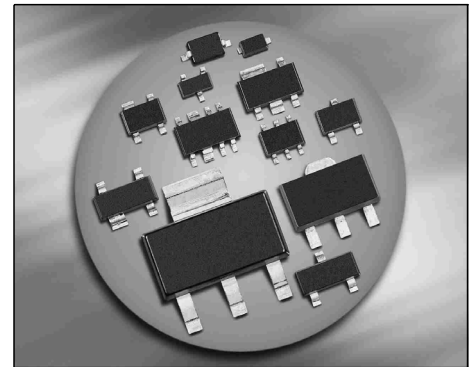


Silicon N_Channel MOSFET Tetrode

- 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	P_{tot}		
$T_S \leq 76^\circ\text{C}$, BF998, BF998R		200	
$T_S \leq 94^\circ\text{C}$, BF998W		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⁾	R_{thchs}		K/W
BF998, BF998R		≤ 370	
BF998W		≤ 280	

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

Electrical Characteristics

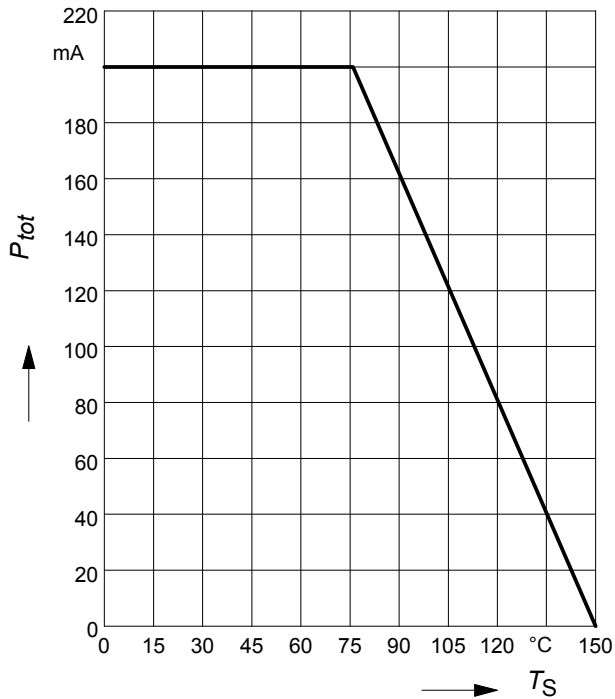
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Drain-source breakdown voltage $I_D = 10\text{ }\mu\text{A}$, $V_{G1S} = -4\text{ V}$, $V_{G2S} = -4\text{ V}$	$V_{(BR)DS}$	12	-	-	V
Gate 1 source breakdown voltage $\pm I_{G2S} = 10\text{ mA}$, $V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)G1SS}$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

