



## LAS 1400, 14U voltage regulators

- Guaranteed load regulation at 3A — 0.6%  $V_o$
- Guaranteed temperature coefficient — 0.015%  $V_o/^{\circ}\text{C}$

### Performance specifications for LAS 1400 and LAS 14U voltage regulators

| Parameter                              | Symbol              | Test Conditions<br>$V_{in}$<br>(volts) | $I_o$       | $T_j$   | LAS 1400<br>Test Limits<br>Min. | Max.         | LAS 14U<br>Test Limits<br>Min. | Max.        | Units              |
|----------------------------------------|---------------------|----------------------------------------|-------------|---------|---------------------------------|--------------|--------------------------------|-------------|--------------------|
| Input Voltage                          | $V_{in}$            | —                                      | 5mA         | 0-125°C | $V_o + 2.5V$                    | 35 [40] (1)  | $V_o + 2.5$ (16)               | 35 [40] (1) | Volts              |
| Output Voltage (2)                     | $V_o$               | $V_1$ to $V_2$                         | 5mA to 3.0A | 25°C    | 0.95   $V_o$   (3)              | 1.05   $V_o$ | 2.65 (4)                       | 30          | Volts              |
| Input Output Differential              | $V_{in} - V_o$      | —                                      | 3.0A        | 0-125°C | 2.5                             | 25           | 2.5                            | 25          | Volts              |
| Output Current                         | $I_o$               | —                                      | —           | 25°C    | —                               | 3.0          | —                              | 3.0         | Amps               |
| Standby Current                        | $I_Q$               | $V_1$                                  | —           | 25°C    | 6.5                             | 14.0         | 6.5                            | 14.0        | mA                 |
| Standby Current Change with input      | $\Delta I_Q$        | $V_1$ to $V_3$                         | 5mA         | 25°C    | —                               | 1.3          | —                              | 1.3         | mA                 |
| Standby Current Change with Load       | $\Delta I_Q$        | $V_1$                                  | 5mA to 3.0A | 25°C    | —                               | 1.5          | —                              | 1.5         | mA                 |
| Maximum Current Limit                  | $I_{LIM}$           | $V_1$                                  | —           | 25°C    | —                               | 4.5          | —                              | 4.5         | Amps               |
| Short-Circuit Current                  | $I_S$               | 25V                                    | —           | 25°C    | —                               | 2.0          | —                              | 2.0         | Amps               |
| Power Dissipation (5)                  | $P_D$               | —                                      | —           | —       | —                               | 30           | —                              | 30          | Watts              |
| Thermal Resistance Junction-to-case    | $\theta_{J-C}$      | —                                      | —           | —       | —                               | 2.25         | —                              | 2.75        | °C per Watt        |
| Storage Temperature                    | $T_S$               | —                                      | —           | —       | -65                             | +150         | -65                            | +150        | °C                 |
| Maximum Operating Junction Temperature | $T_J$               | —                                      | —           | —       | -55                             | +150         | -55                            | +150        | °C                 |
| Regulation — Load (5) (2)              | (REG) <sub>L</sub>  | $V_1$                                  | 5mA to 3.0A | 25°C    | —                               | 0.6          | —                              | 0.6         | % $V_o$            |
| Regulation — Line (5) (2)              | (REG) <sub>IN</sub> | $V_1$ to $V_2$                         | 2.0A        | 25°C    | —                               | 1.0          | —                              | 1.0         | % $V_o$            |
| Temperature Coefficient                | $T_C$               | $V_1$                                  | 5mA         | 0-125°C | —                               | 0.015        | —                              | 0.015       | % $V_o$ per °C     |
| Output Noise Voltage (7)               | $V_N$               | $V_1$                                  | 0.1A        | 0-125°C | —                               | 10           | —                              | 10          | $\mu\text{Vrms/V}$ |
| Ripple Attenuation                     | $R_A$               | $V_o - 10V$                            | 2.0A        | 0-125°C | 60 (8)                          | —            | 66 (9)                         | —           | dB                 |
| Control Voltage                        | $V_C$               | $V_1$ to $V_2$                         | 5mA         | 25°C    | —                               | —            | 2.375                          | 2.625       | V                  |

#### NOTES

- Values of 35V applies to  $V_o = 5V$  to 12V. Values of 40V applies to  $V_o$  of +15 volts.
- $V_1 = V_o + 5V$ ,  $V_2 = V_o + 15V$ ,  $V_3 = V_o + 10V$ .
- Nominal output voltages are specified under ordering information.
- $V_o = V_C [1 + \frac{R_1}{R_2}]$   
 $R_1$  — resistance from output to control.  
 $R_2$  — resistance from control to common.
- Instantaneous regulation average chip temperature changes must be accounted for separately.

