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Datasheet for #sbcw13692 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 be used with a high compliance CW laser driver capable of reaching the operating current and voltage indicated in this datasheet, or up to 2.5A/20V.

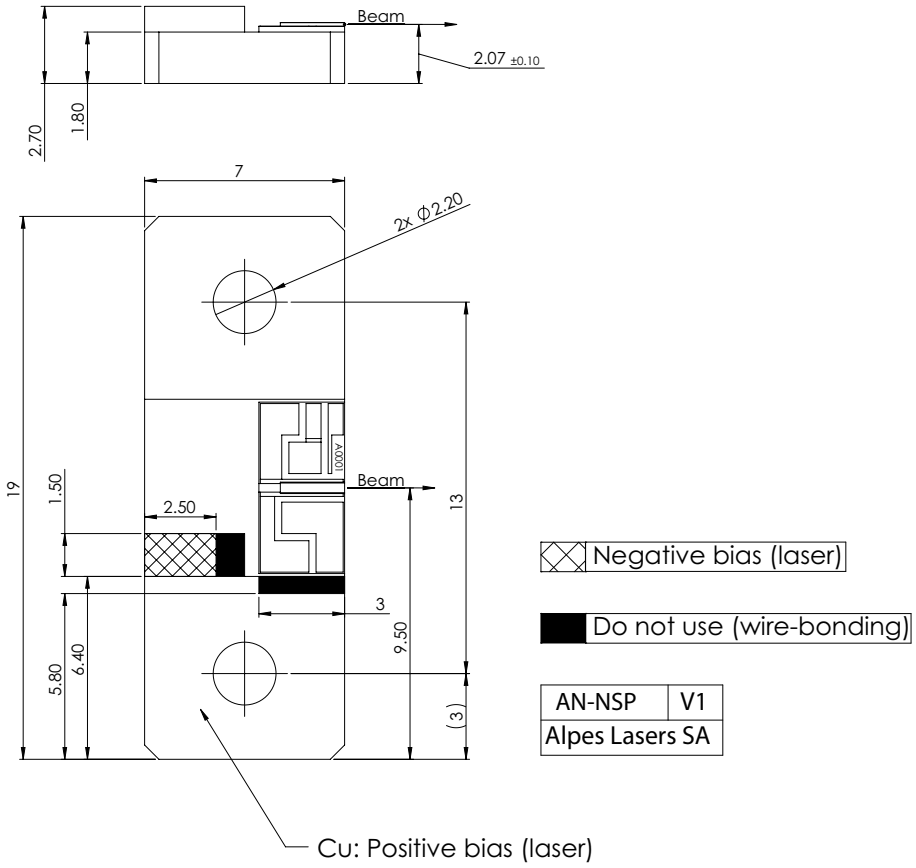

Figure 1: Mechanical and electrical interface for #sbcw13692 DN

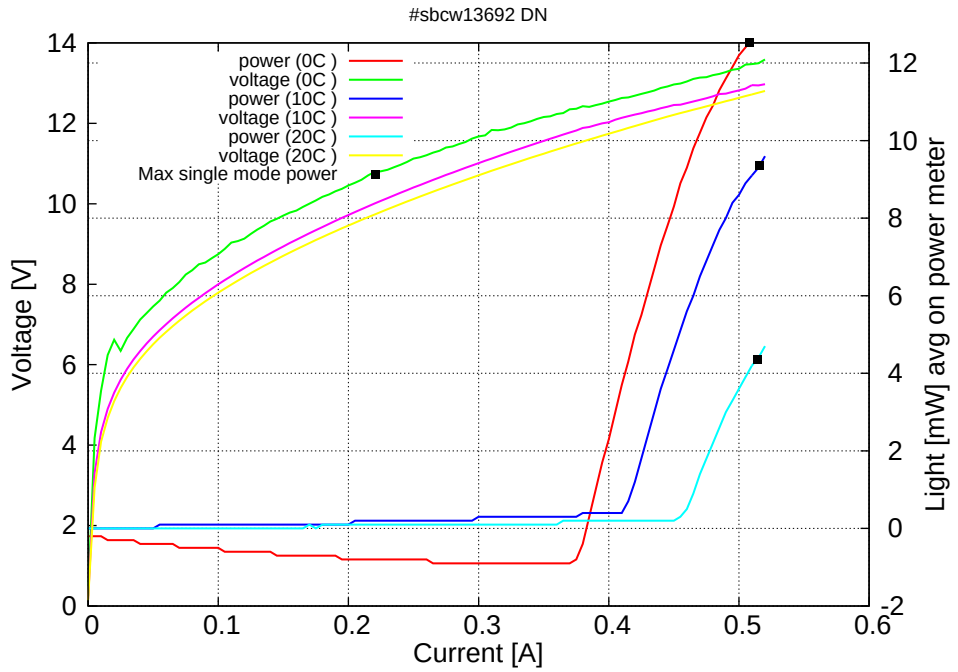

Figure 2: voltage and avg power vs current in continuous-wave operation (the solid squares indicate the maximum singlemode emitted power)

Note: at 0C: Ith=0.39A / Vth=12.5V (2-wires measurements). Maximum operation current: 0.52A for all temperatures.

