

THOMSON SEMICONDUCTORS

T-58-11-23
UA723
UA723A

78C 06262 D

PRECISION ADJUSTABLE POSITIVE VOLTAGE REGULATORS

The UA723,A is a monolithic voltage regulator constructed on a single silicon chip. The device consists of a temperature compensated reference amplifier, error amplifier, power series pass transistor and current limit circuitry. Additional NPN or PNP pass elements may be used when output currents exceeding 150 mA are required. Provisions are made for adjustable current limiting and remote shut down. In addition to the above the device features low standby current drain, low temperature drift and high ripple rejection. Applications include laboratory power supplies, airborne systems and other power supplies for digital and linear circuits.

- Positive or negative supply operation.
- Series, shunt, switching or floating operation.
- 0.01% line regulation.
- Output voltage adjustable from 2 to 37 volts.
- Output current up to 150 mA without external pass transistor.

ORDERING INFORMATION

Hi-Rel versions available - See chapter 14

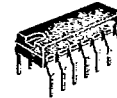
PART NUMBER	TEMPERATURE RANGE	PACKAGE			
		H	DP	FP	DG
UA723C	0°C to + 70°C	•	•	•	•
UA723I	-25°C to + 85°C	•	•	•	•
UA723M	-55°C to + 125°C	•	•	•	•
UA723AC	0°C to + 70°C	•	•	•	•
UA723AM	-55°C to + 125°C	•	•	•	•

Examples : UA723CH, UA723CDP, UA723CFP, UA723CDG

PRECISION ADJUSTABLE POSITIVE VOLTAGE REGULATORS

CASES

CB-2
(TO-116)



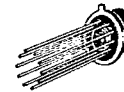
CB-511
(SO-14)



DP SUFFIX
PLASTIC PACKAGE
DG SUFFIX
CERDIP PACKAGE

FP SUFFIX
PLASTIC
MICROPACKAGE

CB-3
(TO-100)

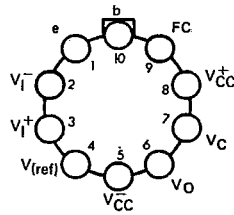


H SUFFIX
METAL CAN

PIN ASSIGNMENTS

(Bottom view)

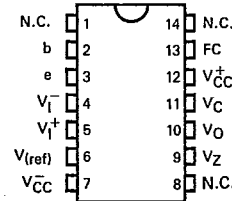
CB-3



Pin 5 is connected to case.

(Top view)

CB-2 - CB-511



THOMSON SEMICONDUCTORS
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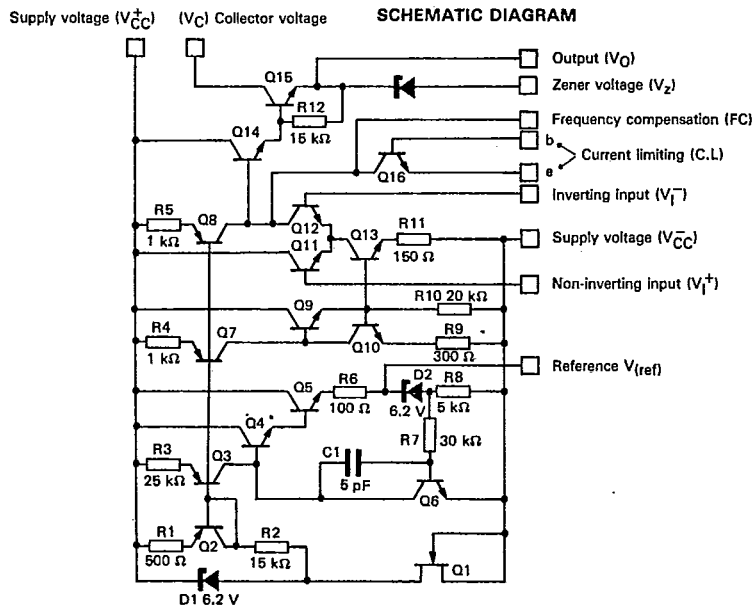
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Input voltage (Both Inputs)	V_I	40	V
Pulse voltage from V_{CC}^+ to V_{CC}^- (50 ms)	$V_I(\text{pulse})$	50	V
Input-output voltage differential	$V_I - V_O$	38	V
Output current	I_O	150	mA
Operating junction temperature range	T_{oper}	0 to + 70 -55 to + 125 -25 to + 85	°C
Storage temperature range	T_{stg}	-65 to + 150	°C
Internal power dissipation	P_D	500	mW

THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Maximum junction-case thermal resistance	$R_{th(j-c)}$	45 60 25	°C/W
Maximum junction-ambient thermal resistance	$R_{th(j-a)}$	185 150 100	°C/W
Junction ceramic-substrate (Case glued to substrate)	CB-511	90	°C/W
Junction ceramic-substrate (Case glued to substrate, substrate temperature maintained constant)	CB-511	65	°C/W

SCHEMATIC DIAGRAM



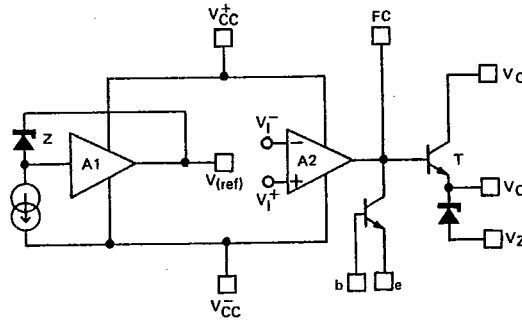
CASE	V_I^-	V_I^+	$V_{(ref)}$	V_{CC}^-	V_{CC}^+	V_Z	V_O	F.C.	C.L.	V_C	N.C.
CB-3	2	3	4	5	8	-	6	9	1, 10	7	-
CB-2, CB-511	4	5	6	7	12	9	10	13	2, 3	11	1, 8, 14

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EQUIVALENT CIRCUIT



- Z : Temperature compensated zener
- A1 : Voltage reference amplifier
- A2 : Error amplifier
- T : Series pass transistor

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, $T_{amb} = +25^{\circ}C$, $V_I = V_{CC}^+ = V_C = +12V$, $V_{CC}^- = 0$, $V_O = +5V$, $I_C = 1mA$, $R_{SC} = 0$, C_1 (compensation) = 100 pF and divider impedance as seen by error amplifier $\leq 10k\Omega$.

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

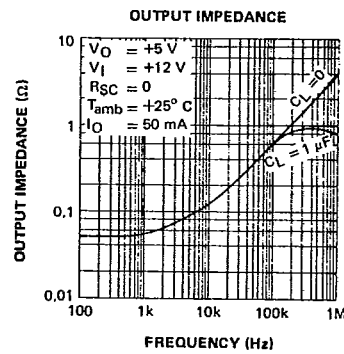
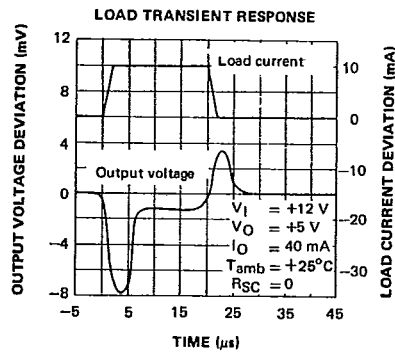
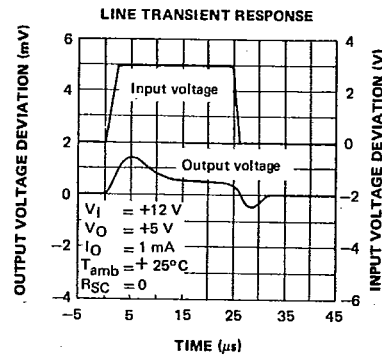
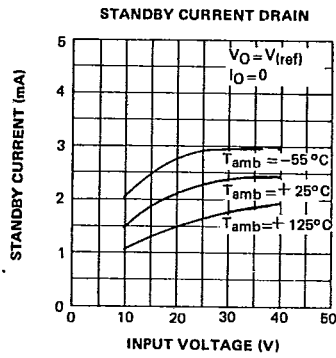
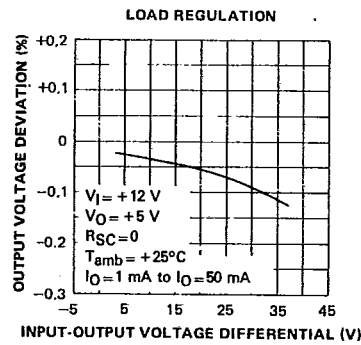
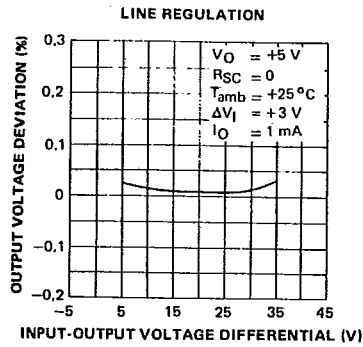
Characteristic	Symbol	UA723M			UA723C, I			Unit
		Min	Typ	Max	Min	Typ	Max	
Input voltage range	V_I	9.5	—	40	9.5	—	40	V
Output voltage range	V_O	2	—	37	2	—	37	V
Input-output voltage differential	$V_I - V_O$	3	—	38	3	—	38	V
Line regulation $T_{amb} = +25^{\circ}C$, $+12V \leq V_I \leq +15V$ $+12V \leq V_I \leq +40V$ $T_{min} \leq T_{amb} \leq T_{max}$, $+12V \leq V_I \leq +15V$	K_{VI}	—	0.01 0.02	0.1 0.2 0.3	—	0.01 0.1	0.1 0.5 0.3	%/V _O
Load regulation (1 mA $\leq I_O \leq 50$ mA) $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$	K_{VO}	—	0.03	0.15 0.6	—	0.03	0.2 0.6	%/V _O
Ripple rejection (50 Hz $\leq f \leq 10$ kHz) $C_{(ref)} = 0$ $C_{(ref)} = 5 \mu F$	R_{vf}	—	74 86	—	—	74 86	—	dB
Standby current drain ($I_O = 0$, $V_I = +30V$)	I_{IB}	—	2.3	3.5	—	2.3	4	mA
Reference voltage	$V_{(ref)}$	6.95	7.15	7.35	6.8	7.15	7.5	V
Short-circuit current ($R_{SC} = 10 \Omega$, $V_O = 0$)	I_{SC}	—	65	—	—	65	—	mA
Output noise voltage (100 Hz $\leq f \leq 10$ kHz) $C_{(ref)} = 0$ $C_{(ref)} = 5 \mu F$	V_{NO}	—	20 2.5	—	—	20 2.5	—	μV_{rms}
Average temperature coefficient of output voltage $T_{min} \leq T_{amb} \leq T_{max}$	α_{VO}	—	0.002	0.015	—	0.003	0.015	%/°C
Long term stability	K_{VH}	—	0.05 0.1	0.2	—	0.05 0.1	0.2	%/1000 H

