



# SMF-06020

Samsung Microwave Semiconductor

## Power Optimized GaAs FET

2-14 GHz

### Description

The SMF-06020 is a packaged version of the SMF-06000. The chip is a 600  $\mu\text{m}$  n-channel MESFET with 0.5  $\mu\text{m}$  gate length, utilizing Samsung Microwave's power optimized P5 process. The SMF-06000 active layer is formed by ion implantation. Ti/Pt/Au gate metalization 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 SMF-06020 suitable for the most demanding applications.

The chip devices are selected from Samsung Microwave's Military Grade wafers, using 100% on-wafer DC 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.

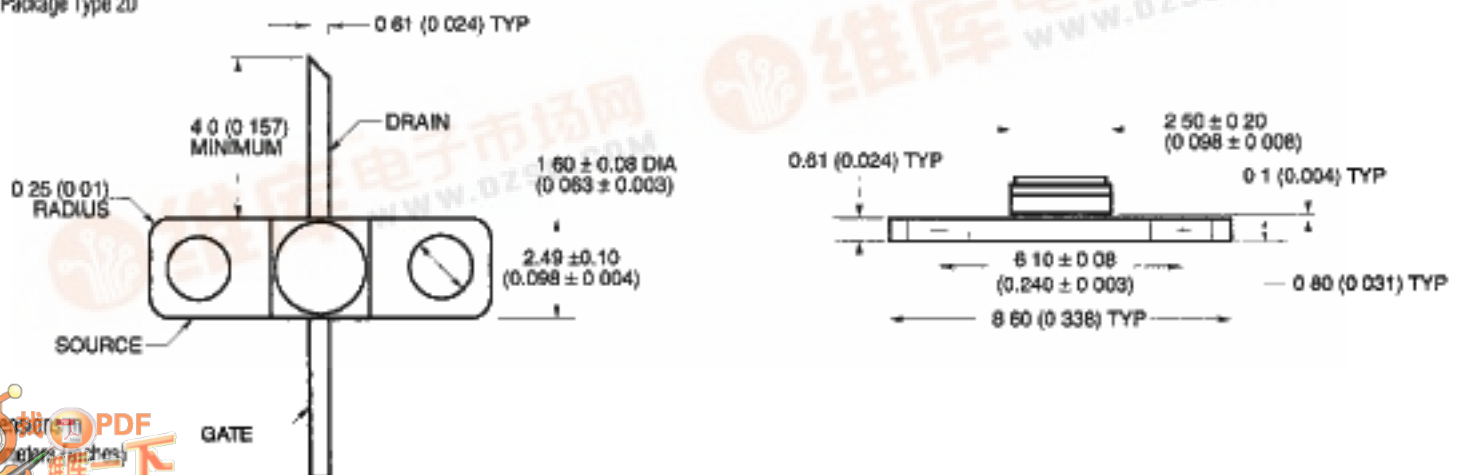
Standard shipping containers are conductive Gel-Paks with conductive foam liners, sealed in metallized bags for additional ESD protection. When specified by Source Control Drawing, the SMF-06020 can be supplied with 100% screening and Quality Conformance Inspection, such as described in MIL-S-19500.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

### 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

### Package Outline

FET Package Type 20



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

Symbol	Parameter	Frequency	Units	Minimum	Typical	Maximum
$P_{1dB}$	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	Minimum	Typical	Maximum
$I_{DSS}$	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, $V_{DS} = 3.0\text{ V}$ , $V_{GS} = 0$ 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

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

Frequency (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	-86.8
4.0	850	-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	1.828	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	-62.1	-25.51	.053	-61.2	730	188.0
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	.068	-65.2	691	155.4