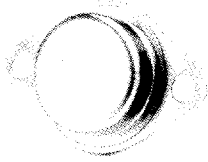


LAS 3900

8 AMP POSITIVE VOLTAGE REGULATORS

12



FEATURES

- Guaranteed Power Dissipation 80 Watts @ 69°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: 0.7°C/W

DESCRIPTION

The LAS 3900 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 8.0 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. A low-noise, temperature stable band gap reference is the key design factor insuring excellent temperature regulation of the LAS 3900 Series. This, coupled to a very low output impedance, insures superior load regulation.

The LAS 39U, a four terminal, adjustable regulator is available with an output range from +4 to +16 volts, providing remote sense capability with a single potentiometer.

ABSOLUTE
MAXIMUM RATINGS

PARAMETER	SYMBOL	MINIMUM	MAXIMUM	UNITS
Input Voltage	V_{IN}		25 ⁽¹⁾ (2)	Volts
Power Dissipation	P_D		Internally Limited ⁽³⁾	
Thermal Resistance Junction To Case	θ_{JC}		0.7	°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 $V_{IN} = 25V$ max.

⁽²⁾ In case of short circuit, with input-output voltages approaching 25V, regulator may require the removal of the input voltage to restart.

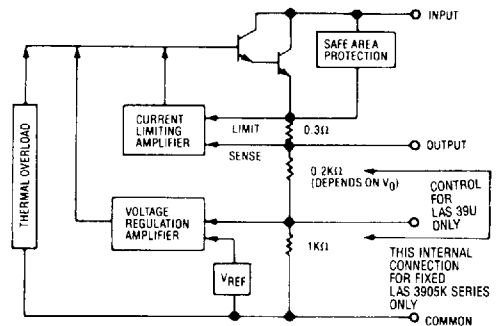
⁽³⁾ For operation above 69°C T_{CASE} , derate @ 1.42 Watt/°C.

DEVICE SELECTION GUIDE

V_{OUT}	V_{OUT} TOLERANCE		
	± 5%	+5%, -3%	± 2%
5	LAS 3905*	LAS 3905K	LAS 39A05*, 39A05K
4 to 16	LAS 39U* (Adjustable)		

*Remote Sense Capability

BLOCK DIAGRAM



LAS 3905K, LAS 39U

Note: See p. 3 for LAS 3905 Block Diagram

8 AMP POSITIVE VOLTAGE REGULATORS

LAS 3900

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.

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Parameter	Symbol	Test Conditions			Test Limits		Units
		V_{IN}	I_O	T_J	Min	Max	
Output Voltage ² LAS 3905 ¹ LAS 3905K ¹ LAS 39A05, 39A05K ¹ LAS 39U ⁵	V_O	V_1 to V_2	10mA to 8.0A	25°C	0.95 V_O 0.97 V_O 0.98 V_O 4.0	1.05 V_O 1.05 V_O 1.02 V_O 16	Volts
Input-Output Differential	$V_{IN}-V_O$		8A	0-125°C	2.6		Volts
Line Regulation ²	REG _(LINE)	V_1 to V_3	5A	25°C		2.0	% V_O
Load Regulation ²	REG _(LOAD)	V_1	10mA to 8.0A	25°C		0.6	% V_O
Quiescent Current	I_Q	V_1	10mA	25°C		20.0	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 8.0A	25°C		5.0	mA
Current Limit ²	I_{LIM}	$V_0 + 5V$		25°C		18	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 39U	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 8A	0-125°C		80	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) $V_3 = V_C (1 + R1/R2)$

