



*This product is sold
and supported
in the USA by*



LASER LAB SOURCE
marketplace for **Scientists & Engineers**

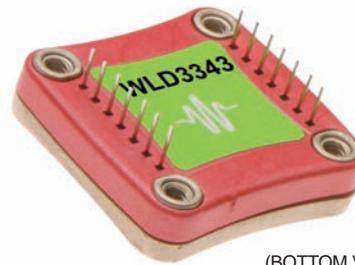
contact@LaserLabSource.com

800.887.5065



WLD3343

General Purpose Driver for Laser Diodes & VCSELs



(BOTTOM VIEW)



GENERAL DESCRIPTION:

The WLD3343 is an easy-to-use analog circuit for space constrained laser diode applications. The WLD3343 maintains precision laser diode current (constant current mode) or stable photodiode current (constant power mode) regulation using electronics that are compatible with any laser diode type. Safely supply up to 3 Amps of current to your laser diode from a single +5 Volt power supply.

Excellent for VCSELs, electro-optical equipment, and medical/dental systems.



Add Fan for 2 A

Add Heatsink & Thermal Washer for 1 A

Up to 500 mA

FEATURES:

- Low Cost
- Slow Start Laser Diode Protection
- Drive Up to 3 Amps Output Current
- Constant Current or Power Operation
- Compatible With Any Laser Diode Type
- Small Package Size (1.30" X 1.26" X 0.313")
- Voltage Controlled Setpoint
- TTL Compatible Shutdown Pin
- Adjustable Current Limit
- Adjustable Current Range
- 2 MHz Constant Current Bandwidth
- Over Temperature Shutdown
- 14-Pin DIP PCB Mount

Ordering Information

| | |
|------------|--|
| WLD3343 | 2.2 A Laser Diode Driver |
| WLD3343HB | 2.2 A Li+ Battery-compatible Driver |
| WLD3343-3A | 3 A Laser Diode Driver |
| WLD3343-2L | 2.2 A Lower Noise Driver, no CP mode |
| WLD3343-3L | 3 A Lower Noise Driver, no CP mode |
| WLD3393 | Evaluation PCB for WLD3343, WLD3343-3A, WLD3343-2L, and WLD3343-3L |
| WTW002 | Thermal Washer for all WLDs |
| WHS302 | Heatsink for all WLDs |
| WXC303 | +5 VDC Fan for all WLDs |
| WXC304 | +12 VDC Fan for all WLDs |

Figure 1
Top View Pin Layout and Descriptions

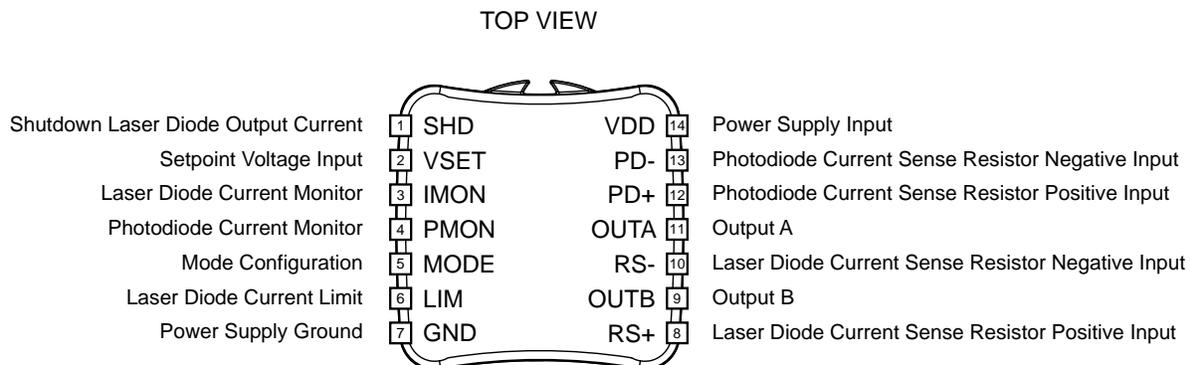
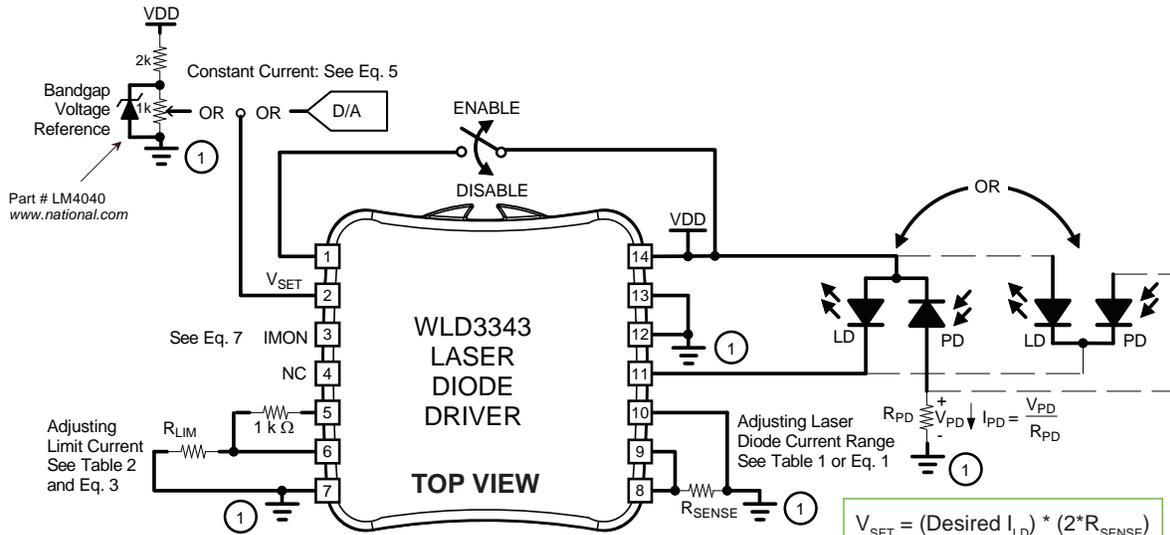


Figure 2
 Quick Connect Diagram
 For Type A/B Laser Diodes
 Operated in Constant Current Mode

An online tool is available
 to determine values for external components:
<http://www.teamwavelength.com/support/tools.asp>



① TIE GROUND CONNECTIONS DIRECTLY TO PIN 7

$V_{SET} = (\text{Desired } I_{LD}) * (2 * R_{SENSE})$

Without Evaluation Board

$$R_{SENSE} = \frac{1.00}{I_{LDMAX}}$$

With Eval Board (Rev. Level)

| LD Range | R _{SENSE} (Rev. C) | R _{SENSE} (Rev. A&B) |
|----------|-----------------------------|-------------------------------|
| 2.0 A | 438 mΩ | 500 mΩ |
| 200 mA | 5.01 Ω | 5.1 Ω |

