# KA7630/KA7631

## Fixed Multi-Output Regulator

## Features

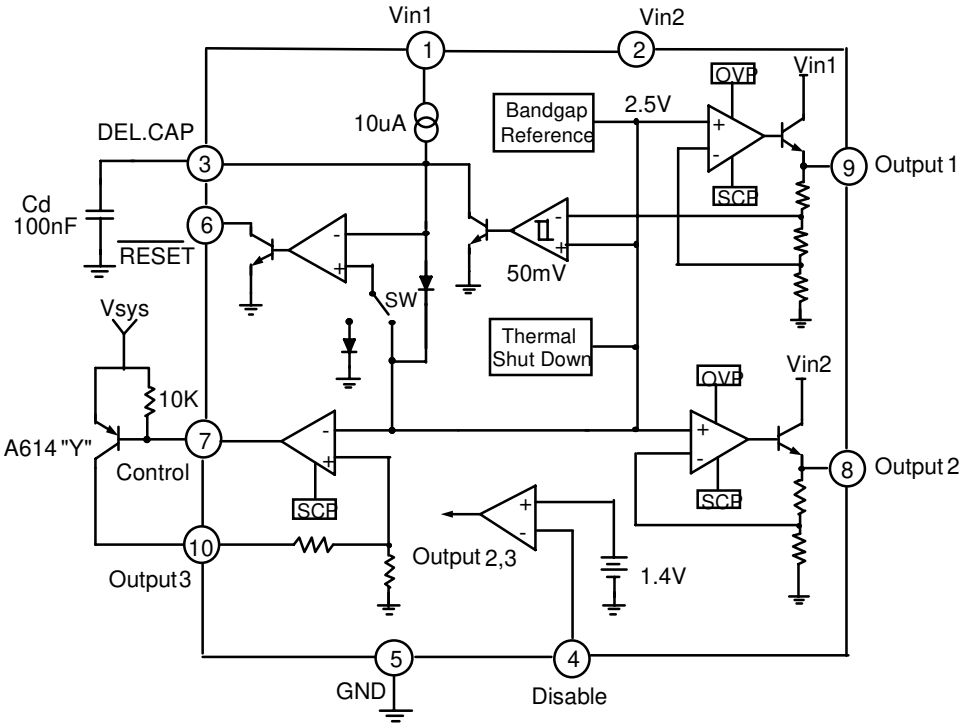
- Output Currents up to 0.5A (Output1 & 2)
- Output Current up to 1A with External Transistor (Output3)
- Fixed Precision Output 1 Voltage 5.1V ±2%
- Fixed Precision Output 2 Voltage 8V ±2% (KA7630)
- Fixed Precision Output 2 Voltage 9V ±2% (KA7631)
- Control Signal Generator for Output 3 Voltage (12V ±2%)
- Reset Facility for Output Voltage1
- Output 2,3 with Disable by TTL Input
- Current Limit Protection at Each Output
- Thermal Shut Down

## Description

The KA7630/KA7631 is a multi-output positive voltage regulator designed to provide fixed precision output voltages of 5.1V, 8V (7630) / 9V(7631) at current up to 0.5Aand 12V at current up to 1A with external PNP transistor.
An internal reset circuit generates a reset pulse when the output 1 decreases below the regulated value. Output2 & 3 can be disabled by TTL input. Protection features include over voltage protection, short circuit protection and thermal shutdown.

**10-SIP H/S**

## Internal Block Diagram




Rev. 1.0.1

## Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit | Remark |
|---|---|---|---|---|
| DC Input Voltage | Vin | 20 | V | - |
| Disable Input Voltage | Vc | 20 | V | - |
| Output Current | Io | 0.5 | A | - |
| Power Dissipation | Pd | 1.5 | W | No Heatsink |
| Junction Temperature | Tj | +150 | °C | - |
| Operating Temperature | Topr | 0 ~ +125 | °C | - |

