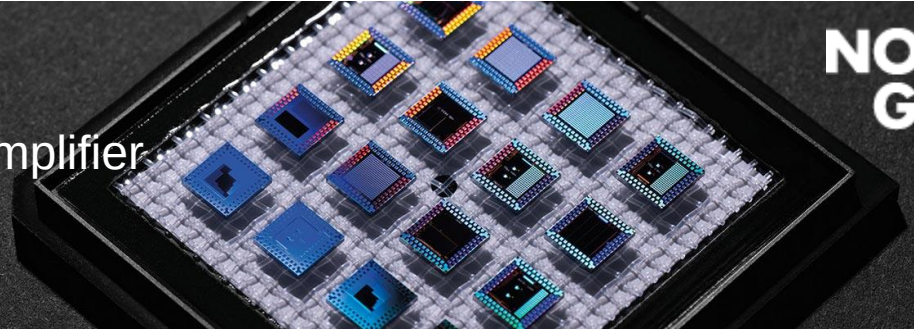
APH667
81-86 GHz
High Power Amplifier



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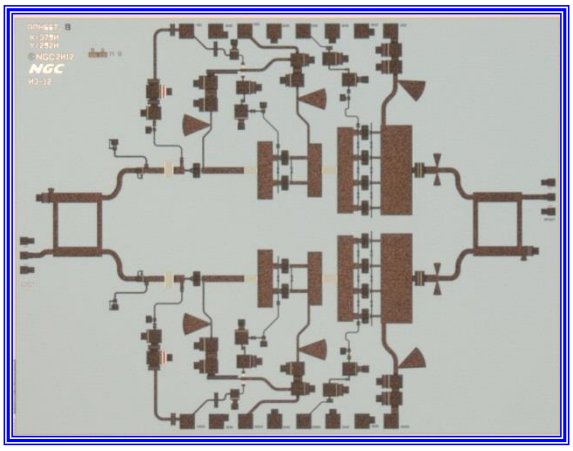

x=3.79mm; y=2.92 mm

Applications

- FCC E-band Communication Systems @ 81-86 GHz Frequency Band
- Short Haul / High Capacity Links
- Enterprise Wireless LAN
- Wireless Fiber Replacement

Product Features

- RF Frequency: 81 to 86 GHz
- Linear Gain: 14 dB typ.
- Psat: 25.5 dBm typ.
- Die Size: 11.07 sq. mm.
- 2 mil substrate
- DC Power: 4 VDC @ 630 mA

Product Description

The APH667 is a Gallium Arsenide-based broadband, three-stage power amplifier device, designed for use in commercial digital radios and wireless LANs. To ensure rugged and reliable operation, GaAs pHEMT devices are fully passivated. Both bond pad and backside metallization are Ti/Au, which is compatible with conventional die attach, thermocompression, and thermosonic wire bonding assembly techniques.

Performance Characteristics (Ta = 25°C)

Specification *	Min	Typ	Max	Unit
Frequency	81		86	GHz
Linear Gain	13.5	14		dB
Input Return Loss	16	20		dB
Output Return Loss	14	19		dB
P1db (PP*)		TBD		dBm
Psat (PP*)	25	25.5		dBm
PAE @ Psat (PP*)				%
Psat (-3)	24.5	25		dBM
Vd1=Vg1a, Vd2=Vd2a		4		V
Vg1=Vg1a		-0.08		V
Vg2=Vg2a		-0.07		V
Id1+Id1a		270		mA
Id2+Id2a		360		mA

* Pulsed-Power On-Wafer unless otherwise noted

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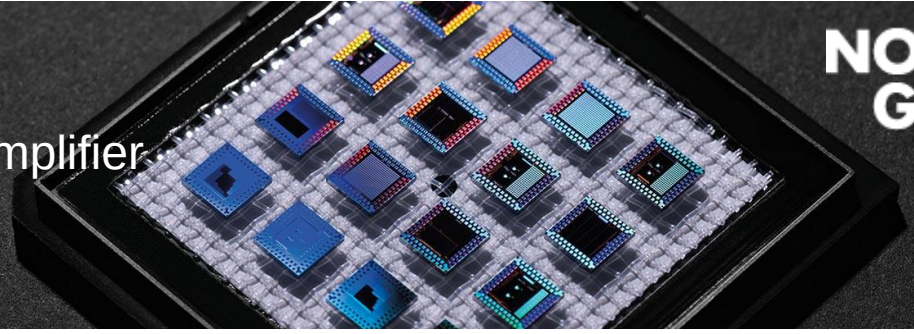