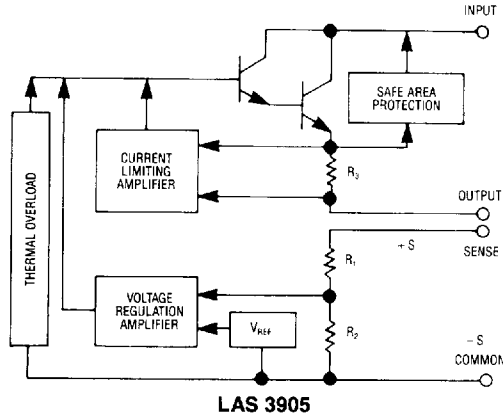
R1 = Resistance from output to control

R2 = Resistance from control to common

LAS 3900

8 AMP POSITIVE VOLTAGE REGULATORS

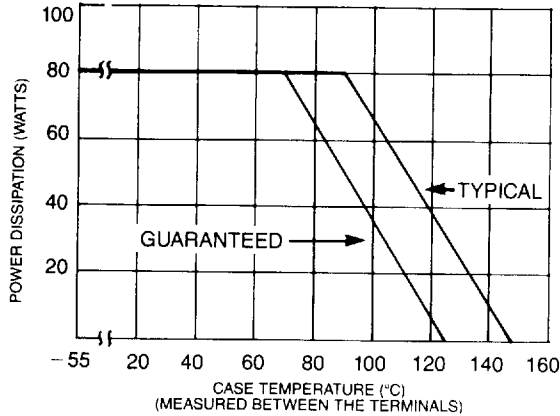
BLOCK DIAGRAM



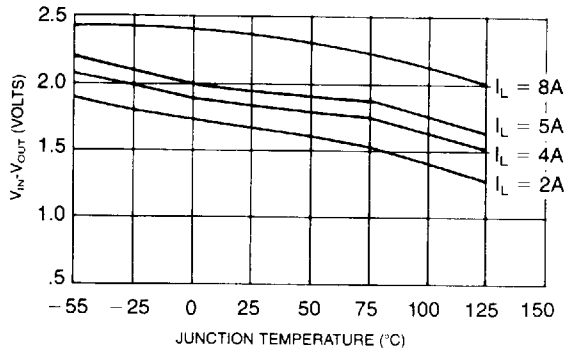
12

OPERATIONAL DATA

POWER DERATING



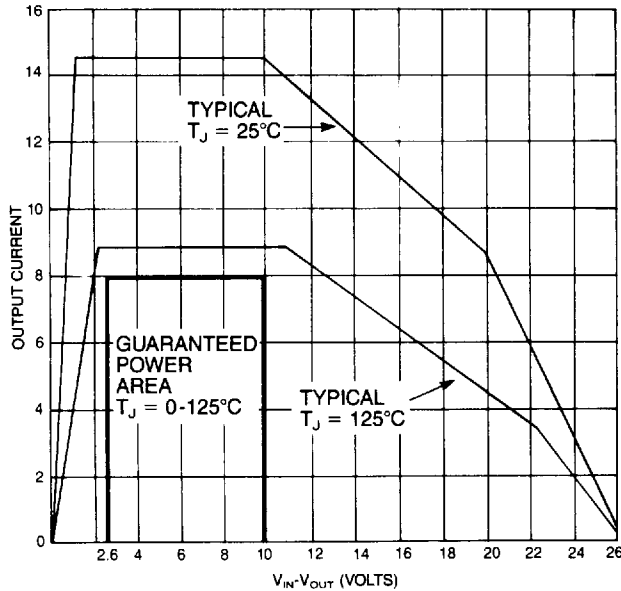
TYPICAL INPUT-OUTPUT VOLTAGE DIFFERENTIAL VS JUNCTION TEMPERATURE



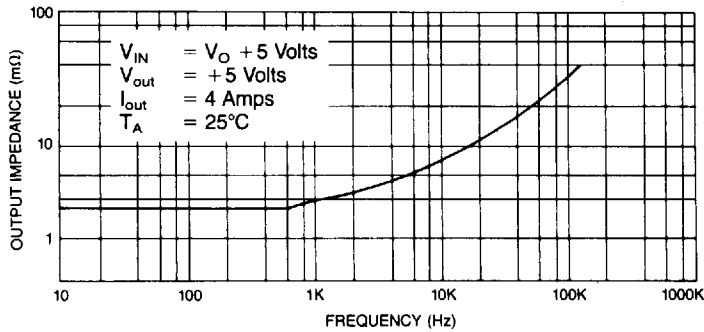
