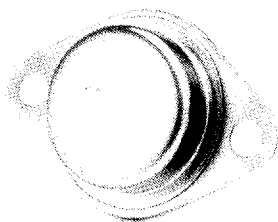


1.5 AMP POSITIVE VOLTAGE REGULATORS

LAS 1500



FEATURES

- Guaranteed Power Dissipation 15 Watts @ 87.5° Case
- Guaranteed input-output differential: + 2.4 Volts
- Low noise, band gap reference
- Remote sense capability
- Sample power cycled burn-in
- Guaranteed thermal resistance junction to case: 2.5° C/W

DESCRIPTION

The LAS 1500 Series 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 shutdown, and safe area protection on the chip, 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.

A low-noise, temperature stable band gap reference is the key design factor insuring excellent temperature regulation of the LAS 1500 Series. This, coupled to a very low output impedance, insures superior performance and load regulation.

The LAS 15U, a four-terminal, adjustable regulator is available with an output range from +4 to +30 Volts providing remote sense capability with a single potentiometer.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MINIMUM	MAXIMUM	UNITS
Input Voltage	V_{IN}		35(40) ⁽¹⁾ (2)	Volts
Power Dissipation	P_D		Internally Limited ⁽³⁾	
Thermal Resistance Junction to Case	θ_{JC}		2.5	°C/Watt
Operating Junction Temperature Range	T_J	-55	150	°C
Storage Temperature Range	T_{STG}	-65	150	°C
Lead Temperature (Soldering, 60 Seconds Time Limit)	T_{LEAD}		300	°C

⁽¹⁾ Short circuit protection is only assured to V_{IN} max. Value of 35V applies to V_O of +5V to +12V. Value of 40V applies to V_O of 13.8V to 24V and LAS 15U.

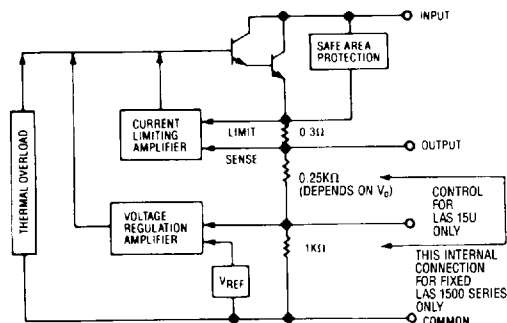
⁽²⁾ In case of short circuit with input-output voltages approaching V_{IN} max, regulator may require the removal of the input voltage to restart.

⁽³⁾ For operation above 87.5°C T_{CASE} , derate @ 400 mW/°C.

DEVICE SELECTION GUIDE

V_{OUT}	V_{OUT} TOLERANCE	
	± 5%	± 2%
5	LAS 1505	LAS 15A05
6	LAS 1506	LAS 15A06
8	LAS 1508	LAS 15A08
10	LAS 1510	LAS 15A10
12	LAS 1512	LAS 15A12
13.8	LAS 15CB	—
15	LAS 1515	LAS 15A15
18	LAS 1518	LAS 15A18
20	LAS 1520	LAS 15A20
24	LAS 1524	LAS 15A24
4 to 30	LAS 15U (Adjustable/Remote Sense)	

BLOCK DIAGRAM



LAS 1500

1.5 AMP POSITIVE VOLTAGE REGULATORS

ELECTRICAL CHARACTERISTICS

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Input voltage test conditions are as follows: $V_1 = V_0 + 3$ Volts, $V_2 = V_0 + 10$ Volts, $V_3 = V_0 + 15$ Volts, or the maximum input, whichever is less.

Parameter	Symbol	Test Conditions			Test Limits		Units
		V_{IN}	I_O	T_J	Min	Max	
Output Voltage ² LAS 1500 ¹ LAS 15A00 ¹ LAS 15U ⁵	V_O	V_1 to V_2	10mA to 1.5A	25°C	0.95 V_O 0.98 V_O 4.0	1.05 V_O 1.02 V_O 30.0	Volts
Input-Output Differential	$V_{IN}-V_O$		1.5A	0-125°C	2.4		Volts
Line Regulation ²	REG _(LINE)	V_1 to V_3	1.5A	25°C		1.5	% V_O
Load Regulation ²	REG _(LOAD)	$V_O + 5V$	10mA to 1.5A	25°C		0.6	% V_O
Quiescent Current	I_Q	V_1	10mA	25°C		18.0	mA
Quiescent Current Line	I_Q (LINE)	V_1 to V_2	10mA	25°C		5.0	mA
Quiescent Current Load	I_Q (LOAD)	V_1	10mA to 1.5A	25°C		5.0	mA
Current Limit ²	I_{LIM}	$V_O + 5V$		25°C		5.2	Amps
Temperature Coefficient	T_C	V_1	0.1A	0-125°C		0.02	% V_O /°C
Output Noise ³ Voltage	V_N	V_1	0.1A	0-125°C		10	$\mu V_{rms}/V$
Ripple Attenuation ⁴	R_A	$V_O + 5V$	1.0A	0-125°C	60		dB
Control Voltage LAS 15U	V_C	V_1 to V_2	10mA	25°C	3.6	4.0	Volts
Power Dissipation	P_D	$V_{IN}-V_{OUT}$ 2.4V to 10.0V	10mA to 1.5A	0-125°C		15	Watts

(1) Nominal output voltages are specified under Device Selection Guide.

