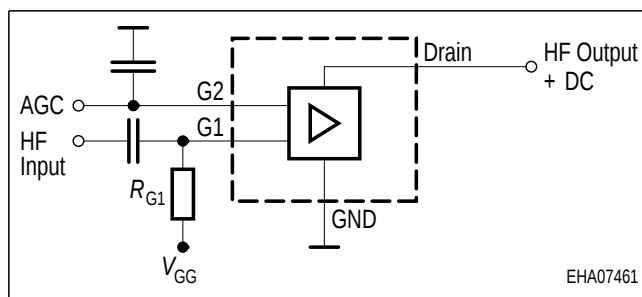
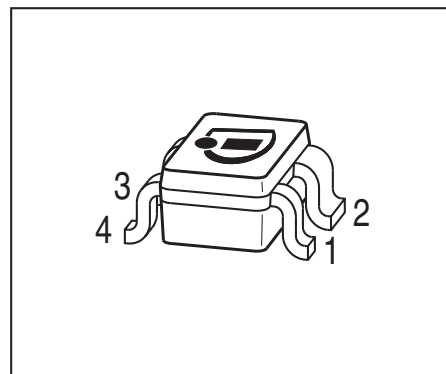


Silicon N-Channel MOSFET Tetrode

- Low noise gain controlled input stages of UHF- and VHF - tuners with 3 V up to 5 V supply voltage
- Integrated gate protection diodes
- Excellent noise figure
- High gain, high forward transadmittance
- Improved cross modulation at gain reduction
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



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

Type	Package	Pin Configuration						Marking
BF5020	SOT143	1 = S	2 = D	3 = G2	4 = G1	-	-	KYs
BF5020R	SOT143R	1 = D	2 = S	3 = G1	4 = G2	-	-	KYs
BF5020W	SOT343	1 = D	2 = S	3 = G1	4 = G2	-	-	KYs

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	8	V
Continuous drain current	I_D	25	mA
Gate 1/ gate 2-source current	I_{G1S}, I_{G2S}	± 10	mA
Gate 1/ gate 2-source voltage	V_{G1S}, V_{G2S}	± 6	V
Total power dissipation	P_{tot}		mW
$T_s \leq 76^\circ\text{C}$, BF5020, BF5020R		200	
$T_s \leq 94^\circ\text{C}$, BF5020W		200	
Storage temperature	T_{stg}	-55 ... 150	$^\circ\text{C}$
Channel temperature	T_{ch}	150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Channel - soldering point ¹⁾ BF5020, BF5020R BF5020W	R_{thchs}	≤ 370 ≤ 280	K/W

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 $I_D = 20\text{ }\mu\text{A}$, $V_{G1S} = 0$, $V_{G2S} = 0$	$V_{(BR)DS}$	12	-	-	V
Gate1-source breakdown voltage $+I_{G1S} = 10\text{ mA}$, $V_{G2S} = 0$, $V_{DS} = 0$	$+V_{(BR)G1SS}$	6	-	15	V
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	nA
Gate2-source leakage current $V_{G2S} = 6\text{ V}$, $V_{G1S} = 0$, $V_{DS} = 0$	$+I_{G2SS}$	-	-	50	
Drain current $V_{DS} = 5\text{ V}$, $V_{G1S} = 0$, $V_{G2S} = 4\text{ V}$	I_{DSS}	-	-	100	
Drain-source current $V_{DS} = 5\text{ V}$, $V_{G2S} = 4\text{ V}$, $R_{G1} = 120\text{ k}\Omega$	I_{DSX}	-	14	-	mA
Gate1-source pinch-off voltage $V_{DS} = 5\text{ V}$, $V_{G2S} = 4\text{ V}$, $I_D = 20\text{ }\mu\text{A}$	$V_{G1S(p)}$	-	0.7	-	V
Gate2-source pinch-off voltage $V_{DS} = 5\text{ V}$, $I_D = 20\text{ }\mu\text{A}$, $V_{G1S} = 2\text{ V}$	$V_{G2S(p)}$	-	0.7	-	

