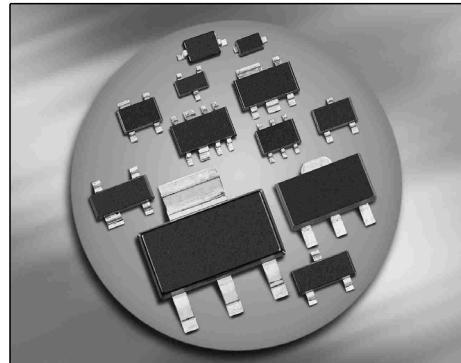


Silicon N_Channel MOSFET Tetrode

- Short-channel transistor with high S / C quality factor
- For low-noise, gain-controlled input stage up to 1 GHz



ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Package	Pin Configuration						Marking
BF998	SOT143	1=S	2=D	3=G2	4=G1	-	-	MOs
BF998R	SOT143R	1=D	2=S	3=G1	4=G2	-	-	MRs
BF998W	SOT343	1=D	2=S	3=G1	4=G2	-	-	MR

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	12	V
Continuous drain current	I_D	30	mA
Gate 1/ gate 2-source current	$\pm I_{G1/2SM}$	10	
Total power dissipation $T_S \leq 76 \text{ }^\circ\text{C}$, BF998, BF998R	P_{tot}	200	
$T_S \leq 94 \text{ }^\circ\text{C}$, BF998W		200	
Storage temperature	T_{stg}	-55 ... 150	°C
Channel temperature	T_{ch}	150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Channel - soldering point ¹⁾ BF998, BF998R	R_{thchs}	≤ 370	K/W
BF998W		≤ 280	

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

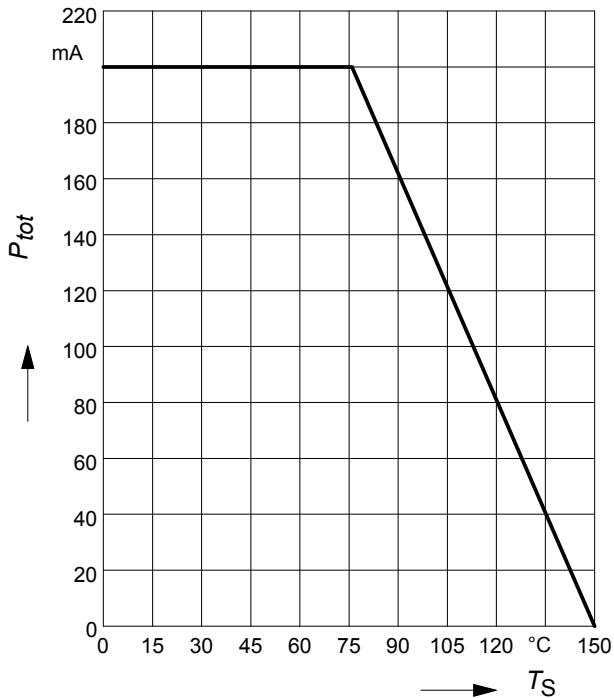
Electrical Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Drain-source breakdown voltage $I_D = 10 \mu A, V_{G1S} = -4 V, V_{G2S} = -4 V$	$V_{(BR)DS}$	12	-	-	V
Gate 1 source breakdown voltage $\pm I_{G2S} = 10 mA, V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)G1SS}$	8	-	12	
Gate2 source breakdown voltage $\pm I_{G2S} = 10 mA, V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)G2SS}$	8	-	12	
Gate 1 source leakage current $\pm V_{G1S} = 5 V, V_{G2S} = V_{DS} = 0$	$\pm I_{G1SS}$	-	-	50	nA
Gate 2 source leakage current $\pm V_{G2S} = 5 V, V_{G2S} = V_{DS} = 0$	$\pm I_{G2SS}$	-	-	50	nA
Drain current $V_{DS} = 8 V, V_{G1S} = 0, V_{G2S} = 4 V$	I_{DSS}	5	9	15	mA
Gate 1 source pinch-off voltage $V_{DS} = 8 V, V_{G2S} = 4 V, I_D = 20 \mu A$	$-V_{G1S(p)}$	-	0.8	2.5	V
Gate 2 source pinch-off voltage $V_{DS} = 8 V, V_{G1S} = 0, I_D = 20 \mu A$	$-V_{G2S(p)}$	-	0.8	2	

