

# UTC UC723 LINEAR INTEGRATED CIRCUIT

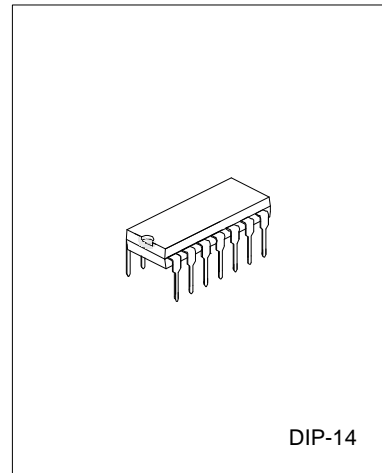
## ADJUSTABLE VOLTAGE REGULATOR

### DESCRIPTION

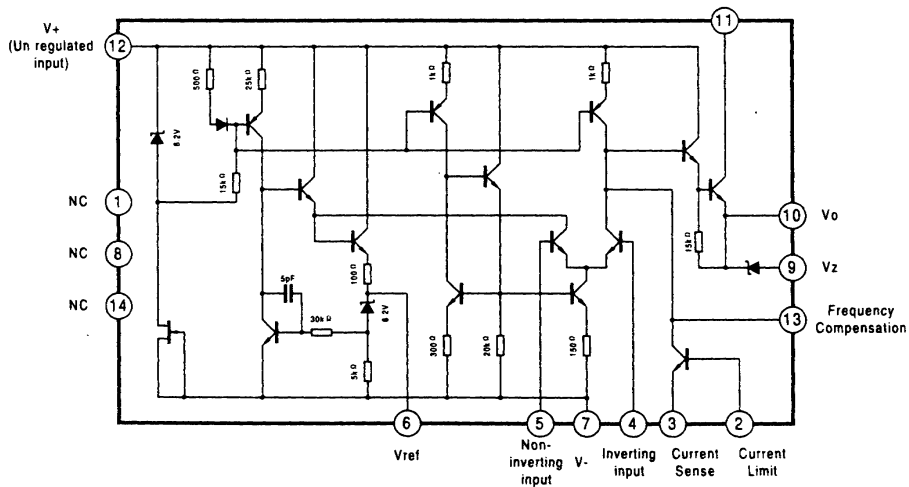
The UTC UC723 is a silicon monolithic integrated circuit, designed for service as voltage regulator at output voltages, ranging from 2V to 37V at current up to 150mA. It includes a temperature-compensated reference amplifier, an error amplifier, a power series pass transistor, and a current-limiting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

### FEATURES

- \*Up to 150mA output current
- \*Adjustable output voltage (from 2V to 37V)
- \*Positive and negative voltage regulation
- \*Regulation in excess of 10A with suitable pass transistors
- \*Input and output short-circuit protection
- \*Load and line regulation < 0.03%



### BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS( $T_a=25^{\circ}\text{C}$ )

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage(between V+ and V-)	V <sub>cc</sub>	40	V
Pulse Voltage for 50ms	V <sub>pulse</sub>	50	V
Differential Input-Output Voltage	V <sub>d</sub>	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	I <sub>z</sub>	25	mA
Power Dissipation	P <sub>d</sub>	900	mW
Operating Temperature	T <sub>opr</sub>	-55 ~ 125	°C
Storage Temperature	T <sub>str</sub>	-65 ~ 150	°C

ELECTRICAL CHARACTERISTICS( $T_a=25^{\circ}\text{C}$ ,  $V_+=V_c=V_i=12\text{V}$ ,  $V_o=5\text{V}$ ,  $I_L=1\text{mA}$ ,  $C_1=100\text{Pf}$ ,  $C_{ref}=0$ ,  $R_{scp}=0$ , unless otherwise specified, divider impedance  $R_1 \cdot R_2 / (R_1 + R_2)$  at non-inverting input, terminal 5=10K $\Omega$ )

