



HMF-06020

Power Optimized GaAs FET
2–14 GHz

PRODUCT DATA

Features

- +24.5 dBm Output Power with 7.5 dB Associated Gain at 8 GHz
- Power Optimized Design Provides High Power-Added Efficiency
- Large Cross Section Ti/Pt/Au Gates Enhance Durability and Reliability
- Chip Devices are Selected from Standard *Military Grade* Wafers
- Hermetic Metal/Ceramic Package Suitable for Hi-Rel Applications
- Custom Electrical Test and Screening Available for Source Control Drawings

Description

The HMF-06020 is a packaged version of the HMF-06000. The chip is a 600 μm n-channel MESFET with 0.5 μm gate length, utilizing Harris Microwave's power optimized P5 process. The HMF-06000 active layer is formed by ion implantation. Ti/Pt/Au gate metallization and large "T" cross section minimize parasitic resistance while providing high reliability and ruggedness for RF overdrive. Ohmic metallization is Au/Ge/Ni.

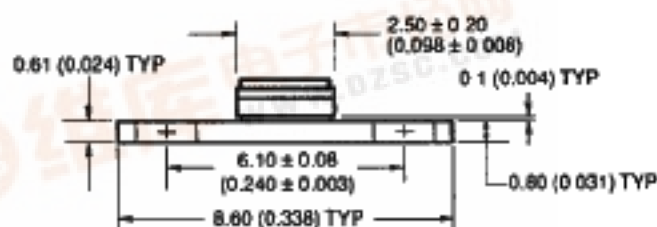
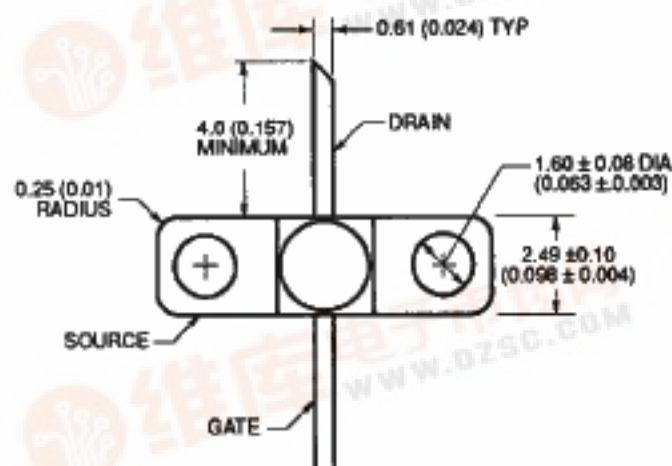
Assembly techniques complement the ruggedness of the chip. Eutectic die attach, thermocompression wedge bonding with gold wire, and a 100 mil hermetically sealed metal/ceramic package make the HMF-06020 suitable for the most demanding applications.

The chip devices are selected from Harris Microwave's *Military Grade* wafers, using 100% on-wafer probe data. The assembly process includes pre-cap visual inspection and 100% leak testing. Electrical tests include DC and RF performance to the Electrical Specifications listed.

Standard shipping containers are conductive Gel-Paks with conductive foam liners, sealed in metallized bags for additional ESD protection. When specified by Source Control Drawing, the HMF-06020 can be supplied with 100% screening and Quality Conformance Inspection, such as described in MIL-S-19500. Customers with special electrical test or screening requirements should contact the factory.

Package Outline

FET Package Type 20



Dimensions in millimeters (inches)

RF Electrical Specifications at $T_A = 25^\circ\text{C}$ ($V_{DS} = 8.0\text{ V}$, $I_{DS} = 50\% I_{DSS}$)

SYMBOL	PARAMETER	FREQ	UNITS	MIN	TYP	MAX
P_{1dB}	Output Power at 1dB Gain Compression	4 GHz 8 GHz 12 GHz	dBm	23.5	24.5 24.5 24.5	
G_{1dB}	1dB Compressed Gain	4 GHz 8 GHz 12 GHz	dB	6.5	13.0 7.5 5.5	
MAG	Maximum Available Gain	8 GHz	dB		9.5	
P_{MAG}	Output Power at MAG Tuning	8 GHz	dBm		20.5	

NOTE: Because Maximum Available Gain is not formally defined from the S-Parameters at some frequencies, values shown are Maximum Tuned Gain.

DC Electrical Specifications at $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETERS AND TEST CONDITIONS	UNITS	MIN	TYP	MAX
I_{DSS}	Saturated Drain Current, $V_{DS} = 3.0\text{ V}$, $V_{GS} = 0\text{ V}$	mA	120	160	200
V_P	Pinch Off Voltage, $V_{DS} = 3.0\text{ V}$, $I_{DS} = 2.0\text{ mA}$	V	-4.5	-3.5	-2.0
g_m	Transconductance, $V_{DS} = 3.0\text{ V}$, $V_{GS} = 0\text{ to } -0.5\text{ V}$	mS		70	

Product Ratings

SYMBOL	PARAMETER	MAXIMUM OPERATING CONDITIONS	
		RECOMMENDED	ABSOLUTE
V_{DS}	Drain to Source Voltage	+10.0 V	+14.0 V
V_{GS}	Gate to Source Voltage	-6.0 V	-8.0 V
T_{CH}	Channel Temperature, Operating	+180°C	+250°C
T_{STG}	Storage Temperature	-65°C to +180°C	-65°C to +250°C

NOTE: Permanent damage may result from operation at conditions beyond absolute maximum ratings.

Refer to Application Note 201 for assembly recommendations.

Typical S-Parameters ($V_{DS} = 8.0\text{ V}$, $I_{DS} = 50\% I_{DSS}$)

FREQ (GHz)	S_{11}		S_{21}			S_{12}			S_{22}	
	MAG	ANG	dB	MAG	ANG	dB	MAG	ANG	MAG	ANG
2.0	.934	-70.9	10.04	3.176	120.1	-25.68	.052	40.6	.568	-49.6
3.0	.893	-98.4	8.87	2.778	96.9	-24.01	.063	23.1	.580	-66.8
4.0	.860	-119.6	7.50	2.370	74.9	-23.10	.070	5.8	.570	-89.2
5.0	.853	-139.8	6.51	2.115	54.6	-22.50	.075	-7.7	.571	-104.1
6.0	.838	-158.4	5.23	1.826	36.3	-22.50	.075	-21.1	.625	-117.6
7.0	.822	-172.9	4.16	1.614	19.3	-23.22	.069	-33.0	.632	-132.6
8.0	.821	175.7	3.19	1.444	3.3	-23.88	.064	-40.7	.630	-145.2
9.0	.818	165.2	2.40	1.318	-9.8	-24.15	.062	-40.3	.645	-155.3
10.0	.815	154.1	1.87	1.240	-23.5	-23.88	.064	-45.8	.661	-168.7
11.0	.807	142.2	1.45	1.182	-37.0	-23.88	.064	-57.6	.684	175.5
12.0	.793	131.1	1.13	1.139	-52.1	-25.51	.053	-61.2	.730	168.0
13.0	.780	120.0	0.90	1.109	-64.2	-24.88	.057	-51.1	.715	161.3
14.0	.774	106.9	0.84	1.102	-78.6	-23.22	.069	-55.2	.691	155.4