## Electrical Characteristics(KA7630)

(Refer to test circuit Vin1=7.5V ,Vin2=10.5V ,Tj = +25°C, unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Output Voltage 1 | Vo1 | Io1 = 10mA<br>7.5V<Vin1<14V<br>5mA < Io1< 500mA | 5<br>4.9 | 5.1<br>5.1 | 5.2<br>5.3 | V |
| Output Voltage 2 | Vo2 | Io2 = 10mA<br>10.5V < Vin2< 18V<br>5mA < Io2 < 500mA | 7.84<br>7.7 | 8<br>8 | 8.16<br>8.3 | V |
| Dropout Output Voltage 1,2 | Vd1,2 | Io1,2 = 500mA | - | - | 2.5 | V |
| Line Regulation 1,2 | ΔVo 1,2 | 7.5V < Vin1<14V<br>10.5V < Vin2 < 18V<br>Io1,2 = 200mA | - | - | 50<br>80 | mV |
| Load Regulation 1,2 | ΔVo 1,2 | 5mA < Io1< 500mA<br>5mA < Io2< 500mA | - | - | 100<br>160 | mV |
| Output Voltage 3 | Vo3 | Vsys=13V, Io3=100mA | 11.7 | 12 | 12.3 | V |
| Line Regulation 3 | ΔVo3 | 13V< Vin2 < 18V, Io3 =100mA | - | - | 120 | mV |
| Load Regulation 3 | ΔVo3 | 5mA < Io3 < 1A | - | - | 250 | mV |
| Reset Pulse Delay | Trd | Cd = 100nF, Note1 | - | 25 | - | ms |
| Saturation Voltage in Reset Condition | VrL | I6 = 5mA | - | - | 0.4 | V |
| Leakage Current at Pin 6 | IrH | V6 = 10V | - | - | 10 | μA |
| Output Voltage Thermal Drift | STt | 0°C <Tj < +125°C , Note2 | - | 100 | | ppm/°C |
| Short Circuit Output Current | Isc1,2 | Vin1 = 7.5V ,Vin2 = 10.5V | - | - | 1.6 | A |
| Disable Voltage High | VdisH | Output 2 Active | 0.8 | - | 2.0 | V |
| Disable Voltage Low | VdisL | Output 2 Disabled | 0.8 | - | 2.0 | V |
| Disable Bias Current | Idis | 0V < Vdis < 7V | -100 | - | 2 | μA |
| Junction Temperature for TSD | Ttsd | Note 2 | - | 145 | - | °C |
| Quiescent Current | Iq | Io1 = 10mA, Output2 Disabled | - | - | 2 | mA |
| Reset Threshold Voltage | Vr | K = Vo1 | K-0.4 | K-0.25 | K -0.1 | V |
| Reset Threshold Hysteresis | Vrth | Note1 | 20 | 50 | 100 | mA |

**Notes:**

1. To check the reset circuit ,the reset output is low to discharge the delay capacitor(=Cd). it's less than Vo1-0.25V. And the reset output is high when the delay capacitor voltage linearly increased by the internal current source(10μA) if it's more than Vo1- 0.2V. The equation of delay time is same as below. Trd = (Cd × 2.5) / 10μA
2. These parameters, although guaranteed, are not 100% tested in production.

## Electrical Characteristics(KA7631) (Continued)

(Refer to test circuit Vin1=7.5V ,Vin2=11.5V ,$T_j$ = +25°C, unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Output Voltage 1 | Vo1 | Io1 = 10mA<br>7.5V < Vin1 < 14V<br>5mA < Io1 < 500mA | 5<br>4.9 | 5.1<br>5.1 | 5.2<br>5.3 | V |
| Output Voltage 2 | Vo2 | Io2 = 10mA<br>11.5V < Vin2 < 18V<br>5mA < Io2< 500mA | 8.82<br>8.65 | 9<br>9 | 9.18<br>9.35 | V |
| Dropout Output Voltage 1,2 | Vd1,2 | Io1,2 = 500mA | - | - | 2.5 | V |
| Line Regulation 1,2 | ΔVo 1,2 | 7.5V < Vin1< 14V<br>11.5V < Vin2< 18V<br>Io1,2 = 200mA | - | - | 50<br>80 | mV |
| Load Regulation 1,2 | ΔVo 1,2 | 5mA < Io1< 500mA<br>5mA < Io2 < 500mA | - | - | 100<br>160 | mV |
| Output Voltage 3 | Vo3 | Vsys =13V, Io3 = 100mA | 11.7 | 12 | 12.3 | V |
| Line Regulation 3 | ΔVo3 | 13V < Vin2 <18V, Io3 =100mA | - | - | 120 | mV |
| Load Regulation 3 | ΔVo3 | 5mA < Io3 < 1A | - | - | 250 | mV |
| Reset Pulse Delay | Trd | Cd = 100nF, Note1 | - | 25 | - | ms |
| Saturation Voltage in Reset Condition | VrL | I6 = 5mA | - | - | 0.4 | V |
| Leakage Current at Pin 6 | IrH | V6 = 10V | - | - | 10 | μA |
| Output Voltage Thermal Drift | STt | 0°C < Tj < +125°C , Note2 | - | 100 | - | ppm/°C |
| Short Circuit Output Current | Isc1,2 | Vin1 = 7.5V ,Vin2 = 11.5V | - | - | 1.6 | A |
| Disable Voltage High | VdisH | Output 2 Active | 0.8 | - | 2.0 | V |
| Disable Voltage Low | VdisL | Output 2 Disabled | 0.8 | - | 2.0 | V |
| Disable Bias Current | Idis | 0V < Vdis < 7V | -100 | - | 2 | μA |
| Junction Temperature for TSD | Ttsd | Note2 | - | 145 | - | °C |
| Quiescent Current | Iq | Io1=10mA, Output2 Disabled | - | - | 2 | mA |
| Reset Threshold Voltage | Vr | K = Vo1 | K-0.4 | K-0.25 | K -0.1 | V |
| Reset Threshold Hysteresis | Vrth | Note1 | 20 | 50 | 100 | mA |

