



# THE DATASHEET OF KA723



# KA723

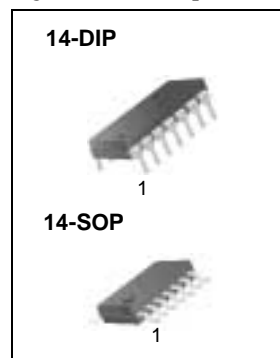
## Precision Voltage Regulator

### Features

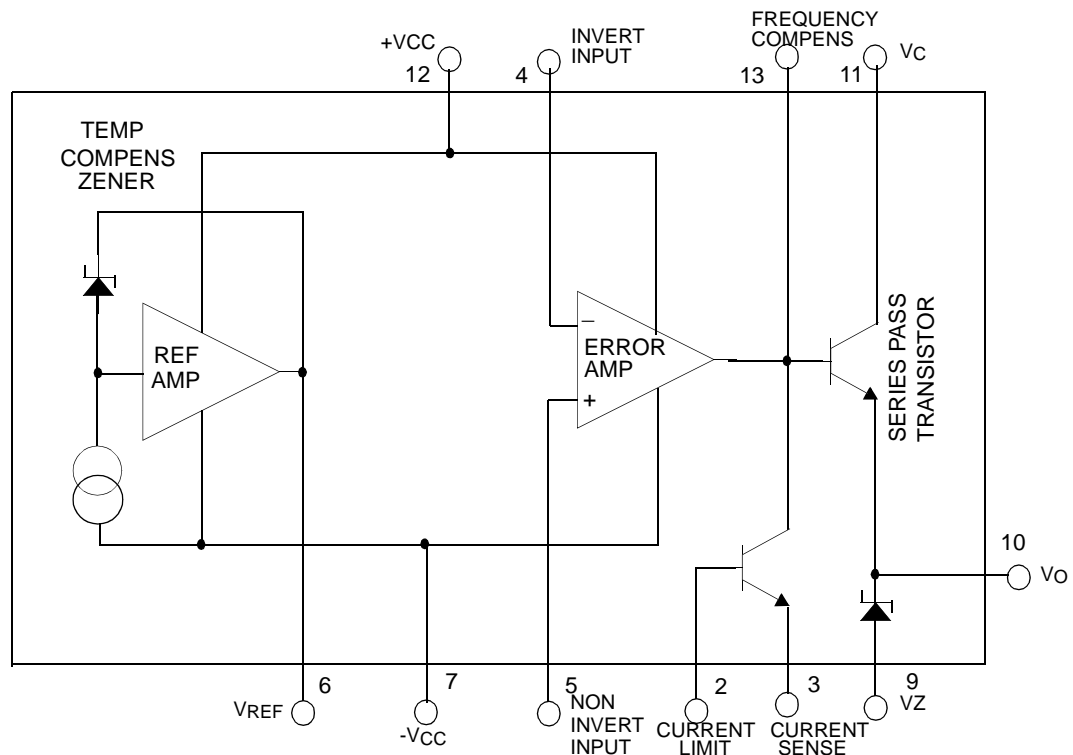
- Positive or Negative Supply Operation
- 0.01% Line and Load Regulation
- Output Voltage Adjustable from 2V to 37V
- Output Current to 150mA Without External Pass Transistor

### Description

The KA723 are monolithic integrated circuit voltage regulators featuring high ripple rejection, excellent output and load regulation, excellent temperature stability, and low standby current. The KA723 are also useful in a wide range of other applications such as a shunt regulator, a current regulator or a temperature controller.



### Internal Block Diagram



## Absolute Maximum Ratings

| Parameter                                  | Symbol      | Value      | Unit  |
|--|-------------|------------|-------|
| Pulse Voltage From V+ to V- (50ms)         | $V_{I(P)}$  | 50         | VPEAK |
| Continuous Voltage from V+ to V-           | $V_I$       | 40         | V     |
| Input-Output Voltage Differential          | $V_I - V_O$ | 40         | V     |
| Maximum Output Current                     | $I_O$       | 150        | mA    |
| Differential Input Voltage                 | $V_{ID}$    | $\pm 5$    | V     |
| Voltage Between Non-Inverting Input and V- | $V_{IE}$    | 8          | V     |
| Current From VZ                            | $I_Z$       | 25         | mA    |
| Current From VREF                          | $I_{REF}$   | 15         | mA    |
| Power Dissipation                          | PD          | 1000       | mW    |
| Operating Temperature Range                | $T_{OPR}$   | 0 ~ +70    | °C    |
| Storage Temperature Range                  | $T_{STG}$   | -65 ~ +150 | °C    |

