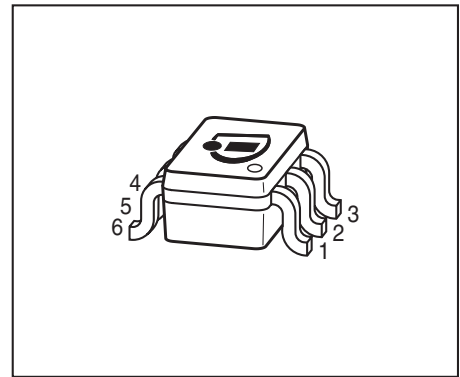
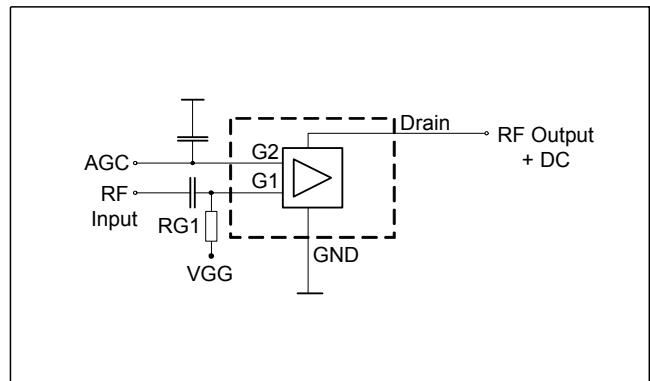
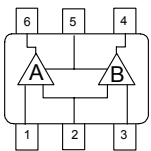


Dual N-Channel MOSFET Tetrode

- 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 ¹⁾	R_{thchs}	≤ 280	K/W

¹⁾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.	

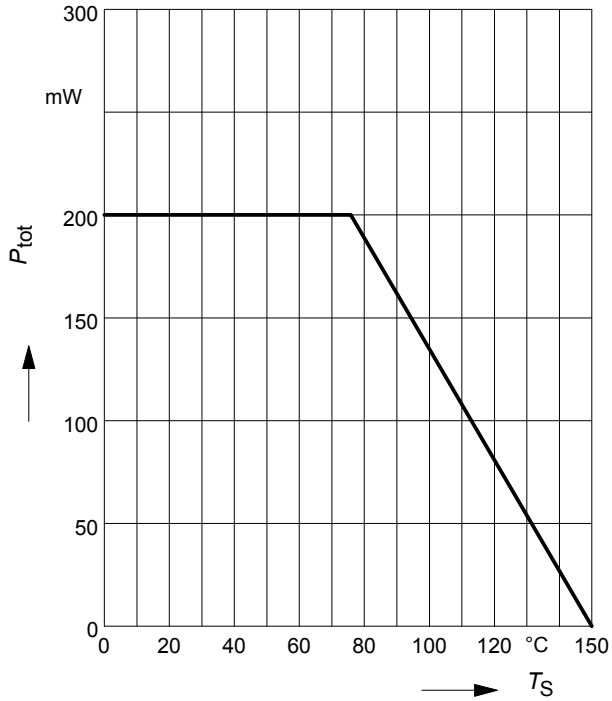
DC Characteristics

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	μA
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	μA
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

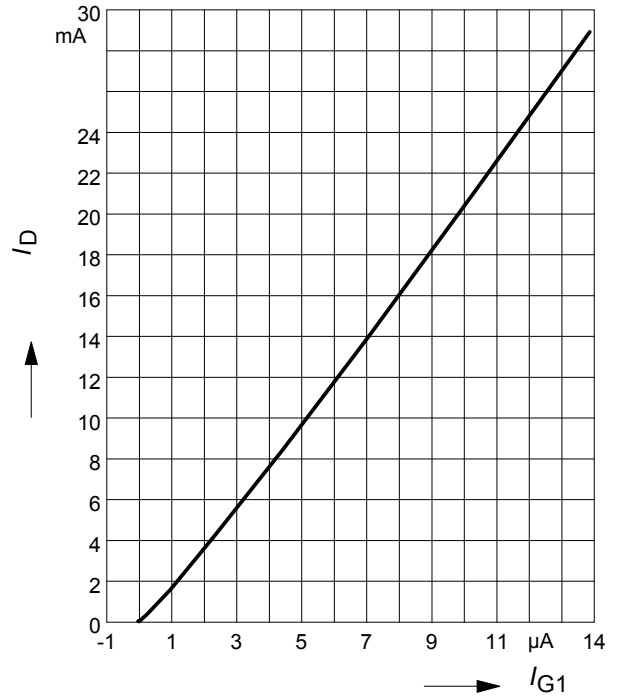
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics $V_{DS}=5\text{V}$, $V_{G2S}=4\text{V}$, ($I_D=10\text{mA}$) (verified by random sampling)					
Forward transconductance	g_{fs}	-	30	-	mS
Gate1 input capacitance $f = 10\text{ MHz}$	C_{g1ss}	-	2.2	-	pF
Output capacitance $f = 10\text{ MHz}$	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 $V_{G2S} = 4 \dots 0\text{ V}$, $f = 800\text{ MHz}$	ΔG_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 μ V

