

Samsung Microwave Semiconductor

April 1996

## Medium Power GaAs FET

800 - 1000 MHz

### Preliminary

#### Description

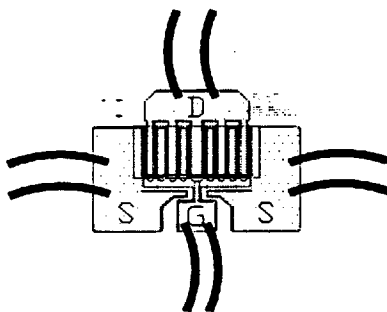
The CS-500200 is a 1500  $\mu\text{m}$  n-channel MESFET with 1  $\mu\text{m}$  gate length, that is processed with Samsung Microwave's power optimized P20 process. Ti/PV/Au gate metallization, silicon nitride passivation, Au plated, and 100  $\mu\text{m}$  chip thickness provide reliable and rugged performance even under high power RF overdrive conditions.

Specially designed doping profile is used for the device to produce high output power with high power added efficiency and linearity at 4.7V and 20 mA bias. Large gold bond pads are provided for ease of automated assembly techniques. CS-500200 is specially designed for commercial portable cellular phone and ISM band wireless applications.

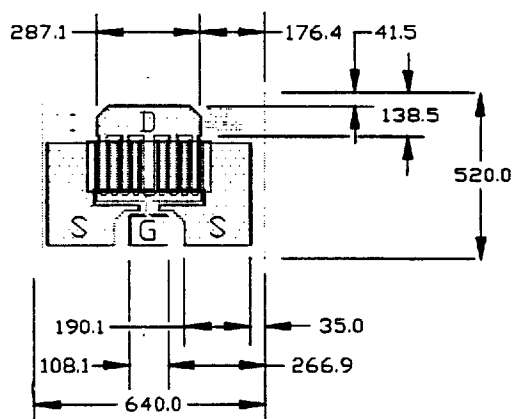
#### Features (Typical)

- 4.7 V operation
- +20.5 dBm output power at 1.0 dB compression with 18.0 dB associated gain at 0.84 GHz and at 4.7V and 20 mA bias
- Power optimized design provides high power-added efficiency (55% at 800MHz)
- 32.0 dBm Third Order Intercept
- High breakdown voltage

**Bonding Diagram**



**Device Outline**



**RF Electrical Specifications at  $T_A = 25^\circ\text{C}$ , ( $V_{DS} = 4.7\text{ V}$ ,  $I_{DS} = 20\text{ mA}$ ,  $f=0.84\text{ GHz}$ )**

Symbol	Parameter	Units	Minimum	Typical	Maximum
$P_{OUT}$	Output Power at 7dBm Input Power	dBm		22.5	
$P_{1dB}$	Output Power at 1dB Compression Point	dBm		20.5	
$G_{1dB}$	Gain at 1dB Compressed Point	dB		14.0	
$IP_3$	Two-tone, Third-order Intercept, Output (Delta Frequency = 1MHz)	dBm		32.0	
PAE	Power Added Efficiency at $P_{1dB}$	%		55.0	

Note: The PAE is measured at the efficiency optimized point with input power of +7dBm.  
The  $IP_3$  is measured at the same efficiency optimized load match as PAE.

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

Symbol	Parameter	Units	Minimum	Typical	Maximum
$I_{DSS}$	Saturation Current, $V_{DS}=3\text{V}$ , $V_{GS}=0\text{V}$	mA	320	385	450
$V_P$	Pinchoff Voltage, $V_{DS}=3\text{V}$ , $I_{DS}=1\text{mA/mm}$	V	-3.00	-2.45	-1.90
$g_m$	Transconductance, $V_{DS}=3\text{V}$ , $I_{DS}=10\% I_{DSS}$	mS	90	140	
$BV_{GS0}$	Gate-Source Breakdown Voltage, $I_{GS}=0.1\text{ mA}$	V	15	18	
$BV_{GD0}$	Gate-Drain Breakdown Voltage, $I_{dG}=0.1\text{ mA}$	V	18	20	
$R_{th}$	Thermal Resistance	$^\circ\text{C/W}$		60	

**Absolute Maximum Ratings**

Symbol	Parameter	Units	Rating
$V_{DS}$	Drain to Source Voltage	Volts	8
$V_{GS}$	Gate to Source Voltage	Volts	-6 to 0
$T_{CH}$	Channel Temperature	$^\circ\text{C}$	+175
$T_{STG}$	Storage Temperature	$^\circ\text{C}$	-65 to +150

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

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