

## 9.0um high power benchtop FP-QCL mid-infrared quantum cascade laser 400mW (TDLAS integrated control module)



- **Product Description**

The MP-QCL-9000-FP-400-T high-power desktop FP-QCL mid-infrared quantum cascade laser is a mid-infrared testing laser developed by Idealphotonics in the first half of 2019. Its low loss in the atmospheric

window makes it suitable for space optical communication testing and research. Our benchtop light source offers high power and does not require ITAR review, making it an excellent choice for commercial mid-infrared testing light sources. With a tunable range of over 100nm and an output power greater than 400mW, it meets the industrial testing needs of our customers. Our laser features built-in ZnSe collimation for stable output power, with superior temperature and wavelength stability, far surpassing the stability of traditional high-power quantum cascade lasers by several orders of magnitude.

- **Product features**

High power、 Compact structure、 Software intelligent control、 Built-in FPGA

- **Part Number**

MP-QCL-9000-FP-400-T

- **Application area**

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



## ● Core parameters

Wavelength	Output Power	Spectral Width
9.0um	400mW	3nm

## ● General Parameters

### Parameters

Parameters	Unit	Technical Specification		
		Min.	Typ.	Max.
Output Power 1	mW	350	-	500
Peak Operating Wavelength 2	um	8.9	9.0	9.1
Spectral Width (FWHM)	nm	-	3	-
Output Side-Mode Suppression Ratio (SMSR)	dB	30	-	-
M <sup>2</sup> Factor			<1.2	
Output Beam Divergence Angle	Mrad		<2	
Output Isolation	dB	-	30	-
Wavelength Temperature Coefficient	nm/°C		0.6	
Wavelength Current Coefficient	nm/mA		0.2	



<b>Output Power Stability (15 minutes) 4</b>	%	-	±0.5	±1.0
<b>Output Power Stability (8 h)</b>	%	-	±1.0	±2.0
<b>Output Power Adjustment Range</b>	%	0	-	100
<b>Output Power Control Mode</b>		<b>Software Control</b>		
<b>TEC Stability</b>	°C	-	±0.1	±0.2
<b>TEC Working Range</b>	°C	0	30	50
<b>Operating Voltage</b>	VAC	100	220	240
<b>Electrical Power Consumption: 5</b>	W	-	-	2
<b>Operating Temperature</b>	°C	0	-	55
<b>Storage Temperature</b>	°C	-20	-	65
<b>Dimensions</b>	mm	343(L) × 193(W) × 180(H) <b>Benchtop</b>		

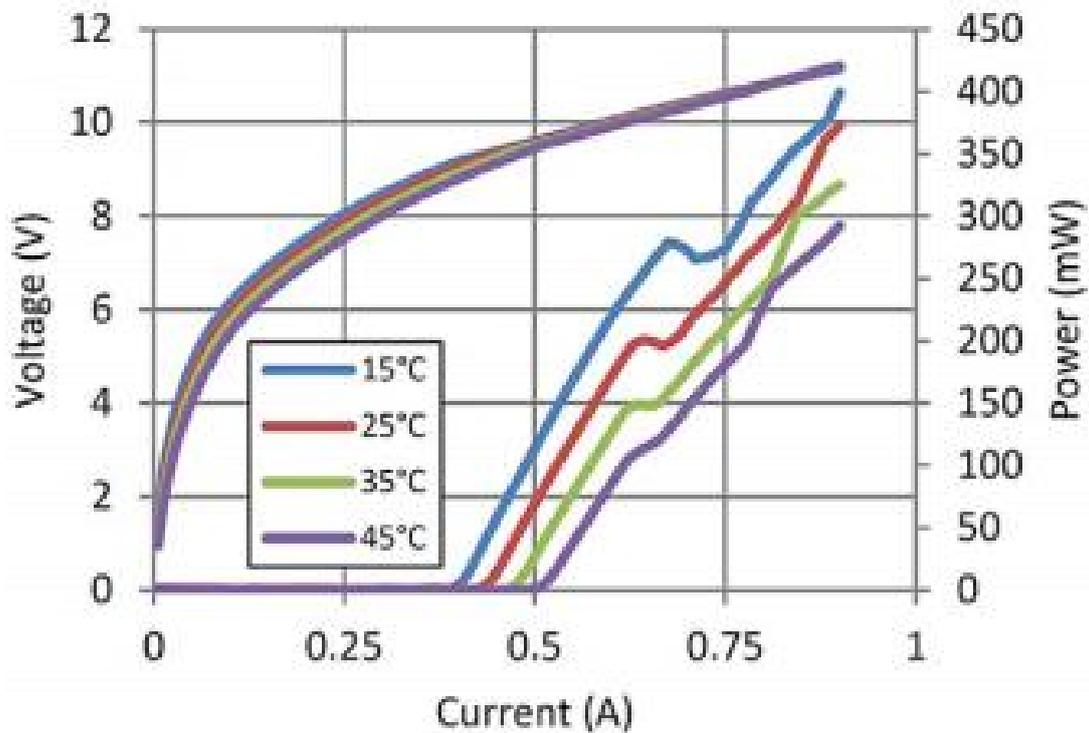
#### Technical Specification Notes:

1. Output power is selectable.
2. Peak operating wavelength is selectable.
3. Output power stability test conditions are at 25°C, with a 30-minute warm-up after powering on.