**Notes:**

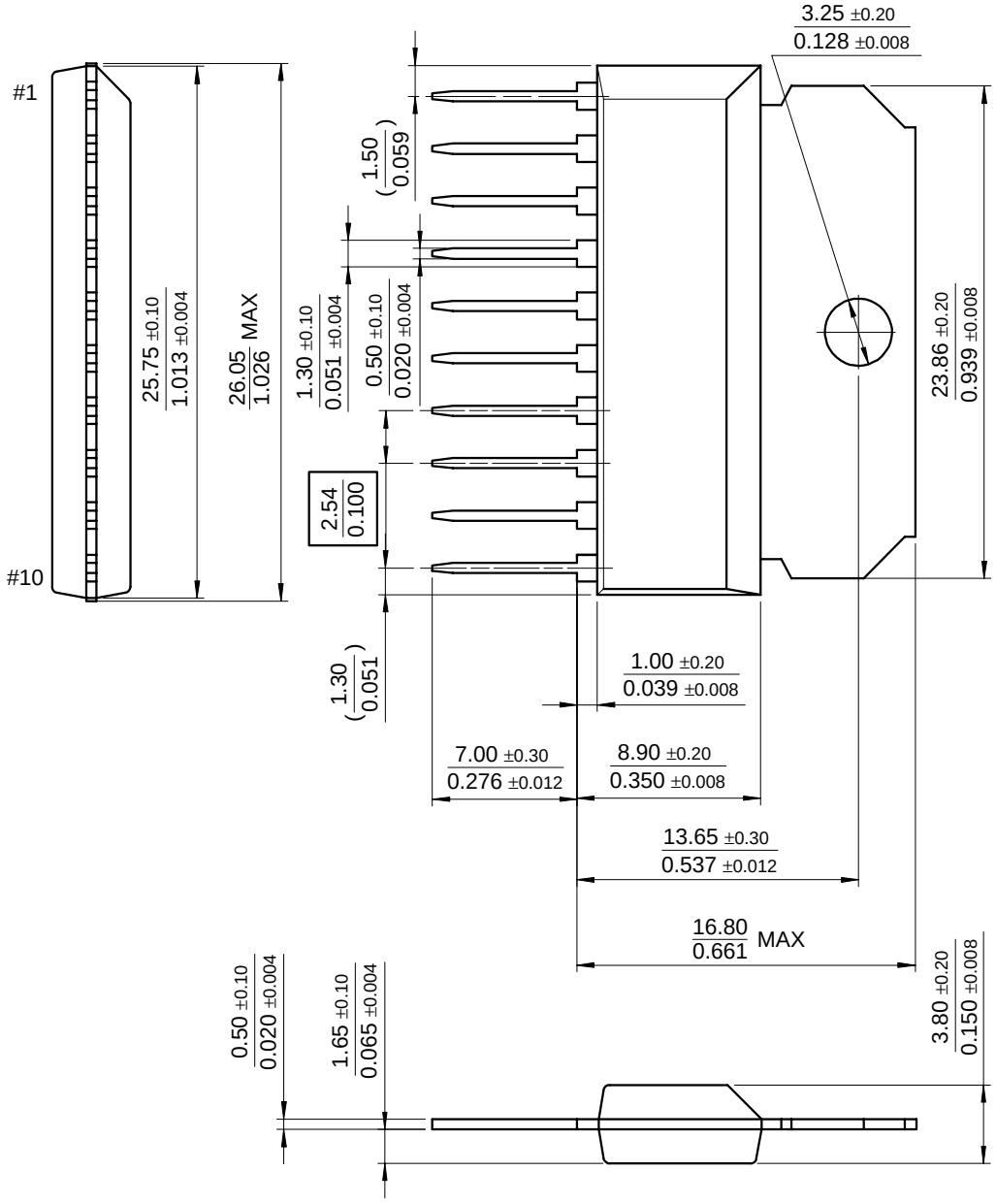
1. To check the reset circuit ,the reset output is low to discharge the delay capacitor(=Cd). if it's less than Vo1-0.25V. And the reset output is high when the delay capacitor voltage linearly increased by the internal current source(10μA) if it's more than Vo1- 0.2V. The equation of delay time is same as below. Trd = (Cd × 2.5) / 10μA
2. These parameters, although guaranteed, are not 100% tested in production.

# Mechanical Dimensions

## Package

**Dimensions in millimeters**

### 10-SIP-H/S



## Ordering Information

| Product Number | Package | Operating Temperature |
|---|---|---|
| KA7630 | 10-SIP-H/S | 0°C to +125°C |
| KA7631 | | |

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