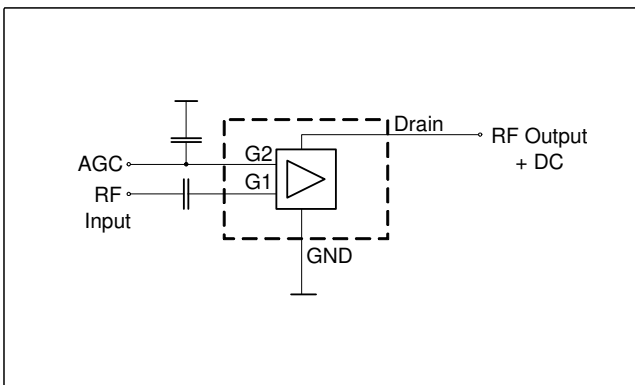
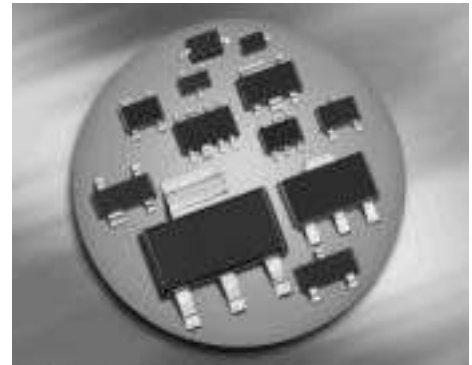


**Silicon N-Channel MOSFET Tetrode**

- For low noise, high gain controlled input stage up to 1 GHz
- Operating voltage 9 V
- Integrated biasing network
- Pb-free (RoHS compliant) package<sup>1)</sup>
- Qualified according AEC Q101



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

Type	Package	Pin Configuration						Marking
BF1009S	SOT143	1=S	2=D	3=G2	4=G1	-	-	JLs
BF1009SR	SOT143R	1=D	2=S	3=G1	4=G2	-	-	JLs

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	12	V
Continuous drain current	$I_D$	25	mA
Gate 1/ gate 2-source current	$\pm I_{G1/2SM}$	10	
Gate 1 (external biasing)	$+V_{G1SE}$	3	V
Total power dissipation $T_S \leq 76 \text{ }^\circ\text{C}$ , BF1009S, BF1009SR	$P_{tot}$	200	mW
Storage temperature	$T_{stg}$	-55 ... 150	$^\circ\text{C}$
Channel temperature	$T_{ch}$	150	

<sup>1)</sup>Pb-containing package may be available upon special request

**Note:**

**It is not recommended to apply external DC-voltage on Gate 1 in active mode.**

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Channel - soldering point <sup>1)</sup> BF1009S, BF1009SR	$R_{thchs}$	$\leq 370$	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 $I_D = 500 \mu\text{A}$ , $V_{G1S} = 0$ , $V_{G2S} = 0$	$V_{(BR)DS}$	12	-	-	V
Gate1-source breakdown voltage $+I_{G1S} = 10 \text{ mA}$ , $V_{G2S} = 0$ , $V_{DS} = 0$	$+V_{(BR)G1SS}$	9	-	12	
Gate2 source breakdown voltage $\pm I_{G2S} = 10 \text{ mA}$ , $V_{G1S} = 0$ , $V_{DS} = 0$	$\pm V_{(BR)G2SS}$	9	-	12	
Gate1-source leakage current $V_{G1S} = 6 \text{ V}$ , $V_{G2S} = 0$	$+I_{G1SS}$	-	-	60	$\mu\text{A}$
Gate 2 source leakage current $\pm V_{G2S} = 8 \text{ V}$ , $V_{G1S} = 0$ , $V_{DS} = 0$	$\pm I_{G2SS}$	-	-	50	nA
Drain current $V_{DS} = 9 \text{ V}$ , $V_{G1S} = 0$ , $V_{G2S} = 6 \text{ V}$	$I_{DSS}$	-	-	500	$\mu\text{A}$
Operating current (selfbiased) $V_{DS} = 9 \text{ V}$ , $V_{G2S} = 6 \text{ V}$	$I_{DSO}$	10	13	16	mA
Gate2-source pinch-off voltage $V_{DS} = 9 \text{ V}$ , $I_D = 500 \mu\text{A}$	$V_{G2S(p)}$	-	0.9	-	V