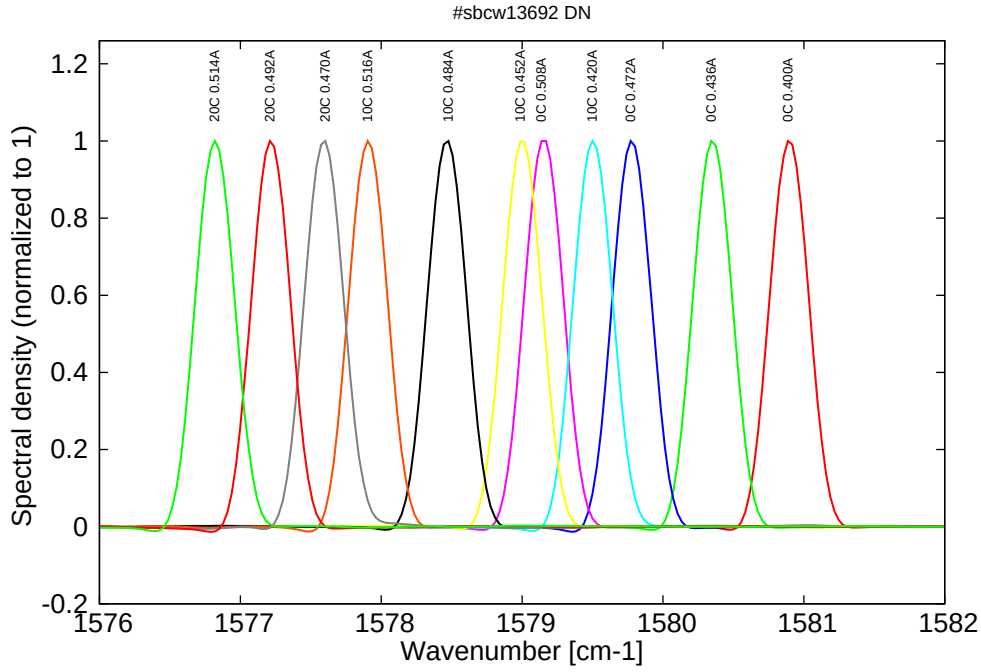

Figure 3: spectra at 0C, 10C and 20C in continuous-wave operation (front resistor current $I_F = 0$A and back resistor current $I_B = 0$A)

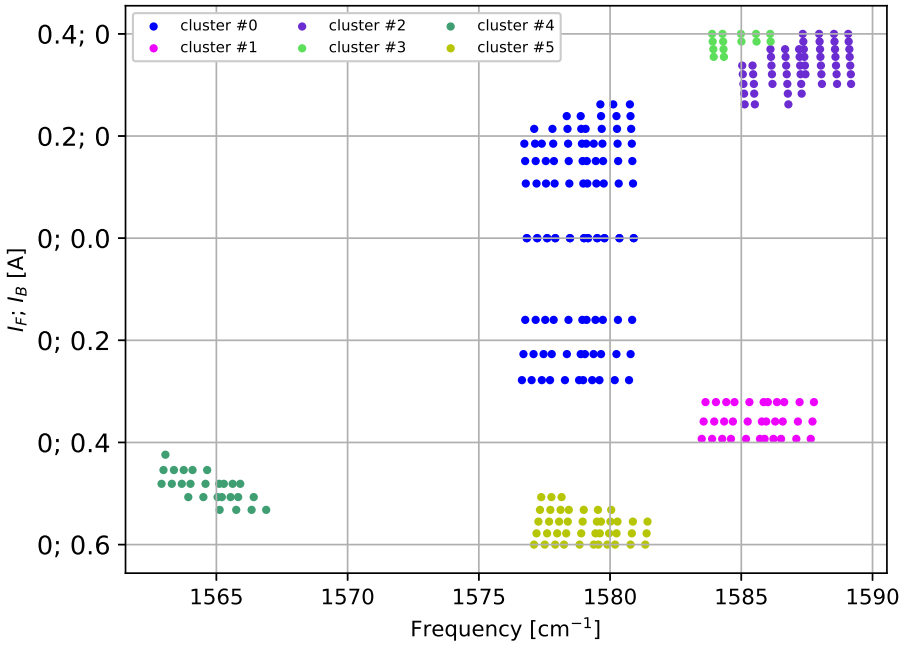

Figure 4: Emission frequency as a function of electrical current on the front resistor I_F or back resistor I_B. Either the back or the front resistors are heated, while no electrical current is flowing through the other resistor.

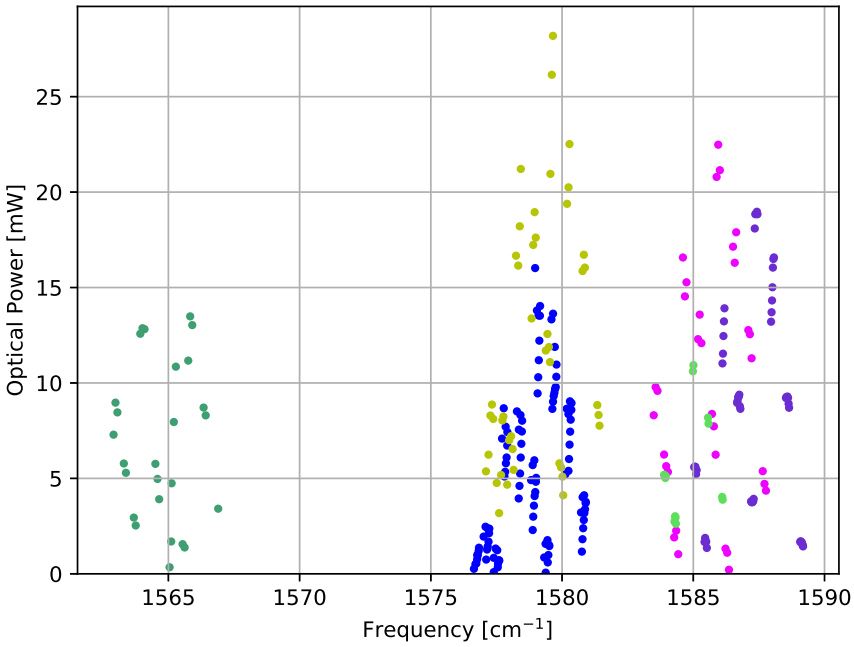

Figure 5: Optical power as a function of emission frequency.

