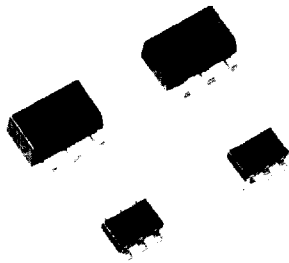


NEW DEVICE

GaAs Devices for Digital Mobile Communications — Ideal for Second-generation Cordless Telephones



FEATURES AND FUNCTIONS

- Meets next-generation digital communications systems
- Low operating voltage enables higher efficiency
- Meets surface mounting (SMP2001 and SPF2020)

- Operates with ± 3 V power supply
- Achieves input-output characteristics with good linearity

■ Features of the SPF2020 (GaAs FET)

- Ideal for the final stage of amplifiers in second-generation cordless telephones
- Operates with drain voltage $V_{DS} = 3$ V
- Achieves power-added efficiency of 35%

■ Features of the SPM2001 (GaAs MMIC)

- Ideal for the driver stage of amplifiers in second-generation cordless telephones

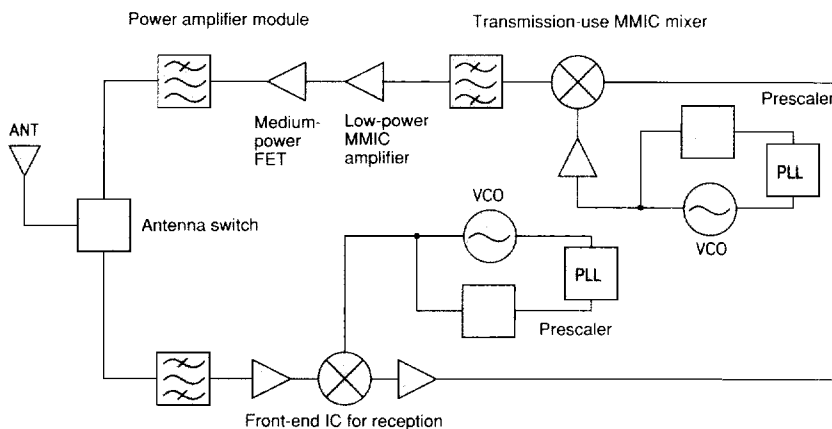
OVERVIEW

As mobile communications media are on the threshold of an advance from analog to digital, Sanyo has been quick to perceive the wave of change to new media and new communications, and has developed GaAs devices for digital mobile communications, supporting digital communications systems that offer big potential and widespread possibilities.

■ Product Lineup and Main Specifications

Devices	Conditions	Specifications
Low-power MMIC amplifier SPM2001 (ES completed)	$f = 1.9$ GHz $V_{DO} = \pm 3$ V, Operating current 40 mA	P1 dB > 12 dBm, $G_L > 12$ dB
Medium-power MESFET SPF2020 (ES completed)	$V_{DS} = 3$ V, $I_{DS} = 160$ mA	P1 dB > 22 dBm, $GL > 12$ dB, $n_{add} > 35\%$
Medium-power MESFET SPG3 (ES: December 1993)	$f = 1.5$ GHz $V_{DS} = 6$ V, $I_{DS} = 300$ mA	P1 dB > 24 dBm, $G_L > 16$ dB
Medium-power MESFET SPG4 (ES: December 1993)	$V_{DS} = 6$ V, $I_{DS} = 1500$ mA	P1 dB > 32 dBm, $G1$ dB > 10 dB

Power amplifier modules	Conditions/Specifications
1.9 GHz power amplifier module SPA1921 (ES: mid-1994)	Under development
1.5 GHz power amplifier module SPA1531 (ES: mid-1994)	



GaAs devices for 1.9 GHz and 1.5 GHz support are currently under development.

Sample RF circuit application

■ SPM2001 (GaAs MMIC)

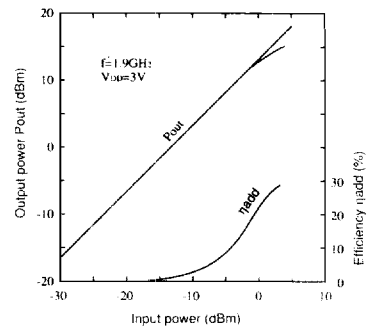
◆ Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Rating	Unit
Supply voltage	V _{DD}	5	V
Gate voltage	V _{GG}	-3	V
Allowable power dissipation	P _T	0.25	W
Storage temperature	T _{stg}	-55 to 150	°C
Channel temperature	T _{ch}	150	°C

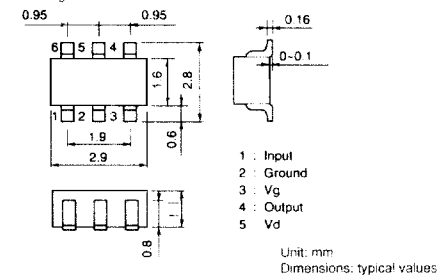
◆ Electrical Characteristics at Ta = 25°C

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Drain current	I _D	V _{DD} = 3 V		40		mA
Output power at 1 dB gain compression	P _o (1 dB)	V _{DD} = 3 V, f = 1.9 GHz		12		dBm
Linear power gain at 1 dB gain compression	G (1 dB)			12		dB
VSWR (input)				2.5		
VSWR (output)				2.0		
2nd and 3rd harmonics				30		

Input power vs. output power characteristics



(Package: CP6)



Unit: mm
Dimensions: typical values

■ SPF2020 (GaAs FET)

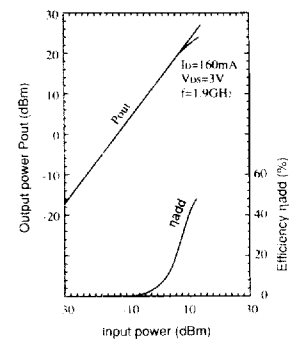
◆ Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Rating	Unit
Gate-source voltage	V _{GSO}	-7	V
Gate-drain voltage	V _{GDO}	-7	V
Drain current	I _D	500	mA
Allowable power dissipation	P _T	0.5 (1.0*)	W
Storage temperature	T _{stg}	-55 to 150	°C
Channel temperature	T _{ch}	150	°C

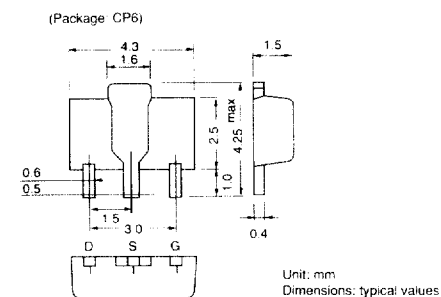
* When mounted on ceramic board (250 mm² × 0.8 mm)

◆ Electrical Characteristics at Ta = 25°C

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Saturation drain current	I _{DSS}	V _{DS} = 3 V, V _{GS} = 0 V		400		mA
Cut-off voltage	V _{GS(off)}	V _{DS} = 3 V, I _D = 100 μA	-1.5	-2.3	-3.0	V
Mutual conductance	g _m	V _{DS} = 3 V, I _D = 160 mA		250		ms
Gate-source breakdown voltage	V _{(BR)GSO}	I _G = -100 μA	-7			V
Gate-drain breakdown voltage	V _{(BR)GDO}	I _G = -100 μA	-7			V
Output power at 1 dB gain compression	P _o (1 dB)	V _{DS} = 3 V, I _D = 160 mA f = 1.9 GHz		22		dBm
Linear power gain at 1 dB gain compression	G (1 dB)			12		dB
Power-added efficiency	η _{add}			35		%



Input power vs. output power characteristics
(Package: CP6)



Unit: mm
Dimensions: typical values