Electrical Characteristics

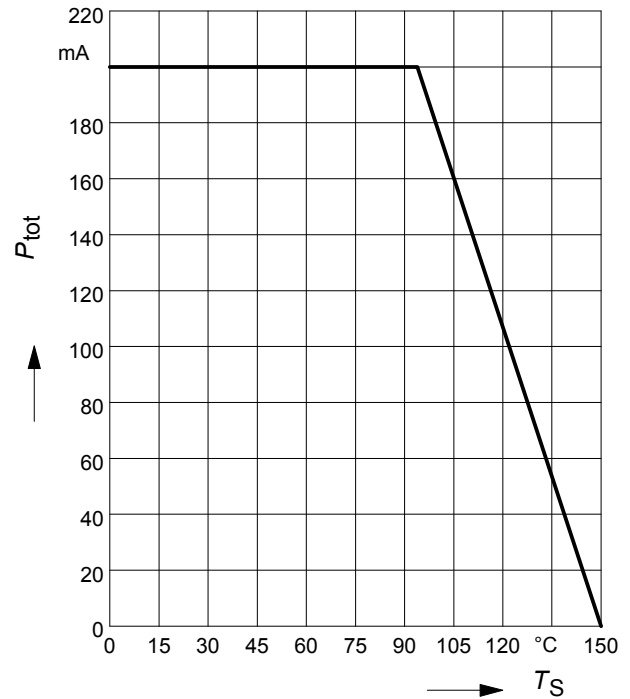
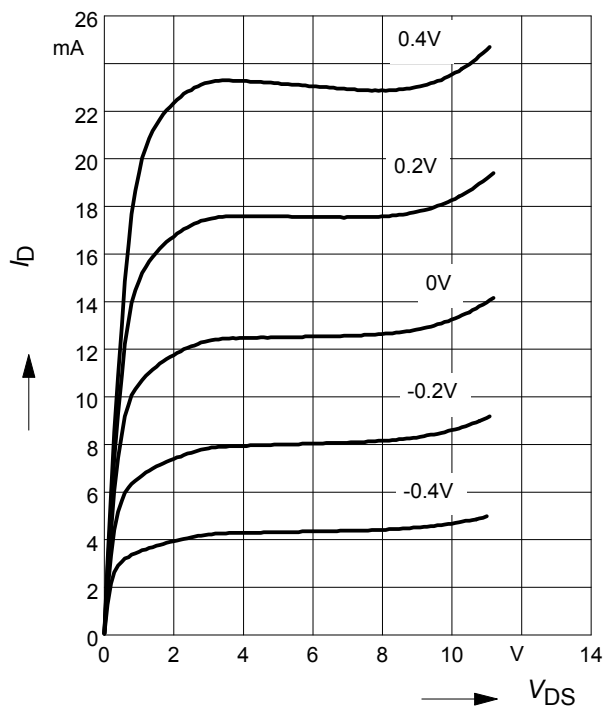
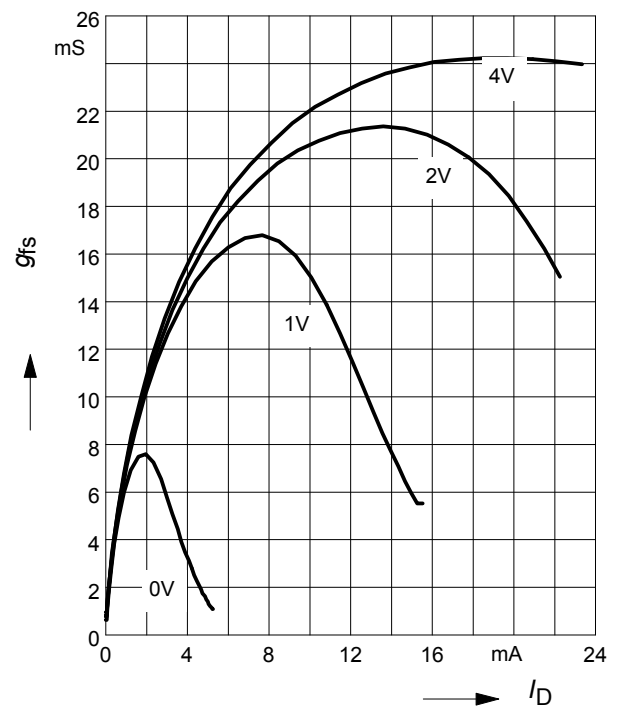
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Forward transconductance $V_{DS} = 8\text{ V}$, $I_D = 10\text{ mA}$, $V_{G2S} = 4\text{ V}$	g_{fs}	20	24	-	-
Gate1 input capacitance $V_{DS} = 8\text{ V}$, $I_D = 10\text{ mA}$, $V_{G2S} = 4\text{ V}$, $f = 1\text{ MHz}$	C_{g1ss}	-	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 20	- -	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 1.8	- -	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

