



February, 2016

## LDTC2/2

Combine the drive power of the WLD3343 with the temperature stability of the WTC3243

### GENERAL DESCRIPTION:

The LDTC 2/2 combines a 2.2 Amp laser driver and 2.2 Amp temperature controller on one small board. Available as an open frame or in a chassis mount enclosure.

The WTC3243 will control temperature using thermistors, RTDs, or linear temperature sensors such as the LM335 or the AD590. Adjust temperature using the onboard trimpot or a remote voltage input from a panel mount potentiometer, DAC, or other voltage source. A default temperature setpoint configuration provides fault tolerance and avoids accidental damage to system components. Adjustable trimpots configure heat and cool current limits.

The heart of the laser driver section is the WLD3343 2.2 Amp Laser Driver. It maintains precision laser diode current (Constant Current mode) or stable photodiode current (Constant Power mode) using electronics compatible with A/B Type lasers.

Ideal for integrated laser driver or LED packages that include temperature control, often utilized in medical diagnostic equipment, remote sensing, analytical instrumentation, military and communications applications.



### FEATURES, LDTC2/2:

- Small package size
- Single supply operation possible
- Cost Effective

### FEATURES, Laser Diode Driver:

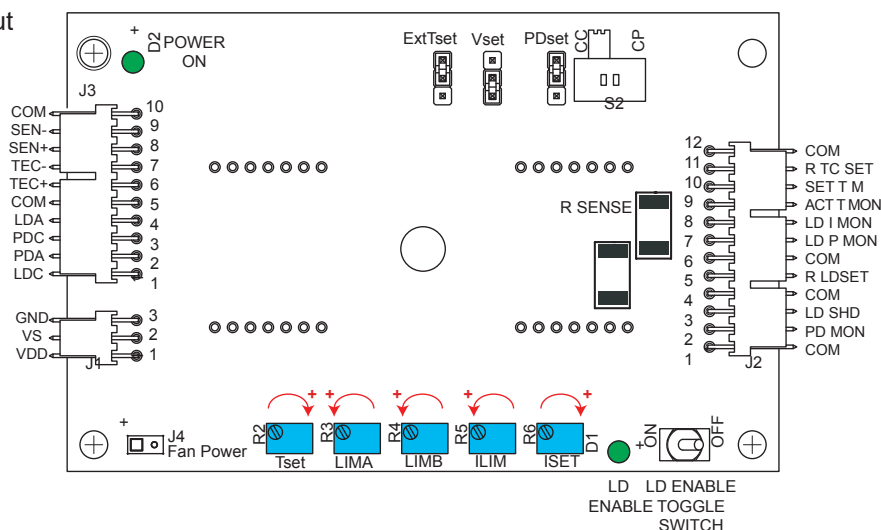
- Default current range is 2.2 A. Custom ranges, from 3 mA up, are easily configured
- Slow start laser diode protection
- Constant Current or Constant Power modes
- Compatible with A or B type laser diodes
- Adjustable laser diode current limit
- Remote TTL Shutdown / Interlock

### FEATURES, Temperature Controller:

- Drive up to 2.2 A of TEC current
- Set temp using D/A - includes default to 1 Volt to avoid drive when D/A is turned off or signal is lost
- Ultra-stable PI control loop
- Separate Heat & Cool current limits
- Single power supply operation possible

**Figure 1**

Top View Pin Layout and Descriptions



## ELECTRICAL AND OPERATING SPECIFICATIONS

PAGE 5

ABSOLUTE MAXIMUM RATINGS		SYMBOL	VALUE	UNIT
Operating Temperature, case <sup>[1]</sup>		T <sub>OPR</sub>	- 40 to + 85	°C
Storage Temperature		T <sub>STG</sub>	- 65 to +150	°C
Weight - with enclosure		LDTC2/2E	6.5	oz
Weight - open frame		LDTC2/2O	2.4	oz
WLD3343 Laser Diode Driver Rating		SYMBOL	VALUE	UNIT
Supply Voltage (Voltage on Pin 14)		V <sub>DD</sub>	+4.75 to +12	Volts DC
Output Current (See SOA Chart)		I <sub>LD</sub>	2.2	Amps
Power Dissipation, T <sub>AMBIENT</sub> = +25°C		P <sub>MAX</sub>	9	Watts
WTC3243 Temperature Controller Rating		SYMBOL	VALUE	UNIT
Supply Voltage 1 (Voltage on Pin 1)		V <sub>DD</sub>	+4.75 to +12	Volts DC
Supply Voltage 2 (Voltage on Pin 14)		V <sub>S</sub>	+4.5 to +28	Volts DC
Output Current (See SOA Chart)		I <sub>OUT</sub>	±2.2	Amps
Power Dissipation, T <sub>AMBIENT</sub> = +25°C (with fan and heat sink per SOA Chart)		P <sub>MAX</sub>	9	Watts

Laser Diode Driver PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
<b>CONSTANT CURRENT CONTROL</b>					
Long Term Stability, 24 hours	T <sub>AMBIENT</sub> = 25°C		50	75	ppm
<b>CONSTANT POWER CONTROL</b>					
Long Term Stability, 24 hours	T <sub>AMBIENT</sub> = 25°C	0.02		0.05	%
Short Term Stability, 1 hour	T <sub>AMBIENT</sub> = 25°C		0.01		%
<b>OUTPUT</b>					
Current, peak, see SOA chart	With Heat Sink and Fan	1.8	2.0	2.2	Amps
Compliance Voltage, Laser Diode Load	Full Temp. Range, I <sub>LD</sub> = 2.0 Amps, 5V	3.0			Volts
Rise Time	I <sub>LD</sub> = 2 Amps		460		nsec
Fall Time	I <sub>LD</sub> = 2 Amps		320		nsec
Bandwidth	Constant Current, Sine Wave		1.6		MHz
Bandwidth	Constant Power	(Depends on PD BW)			
Delayed Start			0.25		Seconds
Slow Start Ramp Rate			0.01		Seconds
<b>POWER SUPPLY</b>					
Voltage, V <sub>DD</sub>		5		12	Volts
Current, V <sub>DD</sub> supply, quiescent		5	10	15	mA
<b>INPUT</b>					
Offset Voltage, initial, I <sub>mon</sub>	Pin 2, T <sub>AMBIENT</sub> = 25°C, V <sub>CM</sub> = 0V		1	5	mV
Bias Current (based on input Res of op amp)	Pin 2, T <sub>AMBIENT</sub> = 25°C, V <sub>CM</sub> = 0V		20	50	nA
Common Mode Range	Pin 2, Full Temperature Range	0		V <sub>DD</sub>	V
Common Mode Rejection, Set point	Full Temperature Range	60	85		dB
Power Supply Rejection	Full Temperature Range	60	80		dB
VSET Damage Threshold		< -0.5	> V <sub>DD</sub> + 0.5		V

<sup>[1]</sup> With Revision D 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.

**CAUTION:** Operation higher than 5V on VDD (i.e. 12V) requires close evaluation of the SOA curves and current limit settings. Damage to the WLD or WTC will occur if they are operated outside their Safe Operating Area. Contact the factory if you plan to use higher than 5V.

Temperature Controller PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
<b>TEMPERATURE CONTROL</b>					
Short Term Stability, 1 hour <sup>[2]</sup>	OFF ambient, TSET = 25°C/10 kΩ thermistor		0.0009		°C
Short Term Stability, 1 hour <sup>[2]</sup>	ON ambient, TSET = 25°C/10 kΩ thermistor		0.002		°C
Long Term Stability, 24 hour <sup>[2]</sup>	OFF ambient, TSET = 25°C/10 kΩ thermistor		0.002		°C
Control Loop		P	PI		
P (Proportional Gain)		18	20	22	A/V
I (Integrator Time Constant)		2	3	4	Sec.
Setpoint vs. Actual T Accuracy	TSET = 25°C using 10 kΩ thermistor		<0.2% (Rev B)		
<b>OUTPUT</b>					
Current, peak, see SOA Chart		±1.8	±2.0	± 2.2	Amps
Compliance Voltage, Pin 11 to Pin 12	Full Temp. Range, I <sub>OUT</sub> = 100 mA		V <sub>S</sub> - 0.1		Volts
Compliance Voltage, Pin 11 to Pin 12	Full Temp. Range, I <sub>OUT</sub> = 1 Amp		V <sub>S</sub> - 0.3		Volts
Compliance Voltage, Pin 11 to Pin 12	Full Temp. Range, I <sub>OUT</sub> = 1.5 Amps		V <sub>S</sub> - 0.3		Volts
Compliance Voltage, Pin 11 to Pin 12	Full Temp. Range, I <sub>OUT</sub> = 2.0 Amps		V <sub>S</sub> - 0.6		Volts
Resistive Heater	Full Temp. Range, I <sub>OUT</sub> = 2.2 Amps		V <sub>S</sub> - 0.6		Volts
<b>POWER SUPPLY</b>					
Voltage, VDD		4.75		12	Volts
Current, VDD supply, quiescent			55	105	mA
Voltage, Vs		4.5		28	Volts
Current, Vs supply, quiescent		20	50	100	mA
<b>TEMPERATURE SENSORS</b>					
Sensor Compatibility	Thermistors, RTD, IC Sensors				
Sensor Input Voltage Range <sup>[3]</sup>			GND to V <sub>DD</sub> -2		Volts
Sensor Input Damage Threshold			>V <sub>DD</sub> +7 or <-0.7		Volts
<b>VSET</b>					
Input Impedance			500		kΩ
VSET Damage Threshold			>V <sub>DD</sub> +7 or <-0.7		Volts
<b>BIAS CURRENT</b>					
Bias Current Accuracy	Include bias current resistor tolerance		1		%
<b>THERMAL</b>					
Heatspreader Temperature Rise	T <sub>AMBIENT</sub> = 25°C	28	30	33	°C/W
Heatspreader Temperature Rise	With WHS302 Heat sink and WTW002 Thermal Washer	18	21.5	25	°C/W
Heatspreader Temperature Rise	With WHS302 Heat sink, WTW002 Thermal Washer and 3.5 CFM fan	3.1	3.4	3.9	°C/W

<sup>[2]</sup> When using resistive heaters, stability can only be consistently achieved when specified temperatures are 10°C or more above ambient.

<sup>[3]</sup> The bias source has a compliance up to VDD - 2 V. In normal operation this limits the sensor voltage range from 0 V to VDD - 2 V. While voltages up to ±5 V outside this range on the VSET pin will not damage the unit, it will not provide proper control under these conditions.