| ELECTRICAL AND OPERATING SPECIFICATIONS | | | PAGE 3 | |
|---|----------------------------------|--------------------|------------|---------|
| ABSOLUTE MAXIMUM RATINGS | | | | |
| RATING | SYMBOL | VALUE | UNIT | |
| Supply Voltage (Voltage on Pin 14) | V _{DD} | +4.5 to +12.5 | Volts DC | |
| Output Current (See SOA Chart) | I _{LD} | 2.2 or 3 | Amperes | |
| Power Dissipation, T _{AMBIENT} = +25°C | P _{MAX} | 9 | Watts [1] | |
| Operating Temperature, case [2] | T _{OPR} | - 40 to + 85 [3] | °C | |
| Storage Temperature | T _{STG} | - 65 to +150 | °C | |
| Weight | WLD3343 | 0.6 | oz | |
| PARAMETER | TEST CONDITIONS | WLD3343-2A | WLD3343-3A | UNITS |
| OUTPUT | | | | |
| Current, peak, see SOA chart | | 2.2 | 3 | Amps |
| Compliance Voltage, Laser Diode Load | I _{LD} = 100 mA, 5 V | 3.6 | | Volts |
| Compliance Voltage, Laser Diode Load | I _{LD} = 1.0 Amp, 5 V | 3.5 | | Volts |
| Compliance Voltage, Laser Diode Load | I _{LD} = 2.0 Amps, 5 V | 3.0 | | Volts |
| Compliance Voltage, Laser Diode Load | I _{LD} = 3.0 Amps, 5 V | 2.8 | | Volts |
| Compliance Voltage, Laser Diode Load | I _{LD} = 100 mA, 12 V | 10.6 | | Volts |
| Compliance Voltage, Laser Diode Load | I _{LD} = 1.0 Amp, 12 V | 10.4 | | Volts |
| Compliance Voltage, Laser Diode Load | I _{LD} = 2.0 Amp, 12 V | 10.1 | | Volts |
| Compliance Voltage, Laser Diode Load | I _{LD} = 3.0 Amp, 12 V | 9.8 | | Volts |
| Rise Time | I _{LD} = Full Scale | 460 | | nsec |
| Fall Time | I _{LD} = Full Scale | 320 | | nsec |
| Bandwidth | Constant Current, Sine Wave, 2 A | 2.0 | | MHz |
| Bandwidth | Constant Power | (Depends on PD BW) | | |
| Slow Start - Delay | | 0.24 | | Seconds |
| Slow Start - Ramp | | 0.01 | | Seconds |
| Leakage Current [4] | | 0 | | mA |
| CONSTANT CURRENT CONTROL | | | | |
| Short Term Stability, 1 hour | T _{AMBIENT} = 25°C | 200 | 200 | ppm |
| CONSTANT POWER CONTROL | | | | |
| Short Term Stability, 1 hour | T _{AMBIENT} = 25°C | 0.01 | | % |
| Long Term Stability, 24 hours | T _{AMBIENT} = 25°C | 0.05 | | % |
| Notes: | | | | |
| [1] In the WLD3343 and WLD3343-2L models, internal power dissipation is 1.2 W (without heatsink), 2 W (with heatsink), and 9 W (with heatsink and fan). In the WLD3343-3A and WLD3343-3L models, internal power dissipation is 2 W (without heatsink), 3 W (with heatsink), and 10 W (with heatsink and fan). | | | | |
| [2] With Revision D forward of the WLD3343, an internal thermostat has been added to activate Shutdown (SHD) when the internal temperature exceeds 105°C. The output will be re-enabled after a 250 to 300 msec slow-start once the internal temperature drops below 95°C. | | | | |
| [3] Max ambient operating temperature of the WLD3343-3A and WLD3343-3L is 45°C. | | | | |
| [4] Leakage current specification is based on full current set by R _{SENSE} . See page 9 for information on setting the current range. Minimum turn on current in the 200 mA range is 350 µA. Minimum turn on current in the 2 A range is 12 mA. This specification applies to Rev. E forward. | | | | |
| Noise: To further reduce noise, the WLD3343-2L and WLD3343-3L models are available. Both are about 2.5 times lower noise than the WLD3343 and WLD3343-3A, respectively. Constant Power (CP) mode is not available in these models. | | | | |

ELECTRICAL AND OPERATING SPECIFICATIONS - Continued

| PARAMETER | TEST CONDITIONS | WLD3343-2A | WLD3343-3A | UNITS |
|--|---|------------------------------|------------|-----------------|
| INPUT | | | | |
| Offset Voltage, initial, I_{mon} | Pin 2, $T_{AMBIENT} = 25^{\circ}C$, $V_{CM} = 0 V$ | 1 | | mV |
| V_{SET} Bias Current ⁽¹⁾ | | -50 to 150 | | μA |
| V_{SET} Input Voltage Range | | 0 to 2 | | V |
| Power Supply Rejection | Full Temperature Range | 80 | | dB |
| V_{SET} (Pin 2) Damage Threshold | | $> V_{DD} + 0.5$ or < -0.5 | | V |
| THERMAL | | | | |
| | $T_{AMBIENT} = 25^{\circ}C$ | | | |
| Heatspreader Temperature Rise | With WHS302 Heat sink, WTW002 | 30 | | $^{\circ}C / W$ |
| Heatspreader Temperature Rise | Thermal Washer | 21.5 | | $^{\circ}C / W$ |
| Heatspreader Temperature Rise | With WHS302 Heat sink, WTW002 Thermal Washer and 3.5 CFM fan | 3.4 | | $^{\circ}C / W$ |
| Pin Solderability | Solder temp @260 $^{\circ}C$ | 10 | | Seconds |
| POWER SUPPLY | | | | |
| Voltage, V_{DD} | | 5 to 12 | | Volts |
| Current, V_{DD} supply, quiescent | | 10 | | mA |
| MONITOR ACCURACY | | | | |
| Monitor Voltage versus Expected Output Current, based on transfer function | | 0.5 | | % |
| PD Monitor versus Actual | | 3.3 | | % |
| Setpoint versus Actual | | 3.5 | | % |

Notes:

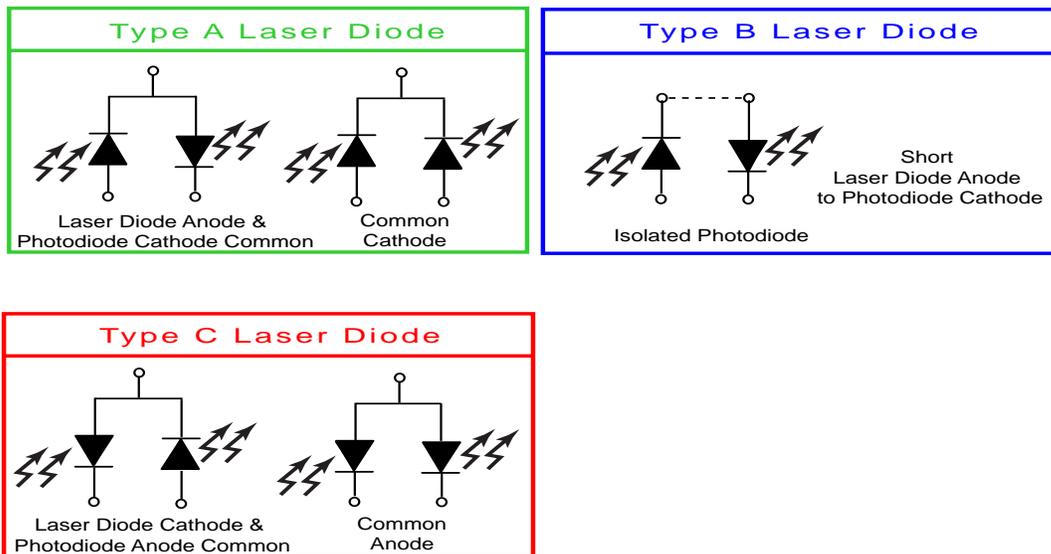
[1] As V_{SET} approaches zero volts, the V_{SET} signal source must sink up to 50 μA . As V_{SET} approaches 2 V, the V_{SET} signal source must source up to 150 μA .

| Pin | Pin # | Name | Function |
|------|-------|---|--|
| SHD | 1 | Shutdown Laser Diode Output Current | Float or connect a zero Volt signal to Pin 1 (SHD) to ENABLE the output current to the laser diode. Connect a +3 Volt or greater signal to Pin 1 (SHD) to DISABLE the output current to the laser diode. |
| VSET | 2 | Setpoint Voltage Input or Modulation Input | Connect a voltage source between Pin 2 (VSET) and Pin 7 (GND) to control either the laser diode current in constant current mode or laser diode power in constant power mode. Range is 0-2.0 volt full scale. Input impedance is 20 k Ω . The offset voltage is 0.5V when open (applies to Revision D forward). Do not let the input pin float or damage to the load may result. |
| IMON | 3 | Laser Diode Current Monitor | Monitor the laser diode forward current using Pin 3 (IMON). The Laser Diode Current Monitor produces a voltage proportional to the current flowing through the laser diode. |
| PMON | 4 | Photodiode Current Monitor | Monitor the laser diode power using Pin 4 (PMON). The Photodiode Current Monitor produces a voltage proportional to the current produced by the laser diode monitor photodiode. |
| MODE | 5 | Mode Configuration | CONSTANT CURRENT OPERATION: A 1k Ω resistor between Pin 5 (MODE) and Pin 6 (LIM) configures the WLD3343 to regulate the laser diode's forward current. CONSTANT POWER OPERATION: A 0.1 μ F capacitor between Pin 5 (MODE) and Pin 6 (LIM) configures the WLD3343 to regulate the laser diode's output power. |
| LIM | 6 | Laser Diode Current Limit | A resistor connected between Pin 6 (LIM) and Pin 7 (GND) limits the maximum amount of forward current through the laser diode |
| GND | 7 | Power Supply Ground | Connect the VDD power supply ground connection to Pin 7 (GND). |
| RS+ | 8 | Laser Diode Current Sense Resistor Positive Input | Connect Pin 8 (RS+) directly to the positive side of the laser diode current sense resistor. The resistance value of R _{SENSE} determines the range of forward current through the laser diode. |
| OUTB | 9 | Output B | Connect Pin 9 (OUTB) to the positive side of R _{SENSE} . |
| RS- | 10 | Laser Diode Current Sense Resistor Negative Input | Connect Pin 10 (RS-) directly to the negative side of the laser diode current sense resistor. The resistance value of R _{SENSE} determines the range of forward current through the laser diode. |

