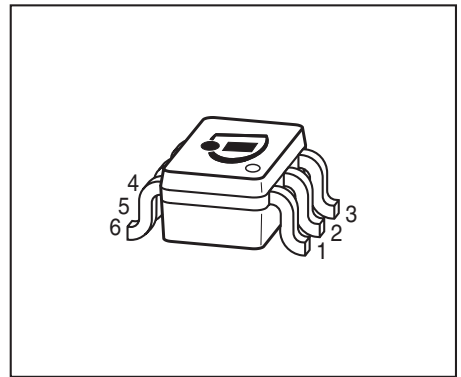
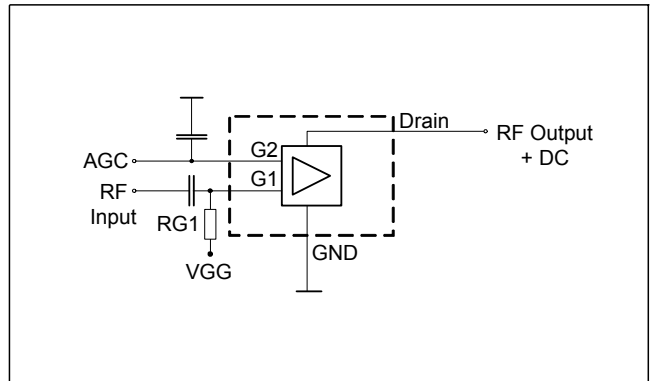
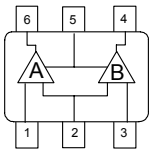


**Dual N-Channel MOSFET Tetrode**

- Low noise gain controlled input stages for UHF and VHF -tuners e. g. (NTSC, PAL)
- Two AGC amplifiers in one single package
- Integrated gate protection diodes
- Low noise figure, high AGC-range
- Improved cross modulation at gain reduction
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101


**BG5120K**


**ESD (Electrostatic discharge) sensitive device, observe handling precaution!**

Type	Package	Pin Configuration						Marking
BG5120K	SOT363	1=G1*	2=G2	3=G1**	4=D**	5=S	6=D*	K1

\* For amp. A; \*\* for amp. B

180° rotated tape loading orientation available

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	8	V
Continuous drain current	$I_D$	20	mA
Gate 1/ gate 2-source current	$\pm I_{G1/2SM}$	1	
Gate 1/ gate 2-source voltage	$\pm V_{G1/G2S}$	6	V
Total power dissipation	$P_{tot}$	200	mW
Storage temperature	$T_{stg}$	-55 ... 150	°C
Channel temperature	$T_{ch}$	150	

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Channel - soldering point <sup>1)</sup>	$R_{thchs}$	$\leq 280$	K/W

