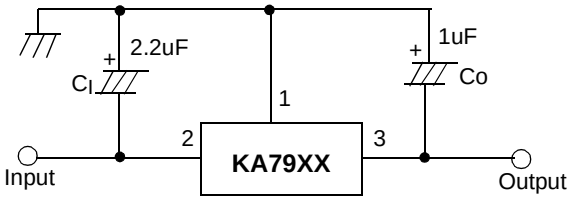



**Figure 6. Negative Fixed output regulator**

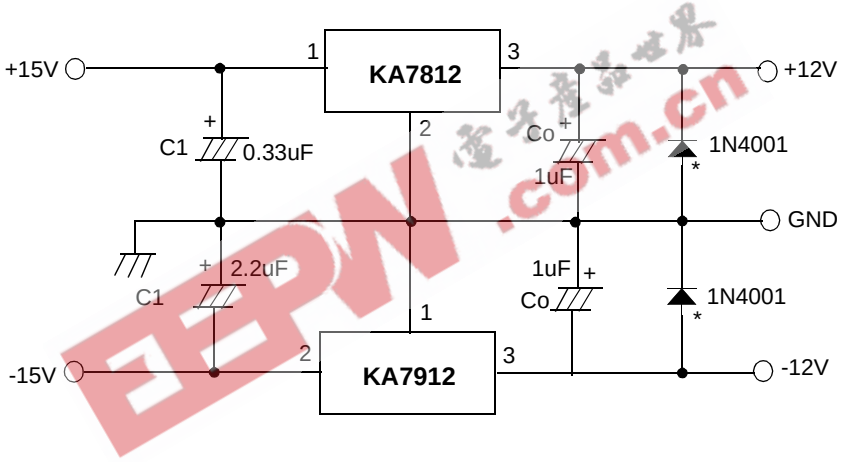



**Figure 7. Split power supply ( ± 12V/1A)**

**Note:**

(1) To specify an output voltage, substitute voltage value for "XX "

(2) Required for stability. For value given, capacitor must be solid tantalum. If aluminium electronics are used, at least ten times value shown should be selected. $C_I$ is required if regulator is located an appreciable distance from power supply filter.

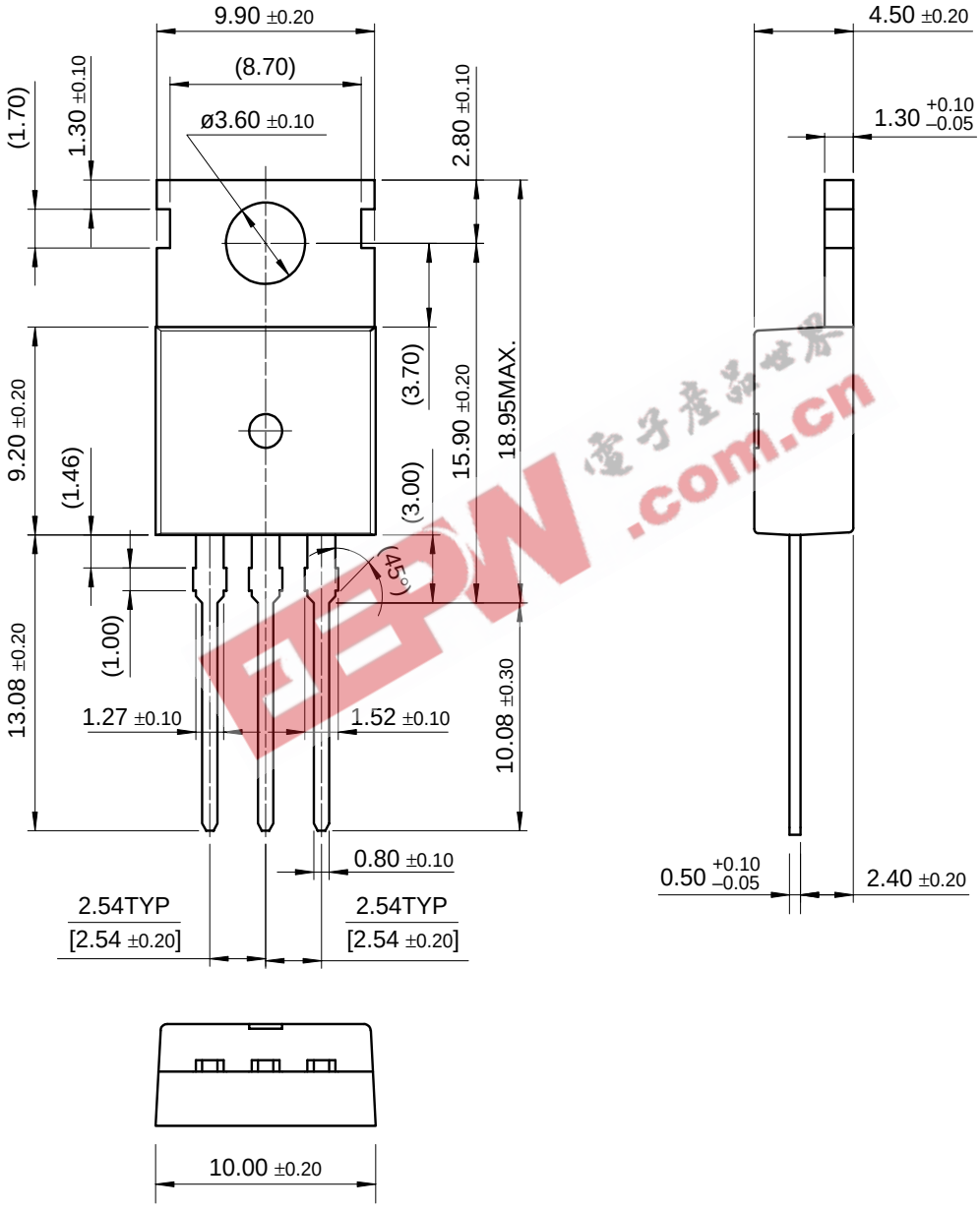
(3) To improve transient response. If large capacitors are used, a high current diode from input to output (1N400l or similar) should be introduced to protect the device from momentary input short circuit.

# Mechanical Dimensions

## Package

**Dimensions in millimeters**

### TO-220



## Ordering Information

| Product Number | Output Voltage Tolerance | Package | Operating Temperature |
|---|---|---|---|
| KA7905 | ±4% | TO-220 | 0 ~ +125°C |
| KA7906 | | | |
| KA7908 | | | |
| KA7909 | | | |
| KA7910 | | | |
| KA7912 | | | |
| KA7915 | | | |
| KA7918 | | | |
| KA7924 | | | |
| KA7905A | ±2% | | |
| KA7912A | | | |
| KA7915A | | | |

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.



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