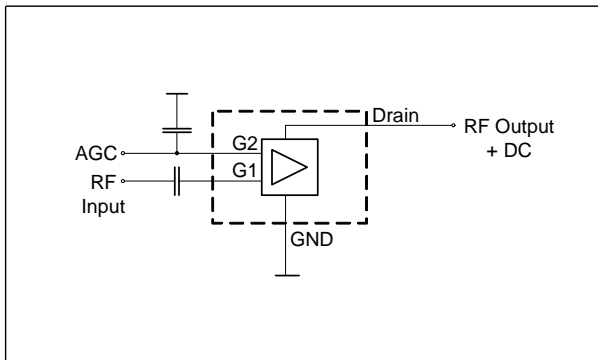
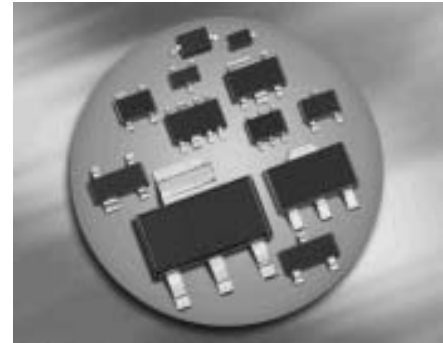


Silicon N-Channel MOSFET Tetrode

- For low noise, high gain controlled input stage up to 1 GHz
- Operating voltage 9 V
- Integrated biasing network
- Pb-free (RoHS compliant) package¹⁾
- 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	°C
Channel temperature	T_{ch}	150	

¹Pb-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 ¹⁾ BF1009S, BF1009SR	R_{thchs}	≤ 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	μA
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	μA
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

