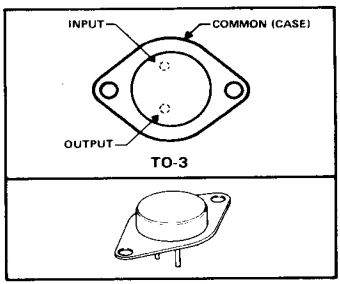
TYPE LM323
3-AMP, 5-VOLT POSITIVE REGULATOR

D2717, JANUARY 1983

- 3-A Output Current Capability
- 2.5-V Dropout Voltage
- Thermal Shutdown Protection
- Internal Current Limiting Protection
- Output Impedance . . . 0.01 Ω Typ
- Power Dissipation up to 30 W
- Direct Replacement for National Semiconductor LM323

KA PACKAGE
(TOP VIEW)



description

The LM323 is a three-terminal, fixed-positive-voltage regulator with a 5-volt output and a load driving capability of 3 amperes. The LM323 provides high output current capabilities through new circuit design and processing without sacrificing the regulation characteristics of lower-current devices.

The internal current-limiting and thermal-shutdown features make this device essentially immune to overload. The LM323 requires no external components for fixed-voltage operation, however if the device is more than four inches from the input filter capacitor, a 1-microfarad solid-tantalum capacitor should be used at the input. A 0.1-microfarad capacitor at the output may be used to improve output transient response. In addition to its use as a fixed-voltage regulator, the LM323 can be used with external components to obtain adjustable output voltages and currents and can also be used as the power-pass element in precision regulators.

The LM323 is characterized for operation from 0°C to 125°C.

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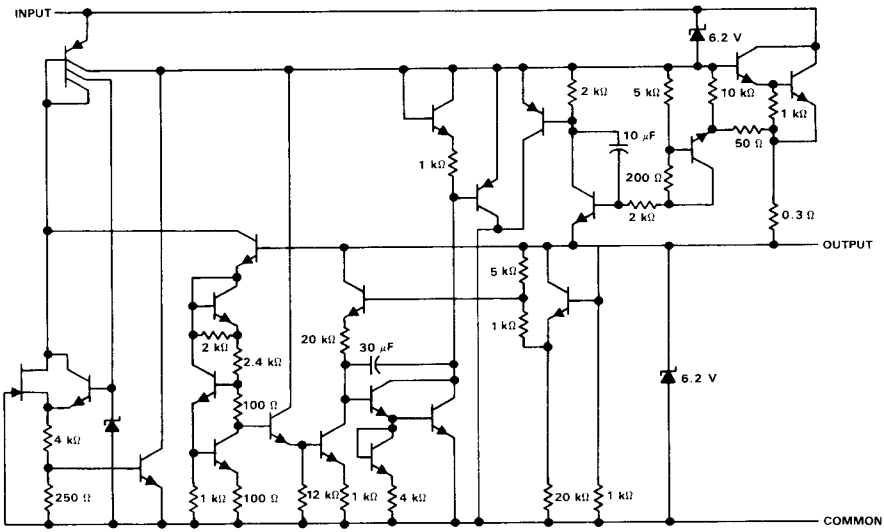
schematic diagram



Component values shown are nominal.

absolute maximum ratings over operating temperature range (unless otherwise noted)

Input voltage	20 V
Continuous total dissipation at (or below) 25°C free-air temperature (see Note 1)	3.5 W
Continuous total dissipation at (or below) 25°C case temperature (see Note 1)	30 W
Operating free-air, case, or virtual junction temperature range	−55°C to 150°C
Storage temperature range	−65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds	300°C

NOTE 1: For operation above 25°C free-air temperature, refer to Figure 1. For operation above 25°C case temperature, refer to Figure 2.

recommended conditions

	MIN	NOM	MAX	UNIT
Input voltage	7.5		15	V
Output current			3	A
Operating virtual junction temperature range, T_J	0		125	°C

electrical characteristics at 25°C virtual junction temperature, P ≤ 30 W (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	V_I = 7.5 V, I_O = 0	4.8	5	5.2	V
	V_I = 7.5 V to 15 V, I_O = 0 to 3 A, P ≤ 30 W, T_J = 0°C to 125°C	4.75		5.25	
Input regulation	V_I = 7.5 V to 15 V, See Note 2		5	25	mV
Output regulation	V_I = 7.5 V, I_O = 0 to 3 A, See Note 2		25	100	mV
Output noise voltage	f = 100 Hz to 100 kHz		40		μV
Output voltage long-term drift (see Note 3)	After 1000 h at T_J and V_I both at maximum rated values			35	mV
Bias current	V_I = 7.5 V to 15 V, I_O = 0 to 3 A, T_J = 0°C to 125°C		12	20	mA
Short-circuit output current	V_I = 7.5 V		4	5	A
	V_I = 15 V		3	4.5	

NOTES: 2. Input regulation and output regulation are measured using pulse techniques (t_w ≤ 1 ms, duty cycle ≤ 5%) to limit changes in average internal dissipation. Output voltage changes due to large changes in internal dissipation must be taken into account separately.

3. Since long-term drift cannot be measured on the individual device prior to shipment, this specification is not intended to be a guarantee or warranty. It is an engineering estimate of the average drift to be expected from lot to lot.

