BW10-1060-T-PxFA-yy

BANDWIDTH10, LTD.

Description:

Bandwidth10's BW10-1060 pigtailed TO is part of a family of wavelength tunable lasers based on the innovative High Contrast Grating (HCG). It is a single mode tunable 1060 nm VCSEL in a 7 pin TO package with permanently attached fiber including a TEC and optical isolator.

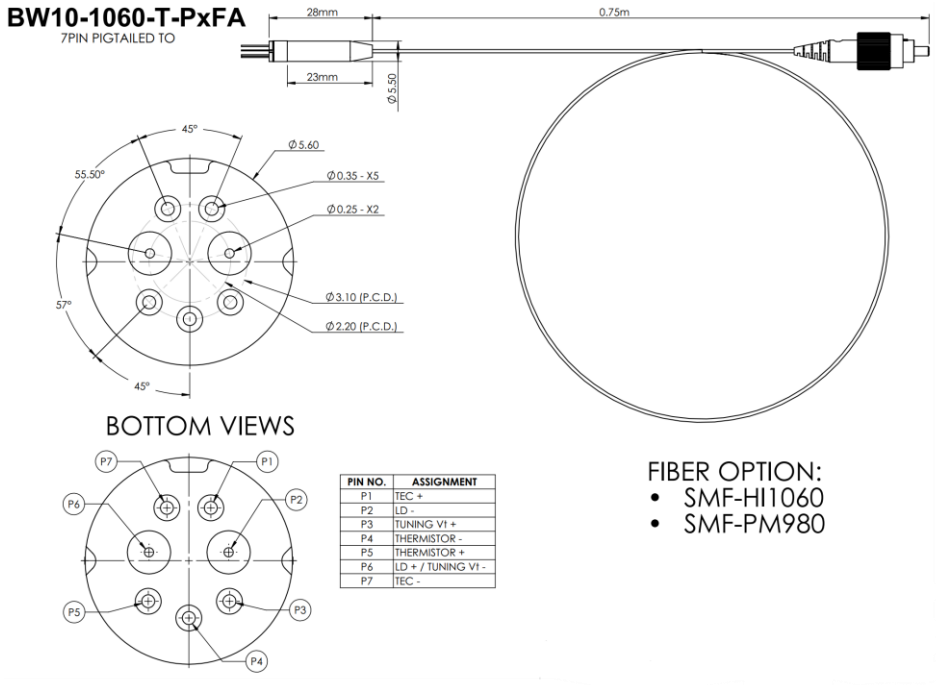
Applications:

- Optical Coherence Tomography (OCT)
- Swept source
- Medical Imaging
- Optical sensing
- Tunable Diode Laser Absorption Spectroscopy (TDLAS)

Features:

- TO-56 7-Pin Small Form Footprint
- Permanently attached 0.75m +-0.1m 900µm fiber pigtail with FC/APC Connector
- Integrated TEC (Temperature Stabilization)
- Integrated optical isolator
- Minimum CW optical power of 0.1 mW @25°C TEC Temperature over tuning range
- Single Mode, VCSEL
- Wavelength Tuning Range: up to 40+ nm
- Fast Wavelength Tuning up to +200 kHz

Dimensional Drawing and Pin Assignment



PIN NO.	ASSIGNMENT
P1	TEC +
P2	LD -
P3	TUNING V1 +
P4	THERMISTOR -
P5	THERMISTOR +
P6	LD + / TUNING V1 -
P7	TEC -

CAUTION: Device is sensitive to electrostatic discharge.

First Time Setup Sequence with lab equipment and BW10-420D fixture

Follow these steps in exact order, to avoid damage!

1. Hook up all equipment. Do short all supply outputs before use (to reduce the risk of surges when first switched on).
2. Power up the equipment. Ensure all supply outputs are disabled. Set supply compliance limits (if applicable).
3. Connect all cables to testing equipment, the fixture BW10-420D is recommended.
4. If possible, connect TO pin 2, 3 and 6 to GND, i.e. short the laser driver output and tuning voltage source output to GND.
5. Observing ESD protection, load the TO into mount or heatsink (clamp it down if applicable).
6. Check TEC controller reading (room temperature).
7. If OK, set TEC controller to 25°C and turn it on, and wait for stable 25°C reading. If the temperature is oscillating adjust the gain or PID settings of the controller.
8. Turn on Tuning voltage, with setting to 0V.
9. Remove the GND connecting from point 4.
10. Turn on Laser driver (low bias <0.5mA). Slowly increase bias to 3.5mA (or the current specified in test report for specific part). TEC controller shall indicate a TO temperature jump, followed by stabilization back to set point.
11. Check the Laser driver readouts to verify that voltage is within expected range (as per datasheet).
12. Connect optical output to Power meter and/or Optical spectrum analyzer respective Spectrometer (using fiber splitter if applicable)
13. Double check TEC controller for stable reading at set point.
14. Slowly increase Tuning voltage to the tuning voltage for WLstart given in the test report. You should be able to measure an optical power larger than the value P_O given in the datasheet. If you measure the spectrum you will notice that the laser will laser at the start wavelength given in the test report.
15. Apply various tuning voltages (observing max. ratings as of testsheet), for detailed check of tuning function. If you AC sweep the tuning voltage ensure that you never have a negative tuning voltage, i.e. apply a DC bias first and slowly increase the AC voltage

System and laser are now ready for standard testing procedure.

Shutdown Procedure with lab equipment and BW10-420D fixture

Follow these steps in exact order, to avoid damage!

1. Lower the tuning voltage to 0V.
2. Lower the laser current to 0 mA.
3. Short the Laser current source outputs to GND.
4. Short the DC voltage source outputs to GND.
5. Disable the TEC.

You can now safely disconnect the laser. Please place the laser in the ESD safe container used for shipment.

Power sequencing when driving the laser with your own circuit.

Follow these steps in exact order, to avoid damage!

Enabling the laser:

1. We recommend adding SPDT electrical switches which short pin 2,3 and 6 to GND if the laser is not in use.
2. Tune on your circuity.
3. Turn on the TEC control.
4. Toggle SPDT switches to connect pin 2, 3 and 6 with your circuit. Verify applied laser diode current is 0 mA and tuning voltage is 0 V before toggling!
5. Next increase the laser current to the value given in the test sheet.
6. Apply the DC portion of the tuning voltage.
7. Apply the AC portion of the tuning voltage.
8. Once a tuning voltage is applied do not change the laser current.

Disabling the laser

1. Decrease the AC portion of the tuning voltage to ~0 Vpp.
2. Decrease the DC portion of the tuning voltage to 0 V.
3. Decrease the laser current to 0 mA.
4. Toggle the SPDT switches and short pin 2,3 and 6 to GND.
5. Turn off the TEC circuit.

Do not hesitate to contact BW10 for further support!

Please check also the detailed application note.

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Storage Temperature Storage at 70°C is limited due to the foam used in the shipment package. The pigtail TO was qualified for 85°C without package	T_{stg}	-20 to +70	°C
Operating Case Temperature	T_c	-5 to +55	°C
Forward Current of VCSEL	I_{LD}	4 mA	mA
Reverse Current of VCSEL	I_{LDRS}	0	mA
Reverse Voltage of VCSEL	V_{LD}	0	V
Soldering Temperature	T_{sld}	350 (10 sec.)	°C

Operating Conditions

Parameter	Symbol	Values			Unit
		Min	Typical	Max	
Optical Output Power At 25°C TEC temp. over tuning range	P_O	0.1			mW
Operating Current	I_{LD}	0	3.5	See test sheet	mA
Operating TEC Temperature	T_{op}	5	25	30	°C
TEC maximum Current	I_{TEC}		0.35	0.5	A
TEC voltage	V_{TEC}			0.9	V
Guaranteed Start / Red edge wavelength at I_{op} / T_{op} / VT_{start}	λ	1045		1085	nm
Guaranteed tuning range / tuning to blue wavelengths Tuning range is guaranteed for 100KHz or slower. Minimum tuning range is specified in part number: 30 nm: BW10-1060-T-PHxx-30 40 nm: BW10-1060-T-PHxx-40	Δλ	30			nm
		40			
Power difference over Tuning Range	ΔP			10	dB
Polarization Extinction Ratio for PM fiber version (BW10-1060-T-P9FA-yy)	PER	20			dB

Threshold Current over tuning range	I_{th}		1	4.5	mA
Laser Drive Voltage	Vcc	0	3	6	V
Differential Resistance	R_d		500	700	Ω
Maximum Sinusoidal Sweep rate We guarantee the tuning rage if the laser is swept 100kHz or less.	f_{max}	100	200		kHz
Side-mode suppression ratio	SMSR	20			dB
Tuning Voltage	V_{tune}	See test sheet	See test sheet	See test sheet	V
Tuning Current	I_{tune}	0		10	µA
Coherence length Measured with an OCT system, fringes were attenuated by 3dB >10cm of de-tuning.			20		cm
Linewidth Calculated from typical coherence length			470		MHz

Order and Contact Information

Model Number	Contact Information
BW10-1060-T-PHFA-30 30nm pigtailed TO with 0.75m 900µm Hi1060 fiber and FC/APC connector BW10-1060-T-PHFA-40 40nm pigtailed TO with 0.75m 900µm Hi1060 fiber and FC/APC connector BW10-1060-T-P9FA-30 30nm pigtailed TO with 0.75m 900µm PM980 polarization maintaining PANDA fiber. The narrow key FC/APC connector and output signal are aligned to the slow axis. BW10-1060-T-P9FA-40 40nm pigtailed TO with 0.75m 900µm PM980 polarization maintaining PANDA fiber. The narrow key FC/APC connector and output signal are aligned to the slow axis.	Bandwidth 10 Ltd. 2080 Addison Street, Suite 2 Berkeley, CA 94704, USA info@bandwidth10.com