Quantum Cascade Solutions
Avenue des Pâquiers 1
CH-2072 St-Blaise
T: +41 32 729 95 10
F: +41 32 729 95 19

Datasheet for #sbcw10097 DN

Recommendations:

Please read the User Manual and have a look at the FAQ at
`http://www.alpeslasers.ch/?a=142`

WARNING: Operating the laser with higher current or voltage than specified in this document may cause damage and will result in loss of warranty, unless Alpes Lasers has permitted to do so!

WARNING: Beware of the polarity of the laser. This laser has to be powered with negative current on the laser contact (= bonding pad, corresponding to the label "laser" on the LLH) and the positive current on the base contact (= submount, corresponding to the label "base" on the LLH). To use with a power-supply ILX Lightwave LDX-3232 or equivalent.

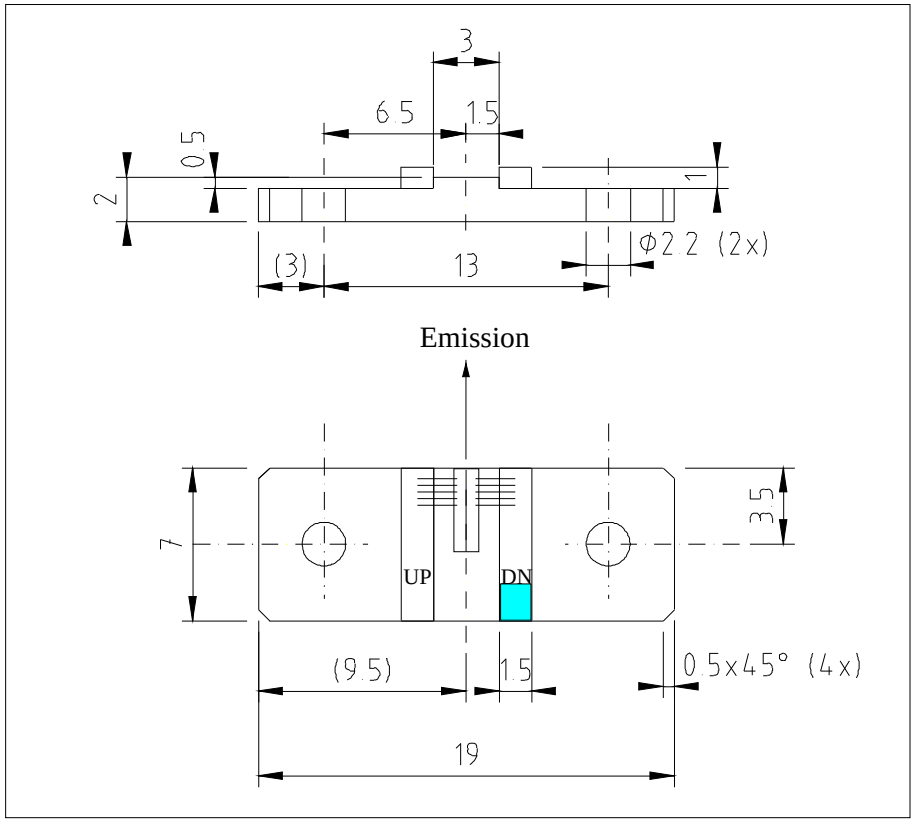

Figure 1: Support mounting for #sbcw10097 DN (please note that the laser is connected to the DN pad drawn in blue)

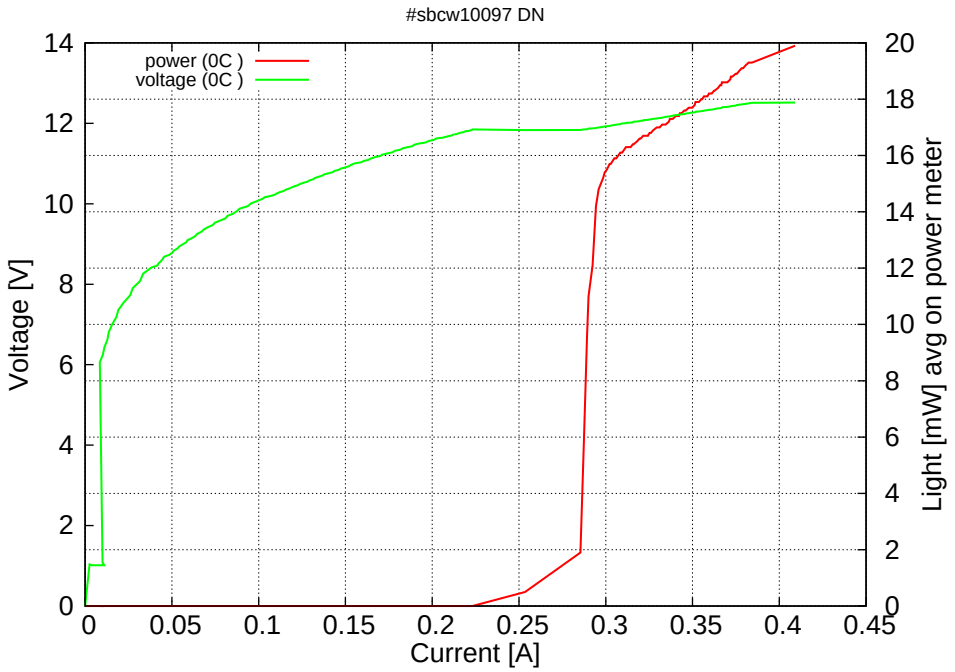

Figure 2: laser voltage and avg power vs laser current in continuous-wave operation (front resistor current $I_F = 0$A and back resistor current $I_B = 0$A) (the solid squares indicate the maximum singlemode emitted power)

Note: at 0C: Ith=0.25A / Vth=11.8V (2-wires measurements). Maximum operation current: 0.41A for all temperatures.

