Features

- **Output Power:** P_{1dB}=31.5dBm(typ.)
- **High Gain:** G_L=16dB(typ.)
- **High Efficiency:** PAE =45%(typ.)
- **High Linearity:** IP_3=46dBm(typ.)
- **Class A or Class AB Operation**
- **Low Cost**

Description

The HWF1687RA 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.

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	3 mA
T_{CH}	Channel Temperature	175°C
T_{STG}	Storage Temperature	-65 to +175°C
P_T[2]	Power Dissipation	7.5W

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

[2] Mounted on an infinite heat sink.

Outline Dimensions

RA Package (Ceramic)

unit : mm (inch)

Electrical Specification at 25°C

Symbol	Parameters	Conditions	Units	Min.	Typ.	Max.
I_{DSS}	Saturated Drain Current	V_{DS}=3V, V_{GS}=0V	mA	500	600	900
V_P	Pinch-off Voltage	V_{DS}=3V, I_{DS}=30mA	V	-3.5	-2.0	-1.5
g_m	Transconductance	V_{DS}=3V, I_{DS}=300mA	mS	-	300	-
R_{th}	Thermal Resistance	Channel to Case	°C/W	-	15	20
P_{1dB}	Output Power @1dB Gain	V_{DS}=10V	dBm	30.5	31.5	-
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=2.4GHz	dBm	-	46	-

[3] Single carrier level 15dBm, 1 MHz apart between 2 tones, current adjusted for best IP_3
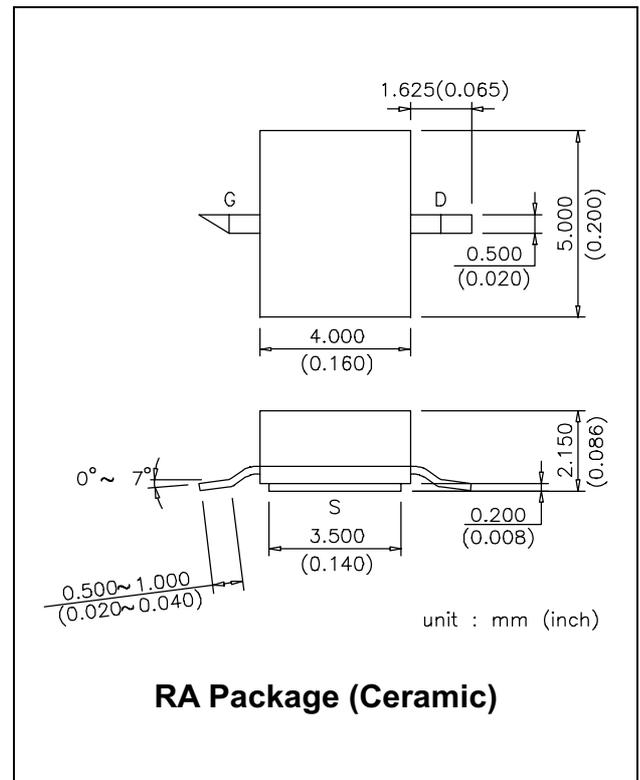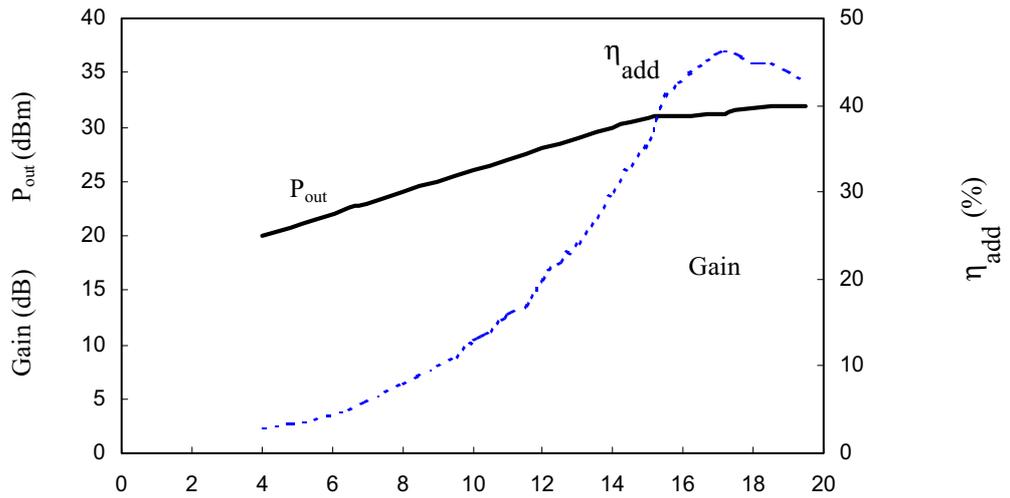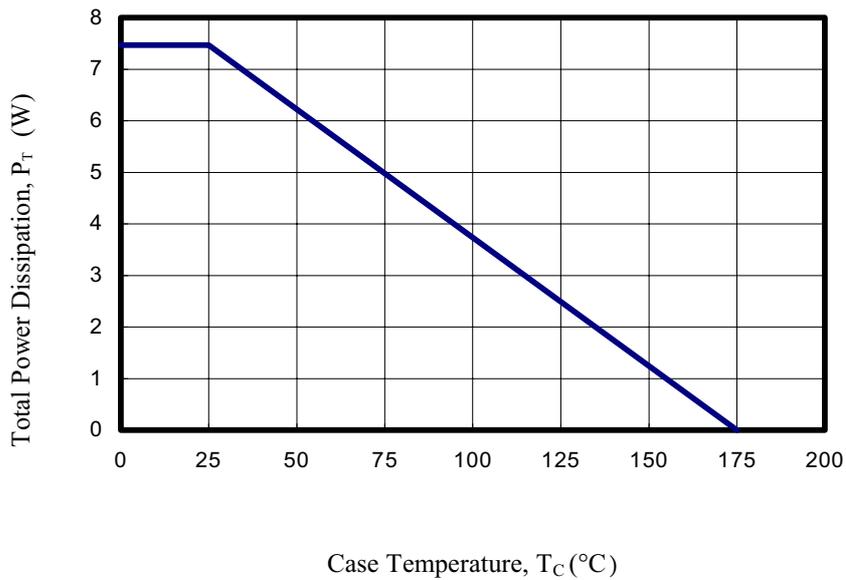
Typical Performance at 25°C

