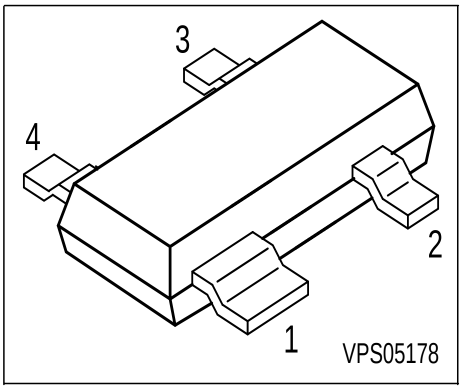
Silicon N-Channel MOSFET Tetrode

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



ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precaution!

Type	Marking	Pin Configuration						Package
BF998	MOs	1=S	2=D	3=G2	4=G1	-	-	SOT143

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}	200	mW
Storage temperature	T_{stg}	-55 ... 150	°C
Channel temperature	T_{ch}	150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Channel - soldering point[1]	R_{thchs}	$\leq$ 370	K/W

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

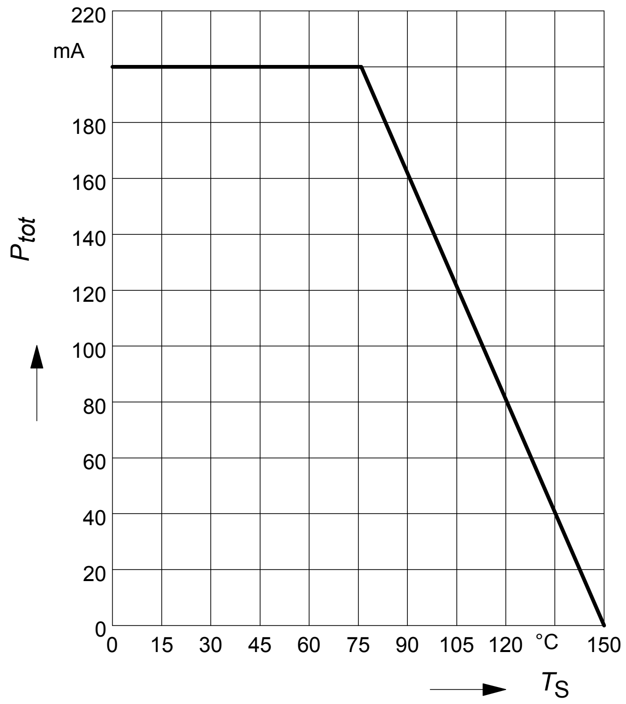
Electrical Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Drain-source breakdown voltage I_D = 10 µA, 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}	2	-	18	mA
Gate 1 source pinch-off voltage V_{DS} = 8 V, V_{G2S} = 4 V, I_D = 20 µA	$-V_{G1S(p)}$	-	-	2.5	V
Gate 2 source pinch-off voltage V_{DS} = 8 V, V_{G1S} = 0 , I_D = 20 µA	$-V_{G2S(p)}$	-	-	2	

Electrical Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Forward transconductance V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V	g_{fs}	-	24	-	-
Gate1 input capacitance V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz	C_{g1ss}	-	2.1	2.5	pF
Gate 2 input capacitance V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz	C_{g2ss}	-	1.2	-	pF
Feedback capacitance V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz	C_{dg1}	-	25	-	fF
Output capacitance V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz	C_{dss}	-	1.1	-	pF
Power gain	G_p				dB
V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V, f = 45 MHz		-	28	-	
V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V, f = 800 MHz		-	20	-	
Noise figure	F				dB
V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V, f = 45 MHz		-	2.8	-	
V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V, f = 800 MHz		-	1.8	-	
Gain control range V_{DS} = 8 V, VG2S = 4 ... -2 V , f = 800 MHz	ΔG_p	40	-	-	

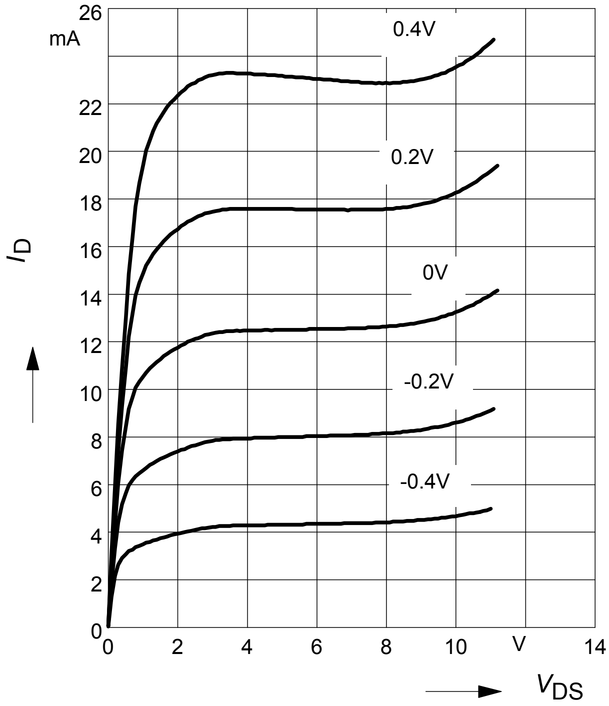
Total power dissipation $P_{tot} = f(T_S)$