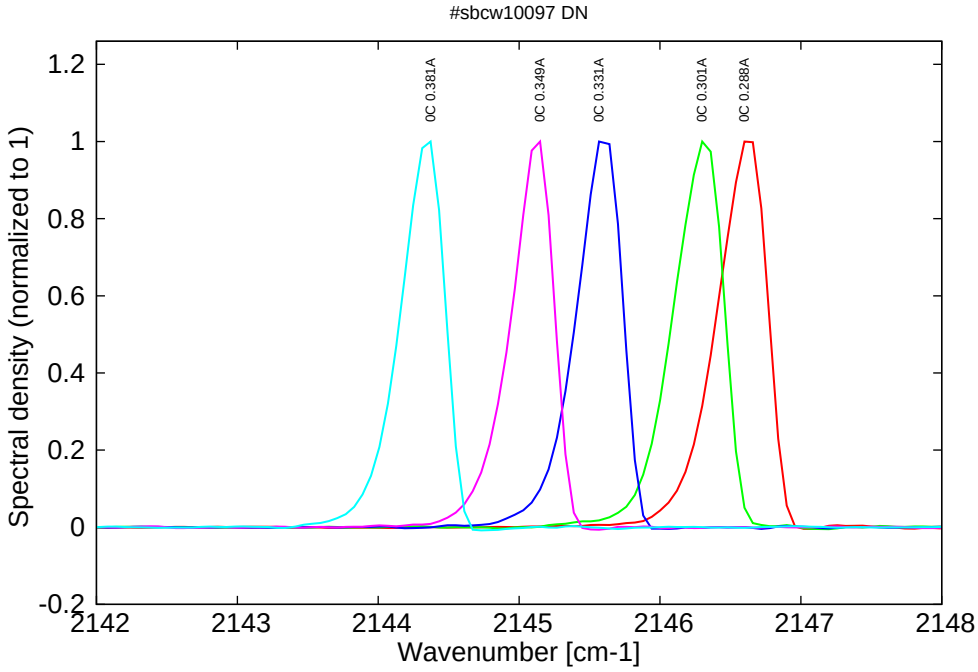

Figure 3: spectra at 0C in continuous-wave operation (front resistor current $I_F = 0$A and back resistor current $I_B = 0$A)

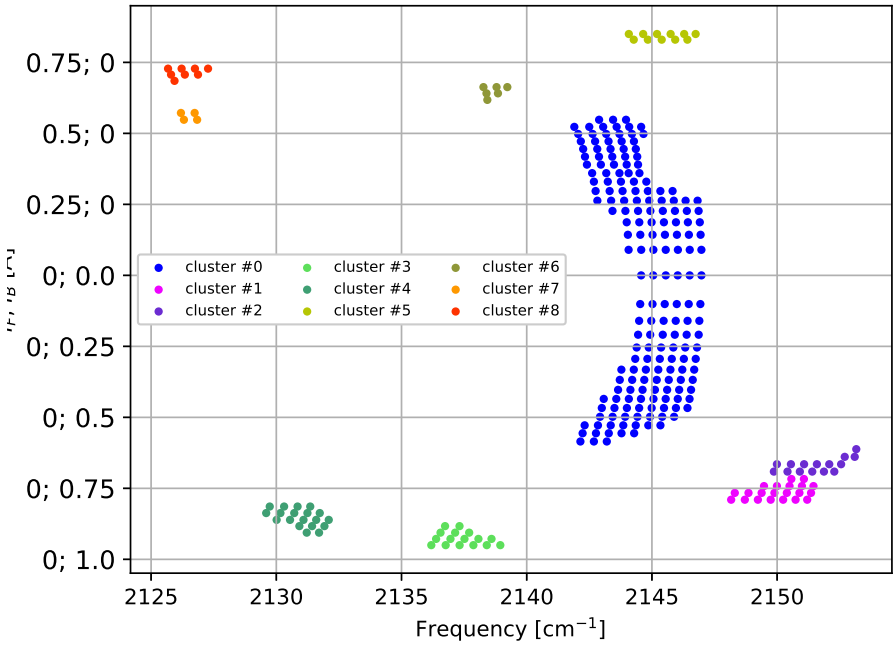

Figure 4: Emission frequency as a function of electrical current on the front resistor I_F or back resistor I_B. Either the back or the front resistors are heated, while no electrical current is flowing through the other resistor.

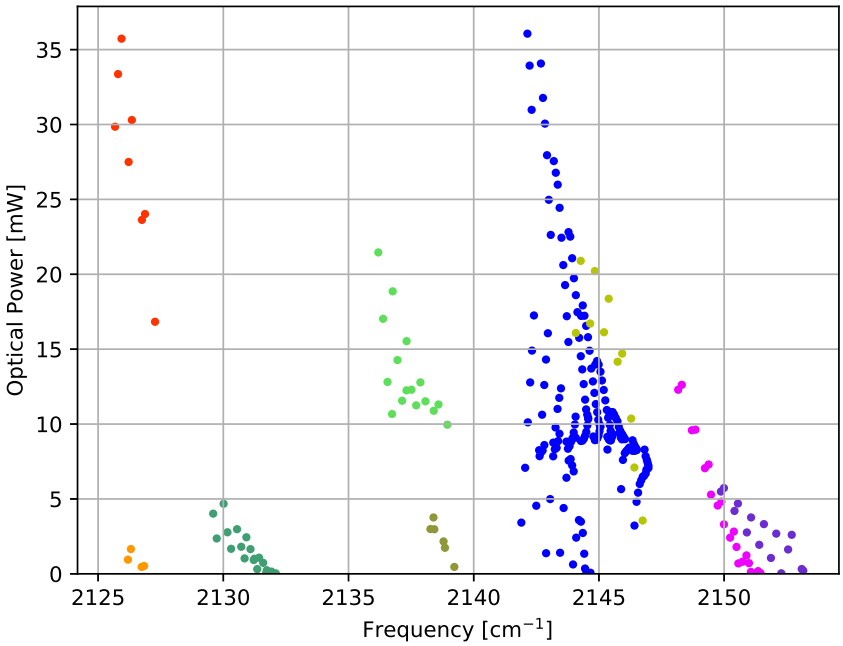

Figure 5: Optical power as a function of emission frequency.