Pin Descriptions continued on the next page.

| Pin | Pin # | Name | Function |
|------|-------|--|---|
| OUTA | 11 | Output A | <p>TYPE A/B LASER DIODES: Connect Pin 11 (OUTA) to the cathode connection of the laser diode for type A/B laser diode operation.</p> <p>TYPE C LASER DIODES: Connect Pin 11 (OUTA) to Pin 14 (VDD) for type C laser diode operation.</p> |
| PD+ | 12 | Photodiode Current Sense Resistor Positive Input | <p>TYPE A/B LASER DIODE OPERATION: CC: Connect Pin 12 (PD+) and Pin 13 (PD-) to Pin 7 (GND). CP: Connect Pin 12 (PD+) to the anode of the photodiode.</p> <p>TYPE C LASER DIODE OPERATION: CC: Connect Pin 12 (PD+) and Pin 13 (PD-) to Pin 7 (GND). CP: Connect Pin 12 (PD+) to Pin 14 (VDD).</p> |
| PD- | 13 | Photodiode Current Sense Resistor Negative Input | <p>TYPE A/B LASER DIODE OPERATION: CC: Connect Pin 12 (PD+) and Pin 13 (PD-) to Pin 7 (GND). CP: Connect Pin 13 (PD-) to Pin 7 (GND).</p> <p>TYPE C LASER DIODE OPERATION: CC: Connect Pin 12 (PD+) and Pin 13 (PD-) to Pin 7 (GND). CP: Connect Pin 13 (PD-) to the cathode of the photodiode.</p> |
| VDD | 14 | Power Supply Input | <p>Power supply input for the WLD3343's internal control electronics. Supply range input for this pin is +5 to +12 Volts DC.</p> |

LASER DIODE PACKAGE STYLES



SAFE OPERATING AREA & HEATSINK REQUIREMENTS

Caution:

Do not exceed the Safe Operating Area (SOA). Exceeding the SOA voids the warranty.

An online tool is available for calculating Safe Operating Area at:

<http://www.teamwavelength.com/support/calculator/soa/soald.php>.

To determine if the operating parameters fall within the SOA of the device, the maximum voltage drop across the controller and the maximum current must be plotted on the SOA curves.

These values are used for the example SOA determination:

$$\left. \begin{array}{l} V_S = 12 \text{ volts} \\ V_{\text{Load}} = 5 \text{ volts} \\ I_{\text{Load}} = 1 \text{ amp} \end{array} \right\} \text{ These values are determined from the specifications of the laser diode.}$$

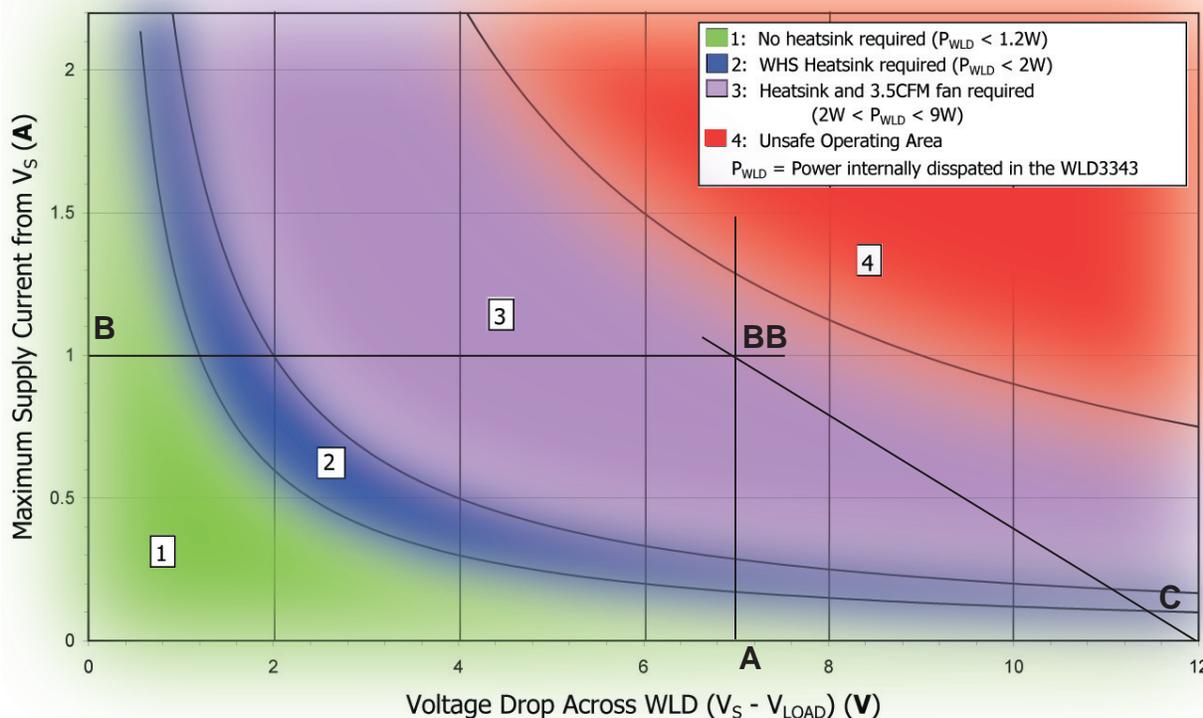
Follow these steps:

1. Determine the maximum voltage drop across the driver, $V_S - V_{\text{Load}}$, and mark on the X axis.
Example: 12 volts - 5 volts = 7 volts, Point A
2. Determine the maximum current, I_{Load} , through the driver and mark on the Y axis:
(1 amp, Point B)
3. Draw a horizontal line through Point B across the chart. (Line BB)
4. Draw a vertical line from Point A to the maximum current line indicated by Line BB.
5. Mark V_S on the X axis. (Point C)
6. Draw the Load Line from where the vertical line from point A intersects Line BB down to Point C.

Refer to the chart shown below and note that the Load Line is in the Unsafe Operating Areas for use with no heatsink (1) or the heatsink alone (2), but is outside of the Unsafe Operating Area for use with heatsink and Fan (3).

WLD3343 or WLD3343-2L Safe Operating Area

Graphs assume:
25°C Ambient
75°C Case



SAFE OPERATING AREA & HEATSINK REQUIREMENTS

Caution:

Do not exceed the Safe Operating Area (SOA). Exceeding the SOA voids the warranty.

An online tool is available for calculating Safe Operating Area at:

<http://www.teamwavelength.com/support/calculator/soa/soald.php>.

To determine if the operating parameters fall within the SOA of the device, the maximum voltage drop across the controller and the maximum current must be plotted on the SOA curves.