- Derate above  $T_C = 80^{\circ}\text{C}$  444mW per °C for LAS 1405-1415. Derate above  $T_C = 70^{\circ}\text{C}$  364 mW per °C for LAS-14U.
- Specified in  $\mu\text{Vrms/volt}$  output. BW = 10HZ-100K HZ.
- Ripple attenuation is specified for a 1 Vrms, 120 HZ input ripple. Ripple attenuation is a minimum of 60 dB at 5 volts output and is 1 db less for each volt increase in output voltage.
- Ripple attenuation is specified for a 1 Vrms, 120 HZ input ripple. Ripple attenuation is a minimum of 66 dB at 5 volts output and is 1 db less for each volt increase in output voltage.
- Minimum input voltage is 6V.

#### Outline drawing — fixed output

#### Outline drawing — variable output



LAS 1405-1415



LAS 14U

### Ordering information

Monolithic Voltage Regulators 30 watt 3A.

#### LAS 1400 Series — fixed output

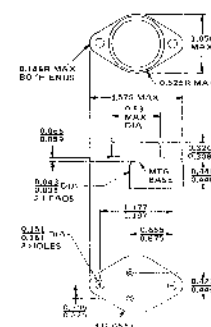
| Type     | Output Voltage (Vdc) | £    | ¢    |
|----------|----------------------|------|------|
| LAS 1405 | +5                   | 6.40 | 5.14 |
| LAS 1408 | +8                   | 6.40 | 5.14 |
| LAS 1409 | +9                   | 6.40 | 5.14 |
| LAS 1410 | +10                  | 6.40 | 5.14 |
| LAS 1412 | +12                  | 6.40 | 5.14 |
| LAS 1415 | +15                  | 6.40 | 5.14 |

#### LAS 14U Series — variable output

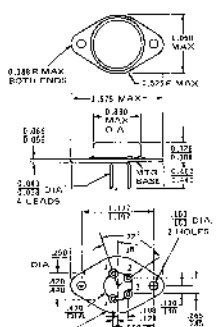
| Type    | Output Voltage (Vdc) | £     | ¢    |
|---------|----------------------|-------|------|
| LAS 14U | +2.65 to +30         | 10.06 | 8.49 |

Please contact Lambda (High Wycombe 36386) or our distributors for higher quantity prices. Device configurations and prices are subject to change without notice.

Prices do not include V.A.T.



Pin Function - 1400 series  
 1 op-amp  
 2 Control  
 3 Input



Pin Function 14U  
 1 op-amp  
 2 Control  
 3 Input  
 4 Output  
 5 Input

Note: Dimensions in inches.

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### Absolute maximum ratings

|                                                                      |                                    |
|----------------------------------------------------------------------|------------------------------------|
| Input Voltage ( $V_o = 5V$ to 12V)<br>( $V_o = 15V$ to 30V)          | 35 volts<br>40 volts               |
| Internal Power Dissipation                                           | Internally Limited                 |
| Operating Junction Temperature Range                                 | -55°C to +150°C                    |
| Storage Temperature Range                                            | -65°C to +150°C                    |
| Terminal Temperature (1/16" from case)                               | +300°C for 10 sec.                 |
| Thermal Resistance, junction-to-case (LAS 1400)<br>(LAS 14U)         | 2.25°C per watt<br>2.75°C per watt |
| Derating (LAS 1400, $T_C$ above 80°C)<br>(LAS 14U, $T_C$ above 70°C) | 444mW per °C<br>364mW per °C       |

- Guaranteed input-output differential—2.5 volts
- Guaranteed ripple attenuation—60dB

## LAS 1400, 14U voltage regulators



### Operational data LAS1400 and 14U monolithic 3A voltage regulators

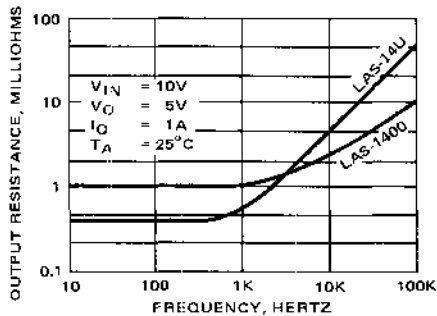


Fig. 1. Typical output resistance VS frequency.

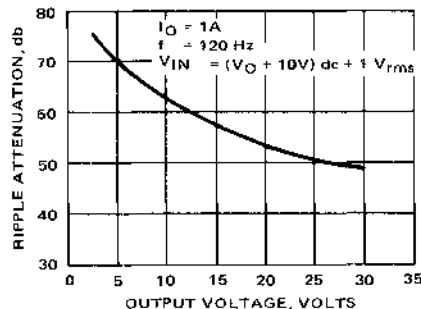


Fig. 2. Typical ripple attenuation VS output

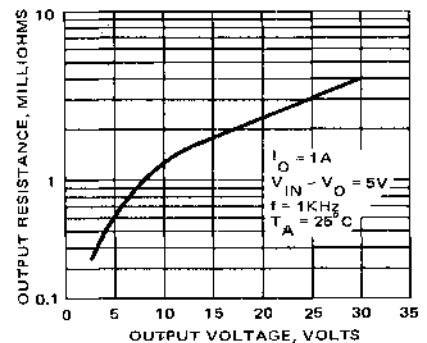


Fig. 3. Typical output resistance VS output voltage.