(2) Low duty cycle pulse testing with Kelvin connections required. Die temperature changes must be accounted for separately.

(3) BW = 10Hz - 100KHz

(4) Ripple attenuation is specified for a 1Vrms, 120Hz, input ripple.

Ripple attenuation is minimum of 60 dB at 5V output and is 1 dB less for each volt increase in the output voltage.

(5) $V_O = V_C (1 + R1/R2)$

R1 = Resistance from output to control

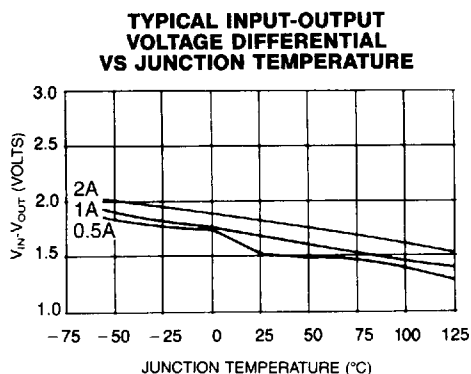
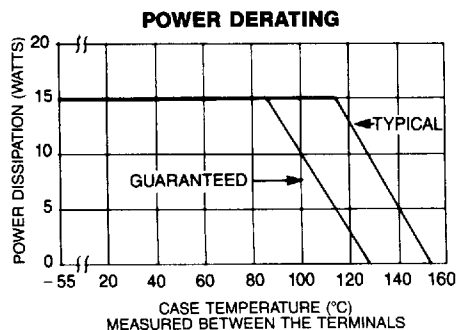
R2 = Resistance from control to common

1.5 AMP POSITIVE VOLTAGE REGULATORS

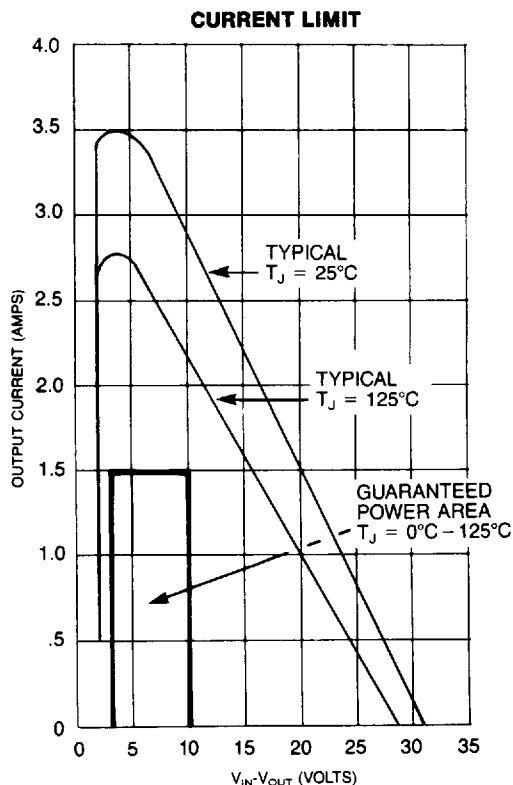
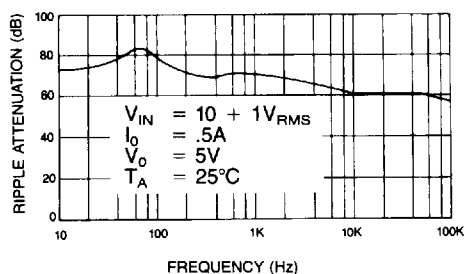
LAS 1500

OPERATIONAL DATA

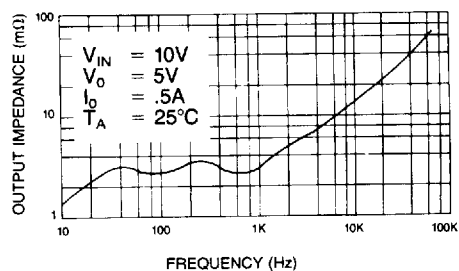
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TYPICAL RIPPLE ATTENUATION VS FREQUENCY