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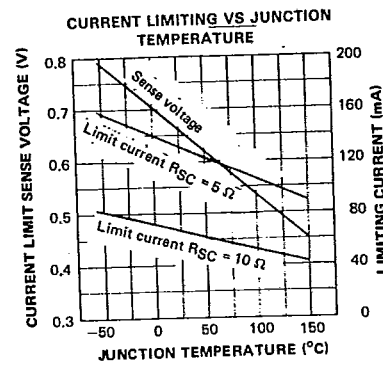
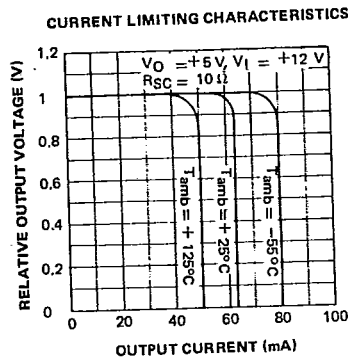
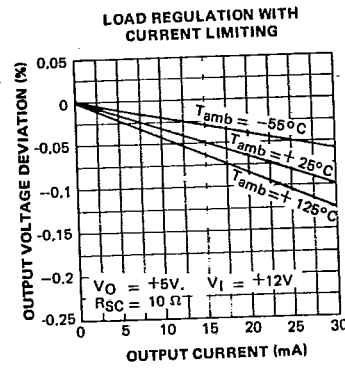
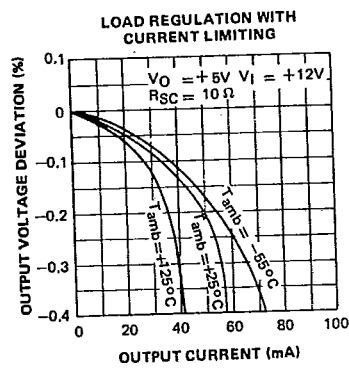
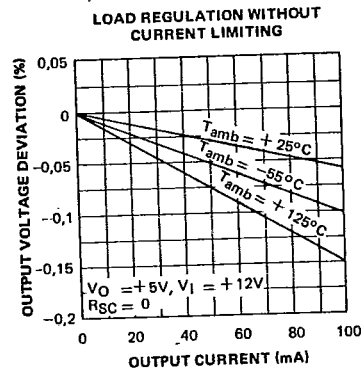
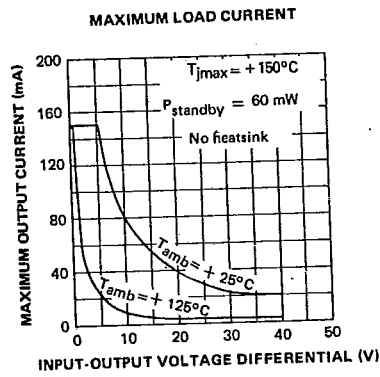
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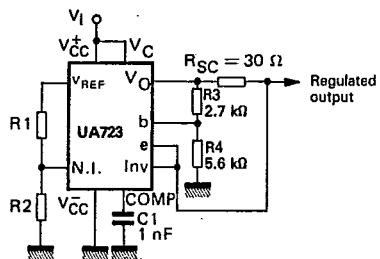
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BASIC CIRCUITS

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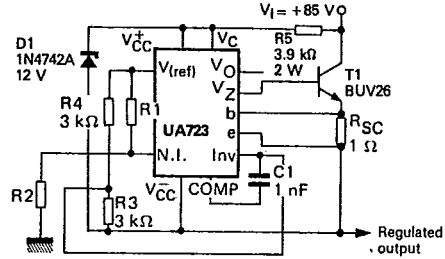
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FOLDBACK CURRENT LIMITING



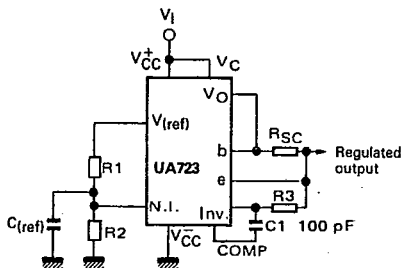
Regulated output voltage	+ 5 V
Line regulation ($\Delta V_I = 3$ V)	0.5 mV
Load regulation ($\Delta I_L = 10$ mA)	1 mV
Short-circuit current	20 mA

POSITIVE FLOATING REGULATOR



Regulated output voltage	+ 60 V
Line regulation ($\Delta V_I = 20$ V)	15 mV
Load regulation ($\Delta I_L = 50$ mA)	20 mV

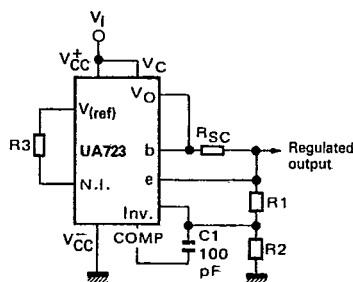
BASIC LOW VOLTAGE REGULATOR
($V_O = 2$ to 7 V)



Regulated output voltage	5 V
Line regulation ($\Delta V_I = 3$ V)	0.5 mV
Load regulation ($\Delta I_L = 50$ mA)	1.5 mV

NOTE 3 : $R_3 = \frac{R_1 R_2}{R_1 + R_2}$ for minimum temperature drift

BASIC HIGH VOLTAGE REGULATOR
($V_O = 7$ to 37 V)



Regulated output voltage	15 V
Line regulation ($\Delta V_I = 3$ V)	1.5 mV
Load regulation ($\Delta I_L = 50$ mA)	4.5 mV

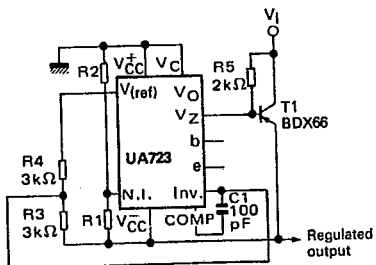
NOTE : $R_3 = \frac{R_1 R_2}{R_1 + R_2}$ for minimum temperature drift

R3 may be eliminated for minimum component count

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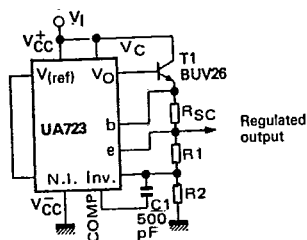
NEGATIVE VOLTAGE REGULATOR (Note 1)



Regulated output voltage	-15 V
Line regulation ($\Delta V_I = 3 V$)	1 mV
Load regulation ($\Delta I_L = 100 \text{ mA}$)	2 mV

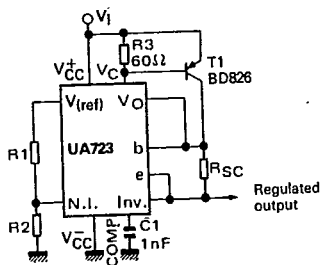
Note 1 : For applications using TO-100 metal cans, V_Z can be implemented externally by connecting a 6.2 V zener diode to V_O pin.

POSITIVE VOLTAGE REGULATOR (External NPN Pass Transistor)



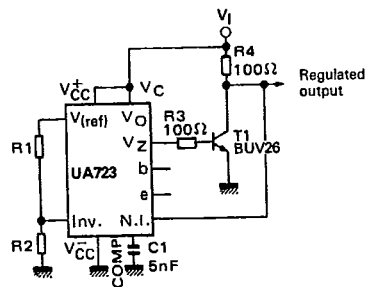
Regulated output voltage	+15 V
Line regulation ($\Delta V_I = 3 V$)	1.5 mV
Load regulation ($\Delta I_L = 1 A$)	15 mV

POSITIVE VOLTAGE REGULATOR (External PNP Pass Transistor)



Regulated output voltage	+5 V
Line regulation ($\Delta V_I = 3 V$)	0.5 mV
Load regulation ($\Delta I_L = 1 A$)	5 mV

SHUNT REGULATOR

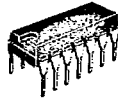
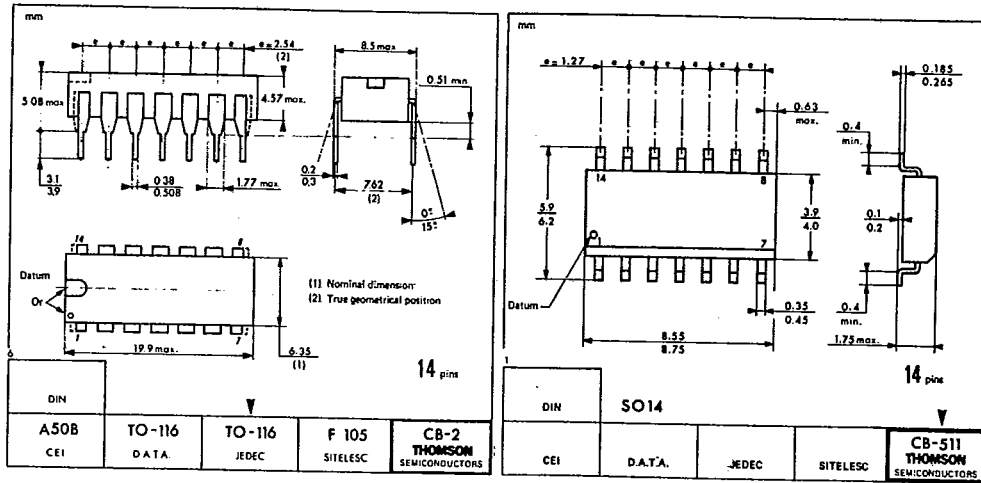


Regulated output voltage	+5 V
Line regulation ($\Delta V_I = 10 V$)	0.5 mV
Load regulation ($\Delta I_L = 100 \text{ mA}$)	1.5 mV

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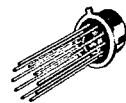
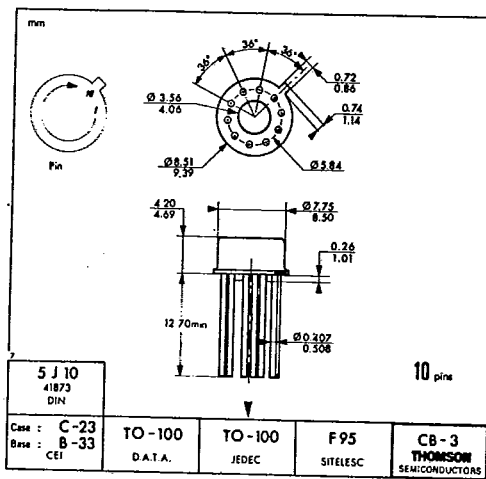
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CB-2
DP SUFFIX
PLASTIC PACKAGE
DG SUFFIX
CERDIP PACKAGE



CB-511
FP SUFFIX
PLASTIC MICROPACKAGE



CB-3
H SUFFIX
METAL CAN

These specifications are subject to change without notice.
Please inquire with our sales offices about the availability of the different packages.