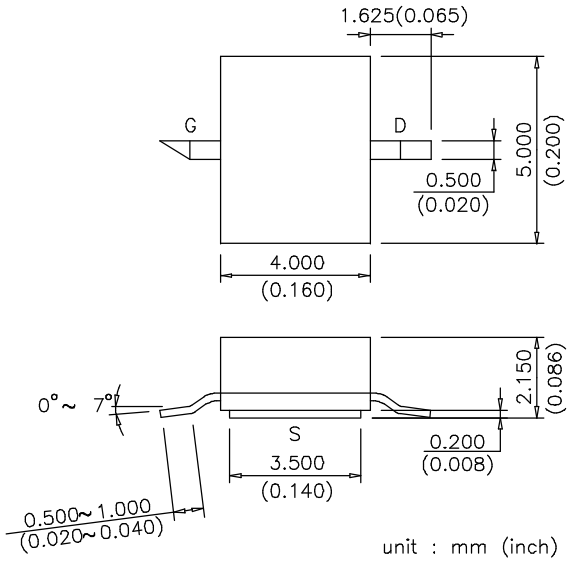
Features

- **Output Power:** P_{1dB}=30 dBm (typ.)
- **High Gain:** GL=16 Db (typ.)
- **High Efficiency:** PAE =45% (typ.)
- **High Linearity:** IP3=45 dBm (typ.)
- **Low Cost**

Description

The HWF1686RA is a medium power GaAs MESFET designed for various RF and Microwave applications. It is presently offered in a low cost, surface-mountable ceramic package.

Outline Dimensions



RA Package (Ceramic)

Absolute Maximum Ratings

V_{DS}[1]	Drain to Source Voltage	+15V
V_{GS}	Gate to Source Voltage	-5V
I_D	Drain Current	I_{DSS}
I_G	Gate Current	2 mA
T_{CH}	Channel Temperature	175°C
T_{STG}	Storage Temperature	-65 to +175°C
P_T[2]	Power Dissipation	3.5 W

[1] Hexawave recommends that the quiescent drain-source operating voltage (V_{DS}) should not exceed 10 Volts.

[2]Mounted on an infinite heat sink.

Electrical Specification at 25°C

Symbol	Parameters	Conditions	Units	Min.	Typ.	Max.
I_{DSS}	Saturated Drain Current	V_{DS}=3V, V_{GS}=0V	mA	300	400	600
V_P	Pinch-off Voltage	V_{DS}=3V, I_{DS}=20 mA	V	-3.5	-2.0	-1.5
g_m	Transconductance	V_{DS}=3V, I_{DS}=200 mA	mS	-	200	-
R_{th}	Thermal Resistance	Channel to Case	°C/W	-	30	40
P_{1dB}	Output Power @1dB Gain	V_{DS}=10V	dBm	29.0	30.0	-
G_L	Linear Power Gain	I_{DS}=0.5I_{DSS}	dB	15	16	-
PAE	Power-added Efficiency (P_{out} = P_{1dB})		%	-	45	-
IP_3	Third-order Intercept Point[3]	f=2.4 GHz	dBm	-	45	-

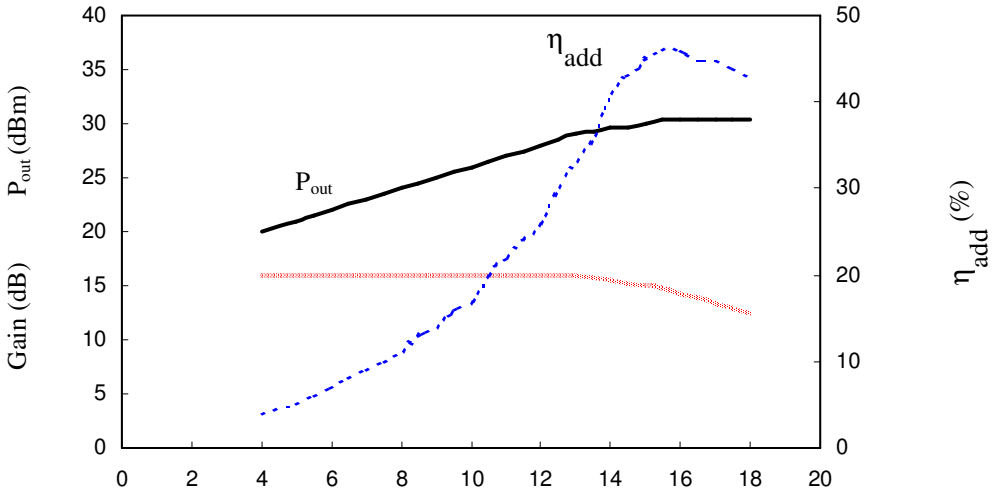
[3] Single carrier level 15dBm, 1 MHz apart between 2 tones, current adjusted for best IP_3

