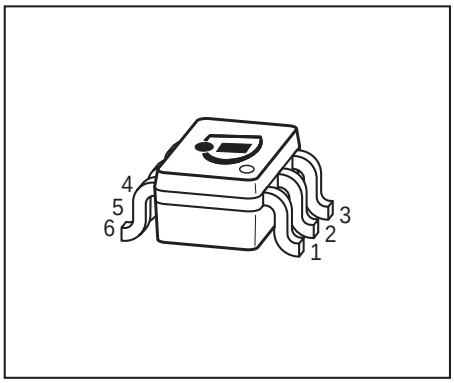
Dual N-Channel MOSFET Tetrode

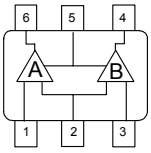
Preliminary data

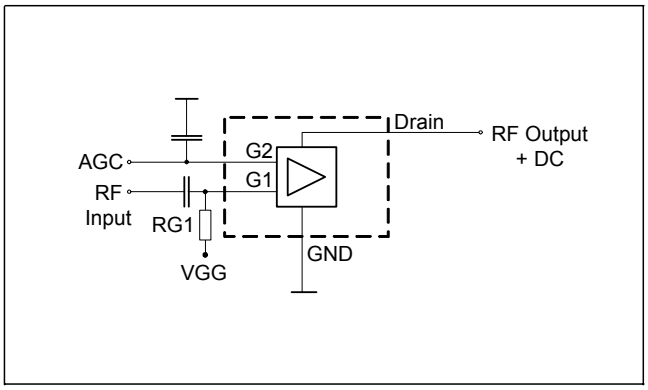


- Low noise gain controlled input stages for UHF and VHF -tuners e. g. (NTSC, PAL)
- Two AGC amplifiers in one single package
- Integrated gate protection diodes
- Low noise figure, high AGC-range
- Improved cross modulation at gain reduction
- $G1_A$ and $G1_B$ at same side
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101

AEC Qualified RoHS

BG5120K





ESD (**E**lectro**s**tatic **d**ischarge) 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

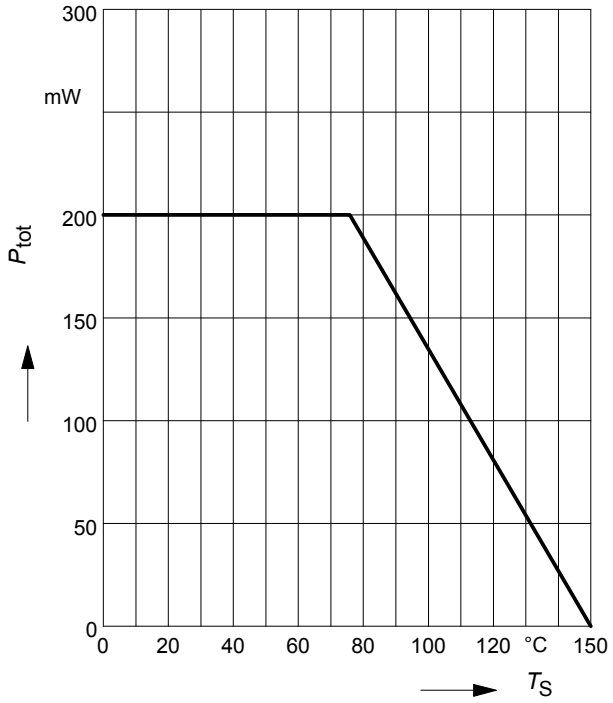
Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Drain-source breakdown voltage I_D = 10 µA, V_{G1S} = 0 , V_{G2S} = 0	$V_{(BR)DS}$	12	-	-	V
Gate1-source breakdown voltage +I_{G1S} = 10 mA, V_{G2S} = 0 , V_{DS} = 0	+$V_{(BR)G1SS}$	6	-	15	
Gate2-source breakdown voltage +I_{G2S} = 10 mA, V_{G1S} = 0 , V_{DS} = 0	+$V_{(BR)G2SS}$	6	-	15	
Gate1-source leakage current V_{G1S} = 6 V, V_{G2S} = 0 , V_{DS} = 0	+I_{G1SS}	-	-	50	nA
Gate2-source leakage current V_{G2S} = 6 V, V_{G1S} = 0 , V_{DS} = 0	+I_{G2SS}	-	-	50	
Drain current V_{DS} = 5 V, V_{G1S} = 0 , V_{G2S} = 4 V	I_{DSS}	-	-	1	µA
Drain-source current V_{DS} = 5 V, V_{G2S} = 4 V, R_{G1} = 150 kΩ	I_{DSX}	-	12	-	mA
Gate1-source pinch-off voltage V_{DS} = 5 V, V_{G2S} = 4 V, I_D = 20 µA	$V_{G1S(p)}$	-	0.7	-	V
Gate2-source pinch-off voltage V_{DS} = 5 V, I_D = 20 µA, V_{G1S} = 2 V	$V_{G2S(p)}$	-	0.6	-	

Electrical Characteristics at T_A = 25°C, unless otherwise specified

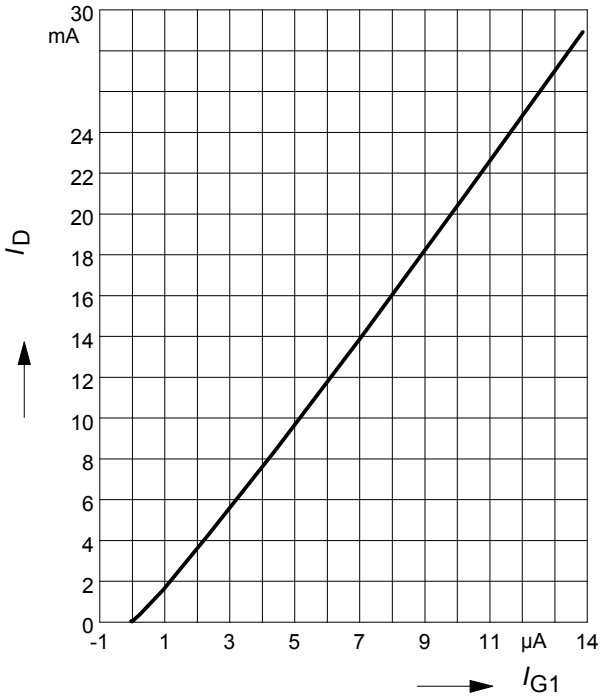
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics V_{DS}= 5V , V_{G2S}=4V, (I_D=10mA) (verified by random sampling)					
Forward transconductance	g_{fs}	-	33	-	mS
Gate1 input capacitance	C_{g1ss}	-	2.2	-	pF
Output capacitance	C_{dss}	-	1.3	-	
Power gain	G_p				dB
800 MHz		-	24	-	
45 MHz		-	33	-	
Noise figure	F				dB
800 MHz		-	1.2	-	
45 MHz		-	0.8	-	
Gain control range	ΔG_p	45	-	-	
Cross-modulation k=1%, f_W=50MHz, f_{unw}=60MHz	X_{mod}				dBµV
AGC = 0 dB		90	-	-	
AGC = 10 dB		-	95	-	
AGC = 40 dB		100	105	-	

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

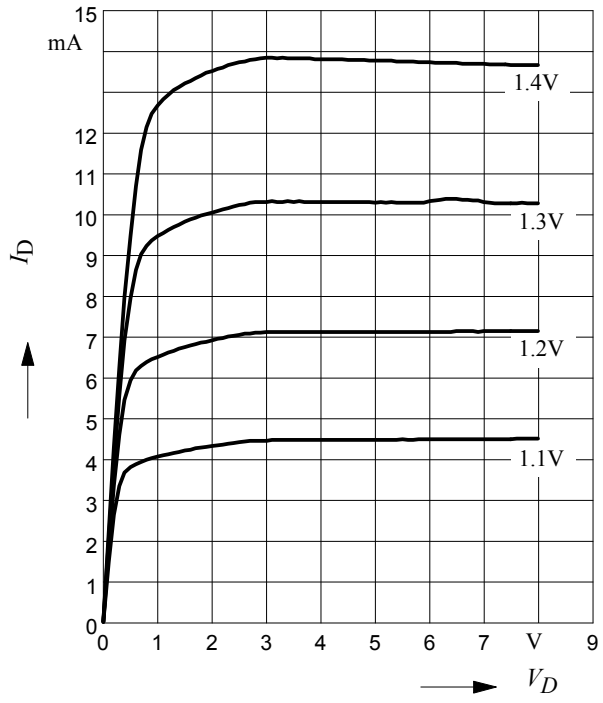


Drain current $I_D = f(I_{G1})$

V_{G2S} = 4V



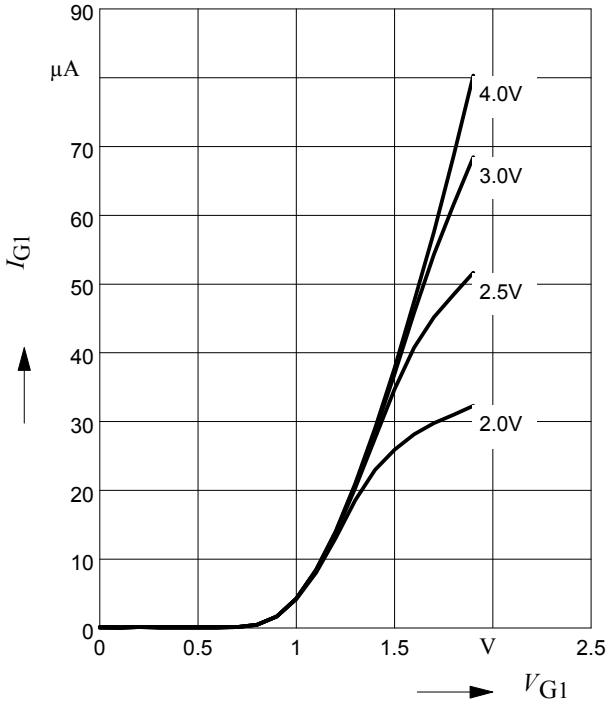
Output characteristics $I_D = f(V_{DS})$



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

V_{DS} = 5V

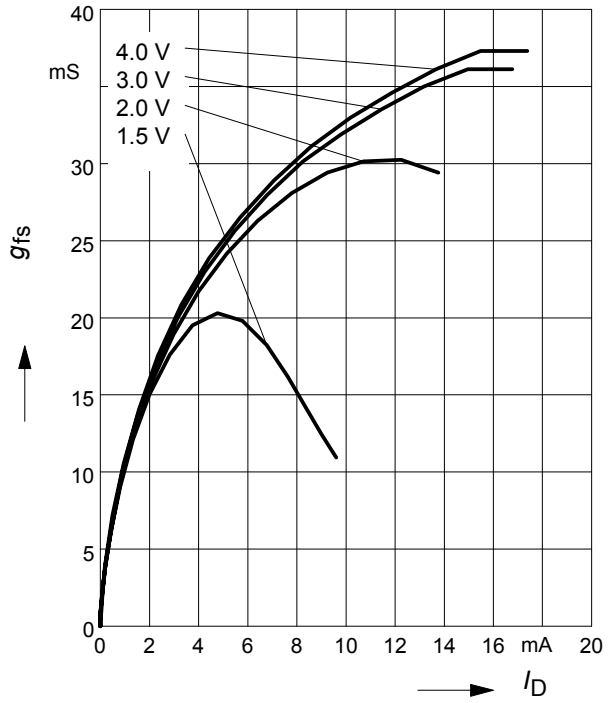
V_{G2S} = Parameter



Gate 1 forward transconductance

$g_{fs} = f(I_D)$

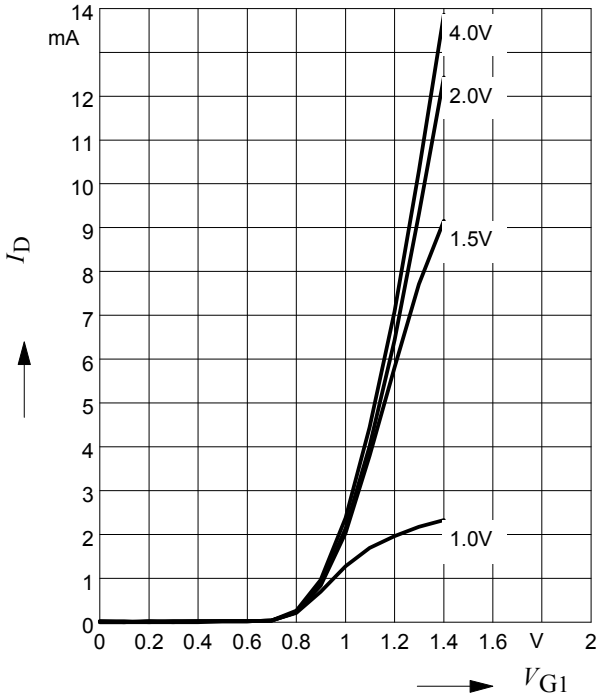
V_{DS} = 5V, V_{G2S} = Parameter



Drain current $I_D = f(V_{G1S})$

V_{DS} = 5V

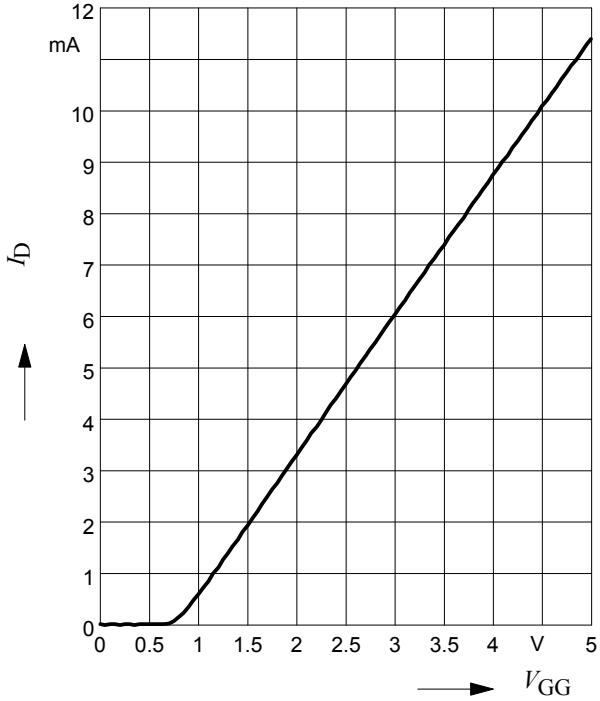
V_{G2S} = Parameter



Drain current $I_D = f(V_{GG})$

V_{DS} = 5V, V_{G2S} = 4V, R_{G1} = 150kΩ

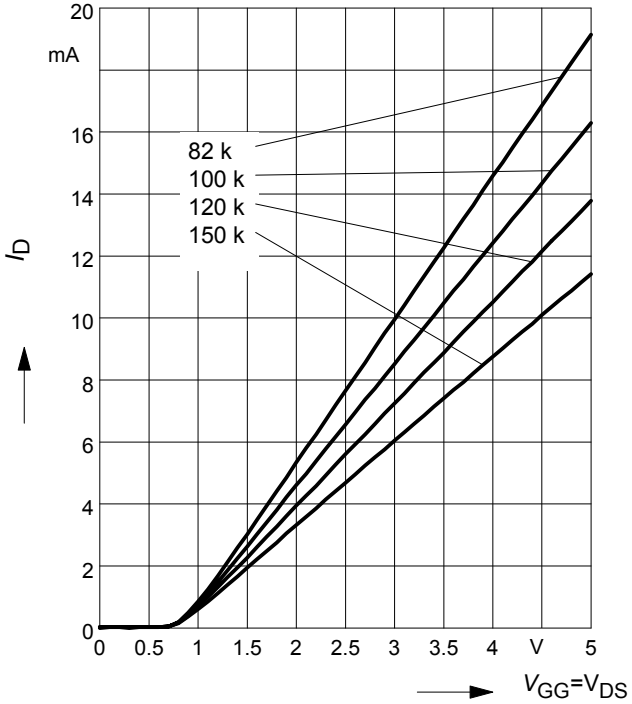
(connected to V_{GG}, V_{GG}=gate1 supply voltage)



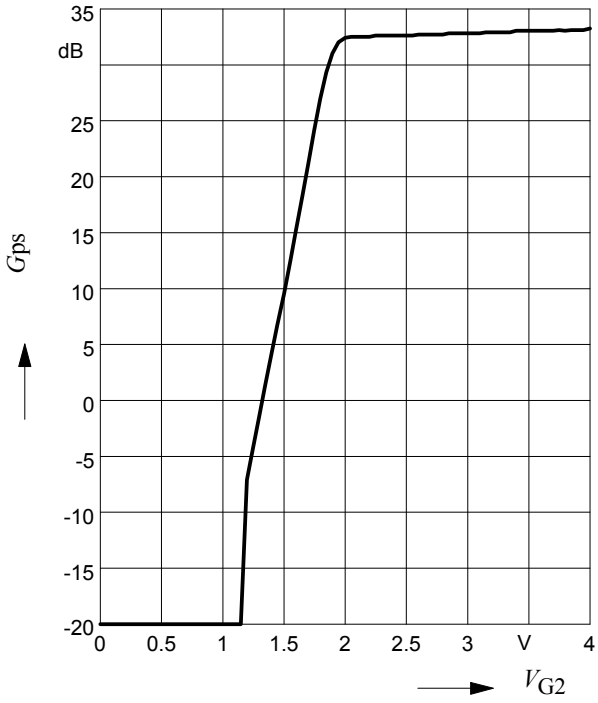
Drain current $I_D = f(V_{GG})$

V_{DS} = 5V, V_{G2S} = 4V

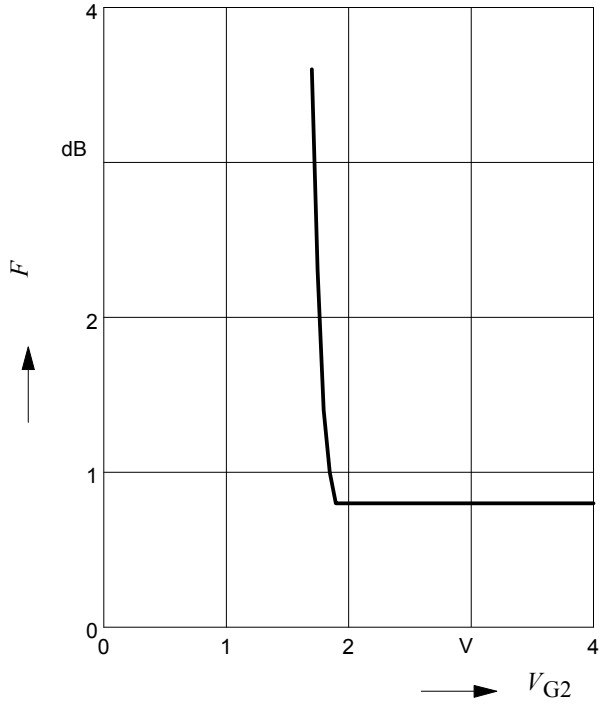
R_{G1} = Parameter in kΩ



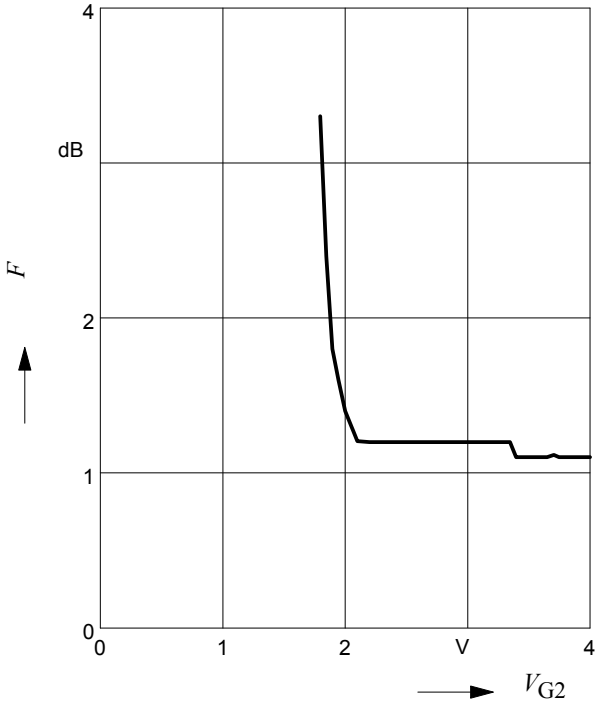
Power gain $G_{ps} = f(V_{G2S})$
f= 45MHz



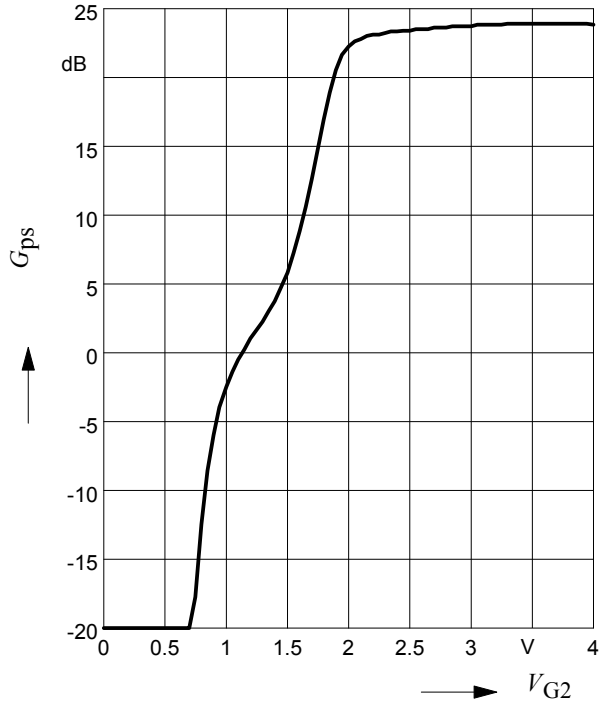
Noise figure $F = f(V_{G2S})$
f=45MHz



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

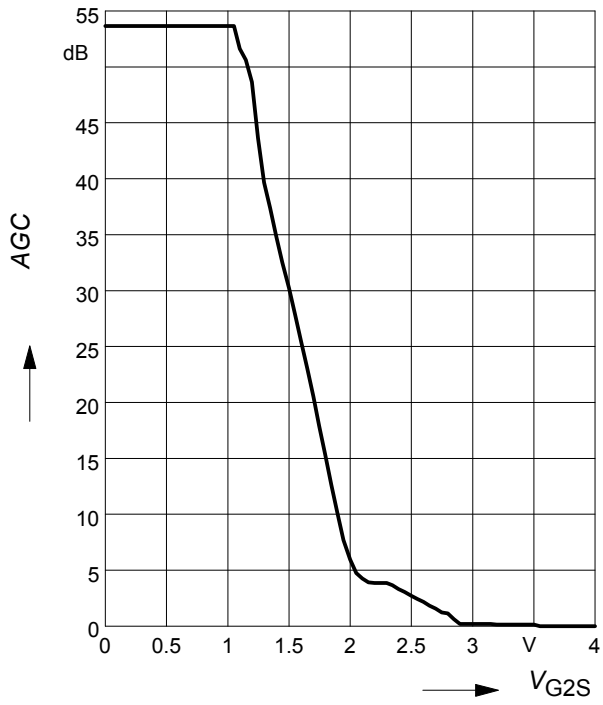


Power gain $G_{ps} = f(V_{G2S})$
f = 800 GHz



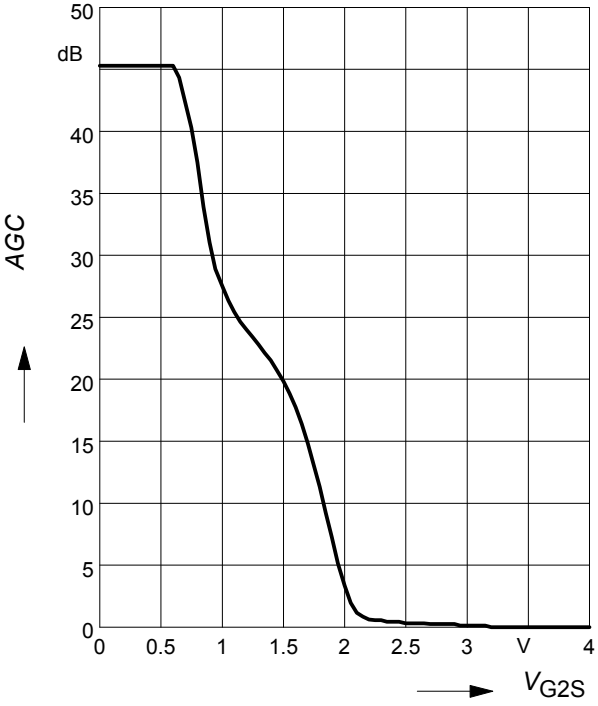
AGC characteristic $AGC = f(V_{G2S})$

V_{DS} = 5 V, R_{GG} = 120 kΩ, f = 45 MHz



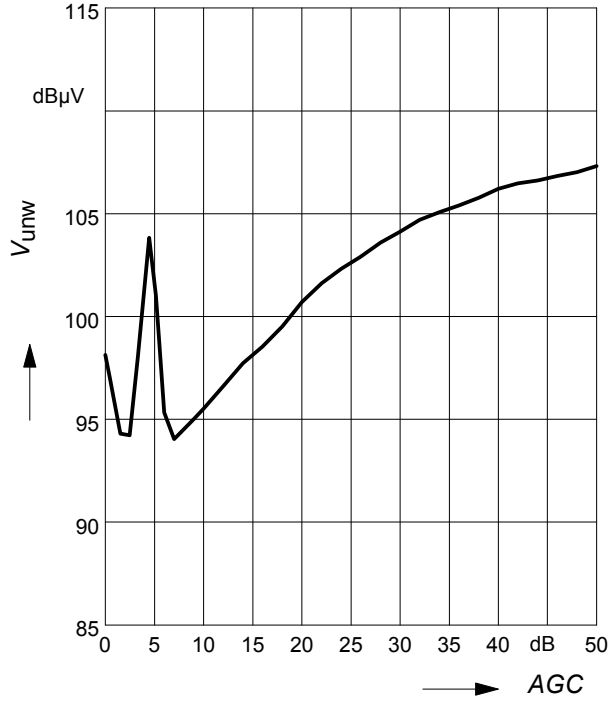
AGC characteristic $AGC = f(V_{G2S})$

V_{DS} = 5 V, R_{GG} = 120 kΩ, f = 800 MHz

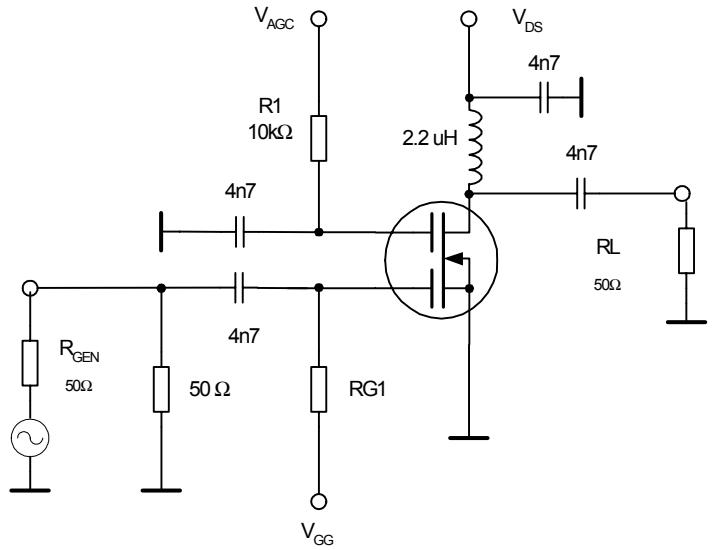


Crossmodulation $V_{unw} = (AGC)$

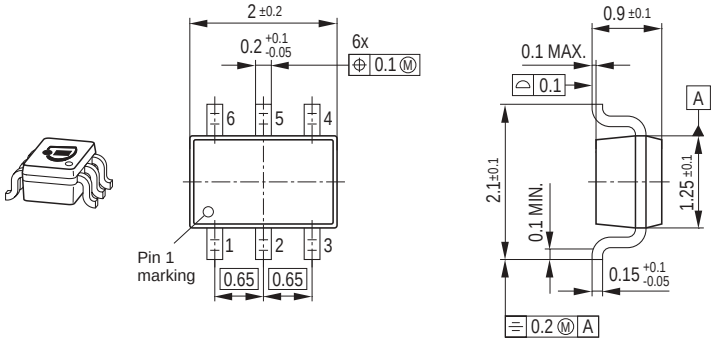
V_{DS} = 5 V, I_D = 14 mA



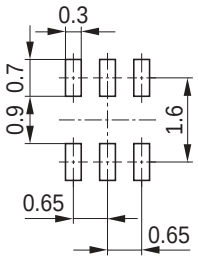
Crossmodulation test circuit



Package Outline

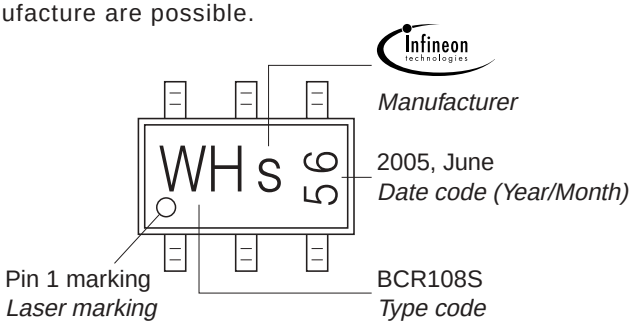


Foot Print



Marking Layout (Example)

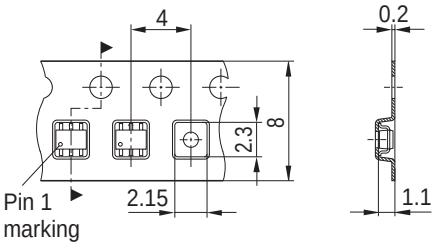
Small variations in positioning of
Date code, Type code and Manufacture are possible.



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.



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