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 - 0.28	0.0 - 1.3	0	0	0.40 - 0.52	11.9 - 13.1	1576.6 - 1580.9	0 - 20	16
#0-Front	0	0	0.00 - 0.26	0.0 - 1.4	0.40 - 0.52	12.0 - 13.1	1576.7 - 1580.9	0 - 20	14
#1-Back	0.32 - 0.39	1.4 - 1.7	0	0	0.40 - 0.52	11.8 - 12.8	1583.5 - 1587.8	0 - 20	22
#2-Front	0	0	0.26 - 0.40	1.2 - 1.8	0.40 - 0.52	11.9 - 12.8	1585.0 - 1589.2	0 - 20	19
#3-Front	0	0	0.35 - 0.40	1.6 - 1.9	0.45 - 0.52	12.0 - 12.6	1583.9 - 1586.1	10 - 20	11
#4-Back	0.42 - 0.53	1.9 - 2.4	0	0	0.40 - 0.52	11.6 - 12.7	1562.9 - 1566.9	0 - 20	13
#5-Back	0.51 - 0.60	2.3 - 2.8	0	0	0.40 - 0.52	11.5 - 12.5	1577.1 - 1581.4	0 - 20	28

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	0.278	1.259	0.35	0.508	12.87	6.54	6.89	16	0	1578.97
0.0	0.0	0.227	1.111	0.25	0.508	12.91	6.56	6.81	14	0	1579.04
0.0	0.0	0.16	0.989	0.16	0.508	12.97	6.59	6.75	14	0	1579.10
0.0	0.0	0.0	0.0	0.00	0.508	13.14	6.68	6.68	14	0	1579.16
0.0	0.0	0.0	0.0	0.00	0.508	13.09	6.65	6.65	14	0	1579.16
0.0	0.0	0.278	1.259	0.35	0.472	12.57	5.93	6.28	13	0	1579.60
0.0	0.0	0.227	1.111	0.25	0.472	12.62	5.96	6.21	14	0	1579.66
0.0	0.0	0.16	0.989	0.16	0.472	12.68	5.98	6.14	12	0	1579.72
0.0	0.0	0.0	0.0	0.00	0.472	12.84	6.06	6.06	10	0	1579.78
0.0	0.0	0.0	0.0	0.00	0.472	12.80	6.04	6.04	11	0	1579.79
0.0	0.0	0.278	1.259	0.35	0.436	12.28	5.36	5.71	9	0	1580.18
0.0	0.0	0.227	1.111	0.25	0.436	12.33	5.37	5.63	8	0	1580.24
0.0	0.0	0.16	0.989	0.16	0.436	12.38	5.40	5.56	9	0	1580.30
0.0	0.0	0.0	0.0	0.00	0.436	12.54	5.47	5.47	9	0	1580.35
0.0	0.0	0.0	0.0	0.00	0.436	12.50	5.45	5.45	9	0	1580.36
0.0	0.0	0.278	1.259	0.35	0.4	11.99	4.79	5.14	3	0	1580.72
0.0	0.0	0.227	1.111	0.25	0.4	12.03	4.81	5.06	4	0	1580.78
0.0	0.0	0.16	0.989	0.16	0.4	12.09	4.84	4.99	4	0	1580.84
0.0	0.0	0.0	0.0	0.00	0.4	12.25	4.90	4.90	4	0	1580.90
0.0	0.0	0.0	0.0	0.00	0.4	12.21	4.89	4.89	4	0	1580.90
0.0	0.0	0.278	1.174	0.33	0.516	12.64	6.52	6.85	7	10	1577.71
0.0	0.0	0.227	0.934	0.21	0.516	12.69	6.55	6.76	9	10	1577.78
0.0	0.0	0.16	0.615	0.10	0.516	12.75	6.58	6.68	8	10	1577.85
0.0	0.0	0.0	0.0	0.00	0.516	12.89	6.65	6.65	7	10	1577.91
0.0	0.0	0.0	0.0	0.00	0.516	12.87	6.64	6.64	7	10	1577.92
0.0	0.0	0.278	1.174	0.33	0.484	12.39	6.00	6.32	9	10	1578.28
0.0	0.0	0.227	0.934	0.21	0.484	12.44	6.02	6.23	8	10	1578.35
0.0	0.0	0.16	0.615	0.10	0.484	12.49	6.05	6.15	8	10	1578.42
0.0	0.0	0.0	0.0	0.00	0.484	12.63	6.11	6.11	7	10	1578.47
0.0	0.0	0.0	0.0	0.00	0.484	12.61	6.10	6.10	8	10	1578.48
0.0	0.0	0.278	1.174	0.33	0.452	12.13	5.48	5.81	5	10	1578.82
0.0	0.0	0.227	0.934	0.21	0.452	12.18	5.50	5.72	6	10	1578.88
0.0	0.0	0.16	0.615	0.10	0.452	12.24	5.53	5.63	6	10	1578.94
0.0	0.0	0.0	0.0	0.00	0.452	12.37	5.59	5.59	5	10	1579.00
0.0	0.0	0.0	0.0	0.00	0.452	12.35	5.58	5.58	5	10	1579.01
0.0	0.0	0.278	1.174	0.33	0.42	11.87	4.99	5.31	1	10	1579.32
0.0	0.0	0.227	0.934	0.21	0.42	11.92	5.01	5.22	2	10	1579.37
0.0	0.0	0.16	0.615	0.10	0.42	11.98	5.03	5.13	2	10	1579.44
0.0	0.0	0.0	0.0	0.00	0.42	12.12	5.09	5.09	2	10	1579.51
0.0	0.0	0.0	0.0	0.00	0.42	12.10	5.08	5.08	1	10	1579.51
0.0	0.0	0.278	1.177	0.33	0.514	12.39	6.37	6.70	0	20	1576.64
0.0	0.0	0.227	0.932	0.21	0.514	12.44	6.39	6.60	1	20	1576.70
0.0	0.0	0.16	0.592	0.09	0.514	12.50	6.42	6.52	1	20	1576.77
0.0	0.0	0.0	0.0	0.00	0.514	12.62	6.49	6.49	1	20	1576.82
0.0	0.0	0.0	0.0	0.00	0.514	12.64	6.49	6.49	1	20	1576.83
0.0	0.0	0.278	1.177	0.33	0.492	12.22	6.01	6.34	2	20	1577.01