¹⁾For calculation of R_{thJA} please refer to Application Note Thermal Resistance

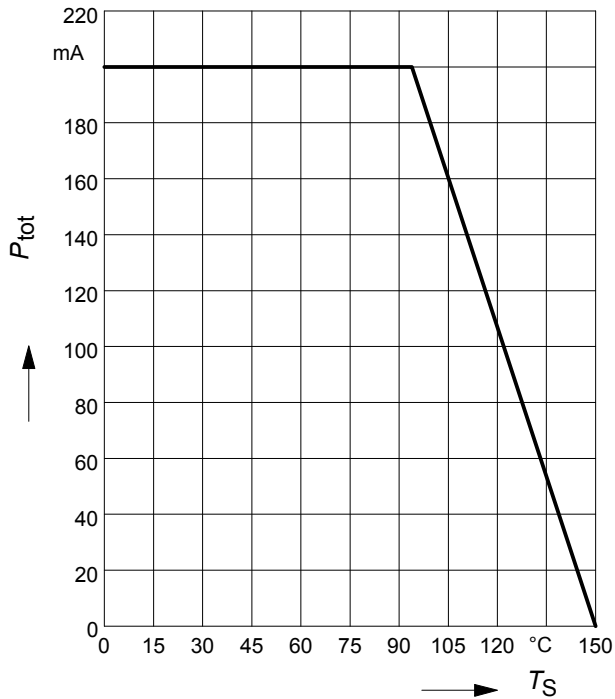
Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics - (verified by random sampling)					
Forward transconductance $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $V_{G2S} = 4\text{ V}$	g_{fs}	-	34	-	mS
Gate1 input capacitance $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $V_{G2S} = 4\text{ V}$	C_{g1ss}	-	2.4	-	pF
Output capacitance $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $V_{G2S} = 4\text{ V}$	C_{dss}	-	1	-	
Power gain $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $V_{G2S} = 4\text{ V}$, $f = 800\text{ MHz}$ $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $V_{G2S} = 4\text{ V}$, $f = 45\text{ MHz}$	G_p	-	26	-	dB
		-	32	-	
Noise figure $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $V_{G2S} = 4\text{ V}$, $f = 800\text{ MHz}$ $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $V_{G2S} = 4\text{ V}$, $f = 45\text{ MHz}$	F	-	1.2	-	dB
		-	0.8	-	
Gain control range $V_{DS} = 5\text{ V}$, $V_{G2S} = 4...0\text{ V}$	ΔG_p	-	45	-	
Cross-modulation ¹⁾ , $V_{DS} = 5\text{ V}$, $R_{G1} = 120\text{ k}\Omega$ AGC = 0 AGC = 10 dB AGC = 40 dB	X_{mod}	-	98	-	dBμV
		-	96	-	
		-	106	-	

¹Input level for $k = 1\%$; $f_w = 50\text{ MHz}$, $f_{unw} = 60\text{ MHz}$

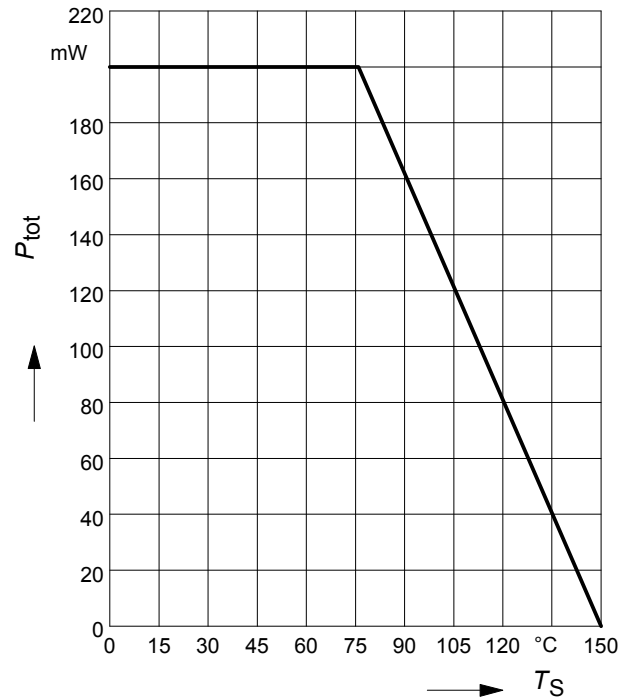
Total power dissipation $P_{\text{tot}} = f(T_S)$