Cluster	I_B [A]	V_B [V]	I_F [A]	V_F [V]	I_L [A]	V_L [V]	Freq [cm^{-1}]	T [C]	$P_{opt}[mW]$
#0-Back	0.00 - 0.58	0.2 - 2.9	0	0	0.25 - 0.41	12.2 - 13.7	2142 - 2147	0	36
#0-Front	0	0	0.00 - 0.55	0.2 - 2.6	0.25 - 0.41	12.2 - 14.5	2142 - 2147	0	17
#1-Back	0.72 - 0.79	3.4 - 3.9	0	0	0.29 - 0.41	13.4 - 14.3	2148 - 2151	0	13
#2-Back	0.61 - 0.69	2.9 - 3.4	0	0	0.29 - 0.41	13.4 - 14.0	2150 - 2153	0	6
#3-Back	0.88 - 0.95	4.3 - 4.9	0	0	0.31 - 0.41	13.1 - 13.9	2136 - 2139	0	21
#4-Back	0.81 - 0.91	3.9 - 4.4	0	0	0.31 - 0.41	13.5 - 14.2	2130 - 2132	0	5
#5-Front	0	0	0.83 - 0.85	3.8 - 4.1	0.29 - 0.39	13.0 - 13.6	2144 - 2147	0	21
#6-Front	0	0	0.62 - 0.66	2.9 - 3.2	0.37 - 0.41	14.2 - 14.4	2138 - 2139	0	4
#7-Front	0	0	0.55 - 0.57	2.6 - 2.8	0.39 - 0.41	14.4 - 14.5	2126 - 2127	0	2
#8-Front	0	0	0.69 - 0.73	3.3 - 3.5	0.35 - 0.41	13.3 - 13.7	2126 - 2127	0	36

Table 1: Overview of the clusters.

I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.0	0.0	0.585	2.857	1.67	0.41	13.60	5.58	7.25	36	0	2142.14
0.0	0.0	0.556	2.734	1.52	0.41	13.68	5.61	7.13	34	0	2142.23
0.0	0.0	0.528	2.569	1.36	0.41	13.67	5.60	6.96	31	0	2142.31
0.0	0.0	0.585	2.808	1.64	0.39	13.46	5.25	6.89	34	0	2142.68
0.0	0.0	0.556	2.702	1.50	0.39	13.48	5.26	6.76	32	0	2142.77
0.0	0.0	0.528	2.602	1.37	0.39	13.45	5.25	6.62	30	0	2142.85
0.0	0.0	0.498	2.439	1.21	0.39	13.46	5.25	6.46	28	0	2142.93
0.0	0.0	0.467	2.348	1.10	0.39	13.43	5.24	6.33	25	0	2143.00
0.0	0.0	0.435	2.143	0.93	0.39	13.46	5.25	6.18	23	0	2143.08
0.0	0.0	0.585	2.791	1.63	0.37	13.30	4.92	6.55	28	0	2143.20
0.0	0.0	0.556	2.72	1.51	0.37	13.37	4.95	6.46	27	0	2143.28
0.0	0.0	0.528	2.539	1.34	0.37	13.32	4.93	6.27	26	0	2143.35
0.0	0.0	0.498	2.414	1.20	0.37	13.29	4.92	6.12	24	0	2143.43
0.0	0.0	0.467	2.297	1.07	0.37	13.28	4.91	5.99	22	0	2143.50
0.0	0.0	0.435	2.122	0.92	0.37	13.29	4.92	5.84	21	0	2143.58
0.0	0.0	0.403	1.987	0.80	0.37	13.27	4.91	5.71	19	0	2143.65
0.0	0.0	0.368	1.865	0.69	0.37	13.29	4.92	5.60	17	0	2143.72
0.0	0.0	0.332	1.722	0.57	0.37	13.28	4.91	5.49	15	0	2143.78
0.0	0.0	0.556	2.707	1.51	0.35	13.22	4.63	6.13	23	0	2143.79
0.0	0.0	0.528	2.514	1.33	0.35	13.16	4.61	5.93	23	0	2143.86
0.0	0.0	0.498	2.419	1.20	0.35	13.10	4.58	5.79	21	0	2143.93
0.0	0.0	0.467	2.258	1.05	0.35	13.13	4.60	5.65	20	0	2144.00
0.0	0.0	0.435	2.102	0.91	0.35	13.13	4.60	5.51	19	0	2144.08
0.0	0.0	0.403	2.017	0.81	0.35	13.11	4.59	5.40	17	0	2144.14
0.0	0.0	0.368	1.852	0.68	0.35	13.12	4.59	5.27	16	0	2144.21
0.0	0.0	0.332	1.727	0.57	0.35	13.08	4.58	5.15	15	0	2144.28
0.0	0.0	0.556	2.651	1.47	0.33	13.07	4.31	5.79	17	0	2144.29
0.0	0.0	0.294	1.588	0.47	0.35	13.09	4.58	5.05	14	0	2144.33
0.0	0.0	0.528	2.515	1.33	0.33	12.99	4.29	5.61	18	0	2144.35
0.0	0.0	0.254	1.381	0.35	0.35	13.11	4.59	4.94	13	0	2144.39
0.0	0.0	0.498	2.381	1.19	0.33	12.99	4.29	5.47	17	0	2144.42
0.0	0.0	0.209	1.124	0.23	0.35	13.14	4.60	4.83	12	0	2144.45
0.0	0.0	0.16	0.903	0.14	0.35	13.07	4.57	4.72	11	0	2144.49
0.0	0.0	0.467	2.233	1.04	0.33	12.97	4.28	5.32	17	0	2144.49
0.0	0.0	0.101	0.649	0.07	0.35	13.04	4.56	4.63	11	0	2144.53
0.0	0.0	0.435	2.093	0.91	0.33	12.98	4.28	5.19	16	0	2144.56
0.0	0.0	0.0	0.218	0.00	0.35	13.06	4.57	4.57	10	0	2144.57
0.0	0.0	0.403	1.954	0.79	0.33	12.95	4.27	5.06	15	0	2144.63
0.0	0.0	0.368	1.861	0.68	0.33	12.95	4.27	4.96	14	0	2144.69
0.0	0.0	0.332	1.696	0.56	0.33	12.93	4.27	4.83	13	0	2144.76
0.0	0.0	0.294	1.548	0.46	0.33	12.93	4.27	4.72	12	0	2144.82
0.0	0.0	0.528	2.492	1.32	0.31	12.86	3.99	5.30	14	0	2144.85
0.0	0.0	0.254	1.364	0.35	0.33	12.97	4.28	4.63	11	0	2144.87
0.0	0.0	0.498	2.386	1.19	0.31	12.84	3.98	5.17	14	0	2144.92
0.0	0.0	0.209	1.108	0.23	0.33	13.01	4.29	4.52	11	0	2144.93
0.0	0.0	0.16	0.89	0.14	0.33	12.94	4.27	4.41	10	0	2144.97