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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	0.227	0.932	0.21	0.492	12.26	6.03	6.24	2	20	1577.08
0.0	0.0	0.16	0.592	0.09	0.492	12.32	6.06	6.16	2	20	1577.16
0.0	0.0	0.0	0.0	0.00	0.492	12.44	6.12	6.12	2	20	1577.22
0.0	0.0	0.0	0.0	0.00	0.492	12.48	6.14	6.14	2	20	1577.23
0.0	0.0	0.278	1.177	0.33	0.47	12.04	5.66	5.99	1	20	1577.40
0.0	0.0	0.227	0.932	0.21	0.47	12.09	5.68	5.89	1	20	1577.47
0.0	0.0	0.16	0.592	0.09	0.47	12.15	5.71	5.81	1	20	1577.53
0.0	0.0	0.0	0.0	0.00	0.47	12.27	5.77	5.77	1	20	1577.60
0.0	0.0	0.0	0.0	0.00	0.47	12.30	5.78	5.78	1	20	1577.61

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}]
0.214	1.189	0.0	0.0	0.25	0.508	12.96	6.58	6.84	9	0	1579.07
0.185	1.145	0.0	0.0	0.21	0.508	13.01	6.61	6.82	10	0	1579.09
0.151	0.992	0.0	0.0	0.15	0.508	13.03	6.62	6.77	11	0	1579.11
0.107	0.728	0.0	0.0	0.08	0.508	13.10	6.65	6.73	12	0	1579.13
0.0	0.0	0.0	0.0	0.00	0.508	13.14	6.68	6.68	14	0	1579.16
0.0	0.0	0.0	0.0	0.00	0.508	13.09	6.65	6.65	14	0	1579.16
0.262	1.445	0.0	0.0	0.38	0.472	12.62	5.96	6.33	9	0	1579.63
0.239	1.411	0.0	0.0	0.34	0.472	12.63	5.96	6.30	9	0	1579.66
0.214	1.189	0.0	0.0	0.25	0.472	12.66	5.98	6.23	9	0	1579.68
0.185	1.145	0.0	0.0	0.21	0.472	12.71	6.00	6.21	9	0	1579.71
0.151	0.992	0.0	0.0	0.15	0.472	12.73	6.01	6.16	10	0	1579.73
0.107	0.728	0.0	0.0	0.08	0.472	12.79	6.04	6.12	10	0	1579.76
0.0	0.0	0.0	0.0	0.00	0.472	12.84	6.06	6.06	10	0	1579.78
0.0	0.0	0.0	0.0	0.00	0.472	12.80	6.04	6.04	11	0	1579.79
0.262	1.445	0.0	0.0	0.38	0.436	12.32	5.37	5.75	5	0	1580.12
0.239	1.411	0.0	0.0	0.34	0.436	12.34	5.38	5.72	5	0	1580.24
0.214	1.189	0.0	0.0	0.25	0.436	12.36	5.39	5.65	6	0	1580.27
0.185	1.145	0.0	0.0	0.21	0.436	12.41	5.41	5.62	7	0	1580.29
0.151	0.992	0.0	0.0	0.15	0.436	12.43	5.42	5.57	7	0	1580.31
0.107	0.728	0.0	0.0	0.08	0.436	12.50	5.45	5.53	8	0	1580.33
0.0	0.0	0.0	0.0	0.00	0.436	12.54	5.47	5.47	9	0	1580.35
0.0	0.0	0.0	0.0	0.00	0.436	12.50	5.45	5.45	9	0	1580.36
0.262	1.445	0.0	0.0	0.38	0.4	12.02	4.81	5.19	1	0	1580.76
0.239	1.411	0.0	0.0	0.34	0.4	12.04	4.82	5.15	2	0	1580.78
0.214	1.189	0.0	0.0	0.25	0.4	12.07	4.83	5.08	2	0	1580.80
0.185	1.145	0.0	0.0	0.21	0.4	12.11	4.85	5.06	3	0	1580.83
0.151	0.992	0.0	0.0	0.15	0.4	12.13	4.85	5.00	3	0	1580.85
0.107	0.728	0.0	0.0	0.08	0.4	12.20	4.88	4.96	3	0	1580.87
0.0	0.0	0.0	0.0	0.00	0.4	12.25	4.90	4.90	4	0	1580.90
0.0	0.0	0.0	0.0	0.00	0.4	12.21	4.89	4.89	4	0	1580.90
0.214	0.946	0.0	0.0	0.20	0.516	12.75	6.58	6.78	5	10	1577.80
0.185	0.802	0.0	0.0	0.15	0.516	12.77	6.59	6.74	5	10	1577.83
0.151	0.628	0.0	0.0	0.09	0.516	12.79	6.60	6.70	6	10	1577.86
0.107	0.402	0.0	0.0	0.04	0.516	12.82	6.62	6.66	6	10	1577.89
0.0	0.0	0.0	0.0	0.00	0.516	12.89	6.65	6.65	7	10	1577.91
0.0	0.0	0.0	0.0	0.00	0.516	12.87	6.64	6.64	7	10	1577.92
0.239	1.069	0.0	0.0	0.26	0.484	12.45	6.03	6.28	4	10	1578.35
0.214	0.946	0.0	0.0	0.20	0.484	12.48	6.04	6.24	5	10	1578.38
0.185	0.802	0.0	0.0	0.15	0.484	12.50	6.05	6.20	5	10	1578.40
0.151	0.628	0.0	0.0	0.09	0.484	12.53	6.06	6.16	6	10	1578.43
0.107	0.402	0.0	0.0	0.04	0.484	12.56	6.08	6.12	7	10	1578.45
0.0	0.0	0.0	0.0	0.00	0.484	12.63	6.11	6.11	7	10	1578.47
0.0	0.0	0.0	0.0	0.00	0.484	12.61	6.10	6.10	8	10	1578.48
0.239	1.069	0.0	0.0	0.26	0.452	12.19	5.51	5.76	2	10	1578.88
0.214	0.946	0.0	0.0	0.20	0.452	12.20	5.52	5.72	3	10	1578.90
0.185	0.802	0.0	0.0	0.15	0.452	12.24	5.53	5.68	4	10	1578.93