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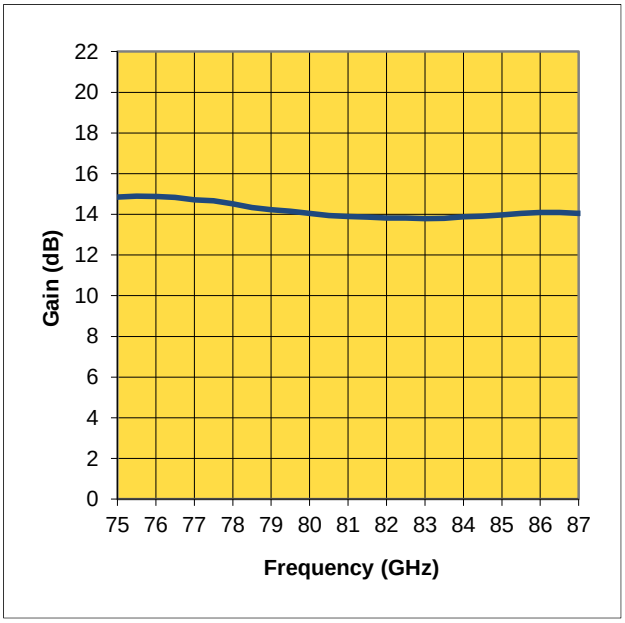
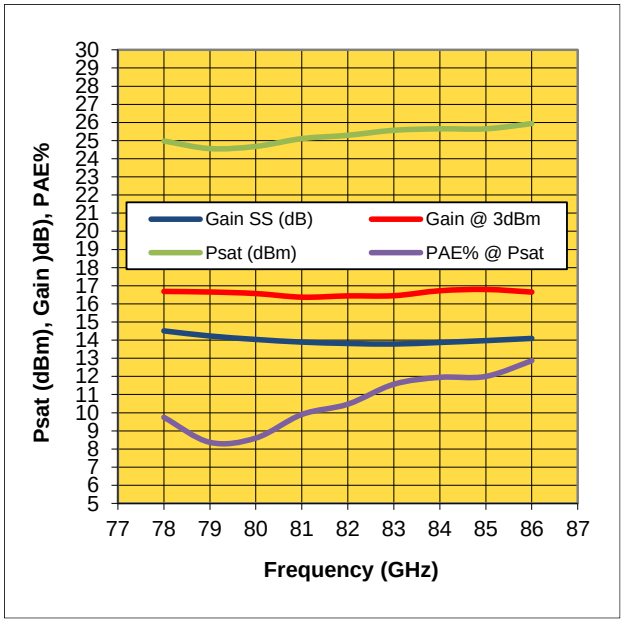
On wafer measured Performance Characteristics (Typical Performance at 25°C)
Vd = 4.0 V, Id1 + Id1a = 270 mA, Id2 + Id2a = 360 mA