<sup>1)</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

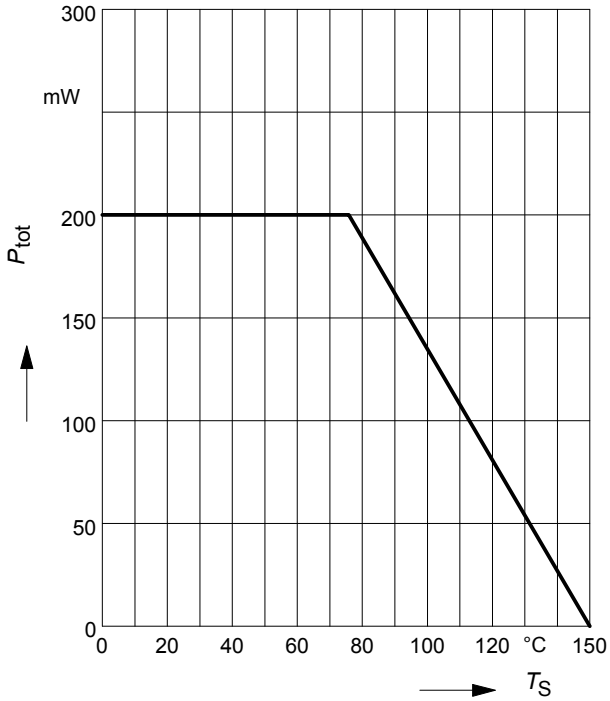
**DC Characteristics**

Drain-source breakdown voltage $I_D = 10 \mu\text{A}$ , $V_{G1S} = 0$ , $V_{G2S} = 0$	$V_{(BR)DS}$	12	-	-	V
Gate1-source breakdown voltage $+I_{G1S} = 10 \text{mA}$ , $V_{G2S} = 0$ , $V_{DS} = 0$	$+V_{(BR)G1SS}$	6	-	15	
Gate2-source breakdown voltage $+I_{G2S} = 10 \text{mA}$ , $V_{G1S} = 0$ , $V_{DS} = 0$	$+V_{(BR)G2SS}$	6	-	15	
Gate1-source leakage current $V_{G1S} = 6 \text{V}$ , $V_{G2S} = 0$ , $V_{DS} = 0$	$+I_{G1SS}$	-	-	50	$\mu\text{A}$
Gate2-source leakage current $V_{G2S} = 6 \text{V}$ , $V_{G1S} = 0$ , $V_{DS} = 0$	$+I_{G2SS}$	-	-	50	nA
Drain current $V_{DS} = 5 \text{V}$ , $V_{G1S} = 0$ , $V_{G2S} = 4 \text{V}$	$I_{DSS}$	-	-	10	$\mu\text{A}$
Drain-source current $V_{DS} = 5 \text{V}$ , $V_{G2S} = 4 \text{V}$ , $R_{G1} = 100 \text{k}\Omega$	$I_{DSX}$	-	12	-	mA
Gate1-source pinch-off voltage $V_{DS} = 5 \text{V}$ , $V_{G2S} = 4 \text{V}$ , $I_D = 20 \mu\text{A}$	$V_{G1S(p)}$	-	0.7	-	V
Gate2-source pinch-off voltage $V_{DS} = 5 \text{V}$ , $I_D = 20 \mu\text{A}$ , $V_{G1S} = 2 \text{V}$	$V_{G2S(p)}$	-	0.6	-	

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

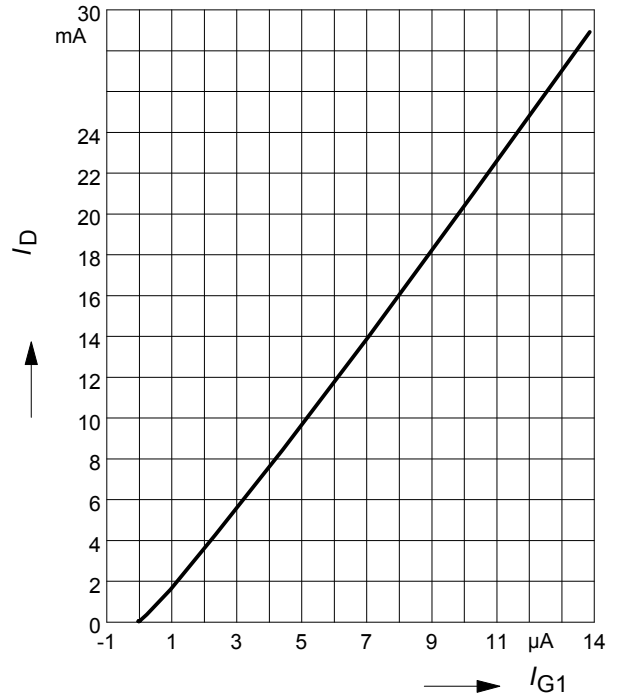
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics</b> $V_{DS}=5\text{V}$ , $V_{G2S}=4\text{V}$ , ( $I_D=10\text{mA}$ ) (verified by random sampling)					
Forward transconductance	$g_{fs}$	-	30	-	mS
Gate1 input capacitance $f = 10\text{ MHz}$	$C_{g1ss}$	-	2.2	-	pF
Output capacitance $f = 10\text{ MHz}$	$C_{dss}$	-	1.4	-	
Power gain 800 MHz 45 MHz	$G_p$	- -	23 30	- -	dB
Noise figure 800 MHz 45 MHz , 45 MHz	$F$	- -	1.1 0.7	- -	dB
Gain control range $V_{G2S} = 4 \dots 0\text{ V}$ , $f = 800\text{ MHz}$	$\Delta G_p$	45	-	-	
Cross-modulation $k=1\%$ , $f_W=50\text{MHz}$ , $f_{unw}=60\text{MHz}$ AGC = 0 dB AGC = 10 dB AGC = 40 dB	$X_{mod}$	90 - 96	- 87 100	- - -	dB $\mu$ V

