# UTC UNISONIC TECHNOLOGIES CO., LTD

## **UC723**

#### LINEAR INTEGRATED CIRCUIT

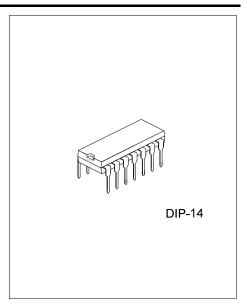
## ADJUSTABLE VOLTAGE REGULATOR

#### DESCRIPTION

The UTC UC723 is a silicon monolithic integrated circuit, designed for service as voltage regulator at output voltages, ranging from 2V ~ 37V at current up to 150mA. It includes a temperature-compensated reference amplifier, an error amplifier, a power series pass transistor, and a current-limiting circuit.

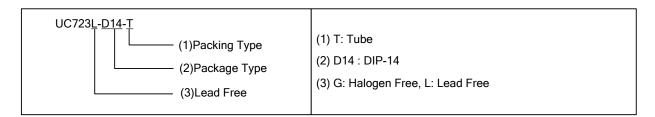
### **FEATURES**

- \*Up to 150mA Output Current
- \*Adjustable Output Voltage (From 2V ~ 37V)
- \*Positive and Negative Voltage Regulation
- \*Regulation in Excess of 10A with Suitable Pass Transistors
- \*Input and Output Short-Circuit Protection



#### ORDERING INFORMATION

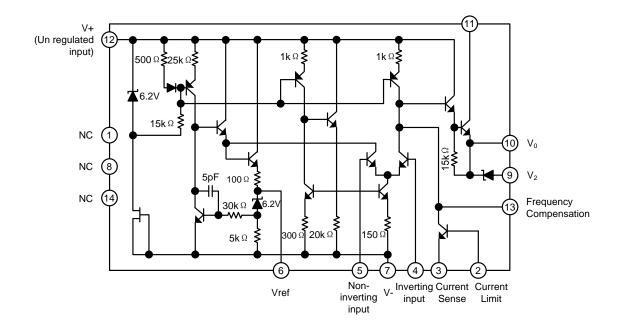
| Ordering Number |              | Dookogo | Doolsing |  |
|-----------------|--------------|---------|----------|--|
| Lead free       | Halogen Free | Package | Packing  |  |
| UC723L-D14-T    | UC723G-D14-T | DIP-14  | Tube     |  |



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<sup>\*</sup>Load and Line Regulation< 0.03%

#### ■ BLOCK DIAGRAM



#### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C)

| PARAMETER  | SYMBOL           | VALUE     | UNIT |
|--|------------------|-----------|------|
| Supply Voltage(between V+ and V-)                                    | Vcc              | 40        | V    |
| Pulse Voltage for 50ms   | $V_{PULSE}$      | 50        | V    |
| Differential Input-Output Voltage                                    | $V_D$            | 40        | V    |
| Different Input Voltage (Between inverting and non-inverting inputs) | V <sub>ID</sub>  | ±5        | V    |
| Different Input Voltage (Between Non-inverting Input and V-)         | V <sub>ID</sub>  | 8         | V    |
| Current from Zener Diode Terminal                                    | lz               | 25        | mA   |
| Power Dissipation  | P <sub>D</sub>   | 900       | mW   |
| Operating Temperature  | T <sub>OPR</sub> | 0 ~ 70    | °C   |
| Storage Temperature  | T <sub>STG</sub> | -40 ~ 150 | °C   |
| Junction Temperature   | TJ               | 125       | °C   |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

#### ■ ELECTRICAL CHARACTERISTICS

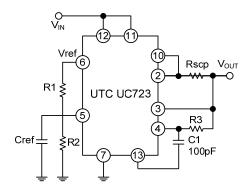
 $(T_A=25^{\circ}C, V+=V_C=V_{IN}=12V, V_{OUT}=5V, I_L=1mA, C1=100Pf, C_{REF}=0, R_{SCP}=0, unless otherwise specified, divider impedance R1*R2 / (R1+R2) at non-inverting input, terminal 5=10K<math>\Omega$ )