TYPICAL OUTPUT IMPEDANCE VS FREQUENCY

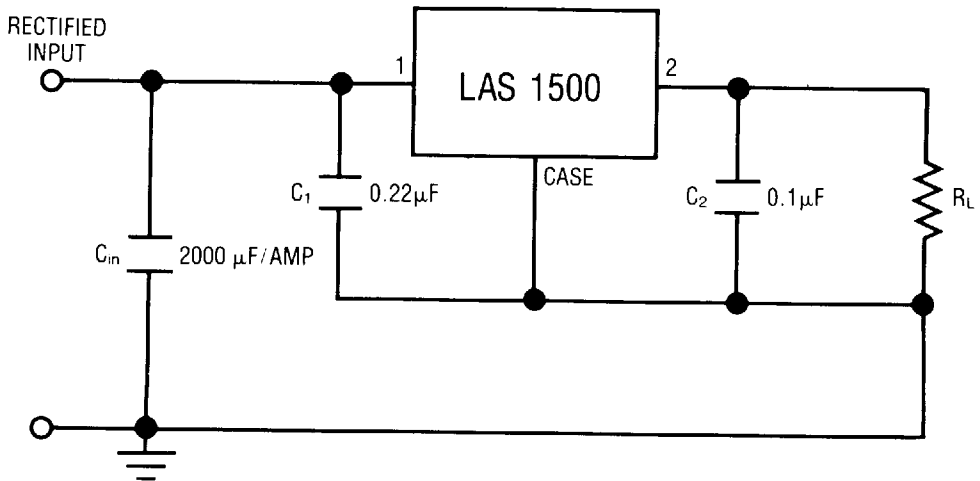


LAS 1500

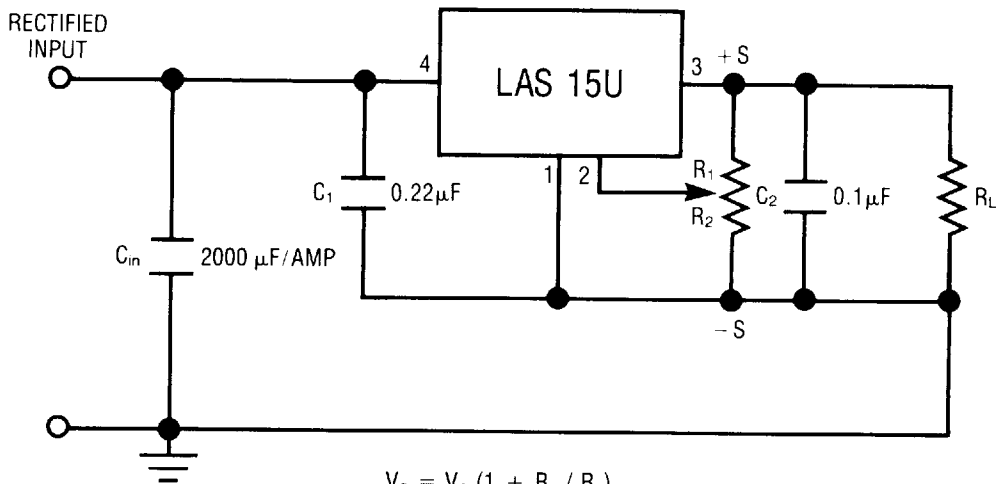
1.5 AMP POSITIVE VOLTAGE REGULATORS

TYPICAL APPLICATIONS

FIXED VOLTAGE REGULATOR¹



ADJUSTABLE VOLTAGE REGULATOR^{1,2}



$$V_o = V_c (1 + R_1 / R_2)$$

¹ C₁ and C₂ should be placed as close as possible to the regulator.

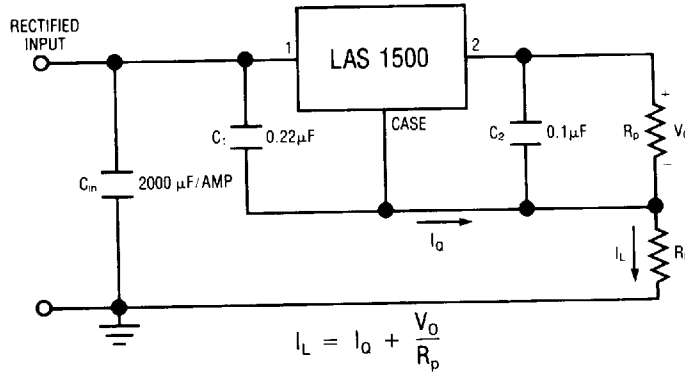
² $\frac{V_o}{R_1 + R_2} \geq 10 \text{ mA}$

