Features

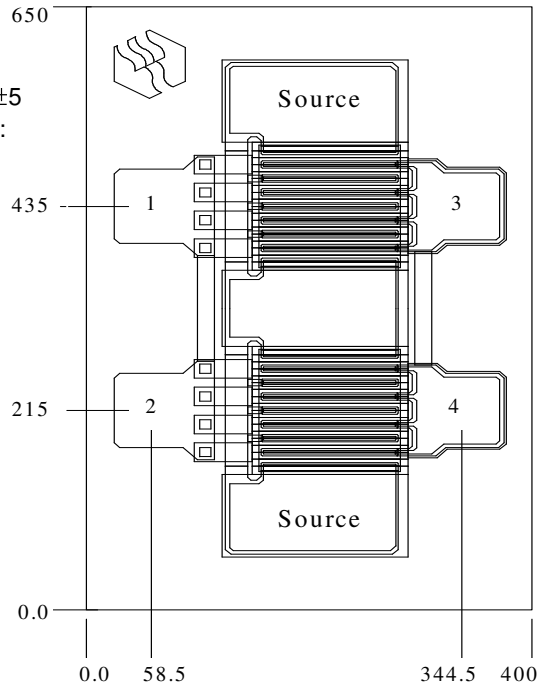
- **Output Power:** P_{1dB}=30dBm(typ.)
- **High Gain:** G_L=16dB(typ.)
- **High Efficiency:** PAE=45%(typ.)
- **High Linearity:** IP_3=45dBm(typ.)

Description

Designed for various RF and Microwave applications, the HWF1686YC is a medium power GaAs MESFET chip with 2 mm gate width and 0.7 μm gate length.

Outline Dimensions

Unit : μm
Thickness: 53±5
All Bond Pads:
60 x 60



Bond Pads:
1 to 2: Gate
3 to 4: Drain

Source electrodes are connected to the bottom of the chip by

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	5.4W

* mounted on an infinite heat sink

Electrical Specifications (T_A=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}=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	-	20	28
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*	f=2.4GHz	dBm	-	45	-

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

Bonding Manner

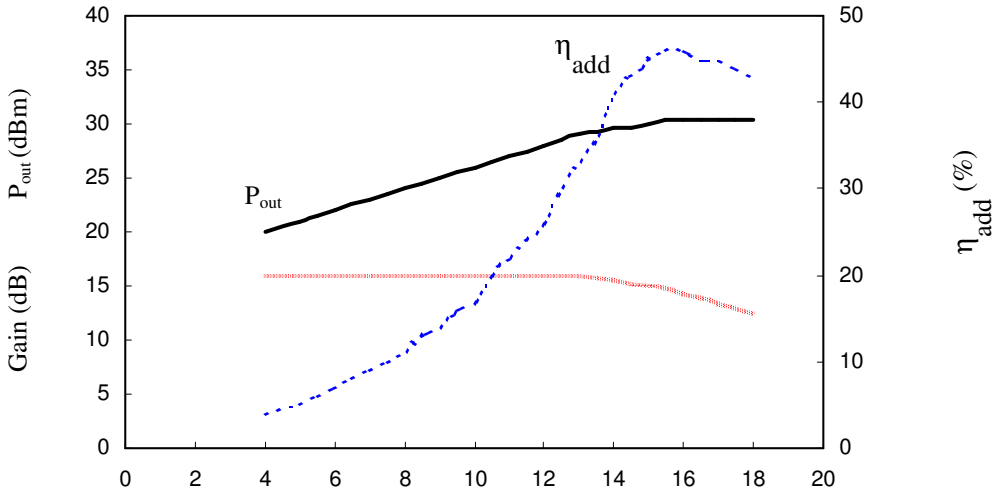
Gate, drain, pad: 1 wire on each pad
Source pad: 2 wires on each side

Typical Performance (T_A=25°C)