BF5020W

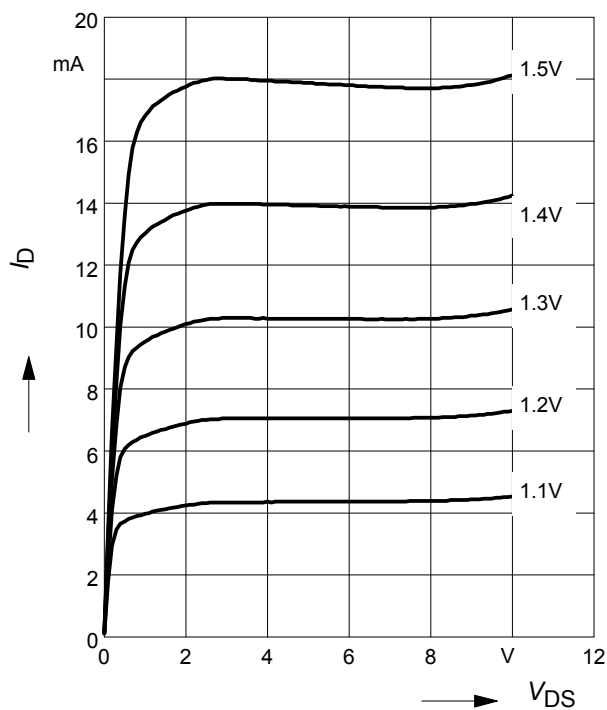


Total power dissipation $P_{\text{tot}} = f(T_S)$

BF5020, BF5020R



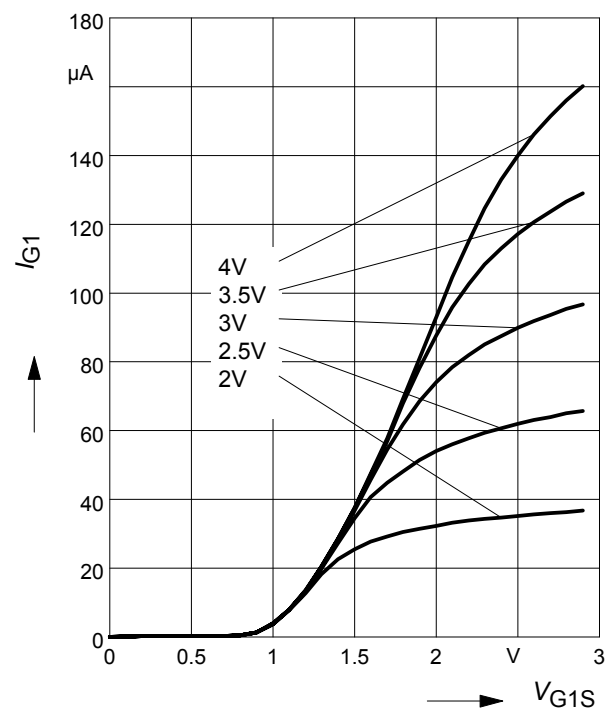
Output characteristics $I_D = f(V_{\text{DS}})$