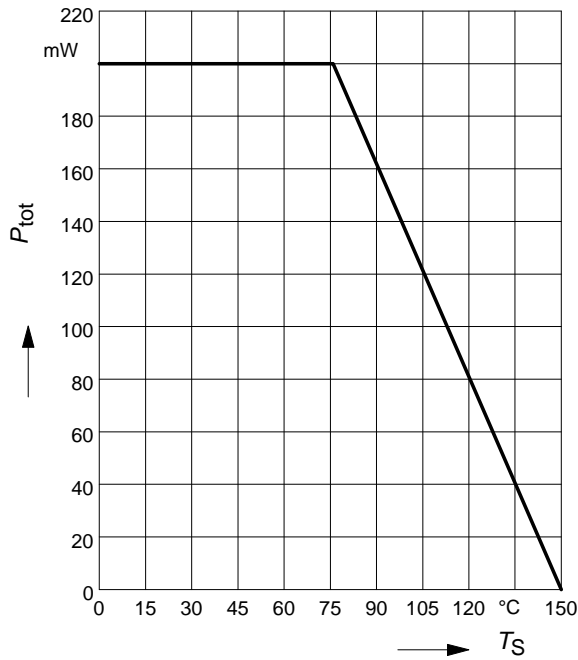
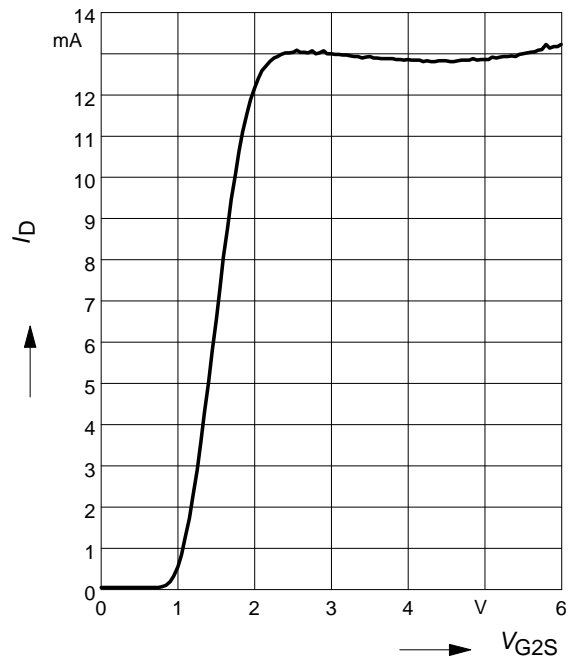
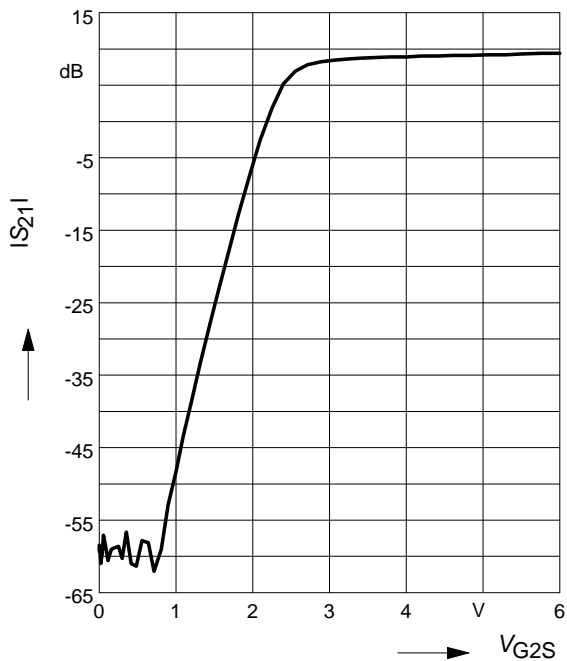
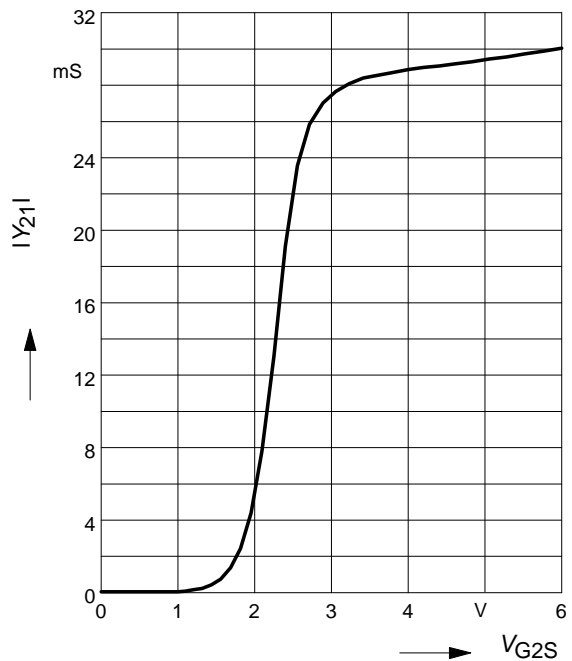
¹⁾For calculation of R_{thJA} please refer to Application Note Thermal Resistance

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 $V_{DS} = 9\text{ V}, V_{G2S} = 6\text{ V}$	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 $V_{DS} = 9\text{ V}, V_{G2S} = 6 \dots 0\text{ V}, f = 800\text{ MHz}$	ΔG_p	40	50	-	

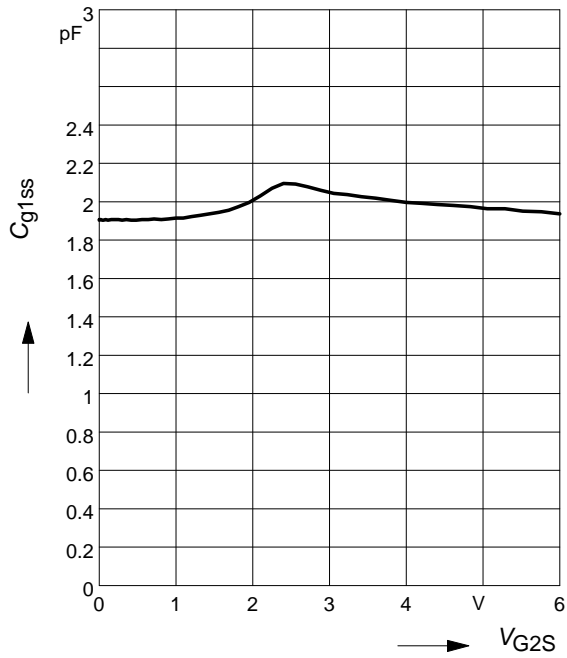
Total power dissipation $P_{tot} = f(T_S)$

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


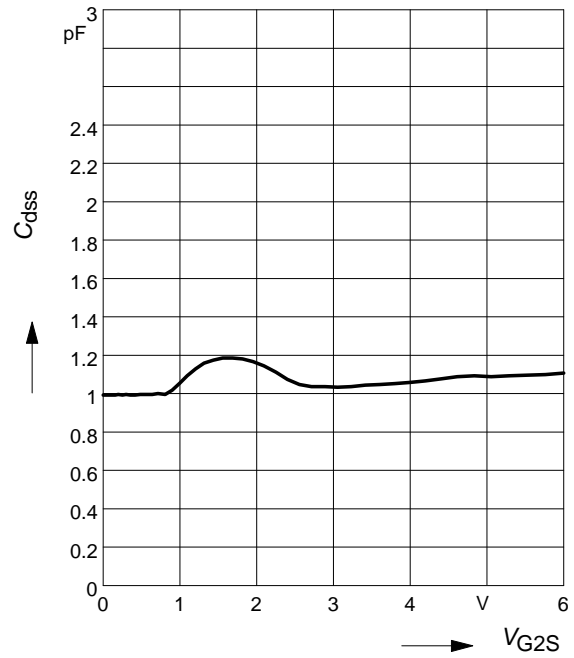
Gate 1 input capacitance $C_{g1ss} = f(V_{G2S})$

$f = 200 \text{ MHz}$

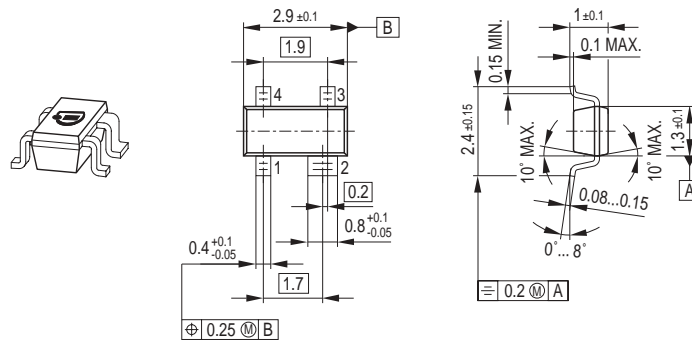


Output capacitance $C_{dss} = f(V_{G2S})$

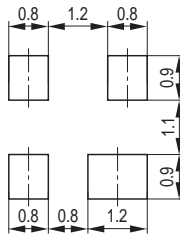
$f = 200 \text{ MHz}$



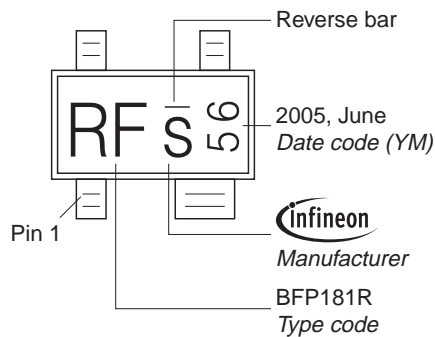
Package Outline



Foot Print

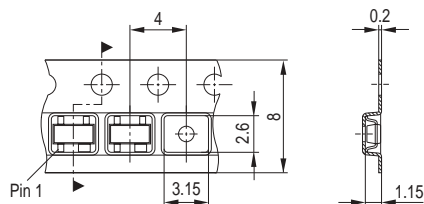


Marking Layout (Example)



Standard Packing

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



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