Typical Performance at 25°C

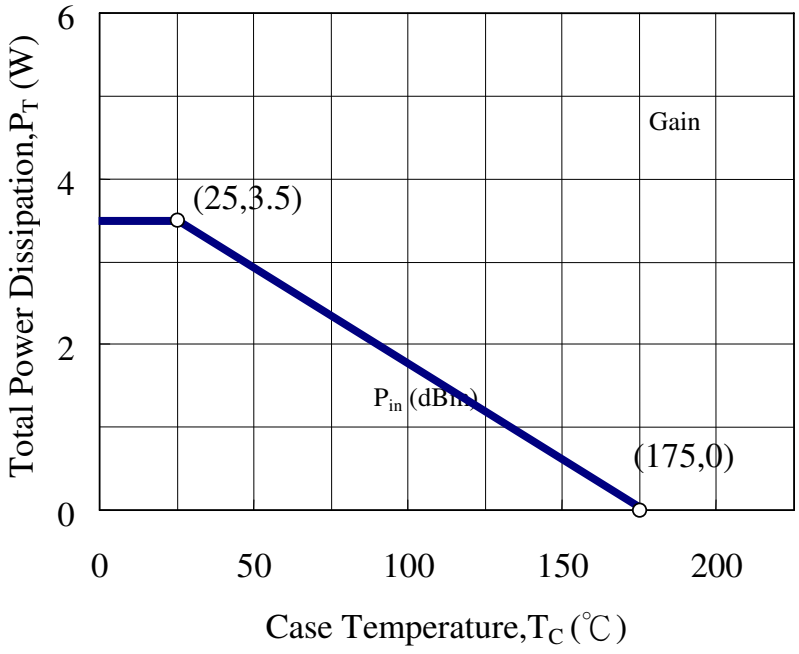
Output Power, Efficiency & Gain vs. Input Power

V_{DS}=10V, I_{DS}=0.5I_{DSS}

f=2.4GHz



Power Derating Curve



Typical S-Parameters (Common Source, T_A=25°C, V_{DS}=10V, I_{DS}=0.5I_{DSS})

Freq	S_{11}		S_{21}		S_{12}		S_{22}	
(GHz)	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
0.5	0.966	-60.600	7.901	137.750	0.014	53.040	0.455	-44.490
0.6	0.954	-71.580	7.488	129.900	0.015	46.780	0.453	-49.140
0.7	0.954	-79.740	7.065	122.830	0.017	40.360	0.444	-55.370
0.8	0.955	-88.330	6.693	116.180	0.018	36.440	0.447	-60.860
0.9	0.951	-95.930	6.327	109.940	0.019	30.700	0.450	-66.130
1.0	0.943	-102.980	5.953	103.930	0.020	26.080	0.454	-71.560
1.1	0.943	-109.520	5.612	98.390	0.021	21.660	0.457	-76.340
1.2	0.943	-115.520	5.283	92.970	0.021	17.640	0.465	-81.450
1.3	0.947	-120.920	4.979	88.080	0.021	14.800	0.468	-85.610
1.4	0.947	-125.900	4.700	83.310	0.022	10.930	0.478	-89.680
1.5	0.949	-130.650	4.434	78.720	0.022	7.860	0.485	-93.630
1.6	0.946	-134.810	4.199	74.510	0.022	4.280	0.494	-97.440
1.7	0.949	-139.040	3.970	70.220	0.021	2.480	0.502	-101.200
1.8	0.950	-142.830	3.771	66.290	0.021	-0.240	0.512	-104.460
1.9	0.949	-146.280	3.579	62.310	0.021	-2.920	0.524	-107.740
2.0	0.948	-149.330	3.402	59.030	0.021	-4.520	0.533	-110.660
2.1	0.951	-152.720	3.245	55.200	0.020	-6.500	0.545	-113.700
2.2	0.947	-155.590	3.081	51.910	0.020	-7.550	0.558	-116.610
2.3	0.946	-158.550	2.942	48.650	0.020	-10.380	0.569	-119.360
2.4	0.944	-161.160	2.811	45.510	0.020	-13.150	0.579	-121.760
2.5	0.940	-163.570	2.691	42.540	0.019	-13.840	0.591	-124.120
2.6	0.939	-166.360	2.577	39.490	0.019	-15.830	0.601	-126.170
2.7	0.940	-168.460	2.473	36.680	0.019	-14.660	0.613	-128.150
2.8	0.936	-170.910	2.374	33.920	0.018	-17.220	0.625	-130.160
2.9	0.932	-172.740	2.290	31.330	0.018	-20.380	0.636	-131.900
3.0	0.931	-175.220	2.198	28.650	0.018	-20.140	0.646	-133.870
4.0	0.900	166.850	1.664	5.030	0.016	-31.630	0.733	-148.980
5.0	0.897	148.860	1.431	-18.490	0.016	-38.100	0.774	-164.480
6.0	0.882	130.020	1.301	-43.500	0.008	-46.420	0.792	178.130
7.0	0.846	109.390	1.206	-69.890	0.015	-52.210	0.837	160.780
8.0	0.781	91.190	1.210	-93.950	0.022	-71.340	0.841	148.940
9.0	0.626	65.480	1.414	-121.200	0.026	-78.610	0.833	141.520
10.0	0.265	-11.550	1.774	-164.010	0.051	-114.740	0.839	129.890