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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}]
0.151	0.628	0.0	0.0	0.09	0.452	12.27	5.55	5.64	4	10	1578.95
0.107	0.402	0.0	0.0	0.04	0.452	12.30	5.56	5.60	4	10	1578.98
0.0	0.0	0.0	0.0	0.00	0.452	12.37	5.59	5.59	5	10	1579.00
0.0	0.0	0.0	0.0	0.00	0.452	12.35	5.58	5.58	5	10	1579.01
0.185	0.802	0.0	0.0	0.15	0.42	11.98	5.03	5.18	0	10	1579.38
0.151	0.628	0.0	0.0	0.09	0.42	12.01	5.04	5.14	1	10	1579.46
0.107	0.402	0.0	0.0	0.04	0.42	12.04	5.06	5.10	1	10	1579.48
0.0	0.0	0.0	0.0	0.00	0.42	12.12	5.09	5.09	2	10	1579.51
0.0	0.0	0.0	0.0	0.00	0.42	12.10	5.08	5.08	1	10	1579.51
0.185	0.788	0.0	0.0	0.15	0.514	12.49	6.42	6.56	1	20	1576.73
0.151	0.626	0.0	0.0	0.09	0.514	12.54	6.44	6.54	1	20	1576.77
0.107	0.401	0.0	0.0	0.04	0.514	12.56	6.46	6.50	1	20	1576.79
0.0	0.0	0.0	0.0	0.00	0.514	12.62	6.49	6.49	1	20	1576.82
0.0	0.0	0.0	0.0	0.00	0.514	12.64	6.49	6.49	1	20	1576.83
0.214	0.933	0.0	0.0	0.20	0.492	12.33	6.07	6.27	1	20	1577.11
0.185	0.788	0.0	0.0	0.15	0.492	12.35	6.07	6.22	1	20	1577.14
0.151	0.626	0.0	0.0	0.09	0.492	12.34	6.07	6.17	1	20	1577.17
0.107	0.401	0.0	0.0	0.04	0.492	12.39	6.09	6.14	2	20	1577.20
0.0	0.0	0.0	0.0	0.00	0.492	12.44	6.12	6.12	2	20	1577.22
0.0	0.0	0.0	0.0	0.00	0.492	12.48	6.14	6.14	2	20	1577.23
0.185	0.788	0.0	0.0	0.15	0.47	12.17	5.72	5.87	0	20	1577.40
0.151	0.626	0.0	0.0	0.09	0.47	12.18	5.73	5.82	0	20	1577.55
0.107	0.401	0.0	0.0	0.04	0.47	12.21	5.74	5.78	1	20	1577.56
0.0	0.0	0.0	0.0	0.00	0.47	12.27	5.77	5.77	1	20	1577.60
0.0	0.0	0.0	0.0	0.00	0.47	12.30	5.78	5.78	1	20	1577.61

Table 3:

Details of cluster #1-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	0.393	1.746	0.69	0.508	12.76	6.48	7.17	21	0	1585.89
0.0	0.0	0.359	1.619	0.58	0.508	12.80	6.50	7.08	22	0	1585.95
0.0	0.0	0.321	1.455	0.47	0.508	12.84	6.52	6.99	21	0	1586.01
0.0	0.0	0.393	1.746	0.69	0.472	12.47	5.88	6.57	17	0	1586.51
0.0	0.0	0.359	1.619	0.58	0.472	12.50	5.90	6.48	16	0	1586.58
0.0	0.0	0.321	1.455	0.47	0.472	12.55	5.92	6.39	18	0	1586.63
0.0	0.0	0.393	1.746	0.69	0.436	12.17	5.31	5.99	13	0	1587.10
0.0	0.0	0.359	1.619	0.58	0.436	12.21	5.32	5.90	13	0	1587.16
0.0	0.0	0.321	1.455	0.47	0.436	12.25	5.34	5.81	11	0	1587.22
0.0	0.0	0.393	1.746	0.69	0.4	11.87	4.75	5.44	5	0	1587.65
0.0	0.0	0.359	1.619	0.58	0.4	11.91	4.76	5.35	5	0	1587.71
0.0	0.0	0.321	1.455	0.47	0.4	11.95	4.78	5.25	4	0	1587.77
0.0	0.0	0.393	1.715	0.67	0.516	12.53	6.46	7.14	17	10	1584.61
0.0	0.0	0.359	1.553	0.56	0.516	12.56	6.48	7.04	15	10	1584.68
0.0	0.0	0.321	1.376	0.44	0.516	12.61	6.51	6.95	15	10	1584.74
0.0	0.0	0.393	1.715	0.67	0.484	12.27	5.94	6.61	12	10	1585.18
0.0	0.0	0.359	1.553	0.56	0.484	12.31	5.96	6.51	14	10	1585.24
0.0	0.0	0.321	1.376	0.44	0.484	12.35	5.98	6.42	12	10	1585.31
0.0	0.0	0.393	1.715	0.67	0.452	12.02	5.43	6.10	8	10	1585.71
0.0	0.0	0.359	1.553	0.56	0.452	12.05	5.45	6.01	8	10	1585.78
0.0	0.0	0.321	1.376	0.44	0.452	12.10	5.47	5.91	6	10	1585.85
0.0	0.0	0.393	1.715	0.67	0.42	11.76	4.94	5.61	1	10	1586.23
0.0	0.0	0.359	1.553	0.56	0.42	11.79	4.95	5.51	1	10	1586.29
0.0	0.0	0.321	1.376	0.44	0.42	11.84	4.97	5.41	0	10	1586.36
0.0	0.0	0.393	1.733	0.68	0.514	12.28	6.31	6.99	8	20	1583.49
0.0	0.0	0.359	1.567	0.56	0.514	12.32	6.33	6.89	10	20	1583.57
0.0	0.0	0.321	1.384	0.44	0.514	12.36	6.35	6.80	10	20	1583.64
0.0	0.0	0.393	1.733	0.68	0.492	12.11	5.96	6.64	6	20	1583.89
0.0	0.0	0.359	1.567	0.56	0.492	12.14	5.97	6.54	6	20	1583.97
0.0	0.0	0.321	1.384	0.44	0.492	12.18	5.99	6.44	5	20	1584.03
0.0	0.0	0.393	1.733	0.68	0.47	11.93	5.61	6.29	2	20	1584.27
0.0	0.0	0.359	1.567	0.56	0.47	11.96	5.62	6.19	2	20	1584.35
0.0	0.0	0.321	1.384	0.44	0.47	12.01	5.64	6.09	1	20	1584.43