8 AMP POSITIVE VOLTAGE REGULATORS

LAS 3900

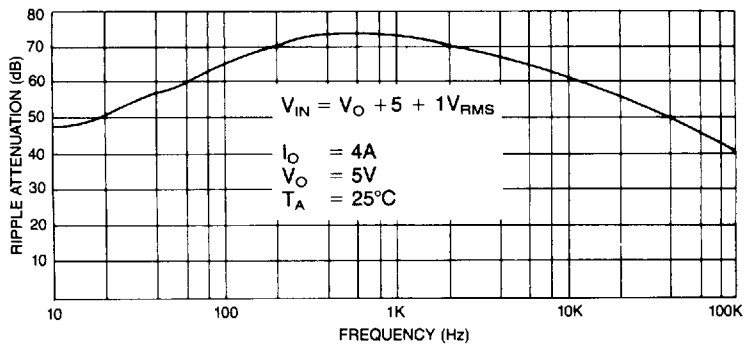
CURRENT LIMIT



TYPICAL OUTPUT IMPEDANCE VS FREQUENCY



TYPICAL RIPPLE ATTENUATION VS FREQUENCY

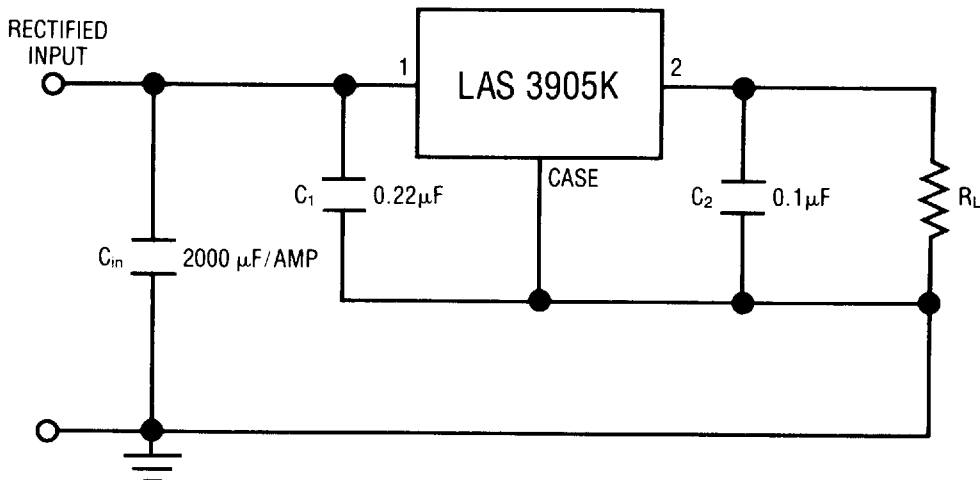


LAS 3900

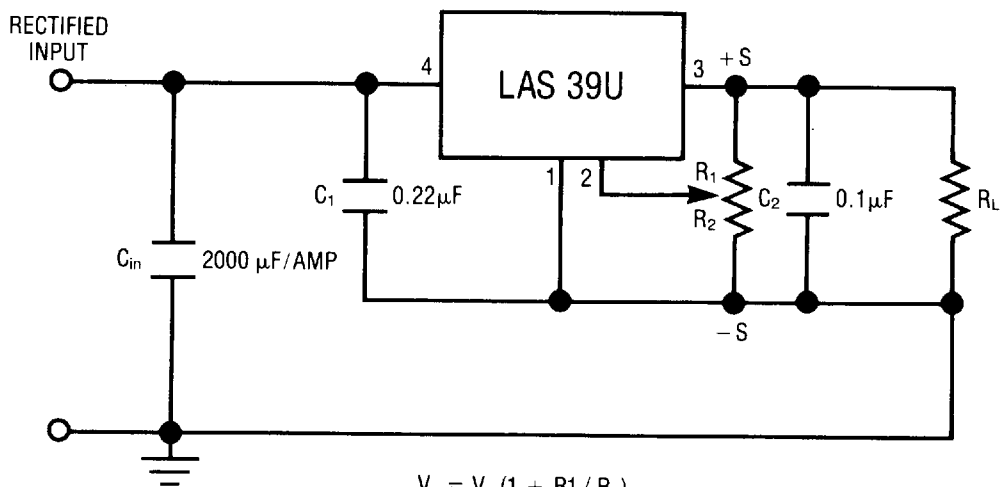
8 AMP POSITIVE VOLTAGE REGULATORS

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.

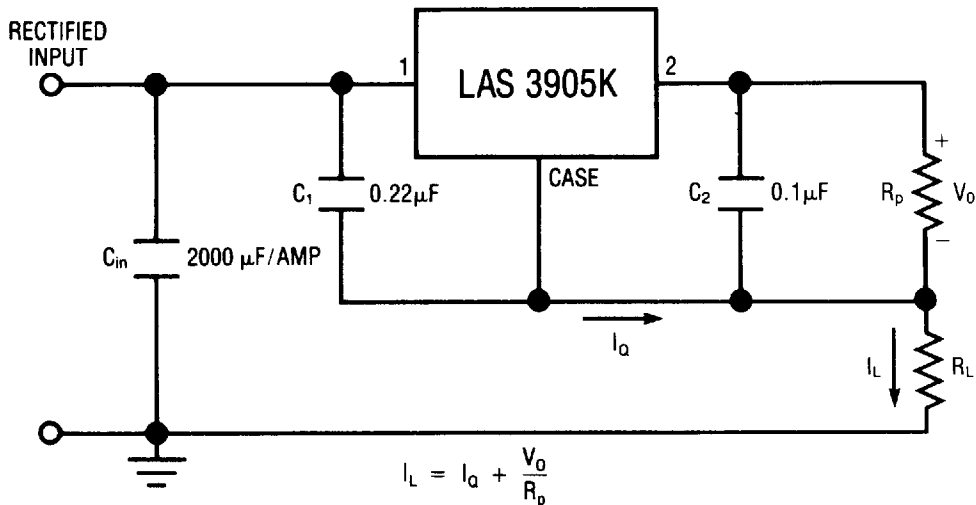
² $\frac{V_o}{R_1 + R_2} \geq 10 \text{ mA}$