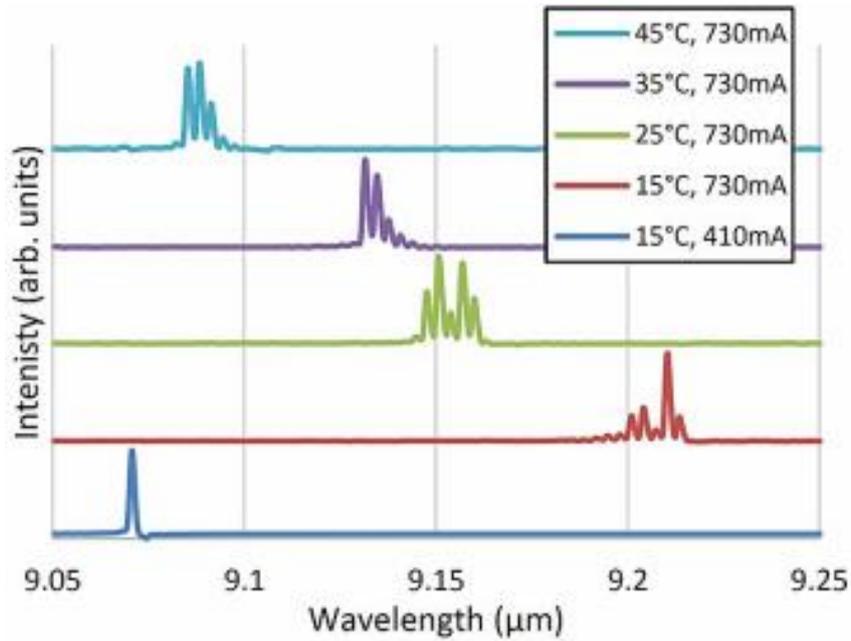
4. Maximum power consumption refers to the overall power consumption under extreme operating conditions.



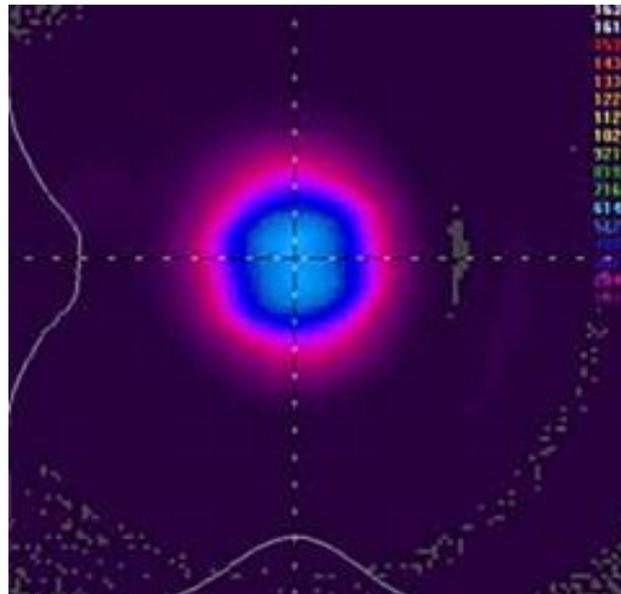
### QCL Laser Characteristic Curve (Example for 9.0um Typical Wavelength) Output Power Characteristic Curve



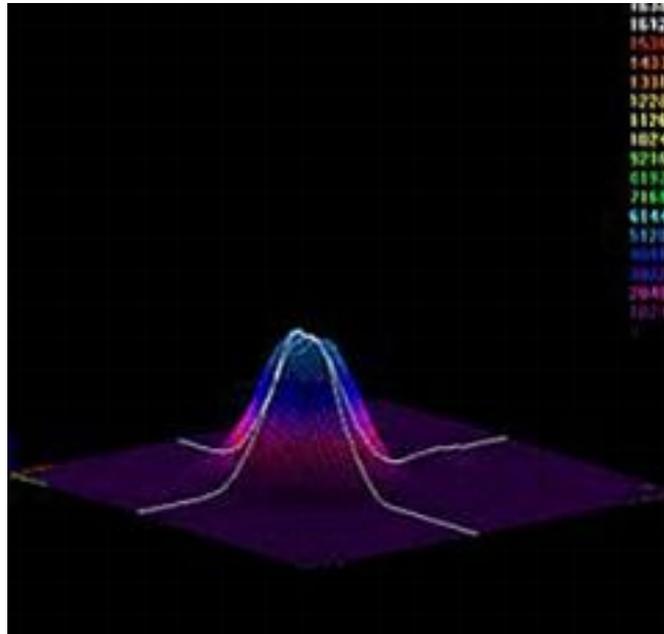
## Laser Spectrum (Continuous)



## Spot analysis



2-D Beam Profile at 1524.0 mm (60.0 in)



3-D Beam Profile at 1524.0 mm (60.0 in)

## PN#/Ordering Info

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=1000mw

## 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\*

Wavele ngth( $\mu$ m)	Wave number ( $\text{cm}^{-1}$ )	Outpu t power (mW)	Wavele ngth( $\mu$ m)	Wave number ( $\text{cm}^{-1}$ )	Outpu t power (mW)	Wavele ngth( $\mu$ m)	Wave number ( $\text{cm}^{-1}$ )	Outpu t power (mW)
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) Quantum cascade lasers

Wav elen gth( $\mu\text{m}$ )	Wav e num ber( $\text{cm}^{-1}$ )	Out put po wer (m W)									
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
3.45	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	5.24	1908	6.17	1620	7.831	1276	9.586	1043
3.48	2873	4.475	2234	5.244	1906	6.177	1618	7.857	1272	9.598	1041



3.49 7	2859	4.47 9	2232	5.25	190 4	6.21 4	1609	7.86 9	1270	9.62 3	103 9
3.51 9	2841	4.48 3	2230	5.25 5	190 2	6.22 5	1606	7.88 7	1267	9.63 4	103 7
3.53 6	2828	4.48 5	2229	5.26 1	190 0	6.22 8	1605	7.90 6	1264	9.65 5	103 5
3.53 8	2826	4.48 9	2227	5.26 4	189 9	6.24 2	1602	7.93 3	1260	9.67 2	103 3
3.54 6	2820	4.49 2	2226	5.26 6	189 8	6.24 3	1601	7.98 6	1252	9.69 2	103 1
3.54 9	2817	4.49 8	2223	5.27 2	189 6	6.25 8	1597	7.99 8	1250	9.72	102 8
3.56 6	2804	4.50 1	2221	5.27 9	189 4	6.26 2	1596	8.01 6	1247	9.74 4	102 6
3.56 8	2802	4.50 6	2219	5.28 9	189 0	7.14 8	1398	8.02 6	1245	9.90 3	100 9
3.60 5	2773	4.50 9	2217	5.29 4	188 8	7.16 4	1395	8.05 4	1241	9.92 1	100 7
3.60 7	2772	4.51 3	2215	5.30 4	188 5	7.17 6	1393	8.10 1	1234	9.94 3	100 5



3.65 5	2735	4.51 7	2213	5.30 6	188 4	7.18 5	1391	8.16 3	1225	9.96 4	100 3
3.72 4	2685	4.52 1	2211	5.45 2	183 4	7.19 5	1389	8.22	1216	9.98 3	100 1
4.18 4	2390	4.52 5	2209	5.48 6	182 2	7.20 5	1387	8.24 2	1213	10.0 01	999
4.18 5	2389	4.52 9	2207	5.52 3	181 0	7.21 7	1385	8.25 2	1211	10.0 29	997
4.18 8	2387	4.53 4	2205	5.55 7	179 9	7.22 9	1383	8.26 5	1209	10.0 42	995
4.19 4	2384	4.53 8	2203	5.59 2	178 8	7.25 8	1377	8.28 2	1207	10.0 63	993
4.19 7	2382	4.54 3	2201	5.61 2	178 1	7.26 8	1375	8.29 2	1205	10.1 9	981
4.2 4	2380	4.54 5	2200	5.62 6	177 7	7.28 5	1372	8.30 1	1204	10.2 06	979
4.20 4	2378	4.55	2197	5.63 2	177 5	7.28 9	1371	8.32 6	1201	10.2 38	976
4.20 7	2376	4.55 4	2195	5.63 9	177 3	7.32 7	1364	8.33 5	1199	10.2 59	974



4.21 5	2372	4.56	2192	5.64 6	177 1	7.33 7	1362	8.35 2	1197	10.2 89	971
4.21 9	2370	4.56 5	2190	5.65 1	176 9	7.34 8	1360	8.38 6	1192	10.3 27	968
4.22 1	2369	4.56 9	2188	5.65 7	176 7	7.35 4	1359	8.90 2	1123	10.3 42	966
4.22 6	2366	4.57 4	2186	5.66 5	176 5	7.36 7	1357	8.94 8	1117	10.3 77	963
4.23 1	2363	4.57 7	2184	5.66 9	176 3	7.37 3	1356	9.00 4	1110	10.3 96	961