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}]
0.4	1.841	0.0	0.0	0.74	0.508	12.75	6.48	7.21	18	0	1587.34
0.385	1.808	0.0	0.0	0.70	0.508	12.77	6.48	7.18	19	0	1587.36
0.37	1.738	0.0	0.0	0.64	0.508	12.79	6.50	7.14	19	0	1587.38
0.355	1.672	0.0	0.0	0.59	0.508	12.84	6.52	7.12	19	0	1587.40
0.338	1.606	0.0	0.0	0.54	0.508	12.84	6.52	7.06	19	0	1587.42
0.321	1.545	0.0	0.0	0.50	0.508	12.84	6.52	7.02	19	0	1587.44
0.4	1.841	0.0	0.0	0.74	0.472	12.46	5.88	6.62	13	0	1587.96
0.385	1.808	0.0	0.0	0.70	0.472	12.47	5.89	6.58	14	0	1587.98
0.37	1.738	0.0	0.0	0.64	0.472	12.50	5.90	6.54	14	0	1588.00
0.355	1.672	0.0	0.0	0.59	0.472	12.55	5.92	6.52	15	0	1588.02
0.338	1.606	0.0	0.0	0.54	0.472	12.54	5.92	6.46	16	0	1588.03
0.321	1.545	0.0	0.0	0.50	0.472	12.55	5.93	6.42	16	0	1588.05
0.302	1.434	0.0	0.0	0.43	0.472	12.57	5.93	6.37	17	0	1588.07
0.4	1.841	0.0	0.0	0.74	0.436	12.17	5.31	6.04	9	0	1588.53
0.385	1.808	0.0	0.0	0.70	0.436	12.18	5.31	6.01	9	0	1588.55
0.37	1.738	0.0	0.0	0.64	0.436	12.21	5.32	5.97	9	0	1588.57
0.355	1.672	0.0	0.0	0.59	0.436	12.25	5.34	5.94	9	0	1588.59
0.338	1.606	0.0	0.0	0.54	0.436	12.25	5.34	5.89	9	0	1588.61
0.321	1.545	0.0	0.0	0.50	0.436	12.26	5.35	5.84	9	0	1588.63
0.302	1.434	0.0	0.0	0.43	0.436	12.28	5.35	5.79	9	0	1588.65
0.4	1.841	0.0	0.0	0.74	0.4	11.87	4.75	5.49	2	0	1589.07
0.385	1.808	0.0	0.0	0.70	0.4	11.89	4.76	5.45	2	0	1589.09
0.37	1.738	0.0	0.0	0.64	0.4	11.91	4.77	5.41	2	0	1589.12
0.355	1.672	0.0	0.0	0.59	0.4	11.96	4.78	5.38	2	0	1589.13
0.338	1.606	0.0	0.0	0.54	0.4	11.96	4.78	5.33	2	0	1589.15
0.321	1.545	0.0	0.0	0.50	0.4	11.96	4.78	5.28	1	0	1589.17
0.302	1.434	0.0	0.0	0.43	0.4	11.99	4.79	5.23	1	0	1589.18
0.37	1.714	0.0	0.0	0.63	0.516	12.57	6.49	7.12	11	10	1586.11
0.355	1.615	0.0	0.0	0.57	0.516	12.58	6.49	7.07	12	10	1586.13
0.338	1.55	0.0	0.0	0.52	0.516	12.60	6.50	7.03	12	10	1586.15
0.321	1.453	0.0	0.0	0.47	0.516	12.62	6.51	6.98	13	10	1586.17
0.302	1.362	0.0	0.0	0.41	0.516	12.64	6.52	6.93	14	10	1586.19
0.37	1.714	0.0	0.0	0.63	0.484	12.31	5.96	6.59	9	10	1586.67
0.355	1.615	0.0	0.0	0.57	0.484	12.33	5.97	6.54	9	10	1586.69
0.338	1.55	0.0	0.0	0.52	0.484	12.35	5.97	6.50	9	10	1586.71
0.321	1.453	0.0	0.0	0.47	0.484	12.36	5.98	6.45	9	10	1586.73
0.302	1.362	0.0	0.0	0.41	0.484	12.35	5.97	6.39	9	10	1586.75
0.283	1.288	0.0	0.0	0.36	0.484	12.40	6.00	6.37	9	10	1586.77
0.262	1.172	0.0	0.0	0.31	0.484	12.42	6.01	6.32	9	10	1586.79
0.37	1.714	0.0	0.0	0.63	0.452	12.06	5.45	6.08	4	10	1587.20
0.355	1.615	0.0	0.0	0.57	0.452	12.07	5.46	6.03	4	10	1587.22
0.338	1.55	0.0	0.0	0.52	0.452	12.09	5.47	5.99	4	10	1587.24
0.321	1.453	0.0	0.0	0.47	0.452	12.11	5.47	5.94	4	10	1587.26
0.302	1.362	0.0	0.0	0.41	0.452	12.13	5.48	5.89	4	10	1587.28
0.283	1.288	0.0	0.0	0.36	0.452	12.15	5.49	5.85	4	10	1587.30
0.338	1.554	0.0	0.0	0.53	0.514	12.37	6.36	6.88	6	20	1585.03

