



HWF1682RA

L-Band GaAs Power FET

January 2006 V4

Outline Dimensions

Features

- **High Output Power:** $P_{1dB}=37$ dBm (typ.)
- **High Gain:** $G_L=11.5$ dB (typ.)
- **High Efficiency:** PAE =45% (typ.)
- **High Linearity:** $IP_3=48$ dBm(typ.)
- **Class A or Class AB Operation**
- **Low Cost**

Description

The HWF1682RA is a high power GaAs MESFET designed for various RF and Microwave applications.

It is presently offered in a low cost, surface-mountable ceramic package.

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	10 mA
T_{CH}	Channel Temperature	175°C
T_{STG}	Storage Temperature	-65 to +175°C
$P_T^{[2]}$	Power Dissipation	15 W

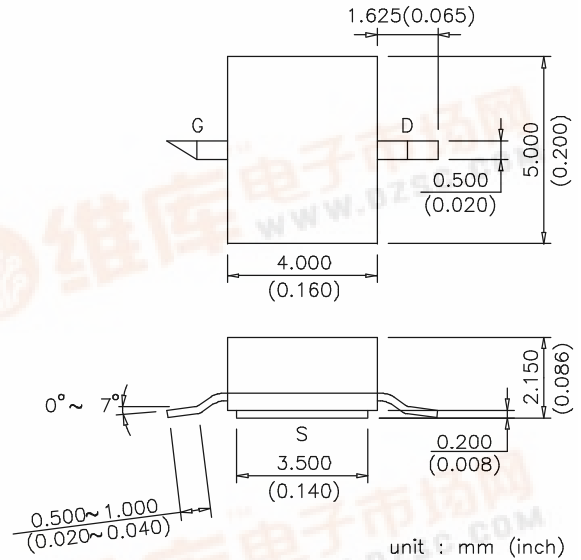
[1] Hexawave recommends that the quiescent drain-source operating voltage (V_{DS}) should not exceed 10 Volts.

[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	1500	2000	2600
V_P	Pinch-off Voltage	$V_{DS}=3V, I_{DS}=100$ mA	V	-3.5	-2.0	-1.5
g_m	Transconductance	$V_{DS}=3V, I_{DS}=1000$ mA	mS	-	1000	-
R_{th}	Thermal Resistance	Channel to Case	°C/W	-	7	10
P_{1dB}	Output Power @1dB Gain	$V_{DS}=10V$	dBm	36.0	37.0	-
G_L	Linear Power Gain	$I_{DS}=0.5I_{DSS}$	dB	10.5	11.5	-
PAE	Power-added Efficiency ($P_{out} = P_{1dB}$)		%	-	40	-
IP_3	Third-order Intercept Point ^[3]		dBm	-	48	-

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



RA Package (Ceramic)