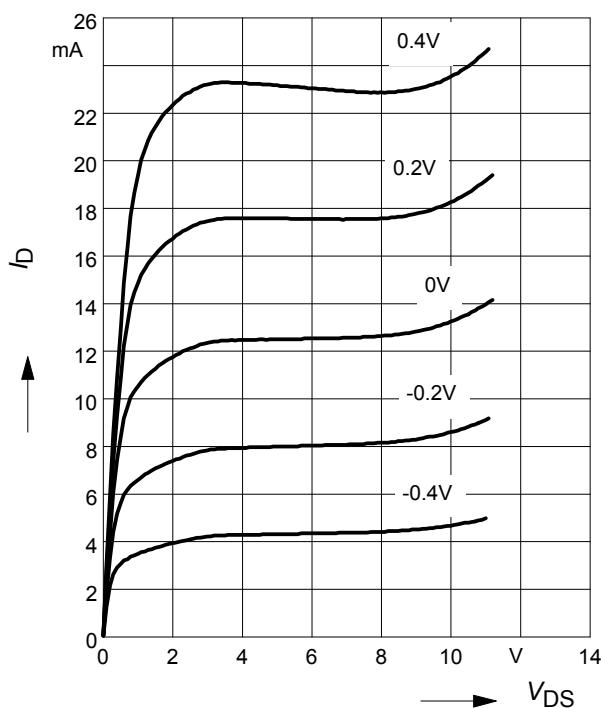
Electrical Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Forward transconductance $V_{DS} = 8 \text{ V}$, $I_D = 10 \text{ mA}$, $V_{G2S} = 4 \text{ V}$	g_{fs}	20	24	-	-
Gate 1 input capacitance $V_{DS} = 8 \text{ V}$, $I_D = 10 \text{ mA}$, $V_{G2S} = 4 \text{ V}$, $f = 1 \text{ MHz}$	C_{g1ss}	-	2.1	2.5	pF
Gate 2 input capacitance $V_{DS} = 8 \text{ V}$, $I_D = 10 \text{ mA}$, $V_{G2S} = 4 \text{ V}$, $f = 1 \text{ MHz}$	C_{g2ss}	-	1.2	-	pF
Feedback capacitance $V_{DS} = 8 \text{ V}$, $I_D = 10 \text{ mA}$, $V_{G2S} = 4 \text{ V}$, $f = 1 \text{ MHz}$	C_{dg1}	-	25	-	fF
Output capacitance $V_{DS} = 8 \text{ V}$, $I_D = 10 \text{ mA}$, $V_{G2S} = 4 \text{ V}$, $f = 1 \text{ MHz}$	C_{dss}	-	1.1	-	pF
Power gain $V_{DS} = 8 \text{ V}$, $I_D = 10 \text{ mA}$, $V_{G2S} = 4 \text{ V}$, $f = 45 \text{ MHz}$ $V_{DS} = 8 \text{ V}$, $I_D = 10 \text{ mA}$, $V_{G2S} = 4 \text{ V}$, $f = 800 \text{ MHz}$	G_p	-	28	-	dB
Noise figure $V_{DS} = 8 \text{ V}$, $I_D = 10 \text{ mA}$, $V_{G2S} = 4 \text{ V}$, $f = 45 \text{ MHz}$ $V_{DS} = 8 \text{ V}$, $I_D = 10 \text{ mA}$, $V_{G2S} = 4 \text{ V}$, $f = 800 \text{ MHz}$	F	-	2.8	-	dB
Gain control range $V_{DS} = 8 \text{ V}$, $V_{G2S} = 4 \dots -2 \text{ V}$, $f = 800 \text{ MHz}$	ΔG_p	40	50	-	

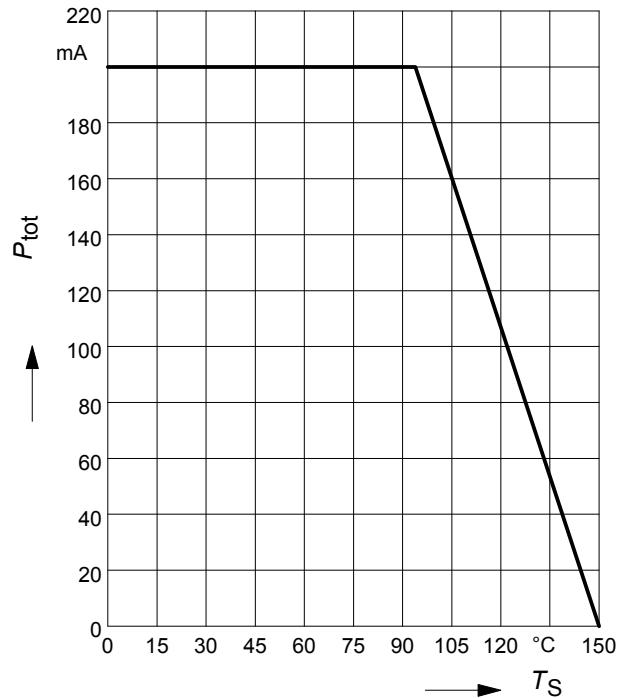
Total power dissipation $P_{\text{tot}} = f(T_S)$
BF998, BF998R



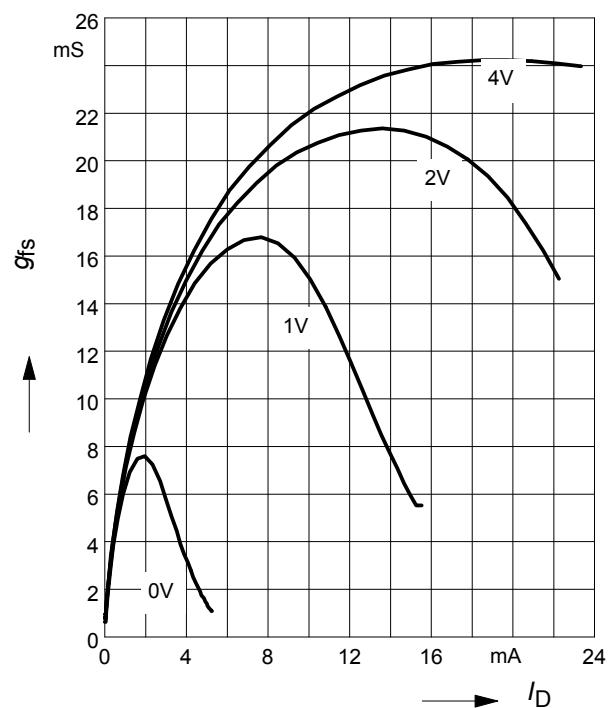
Output characteristics $I_D = f(V_{DS})$
 $V_{G2S} = 4 \text{ V}$
 $V_{G1S} = \text{Parameter}$



Total power dissipation $P_{\text{tot}} = f(T_S)$
BF998W

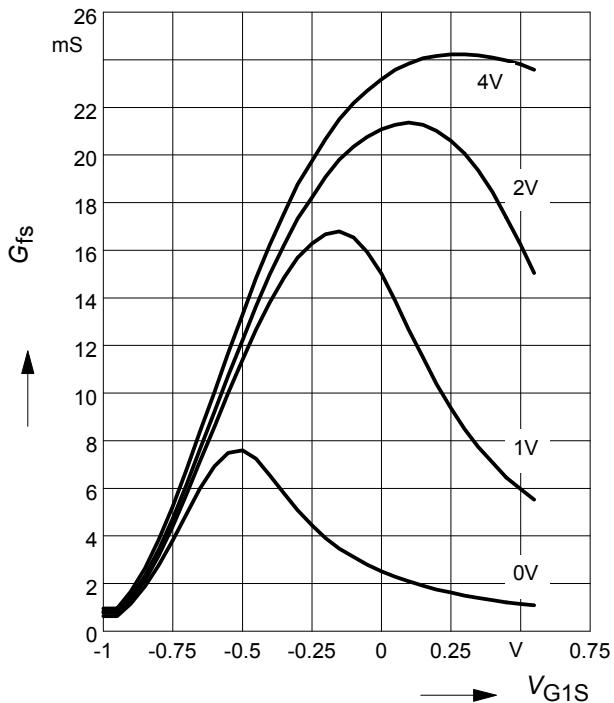


Gate 1 forward transconductance
 $g_{fs} = f(I_D)$
 $V_{DS} = 5 \text{ V}, V_{G2S} = \text{Parameter}$



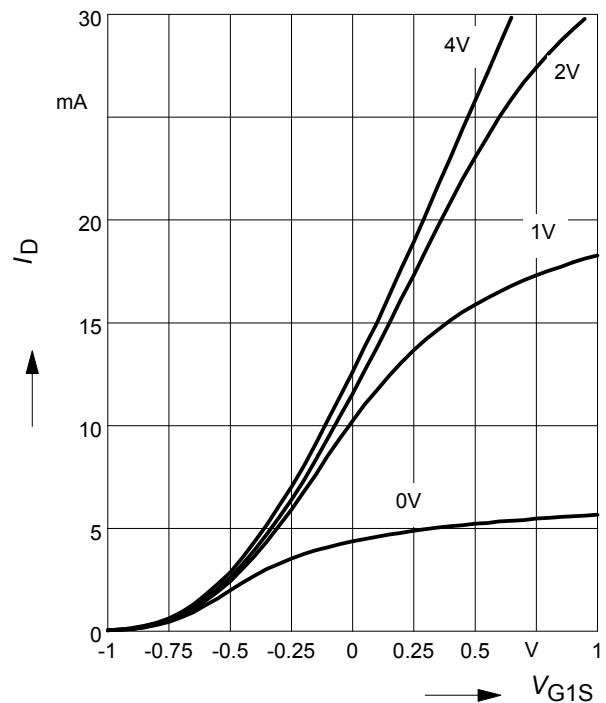
Gate 1 forward transconductance

$$g_{fs1} = f(V_{G1S})$$

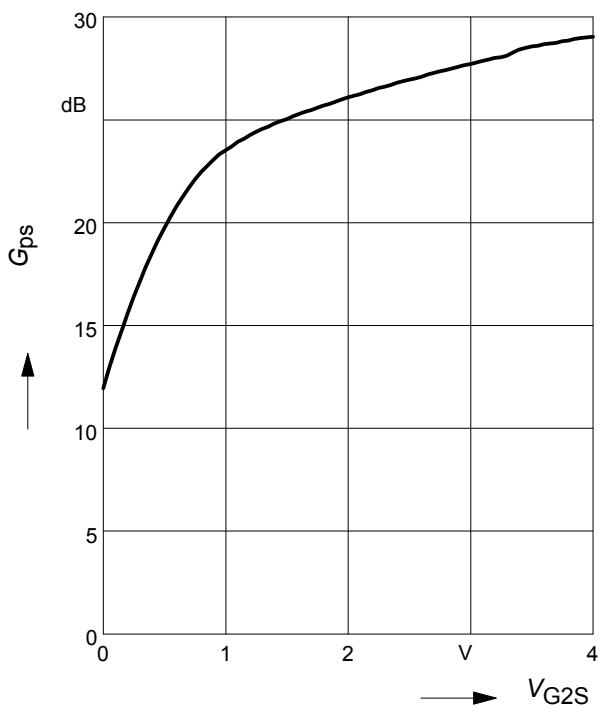

Drain current $I_D = f(V_{G1S})$

$$V_{DS} = 5V$$

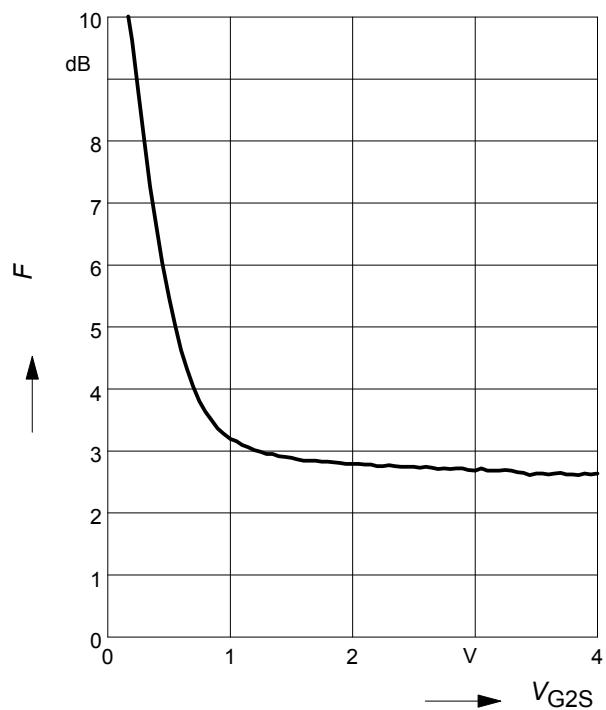
V_{G2S} = Parameter


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

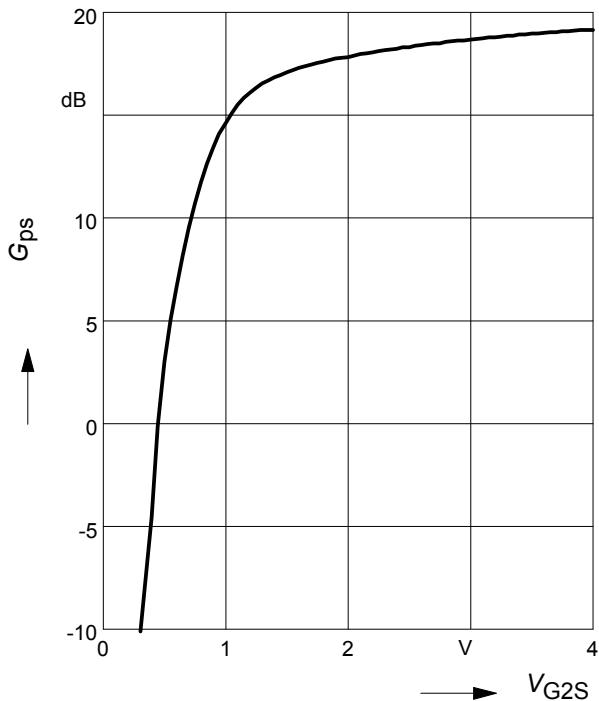
$$f = 45 \text{ MHz}$$


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

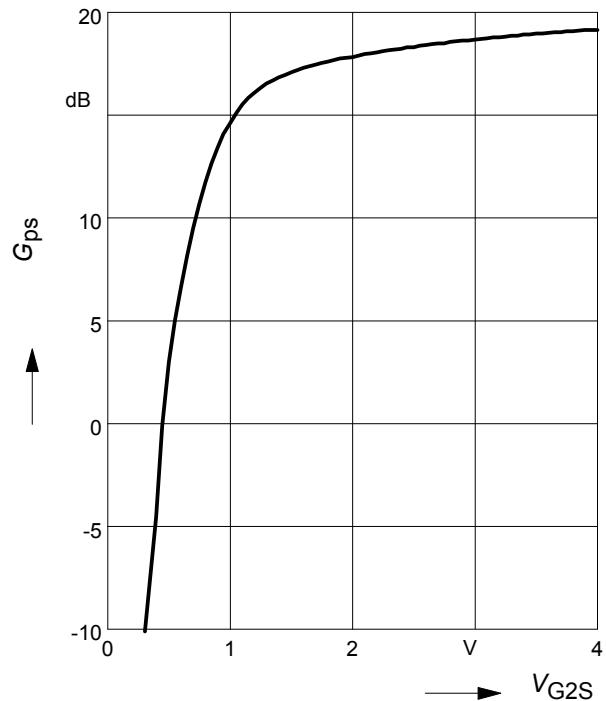
$$f = 45 \text{ MHz}$$



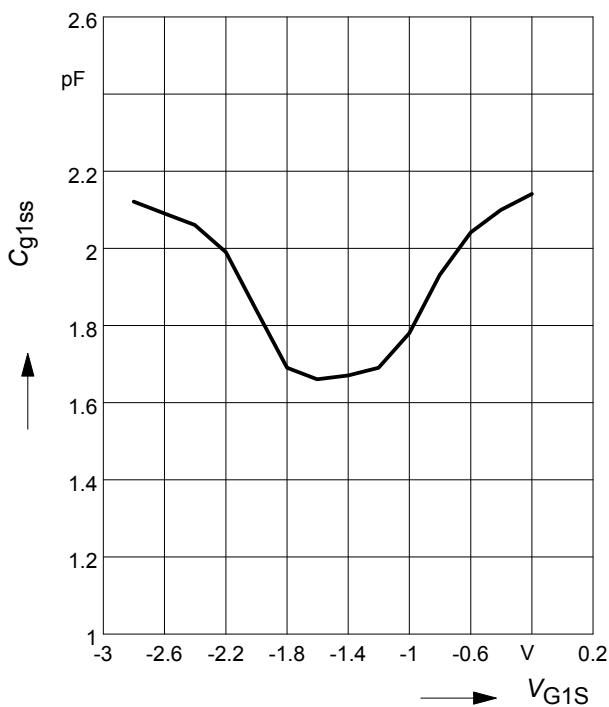
Power gain $G_{ps} = f(V_{G2S})$
 $f = 800 \text{ MHz}$



Power gain $G_{ps} = f(V_{G2S})$
 $f = 800 \text{ MHz}$



Gate 1 input capacitance $C_{g1ss} = f(V_{G1S})$



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

