

Features

- **Output Power:** $P_{1dB}=30dBm$ (typ.)
- **High Gain:** $G_L=15dB$ (typ.)
- **High Efficiency:** $PAE=45\%$ (typ.)
- **High Linearity:** $IP_3=45dBm$ (typ.)
- **Class A or Class AB Operation**

Description

Designed for various RF and Microwave applications, the HWF1686NC is a medium power GaAs MESFET chip with 2 mm gate width and 0.7 μm gate length.

Absolute Maximum Ratings

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

* mounted on an infinite heat sink

Electrical Specifications ($T_A=25^\circ C$)

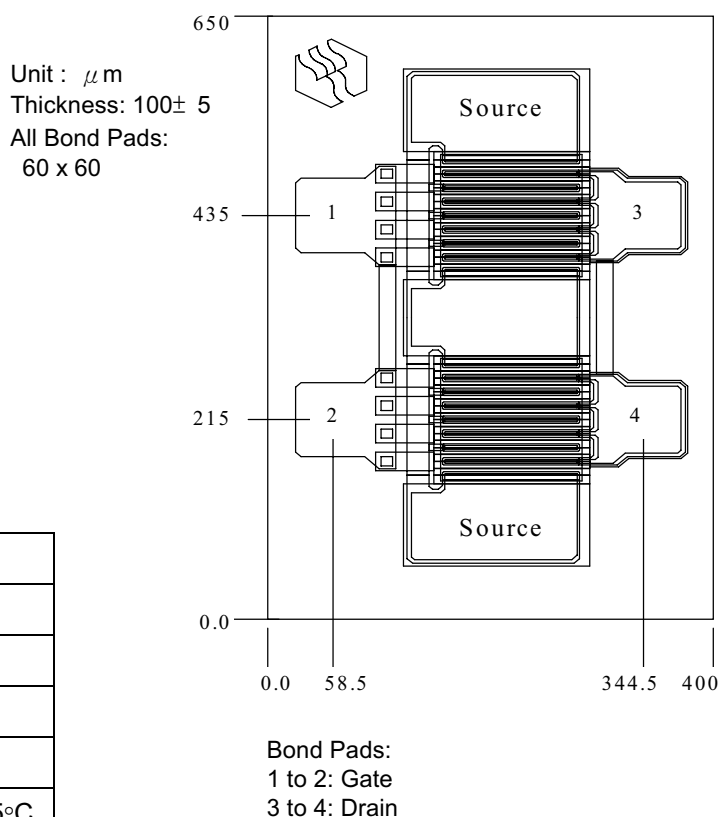
Symbol	Parameters	Conditions	Units	Min.	Typ.	Max.
I_{DSS}	Saturated Drain Current	$V_{DS}=3V, V_{GS}=0V$	mA	300	400	600
V_P	Pinch-off Voltage	$V_{DS}=3V, I_{DS}=20mA$	V	-3.5	-2.0	-1.5
g_m	Transconductance	$V_{DS}=3V, I_{DS}=200mA$	mS	-	200	-
R_{th}	Thermal Resistance	Channel to Case	°C/W	-	32	45
P_{1dB}	Output Power @1dB Gain	$V_{DS}=10V$ $I_{DS}=0.5I_{DSS}$ $f=2.4GHz$	dBm	29.0	30.0	-
G_L	Linear Power Gain		dB	14	15	-
PAE	Power-added Efficiency ($P_{out} = P_{1dB}$)		%	-	45	-
IP_3	Third-order Intercept Point*		dBm	42	45	-

*: Single carrier level 15dBm, 1 MHz apart between 2 tones, current adjusted for best IP_3