Total power dissipation  $P_{tot} = f(T_S)$

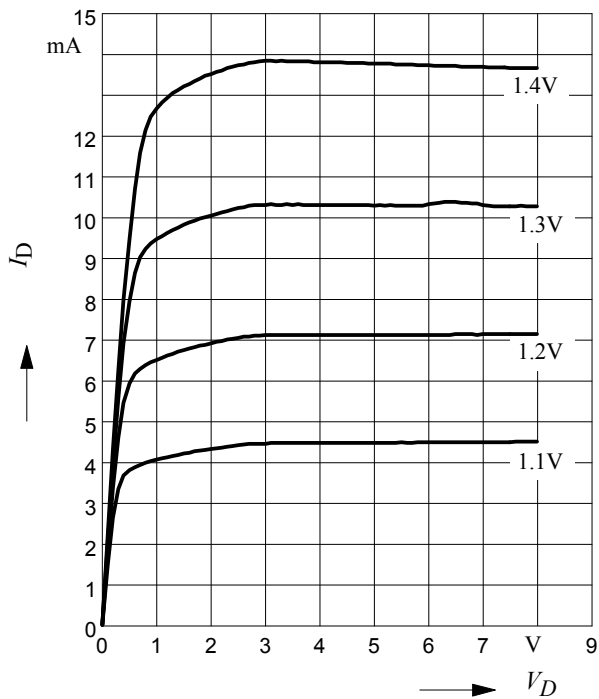


Drain current  $I_D = f(I_{G1})$

$V_{G2S} = 4V$



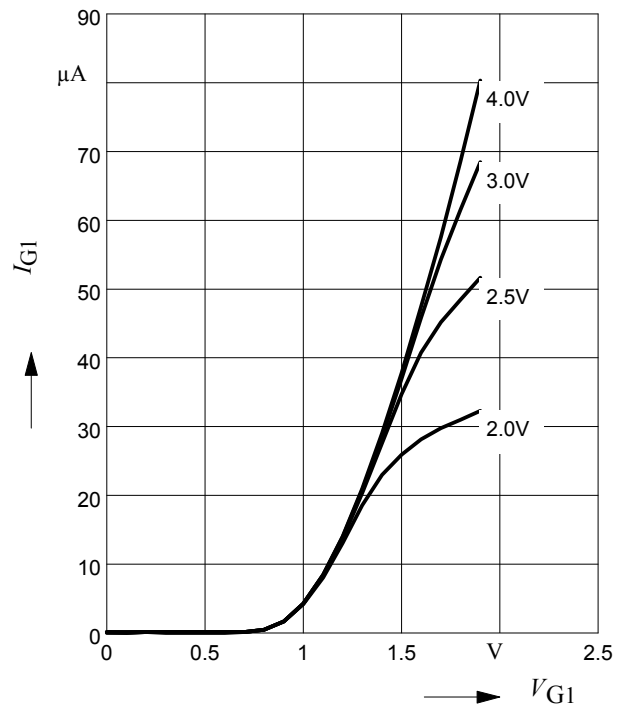
Output characteristics  $I_D = f(V_{DS})$



Gate 1 current  $I_{G1} = f(V_{G1S})$

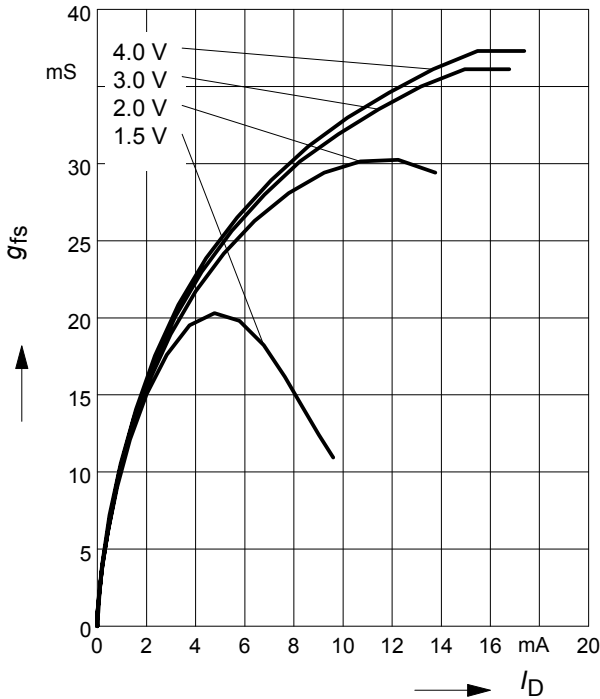
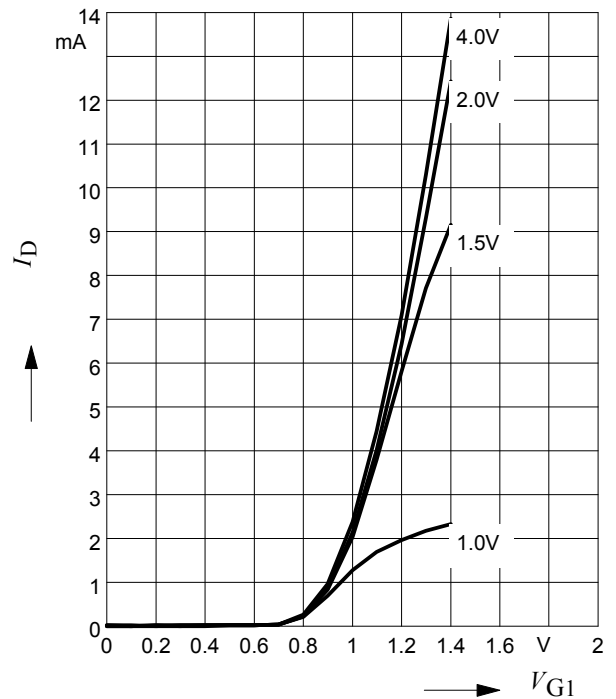
$V_{DS} = 5V$

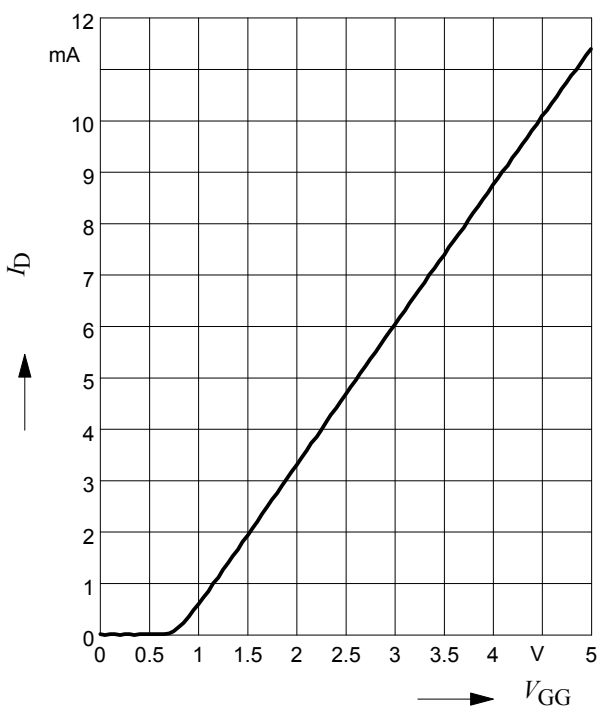
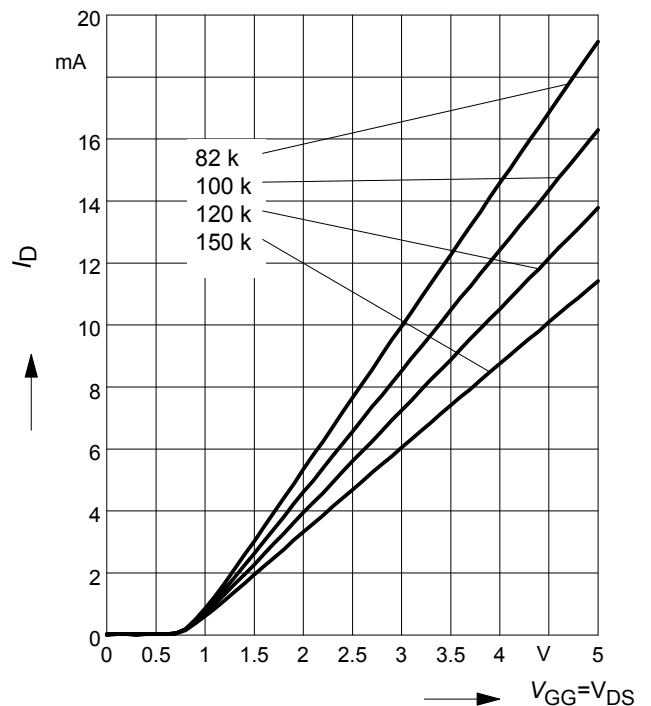
$V_{G2S} = \text{Parameter}$

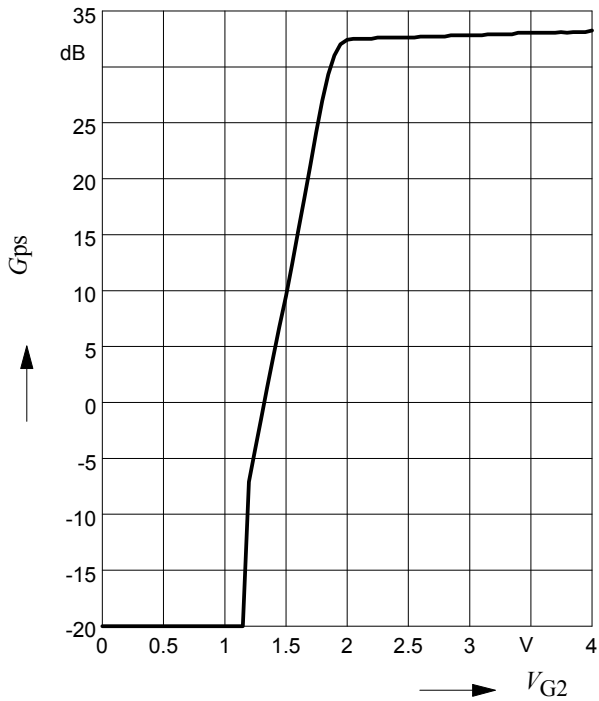
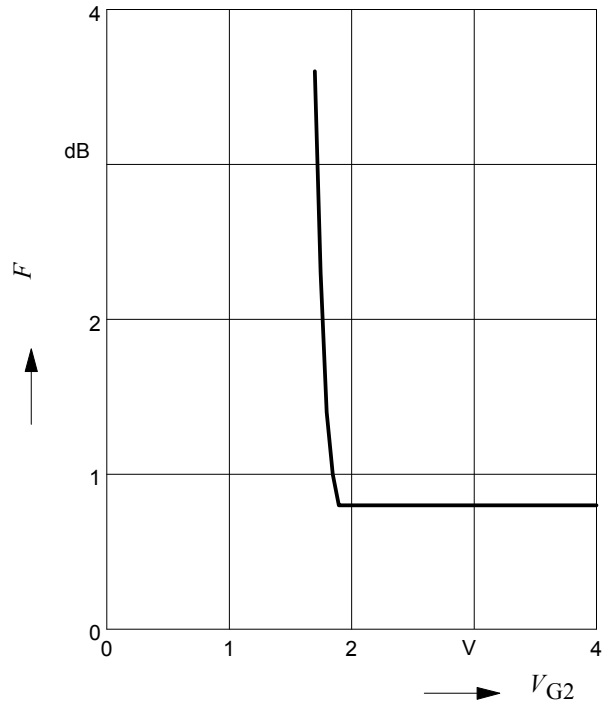
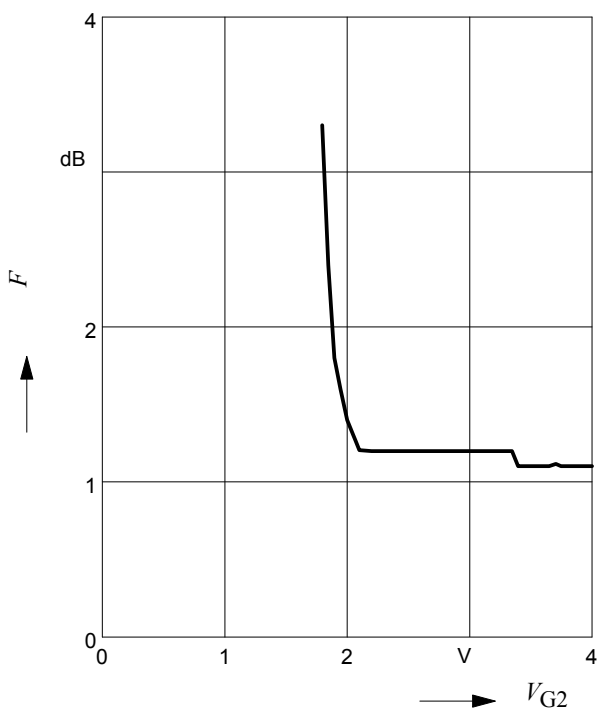
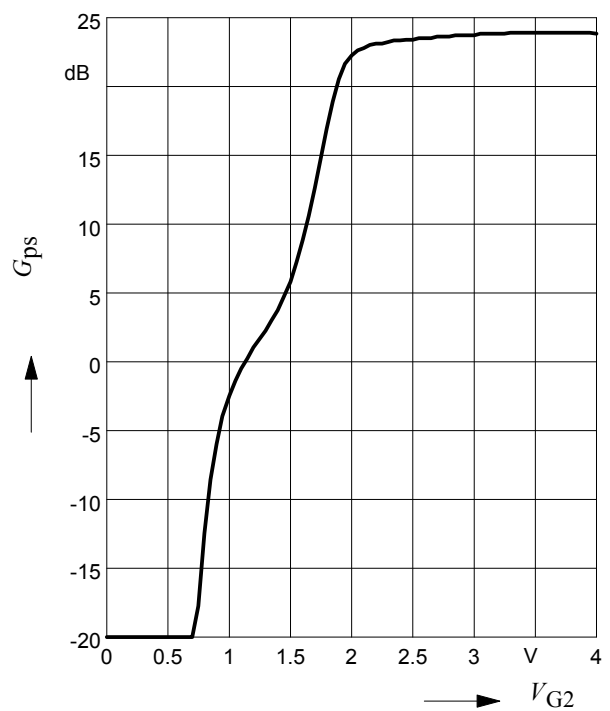


**Gate 1 forward transconductance**

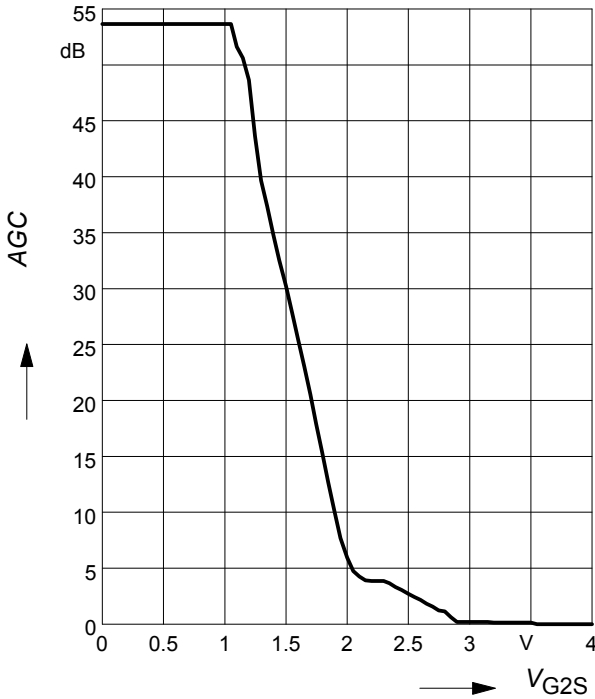
$$g_{fs} = f(I_D)$$

 $V_{DS} = 5V, V_{G2S} = \text{Parameter}$ 

**Drain current  $I_D = f(V_{G1S})$** 
 $V_{DS} = 5V$ 
 $V_{G2S} = \text{Parameter}$ 

**Drain current  $I_D = f(V_{GG})$** 
 $V_{DS} = 5V, V_{G2S} = 4V, R_{G1} = 150k\Omega$ 

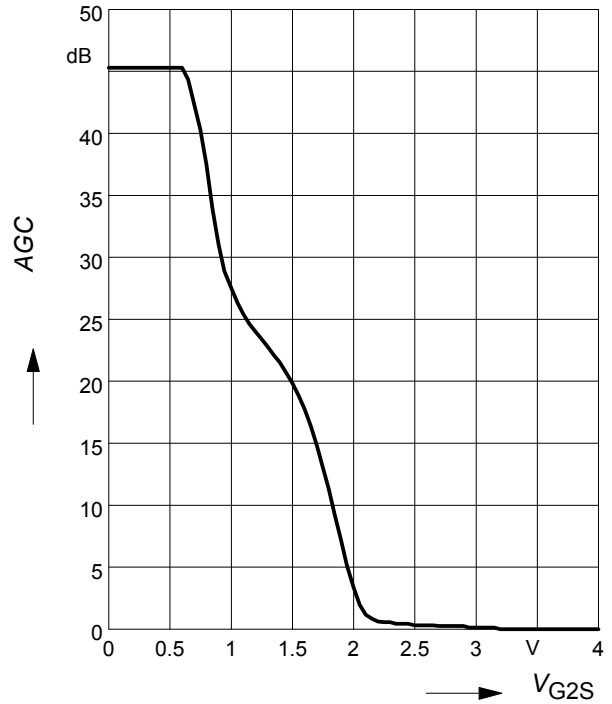
 (connected to  $V_{GG}$ ,  $V_{GG} = \text{gate1 supply voltage}$ )

**Drain current  $I_D = f(V_{GG})$** 
 $V_{DS} = 5V, V_{G2S} = 4V$ 
 $R_{G1} = \text{Parameter in } k\Omega$ 


**Power gain  $G_{ps} = f(V_{G2S})$** 
 $f = 45\text{MHz}$ 

**Noise figure  $F = f(V_{G2S})$** 
 $f = 45\text{MHz}$ 

**Noise figure  $F = f(V_{G2S})$** 
 $f = 800\text{MHz}$ 

**Power gain  $G_{ps} = f(V_{G2S})$** 
 $f = 800\text{GHz}$ 


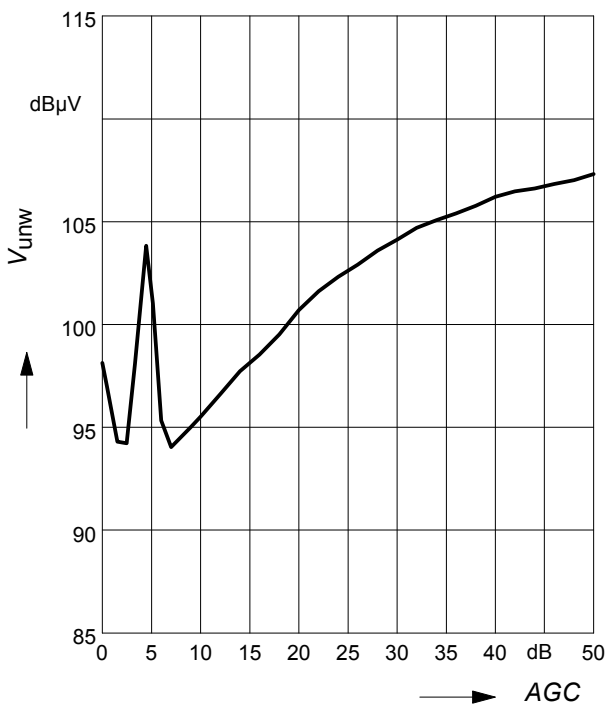
**AGC characteristic  $AGC = f(V_{G2S})$**   
 $V_{DS} = 5\text{ V}, R_{GG} = 120\text{ k}\Omega, f = 45\text{ MHz}$



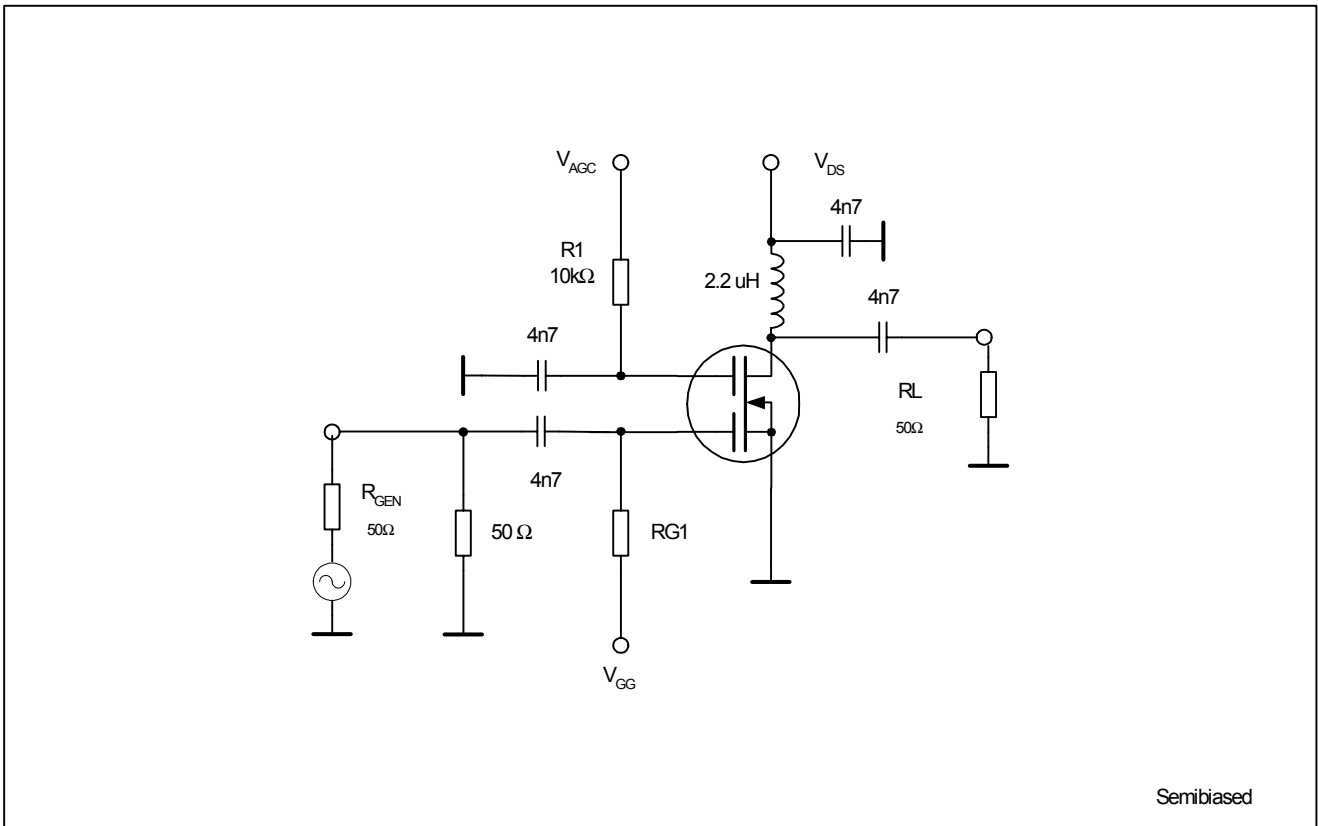
**AGC characteristic  $AGC = f(V_{G2S})$**   
 $V_{DS} = 5\text{ V}, R_{GG} = 120\text{ k}\Omega, f = 800\text{ MHz}$



**Crossmodulation  $V_{unw} = (AGC)$**   
 $V_{DS} = 5\text{ V}, I_D = 14\text{ mA}$

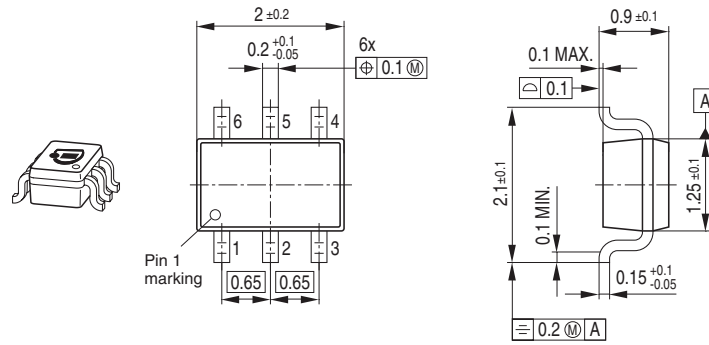


Crossmodulation test circuit

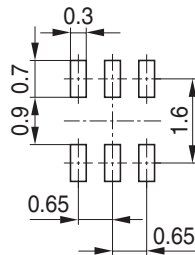




Package Outline

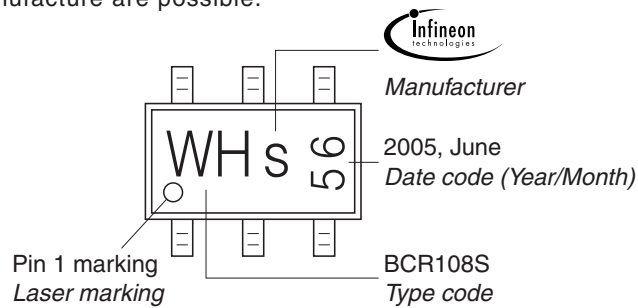


Foot Print



Marking Layout (Example)

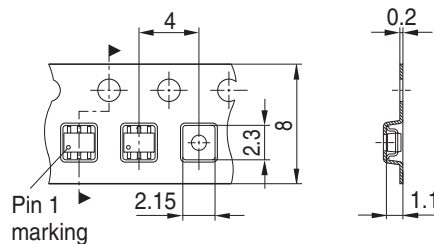
Small variations in positioning of Date code, Type code and Manufacture are possible.



Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel  
 Reel ø330 mm = 10.000 Pieces/Reel

For symmetric types no defined Pin 1 orientation in reel.



Edition 2006-02-01

Published by

Infineon Technologies AG

81726 München, Germany

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