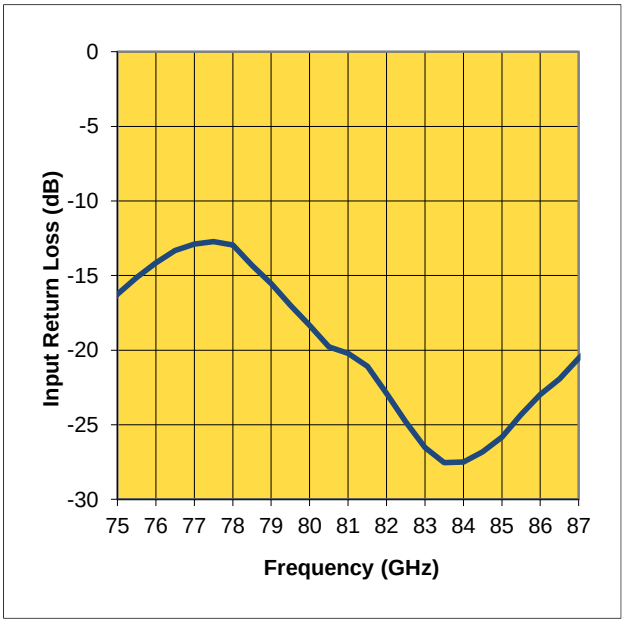
Linear Gain vs. Frequency



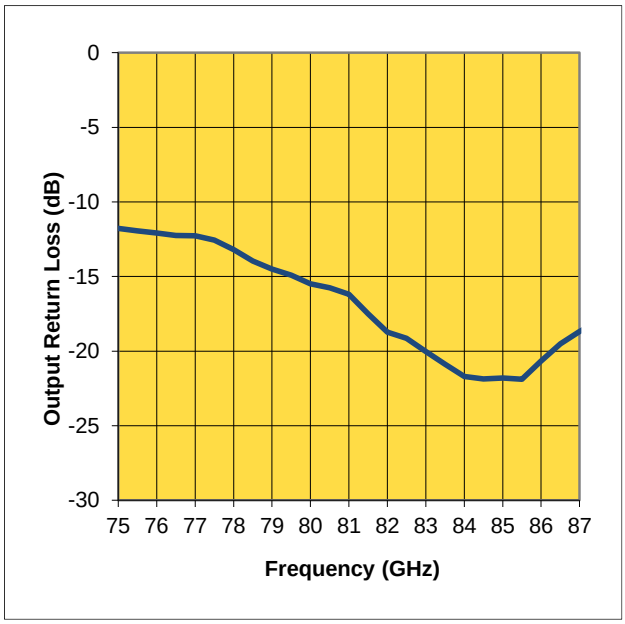
PSAT, GAIN, PAE vs. Frequency



Input Return Loss vs. Frequency



Output Return Loss vs. Frequency



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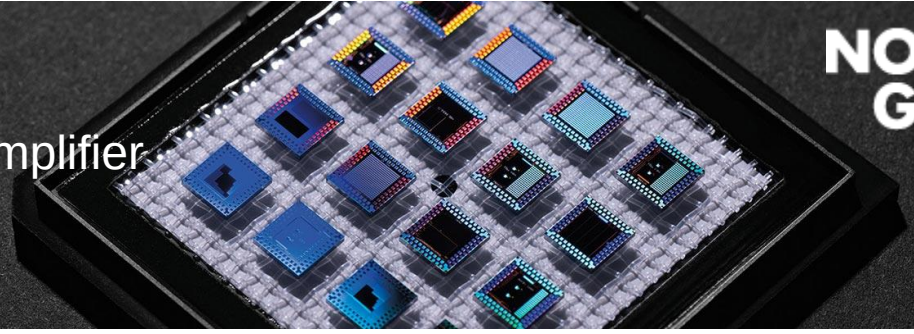
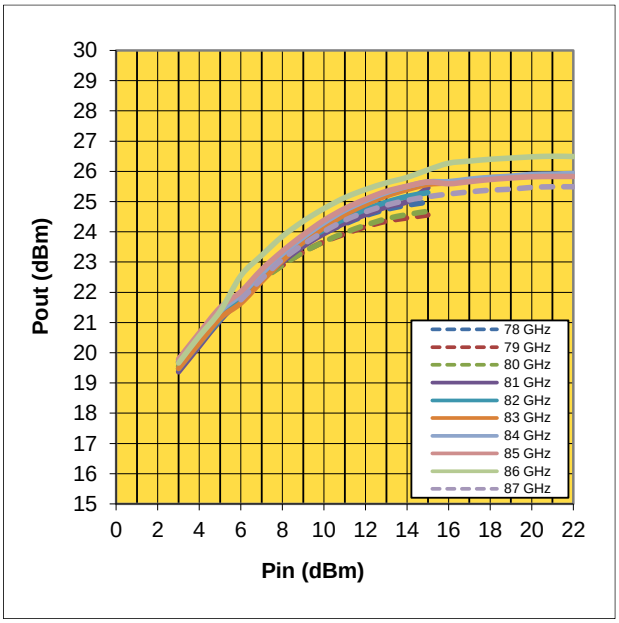


Fixture measured Performance Characteristics (Typical Performance at 25°C)
Vd = 4 V, Id1 + Id1a = 270 mA, Id2 + Id2a = 360 mA

POUT and GAIN vs. PIN



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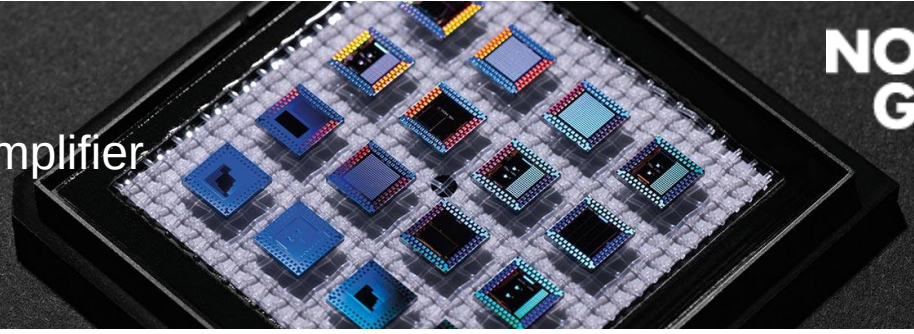

