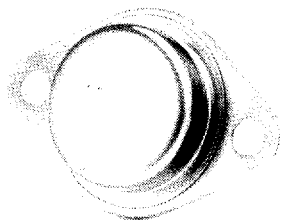


1.5 AMP POSITIVE ADJUSTABLE VOLTAGE REGULATORS

LLM 117,
LLM 317



FEATURES

- Adjustable output down to 1.2V
- Line regulation typically 0.01%/V
- Load regulation typically 0.1%
- Current limit constant with temperature
- Standard 3-terminal, TO-3 package
- MIL-Temperature performance

DESCRIPTION

The LLM 117 and LLM 317 voltage regulators are monolithic integrated circuits designed for use in applications requiring a well regulated positive output voltage. Outstanding features include full power usage up to 1.5 amperes of load current, internal current limiting, thermal shut-down, and safe area protection on the die, providing protection of the series pass Darlington, under most operating conditions. Hermetically sealed steel TO-3 packages are utilized for high reliability and low thermal resistance.

The LLM 117 and LLM 317, three terminal adjustable regulators, are available with an output range from +1.2 to +37 Volts. The output voltage is easily set by two external resistors. Since the regulator is "floating", higher output voltages can be obtained as long as the maximum input-output voltage differential is not exceeded.

ABSOLUTE MAXIMUM RATINGS

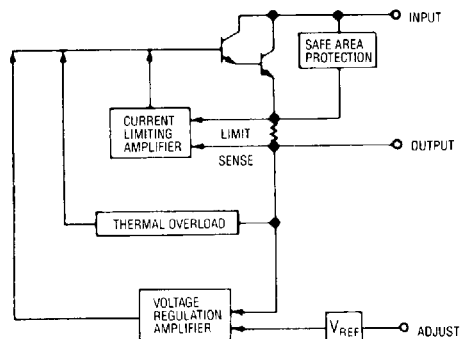
PARAMETER	SYMBOL	MINIMUM	MAXIMUM	UNITS
Input-Output Voltage Differential	$V_{IN} - V_{OUT}$		40	Volts
Power Dissipation	P_D		Internally Limited ⁽¹⁾	
Thermal Resistance Junction to Case	θ_{JC}		3.0	°C/Watt
Operating Junction Temperature Range LLM 117 LLM 317	T_J	-55 0	150 125	°C
Storage Temperature Range	T_{STG}	-65	150	°C
Lead Temperature (Soldering, 60 Seconds Time Limit)	T_{LEAD}		300	°C

(1) For LLM 117 operation above 90°C T_{case} , derate @ 333mW/°C.
For LLM 317 operation above 65°C T_{case} , derate @ 333mW/°C.