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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}]
0.321	1.47	0.0	0.0	0.47	0.514	12.39	6.37	6.84	6	20	1585.06
0.302	1.377	0.0	0.0	0.42	0.514	12.39	6.37	6.78	6	20	1585.08
0.283	1.284	0.0	0.0	0.36	0.514	12.43	6.39	6.75	5	20	1585.11
0.262	1.176	0.0	0.0	0.31	0.514	12.45	6.40	6.71	5	20	1585.13
0.338	1.554	0.0	0.0	0.53	0.492	12.19	6.00	6.52	2	20	1585.43
0.321	1.47	0.0	0.0	0.47	0.492	12.21	6.01	6.48	2	20	1585.45
0.302	1.377	0.0	0.0	0.42	0.492	12.23	6.02	6.43	2	20	1585.48
0.283	1.284	0.0	0.0	0.36	0.492	12.25	6.03	6.39	2	20	1585.49
0.262	1.176	0.0	0.0	0.31	0.492	12.27	6.04	6.35	1	20	1585.52

Table 5:

Details of cluster #3-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}]
0.4	1.864	0.0	0.0	0.75	0.516	12.55	6.47	7.22	11	10	1584.99
0.385	1.799	0.0	0.0	0.69	0.516	12.56	6.48	7.17	11	10	1585.01
0.4	1.864	0.0	0.0	0.75	0.484	12.29	5.95	6.69	8	10	1585.56
0.385	1.799	0.0	0.0	0.69	0.484	12.30	5.95	6.65	8	10	1585.58
0.4	1.864	0.0	0.0	0.75	0.452	12.03	5.44	6.18	4	10	1586.10
0.385	1.799	0.0	0.0	0.69	0.452	12.04	5.44	6.14	4	10	1586.12
0.4	1.854	0.0	0.0	0.74	0.514	12.30	6.32	7.06	5	20	1583.89
0.385	1.778	0.0	0.0	0.68	0.514	12.31	6.33	7.01	5	20	1583.91
0.37	1.705	0.0	0.0	0.63	0.514	12.33	6.34	6.97	5	20	1583.93
0.355	1.639	0.0	0.0	0.58	0.514	12.35	6.35	6.93	5	20	1583.95
0.4	1.854	0.0	0.0	0.74	0.492	12.12	5.96	6.70	3	20	1584.28
0.385	1.778	0.0	0.0	0.68	0.492	12.13	5.97	6.65	3	20	1584.31
0.37	1.705	0.0	0.0	0.63	0.492	12.15	5.98	6.61	3	20	1584.32
0.355	1.639	0.0	0.0	0.58	0.492	12.17	5.99	6.57	3	20	1584.34

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	0.532	2.351	1.25	0.508	12.58	6.39	7.64	5	0	1565.12
0.0	0.0	0.507	2.239	1.14	0.508	12.63	6.42	7.55	8	0	1565.21
0.0	0.0	0.481	2.116	1.02	0.508	12.67	6.44	7.45	11	0	1565.28
0.0	0.0	0.532	2.351	1.25	0.472	12.29	5.80	7.05	11	0	1565.76
0.0	0.0	0.507	2.239	1.14	0.472	12.35	5.83	6.96	13	0	1565.83
0.0	0.0	0.481	2.116	1.02	0.472	12.37	5.84	6.86	13	0	1565.91
0.0	0.0	0.532	2.351	1.25	0.436	12.00	5.23	6.48	9	0	1566.34
0.0	0.0	0.507	2.239	1.14	0.436	12.05	5.25	6.39	8	0	1566.42
0.0	0.0	0.532	2.351	1.25	0.4	11.70	4.68	5.93	3	0	1566.90
0.0	0.0	0.507	2.243	1.14	0.516	12.39	6.39	7.53	13	10	1563.93
0.0	0.0	0.481	2.147	1.03	0.516	12.42	6.41	7.44	13	10	1564.01
0.0	0.0	0.454	2.011	0.91	0.516	12.46	6.43	7.34	13	10	1564.09
0.0	0.0	0.507	2.243	1.14	0.484	12.13	5.87	7.01	6	10	1564.50
0.0	0.0	0.481	2.147	1.03	0.484	12.16	5.89	6.92	5	10	1564.59
0.0	0.0	0.454	2.011	0.91	0.484	12.20	5.91	6.82	4	10	1564.65
0.0	0.0	0.507	2.243	1.14	0.452	11.88	5.37	6.51	0	10	1565.05
0.0	0.0	0.481	2.147	1.03	0.452	11.91	5.38	6.42	2	10	1565.11
0.0	0.0	0.507	2.243	1.14	0.42	11.62	4.88	6.02	2	10	1565.54
0.0	0.0	0.481	2.147	1.03	0.42	11.65	4.89	5.93	1	10	1565.62
0.0	0.0	0.481	2.225	1.07	0.514	12.19	6.26	7.33	7	20	1562.91
0.0	0.0	0.454	2.096	0.95	0.514	12.21	6.28	7.23	9	20	1562.98
0.0	0.0	0.424	1.887	0.80	0.514	12.25	6.30	7.10	8	20	1563.06
0.0	0.0	0.481	2.225	1.07	0.492	12.01	5.91	6.98	6	20	1563.30
0.0	0.0	0.454	2.096	0.95	0.492	12.04	5.92	6.87	5	20	1563.38
0.0	0.0	0.481	2.225	1.07	0.47	11.84	5.56	6.63	3	20	1563.68
0.0	0.0	0.454	2.096	0.95	0.47	11.86	5.58	6.53	3	20	1563.76