Fixture measured Performance Characteristics (Typical Performance at 25°C)
Vd = 4 V, Id1 + Id1a = 270 mA, Id2 + Id2a = 360 mA

Freq GHz	S11 Mag	S11 Ang	S21 Mag	S21 Ang	S12 Mag	S12 Ang	S22 Mag	S22 Ang
70.0	0.497	71.754	3.261	178.910	0.001	146.351	0.298	100.548
70.5	0.455	66.424	3.675	162.143	0.002	105.713	0.320	102.182
71.0	0.411	61.224	4.138	145.694	0.002	105.782	0.346	101.061
71.5	0.364	56.431	4.644	129.808	0.001	54.912	0.347	98.554
72.0	0.303	51.712	5.246	109.949	0.000	92.620	0.333	94.311
72.5	0.239	47.475	5.786	91.809	0.002	118.108	0.307	90.364
73.0	0.161	51.063	6.375	70.960	0.002	70.908	0.284	92.390
73.5	0.118	75.565	6.731	49.643	0.003	40.646	0.277	94.873
74.0	0.143	98.394	6.952	30.126	0.004	3.144	0.266	96.698
74.5	0.180	104.901	6.959	10.435	0.002	-0.368	0.265	98.715
75.0	0.214	104.154	7.002	-6.726	0.002	-35.372	0.281	98.097
75.5	0.240	100.114	7.019	-23.607	0.003	-21.322	0.293	98.873
76.0	0.254	94.761	7.093	-39.638	0.002	-7.401	0.313	95.507
76.5	0.263	89.093	6.952	-57.294	0.001	-62.143	0.321	90.556
77.0	0.260	84.452	6.825	-74.125	0.002	21.052	0.324	84.243
77.5	0.260	79.349	6.690	-91.468	0.003	4.081	0.304	74.620
78.0	0.257	72.107	6.584	-107.821	0.003	15.203	0.262	66.676
78.5	0.231	65.066	6.487	-123.615	0.004	-42.561	0.217	63.498
79.0	0.212	59.855	6.474	-141.039	0.002	-42.997	0.188	65.001
79.5	0.193	55.787	6.305	-154.642	0.002	-86.978	0.165	72.027
80.0	0.173	51.167	6.163	-170.371	0.002	-53.969	0.165	78.293
80.5	0.143	47.174	6.150	176.135	0.002	-83.883	0.177	79.328
81.0	0.129	46.684	6.041	162.457	0.001	102.097	0.194	72.149
81.5	0.118	41.355	6.042	148.595	0.004	38.198	0.187	61.368
82.0	0.094	36.297	6.122	132.692	0.005	2.156	0.187	51.822
82.5	0.076	35.970	6.093	119.180	0.004	-25.692	0.180	38.740
83.0	0.063	35.893	6.090	101.028	0.005	-32.536	0.155	23.181
83.5	0.055	36.477	6.104	86.255	0.003	-31.935	0.124	1.323
84.0	0.046	30.657	6.111	71.304	0.004	-17.145	0.083	-24.383
84.5	0.042	17.659	6.133	54.025	0.006	-29.194	0.053	-51.978
85.0	0.033	0.773	6.217	41.345	0.004	-29.208	0.032	-102.306
85.5	0.034	-25.510	6.289	27.919	0.007	-19.864	0.021	159.833
86.0	0.035	-63.160	6.241	11.695	0.009	-34.957	0.027	109.972
86.5	0.040	-88.169	6.303	-2.409	0.010	-52.802	0.030	49.460
87.0	0.052	-101.018	6.401	-18.639	0.009	-67.489	0.049	-11.144

