

DESCRIPTION

The μ A723/SA723C is a Monolithic Precision Voltage Regulator capable of operation in positive or negative supplies as a series, shunt, switching or floating regulator. The 723 contains a temperature compensated reference amplifier, error amplifier, series pass transistor, and current limiter, with access to remote shutdown.

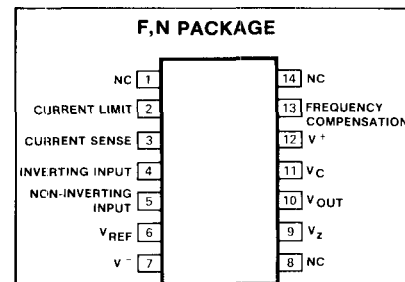
FEATURES

- Positive or negative supply operation
- Series, shunt, switching or floating operation
- .01% line and load regulation
- Output voltage adjustable from 2 to 37 volts
- Output current to 150mA without external pass transistor
- μ A723 MIL STD 88 3A, B, C available

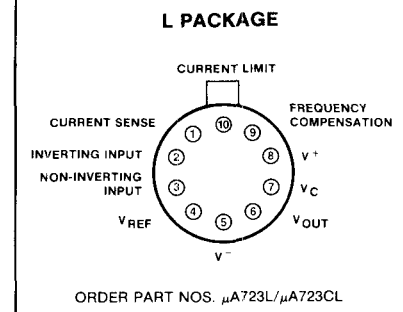
ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Pulse voltage from V^+ to V^- (50 ms)		
μ A723	50	V
μ A723C		
SA723C		
Continuous voltage from V^+ to V^-		
μ A723	40	V
μ A723C	40	V
SA723C	40	V
Input-output voltage differential	40	V
Maximum output current		
μ A723	150	mA
μ A723C	150	mA
SA723C	150	mA
Current from V_{REF}		
μ A723	15	mA
μ A723C		
SA723C		
Current from V_Z		
μ A723		
μ A723C	25	mA
SA723C	25	mA
Internal power dissipation ¹		
μ A723	800	mA
μ A723C	800	mA
SA723C	800	mA
Operating temperature range		
μ A723	-55 to +125	°C
μ A723C	0 to 70	°C
SA723C	-40 to +85	°C
Storage temperature range		
μ A723	-65 to +150	°C
μ A723C	-65 to +150	°C
SA723C	-65 to +150	°C
Lead temperature		
μ A723	300	°C
μ A723C	300	°C
SA723C	300	°C

PIN CONFIGURATION

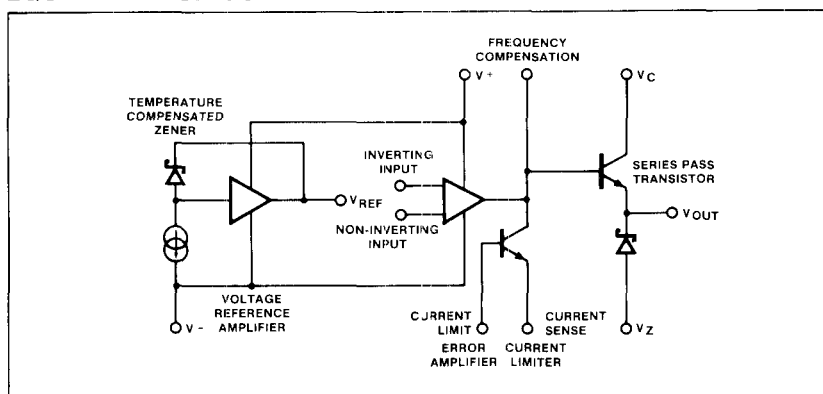


ORDER PART NOS. μ A723N, μ A723F,
 μ A723CN, μ A723CF, SA723CF, SA723CN



ORDER PART NOS. μ A723L/ μ A723CL

EQUIVALENT CIRCUIT



DC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ unless otherwise specified.¹

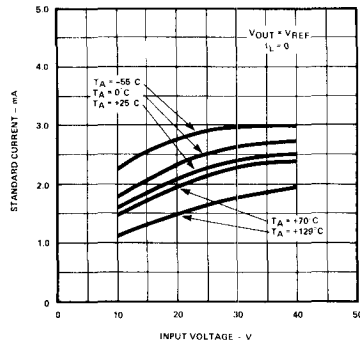
PARAMETER	TEST CONDITIONS	$\mu A723C/SA723C$			$\mu A723$			UNIT
		Min	Typ	Max	Min	Typ	Max	
Line regulation ²	$V_{IN} = 12V$ to $V_{IN} = 15V$ $V_{IN} = 12V$ to $V_{IN} = 40V$		0.01 0.1	0.1 0.5		0.01 0.02	0.1 0.2	% V_{OUT} % V_{OUT}
Load regulation ²	$I_L = 1mA$ to $I_L = 50mA$ $f = 50Hz$ to $10kHz$, $C_{REF} = 0$ $f = 50Hz$ to $10kHz$, $C_{REF} = 5\mu F$		0.03 74 86	0.2		0.03 74 86	0.15	% V_{OUT} dB dB
Short circuit current limit	$R_{SC} = 10\Omega$, $V_{OUT} = 0$		65			65		mA
Reference voltage		6.80	7.15	7.50	6.95	7.15	7.35	V
Output noise voltage	$BW = 100Hz$ to $10kHz$, $C_{REF} = 0$ $BW = 100Hz$ to $10kHz$, $C_{REF} = 5\mu F$		20 2.5			20 2.5		μV_{rms} μV_{rms}
Long term stability			0.1	0.1		0.1		%/1000hrs.
Standby current drain	$I_L = 0$, $V_{IN} = 30V$		2.3	4.0	2.3	3.5		mA
Input voltage range		9.5		40	9.5		40	V
Output voltage range		2.0		37	2.0		37	V
Input-output voltage differential		3.0		38	3.0		38	V
The following specifications apply over the operating temperature ranges								
Line regulation				0.3			0.3	% V_{OUT}
Load regulation				0.6			0.6	% V_{OUT}
Average temperature coefficient of output voltage	$V_{IN} = 12V$ to $V_{IN} = 15V$ $I_L = 1mA$ to $I_L = 50mA$		0.003	0.015		0.002	0.015	%/ $^{\circ}C$

NOTES

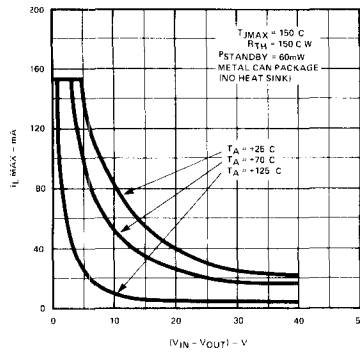
1. $V_{IN} = V_+ = V_C = 12V$, $V_- = 0V$, $V_{OUT} = 5V$, $I_L = 1mA$, $R_{SC} \approx 0$, $C_1 = 100pF$, $C_{REF} = 0$ and divider impedance as seen by error amplifier $\leq 10k\Omega$ when connected as shown in Figure 3.
2. The load and line regulation specifications are for constant junction temperature. Temperature drift effects must be taken into account separately when the unit is operating under conditions of high dissipation.

TYPICAL PERFORMANCE CHARACTERISTICS

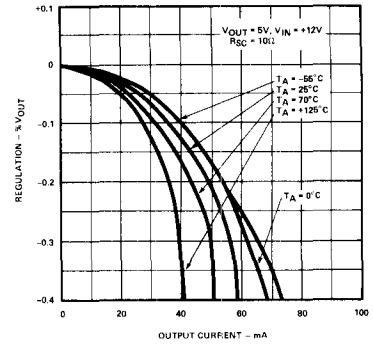
STANDBY CURRENT DRAIN
AS A FUNCTION OF
INPUT VOLTAGE



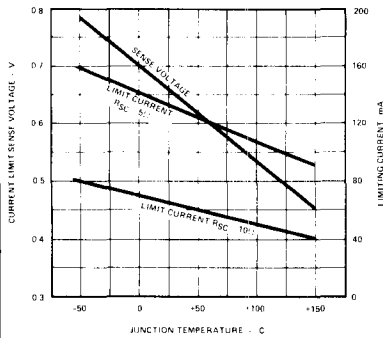
MAXIMUM LOAD CURRENT
AS A FUNCTION OF
INPUT-OUTPUT VOLTAGE
DIFFERENTIAL



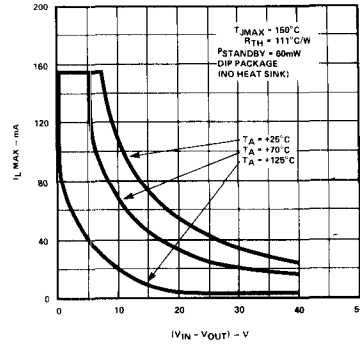
LOAD REGULATION
CHARACTERISTICS WITH
CURRENT LIMITING



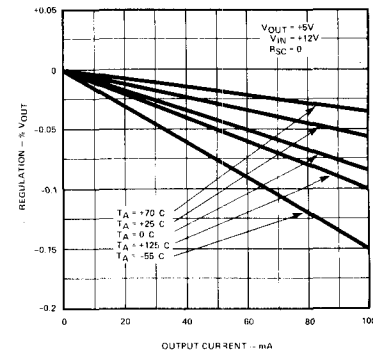
CURRENT LIMITING
CHARACTERISTICS AS A
FUNCTION OF JUNCTION
TEMPERATURE



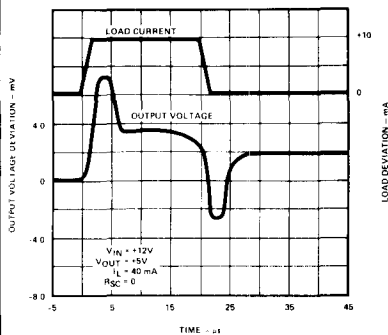
MAXIMUM LOAD CURRENT
AS A FUNCTION OF
INPUT-OUTPUT VOLTAGE
DIFFERENTIAL



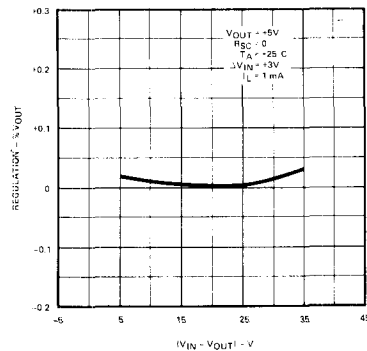
LOAD REGULATION
CHARACTERISTICS WITHOUT
CURRENT LIMITING



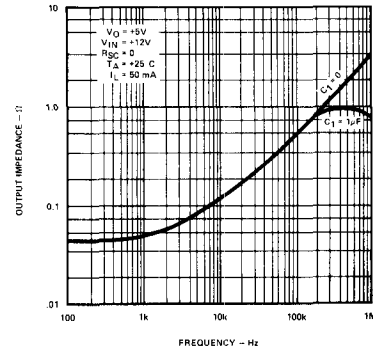
LOAD TRANSIENT RESPONSE



LINE REGULATION AS A
FUNCTION OF INPUT-OUTPUT
VOLTAGE DIFFERENTIAL

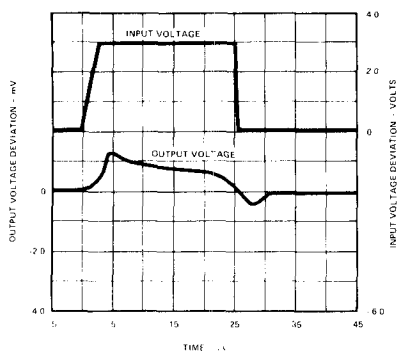


OUTPUT IMPEDANCE AS A
FUNCTION OF FREQUENCY

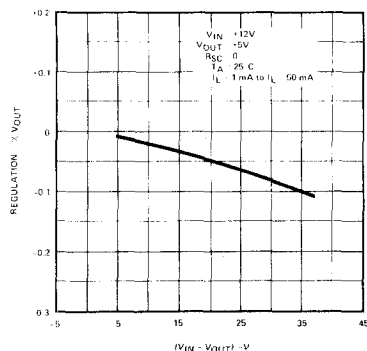


TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

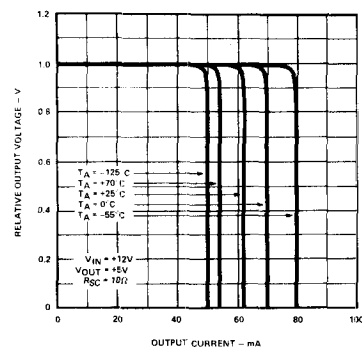
LINE TRANSIENT RESPONSE



LOAD REGULATION AS A FUNCTION OF INPUT-OUTPUT VOLTAGE DIFFERENTIAL

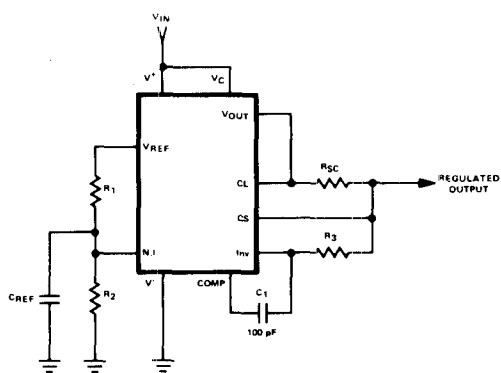


CURRENT LIMITING CHARACTERISTICS



TYPICAL APPLICATIONS

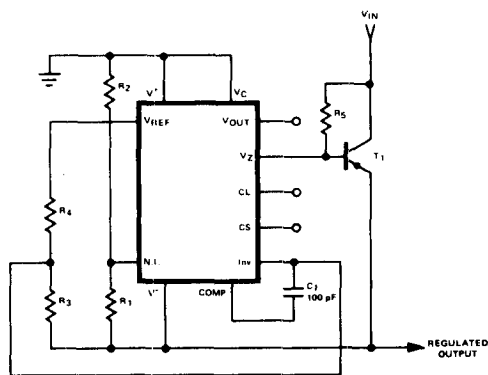
LOW VOLTAGE REGULATOR
(VOUT = 2 TO 7 VOLTS)



$$V_{out} = \left[V_{REF} \times \frac{R_2}{R_1 + R_2} \right]$$

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

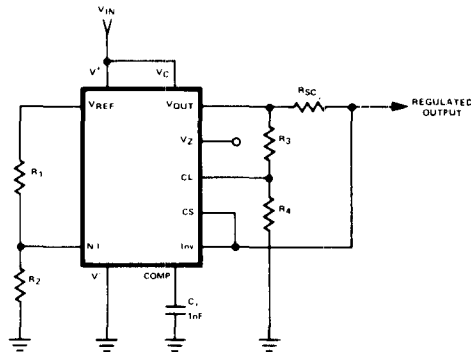
NEGATIVE VOLTAGE REGULATOR



$$V_{out} = \left[\frac{V_{REF}}{2} \times \frac{R_1 + R_2}{R_1} \right]; R_3 = R_4$$

TYPICAL APPLICATIONS (Cont'd)

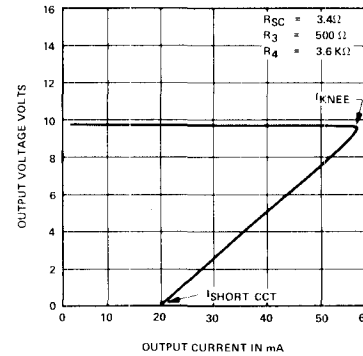
FOLDBACK CURRENT LIMITING REGULATOR
($V_{OUT} = 2$ TO 7 VOLTS)



$$I_{KNEE} = \left[\frac{V_{out} R_3}{R_{SC} R_4} + \frac{V_{SENSE} (R_3 + R_4)}{R_{SC} R_4} \right]$$

$$V_{out} = \left[V_{REF} \times \frac{R_1 + R_2}{R_2} \right]$$

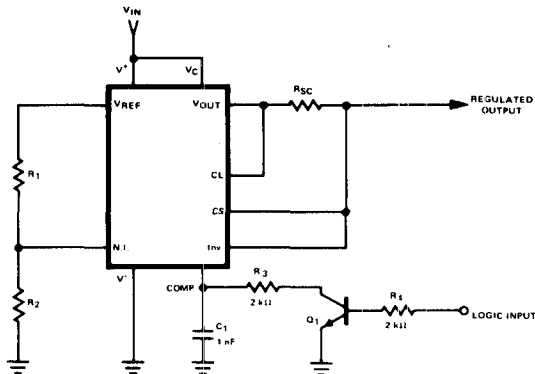
$$I_{SHORT\ CKT} = \left[\frac{V_{SENSE}}{R_{SC}} \times \frac{R_3 + R_4}{R_4} \right]$$



$$\frac{R_4}{R_3} = \frac{V_{out} I_{SC}}{V_{SENSE} (I_{KNEE} - I_{SHORT\ CKT})} - 1$$

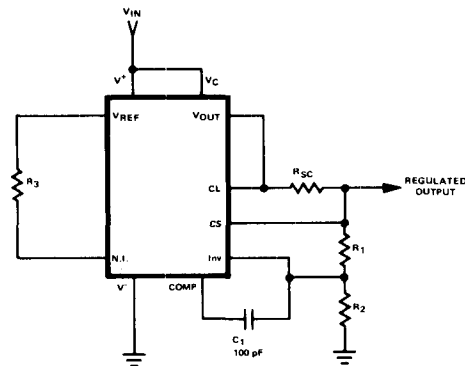
$$R_{SC} = \frac{V_{SENSE}}{I_{SC}} \left[1 + \frac{R_3}{R_4} \right]$$

REMOTE SHUTDOWN REGULATOR
WITH CURRENT LIMITING
($V_{OUT} = 2$ TO 7 VOLTS)



$$V_{out} = \left[V_{REF} \times \frac{R_2}{R_1 + R_2} \right]$$

HIGH VOLTAGE REGULATOR
($V_{OUT} = 7$ TO 37 VOLTS)



$$V_{out} = \left[V_{REF} \times \frac{R_1 + R_2}{R_2} \right]$$

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

R_3 may be eliminated for minimum component count