## Electrical Characteristics

(Unless otherwise specified,  $T_A = 25^\circ\text{C}$ ,  $V_{IN} = V^+ = V_C = 12\text{V}$ ,  $V^- = 0$ ,  $V_{OUT} = 5\text{V}$ ,  $I_L = 1\text{mA}$ ,  $R_{SC} = 0$ ,  $C_I = 100\text{pF}$ ,  $C_{REF} = 0$  and divider impedance as seen by error amplifier  $\leq 10\text{K}\Omega$  connected as shown in figure 1)

| Parameter   | Symbol                  | Conditions   | Min. | Typ.        | Max.       | Unit            |
|---|-------------------------|--|------|-------------|------------|-----------------|
| Line Regulation                                   | $\Delta V_O$            | $V_I = 12\text{V to } 15\text{V}$<br>$V_I = 12\text{V to } 40\text{V}$ | -    | 0.01<br>0.1 | 0.1<br>0.5 | %               |
|   |                         | $T_{MIN} \leq T_A \leq T_{MAX}$<br>$V_I = 12\text{V to } 15\text{V}$   | -    | -           | 0.3        |                 |
| Load Regulation                                   | $\Delta V_O$            | $I_O = 1\text{mA to } 50\text{mA}$                                     | -    | 0.03        | 0.2        | %               |
|   |                         | $T_{MIN} \leq T \leq T_{MAX}$<br>$I_O = 1\text{ to } 50\text{mA}$      | -    | -           | 0.6        |                 |
| Ripple Rejection                                  | dB                      | $f = 100\text{kHz to } 10\text{kHz}, C_{REF} = 0$                      | -    | 74          | -          | dB              |
|   |                         | $f = 100\text{kHz to } 10\text{kHz}, C_{REF} = 5\mu\text{F}$           | -    | 86          | -          |                 |
| Average Temperature Coefficient of Output Voltage | $\Delta V_O / \Delta T$ | $T_{MIN} \leq T \leq T_{MAX}$  | -    | 0.003       | 0.015      | %/°C            |
| Short Circuit Current Limit                       | $I_{SC}$                | $R_{SC} = 10\Omega, V_O = 0$   | -    | 65          | -          | mA              |
| Reference Voltage                                 | $V_{REF}$               | -  | 6.80 | 7.15        | 7.50       | V               |
| Output Noise Voltage                              | $V_N$                   | $f = 100\text{kHz to } 10\text{kHz}, C_{REF} = 0$                      | -    | 20          | -          | $\mu\text{Vms}$ |
|   |                         | $f = 100\text{kHz to } 10\text{kHz}, C_{REF} = 5\mu\text{F}$           | -    | 2.5         | -          |                 |
| Long-term Stability                               | ST                      | -  | -    | 0.1         | -          | %/<br>1000HR    |
| Standby Current Drain                             | $I_D$                   | $I_L = 0, V_I = 30\text{V}$  | -    | 2.0         | 4.0        | mA              |
| Input Voltage Range                               | $V_I$                   | -  | 9.5  | -           | 40         | V               |
| Output Voltage Range                              | $V_O$                   | -  | 2.0  | -           | 37         | V               |
| Input-Output Voltage Differential                 | $V_D$                   | -  | 3.0  | -           | 38         | V               |

### Notes:

- 1.Line and load regulation specifications are given for the condition of constant chip temperature.
- 2.Temperature drifts must be taken into account separately for hit dissipation conditions.

## Typical Application

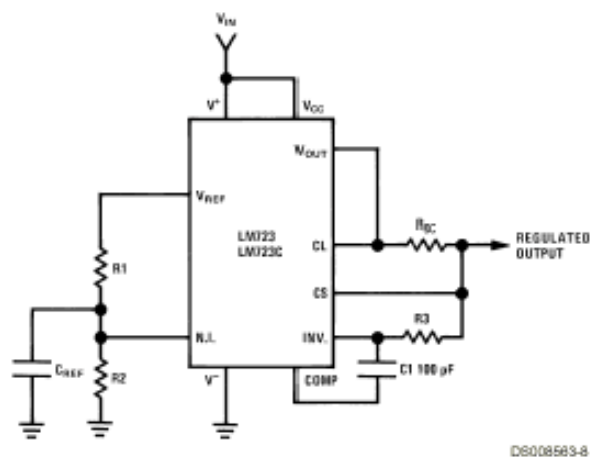


Figure 1. Basic Low Voltage Regulator  
(V<sub>OUT</sub> = 2 to 7Volts)