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

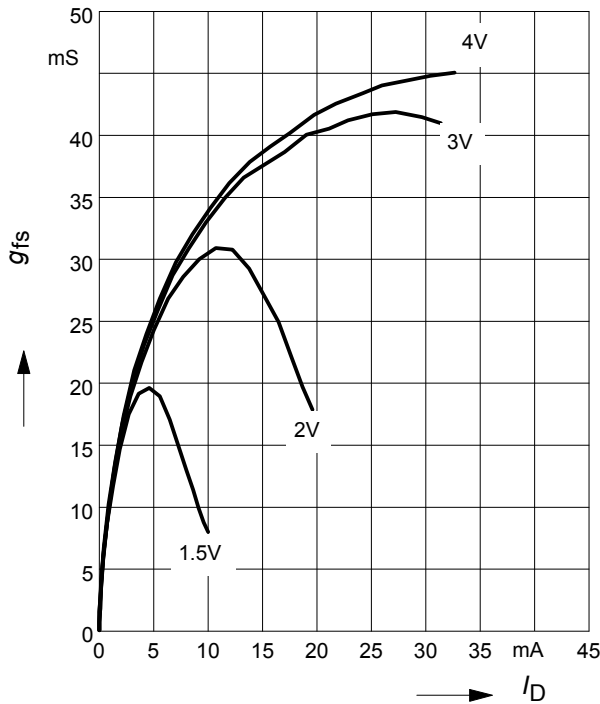
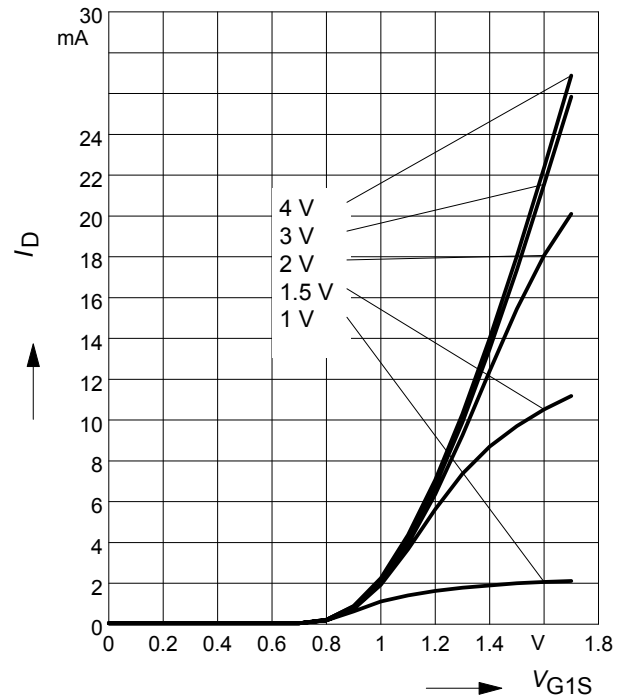
$V_{\text{DS}} = 5\text{V}$