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

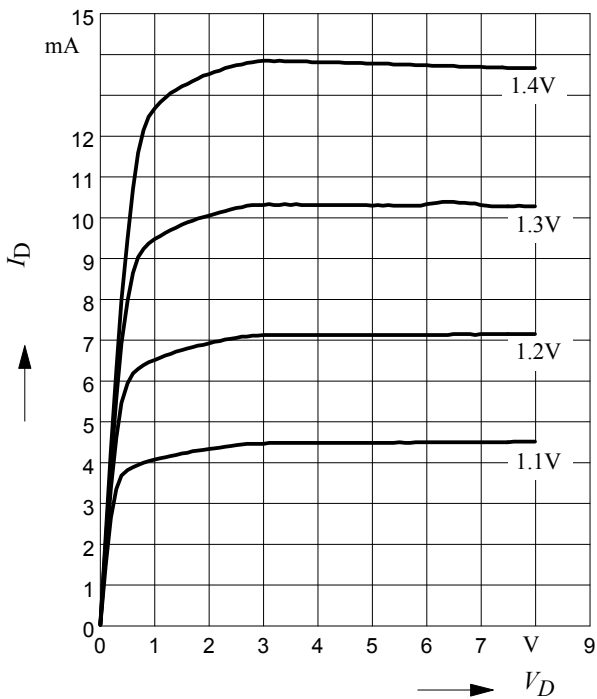


Drain current $I_D = f(I_{G1})$

$V_{G2S} = 4V$



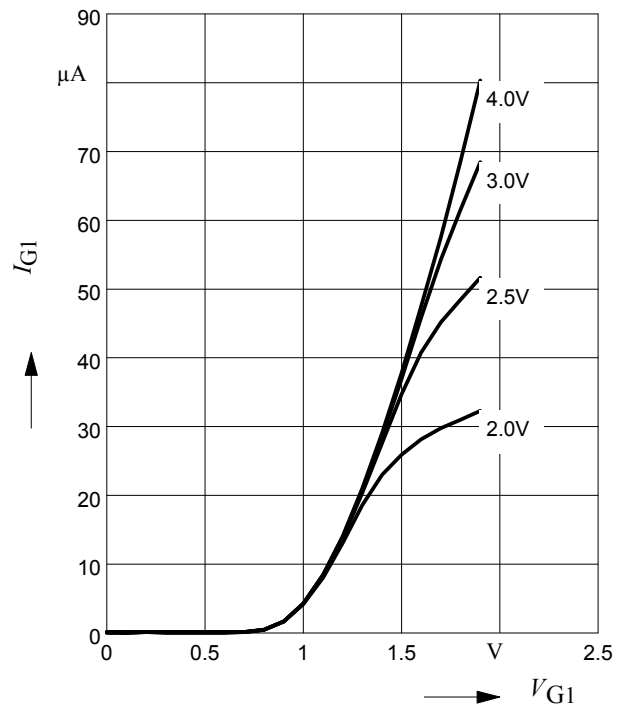
Output characteristics $I_D = f(V_{DS})$



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

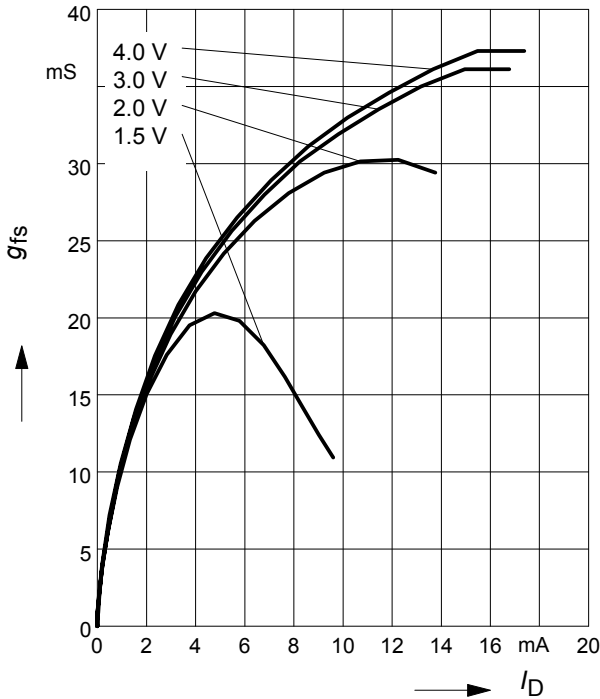
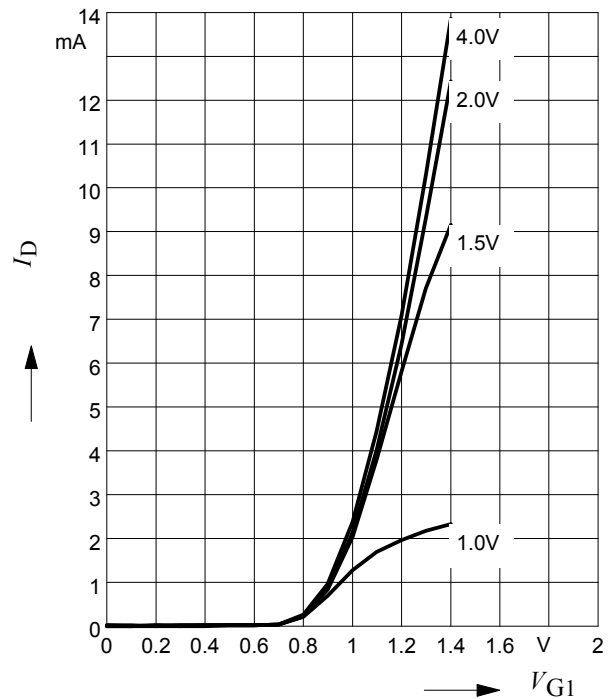
$V_{DS} = 5V$

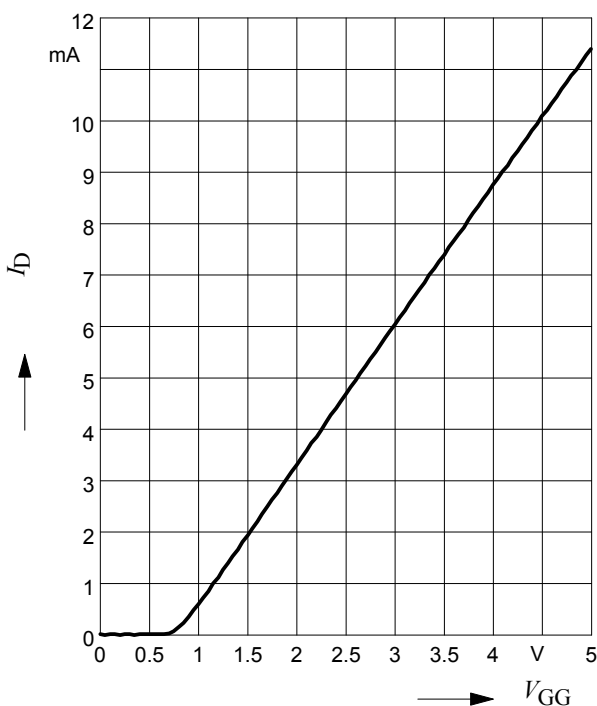
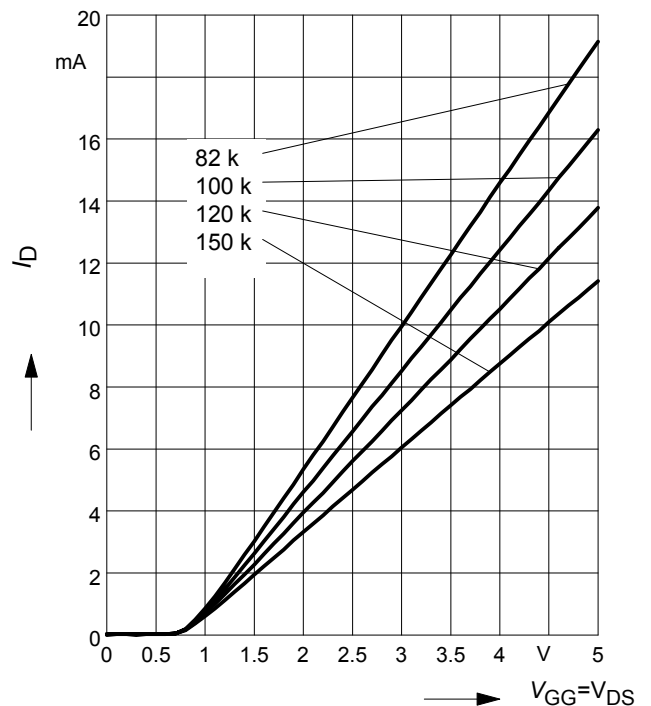
$V_{G2S} = \text{Parameter}$



Gate 1 forward transconductance

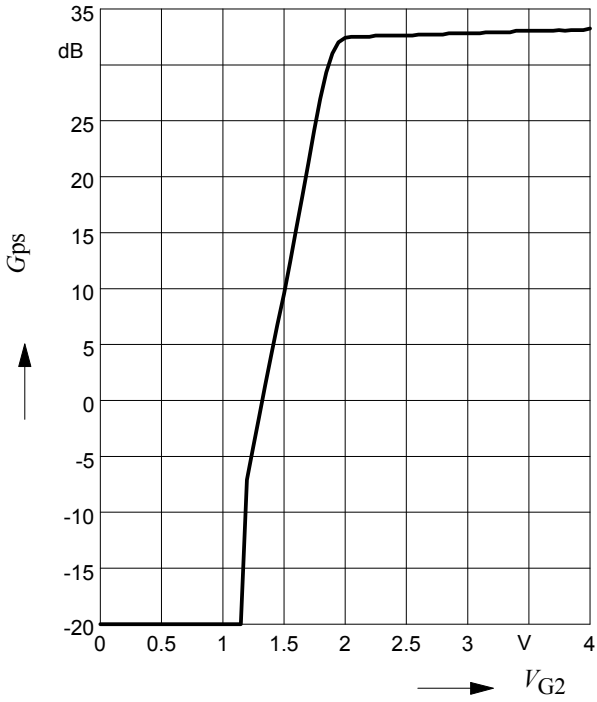
$$g_{fs} = f(I_D)$$

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

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


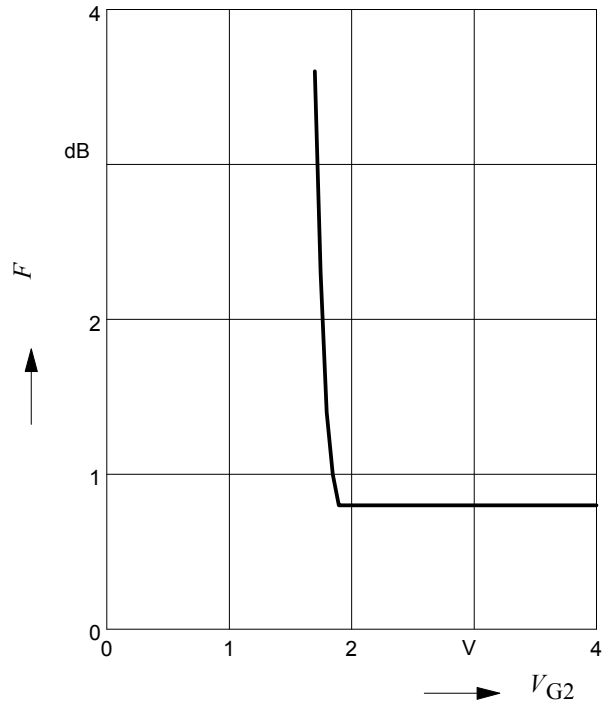
Power gain $G_{ps} = f(V_{G2S})$

$f = 45\text{MHz}$



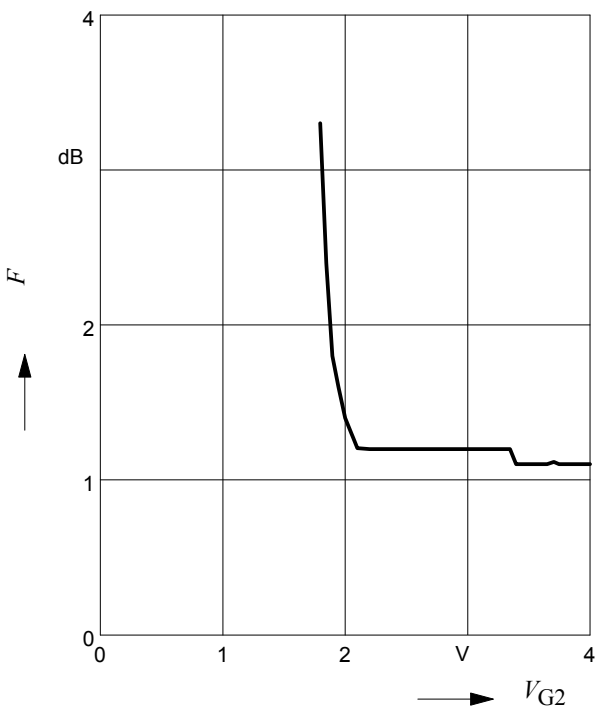
Noise figure $F = f(V_{G2S})$

$f = 45\text{MHz}$



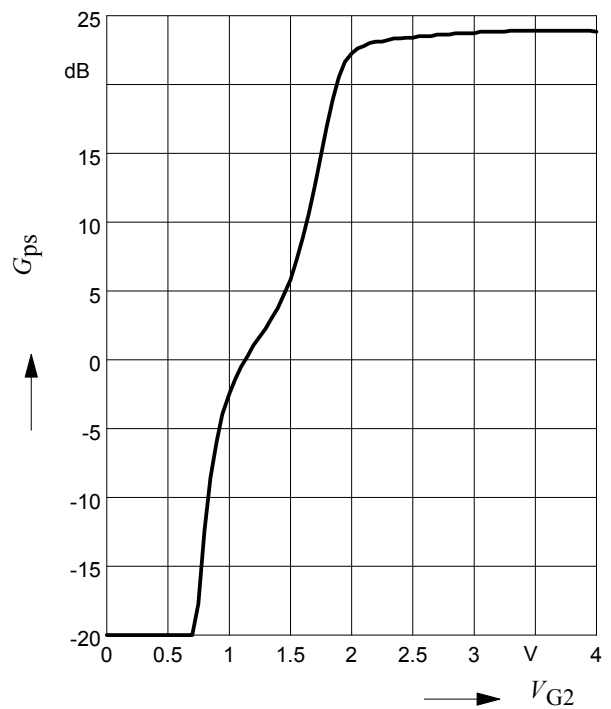
Noise figure $F = f(V_{G2S})$

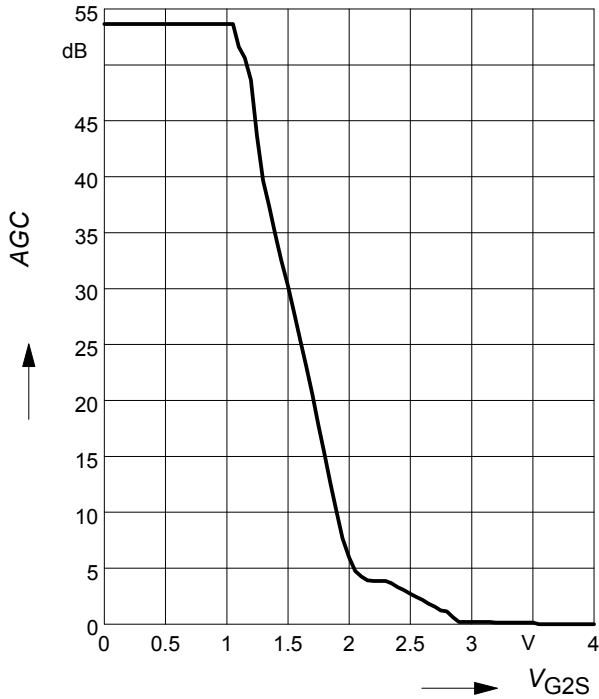
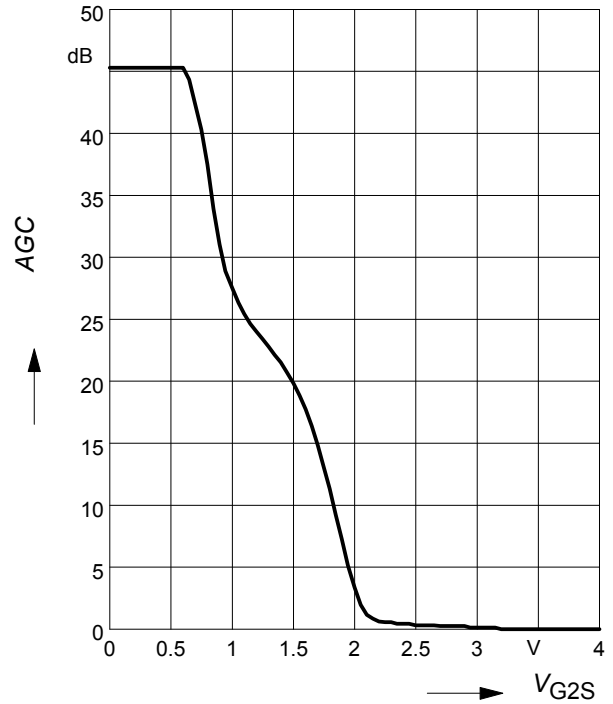
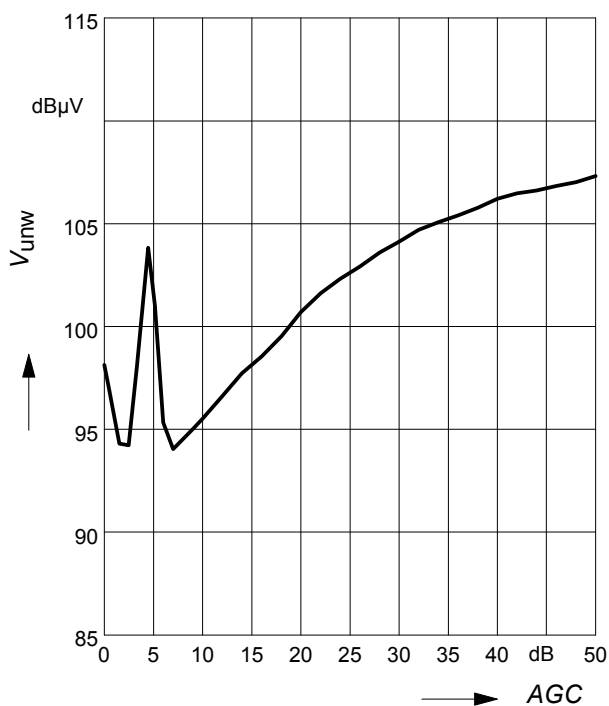
$f = 800\text{MHz}$



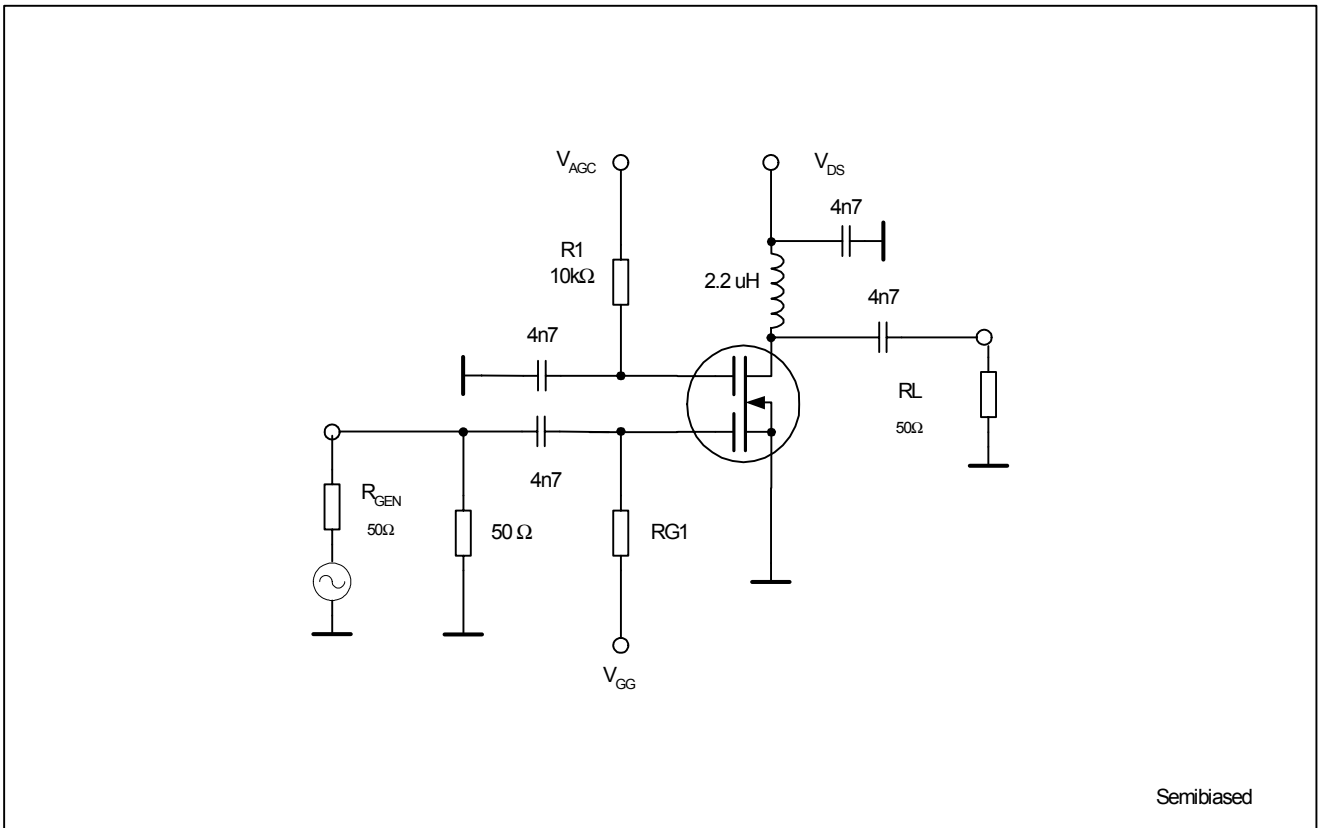
Power gain $G_{ps} = f(V_{G2S})$

$f = 800\text{GHz}$

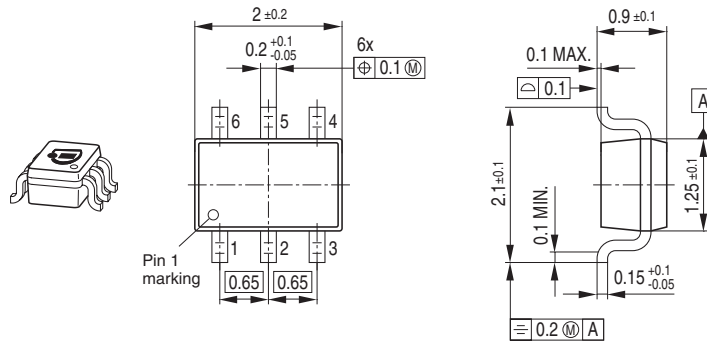


AGC characteristic $AGC = f(V_{G2S})$
 $V_{DS} = 5\text{ V}, R_{GG} = 120\text{ k}\Omega, f = 45\text{ MHz}$

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

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


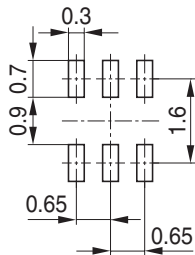
Crossmodulation test circuit



Package Outline

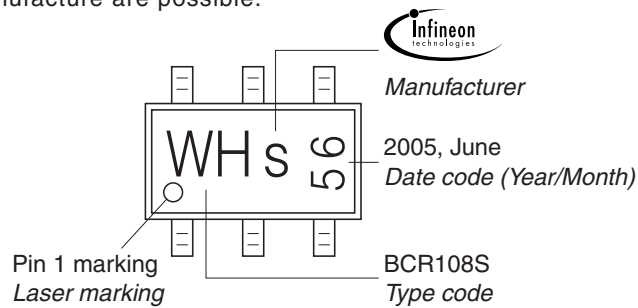


Foot Print



Marking Layout (Example)

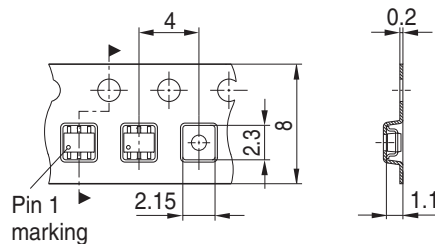
Small variations in positioning of Date code, Type code and Manufacturer are possible.



Standard Packing

Reel \varnothing 180 mm = 3.000 Pieces/Reel
 Reel \varnothing 330 mm = 10.000 Pieces/Reel

For symmetric types no defined Pin 1 orientation in reel.



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