**Note:**  $R3 = \frac{R1R2}{R1 + R2}$  for minimum temperature drift

## Typical Performance

Regulated Output Voltage 5V

Line regulation (  $\Delta V_{IN} = 3V$  ) 0.5mV

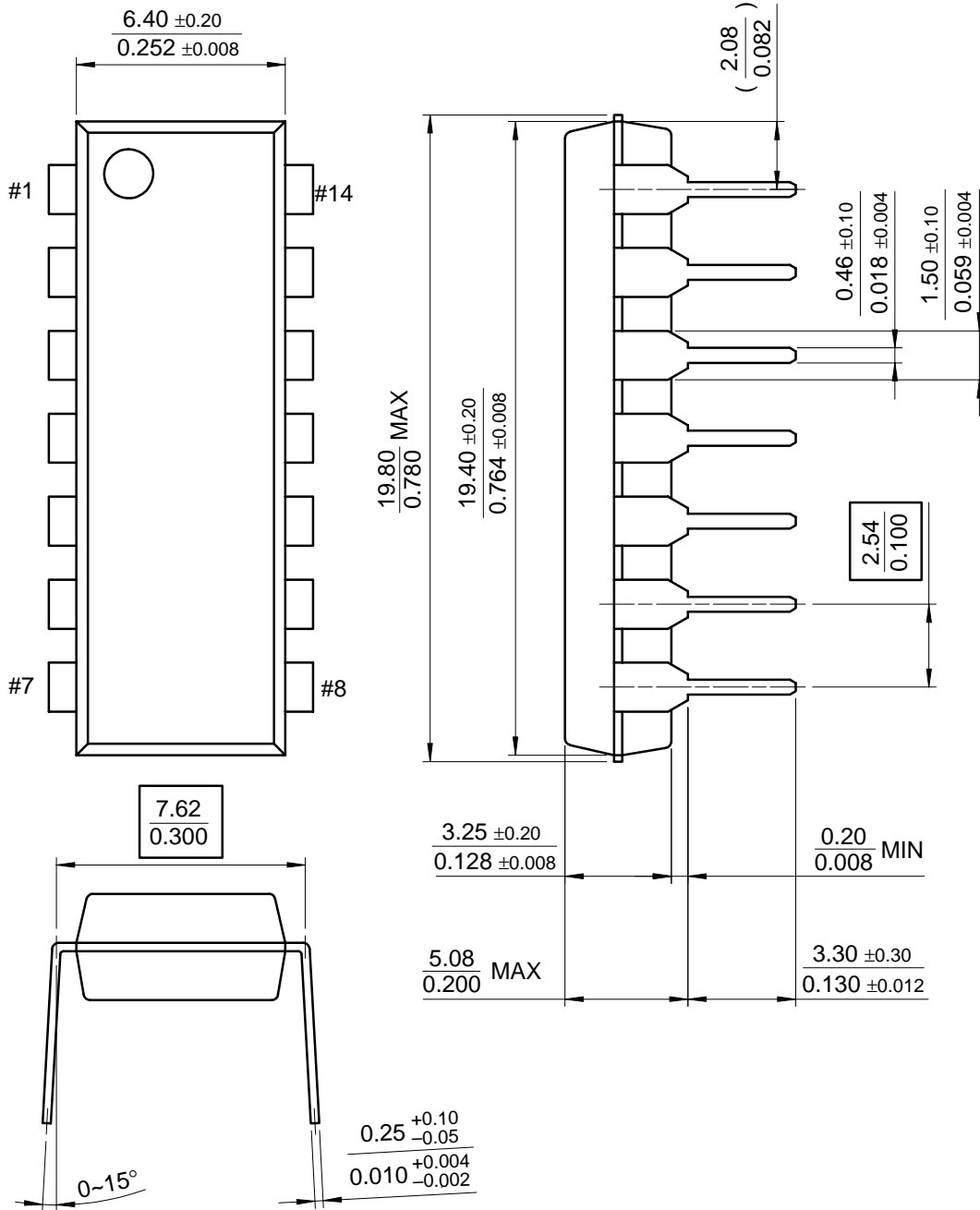
Load Regulation (  $\Delta V_L = 50V$  ) 1.5mV