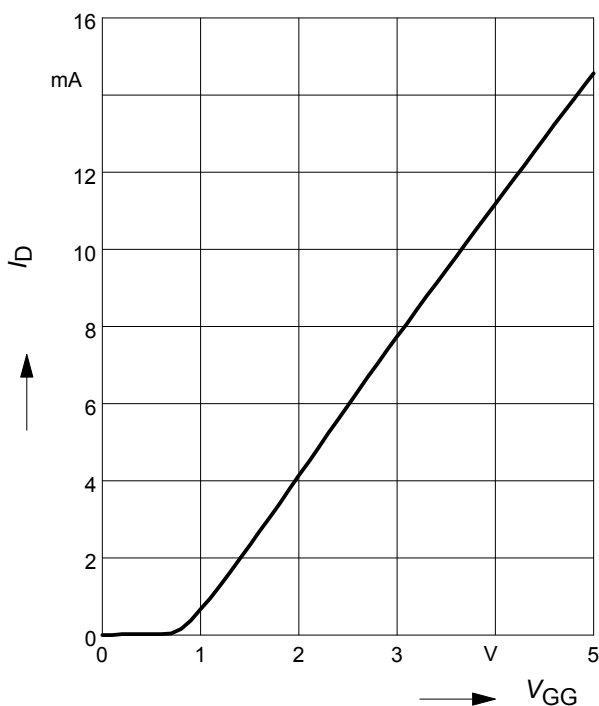
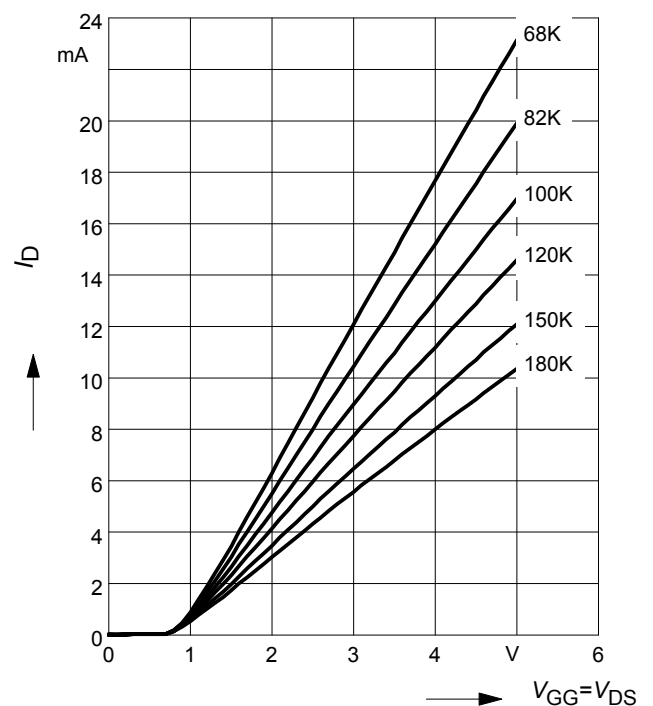
$V_{\text{G2S}} = \text{Parameter}$



Gate 1 forward transconductance

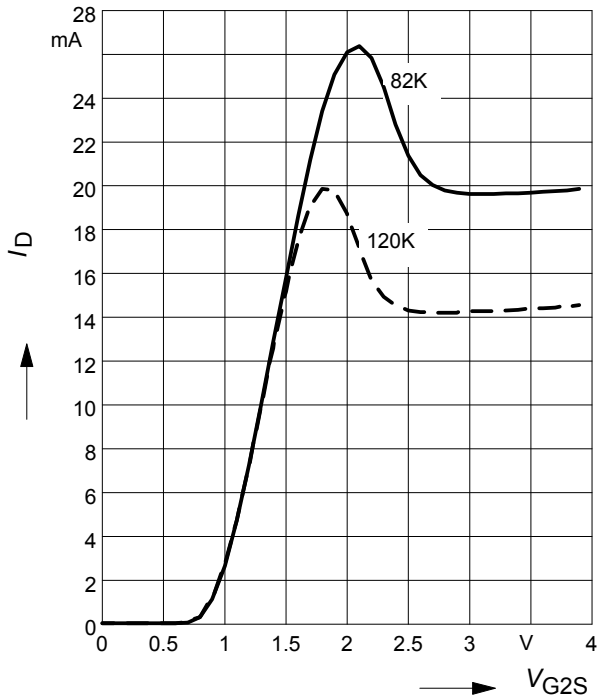
$$g_{fs} = f(I_D)$$

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

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

Drain current $I_D = f(V_{GG})$
 $V_{DS} = 5V, V_{G2S} = 4V, R_{G1} = 120 \text{ k}\Omega$