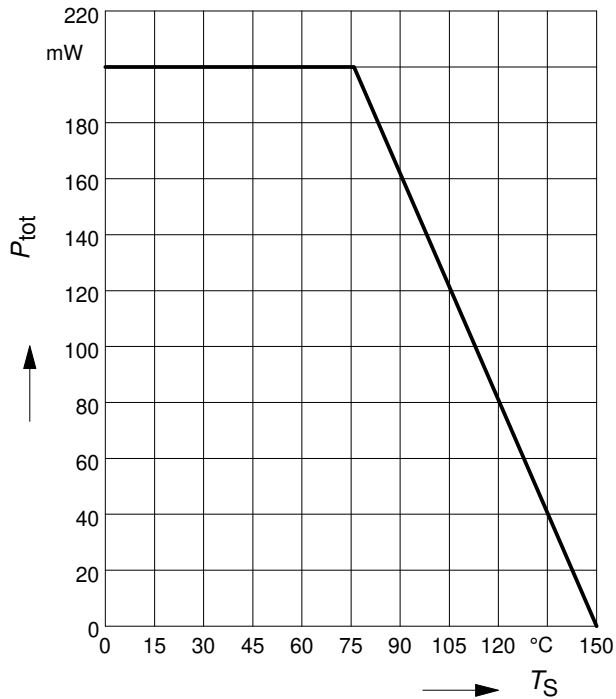
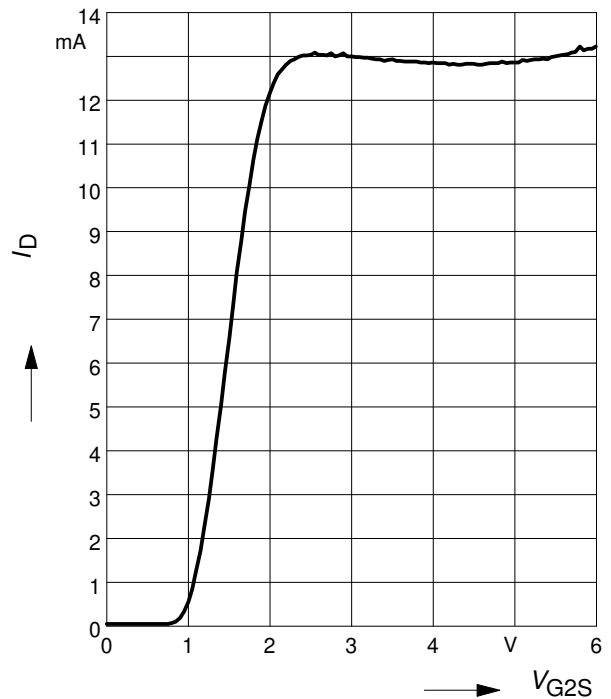
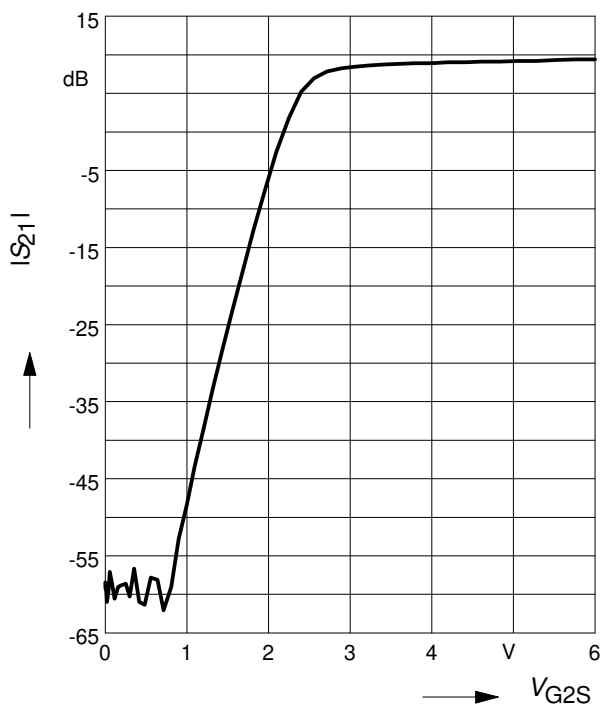
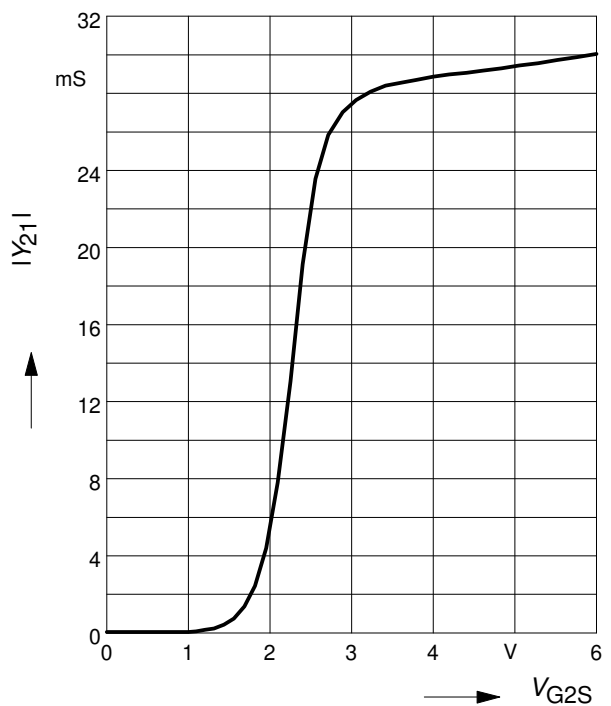
<sup>1)</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics</b> (verified by random sampling)					
Forward transconductance $V_{DS} = 9\text{ V}, V_{G2S} = 6\text{ V}$	$g_{fs}$	26	30	-	mS
Gate1 input capacitance $V_{DS} = 9\text{ V}, V_{G2S} = 6\text{ V}, f = 10\text{ MHz}$	$C_{g1ss}$	-	2.1	2.7	pF
Output capacitance $V_{DS} = 9\text{ V}, V_{G2S} = 6\text{ V}, f = 10\text{ MHz}$	$C_{dss}$	-	0.9	-	
Power gain (self biased) $V_{DS} = 9\text{ V}, V_{G2S} = 6\text{ V}, f = 800\text{ MHz}$	$G_p$	18	22	-	dB
Noise figure $V_{DS} = 9\text{ V}, V_{G2S} = 6\text{ V}, f = 800\text{ MHz}$	$F$	-	1.4	2.1	dB
Gain control range $V_{DS} = 9\text{ V}, V_{G2S} = 6 \dots 0\text{ V}, f = 800\text{ MHz}$	$\Delta G_p$	40	50	-	