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I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.0	0.0	0.467	2.218	1.04	0.31	12.82	3.97	5.01	14	0	2144.99
0.0	0.0	0.101	0.637	0.06	0.33	12.88	4.25	4.31	10	0	2145.02
0.0	0.0	0.0	0.208	0.00	0.33	12.87	4.25	4.25	10	0	2145.05
0.0	0.0	0.435	2.054	0.89	0.31	12.82	3.97	4.87	13	0	2145.06
0.0	0.0	0.403	1.936	0.78	0.31	12.80	3.97	4.75	13	0	2145.12
0.0	0.0	0.368	1.822	0.67	0.31	12.80	3.97	4.64	12	0	2145.19
0.0	0.0	0.332	1.721	0.57	0.31	12.77	3.96	4.53	12	0	2145.25
0.0	0.0	0.294	1.56	0.46	0.31	12.78	3.96	4.42	11	0	2145.32
0.0	0.0	0.528	2.509	1.32	0.29	12.81	3.71	5.04	8	0	2145.34
0.0	0.0	0.254	1.351	0.34	0.31	12.76	3.96	4.30	10	0	2145.37
0.0	0.0	0.498	2.354	1.17	0.29	12.71	3.69	4.86	11	0	2145.41
0.0	0.0	0.209	1.093	0.23	0.31	12.79	3.96	4.19	10	0	2145.43
0.0	0.0	0.16	0.876	0.14	0.31	12.76	3.96	4.10	10	0	2145.47
0.0	0.0	0.467	2.334	1.09	0.29	12.69	3.68	4.77	11	0	2145.48
0.0	0.0	0.101	0.624	0.06	0.31	12.71	3.94	4.00	9	0	2145.51
0.0	0.0	0.435	2.047	0.89	0.29	12.68	3.68	4.57	11	0	2145.55
0.0	0.0	0.0	0.197	0.00	0.31	12.70	3.94	3.94	9	0	2145.55
0.0	0.0	0.403	1.948	0.79	0.29	12.65	3.67	4.45	11	0	2145.61
0.0	0.0	0.368	1.788	0.66	0.29	12.66	3.67	4.33	10	0	2145.67
0.0	0.0	0.332	1.663	0.55	0.29	12.60	3.65	4.21	10	0	2145.74
0.0	0.0	0.294	1.564	0.46	0.29	12.62	3.66	4.12	10	0	2145.79
0.0	0.0	0.254	1.327	0.34	0.29	12.61	3.66	3.99	10	0	2145.85
0.0	0.0	0.498	2.317	1.15	0.27	12.66	3.42	4.57	6	0	2145.89
0.0	0.0	0.209	1.079	0.23	0.29	12.64	3.67	3.89	9	0	2145.91
0.0	0.0	0.16	0.862	0.14	0.29	12.56	3.64	3.78	9	0	2145.95
0.0	0.0	0.467	2.227	1.04	0.27	12.56	3.39	4.43	8	0	2145.96
0.0	0.0	0.101	0.612	0.06	0.29	12.57	3.65	3.71	9	0	2145.99
0.0	0.0	0.0	0.187	0.00	0.29	12.49	3.62	3.62	9	0	2146.03
0.0	0.0	0.435	2.045	0.89	0.27	12.56	3.39	4.28	8	0	2146.03
0.0	0.0	0.403	1.899	0.77	0.27	12.51	3.38	4.14	8	0	2146.09
0.0	0.0	0.368	1.779	0.65	0.27	12.48	3.37	4.02	8	0	2146.15
0.0	0.0	0.332	1.632	0.54	0.27	12.46	3.36	3.91	8	0	2146.21
0.0	0.0	0.294	1.505	0.44	0.27	12.45	3.36	3.80	8	0	2146.27
0.0	0.0	0.254	1.362	0.35	0.27	12.46	3.36	3.71	8	0	2146.33
0.0	0.0	0.209	1.065	0.22	0.27	12.46	3.36	3.59	8	0	2146.39
0.0	0.0	0.467	2.179	1.02	0.25	12.58	3.15	4.16	3	0	2146.42
0.0	0.0	0.16	0.85	0.14	0.27	12.39	3.35	3.48	8	0	2146.42
0.0	0.0	0.101	0.6	0.06	0.27	12.36	3.34	3.40	8	0	2146.47
0.0	0.0	0.435	2.043	0.89	0.25	12.49	3.12	4.01	5	0	2146.50
0.0	0.0	0.0	0.172	0.00	0.27	12.32	3.33	3.33	8	0	2146.51
0.0	0.0	0.403	1.917	0.77	0.25	12.42	3.10	3.88	5	0	2146.56
0.0	0.0	0.368	1.758	0.65	0.25	12.36	3.09	3.74	6	0	2146.63
0.0	0.0	0.332	1.635	0.54	0.25	12.32	3.08	3.62	6	0	2146.69
0.0	0.0	0.294	1.494	0.44	0.25	12.36	3.09	3.53	6	0	2146.75
0.0	0.0	0.254	1.337	0.34	0.25	12.34	3.08	3.42	7	0	2146.80
0.0	0.0	0.209	1.051	0.22	0.25	12.35	3.09	3.31	7	0	2146.87
0.0	0.0	0.16	0.837	0.13	0.25	12.29	3.07	3.21	7	0	2146.89
0.0	0.0	0.101	0.588	0.06	0.25	12.25	3.06	3.12	7	0	2146.93