Bonding Manner

Gate, drain, pad: 1 wire on each pad
Source pad: 2 wires on each side

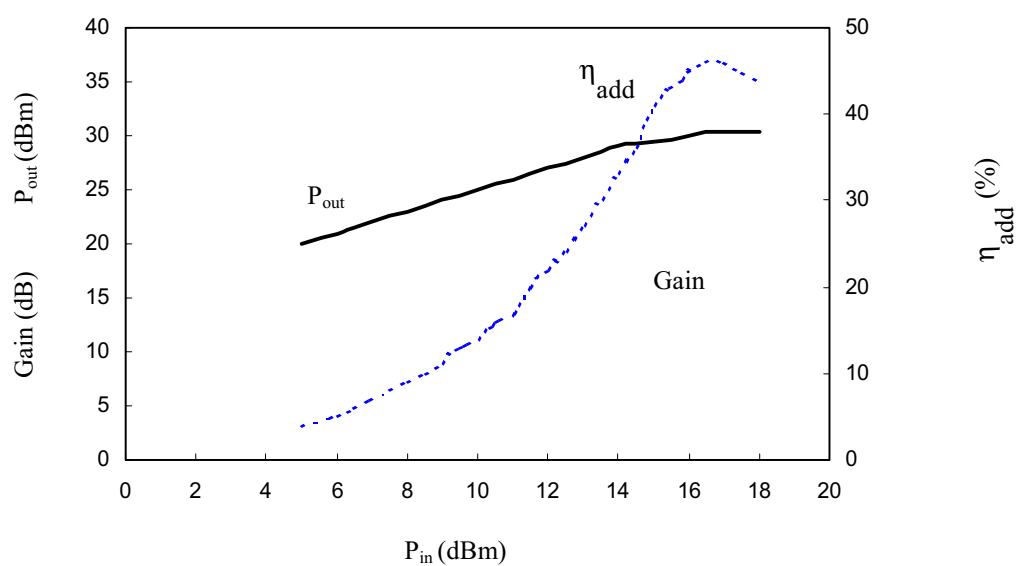
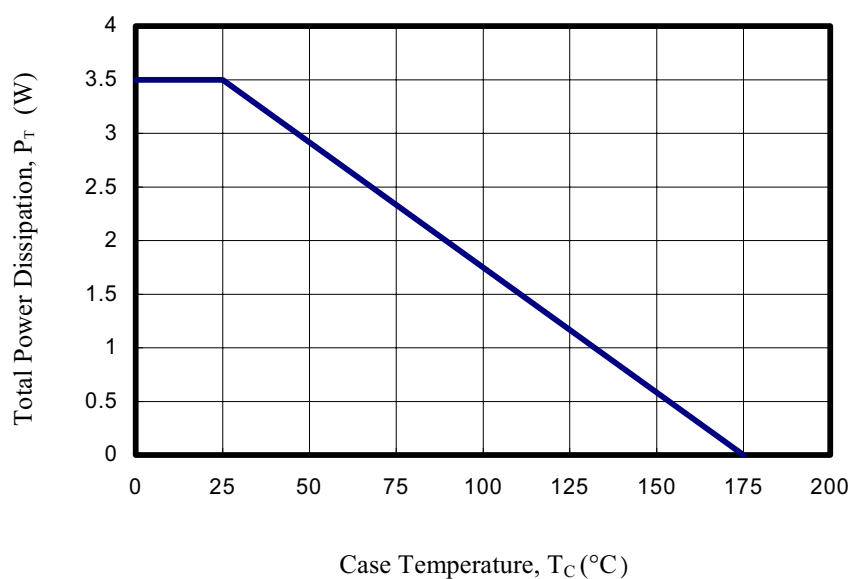
Outline Dimensions



Typical Performance ($T_A=25^\circ\text{C}$)
Output Power, Efficiency & Gain vs. Input Power

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

$$f=2.4\text{GHz}$$


Power Derating Curve


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

Freq (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.
0.50	0.941	-35.52	7.298	155.47	0.014	74.64	0.416	-13.56
0.60	0.955	-42.37	7.083	150.83	0.016	73.22	0.404	-14.52
0.70	0.945	-48.22	6.908	146.30	0.018	70.80	0.396	-16.79
0.80	0.939	-54.25	6.721	142.13	0.020	69.27	0.389	-18.49
0.90	0.913	-60.70	6.531	138.16	0.022	66.98	0.387	-20.05
1.00	0.920	-66.26	6.341	134.51	0.024	63.86	0.376	-22.07
1.10	0.905	-71.82	6.141	130.91	0.026	62.94	0.370	-23.83
1.20	0.900	-77.43	5.965	127.35	0.027	62.28	0.361	-25.76
1.30	0.888	-82.61	5.761	124.14	0.029	60.29	0.358	-27.18
1.40	0.877	-86.99	5.583	121.03	0.030	60.06	0.355	-29.51
1.50	0.866	-91.52	5.400	117.94	0.031	58.28	0.352	-31.54
1.60	0.862	-96.16	5.244	115.05	0.032	57.45	0.352	-33.25
1.70	0.849	-100.26	5.070	112.09	0.033	56.50	0.350	-35.19
1.80	0.845	-104.19	4.908	109.37	0.034	55.46	0.346	-36.50
1.90	0.834	-107.89	4.748	106.76	0.035	55.43	0.348	-37.83
2.00	0.830	-111.59	4.594	104.16	0.036	55.14	0.343	-39.01
2.10	0.824	-115.06	4.446	101.56	0.037	54.06	0.340	-40.61
2.20	0.820	-118.38	4.310	99.28	0.037	53.76	0.337	-41.73
2.30	0.816	-121.59	4.181	96.97	0.038	53.87	0.333	-42.92
2.40	0.815	-124.82	4.062	94.75	0.039	52.98	0.331	-44.47
2.50	0.808	-127.70	3.932	92.72	0.039	53.73	0.326	-45.58
2.60	0.807	-130.55	3.829	90.59	0.040	52.77	0.323	-47.57
2.70	0.805	-133.31	3.723	88.48	0.040	52.95	0.319	-49.20
2.80	0.802	-135.83	3.626	86.57	0.041	53.74	0.319	-51.10
2.90	0.801	-138.38	3.530	84.55	0.041	53.39	0.319	-52.93
3.00	0.798	-141.06	3.436	82.53	0.041	53.50	0.320	-55.13
4.00	0.791	-161.20	2.695	65.37	0.048	56.87	0.321	-70.73
5.00	0.794	-176.63	2.190	50.35	0.056	60.93	0.346	-87.83
6.00	0.806	170.78	1.822	36.65	0.066	62.96	0.385	-104.02
7.00	0.821	160.59	1.544	24.20	0.078	63.40	0.433	-117.44
8.00	0.836	151.44	1.319	12.64	0.090	61.84	0.489	-128.90
9.00	0.848	143.35	1.138	1.99	0.103	59.45	0.540	-138.51
10.00	0.859	135.83	0.989	-7.97	0.116	55.95	0.585	-147.07