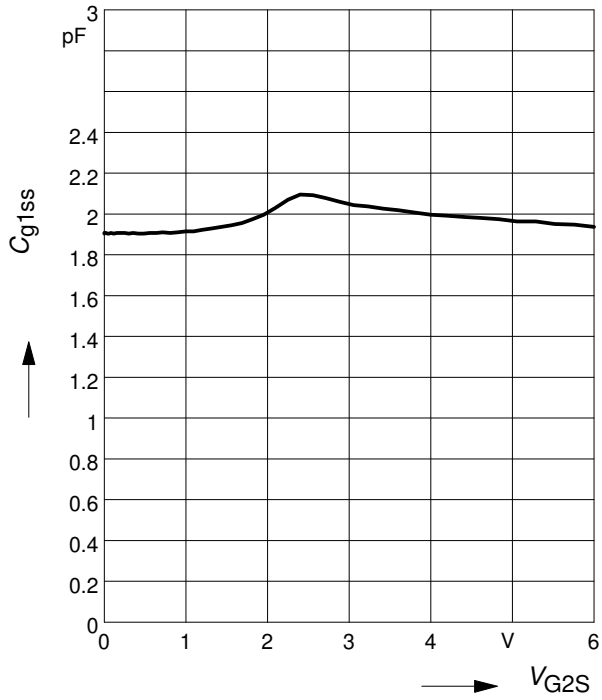
**Total power dissipation  $P_{\text{tot}} = f(T_S)$** 

BF1009S, BF1009SR


**Drain current  $I_D = f(V_{G2S})$** 
 $V_{DS} = 9 \text{ V}$ 

**Insertion power gain**
 $|S_{21}|^2 = f(V_{G2S}), f = 200 \text{ MHz}$ 

**Forward transfer admittance**
 $|Y_{21}| = f(V_{G2S}), f = 200 \text{ MHz}$ 


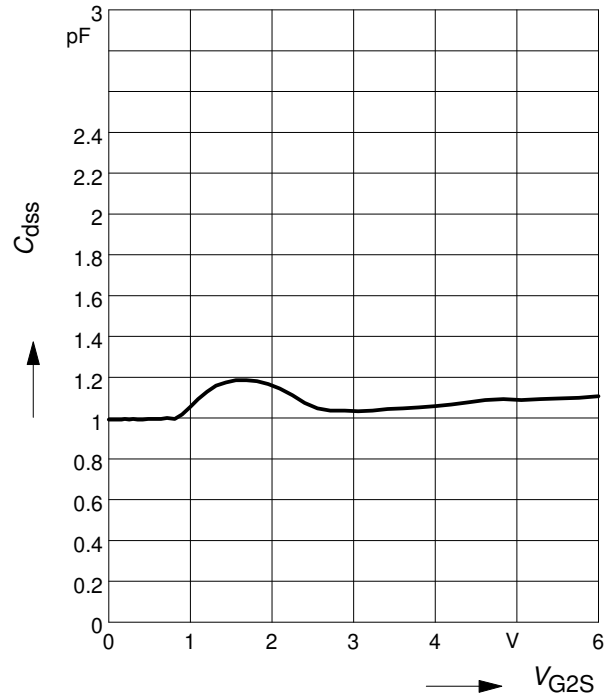
**Gate 1 input capacitance**  $C_{g1ss} = f(V_{G2S})$

$f = 200 \text{ MHz}$

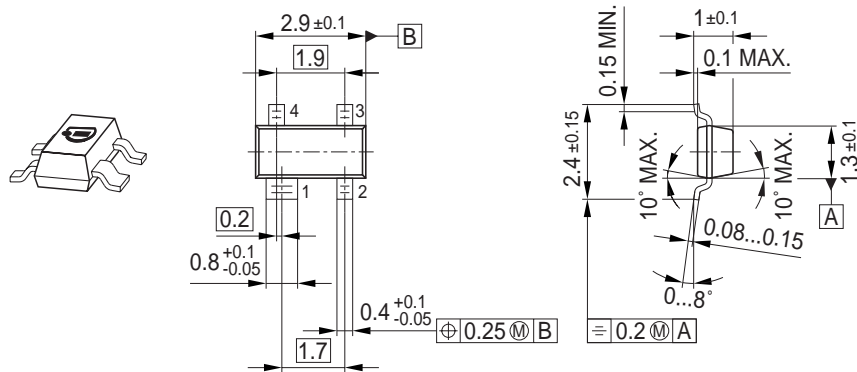


**Output capacitance**  $C_{dss} = f(V_{G2S})$

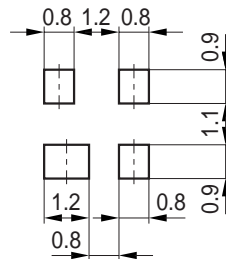
$f = 200 \text{ MHz}$



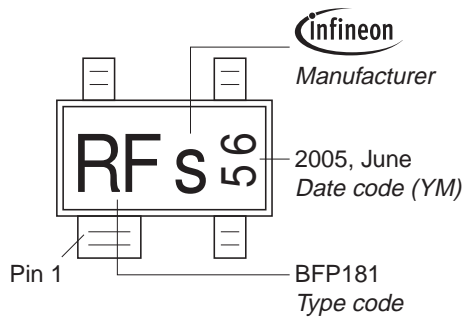
Package Outline



Foot Print

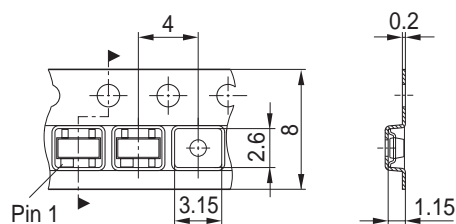


Marking Layout (Example)

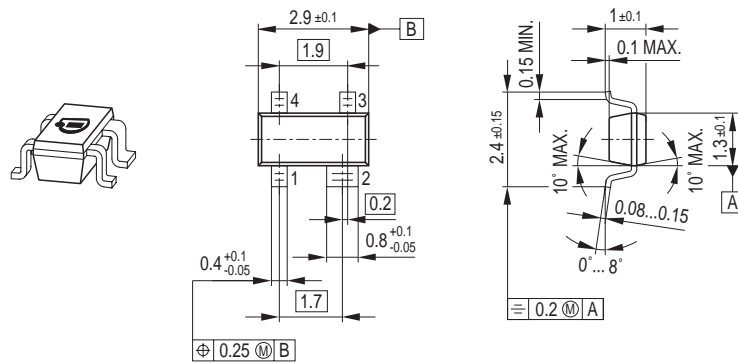


Standard Packing

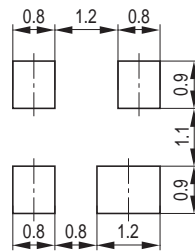
Reel  $\varnothing 180 \text{ mm} = 3.000 \text{ Pieces/Reel}$   
 Reel  $\varnothing 330 \text{ mm} = 10.000 \text{ Pieces/Reel}$



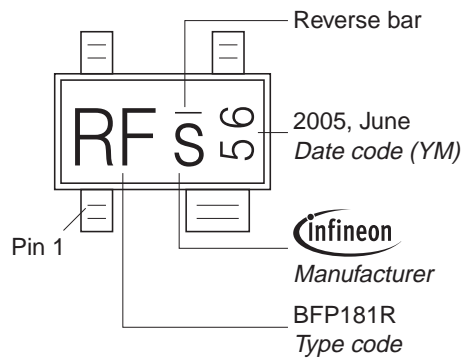
Package Outline



Foot Print

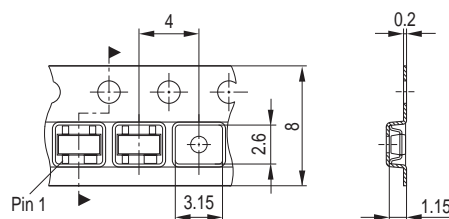


Marking Layout (Example)



Standard Packing

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



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