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I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.0	0.0	0.0	0.159	0.00	0.25	12.22	3.06	3.06	7	0	2146.98

Table 2:

Details of cluster #0-Front

I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.523	2.525	0.0	0.0	1.32	0.41	14.47	5.93	7.25	3	0	2141.90
0.498	2.418	0.0	0.0	1.20	0.41	14.41	5.91	7.11	7	0	2142.05
0.472	2.313	0.0	0.0	1.09	0.41	14.35	5.88	6.98	10	0	2142.16
0.445	2.203	0.0	0.0	0.98	0.41	14.35	5.88	6.86	13	0	2142.25
0.418	2.089	0.0	0.0	0.87	0.41	14.34	5.88	6.75	15	0	2142.33
0.39	1.908	0.0	0.0	0.74	0.41	14.25	5.84	6.59	17	0	2142.41
0.523	2.491	0.0	0.0	1.30	0.39	14.26	5.56	6.86	5	0	2142.50
0.36	1.764	0.0	0.0	0.64	0.41	13.89	5.69	6.33	8	0	2142.61
0.498	2.392	0.0	0.0	1.19	0.39	14.19	5.53	6.73	8	0	2142.63
0.33	1.635	0.0	0.0	0.54	0.41	13.89	5.69	6.23	8	0	2142.68
0.472	2.29	0.0	0.0	1.08	0.39	14.19	5.53	6.61	11	0	2142.73
0.297	1.495	0.0	0.0	0.44	0.41	13.80	5.66	6.10	8	0	2142.75
0.445	2.157	0.0	0.0	0.96	0.39	14.16	5.52	6.48	13	0	2142.82
0.263	1.352	0.0	0.0	0.36	0.41	13.76	5.64	6.00	9	0	2142.82
0.418	2.039	0.0	0.0	0.85	0.39	14.17	5.53	6.38	14	0	2142.89
0.548	2.601	0.0	0.0	1.43	0.37	14.20	5.25	6.68	1	0	2142.89
0.39	1.887	0.0	0.0	0.74	0.39	14.12	5.51	6.24	16	0	2142.96
0.523	2.463	0.0	0.0	1.29	0.37	14.11	5.22	6.51	5	0	2143.05
0.498	2.365	0.0	0.0	1.18	0.37	14.03	5.19	6.37	8	0	2143.17
0.36	1.745	0.0	0.0	0.63	0.39	13.70	5.34	5.97	9	0	2143.18
0.33	1.617	0.0	0.0	0.53	0.39	13.70	5.34	5.88	8	0	2143.24
0.472	2.266	0.0	0.0	1.07	0.37	14.00	5.18	6.25	10	0	2143.27
0.297	1.478	0.0	0.0	0.44	0.39	13.60	5.30	5.74	8	0	2143.31
0.445	2.132	0.0	0.0	0.95	0.37	14.00	5.18	6.13	11	0	2143.35
0.263	1.336	0.0	0.0	0.35	0.39	13.54	5.28	5.63	9	0	2143.37
0.418	2.009	0.0	0.0	0.84	0.37	14.01	5.18	6.02	12	0	2143.42
0.227	1.189	0.0	0.0	0.27	0.39	13.53	5.28	5.55	9	0	2143.43
0.548	2.584	0.0	0.0	1.42	0.35	14.01	4.90	6.32	1	0	2143.45
0.39	1.867	0.0	0.0	0.73	0.37	13.98	5.17	5.90	12	0	2143.48
0.523	2.437	0.0	0.0	1.27	0.35	13.94	4.88	6.15	4	0	2143.59
0.498	2.348	0.0	0.0	1.17	0.35	13.88	4.86	6.03	6	0	2143.70
0.36	1.727	0.0	0.0	0.62	0.37	13.48	4.99	5.61	9	0	2143.70
0.33	1.6	0.0	0.0	0.53	0.37	13.50	5.00	5.52	8	0	2143.76
0.472	2.248	0.0	0.0	1.06	0.35	13.87	4.85	5.92	8	0	2143.79
0.297	1.462	0.0	0.0	0.43	0.37	13.39	4.95	5.39	9	0	2143.83
0.445	2.11	0.0	0.0	0.94	0.35	13.83	4.84	5.78	8	0	2143.87
0.263	1.321	0.0	0.0	0.35	0.37	13.42	4.97	5.31	9	0	2143.89
0.418	1.989	0.0	0.0	0.83	0.35	13.87	4.85	5.69	7	0	2143.93
0.227	1.174	0.0	0.0	0.27	0.37	13.36	4.94	5.21	9	0	2143.94
0.548	2.567	0.0	0.0	1.41	0.33	13.82	4.56	5.97	1	0	2143.97
0.39	1.848	0.0	0.0	0.72	0.35	13.84	4.84	5.56	7	0	2143.99
0.187	1.005	0.0	0.0	0.19	0.37	13.28	4.91	5.10	9	0	2143.99
0.143	0.814	0.0	0.0	0.12	0.37	13.27	4.91	5.03	10	0	2144.04
0.09	0.591	0.0	0.0	0.05	0.37	13.22	4.89	4.94	10	0	2144.07
0.36	1.717	0.0	0.0	0.62	0.35	13.82	4.84	5.46	9	0	2144.07
0.523	2.415	0.0	0.0	1.26	0.33	13.73	4.53	5.79	2	0	2144.09