Output Power, Efficiency & Gain vs. Input Power

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

f=2.4GHz

Power Derating Curve

Case Temperature, T_C (°C)

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

Freq (GHz)	S_{11} Mag.	S_{11} Ang.	S_{21} Mag.	S_{21} Ang.	S_{12} Mag.	S_{12} Ang.	S_{22} Mag.	S_{22} Ang.
0.5	0.962	-76.42	9.456	129.85	0.016	46.86	0.307	-64.76
0.6	0.950	-88.58	8.730	121.80	0.018	40.88	0.303	-70.36
0.7	0.945	-97.49	8.066	114.76	0.019	35.92	0.301	-77.31
0.8	0.946	-106.34	7.495	108.24	0.020	30.21	0.307	-82.95
0.9	0.940	-113.98	6.963	102.31	0.021	26.13	0.314	-88.10
1.0	0.935	-120.90	6.463	96.72	0.022	22.00	0.322	-92.92
1.1	0.935	-127.15	6.016	91.58	0.022	18.06	0.330	-97.39
1.2	0.935	-132.75	5.606	86.69	0.022	14.88	0.342	-101.75
1.3	0.938	-137.60	5.243	82.22	0.022	12.46	0.349	-105.27
1.4	0.938	-142.11	4.915	77.87	0.022	9.82	0.361	-108.53
1.5	0.941	-146.30	4.609	73.75	0.022	7.72	0.371	-111.78
1.6	0.939	-150.07	4.347	69.97	0.022	4.77	0.383	-114.67
1.7	0.941	-153.83	4.098	66.10	0.022	3.83	0.395	-117.70
1.8	0.941	-157.22	3.880	62.48	0.022	1.33	0.407	-120.34
1.9	0.941	-160.17	3.675	58.95	0.022	-0.22	0.420	-122.88
2.0	0.940	-162.84	3.491	55.90	0.022	-1.94	0.431	-125.15
2.1	0.944	-165.81	3.323	52.48	0.021	-3.24	0.444	-127.46
2.2	0.939	-168.31	3.160	49.37	0.021	-4.58	0.459	-129.62
2.3	0.939	-170.93	3.006	46.27	0.021	-4.43	0.474	-131.90
2.4	0.937	-173.33	2.874	43.62	0.021	-6.73	0.484	-133.79
2.5	0.932	-175.41	2.755	40.86	0.020	-6.91	0.496	-135.56
2.6	0.932	-177.92	2.642	38.01	0.020	-10.13	0.508	-137.13
2.7	0.932	-179.77	2.539	35.38	0.020	-9.96	0.520	-138.61
2.8	0.929	178.01	2.441	32.75	0.020	-10.32	0.534	-140.20
2.9	0.923	176.42	2.356	30.28	0.020	-10.44	0.545	-141.56
3.0	0.923	174.25	2.262	27.72	0.019	-11.47	0.556	-143.17
4.0	0.893	157.12	1.726	4.61	0.019	-17.23	0.647	-156.32
5.0	0.892	138.90	1.474	-19.07	0.020	-22.31	0.690	-171.37
6.0	0.881	119.59	1.307	-43.89	0.016	-17.90	0.710	170.90
7.0	0.858	99.12	1.167	-69.47	0.023	-32.91	0.761	153.39
8.0	0.823	81.96	1.107	-91.49	0.030	-47.27	0.767	141.00
9.0	0.764	61.21	1.192	-113.45	0.043	-49.52	0.749	132.82
10.0	0.632	24.25	1.441	-143.52	0.076	-75.80	0.757	120.64