8 AMP POSITIVE VOLTAGE REGULATORS

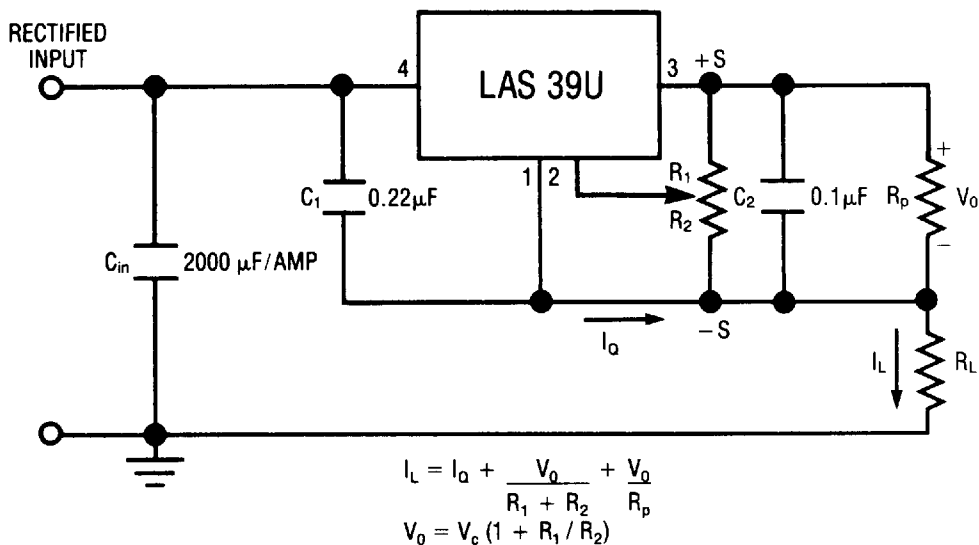
LAS 3900

TYPICAL APPLICATIONS

FIXED CURRENT REGULATOR¹



ADJUSTABLE CURRENT REGULATOR^{1,2}



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

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

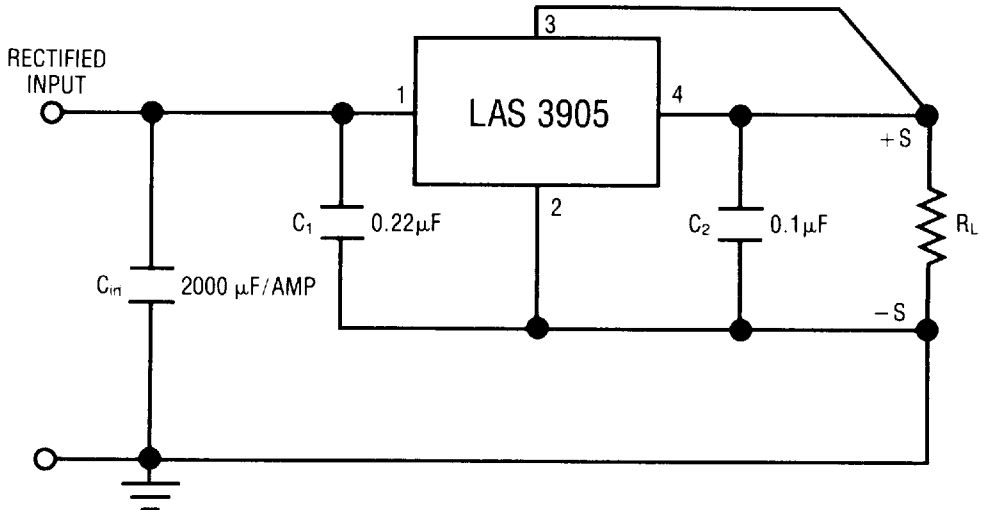
LAS 3900

8 AMP POSITIVE VOLTAGE REGULATORS

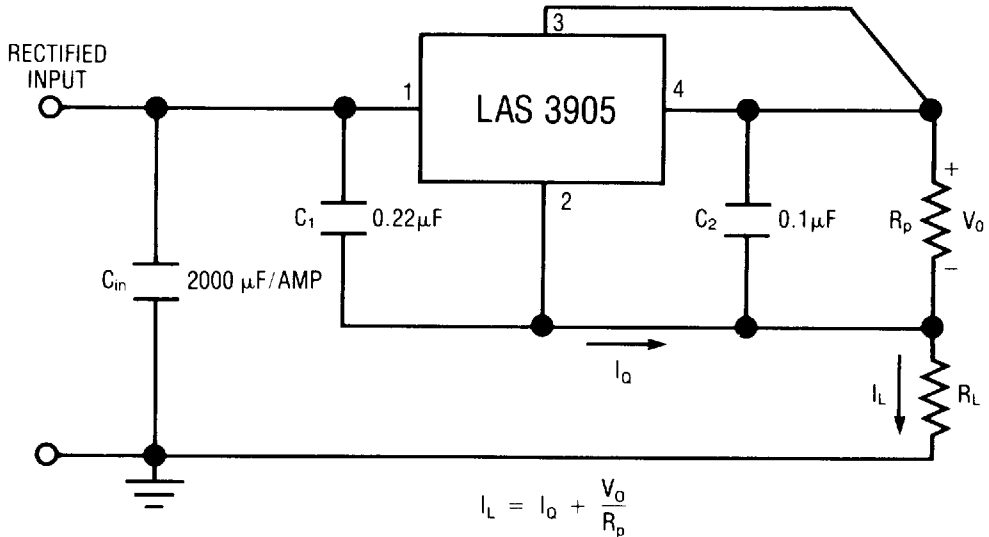
TYPICAL APPLICATIONS

12

FIXED VOLTAGE REGULATOR WITH REMOTE SENSE¹



FIXED CURRENT REGULATOR¹



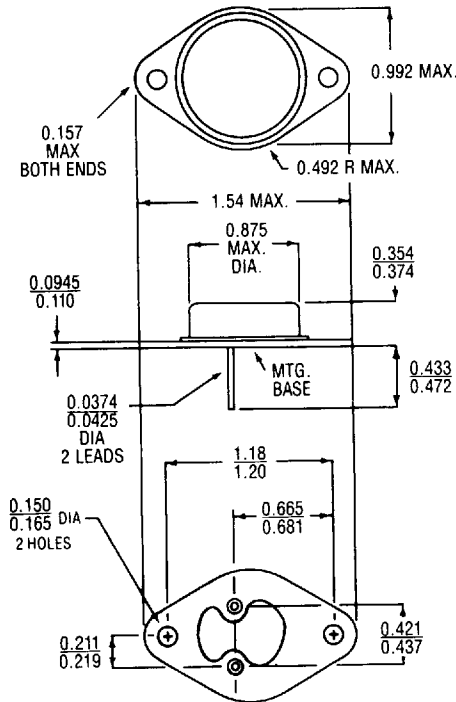