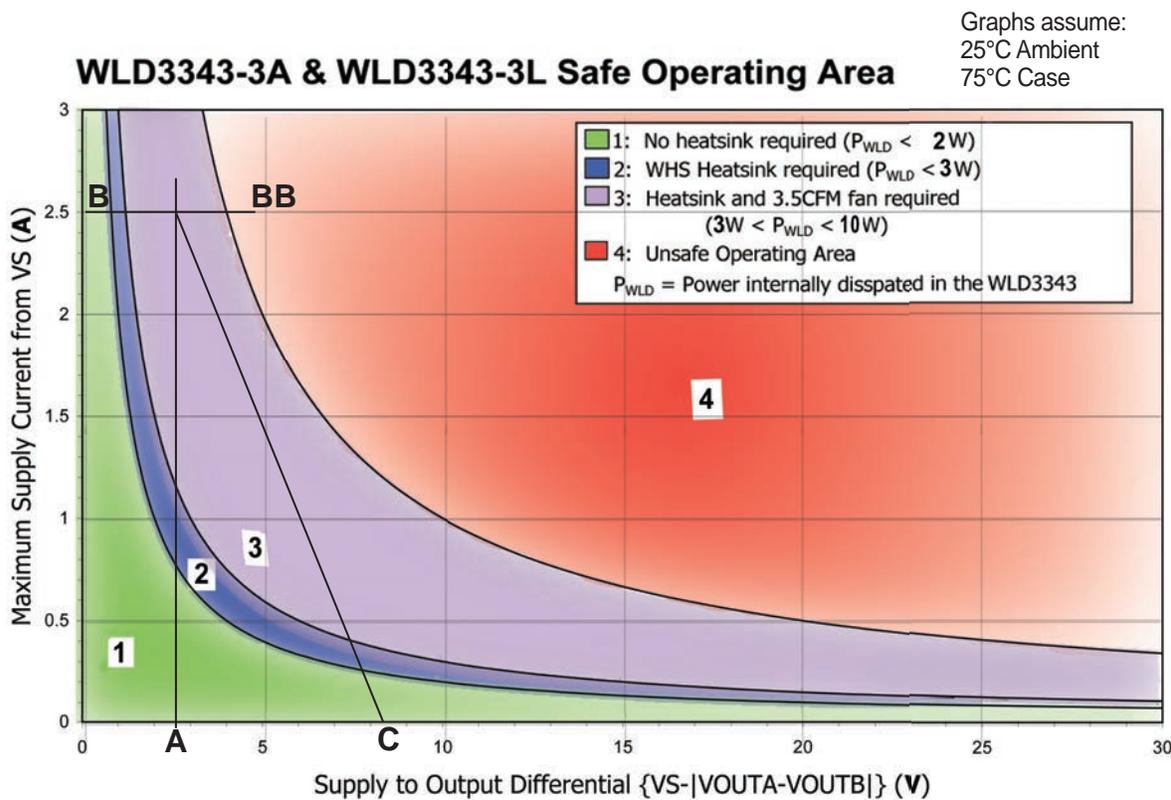
These values are used for the example SOA determination:

$$\left. \begin{array}{l} V_S = 9 \text{ volts} \\ V_{\text{Load}} = 6 \text{ volts} \\ I_{\text{Load}} = 2.5 \text{ amps} \end{array} \right\} \text{ These values are determined from the specifications of the laser diode.}$$

Follow these steps:

1. Determine the maximum voltage drop across the driver, $V_S - V_{\text{Load}}$, and mark on the X axis.
Example: 9 volts - 6 volts = 3 volts, Point A)
2. Determine the maximum current, I_{Load} , through the driver and mark on the Y axis:
(2.5 amps, Point B)
3. Draw a horizontal line through Point B across the chart. (Line BB)
4. Draw a vertical line from Point A to the maximum current line indicated by Line BB.
5. Mark V_S on the X axis. (Point C)
6. Draw the Load Line from where the vertical line from point A intersects Line BB down to Point C.

Refer to the chart shown below. Note that the Load Line is in the Safe Operating Area for use with heatsink and fan (3). It is in the Unsafe Operating Area for use with no heatsink (1) or the heatsink alone (2).



OPERATION

1. SELECTING THE LASER DIODE OUTPUT CURRENT RANGE

The output current range of the WLD3343 depends on the selection of resistor R_{SENSE} placed between Pin 8 (RS+) and Pin 10 (RS-) as shown in Figure 3.

Equation 1 calculates R_{SENSE} for a maximum desired laser diode current, I_{LDMAX} . Refer to Table 1 to select R_{SENSE} for common laser diode current ranges.

Table 1

Laser Diode Current Sense Resistor R_{SENSE} vs Maximum Laser Diode Current I_{LDMAX}

| Maximum Output Current I_{LDMAX} | Constant Power Current Sense Resistor, R_{SENSE} | Constant Current Current Sense Resistor, R_{SENSE} |
|---------------------------------------|--|--|
| 50 mA | 25.00 Ω | 20.00 Ω |
| 125 mA | 10.00 Ω | 8.00 Ω |
| 250 mA | 5.00 Ω | 4.00 Ω |
| 500 mA | 2.50 Ω | 2.00 Ω |
| 1.25 Amps | 1.00 Ω | 0.80 Ω |
| 2.2 Amps | 0.57 Ω | 0.45 Ω |
| 3 Amps | 0.42 Ω | 0.33 Ω |

2. HELPFUL HINTS FOR CHOOSING R_{SENSE}

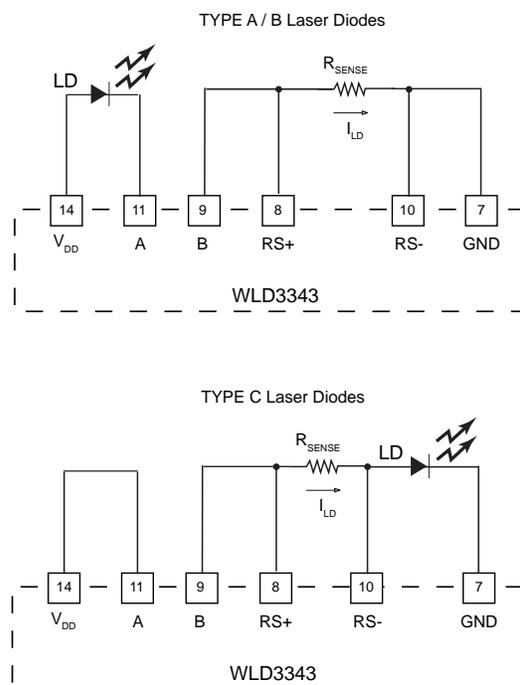
- Never use a carbon film resistor for R_{SENSE} .
- Avoid resistors with high parasitic inductance.
- Select a resistor with a low temperature coefficient ($1\% \approx 100\text{ppm}/^\circ\text{C}$).
- Place R_{SENSE} as close to Pins 8 (RS+) and 10 (RS-) on the WLD3343 as possible to avoid parasitic resistance effects from the PCB layout.
- Use Equation 2 for determining the power rating of R_{SENSE} .

Note: Wavelength Electronics recommends a conservative power rating of 2 times normal maximum for R_{SENSE} . Equation 2 incorporates this recommendation.

An online tool is available to determine values for external components:
<http://www.teamwavelength.com/support/tools.asp>.

Figure 3

Connecting R_{SENSE}



Equation 1

Calculating R_{SENSE}

Constant Power Mode

$$R_{SENSE} = \frac{1.25}{I_{LDMAX}}$$

Constant Current Mode

$$R_{SENSE} = \frac{1.00}{I_{LDMAX}}$$

Equation 2

Calculating The Power Rating For R_{SENSE}

$$\text{RATING} = 2 * I_{LDMAX}^2 * R_{SENSE}$$

OPERATION

3. CONFIGURING THE LASER DIODE CURRENT LIMIT

The WLD3343 allows a customized current range for a specific application. This allows optimized set point resolution while minimizing output noise. Table 2 (next page) lists the scaling factors for different current limits (R_{LIM}).