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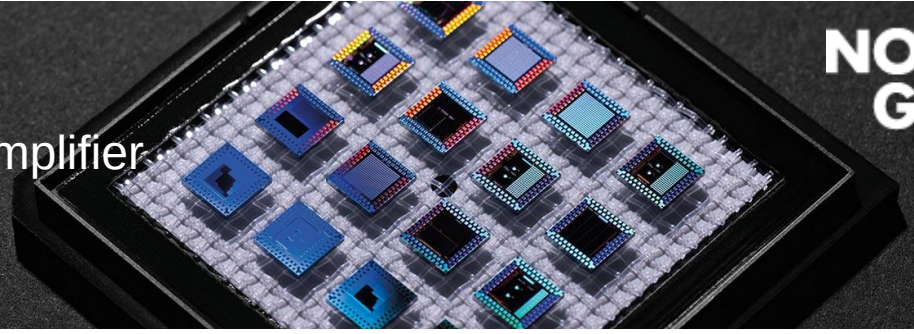

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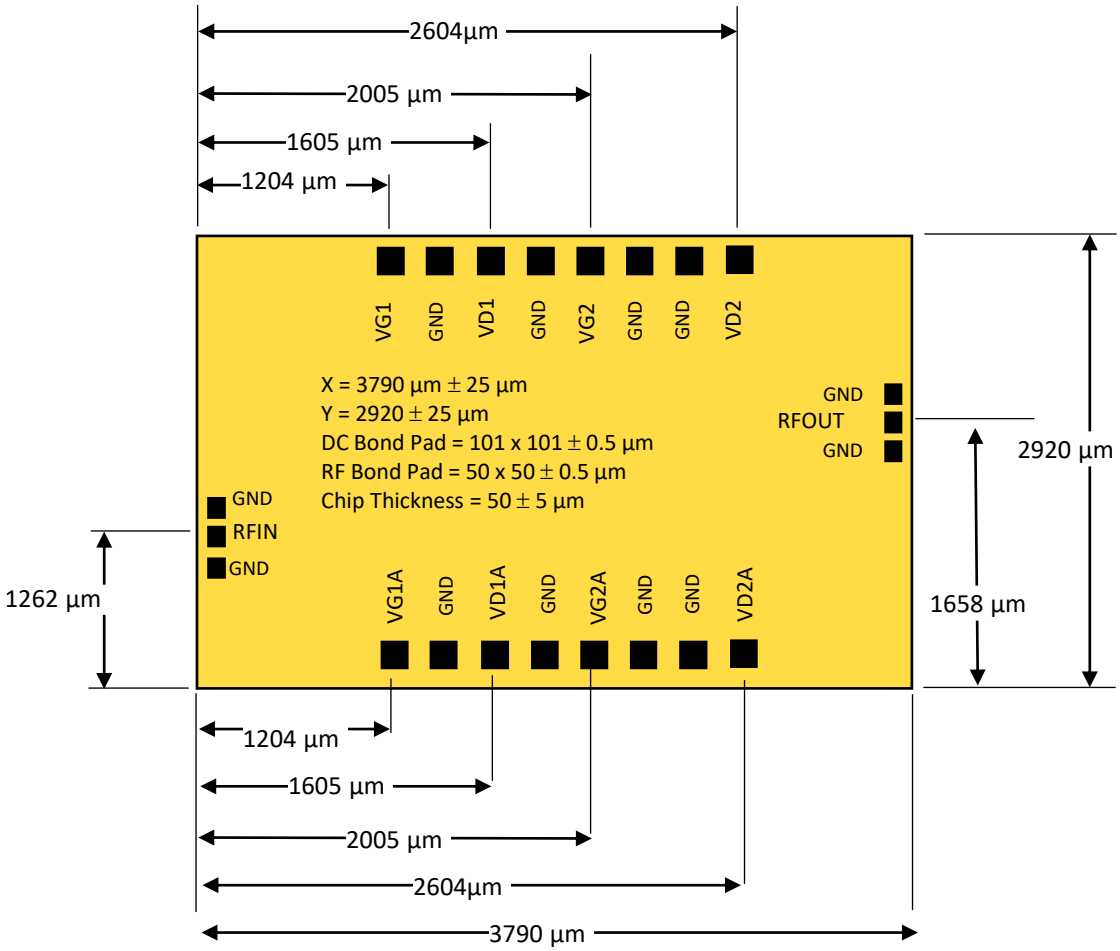
Die Size and Bond Pad Locations (Not to Scale)