# Mechanical Dimensions

## Package

Dimensions in millimeters

### 14-DIP

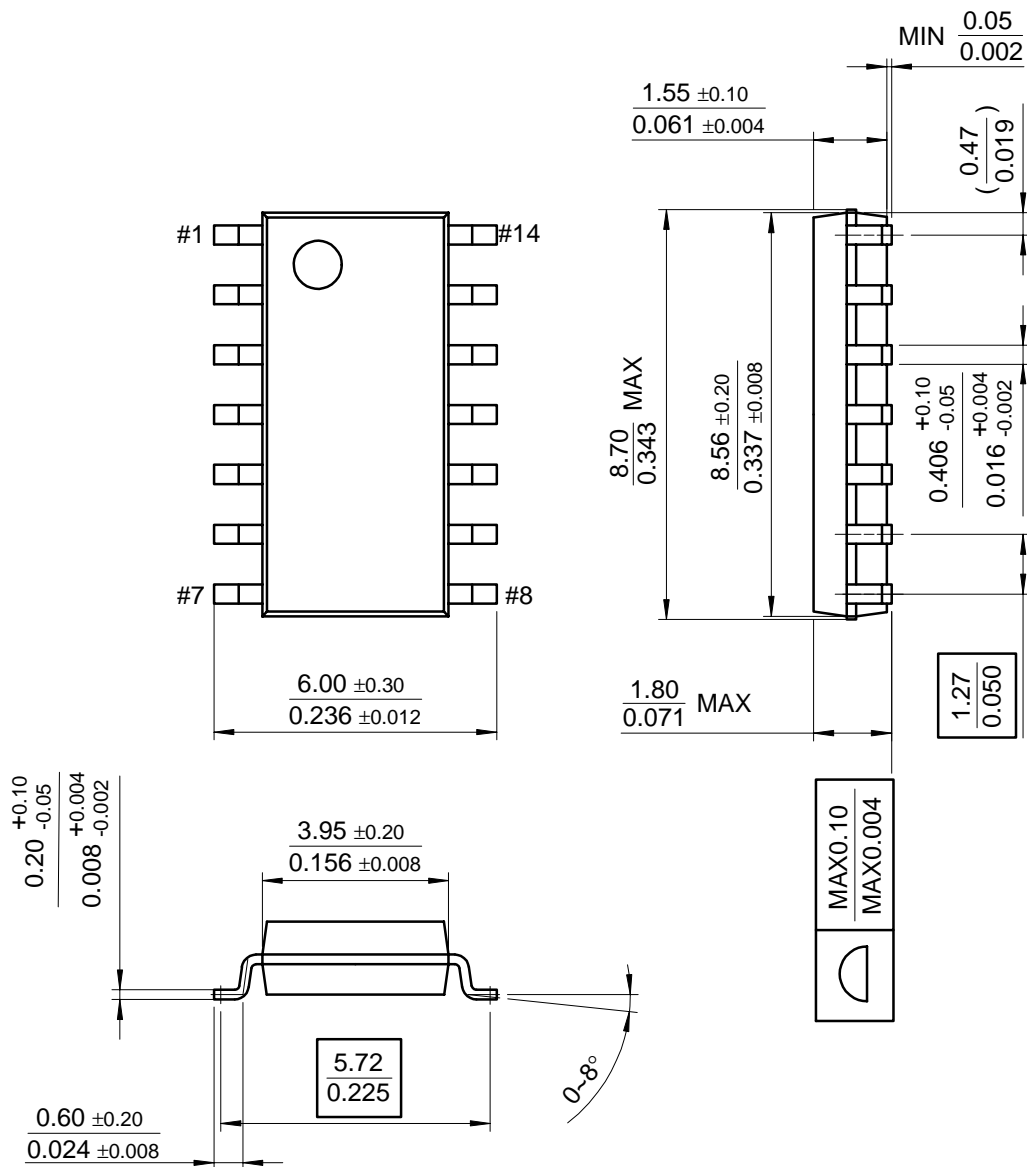


# Mechanical Dimensions (Continued)

Package

Dimensions in millimeters

## 14-SOP



## Ordering Information

| Product Number | Package | Operating Temperature |
|----------------|---------|-----------------------|
| KA723          | 14-DIP  | 0 ~ +70°C             |
| KA723D         | 14-SOP  |                       |

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