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

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


Drain current $I_D = f(V_{G2S})$

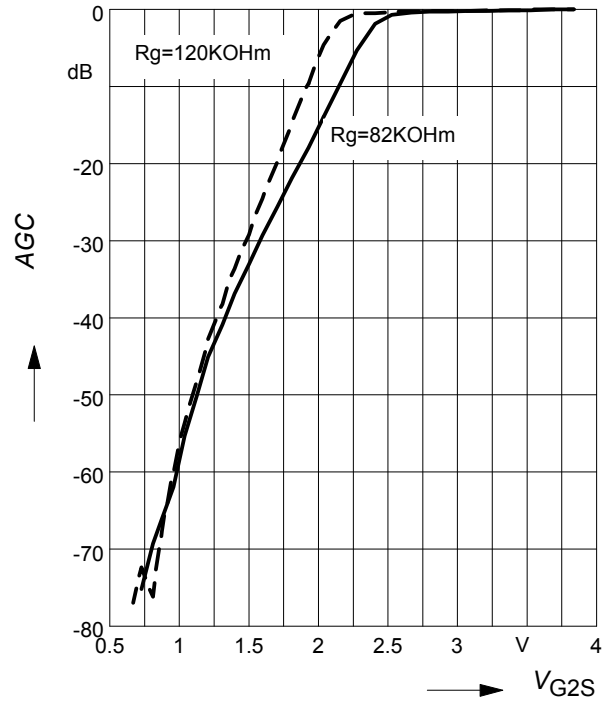
$V_{DS} = 5\text{ V}$, $R_{G1} = \text{Parameter in k}\Omega$