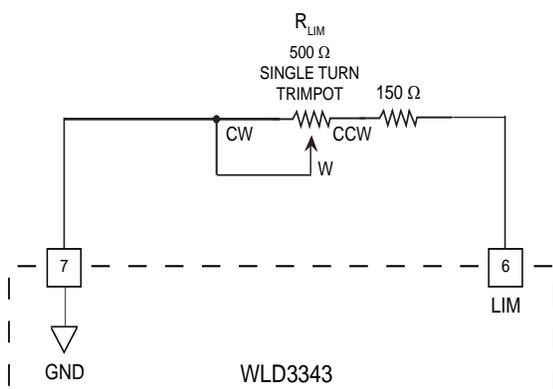
To select an appropriate resistance value for the limit resistor (R_{LIM}), the laser diode type and mode of operation, divide the maximum laser diode current (determined in Section 1) into the desired maximum operating current for the laser diode. This result is the Normalized Maximum Output Current. Choose the resistance value of the current limit set resistor (R_{LIM}) shown next to the calculated Normalized Maximum Output Current.

Use Equation 3 to calculate a precise value for R_{LIM} .

Setting Current Limits Using Trimpots

Connect a 500 Ω trimpot and a 150 Ω resistor as shown in Figure 4 to make the maximum current limit adjustable.

Figure 4
Adjustable Current Limits



An online tool is available to determine values for external components: <http://www.teamwavelength.com/support/tools.asp>.

Example 1

Choosing R_{LIM} for a Type A/B Laser Diode with a 1.5 A Maximum Forward Current in Constant Current Mode.

Configure the WLD3343 so that I_{LDMAX} is 2.2 A by selecting R_{SENSE} equal to 0.45 Ω . The Normalized Maximum Output Current then equals:

$$= \frac{1.5 \text{ Amps}}{2.2 \text{ Amps}} = 0.68$$

A Normalized Output Current of 0.68 (68%) corresponds to a current limit set resistor R_{LIM} of 405 Ω .

Equation 3

Calculating R_{LIM}

$$R_{LIM} = \frac{\alpha \left[\frac{I_{LDLIM} R_{SENSE} + 1}{\beta} \right]}{\left[1 - \left[\frac{I_{LDLIM} R_{SENSE} + 1}{\beta} \right] \right]}$$

| Laser Diode Type / Mode | α | β |
|-------------------------|----------|---------|
| Type A/B - CC | 282 | 2.85 |
| Type A/B - CP | 350 | 3.35 |
| Type C - CC | 290 | 2.93 |
| Type C - CP | 385 | 3.57 |

OPERATION

An online tool is available
to determine values for external components:
<http://www.teamwavelength.com/support/tools.asp>.

WLD3343

Table 2
Current Limit Set Resistor R_{LIM} vs
Normalized Maximum Output Current

| Normalized Maximum Output Current | Type A/B Laser Diode Constant Current Limit Set Resistor R_{LIM} (Ω) | Type A/B Laser Diode Constant Power Limit Set Resistor R_{LIM} (Ω) | Type C Laser Diode Constant Current Limit Set Resistor R_{LIM} (Ω) | Type C Laser Diode Constant Power Limit Set Resistor R_{LIM} (Ω) |
|-----------------------------------|---|---|---|---|
| 0.00 (0%) | 152 | 149 | 150 | 150 |
| 0.04 (4%) | 162 | 160 | 160 | 160 |
| 0.08 (8%) | 172 | 171 | 169 | 171 |
| 0.12 (12%) | 183 | 183 | 179 | 183 |
| 0.16 (16%) | 194 | 195 | 190 | 195 |
| 0.20 (20%) | 205 | 208 | 201 | 207 |
| 0.24 (24%) | 217 | 222 | 213 | 220 |
| 0.28 (28%) | 230 | 236 | 225 | 234 |
| 0.32 (32%) | 243 | 251 | 238 | 248 |
| 0.36 (36%) | 257 | 267 | 251 | 263 |
| 0.40 (40%) | 272 | 284 | 265 | 279 |
| 0.44 (44%) | 288 | 301 | 280 | 295 |
| 0.48 (48%) | 305 | 320 | 296 | 313 |
| 0.52 (52%) | 322 | 340 | 313 | 331 |
| 0.56 (56%) | 341 | 361 | 330 | 350 |
| 0.60 (60%) | 361 | 383 | 349 | 370 |
| 0.64 (64%) | 382 | 406 | 369 | 392 |
| 0.68 (68%) | 405 | 432 | 390 | 414 |
| 0.72 (72%) | 429 | 459 | 412 | 438 |
| 0.76 (76%) | 455 | 488 | 436 | 463 |
| 0.80 (80%) | 483 | 519 | 462 | 490 |
| 0.84 (84%) | 514 | 552 | 490 | 519 |
| 0.88 (88%) | 547 | 588 | 519 | 550 |
| 0.92 (92%) | 582 | 627 | 551 | 583 |
| 0.96 (96%) | 621 | 670 | 586 | 618 |
| 1.00 (100%) | 664 | 716 | 624 | 656 |

OPERATION

4. SELECTING THE MONITOR PHOTODIODE CURRENT RANGE

The monitor photodiode current range determines the selection of the resistor R_{PD} .

Equation 4 calculates R_{PD} for a maximum desired photodiode current, I_{PDMAX} . Refer to Table 3 to select R_{PD} for common photodiode current ranges.

In constant power mode, the photodiode is used to control laser output and R_{PD} is connected across Pin 12 (PD+) and Pin 13 (PD-). In constant current mode, the photodiode is excluded from the control circuit and Pin 12 (PD+) and Pin 13 (PD-) are shorted together. The photodiode current can still be monitored in constant current mode with R_{PD} . Refer to Figure 5 for photodiode resistor connections.

An online tool is available

to determine values for external components:

<http://www.teamwavelength.com/support/tools.asp>.

Equation 4

Calculating R_{PD}

$$R_{PD} = \frac{1}{I_{PDMAX}}$$

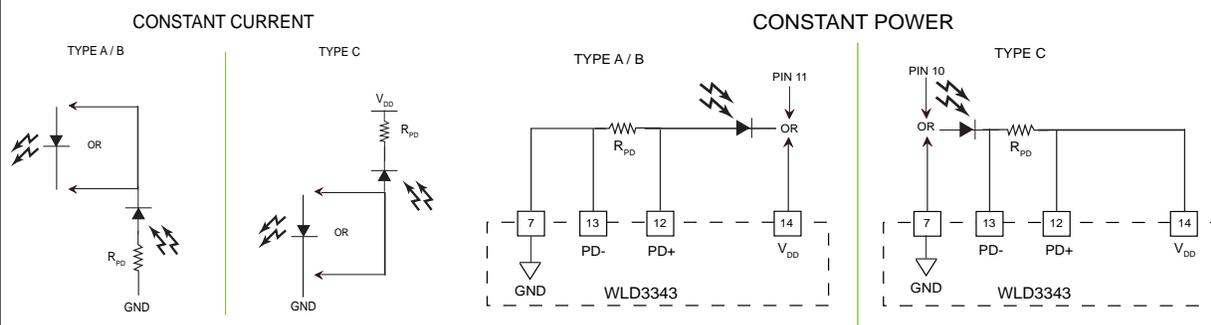
Table 3

Monitor Photodiode Sense Resistor R_{PD} vs Maximum Photodiode Current I_{PDMAX}

| Maximum Photodiode Current, I_{PDMAX} | Monitor Photodiode Current Sense Resistor, R_{PD} |
|---|---|
| 20 μ A | 50 k Ω |
| 200 μ A | 5 k Ω |
| 2 mA | 500 Ω |
| 20 mA | 50 Ω |

Figure 5

Connecting R_{PD}



5. HELPFUL HINTS FOR CHOOSING R_{PD}

- Never use a carbon film resistor for R_{PD} .
- Select a resistor with a low temperature coefficient (ppm/ $^{\circ}$ C).
- Place R_{PD} as close to Pins 12 (PD+) and 13 (PD-) on the WLD3343 as possible to avoid parasitic resistance effects from the PCB layout when in constant power mode.