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I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.498	2.327	0.0	0.0	1.16	0.33	13.71	4.52	5.68	4	0	2144.20
0.33	1.582	0.0	0.0	0.52	0.35	13.26	4.64	5.16	9	0	2144.28
0.472	2.214	0.0	0.0	1.05	0.33	13.73	4.53	5.58	3	0	2144.28
0.297	1.445	0.0	0.0	0.43	0.35	13.20	4.62	5.05	9	0	2144.34
0.445	2.089	0.0	0.0	0.93	0.33	13.73	4.53	5.46	3	0	2144.36
0.263	1.304	0.0	0.0	0.34	0.35	13.22	4.63	4.97	9	0	2144.40
0.418	1.967	0.0	0.0	0.82	0.33	13.77	4.54	5.37	1	0	2144.41
0.39	1.83	0.0	0.0	0.71	0.33	13.79	4.55	5.26	0	0	2144.45
0.227	1.159	0.0	0.0	0.26	0.35	13.18	4.61	4.88	9	0	2144.45
0.187	0.991	0.0	0.0	0.19	0.35	13.13	4.60	4.78	9	0	2144.50
0.36	1.7	0.0	0.0	0.61	0.33	13.78	4.55	5.16	0	0	2144.50
0.143	0.8	0.0	0.0	0.11	0.35	13.05	4.57	4.68	10	0	2144.54
0.523	2.394	0.0	0.0	1.25	0.31	13.61	4.22	5.47	0	0	2144.57
0.0	0.215	0.0	0.0	0.00	0.35	13.06	4.57	4.57	10	0	2144.57
0.09	0.579	0.0	0.0	0.05	0.35	13.01	4.55	4.61	10	0	2144.57
0.498	2.308	0.0	0.0	1.15	0.31	13.64	4.23	5.38	0	0	2144.66
0.33	1.565	0.0	0.0	0.52	0.33	13.11	4.33	4.84	9	0	2144.78
0.297	1.429	0.0	0.0	0.42	0.33	13.06	4.31	4.73	9	0	2144.84
0.263	1.289	0.0	0.0	0.34	0.33	13.04	4.30	4.64	9	0	2144.89
0.227	1.144	0.0	0.0	0.26	0.33	12.98	4.28	4.54	9	0	2144.94
0.187	0.977	0.0	0.0	0.18	0.33	12.95	4.27	4.46	9	0	2144.99
0.143	0.787	0.0	0.0	0.11	0.33	12.90	4.26	4.37	10	0	2145.02
0.0	0.204	0.0	0.0	0.00	0.33	12.87	4.25	4.25	10	0	2145.05
0.09	0.566	0.0	0.0	0.05	0.33	12.87	4.25	4.30	10	0	2145.06
0.297	1.414	0.0	0.0	0.42	0.31	12.84	3.98	4.40	9	0	2145.34
0.263	1.274	0.0	0.0	0.34	0.31	12.87	3.99	4.32	9	0	2145.39
0.227	1.129	0.0	0.0	0.26	0.31	12.79	3.96	4.22	9	0	2145.44
0.187	0.963	0.0	0.0	0.18	0.31	12.75	3.95	4.13	9	0	2145.48
0.143	0.774	0.0	0.0	0.11	0.31	12.72	3.94	4.05	9	0	2145.52
0.09	0.554	0.0	0.0	0.05	0.31	12.68	3.93	3.98	9	0	2145.55
0.0	0.193	0.0	0.0	0.00	0.31	12.70	3.94	3.94	9	0	2145.55
0.297	1.398	0.0	0.0	0.42	0.29	12.71	3.69	4.10	9	0	2145.82
0.263	1.258	0.0	0.0	0.33	0.29	12.66	3.67	4.00	9	0	2145.87
0.227	1.115	0.0	0.0	0.25	0.29	12.63	3.66	3.92	9	0	2145.92
0.187	0.949	0.0	0.0	0.18	0.29	12.59	3.65	3.83	9	0	2145.96
0.143	0.761	0.0	0.0	0.11	0.29	12.55	3.64	3.75	9	0	2146.00
0.0	0.184	0.0	0.0	0.00	0.29	12.49	3.62	3.62	9	0	2146.03
0.09	0.541	0.0	0.0	0.05	0.29	12.53	3.63	3.68	9	0	2146.04
0.263	1.244	0.0	0.0	0.33	0.27	12.52	3.38	3.71	9	0	2146.34
0.227	1.101	0.0	0.0	0.25	0.27	12.48	3.37	3.62	9	0	2146.39
0.187	0.936	0.0	0.0	0.18	0.27	12.42	3.35	3.53	9	0	2146.44
0.143	0.748	0.0	0.0	0.11	0.27	12.37	3.34	3.45	8	0	2146.48
0.0	0.169	0.0	0.0	0.00	0.27	12.32	3.33	3.33	8	0	2146.51
0.09	0.529	0.0	0.0	0.05	0.27	12.35	3.33	3.38	8	0	2146.51
0.263	1.229	0.0	0.0	0.32	0.25	12.36	3.09	3.41	8	0	2146.82
0.227	1.088	0.0	0.0	0.25	0.25	12.35	3.09	3.33	8	0	2146.86
0.187	0.922	0.0	0.0	0.17	0.25	12.30	3.08	3.25	8	0	2146.91
0.143	0.735	0.0	0.0	0.11	0.25	12.27	3.07	3.17	7	0	2146.94

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I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.09	0.517	0.0	0.0	0.05	0.25	12.20	3.05	3.10	7	0	2146.98
0.0	0.155	0.0	0.0	0.00	0.25	12.22	3.06	3.06	7	0	2146.98