| impedance it itz / (itiitz) at nen inve | 9                                  | 101111111111111111111111111111111111111                 |      |       |       |          |  |
|---|------------------------------------|---|------|-------|-------|----------|--|
| PARAMETER                               | SYMBOL                             | TEST CONDITIONS   | MIN  | TYP   | MAX   | UNIT     |  |
| Quiescent Regulator Current             | I <sub>CCQ</sub>                   | $I_L=0, V_{IN}=30V$                                     |      | 2.3   | 3.5   | mA       |  |
| Input Voltage Range                     | $V_{IN}$                           |   | 9.5  |       | 40    | V        |  |
| Output Voltage Range                    | $V_{OUT}$                          |   | 2    |       | 37    | <b>V</b> |  |
| Differential Input-Output Voltage       | $V_{\text{IN}}$ - $V_{\text{OUT}}$ |   | 3    |       | 38    | <b>V</b> |  |
| Reference Voltage                       | $V_{REF}$                          |   | 6.95 | 7.15  | 7.35  | V        |  |
| Line Regulation (Note 1)                |                                    | V <sub>IN</sub> =12V ~ 40V                              |      | 0.6   | 1     | %Vo      |  |
|   |                                    | V <sub>IN</sub> =12V ~ 15V                              |      | 0.01  | 0.1   |          |  |
|   |                                    | V <sub>IN</sub> =12V ~ 15V, T <sub>A</sub> =-55~125°C   |      |       |       |          |  |
| 1 15 1 1 (1)                            | $\Delta V_OUT$                     | I <sub>L</sub> =1mA ~ 50mA                              |      | 0.03  | 0.15  | %Vo      |  |
| Load Regulation (Note 1)                |                                    | I <sub>L</sub> =1mA ~ 50mA, T <sub>A</sub> =-55 ~ 125°C |      |       | 0.6   |          |  |
| Output Voltage Temperature Coefficient  | $\Delta V_{OUT}$                   | T <sub>A</sub> =-55~125°C                               |      | 0.002 | 0.015 | %/°C     |  |
|   | RR                                 | f=50Hz ~ 10KHz  |      | 74    |       | dB       |  |
| Ripple Rejection (Note 2)               |                                    | f=50Hz ~ 10KHz, C <sub>REF</sub> =5μF                   |      | 86    |       |          |  |
|   |                                    | T <sub>MIN</sub> <t<sub>TYP<t<sub>MAX</t<sub></t<sub>   |      | 2.5   |       |          |  |
| Short Circuit Limiting Current          | I <sub>LIM</sub>                   | $R_{SCP}=10\Omega$ , $V_{OUT}=0$                        | •    | 65    |       | mA       |  |
| Equivalent Noise RMS output Voltage     | l VN                               | BW=100Hz ~ 10KHz, C <sub>REF</sub> =0                   |      | -20   |       |          |  |
| (Note 2)                                |                                    | BW=100Hz ~ 10KHz, C <sub>REF</sub> =5μF                 |      | 2.5   |       | μV       |  |

Note 1: Line and load regulation specifications are given for conditions of a constant chip temperature. For high dissipation condition, temperature drifts must be separately taken in account.

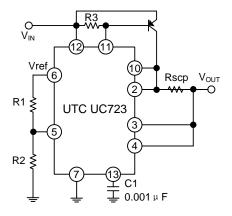
2: For C<sub>REF</sub>, see Fig. 1

#### APPLICATION CIRCUIT



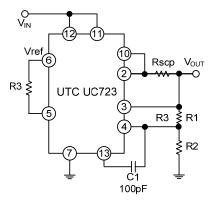
Regulator Output Voltage=5V Line Regulation (  $\triangle$  V<sub>IN</sub>=3V)=0.5mV Load Regulation (  $\triangle$  I<sub>L</sub>=50mA)=1.5mA Note R3=R1\*R2/(R1+R2)for Minmum temperature drift

Fig. 1 Low Voltage Regulator circuit (V<sub>OUT</sub> = 2V ~ 7V)



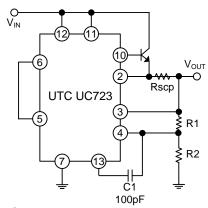
Regulator Output Voltage=5V Line Regulation ( $\Delta$  V<sub>IN</sub>=3V)=0.5mV Load Regulation ( $\Delta$  I<sub>L</sub>=1A)=5mA

Fig. 3 Positive Voltage Regulator circuit (with external p-n-p pass transistor)



Regulator Output Voltage=5V Line Regulation ( $\Delta$ V<sub>IN</sub>=3V)=1.5mV Load Regulation ( $\Delta$ I<sub>L</sub>=50mA)=4.5mA Note R3=R1\*R2/(R1+R2)for Minmum temperature drift

Fig. 2 High Voltage Regulator circuit ( $V_{OUT} = 7V \sim 37V$ )



Regulator Output Voltage=15V Line Regulation (  $\triangle$  V<sub>IN</sub>=3V)=1.5mV Load Regulation (  $\triangle$  I<sub>L</sub>=1A)=15mA

Fig. 4 Positive Voltage Regulator circuit (with external n-p-n pass transistor)

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