OPERATION

6. DISABLING OUTPUT CURRENT

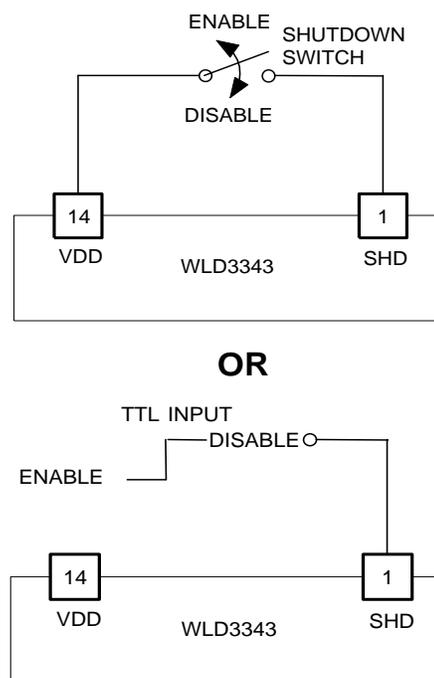
The output current can be enabled and disabled as shown in Figure 6 using a SPST (Single-Pole Single-Throw) switch or a TTL signal.

NOTE:

Do not insert or remove the laser diode from the WLD3343 circuit with power applied to the unit.

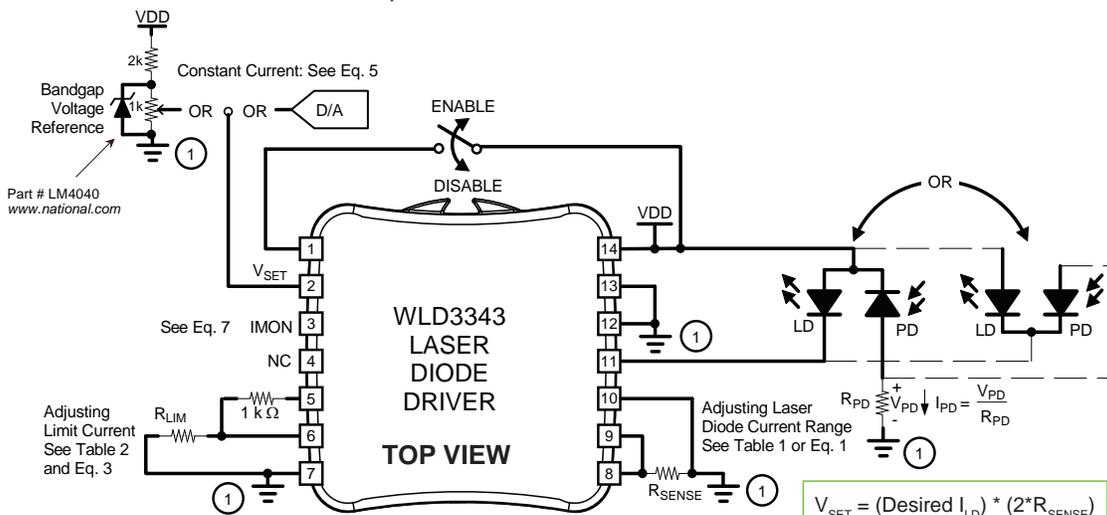
Figure 6

Disabling Output Current



7. OPERATING a Type A/B Laser Diode

Figure 7
A/B Laser Diode Constant Current Operation



① TIE GROUND CONNECTIONS DIRECTLY TO PIN 7

$$V_{SET} = (\text{Desired } I_{LD}) * (2 * R_{SENSE})$$

Without Evaluation Board

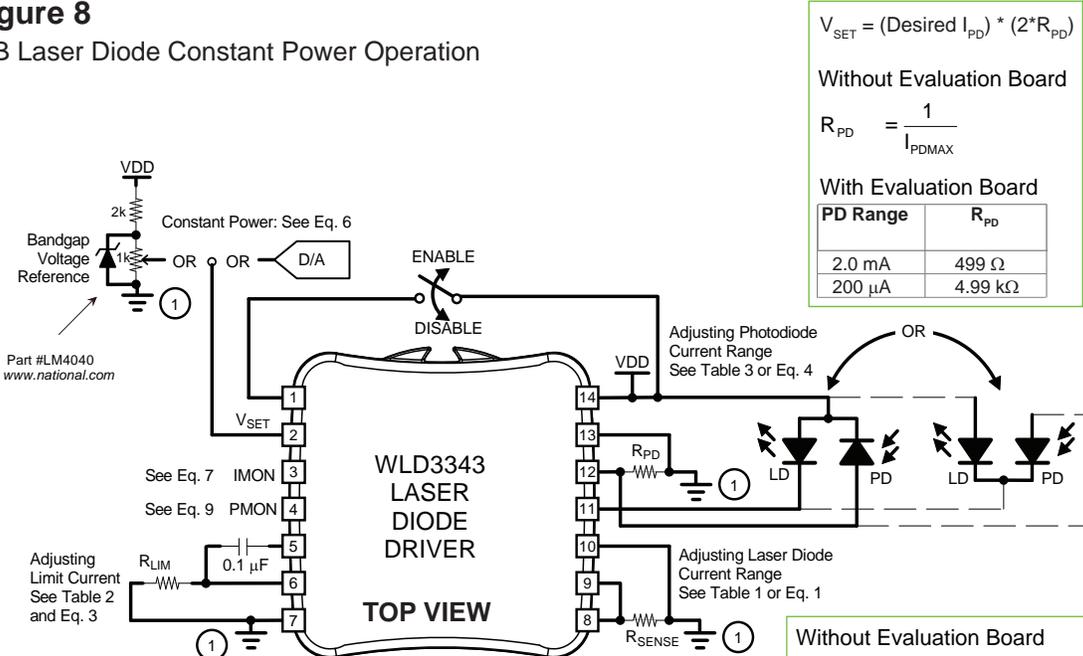
$$R_{SENSE} = \frac{1.00}{I_{LDMAX}}$$

With Eval Board (Rev. Level)

| LD Range | R _{SENSE} (Rev. C) | R _{SENSE} (Rev. A&B) |
|----------|-----------------------------|-------------------------------|
| 2.0 A | 438 mΩ | 500 mΩ |
| 200 mA | 5.01 Ω | 5.1 Ω |

Free Design Calculator: <http://www.teamwavelength.com/support/calculator/wld/default.php>

Figure 8
A/B Laser Diode Constant Power Operation



① TIE GROUND CONNECTIONS DIRECTLY TO PIN 7

$$V_{SET} = (\text{Desired } I_{PD}) * (2 * R_{PD})$$

Without Evaluation Board

$$R_{PD} = \frac{1}{I_{PDMAX}}$$

With Evaluation Board

| PD Range | R _{PD} |
|----------|-----------------|
| 2.0 mA | 499 Ω |
| 200 μA | 4.99 kΩ |

Without Evaluation Board

$$R_{SENSE} = \frac{1.25}{I_{LDMAX}}$$

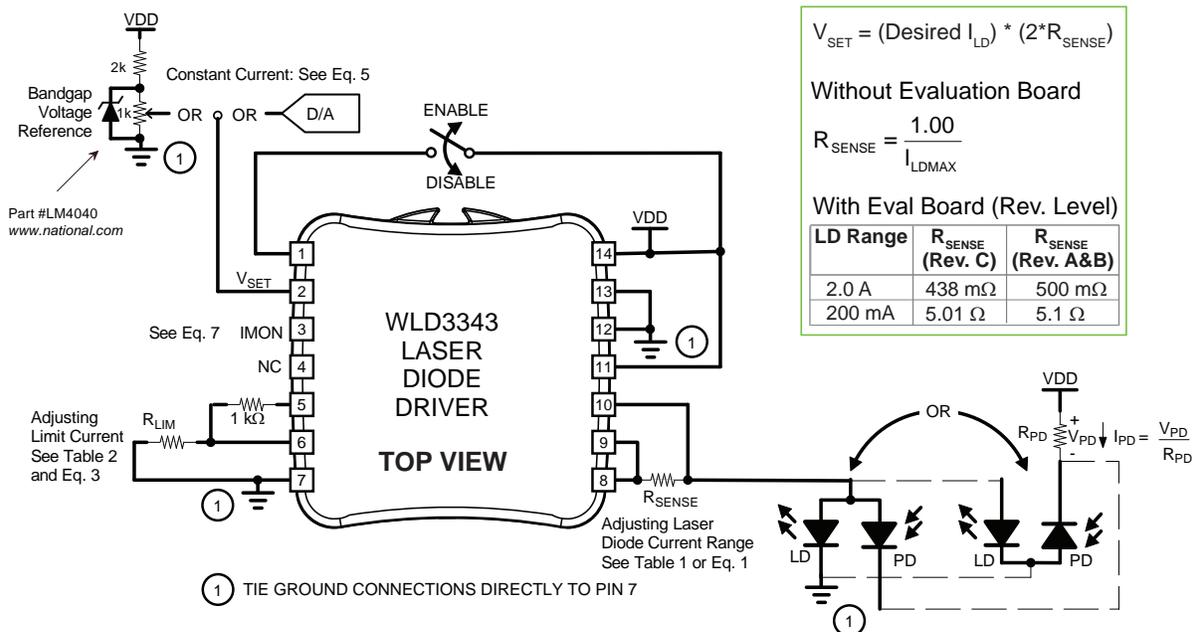
With Eval Board (Rev. Level)

| LD Range | R _{SENSE} (Rev. C) | R _{SENSE} (Rev. A&B) |
|----------|-----------------------------|-------------------------------|
| 2.0 A | 438 mΩ | 500 mΩ |
| 200 mA | 5.01 Ω | 5.1 Ω |

Free Design Calculator: <http://www.teamwavelength.com/support/calculator/wld/default.php>

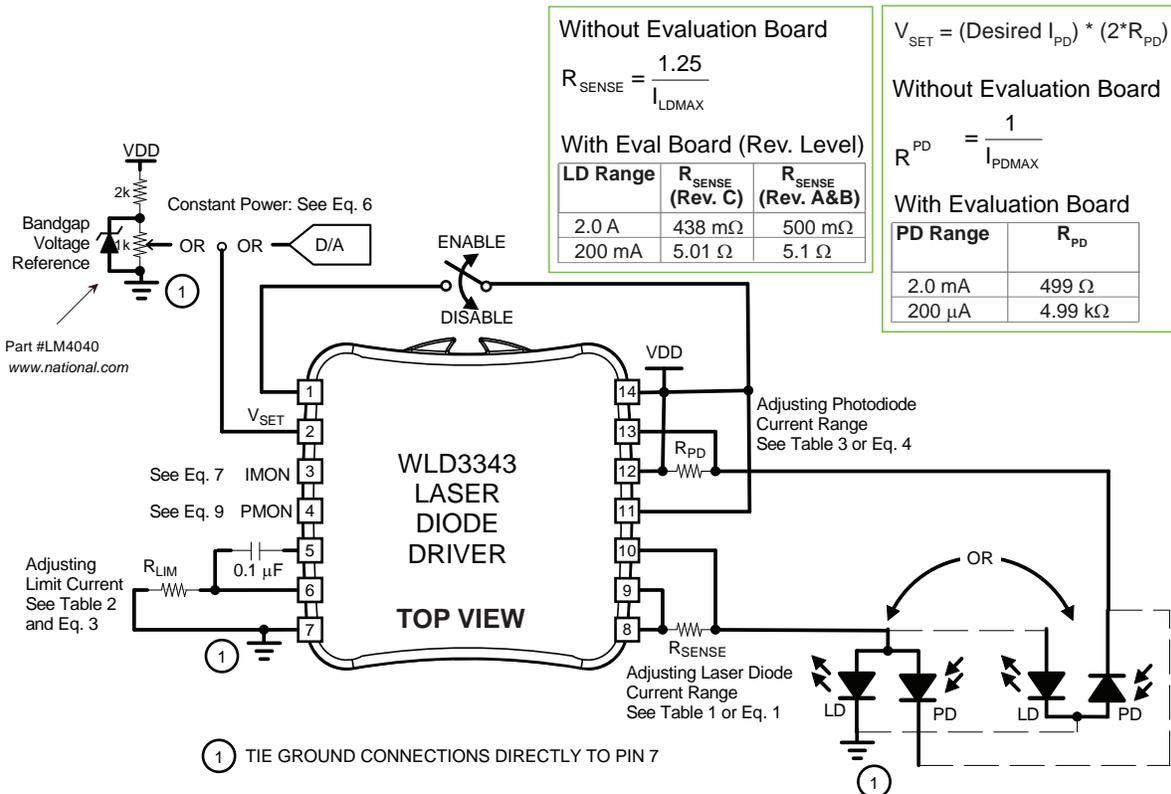
8. OPERATING a Type C Laser Diode

Figure 9
Type C Laser Diode Constant Current Operation



Free Design Calculator: <http://www.teamwavelength.com/support/calculator/wld/default.php>

Figure 10
Type C Laser Diode Constant Power Operation



Free Design Calculator: <http://www.teamwavelength.com/support/calculator/wld/default.php>

OPERATION

9. CONTROLLING THE LASER DIODE FORWARD CURRENT IN CONSTANT CURRENT MODE

Equation 5 calculates the laser diode forward current produced by applying a voltage at Pin 2 (V_{SET}) in constant current mode.

10. CONTROLLING THE MONITOR PHOTODIODE CURRENT IN CONSTANT POWER MODE

Equation 6 calculates the monitor photodiode current produced by applying a voltage at Pin 2 (V_{SET}) in constant power mode.

11. TYPICAL OPERATION OF THE VOLTAGE CONTROL INPUT

Figure 11 illustrates a typical configuration of the WLD3343 voltage input.

CAUTION: CONNECTING VOLTAGES OUTSIDE THE RANGE OF V_{DD} TO GND TO THE VOLTAGE SETPOINT INPUT ON PIN 2 (V_{SET}) CAN RESULT IN DAMAGE TO THE WLD3343 OR YOUR LASER DIODE.

12. MEASURING LASER DIODE FORWARD CURRENT USING THE CURRENT MONITOR OUTPUT

Equation 7 provides a transfer function for converting the voltage output of Pin 3 (IMON) to the amount of forward current flowing through the laser diode.

13. MEASURING MONITOR PHOTODIODE CURRENT IN CONSTANT CURRENT MODE

Equation 8 provides a transfer function for converting the voltage across R_{PD} to the amount of current flowing through the monitor photodiode in constant current mode.

14. MEASURING MONITOR PHOTODIODE CURRENT IN CONSTANT POWER MODE USING THE POWER MONITOR OUTPUT

Equation 9 provides a transfer function for converting the voltage output of Pin 4 (PMON) to the amount of current flowing through the monitor photodiode in constant power mode.

Equation 5

Constant Current Control

$$I_{LD} = \frac{V_{PIN2}}{2 * R_{SENSE}} \quad [AMPS]$$

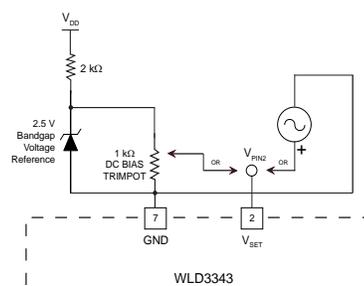
Equation 6

Constant Power Control

$$I_{PD} = \frac{V_{PIN2}}{2 * R_{PD}} \quad [AMPS]$$

Figure 11

Configuring The Voltage Input



Equation 7

Laser Diode Forward Current Measurement

$$I_{LD} = \frac{V_{PIN3}}{2 * R_{SENSE}} \quad [AMPS]$$

Equation 8

Monitor Photodiode Current Measurement in Constant Current Mode

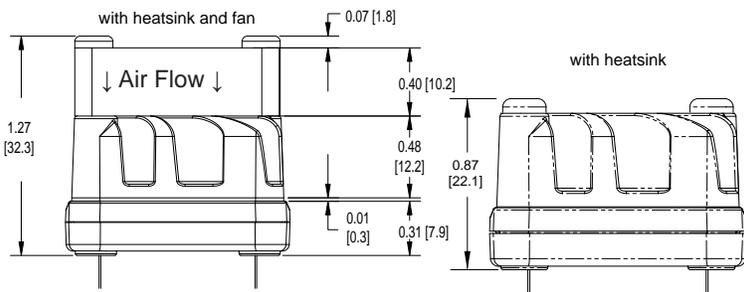
$$I_{PD} = \frac{V_{R_{PD}}}{R_{PD}} \quad [AMPS]$$

Equation 9

Monitor Photodiode Current Measurement in Constant Power Mode

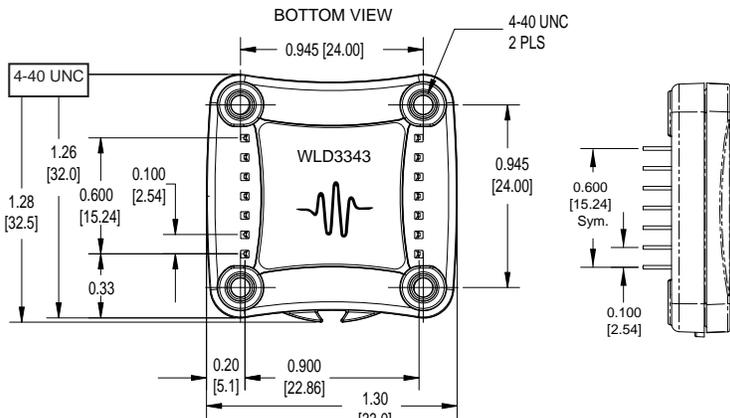
$$I_{PD} = \frac{V_{PIN4}}{2 * R_{PD}} \quad [AMPS]$$

MECHANICAL SPECIFICATIONS



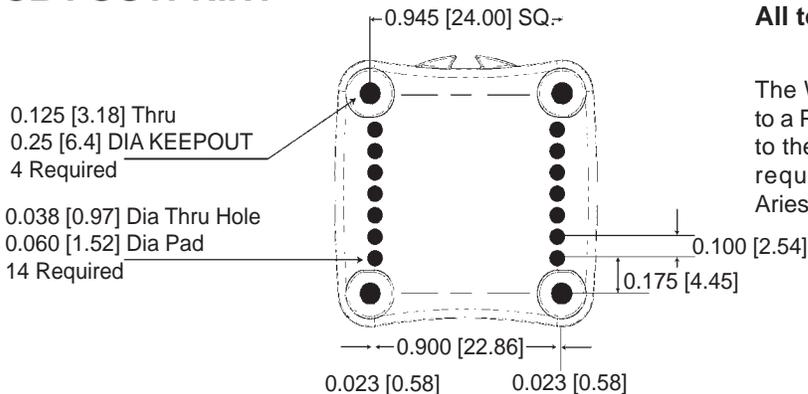
Weights

| | |
|-----------------|--------|
| WLD3343 | 0.6 oz |
| WHS302 Heatsink | 0.5 oz |
| WXC303/4 Fan | 0.3 oz |



PIN DIAMETER: 0.020"
 PIN LENGTH: 0.126"
 PIN MATERIAL: Nickel Plated Steel
 HEAT SPREADER: Nickel Plated Aluminum
 PLASTIC COVER: LCP Plastic
 ISOLATION: 1200 VDC any pin to case
 THERMAL WASHER: WTW002
 HEATSINK: WHS320
 FANS: WXC303 (+5VDC)
 or WXC304 (+12VDC)

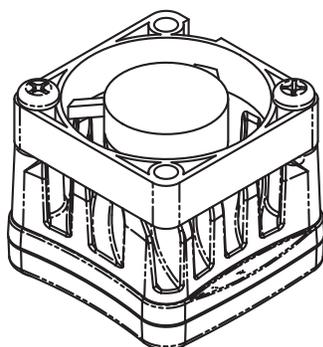
PCB FOOTPRINT



**Dimensions are inches [mm].
 All tolerances are ±5%.**

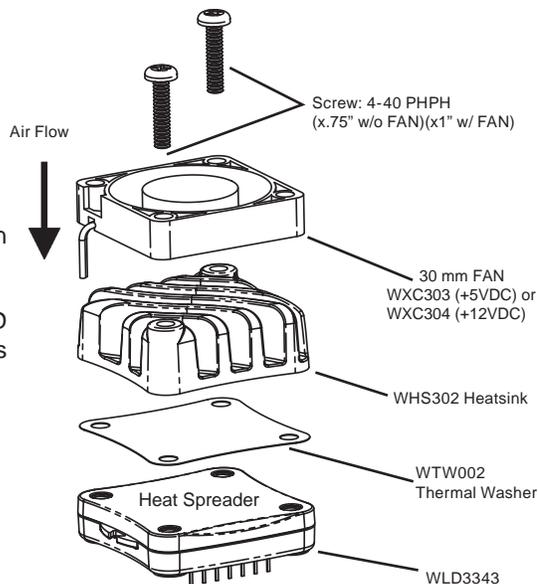
The WLD3343 can be directly soldered to a PCB or installed in a socket soldered to the PCB. Two 7-pin SIP sockets are required. Wavelength recommends Aries Electronics, PN 25-0513-10.

WLD3343 ASSEMBLED WITH HEATSINK & FAN



* Actual fan wire configuration may be different than shown.

Fan can be rotated on the WLD so the location of the wires matches your PCB layout.



CERTIFICATION:

Wavelength Electronics (Wavelength) certifies that this product met it's published specifications at the time of shipment. Wavelength further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by that organization's calibration facilities, and to the calibration facilities of other International Standards Organization members.

WARRANTY:

This Wavelength product is warranted against defects in materials and workmanship for a period of 90 days from date of shipment. During the warranty period, Wavelength will, at its option, either repair or replace products which prove to be defective.

WARRANTY SERVICE:

For warranty service or repair, this product must be returned to the factory. An RMA is required for products returned to Wavelength for warranty service. The Buyer shall prepay shipping charges to Wavelength and Wavelength shall pay shipping charges to return the product to the Buyer upon determination of defective materials or workmanship. However, the Buyer shall pay all shipping charges, duties, and taxes for products returned to Wavelength from another country.

LIMITATIONS OF WARRANTY:

The warranty shall not apply to defects resulting from improper use or misuse of the product or operation outside published specifications.

No other warranty is expressed or implied. Wavelength specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

EXCLUSIVE REMEDIES:

The remedies provided herein are the Buyer's sole and exclusive remedies. Wavelength shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

REVERSE ENGINEERING PROHIBITED:

Buyer, End-User, or Third-Party Reseller are expressly prohibited from reverse engineering, decompiling, or disassembling this product.



WAVELENGTH ELECTRONICS, INC.
 51 Evergreen Drive
 Bozeman, Montana, 59715
 phone: (406) 587-4910 Sales/Tech Support
 fax: (406) 587-4911
 e-mail: sales@teamwavelength.com
 web: www.teamwavelength.com

NOTICE:

The information contained in this document is subject to change without notice. Wavelength will not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material. No part of this document may be translated to another language without the prior written consent of Wavelength.

SAFETY:

There are no user serviceable parts inside this product. Return the product to Wavelength for service and repair to ensure that safety features are maintained.

LIFE SUPPORT POLICY:

As a general policy, Wavelength Electronics, Inc. does not recommend the use of any of its products in life support applications where the failure or malfunction of the Wavelength product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. Wavelength will not knowingly sell its products for use in such applications unless it receives written assurances satisfactory to Wavelength that the risks of injury or damage have been minimized, the customer assumes all such risks, and there is no product liability for Wavelength. Examples of devices considered to be life support devices are neonatal oxygen analyzers, nerve stimulators (for any use), auto transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, ventilators of all types, and infusion pumps as well as other devices designated as "critical" by the FDA. The above are representative examples only and are not intended to be conclusive or exclusive of any other life support device.

| REVISION HISTORY | | |
|------------------|-----------|--|
| REVISION | DATE | NOTES |
| REV. I | 31-Aug-09 | Updated mechanical specification and links |
| REV. J | 21-May-10 | WLD Rev. E released -- lower noise, no leakage current, several models |
| REV. K | 8-Oct-10 | Added VSET input limits |
| REV. L | 3-Jun-11 | Updated mechanical specifications |
| REV. M | 16-Dec-11 | Updated mechanical specifications |
| REV. N | 10-Feb-12 | Updated V _{SET} specifications and pin description |
| REV. O | 25-Jan-13 | Added socket recommendation |
| REV. P | 16-Apr-15 | Updated specs |