Table 3:

I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.0	0.0	0.79	3.9	3.08	0.41	14.28	5.85	8.94	12	0	2148.16
0.0	0.0	0.766	3.813	2.92	0.41	14.27	5.85	8.77	13	0	2148.31
0.0	0.0	0.79	3.879	3.06	0.39	14.10	5.50	8.56	10	0	2148.71
0.0	0.0	0.766	3.783	2.90	0.39	14.09	5.50	8.39	10	0	2148.86
0.0	0.0	0.79	3.821	3.02	0.37	13.98	5.17	8.19	7	0	2149.23
0.0	0.0	0.766	3.722	2.85	0.37	13.95	5.16	8.01	7	0	2149.38
0.0	0.0	0.742	3.588	2.66	0.37	14.01	5.18	7.85	5	0	2149.48
0.0	0.0	0.79	3.811	3.01	0.35	13.85	4.85	7.86	5	0	2149.74
0.0	0.0	0.766	3.679	2.82	0.35	13.80	4.83	7.65	5	0	2149.89
0.0	0.0	0.742	3.569	2.65	0.35	13.84	4.84	7.49	3	0	2149.99
0.0	0.0	0.79	3.761	2.97	0.33	13.70	4.52	7.49	2	0	2150.24
0.0	0.0	0.766	3.638	2.79	0.33	13.60	4.49	7.27	3	0	2150.39
0.0	0.0	0.742	3.526	2.62	0.33	13.72	4.53	7.14	2	0	2150.49
0.0	0.0	0.717	3.378	2.42	0.33	13.77	4.54	6.97	1	0	2150.57
0.0	0.0	0.79	3.752	2.96	0.31	13.54	4.20	7.16	1	0	2150.74
0.0	0.0	0.766	3.679	2.82	0.31	13.48	4.18	7.00	1	0	2150.89
0.0	0.0	0.742	3.573	2.65	0.31	13.58	4.21	6.86	1	0	2150.99
0.0	0.0	0.717	3.369	2.42	0.31	13.62	4.22	6.64	0	0	2151.07
0.0	0.0	0.79	3.747	2.96	0.29	13.41	3.89	6.85	0	0	2151.20
0.0	0.0	0.766	3.696	2.83	0.29	13.42	3.89	6.72	0	0	2151.35
0.0	0.0	0.742	3.525	2.62	0.29	13.45	3.90	6.52	0	0	2151.45

Table 4:

I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.0	0.0	0.691	3.366	2.33	0.41	14.01	5.74	8.07	5	0	2149.87
0.0	0.0	0.665	3.278	2.18	0.41	14.02	5.75	7.93	6	0	2149.99
0.0	0.0	0.691	3.34	2.31	0.39	13.94	5.44	7.74	4	0	2150.41
0.0	0.0	0.665	3.225	2.14	0.39	13.86	5.41	7.55	5	0	2150.55
0.0	0.0	0.691	3.372	2.33	0.37	13.80	5.11	7.44	3	0	2150.91
0.0	0.0	0.665	3.218	2.14	0.37	13.76	5.09	7.23	4	0	2151.08
0.0	0.0	0.691	3.324	2.30	0.35	13.72	4.80	7.10	2	0	2151.40
0.0	0.0	0.665	3.161	2.10	0.35	13.62	4.77	6.87	3	0	2151.59
0.0	0.0	0.691	3.307	2.29	0.33	13.65	4.50	6.79	1	0	2151.87
0.0	0.0	0.665	3.155	2.10	0.33	13.49	4.45	6.55	3	0	2152.08
0.0	0.0	0.691	3.265	2.26	0.31	13.62	4.22	6.48	0	0	2152.28
0.0	0.0	0.665	3.152	2.10	0.31	13.43	4.16	6.26	2	0	2152.56
0.0	0.0	0.639	3.014	1.93	0.31	13.36	4.14	6.07	3	0	2152.70
0.0	0.0	0.639	3.008	1.92	0.29	13.38	3.88	5.80	0	0	2153.10
0.0	0.0	0.612	2.94	1.80	0.29	13.44	3.90	5.70	0	0	2153.16

Table 5:

Details of cluster #3-Back

I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.0	0.0	0.95	4.862	4.62	0.41	13.77	5.65	10.26	21	0	2136.19
0.0	0.0	0.928	4.621	4.29	0.41	13.78	5.65	9.94	17	0	2136.38
0.0	0.0	0.906	4.523	4.10	0.41	13.86	5.68	9.78	13	0	2136.56
0.0	0.0	0.883	4.318	3.81	0.41	13.92	5.71	9.52	11	0	2136.74
0.0	0.0	0.95	4.805	4.56	0.39	13.61	5.31	9.87	19	0	2136.76
0.0	0.0	0.928	4.678	4.34	0.39	13.64	5.32	9.66	14	0	2136.96
0.0	0.0	0.906	4.543	4.12	0.39	13.69	5.34	9.46	12	0	2137.14
0.0	0.0	0.883	4.288	3.79	0.39	13.80	5.38	9.17	12	0	2137.32
0.0	0.0	0.95	4.697	4.46	0.37	13.46	4.98	9.44	16	0	2137.32
0.0	0.0	0.928	4.572	4.24	0.37	13.52	5.00	9.25	12	0	2137.51
0.0	0.0	0.906	4.505	4.08	0.37	13.56	5.02	9.10	11	0	2137.70
0.0	0.0	0.95	4.665	4.43	0.35	13.29	4.65	9.08	13	0	2137.87
0.0	0.0	0.928	4.607	4.28	0.35	13.36	4.68	8.95	12	0	2138.07
0.0	0.0	0.95	4.624	4.39	0.33	13.15	4.34	8.73	11	0	2138.40
0.0	0.0	0.928	4.571	4.24	0.33	13.28	4.38	8.62	11	0	2138.59
0.0	0.0	0.95	4.591	4.36	0.31	13.09	4.06	8.42	10	0	2138.95