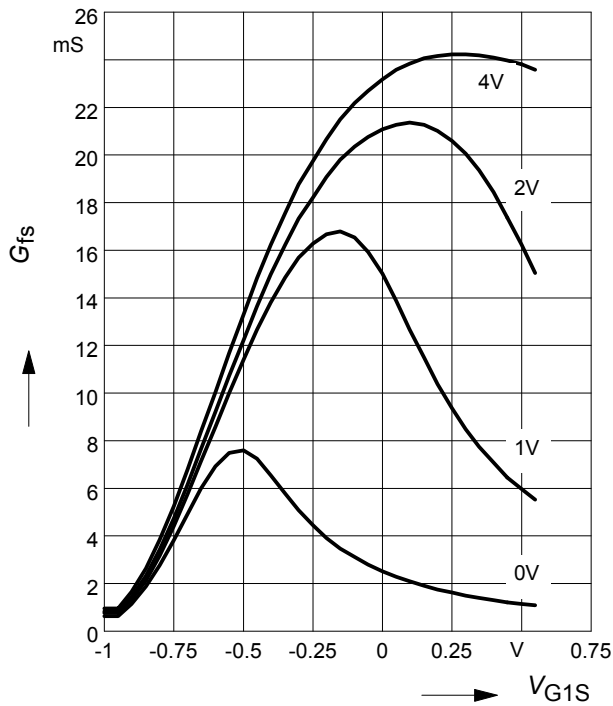

Total power dissipation $P_{\text{tot}} = f(T_S)$

BF998W


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

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


Gate 1 forward transconductance

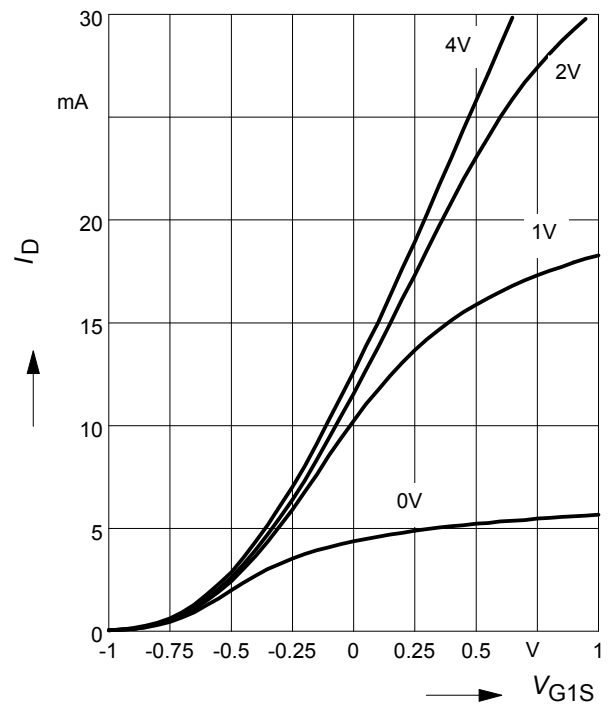
$$g_{fs1} = f(V_{G1S})$$



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

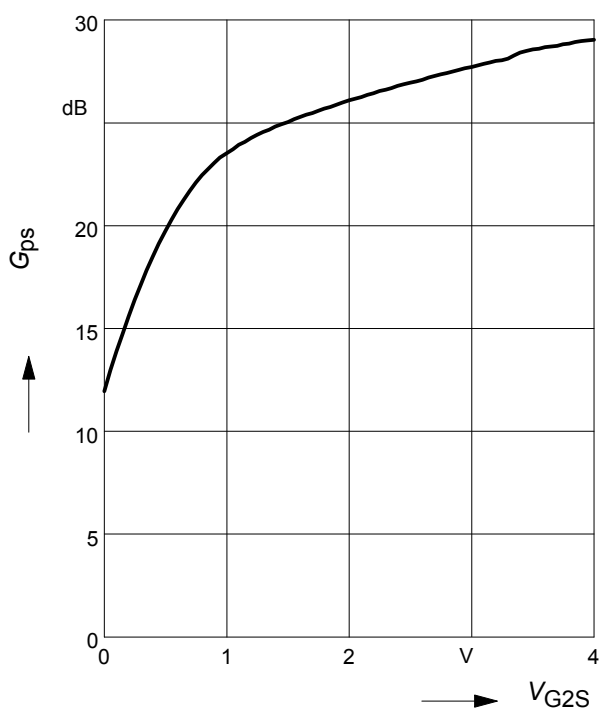
$$V_{DS} = 5V$$

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



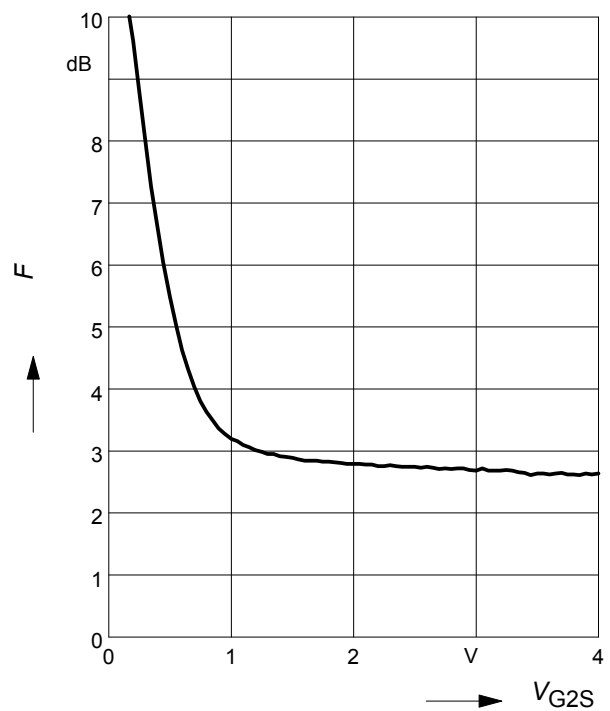