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

$f = 50\text{ MHz}$

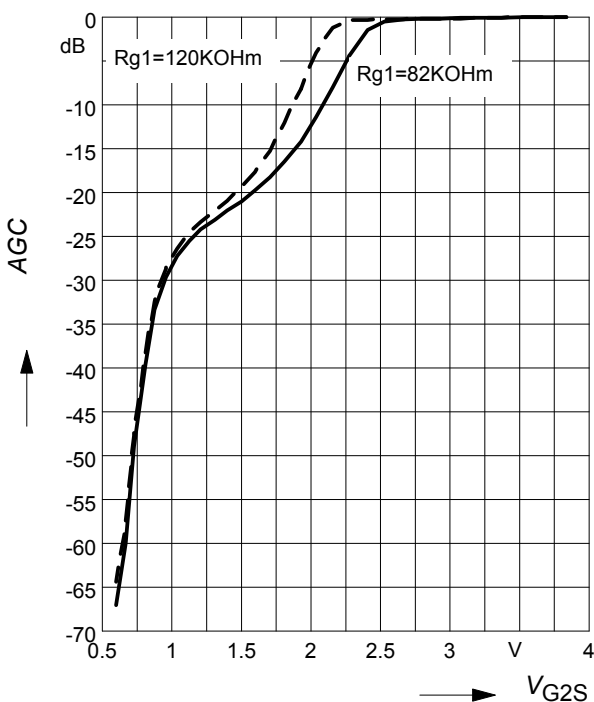
measured in test circuit, see page 7



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

$f = 800\text{ MHz}$

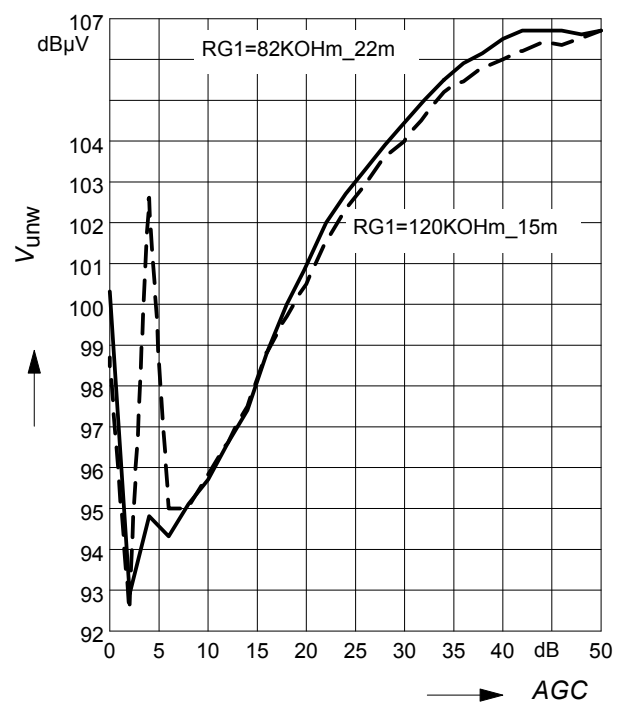
measured in test circuit, see page 7



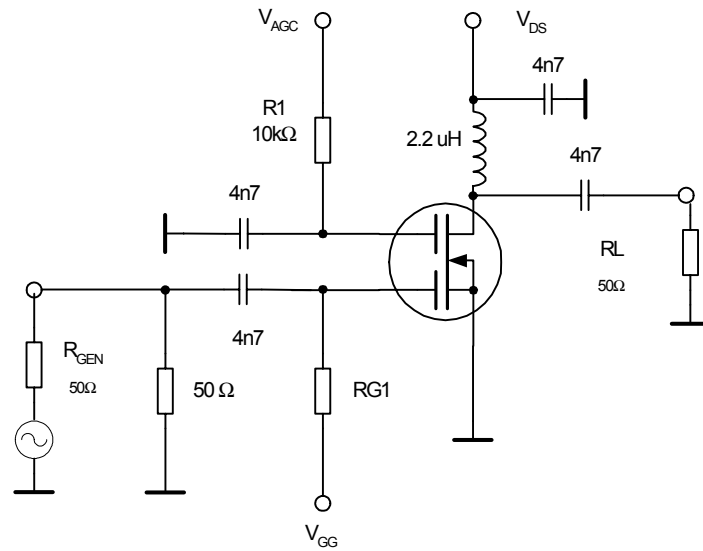
Crossmodulation $V_{unw} = (AGC)$

$V_{DS} = 5\text{ V}$

measured in test circuit, see page 7



Test circuit for Crossmodulation / AGC



Semibiased

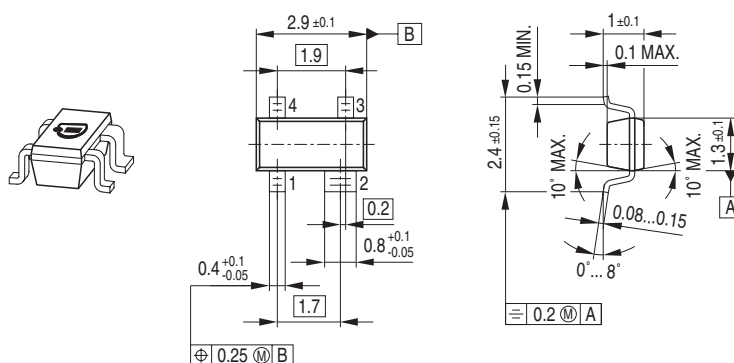
Technical drawing of a 4-pin connector. The drawing includes a perspective view of the component and two detailed cross-sectional views. The perspective view shows a rectangular body with four pins. The left cross-section shows the overall dimensions: a total width of 2.9 ± 0.1 , a central width of 1.9 , and a pin diameter of 0.2 . The right cross-section shows the internal profile with dimensions: a total width of 1 ± 0.1 , a central width of 0.1 MAX., a pin diameter of 0.2 M A , and a pin length of 1.3 ± 0.1 . The drawing also includes various tolerances and material specifications, such as $0.8^{+0.1}_{-0.05}$, $0.4^{+0.1}_{-0.05}$, 0.25 M B , 0.15 MIN. , 10° MAX. , $0.08 \dots 0.15$, $0 \dots 8^\circ$, and 0.1 MAX. .

