INTEGRATED CIRCUITS
UNITRODE

5 AMP POSITIVE VOLTAGE REGULATORS

LAS 1900 SERIES

FEATURES

- Guaranteed Power Dissipation 50 Watts @ 80°C Case
- Guaranteed input-output differential: + 2.6 Volts
- Low noise, band gap reference
- Remote sense capability
- Sample power cycled burn-in
- Guaranteed thermal resistance junction to case: 0.9°C/W
- Available in TO-3 and TO-247 packages
- Grounded case

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MINIMUM	MAXIMUM	UNITS
Input Voltage	V_{IN}		30(35)(1)(2)	Volts
Power Dissipation	P_D		Internally Limited(3)	
Thermal Resistance Junction To Case	θ_{JC}		0.9	°C/Watt
Operating Junction Temperature Range	T_J			°C
LAS 1900 LAS 19U		−55	150	
LAS1900P		0	125	
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 30V applies to V_O of −5V to −12V. Value of 35V applies to V_O of 15V and LAS 19U.
(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 80°C T_{CASE}, derate @ 1.111 watt °/C.

DEVICE SELECTION GUIDE

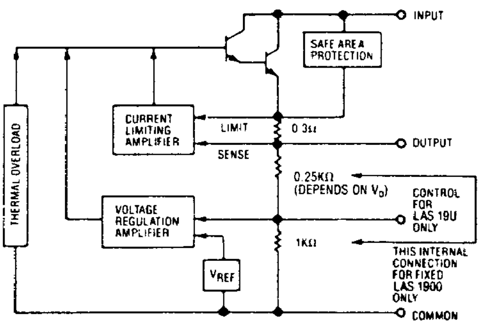
V_{OUT}	V_{OUT} TOLERANCE ±5%	+5%, −3%	±2%
5	LAS 1905	LAS 1905B	LAS 19A05
	LAS 1905P	LAS 1905BP	LAS 19AC5P
12	LAS 1912	LAS 1912B	LAS 19A12
	LAS 1912P	LAS 1912BP	LAS 19A12P
4 to 30	LAS 19U (Adjustable/Remote Sense)		

DESCRIPTION

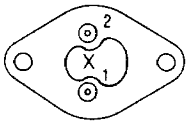
The LAS 1900 Series voltage regulators are monolithic integrated circuits designed for use in applications requiring a well regulated positive output voltage. Outstanding features include full power usage up to 5.0 amperes of load current, internal current limiting, thermal shutdown, and safe area protection on the chip, providing protection of the series pass Darlington, under most operating conditions. Hermetically sealed copper and copper/steel TO-3 packages are utilized for high reliability and low thermal resistance, while the TO-247 package is intended for cost effective designs. A low-noise, temperature stable band gap reference is the key design factor insuring excellent temperature regulation of the LAS 1900 Series. This, coupled to a very low output impedance, insures superior load regulation.

The LAS 19U, a four terminal, adjustable regulator is available with an output range from +4 to +30 Volts, providing remote sense capability with a single potentiometer.

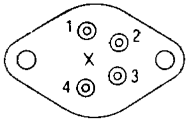
BLOCK DIAGRAM



Bottom View



Bottom View



1 – Input
2 – Output
Case is common

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

1 – Input
2 – Common
3 – Output
Tab Is Common

NOTE: Case temperature measured at point X.

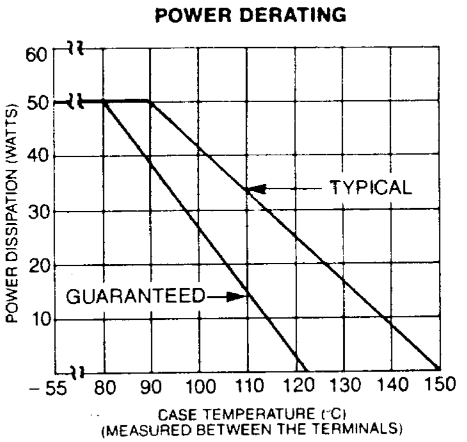
ELECTRICAL CHARACTERISTICS

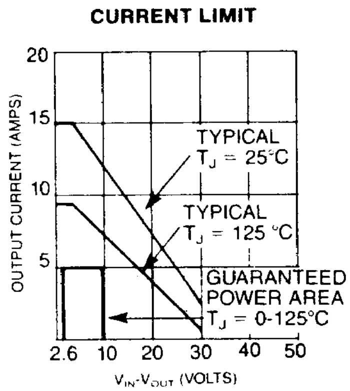
Input voltage test conditions are as follows: $V_1 = V_0 + 3$ Volts, $V_2 = V_0 + 10$ Volts, $V_3 = V_0 + 15$ Volts, or the maximum input, whichever is less.

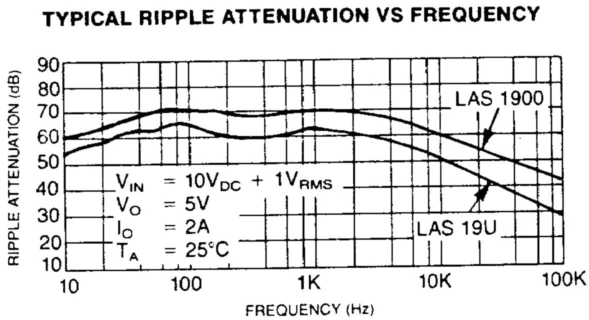
		Test Conditions			Test Limits		
Parameter	**Symbol**	**V_{IN}**	**I_O**	**T_J**	**Min**	**Max**	**Units**
Output Voltage[2] LAS 1900[1] LAS 1900B[1] LAS 19A00[1] LAS 19U[5]	V_O	V_1 to V_2	10mA to 5.0A	25°C	 $0.95\lvert V_O\rvert$ $0.97\lvert V_O\rvert$ $0.98\lvert V_O\rvert$ 4.0	 $1.05\lvert V_O\rvert$ $1.05\lvert V_O\rvert$ $1.02\lvert V_O\rvert$ 30.0	Volts
Input-Output Differential	V_{IN}-V_O		5.0A	0-125°C	2.6		Volts
Line Regulation[2]	$REG_{(LINE)}$	V_1 to V_3	3.0A	25°C		1.0	$\%V_O$
Load Regulation[2]	$REG_{(LOAD)}$	V_1	10mA to 5.0A	25°C		0.6	$\%V_O$
Quiescent Current	I_Q	V_1	10mA	25°C		25.0	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 5.0A	25°C		5.0	mA
Current Limit[2]	I_{LIM}	$V_0 + 5V$		25°C		15	Amps
Temperature Coefficient	T_C	V_1	0.1A	0-125°C		0.03	$\%V_O/°C$
Output Noise[3] Voltage	V_N	V_1	0.1A	0-125°C		10	$\mu V_{rms}/V$
Ripple Attenuation[4]	R_A	$V_0 + 5V$	2.0A	0-125°C	60		dB
Control Voltage LAS 19U	V_C	V_1 to V_2	10mA	25°C	3.6	4.0	Volts
Power Dissipation	P_D	V_{IN}-V_{OUT} 2.6V to 10.0V	10mA to 5.0A	0-125°C		50	Watts

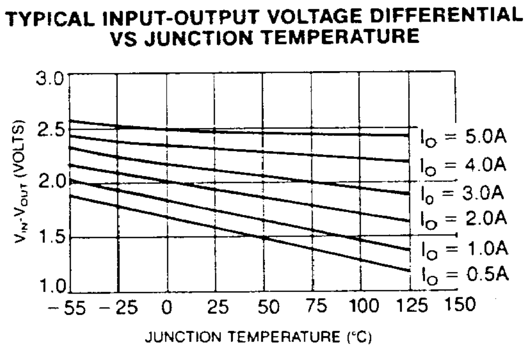
(1) Nominal output voltages are specified under Device Selection Guide.
(2) Low duty cycle pulse testing with Kelvin connections required. Die temperature changes must be accounted for separately.
(3) BW = 10Hz - 100KHz
(4) Ripple attenuation is specified for a 1Vrms, 120Hz input ripple.
Ripple attenuation 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

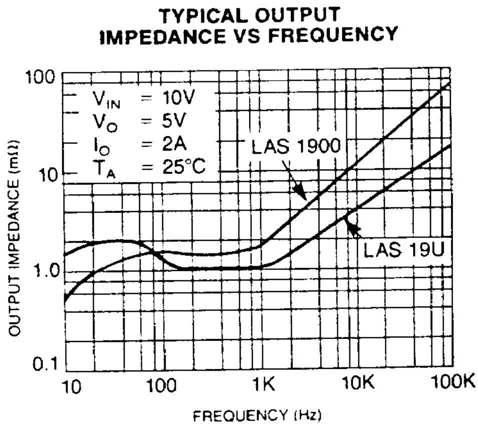
OPERATIONAL DATA





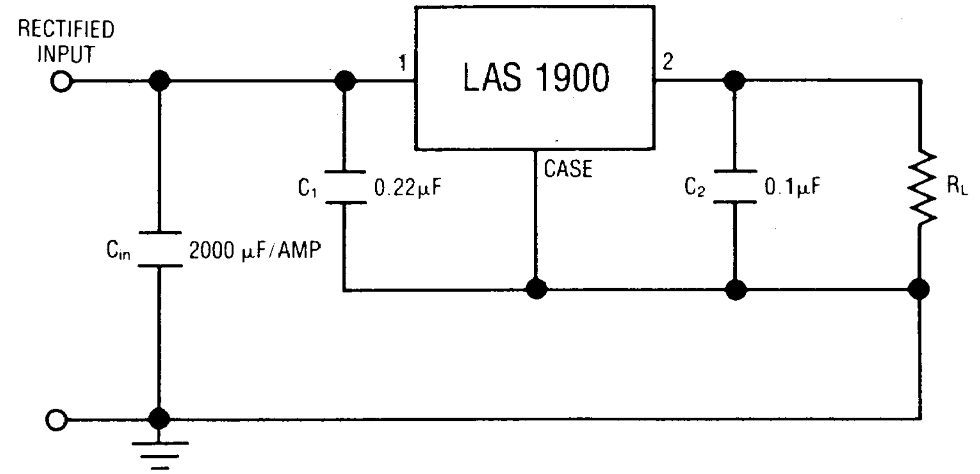




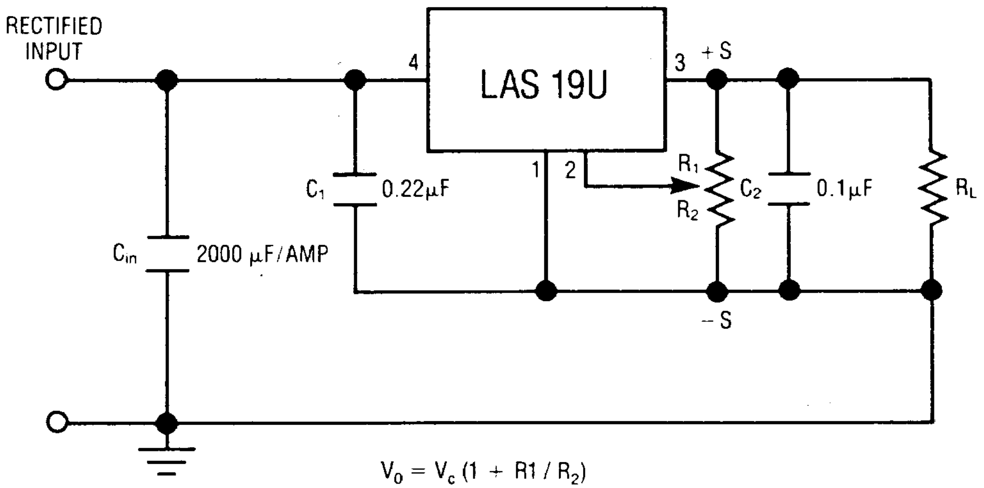


TYPICAL APPLICATIONS

FIXED VOLTAGE REGULATOR [1]



ADJUSTABLE VOLTAGE REGULATOR [1,2]



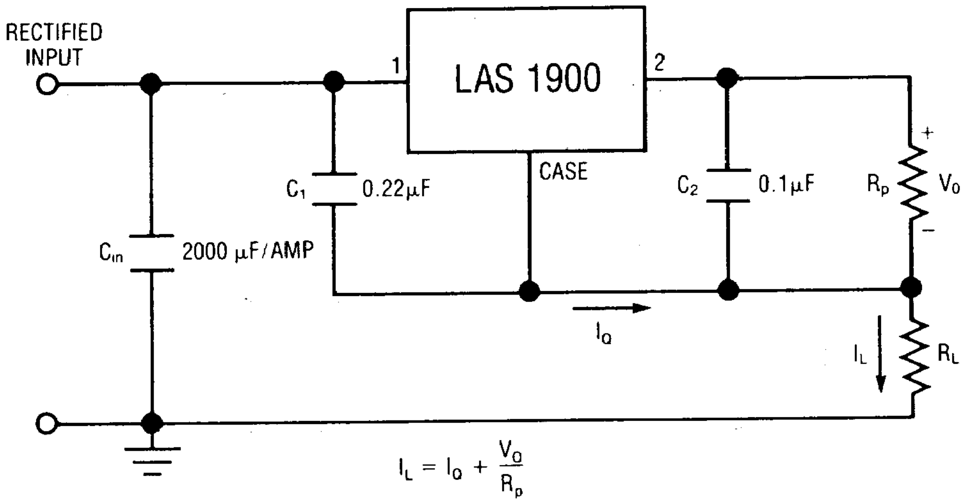
$$V_0 = V_c\,(1 + R1\,/\,R_2)$$

[1] C_1 and C_2 should be placed as close as possible to the regulator.

[2] $\dfrac{V_0}{R_1 + R_2} \geq 10$ mA

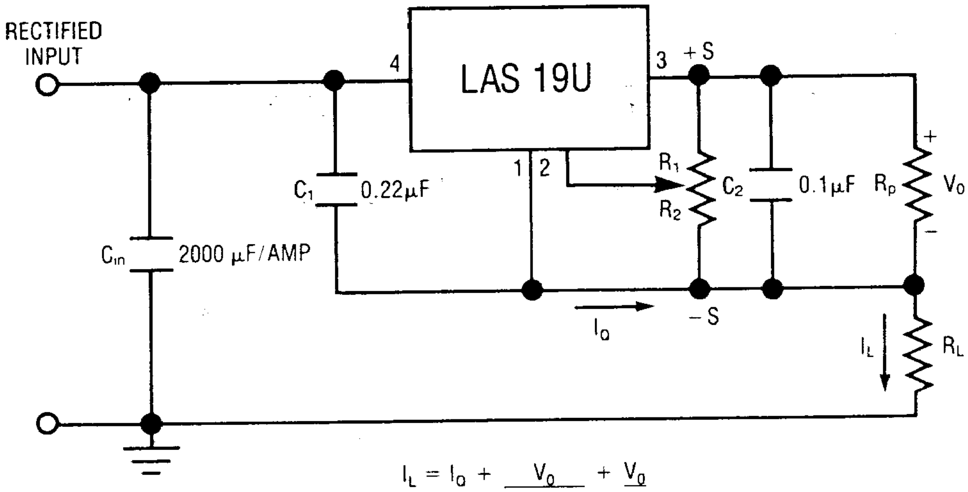
TYPICAL APPLICATIONS

FIXED CURRENT REGULATOR[1]



$$I_L = I_Q + \frac{V_O}{R_p}$$

ADJUSTABLE CURRENT REGULATOR[1,2]



$$I_L = I_Q + \frac{V_O}{R_1 + R_2} + \frac{V_O}{R_p}$$

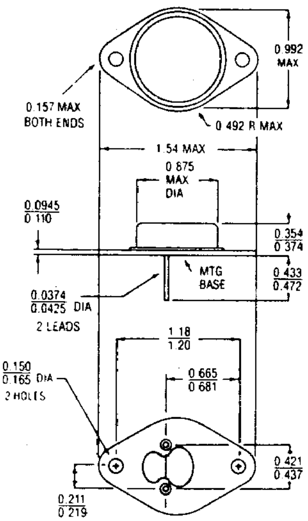
$$V_O = V_c\,(1 + R_1 / R_2)$$

[1] C_1 and C_2 should be placed as close as possible to the regulator.

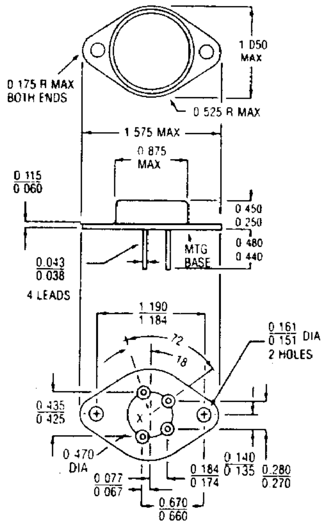
[2] $\dfrac{V_O}{R_1 + R_2} \geq 10$ mA

DEVICE OUTLINE

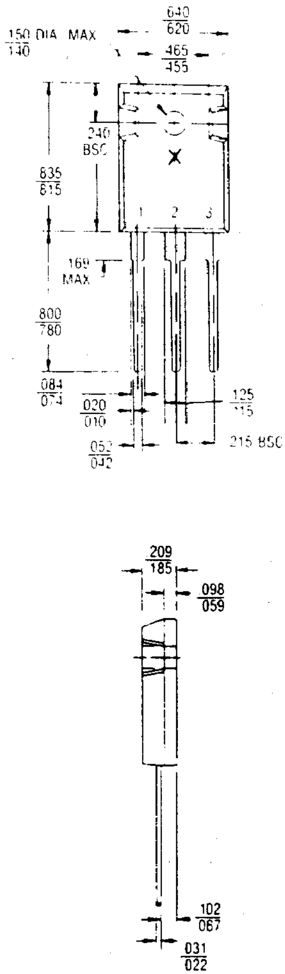
TO-3 (COPPER/STEEL)



TO-3



TO-247



All dimensions are in inches.

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