¹ C_1 and C_2 should be placed as close as possible to the regulator.

8 AMP POSITIVE VOLTAGE REGULATORS

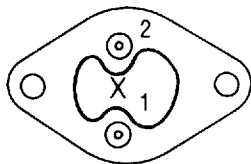
LAS 3900

DEVICE OUTLINE

TO-3 (COPPER/STEEL)



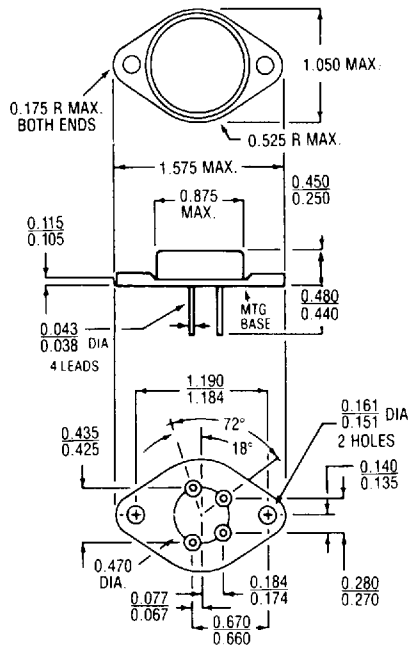
Bottom View



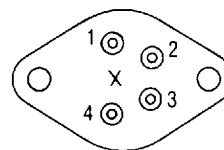
LAS 3905K

- 1 — Input
- 2 — Output
- Case Is Common

TO-3 (COPPER)



Bottom View



LAS 3905

- 1 — Input
- 2 — Common
- 3 — Sense
- 4 — Output
- Case Is Common

LAS 39U

- 1 — Common
- 2 — Control
- 3 — Output
- 4 — Input
- Case Is Common

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