Figure 1: Marking of the BFP181 package

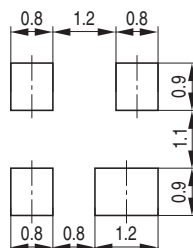
The diagram shows a top-down view of a square package with four pins. The marking area is a rectangle containing 'RF' and 'S' on the left, and '56' on the right. Callouts identify the Infineon logo as the Manufacturer, '2005, June' as the Date code (YM), 'Pin 1' as the bottom-left pin, and 'BFP181' as the Type code.

Technical drawing of a mechanical part, likely a bracket or support. The drawing shows a top view and a side view. The top view dimensions are: overall width 4, overall height 8, distance from the left edge to the center of the first hole 3.15, and distance from the center of the first hole to the center of the second hole 2.6. The side view shows a thickness of 0.2 and a distance of 1.15 from the bottom edge to the center of the first hole. The part has a central rectangular slot and two circular holes on either side. A label 'Pin 1' points to the leftmost hole.

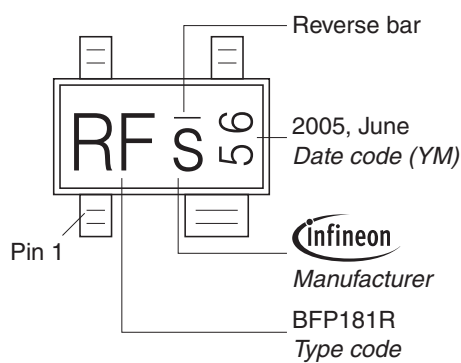
Package Outline



Foot Print

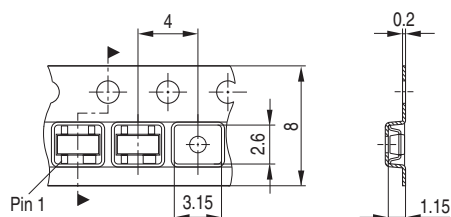


Marking Layout (Example)

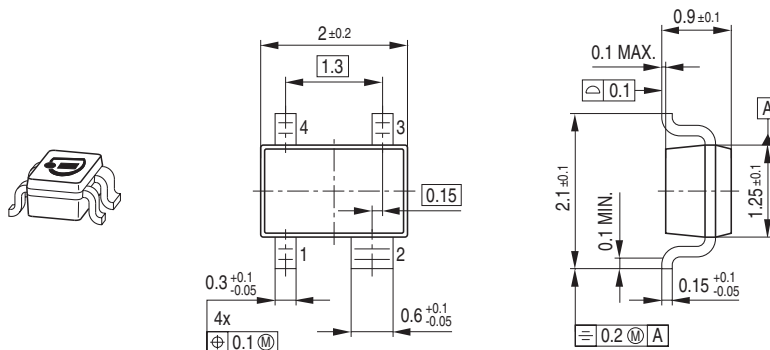


Standard Packing

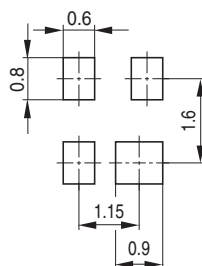
Reel ø180 mm = 3.000 Pieces/Reel
 Reel ø330 mm = 10.000 Pieces/Reel



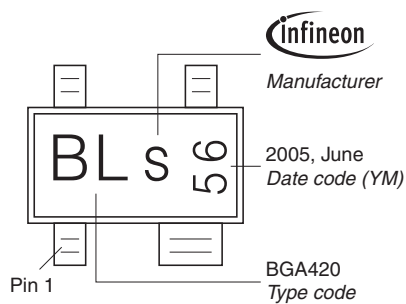
Package Outline



Foot Print

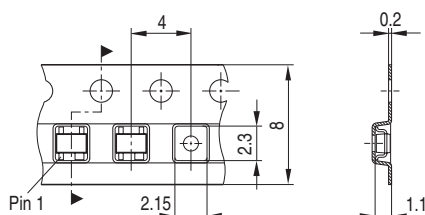


Marking Layout (Example)



Standard Packing

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



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