Table 6:

Details of cluster #4-Back

I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.0	0.0	0.837	4.15	3.47	0.41	14.17	5.81	9.28	4	0	2129.60
0.0	0.0	0.814	4.036	3.29	0.41	14.25	5.84	9.13	2	0	2129.74
0.0	0.0	0.861	4.199	3.62	0.39	13.95	5.44	9.06	5	0	2130.01
0.0	0.0	0.837	4.098	3.43	0.39	14.03	5.47	8.90	3	0	2130.16
0.0	0.0	0.814	4.041	3.29	0.39	14.09	5.50	8.78	2	0	2130.31
0.0	0.0	0.861	4.179	3.60	0.37	13.83	5.12	8.72	3	0	2130.55
0.0	0.0	0.837	4.064	3.40	0.37	13.94	5.16	8.56	2	0	2130.72
0.0	0.0	0.814	3.952	3.22	0.37	13.97	5.17	8.39	1	0	2130.85
0.0	0.0	0.883	4.338	3.83	0.35	13.66	4.78	8.61	2	0	2130.92
0.0	0.0	0.861	4.134	3.56	0.35	13.70	4.79	8.35	2	0	2131.09
0.0	0.0	0.906	4.434	4.02	0.33	13.56	4.47	8.49	1	0	2131.22
0.0	0.0	0.837	4.03	3.37	0.35	13.80	4.83	8.20	1	0	2131.24
0.0	0.0	0.814	3.901	3.18	0.35	13.90	4.87	8.04	0	0	2131.35
0.0	0.0	0.883	4.292	3.79	0.33	13.53	4.46	8.25	1	0	2131.43
0.0	0.0	0.861	4.183	3.60	0.33	13.60	4.49	8.09	1	0	2131.59
0.0	0.0	0.906	4.406	3.99	0.31	13.50	4.18	8.18	0	0	2131.71
0.0	0.0	0.837	4.015	3.36	0.33	13.72	4.53	7.89	0	0	2131.73
0.0	0.0	0.883	4.254	3.76	0.31	13.46	4.17	7.93	0	0	2131.92
0.0	0.0	0.861	4.146	3.57	0.31	13.55	4.20	7.77	0	0	2132.09

Table 7:

Details of cluster #5-Front

I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.85	4.127	0.0	0.0	3.51	0.39	13.57	5.29	8.80	16	0	2144.08
0.83	3.972	0.0	0.0	3.30	0.39	13.58	5.30	8.59	21	0	2144.27
0.85	4.057	0.0	0.0	3.45	0.37	13.42	4.97	8.41	17	0	2144.65
0.83	3.945	0.0	0.0	3.27	0.37	13.41	4.96	8.24	20	0	2144.84
0.85	4.015	0.0	0.0	3.41	0.35	13.28	4.65	8.06	16	0	2145.20
0.83	3.915	0.0	0.0	3.25	0.35	13.28	4.65	7.90	18	0	2145.39
0.85	3.995	0.0	0.0	3.40	0.33	13.12	4.33	7.73	14	0	2145.75
0.83	3.873	0.0	0.0	3.21	0.33	13.15	4.34	7.55	15	0	2145.93
0.85	3.992	0.0	0.0	3.39	0.31	13.01	4.03	7.43	10	0	2146.29
0.83	3.836	0.0	0.0	3.18	0.31	13.12	4.07	7.25	7	0	2146.42
0.85	3.917	0.0	0.0	3.33	0.29	13.01	3.77	7.10	4	0	2146.75

Table 8:

Details of cluster #6-Front

I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.663	3.183	0.0	0.0	2.11	0.41	14.41	5.91	8.02	3	0	2138.27
0.641	3.071	0.0	0.0	1.97	0.41	14.33	5.88	7.84	4	0	2138.39
0.618	2.94	0.0	0.0	1.82	0.41	14.32	5.87	7.69	3	0	2138.43
0.663	3.159	0.0	0.0	2.09	0.39	14.25	5.56	7.65	2	0	2138.80
0.641	3.054	0.0	0.0	1.96	0.39	14.27	5.57	7.52	2	0	2138.85
0.663	3.134	0.0	0.0	2.08	0.37	14.20	5.25	7.33	0	0	2139.23

Table 9:

Details of cluster #7-Front

I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.572	2.754	0.0	0.0	1.58	0.41	14.49	5.94	7.52	1	0	2126.19
0.548	2.636	0.0	0.0	1.44	0.41	14.46	5.93	7.37	2	0	2126.31
0.572	2.723	0.0	0.0	1.56	0.39	14.37	5.60	7.16	0	0	2126.74
0.548	2.646	0.0	0.0	1.45	0.39	14.38	5.61	7.06	1	0	2126.84

Table 10:

Details of cluster #8-Front

I_F [A]	V_F [V]	I_B [A]	V_B [V]	Pel_R [W]	I_L [A]	V_L [V]	P_L [W]	P_{tot} [W]	P_{opt} [mW]	T [C]	freq [cm^{-1}]
0.728	3.497	0.0	0.0	2.55	0.41	13.71	5.62	8.17	30	0	2125.68
0.707	3.43	0.0	0.0	2.43	0.41	13.72	5.63	8.05	33	0	2125.80
0.685	3.288	0.0	0.0	2.25	0.41	13.73	5.63	7.88	36	0	2125.93
0.728	3.481	0.0	0.0	2.53	0.39	13.54	5.28	7.81	27	0	2126.22
0.707	3.381	0.0	0.0	2.39	0.39	13.58	5.30	7.69	30	0	2126.35
0.728	3.465	0.0	0.0	2.52	0.37	13.45	4.98	7.50	24	0	2126.75
0.707	3.339	0.0	0.0	2.36	0.37	13.46	4.98	7.34	24	0	2126.87
0.728	3.415	0.0	0.0	2.49	0.35	13.30	4.66	7.14	17	0	2127.27

Table 11: