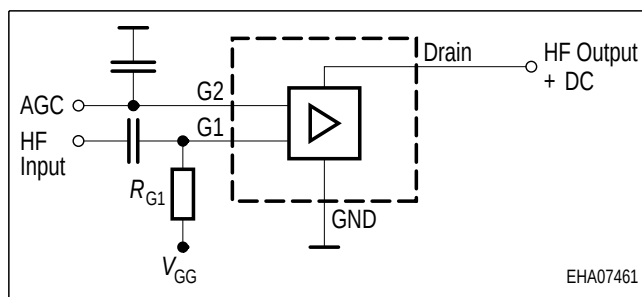
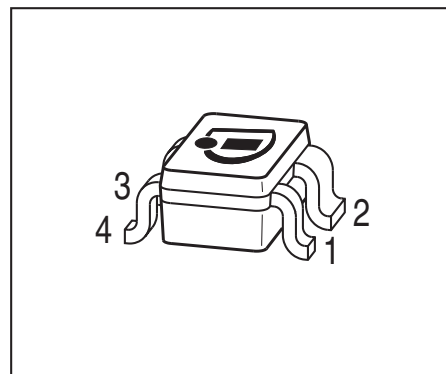


Silicon N-Channel MOSFET Tetrode

- 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 $I_D = 20 \mu A, V_{G1S} = 0, V_{G2S} = 0$	$V_{(BR)DS}$	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	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 $V_{DS} = 5 \text{ V}, V_{G2S} = 4 \text{ V}, I_D = 20 \mu A$	$V_{G1S(p)}$	-	0.7	-	V
Gate2-source pinch-off voltage $V_{DS} = 5 \text{ V}, I_D = 20 \mu A, V_{G1S} = 2 \text{ V}$	$V_{G2S(p)}$	-	0.7	-	

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

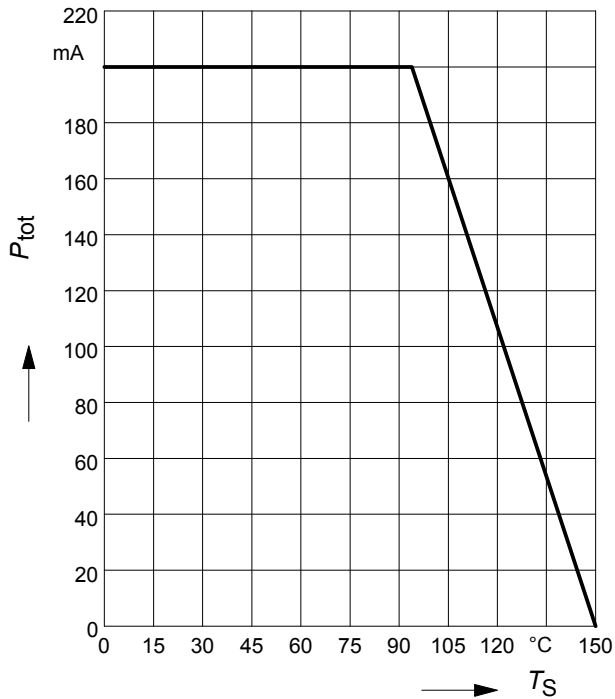
Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

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

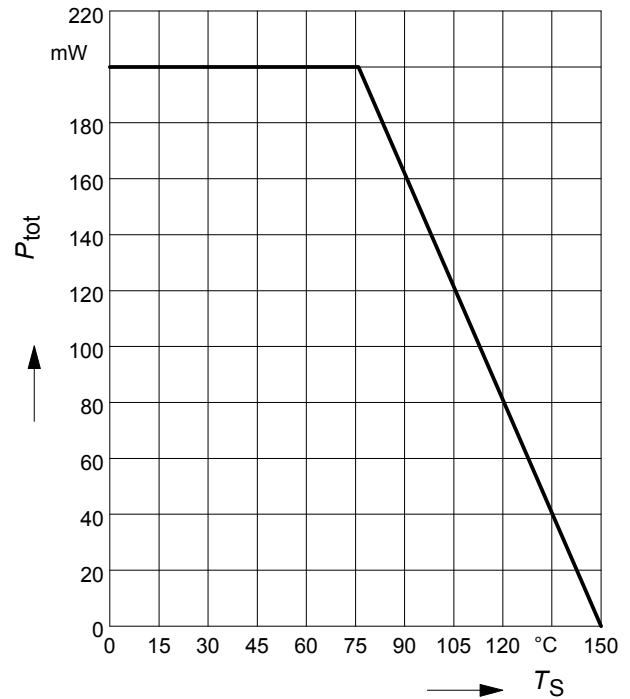
Total power dissipation $P_{\text{tot}} = f(T_S)$

BF5020W

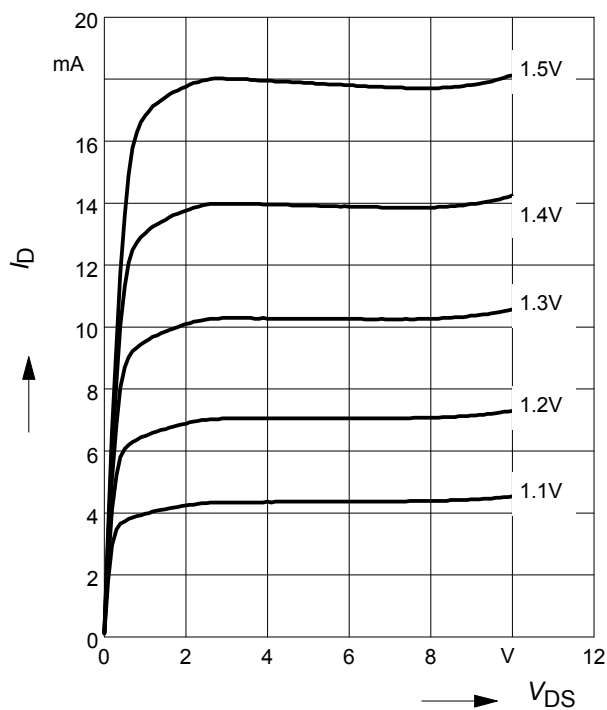


Total power dissipation $P_{\text{tot}} = f(T_S)$

BF5020, BF5020R



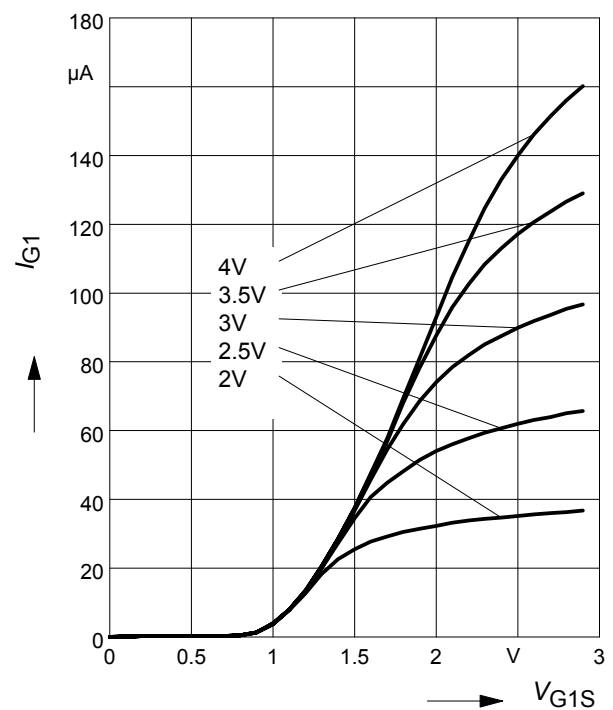
Output characteristics $I_D = f(V_{\text{DS}})$



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

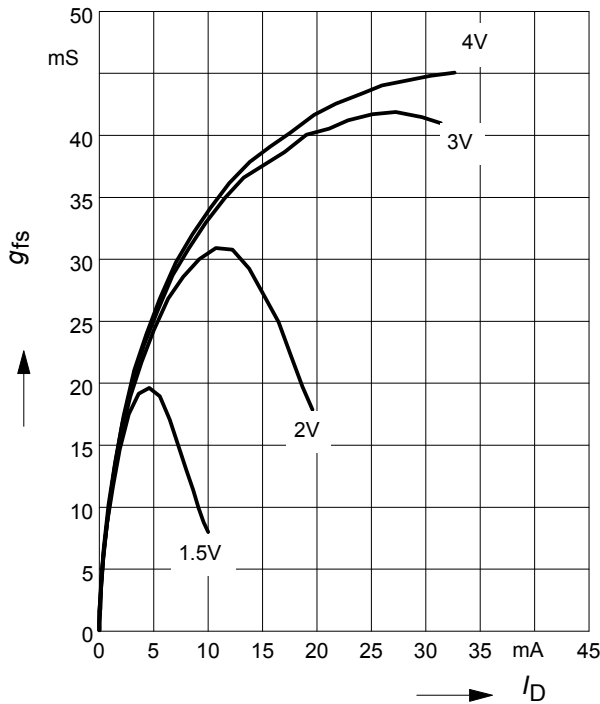
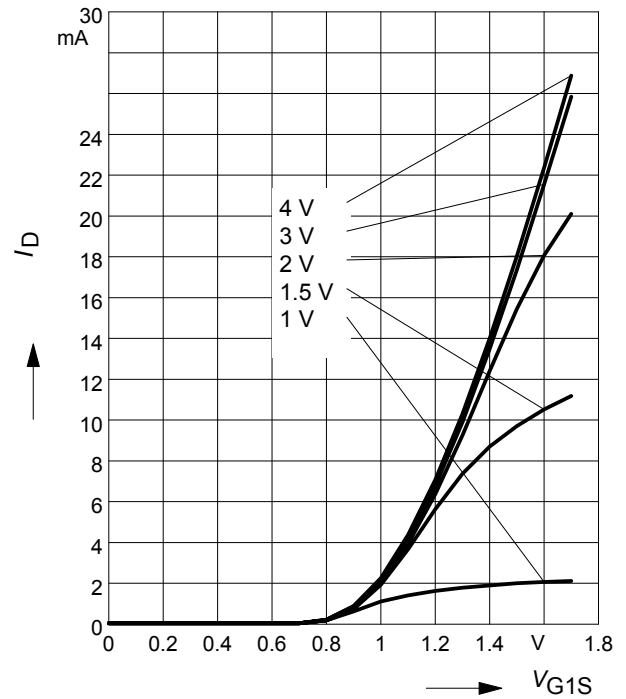
$V_{\text{DS}} = 5\text{V}$

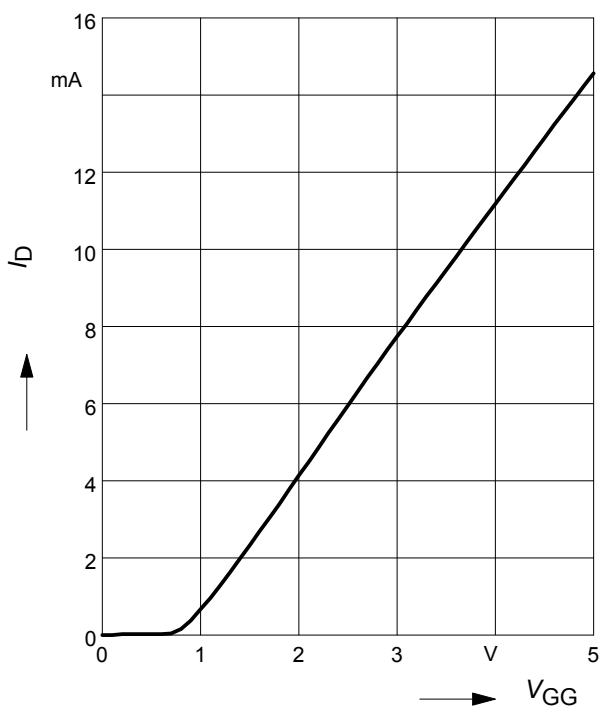
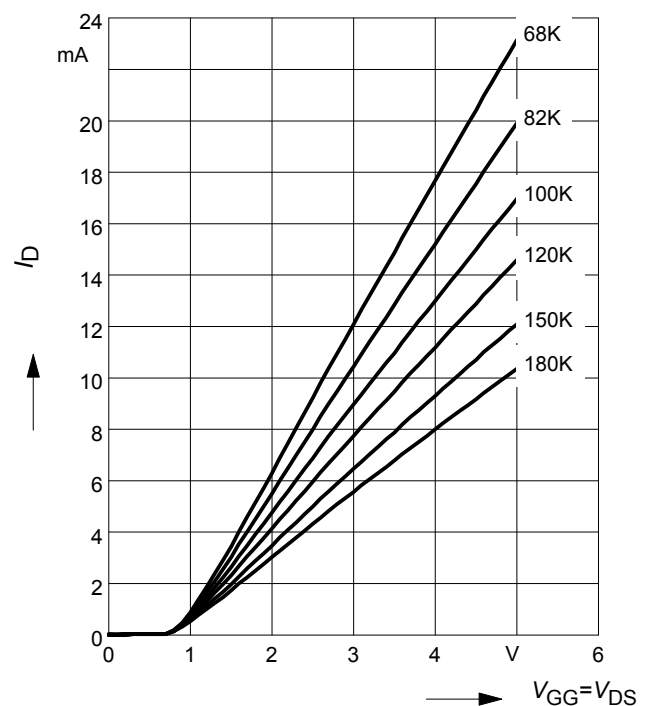
$V_{\text{G2S}} = \text{Parameter}$



Gate 1 forward transconductance

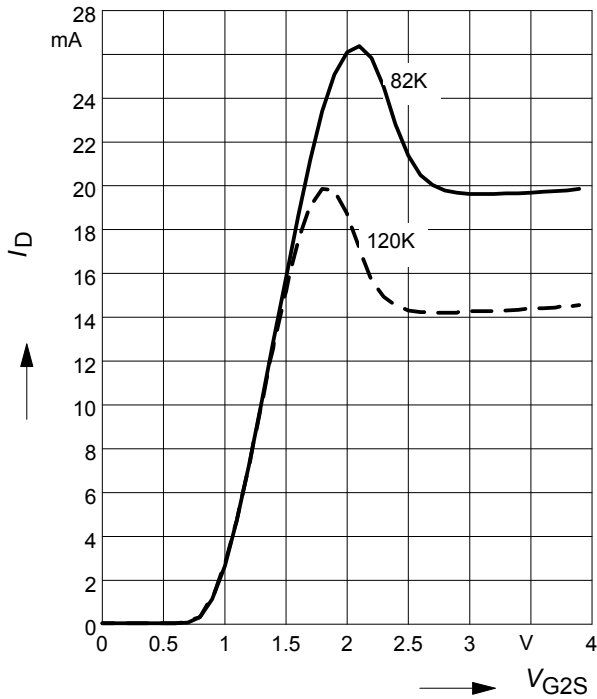
$$g_{fs} = f(I_D)$$

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

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 $I_D = f(V_{G2S})$

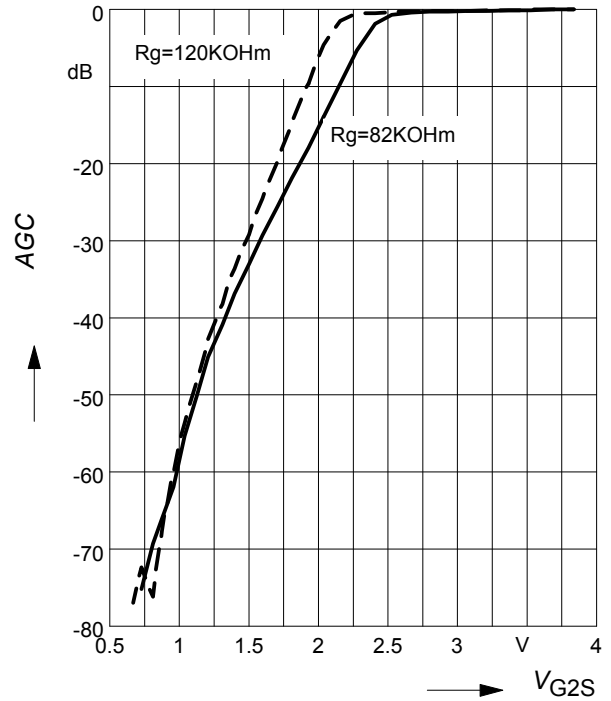
$V_{DS} = 5\text{ V}$, $R_{G1} = \text{Parameter in k}\Omega$



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

$f = 50\text{ MHz}$

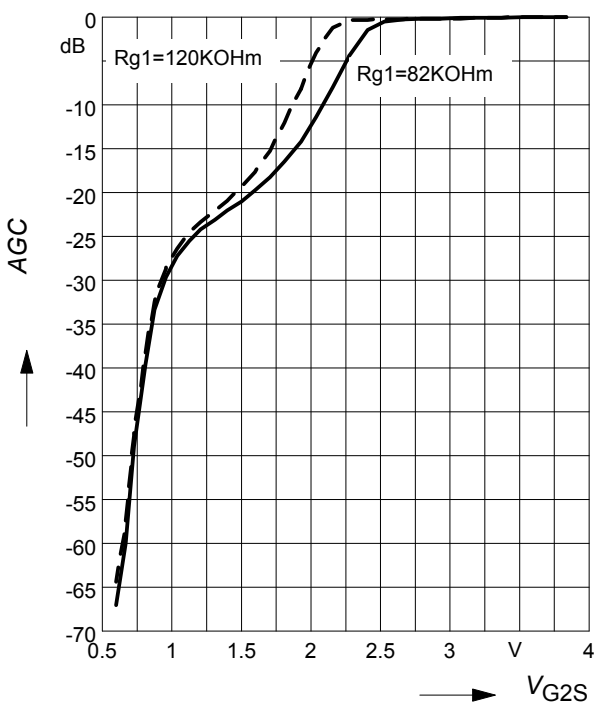
measured in test circuit, see page 7



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

$f = 800\text{ MHz}$

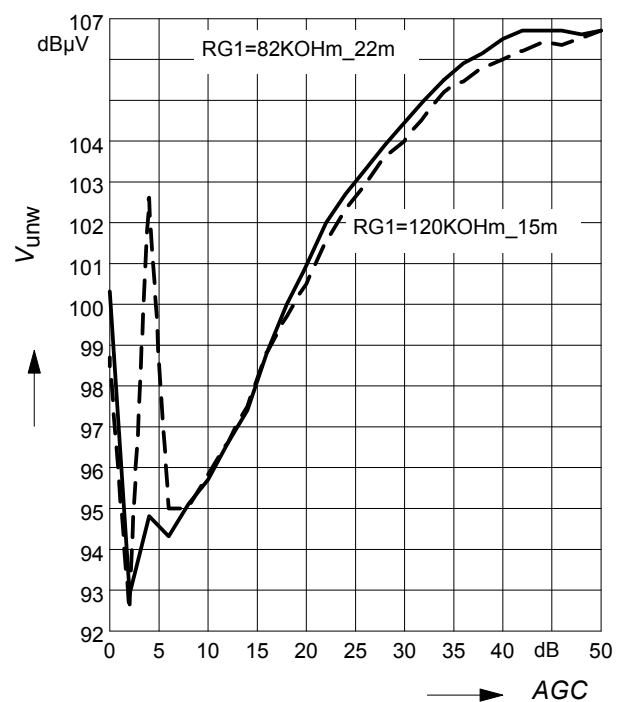
measured in test circuit, see page 7



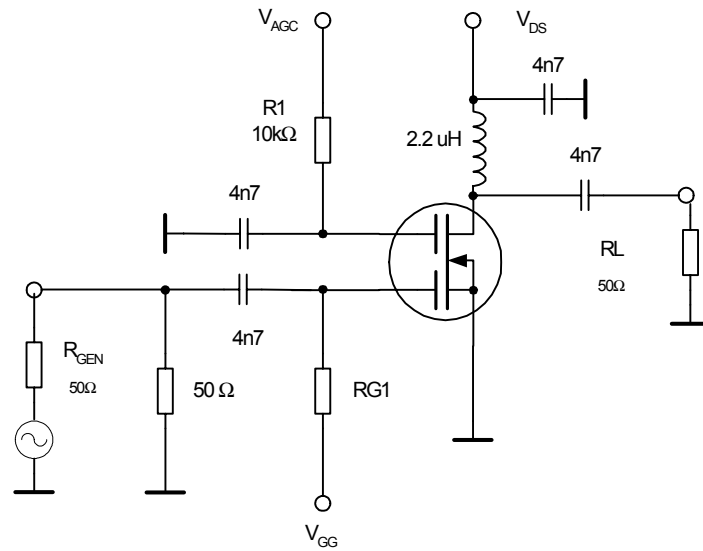
Crossmodulation $V_{unw} = (AGC)$

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

measured in test circuit, see page 7



Test circuit for Crossmodulation / AGC



Semibiased

Technical drawing of a 4-pin D-sub connector. The drawing includes a perspective view of the connector on the left and two detailed cross-sectional views on the right. The left cross-section shows the internal structure with pins 1, 2, 3, and 4, and dimensions for the housing and pins. The right cross-section shows the contact area with dimensions for the contact thickness, contact angle, and contact width. Dimensions are given in millimeters with tolerances.

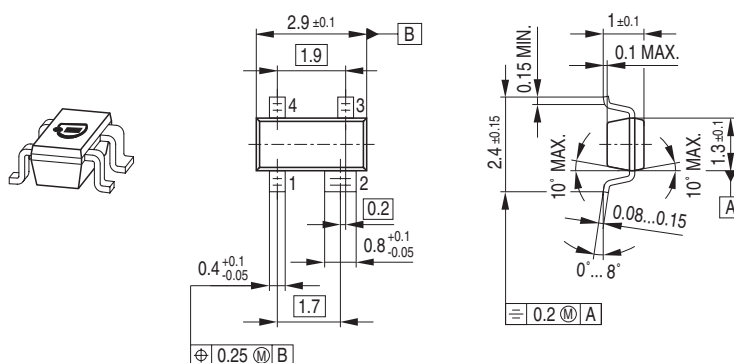
Dimensions (mm):

- Overall width: 2.9 ± 0.1
- Internal width: 1.9
- Pin 1 diameter: 0.2
- Pin 2 diameter: 0.2
- Pin 3 diameter: 0.2
- Pin 4 diameter: 0.2
- Pin 1 length: $0.8^{+0.1}_{-0.05}$
- Pin 2 length: $0.4^{+0.1}_{-0.05}$
- Pin 3 length: $0.4^{+0.1}_{-0.05}$
- Pin 4 length: $0.4^{+0.1}_{-0.05}$
- Pin 1 to Pin 2 distance: 1.7
- Pin 2 to Pin 3 distance: 0.25 M B
- Pin 3 to Pin 4 distance: 0.25 M B
- Pin 4 to Pin 1 distance: 0.25 M B
- Pin 1 to Pin 4 distance: 1.3 ± 0.1
- Pin 1 to Pin 2 distance: 0.2
- Pin 2 to Pin 3 distance: 0.2
- Pin 3 to Pin 4 distance: 0.2
- Pin 4 to Pin 1 distance: 0.2
- Pin 1 to Pin 4 distance: 1.3 ± 0.1
- Pin 1 to Pin 2 distance: 0.2
- Pin 2 to Pin 3 distance: 0.2
- Pin 3 to Pin 4 distance: 0.2
- Pin 4 to Pin 1 distance: 0.2
- Pin 1 to Pin 4 distance: 1.3 ± 0.1

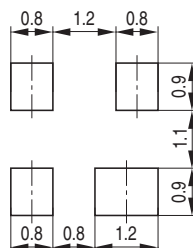
Figure 1: Marking of the BFP181 package

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: 'infineon' as the Manufacturer, '2005, June' as the Date code (YM), 'Pin 1' as the bottom-left pin, and 'BFP181' as the Type code.

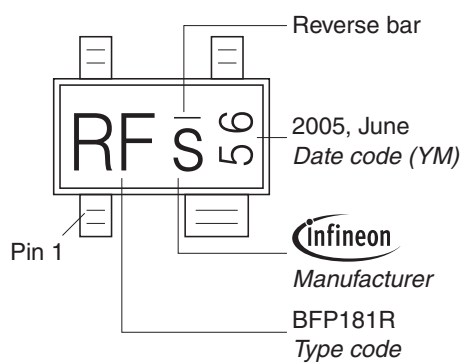
Package Outline



Foot Print

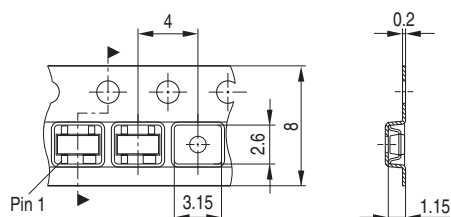


Marking Layout (Example)

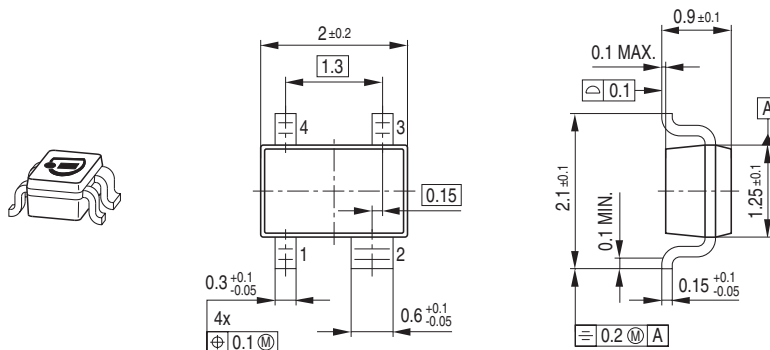


Standard Packing

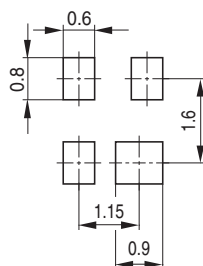
Reel ø180 mm = 3.000 Pieces/Reel
 Reel ø330 mm = 10.000 Pieces/Reel



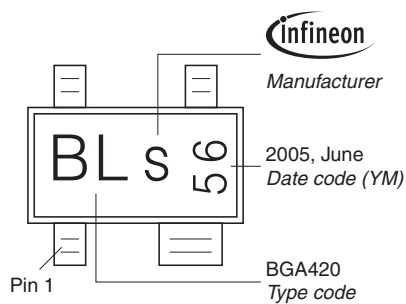
Package Outline



Foot Print

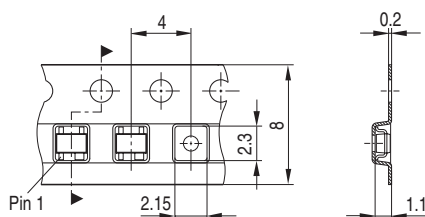


Marking Layout (Example)



Standard Packing

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



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