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THERMAL INFORMATION

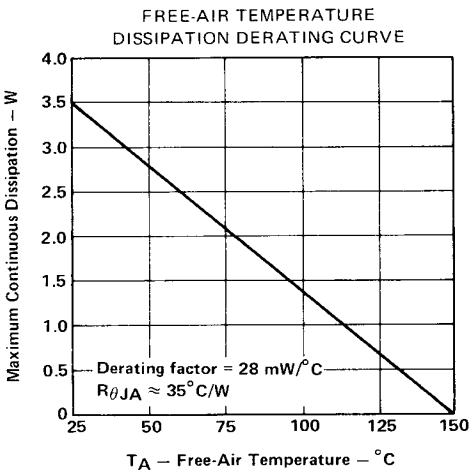

FIGURE 1

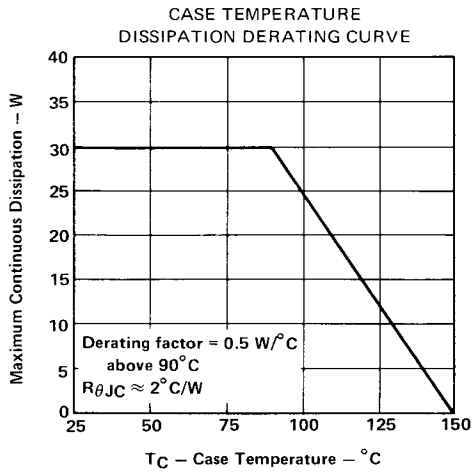

FIGURE 2

TYPICAL CHARACTERISTICS

OUTPUT VOLTAGE
vs
VIRTUAL JUNCTION TEMPERATURE

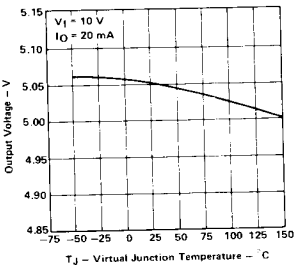

FIGURE 3

OUTPUT NOISE VOLTAGE
vs
FREQUENCY

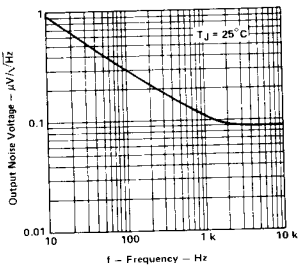

FIGURE 4

BIAS CURRENT
vs
INPUT VOLTAGE

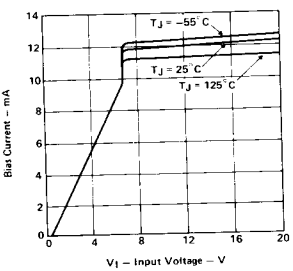

FIGURE 5

SHORT CIRCUIT OUTPUT CURRENT
vs
INPUT VOLTAGE

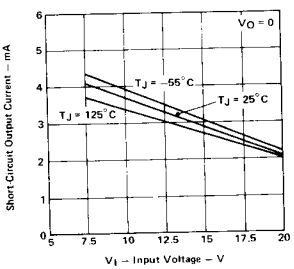

FIGURE 6

PEAK OUTPUT CURRENT
vs
INPUT VOLTAGE

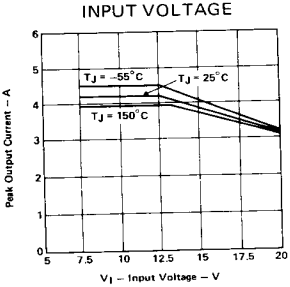

FIGURE 7

RIPPLE REJECTION
vs
FREQUENCY

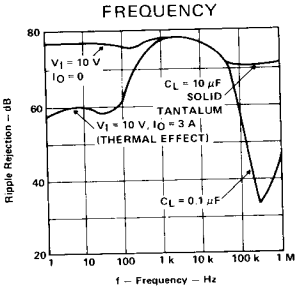

FIGURE 8

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TYPICAL CHARACTERISTICS

OUTPUT IMPEDANCE
vs
FREQUENCY

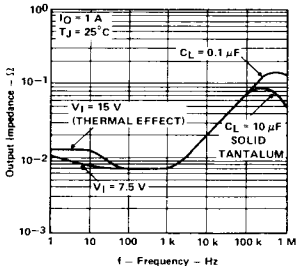


FIGURE 9

DROPOUT VOLTAGE
vs
VIRTUAL JUNCTION TEMPERATURE

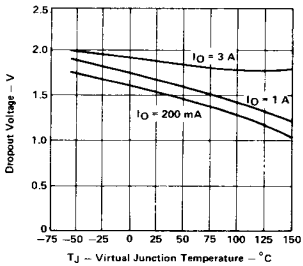


FIGURE 10

INPUT TRANSIENT RESPONSE

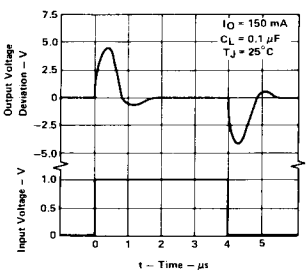


FIGURE 11

LOAD TRANSIENT RESPONSE

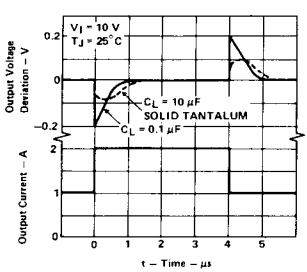
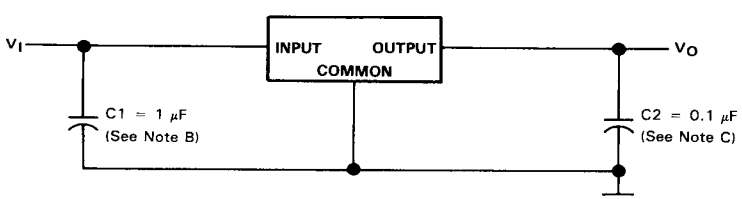


FIGURE 12

TYPICAL APPLICATIONS DATA



NOTES: A. All capacitors are solid tantalum.
B. Use of capacitor C1 is required if regulator is more than 10 cm (4 inches) from filter capacitor.
C. Use of capacitor C2 (optional) improves transient response time.