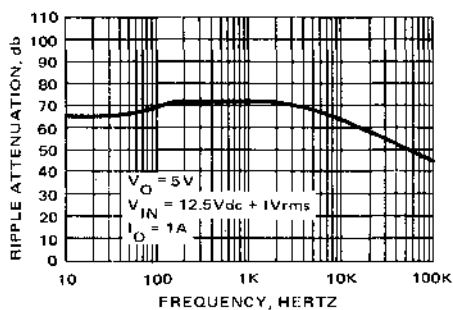


Fig. 4. Typical ripple attenuation VS frequency.

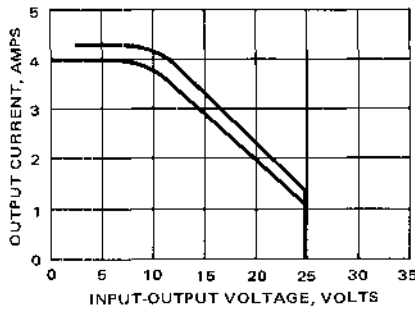


Fig. 5. Typical current limit VS input-output differential

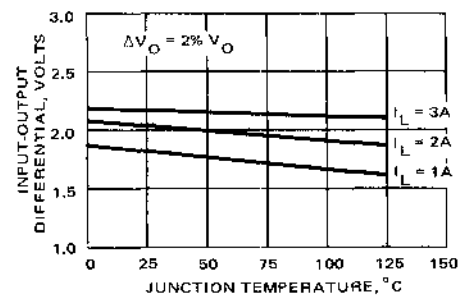
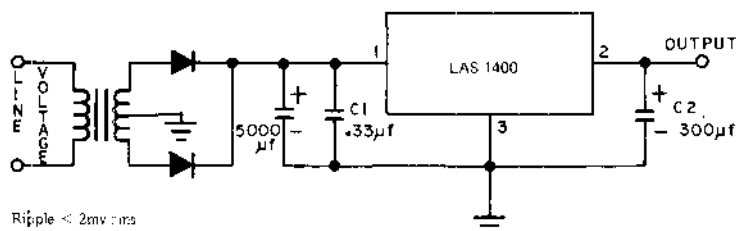


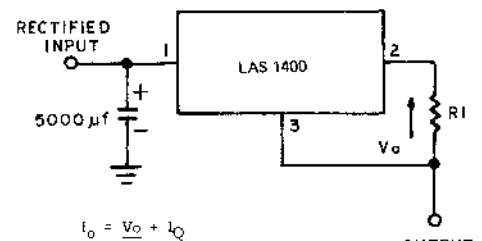
Fig. 6. Typical input-output differential voltage VS junction temperature.

### Connection Diagrams



Ripple < 2mV rms  
Line and Load Regulation < 0.2%

Fig. 7. 3.0 amp power supply circuit.



$$I_o = \frac{V_o}{R_L} + I_Q$$

Fig. 8. Current regulator circuit.

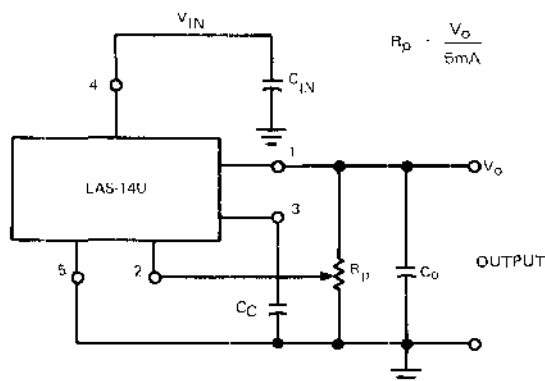


Fig. 9. 3.0 amp adjustable power supply.

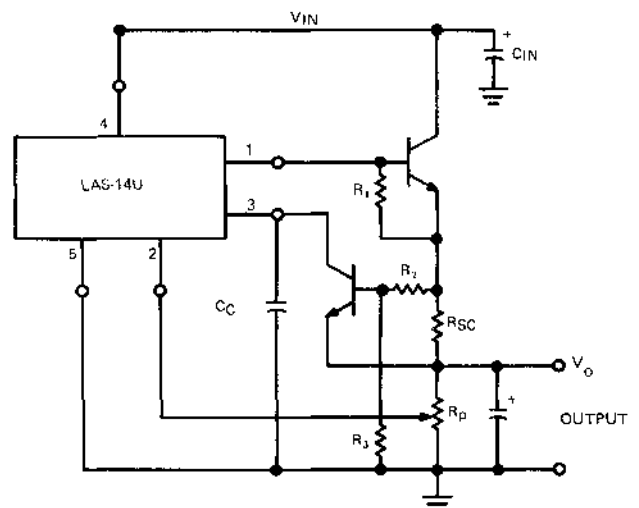


Fig. 10. 3.0 amp regulator used as driver for higher current.