1.5 AMP POSITIVE VOLTAGE REGULATORS

LAS 1500

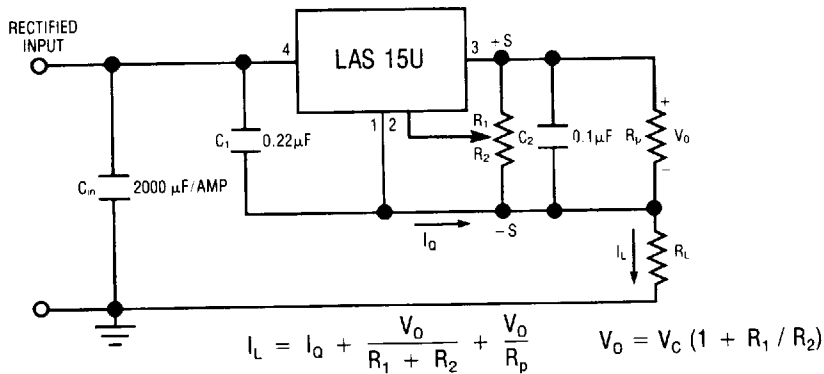
TYPICAL APPLICATIONS

FIXED CURRENT REGULATOR¹

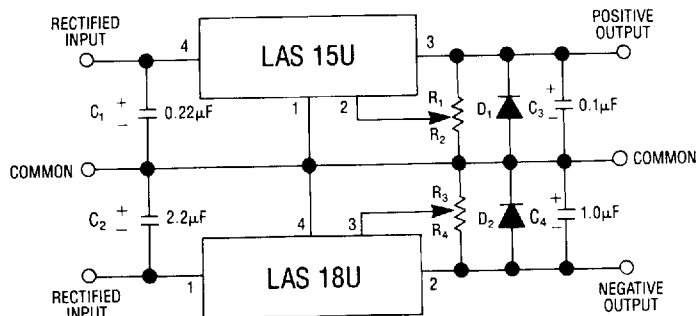


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ADJUSTABLE CURRENT REGULATOR^{1,2}



1.5 AMP DUAL ADJUSTABLE REGULATOR^{1,2,3}



¹ C_1 , C_2 , C_3 and C_4 to be placed as close as possible to the regulator.

² $V_o \geq 10$ mA, where $R_{adj} = R_1 + R_2$ or $R_3 + R_4$

R_{adj}

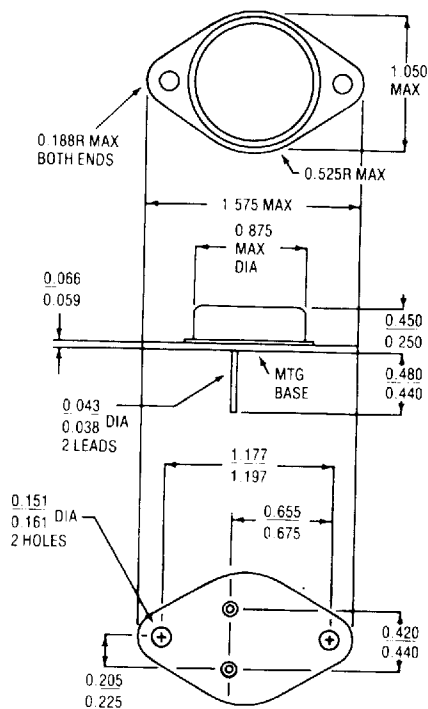
³ Diodes D_1 & D_2 should be low V_F , high current diodes for optimum protection.

LAS 1500

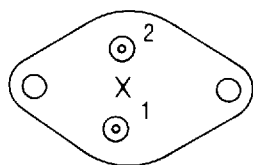
1.5 AMP POSITIVE VOLTAGE REGULATORS

DEVICE OUTLINE

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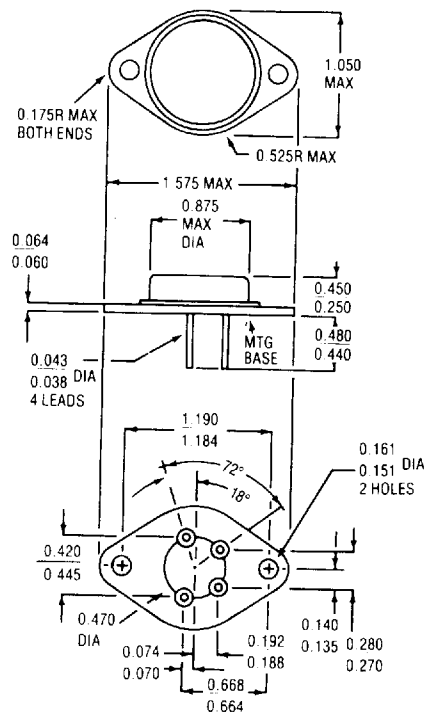


Bottom View

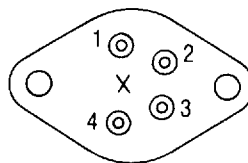


LAS 1500

1-Input
2-Output
Case is common



Bottom View



LAS 15U

1-Common
2-Control
3-Output
4-Input
Case is common

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