Table 7:

Details of cluster #5-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	0.6	2.612	1.57	0.508	12.46	6.33	7.90	21	0	1579.56
0.0	0.0	0.578	2.507	1.45	0.508	12.49	6.35	7.79	26	0	1579.61
0.0	0.0	0.555	2.401	1.33	0.508	12.53	6.37	7.70	28	0	1579.65
0.0	0.0	0.6	2.612	1.57	0.472	12.17	5.74	7.31	19	0	1580.19
0.0	0.0	0.578	2.507	1.45	0.472	12.20	5.76	7.21	20	0	1580.25
0.0	0.0	0.555	2.401	1.33	0.472	12.24	5.78	7.11	23	0	1580.28
0.0	0.0	0.6	2.612	1.57	0.436	11.88	5.18	6.75	16	0	1580.78
0.0	0.0	0.578	2.507	1.45	0.436	11.92	5.20	6.65	17	0	1580.83
0.0	0.0	0.555	2.401	1.33	0.436	11.95	5.21	6.54	16	0	1580.87
0.0	0.0	0.6	2.612	1.57	0.4	11.59	4.64	6.20	9	0	1581.34
0.0	0.0	0.578	2.507	1.45	0.4	11.62	4.65	6.10	8	0	1581.39
0.0	0.0	0.555	2.401	1.33	0.4	11.66	4.66	6.00	8	0	1581.43
0.0	0.0	0.6	2.678	1.61	0.516	12.24	6.32	7.92	17	10	1578.25
0.0	0.0	0.578	2.581	1.49	0.516	12.27	6.33	7.82	16	10	1578.33
0.0	0.0	0.555	2.487	1.38	0.516	12.31	6.35	7.73	18	10	1578.39
0.0	0.0	0.532	2.371	1.26	0.516	12.35	6.37	7.63	21	10	1578.43
0.0	0.0	0.6	2.678	1.61	0.484	11.99	5.80	7.41	13	10	1578.84
0.0	0.0	0.578	2.581	1.49	0.484	12.02	5.82	7.31	17	10	1578.90
0.0	0.0	0.555	2.487	1.38	0.484	12.05	5.83	7.21	19	10	1578.96
0.0	0.0	0.532	2.371	1.26	0.484	12.09	5.85	7.11	18	10	1579.00
0.0	0.0	0.6	2.678	1.61	0.452	11.73	5.30	6.91	12	10	1579.38
0.0	0.0	0.578	2.581	1.49	0.452	11.77	5.32	6.81	13	10	1579.44
0.0	0.0	0.555	2.487	1.38	0.452	11.80	5.33	6.71	12	10	1579.50
0.0	0.0	0.532	2.371	1.26	0.452	11.84	5.35	6.61	11	10	1579.54
0.0	0.0	0.6	2.678	1.61	0.42	11.48	4.82	6.43	6	10	1579.90
0.0	0.0	0.578	2.581	1.49	0.42	11.51	4.83	6.33	6	10	1579.96
0.0	0.0	0.555	2.487	1.38	0.42	11.55	4.85	6.23	5	10	1580.01
0.0	0.0	0.532	2.371	1.26	0.42	11.58	4.86	6.13	4	10	1580.04
0.0	0.0	0.6	2.769	1.66	0.514	12.03	6.18	7.84	5	20	1577.10
0.0	0.0	0.578	2.661	1.54	0.514	12.05	6.19	7.73	6	20	1577.20
0.0	0.0	0.555	2.548	1.41	0.514	12.07	6.21	7.62	8	20	1577.27
0.0	0.0	0.532	2.438	1.30	0.514	12.11	6.22	7.52	9	20	1577.33
0.0	0.0	0.507	2.324	1.18	0.514	12.15	6.25	7.42	8	20	1577.38
0.0	0.0	0.6	2.769	1.66	0.492	11.85	5.83	7.49	5	20	1577.51
0.0	0.0	0.578	2.661	1.54	0.492	11.87	5.84	7.38	3	20	1577.60
0.0	0.0	0.555	2.548	1.41	0.492	11.90	5.86	7.27	5	20	1577.68
0.0	0.0	0.532	2.438	1.30	0.492	11.94	5.87	7.17	8	20	1577.73
0.0	0.0	0.507	2.324	1.18	0.492	11.98	5.89	7.07	8	20	1577.77
0.0	0.0	0.6	2.769	1.66	0.47	11.67	5.49	7.15	5	20	1577.91
0.0	0.0	0.578	2.661	1.54	0.47	11.70	5.50	7.04	7	20	1577.98
0.0	0.0	0.555	2.548	1.41	0.47	11.73	5.51	6.93	7	20	1578.06
0.0	0.0	0.532	2.438	1.30	0.47	11.76	5.53	6.83	7	20	1578.11
0.0	0.0	0.507	2.324	1.18	0.47	11.81	5.55	6.73	5	20	1578.15

Table 8: