9.68um high power benchtop DFB-QCL mid-infrared quantum cascade laser 100mW (TDLAS integrated control module)

Product Description

QCL9680DFB-9.68um high power benchtop DFB-QCL mid-infrared quantum cascade laser is a mid-infrared test laser developed by Idealphotonics. The low loss of the atmospheric window is conducive to the test research of space optical communications. Our benchtop light source has high power and does not require ITAR review, which is an excellent choice for commercial mid-infrared test light sources. The tunable range exceeds

100nm and the output power is greater than 100mw to meet the industrial needs of customer testing. Our laser has built-in Znse collimated output, stable output power, and high temperature and wavelength stability, which is several orders of magnitude higher than the stability of traditional high-power quantum cascade lasers.

Product features

High power、 Compact structure、 Intelligent software control、 Built-in FPGA

Part Number

MP-QCL-9680-DFB-100-T

Application area

Mid-infrared test light source、 Mid-infrared device analysis

Core parameters

Peak operating wavelength	Spectral width	Output power
9.68μm	3 MHz	100mW

General Parameters

Parameter

Parameter	Unit	Indicators		
		Min.	Typical value	Max.
Output power1	mW	50	-	100
Peak operating wavelength 2	um	9.66	9.68	9.71
Spectral width（FWHM）	MHZ	-	3	-
Output side mode suppression ratio（SMSR）	dB	30	-	-
M2 factor			＜1.2	
Output light divergence angle	Mrad		＜2	
Full optical beam waist diameter5	mm		＜4	
Output isolation 3	dB	-	30	-
Wavelength temperature coefficient	nm/K		1.00	
Wavelength current coefficient	nm/A		57.1	
Output power stability（15min）4	%	-	±0.5	±1.0
Output power stability（8h）4	%	-	±1.0	±2.0
Output power adjustable range	%	0	-	100

Output power adjustment mode		Soft control		
TEC stability	°C	-	±0.1	±0.2
TEC operating range	°C	0	30	50
Operating voltage	VAC	100	220	240
Electric power consumption5	W	-	-	5
Operating temperature	°C	0	-	90
Storage temperature	°C	-40	-	85
Diameter	mm	343(L)×193(W)×180(H) benchtop		

Technical Specifications

1. Output power is optional;

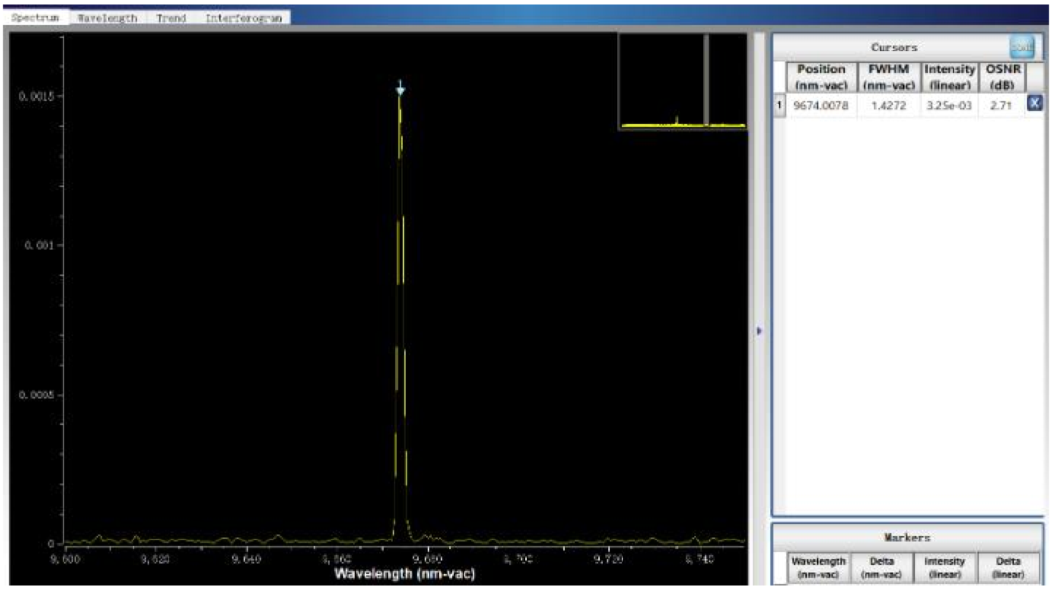
2. Peak operating wavelength can be specified;

3. Output power stability test condition is 25 degrees, after 30 minutes of preheating;

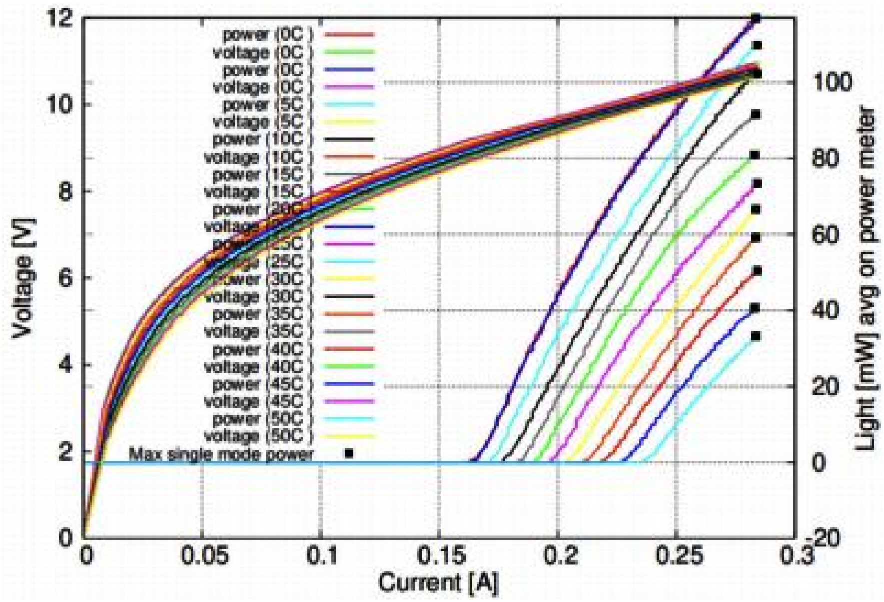
4. Maximum power consumption refers to the overall power consumption under extreme working conditions;

5. I = 0.80 A, V = 8.7 V, T= 15 °C, measured at $1/e^2$.

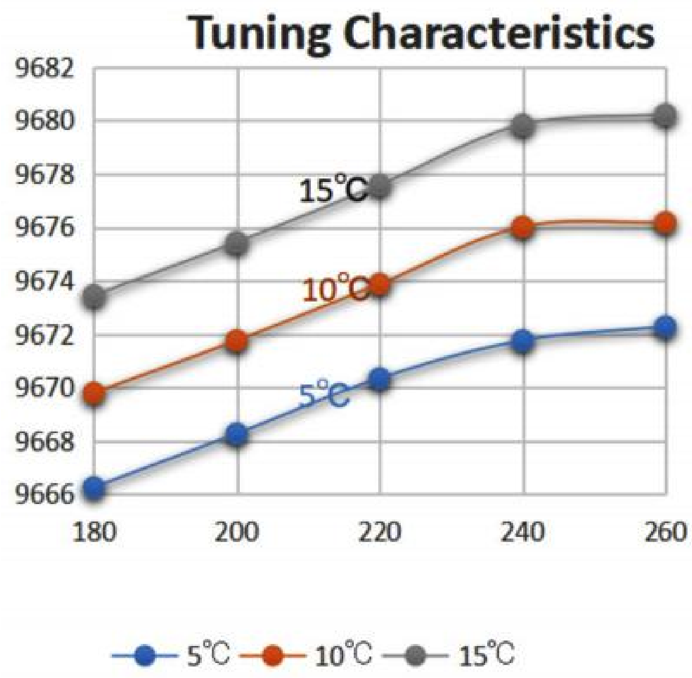
Spectrum chart



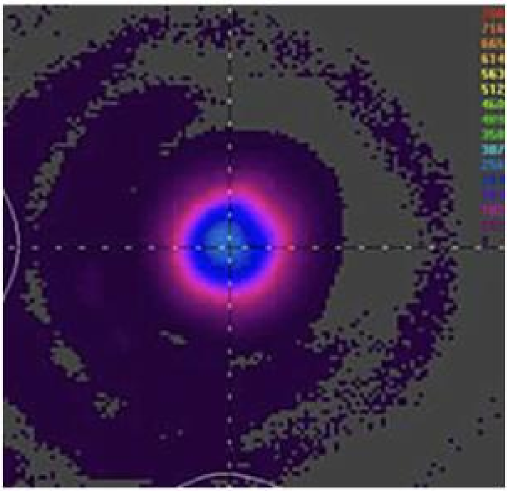
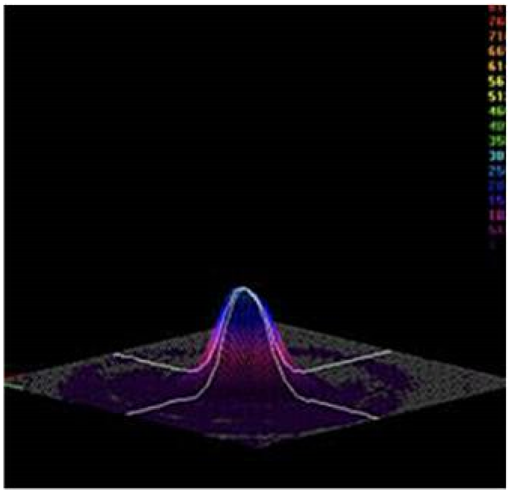
QCL laser characteristic curve (output power characteristic and output voltage characteristic curve)



QCL laser wavelength tuning curve



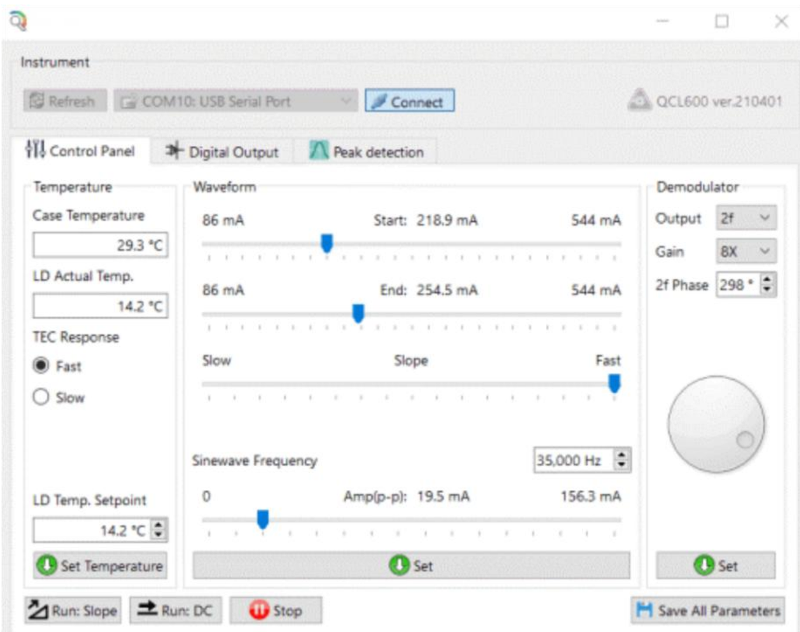
Spot analysis

	
2-D Beam Profile at 762.0 mm (30.0 in)	3-D Beam Profile at 762.0 mm (30.0 in)

Laboratory testing

Using a 9.68μm laser (outputting collimated light), a 5-meter-long optical path miniaturized mid-infrared gas absorption cell, and a PCI-4TE-9-1x1 infrared detection module, we set up the NF_3 gas absorption measurement experiment.

NF_3 gas absorption measurement experiment system diagram



TDLAS dedicated control software interface

Steps:

1. Connect the 9.68μm quantum cascade laser to the power supply and USB, and turn on the laser through the dedicated TDLAS control software;

Connect the infrared detection module at one end of the gas absorption cell, and align the laser with the light inlet of the gas cell at the other end, and adjust the position of the laser to make the optical axis consistent;

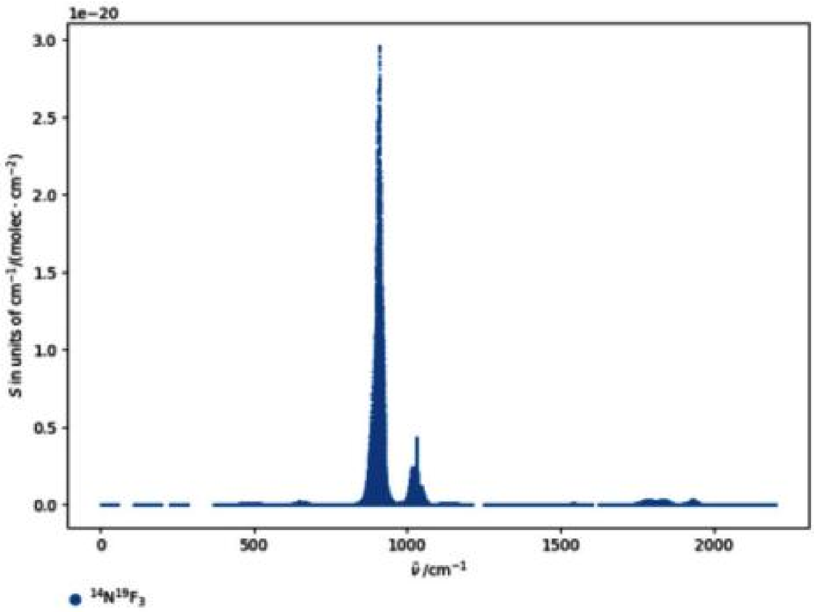
The signal received by the detector is connected to the laser, and the second harmonic signal demodulated by the phase-locked amplifier is connected to the oscilloscope for observation;

Tuning the laser phase, current, gain and temperature to obtain the best signal waveform.

Test results and analysis verification:

The second harmonic of NF_3 gas absorption is tested as follows:

In order to verify that it is the absorption of NF_3 gas, we queried the database parameters as follows:



We can see that the absorption peak in the database corresponds exactly to the absorption peak measured on the oscilloscope, which also verifies that the absorption spectrum on our oscilloscope is the absorption of NF_3 gas.

Ordering Information

MP-QCL- W□□□□ -☆-△-XX

W□□□□: Wavelength

4000: 4000nm

4600: 4600nm

9000: 9000nm

☆ : collimated output

1： with

0: without

△： laser type

FP: QCL-FP

DFB: QCL-DFB

XX: output power

001=1mw

010=10mw

400=400mw

1000=1000m

CW Distributed Feedback (DFB) Quantum Cascade Laser

* Center wavelength measured at T = 15°C under continuous wave

* Center wavelength tuning range: +/- 0.03 um

* Other center wavelengths are listed in the table +/- 100 nm We can provide screening services

* Other center wavelengths can be customized, minimum order quantity: 5 pieces

The wavelengths we can currently provide are as follows*

Wavelength (μm)	Wave number (cm^{-1})	Wavelength (μm)	Wave number (cm^{-1})	Wavelength (μm)	Wave number (cm^{-1})	Wavelength (μm)	Wave number (cm^{-1})	Wavelength (μm)
4.22	2370	> 50	6.25	1600	> 100	9.38	1066	> 100
4.28	2336	> 50	7.15	1399	> 100	9.47	1056	> 150
4.32	2315	> 50	7.26	1377	> 100	9.49	1054	> 150
4.34	2304	> 50	7.32	1366	> 100	9.52	1050	> 200
4.45	2247	> 80	7.37	1357	> 100	9.56	1046	> 200
4.48	2232	> 80	7.43	1346	> 150	9.63	1038	> 150
4.53	2208	> 150	7.57	1321	> 150	9.66	1035	> 100
4.56	2193	> 150	7.61	1314	> 150	9.68	1033	> 100
4.59	2179	> 150	7.75	1290	> 300	9.72	1029	> 100
4.61	2169	> 100	7.78	1285	> 300	9.95	1005	> 100
4.72	2119	> 100	7.80	1282	> 300	10.24	977	> 150
5.18	1931	> 150	7.82	1279	> 300	10.26	975	> 150
5.26	1901	> 150	7.85	1274	> 300	10.28	973	> 150
5.66	1767	> 300	8.01	1248	> 100	10.32	969	> 150
5.73	1745	> 150	8.28	1208	> 200	10.36	965	> 150
6.13	1631	> 150	9.02	1109	> 100	10.54	949	> 100

6.15	1626	> 150	9.05	1105	> 100	10.60	943	> 80
6.18	1618	> 100	9.26	1080	> 100	10.63	941	> 80

Pulsed Distributed Feedback (DFB)

Wavelength (μm)	Wavenumber(cm^{-1})	Wavelength (μm)	Wavenumber(cm^{-1})	Wavelength (μm)	Wavenumber(cm^{-1})	Wavelength (μm)	Wavenumber(cm^{-1})	Wavelength (μm)	Wavenumber(cm^{-1})	Wavelength (μm)	Wavenumber(cm^{-1})
3.399	2942	4.453	2245	5.193	1925	6.135	1629	7.788	1284	9.489	1053
3.402	2939	4.457	2243	5.214	1917	6.143	1627	7.795	1282	9.509	1051
3.450	2898	4.461	2241	5.224	1914	6.153	1625	7.809	1280	9.529	1049
3.451	2897	4.465	2239	5.233	1910	6.156	1624	7.819	1278	9.544	1047
3.477	2876	4.471	2236	5.240	1908	6.170	1620	7.831	1276	9.586	1043
3.480	2873	4.475	2234	5.244	1906	6.177	1618	7.857	1272	9.598	1041
3.497	2859	4.479	2232	5.250	1904	6.214	1609	7.869	1270	9.623	1039
3.519	2841	4.483	2230	5.255	1902	6.225	1606	7.887	1267	9.634	1037
3.536	2828	4.485	2229	5.261	1900	6.228	1605	7.906	1264	9.655	1035
3.538	2826	4.489	2227	5.264	1899	6.242	1602	7.933	1260	9.672	1033
3.546	2820	4.492	2226	5.266	1898	6.243	1601	7.986	1252	9.692	1031
3.549	2817	4.498	2223	5.272	1896	6.258	1597	7.998	1250	9.720	1028
3.566	2804	4.501	2221	5.279	1894	6.262	1596	8.016	1247	9.744	1026

3.568	2802	4.506	2219	5.289	1890	7.148	1398	8.026	1245	9.903	1009
3.605	2773	4.509	2217	5.294	1888	7.164	1395	8.054	1241	9.921	1007
3.607	2772	4.513	2215	5.304	1885	7.176	1393	8.101	1234	9.943	1005
3.655	2735	4.517	2213	5.306	1884	7.185	1391	8.163	1225	9.964	1003
3.724	2685	4.521	2211	5.452	1834	7.195	1389	8.220	1216	9.983	1001
4.184	2390	4.525	2209	5.486	1822	7.205	1387	8.242	1213	10.001	999
4.185	2389	4.529	2207	5.523	1810	7.217	1385	8.252	1211	10.029	997
4.188	2387	4.534	2205	5.557	1799	7.229	1383	8.265	1209	10.042	995
4.194	2384	4.538	2203	5.592	1788	7.258	1377	8.282	1207	10.063	993
4.197	2382	4.543	2201	5.612	1781	7.268	1375	8.292	1205	10.190	981
4.200	2380	4.545	2200	5.626	1777	7.285	1372	8.301	1204	10.206	979
4.204	2378	4.550	2197	5.632	1775	7.289	1371	8.326	1201	10.238	976
4.207	2376	4.554	2195	5.639	1773	7.327	1364	8.335	1199	10.259	974
4.215	2372	4.560	2192	5.646	1771	7.337	1362	8.352	1197	10.289	971
4.219	2370	4.565	2190	5.651	1769	7.348	1360	8.386	1192	10.327	968
4.221	2369	4.569	2188	5.657	1767	7.354	1359	8.902	1123	10.342	966
4.226	2366	4.574	2186	5.665	1765	7.367	1357	8.948	1117	10.377	963
4.231	2363	4.577	2184	5.669	1763	7.373	1356	9.004	1110	10.396	961