Power gain $G_{ps} = f(V_{G2S})$

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



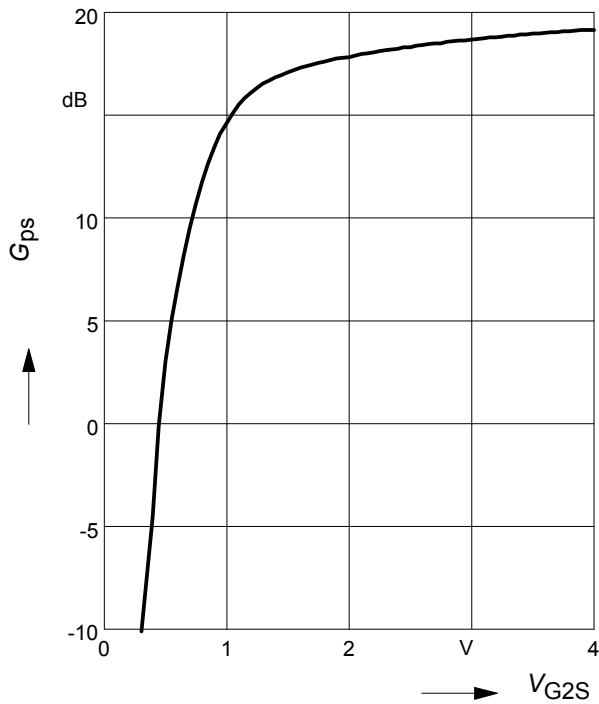
Noise figure $F = f(V_{G2S})$

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



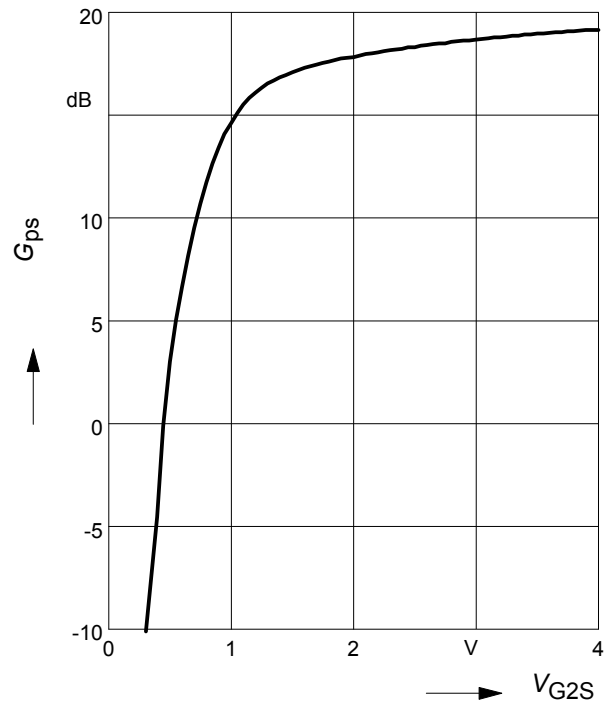
Power gain $G_{ps} = f(V_{G2S})$

$f = 800 \text{ MHz}$

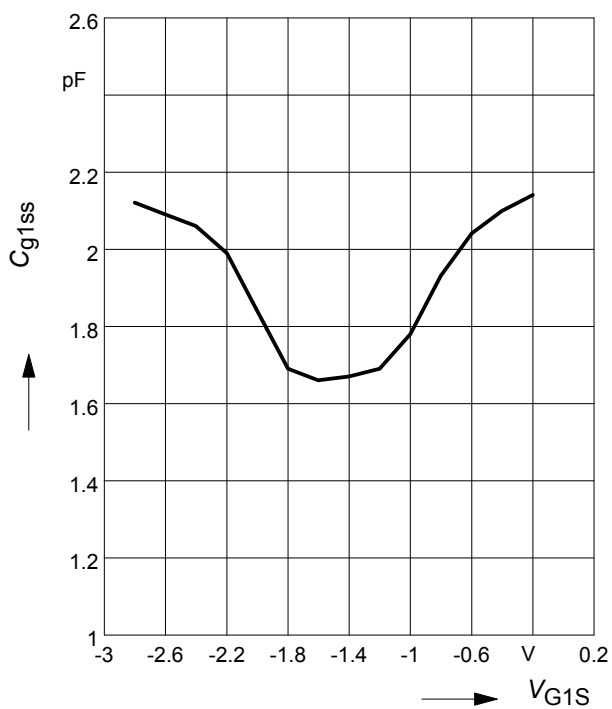


Power gain $G_{ps} = f(V_{G2S})$

$f = 800 \text{ MHz}$



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



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