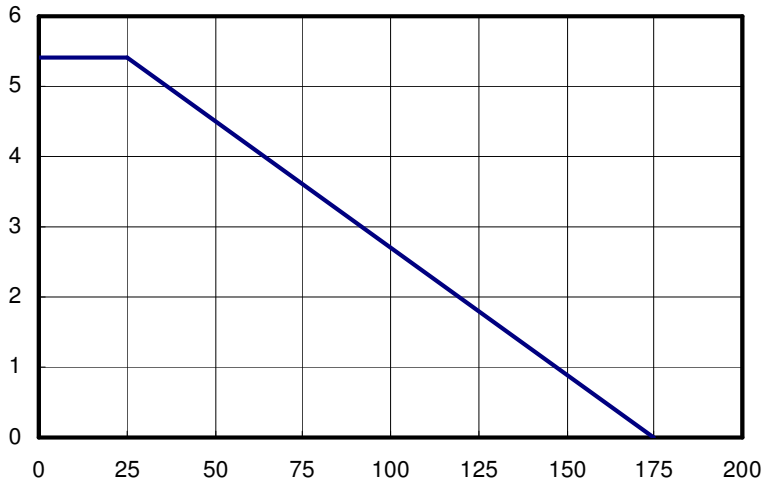
Output Power, Efficiency & Gain vs. Input Power

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

f=2.4GHz



Power Derating Curve



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	0.954	-34.67	7.226	155.21	0.014	69.81	0.447	-19.70
0.6	0.951	-43.74	6.984	150.54	0.017	67.23	0.437	-18.31
0.7	0.961	-49.94	6.840	146.64	0.019	64.68	0.429	-21.07
0.8	0.948	-56.83	6.627	142.25	0.021	61.63	0.419	-21.92
0.9	0.952	-62.89	6.439	138.64	0.022	58.12	0.413	-23.65
1.0	0.935	-68.75	6.249	134.81	0.024	56.88	0.410	-25.63
1.1	0.919	-74.49	6.062	130.93	0.026	53.94	0.402	-27.73
1.2	0.923	-79.55	5.877	127.63	0.027	51.75	0.396	-29.80
1.3	0.912	-84.11	5.683	124.29	0.028	49.51	0.392	-32.16
1.4	0.910	-88.83	5.500	121.14	0.029	47.65	0.386	-33.77
1.5	0.906	-93.24	5.323	118.15	0.030	45.96	0.384	-35.69
1.6	0.897	-97.51	5.155	115.23	0.032	44.48	0.382	-37.44
1.7	0.895	-101.56	4.985	112.39	0.032	42.75	0.376	-39.23
1.8	0.891	-105.51	4.828	109.72	0.033	40.58	0.372	-40.59
1.9	0.890	-109.19	4.675	107.11	0.033	39.47	0.369	-42.16
2.0	0.885	-112.59	4.527	104.59	0.034	38.99	0.368	-43.84
2.1	0.881	-115.71	4.377	102.10	0.034	37.41	0.363	-45.32
2.2	0.882	-119.35	4.247	99.79	0.035	36.06	0.363	-47.31
2.3	0.877	-122.09	4.127	97.46	0.035	35.40	0.361	-48.47
2.4	0.875	-124.98	4.004	95.30	0.035	34.21	0.359	-50.11
2.5	0.872	-127.84	3.884	93.16	0.035	33.53	0.356	-51.75
2.6	0.872	-130.32	3.770	91.12	0.036	32.95	0.354	-53.12
2.7	0.871	-132.93	3.667	88.97	0.036	32.08	0.354	-54.99
2.8	0.868	-135.21	3.563	87.05	0.036	31.42	0.352	-56.45
2.9	0.868	-137.65	3.468	85.04	0.036	30.69	0.354	-58.18
3.0	0.866	-139.91	3.376	83.18	0.036	30.10	0.351	-59.75
4.0	0.864	-158.30	2.637	65.91	0.035	28.12	0.360	-76.06
5.0	0.868	-171.82	2.131	50.92	0.034	29.66	0.387	-91.99
6.0	0.875	177.44	1.762	37.01	0.034	33.69	0.429	-106.97
7.0	0.885	168.64	1.482	24.35	0.035	37.70	0.479	-120.20
8.0	0.893	161.14	1.256	12.37	0.037	40.81	0.533	-131.61
9.0	0.900	154.58	1.076	1.23	0.039	41.73	0.587	-141.27
10.0	0.906	148.43	0.929	-9.39	0.042	40.54	0.632	-149.91