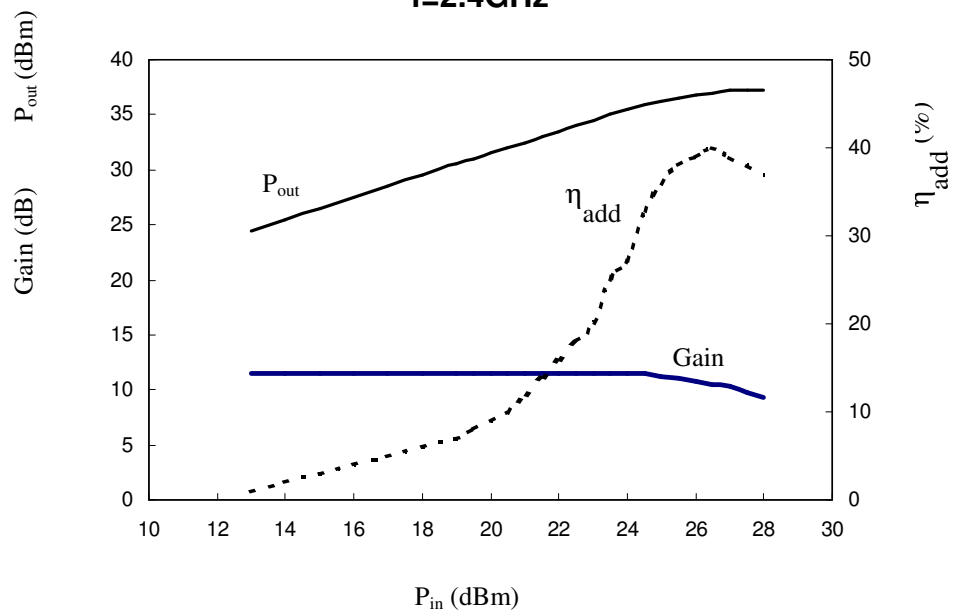


Typical Performance at 25°C

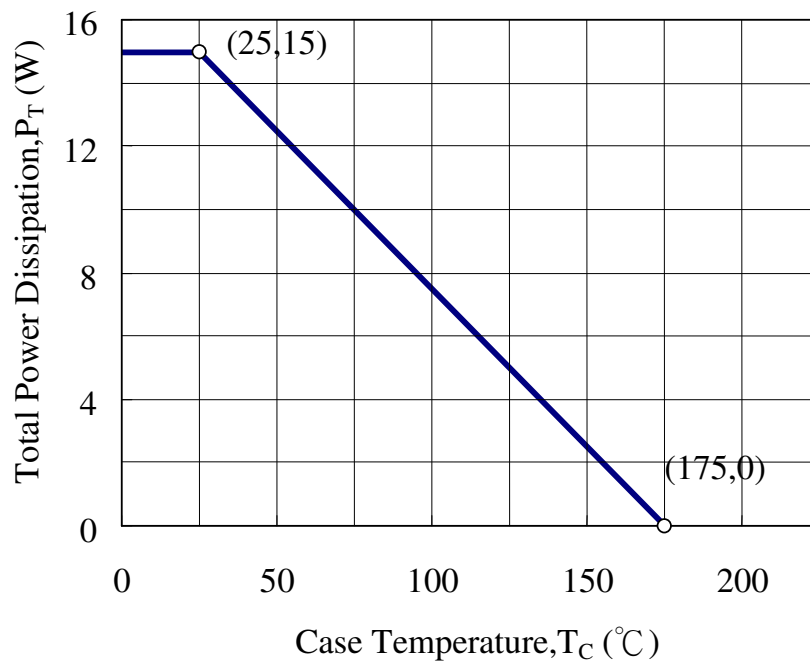
Output Power, Efficiency & Gain vs. Input Power

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

f=2.4GHz



Power Derating Curve



Typical S-Parameters (Common Source, $T_A=25^\circ\text{C}$, $V_{DS}=10\text{V}$, $I_{DS}=0.5I_{DSS}$)

Freq (GHz)	S₁₁		S₂₁		S₁₂		S₂₂	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
0.5	0.957	-152.240	5.836	93.270	0.022	7.790	0.516	-169.860
0.6	0.958	-158.920	4.912	88.030	0.022	5.880	0.518	-171.630
0.7	0.955	-163.540	4.247	83.630	0.022	3.140	0.519	-172.930
0.8	0.959	-167.680	3.740	79.260	0.023	1.820	0.523	-173.550
0.9	0.959	-171.130	3.347	75.390	0.022	-0.260	0.525	-174.270
1.0	0.964	-174.110	3.008	71.960	0.022	-2.230	0.528	-174.840
1.1	0.967	-176.660	2.738	68.580	0.022	-4.410	0.532	-175.180
1.2	0.970	-178.890	2.499	65.350	0.022	-4.110	0.539	-175.490
1.3	0.974	179.350	2.306	62.250	0.021	-4.020	0.545	-175.950
1.4	0.976	177.410	2.135	59.190	0.021	-4.810	0.548	-176.090
1.5	0.980	175.900	1.979	56.240	0.021	-6.110	0.554	-176.720
1.6	0.980	174.170	1.852	53.480	0.021	-6.420	0.560	-176.980
1.7	0.982	172.590	1.733	50.650	0.021	-7.700	0.568	-177.250
1.8	0.984	171.100	1.632	47.870	0.021	-8.290	0.574	-177.590
1.9	0.984	169.790	1.539	45.170	0.020	-8.920	0.582	-178.040
2.0	0.983	168.610	1.459	42.660	0.020	-9.030	0.591	-178.560
2.1	0.988	167.130	1.382	39.890	0.019	-9.200	0.597	-179.020
2.2	0.982	165.970	1.311	37.480	0.020	-9.880	0.608	-179.290
2.3	0.984	164.680	1.249	34.980	0.019	-9.760	0.617	-179.570
2.4	0.983	163.500	1.191	32.690	0.019	-10.090	0.623	-179.900
2.5	0.979	162.420	1.141	30.440	0.019	-10.290	0.632	179.530
2.6	0.980	160.900	1.092	28.060	0.019	-10.390	0.639	179.250
2.7	0.979	160.110	1.047	25.800	0.019	-9.250	0.647	178.880
2.8	0.976	158.800	1.006	23.550	0.018	-10.060	0.657	178.480
2.9	0.970	157.980	0.970	21.350	0.018	-10.510	0.666	178.050
3.0	0.971	156.720	0.932	19.290	0.018	-10.320	0.674	177.570
4.0	0.944	145.920	0.704	-1.870	0.018	-10.920	0.747	170.720
5.0	0.948	133.060	0.585	-24.040	0.019	-14.240	0.782	158.930
6.0	0.949	119.090	0.491	-46.540	0.016	-7.680	0.800	144.170
7.0	0.935	104.540	0.421	-68.180	0.020	-19.950	0.837	131.590
8.0	0.924	93.670	0.385	-85.680	0.023	-31.840	0.834	122.030
9.0	0.908	82.170	0.396	-100.370	0.036	-24.600	0.802	114.020
10.0	0.864	63.210	0.484	-121.250	0.065	-47.010	0.803	101.770