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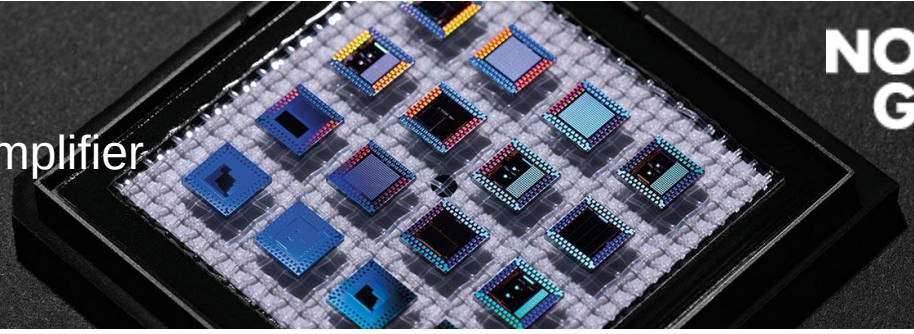

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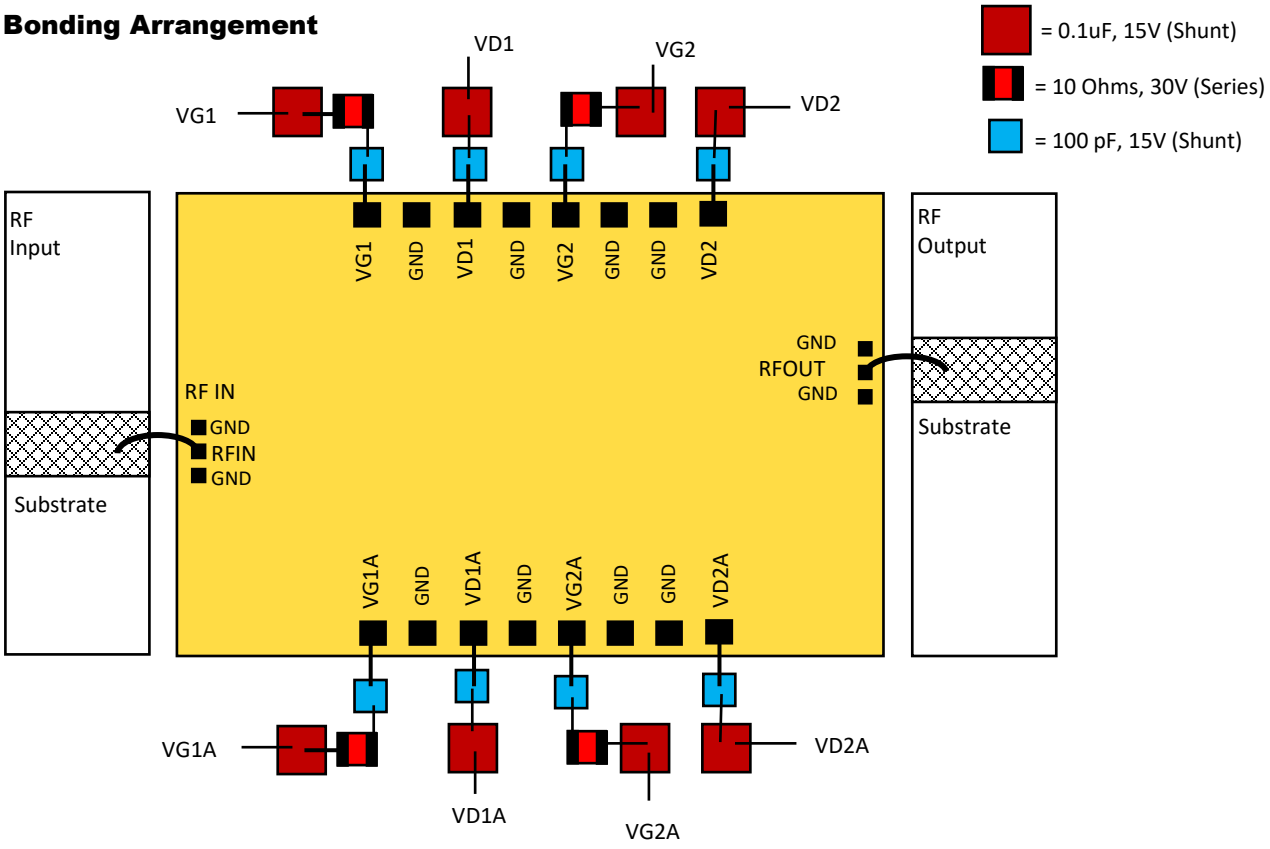
Suggested Bonding Arrangement



Recommended Assembly Notes

1. Bypass caps should be 100 pF ceramic (single-layer) placed no further than 30 mils from the amplifier.
2. Best performance obtained from use of <6 mil (long) by 1.5 by 0.5 mil ribbons on input and output.

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