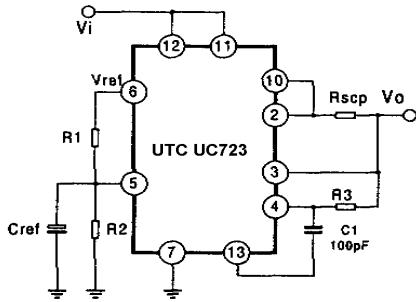
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Quiescent Regulator Current	ICCQ	$I_L=0$ , $V_i=30\text{V}$		2.3	3.5	mA
Input Voltage Range	V <sub>I</sub>		9.5		40	V
Output Voltage Range	V <sub>O</sub>		2		37	V
Differential Input-Output Voltage	V <sub>I-V<sub>O</sub></sub>		3		38	V
Reference Voltage	V <sub>REF</sub>		6.95	7.15	7.35	V
Line Regulation (note 1)	$\Delta V_O$	$V_i=12\text{V to }40\text{V}$ $V_i=12\text{V to }15\text{V}$ $V_i=12\text{V to }15\text{V}$ , $T_a=-55\sim 125^{\circ}\text{C}$		0.02 0.01	0.2 0.1	%V <sub>o</sub>
Load Regulation (note 1)	$\Delta V_O$	$I_L=1\text{mA TO }50\text{mA}$ $I_L=1\text{mA TO }50\text{mA}$ , $T_a=-55\sim 125^{\circ}\text{C}$		0.03	0.15 0.6	%V <sub>o</sub>
Output Voltage Temperature Coefficient	$\Delta V_O$	$T_a=-55\sim 125^{\circ}\text{C}$		0.002	0.015	%/°C
Ripple Rejection (note 2)	RR	$f=50\text{Hz to }10\text{KHz}$ $f=50\text{Hz to }10\text{KHz}$ , $C_{ref}=5\mu\text{F}$ $T_{min}<T_{typ}<T_{max}$		74 86 2.5		dB
Short Circuit Limiting Current	I <sub>LIM</sub>	$R_{scp}=10\Omega$ , $V_o=0$		65		mA
Equivalent Noise RMS output Voltage (note 2)	V <sub>N</sub>	$BW=100\text{Hz to }10\text{KHz}$ , $C_{ref}=0$ $BW=100\text{Hz to }10\text{KHz}$ , $C_{ref}=5\mu\text{F}$		-20 2.5		$\mu\text{V}$

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.

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

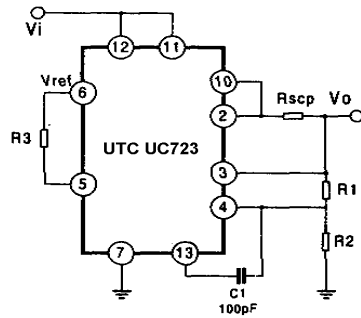
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## APPLICATION CIRCUIT



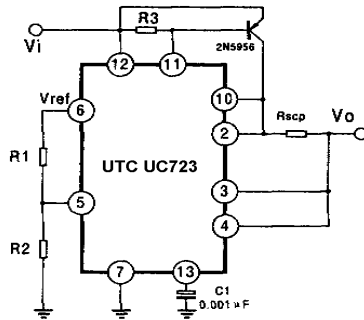
Regulator Output Voltage=5V  
 Line Regulation ( $\Delta V_i=3V$ )=0.5mV  
 Load regulation ( $\Delta I_L=50mA$ )=1.5mV  
 Note  $R_3=R_1 \cdot R_2 / (R_1 + R_2)$  for Minimum temperature drift

Fig. 1 Low Voltage Regulator circuit ( $V_o=2V$  to  $7V$ )



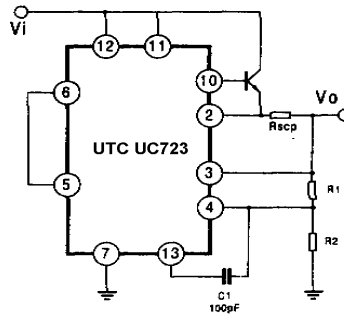
Regulator Output Voltage=5V  
 Line Regulation ( $\Delta V_i=3V$ )=1.5mV  
 Load regulation ( $\Delta I_L=50mA$ )=4.5mV  
 Note  $R_3=R_1 \cdot R_2 / (R_1 + R_2)$  for Minimum temperature drift

Fig. 2 High Voltage Regulator circuit ( $V_o=7V$  to  $37V$ )



Regulator Output Voltage=5V  
 Line Regulation ( $\Delta V_i=3V$ )=0.5mV  
 Load regulation ( $\Delta I_L=1A$ )=5mV

Fig. 3 Positive Voltage regulator Circuit  
 (with external p-n-p pass transistor)



Regulator Output Voltage=15V  
 Line Regulation ( $\Delta V_i=3V$ )=1.5mV  
 Load regulation ( $\Delta I_L=1A$ )=15mV

Fig. 4 Positive Voltage regulator Circuit  
 (with external n-p-n pass transistor)

TYPICAL PERFORMANCE CHARACTERISTICS