DEVICE SELECTION GUIDE

DEVICE	OPERATING JUNCTION TEMPERATURE RANGE
LLM 117	-55 TO 150°C
LLM 317	0 TO 125°C

BLOCK DIAGRAM



LLM 117,
LLM 317**1.5 AMP POSITIVE ADJUSTABLE
VOLTAGE REGULATORS****ELECTRICAL CHARACTERISTICS***

Parameter	Test Conditions ¹			Test Limits			Units
	$V_{IN}-V_{OUT}$	I_O	T_J	Min	Typ	Max	
Line Regulation ²	3V to 40V	0.5A	25°C		0.01	0.04	%/V
LLM 317			25°C		0.01	0.02	%/V
LLM 117					0.02	0.07	%/V
LLM 317					0.02	0.05	%/V
Load Regulation ²	10mA to 1.5A		25°C		5	25	mV
LLM 317			25°C		5	15	mV
LLM 117					0.1	0.5	%
LLM 317					0.1	0.3	%
LLM 117					20	70	mV
LLM 317					20	50	mV
LLM 117					0.3	1.5	%
LLM 317					0.3	1.0	%
Thermal Regulation ³	5V	0.5A	25°C		0.04	0.07	%/W
LLM 317			25°C		0.03	0.07	%/W
Adjust Pin Current	5V	0.5A			50	100	μA
Adjust Pin Current Change	3.0V to 40V	10mA to 1.5A			0.2	5	μA
LLM 317							
LLM 117							
Reference Voltage	3V to 40V	10mA to 1.5A		1.20	1.25	1.30	V
Temperature Stability	5V	0.5A			1		%
Minimum Load Current	40V				3.5	10.0	mA
LLM 317					3.5	5.0	mA
Current Limit	≤15V	40V		1.5	2.2		A
LLM 317/LLM 117			25°C	0.15	0.4		A
LLM 317				0.3	0.4		A
RMS Output Noise ⁴	5V	0.5A	25°C		0.003		% V_O
Ripple Rejection Ratio ⁵	$C_{ADJ} = 10\mu F$ $V_O = 10V$	0.5A			65		dB
				66	80		

(1) Although power dissipation is internally limited, these specifications are applicable for power dissipations of 20 Watts.

(2) Low duty cycle pulse testing with Kelvin connections required. Changes in output voltage due to heating effects are covered under the specification for thermal regulation.

(3) 20mS pulse

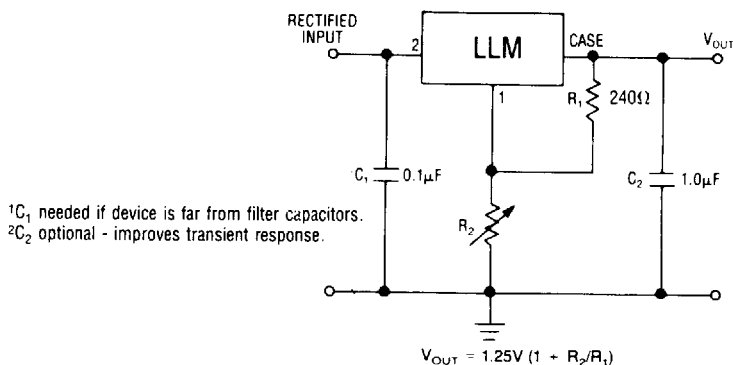
(4) BW = 10Hz to 10kHz

(5) 120Hz input ripple

(6) Unless otherwise specified, the following T_J conditions apply:

LLM 117 — -55 TO 150°C

LLM 317 — 0 TO 125°C

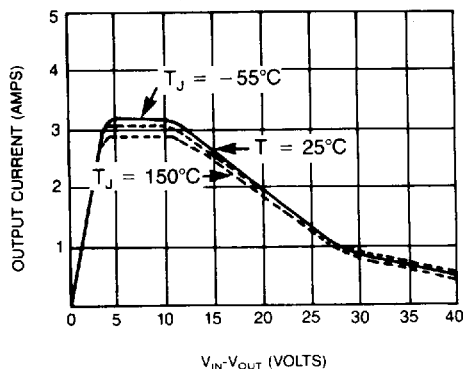
**TYPICAL APPLICATION
ADJUSTABLE VOLTAGE REGULATOR^{1,2}**

1.5 AMP POSITIVE ADJUSTABLE VOLTAGE REGULATORS

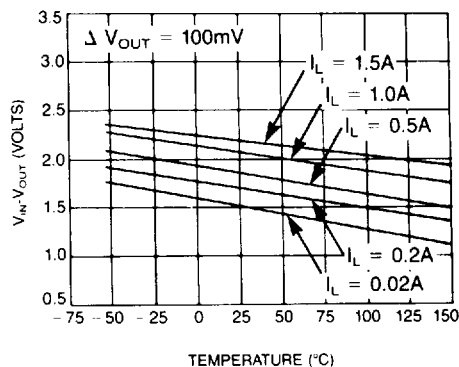
LLM 117,
LLM 317

OPERATIONAL DATA

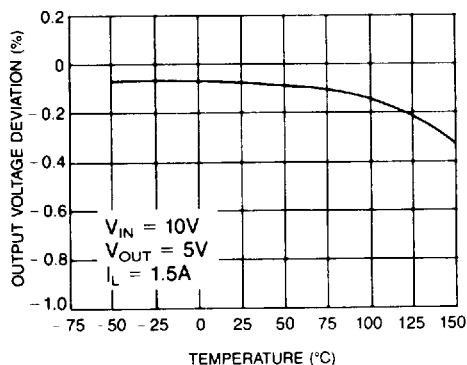
CURRENT LIMIT



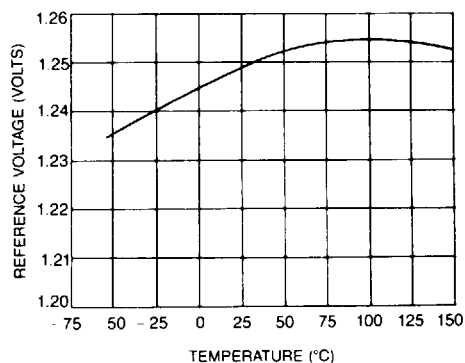
DROPOUT VOLTAGE



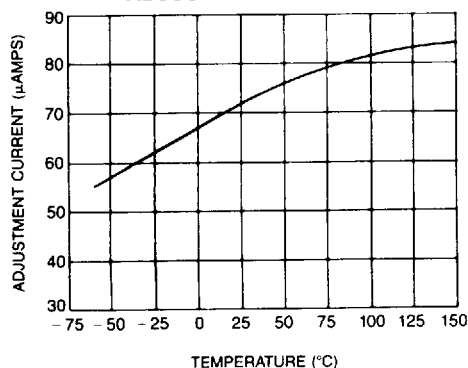
LOAD REGULATION



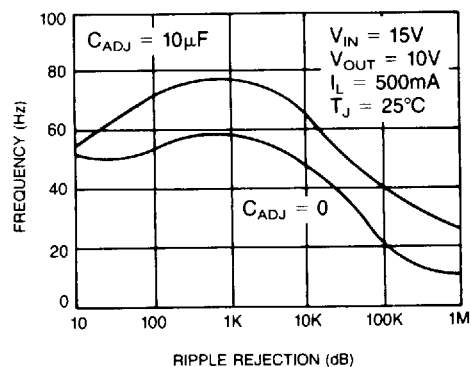
TEMPERATURE STABILITY



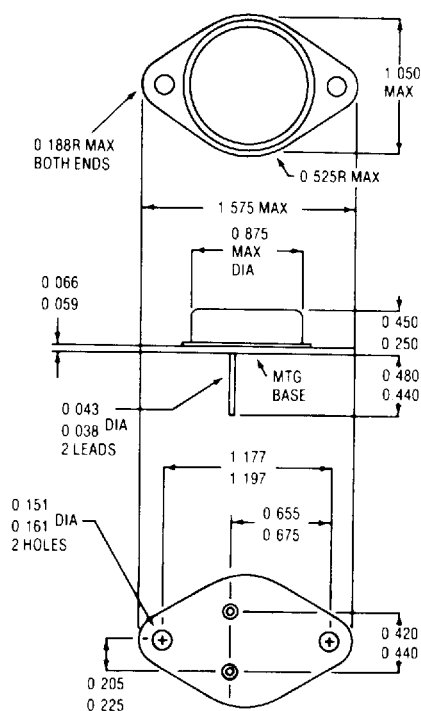
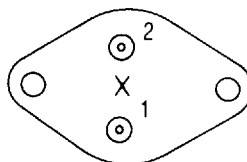
ADJUSTMENT CURRENT



RIPPLE REJECTION



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LLM 117,
LLM 317**1.5 AMP POSITIVE ADJUSTABLE
VOLTAGE REGULATORS****DEVICE OUTLINE****Bottom View**

1 - Adjust
2 - Input
Case is Output

NOTE: Case temperature measured at point X.
All dimensions are in inches.