SAMSUNG ELECTRONICS

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 µm n-channel MESFET with 0.5 µm gate length, utilizing Samsung Microwave's power optimized P5 process. The SMF-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 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.

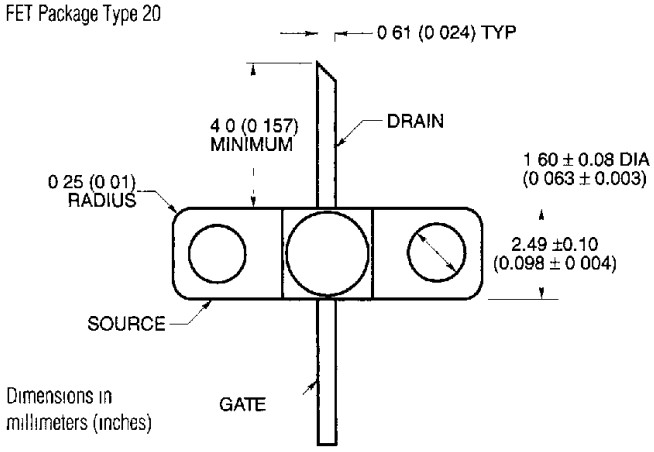
Standard shipping containers are conductive Gel-Paks with conductive foam liners, sealed in metallized bags for additional ESD protection. When specified by Source Control Drawing, the SMF-06020 can be supplied with 100% screening and Quality Conformance Inspection, such as described in MIL-S-19500.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

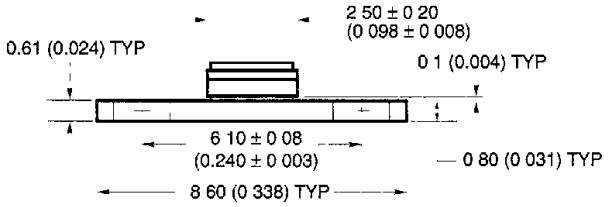
Features

- +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°C (V_{DS} = 8.0 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°C

Symbol	Parameters and Test Conditions	Units	Minimum	Typical	Maximum
I_{DSS}	Saturated Drain Current, V_{DS} = 3 0 V, V_{GS} = 0 V	mA	120	160	200
V_P	Pinch Off Voltage, V_{DS} = 3.0 V, I_{DS} = 2 0 mA	V	–4 5	–3 5	–2 0
g_m	Transconductance, V_{DS} = 3 0 V, V_{GS} = 0 to –0 5 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 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	–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