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

V_{G2S} = +4 V

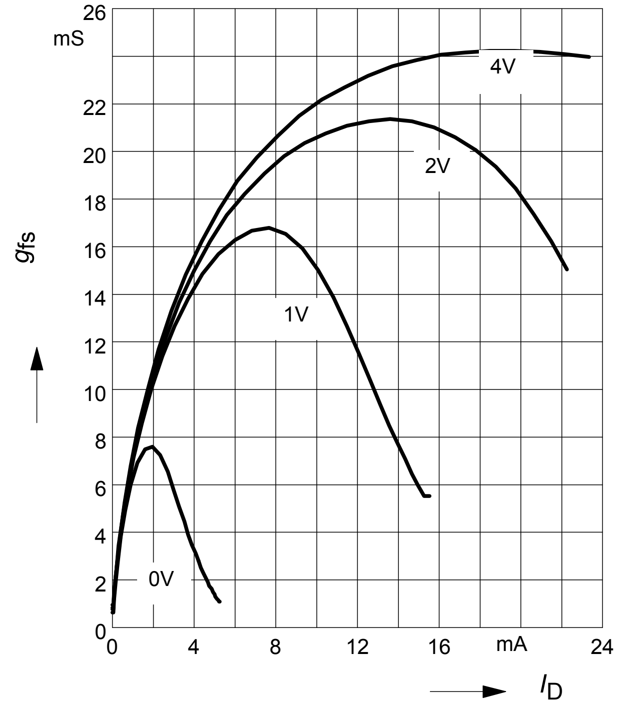
V_{G1S} = Parameter



Gate 1 forward transconductance

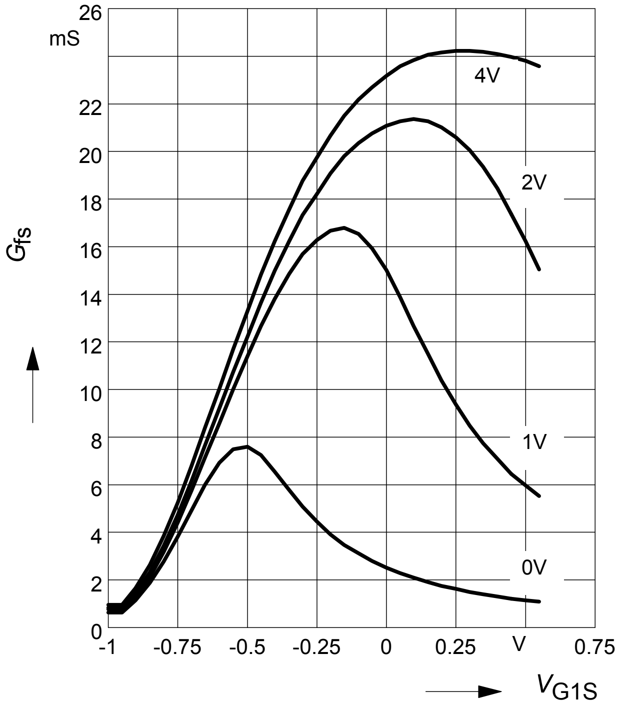
$g_{fs} = f(I_D)$

V_{DS} = 5V, V_{G2S} = Parameter



Gate 1 forward transconductance

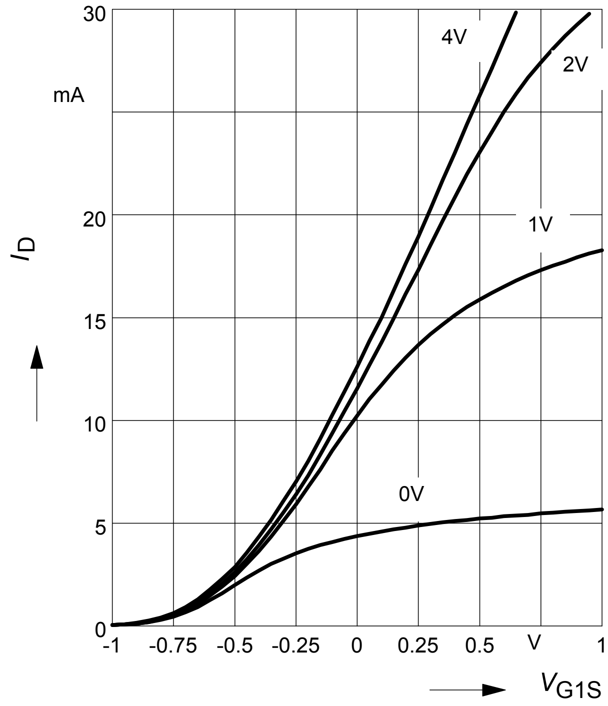
$g_{fs} = f(V_{G1S})$



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

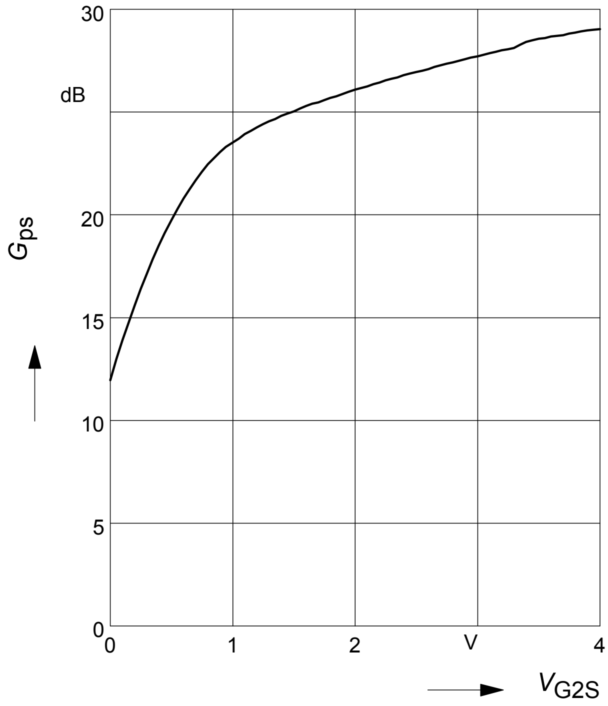
V_{DS} = 5V

V_{G2S} = Parameter



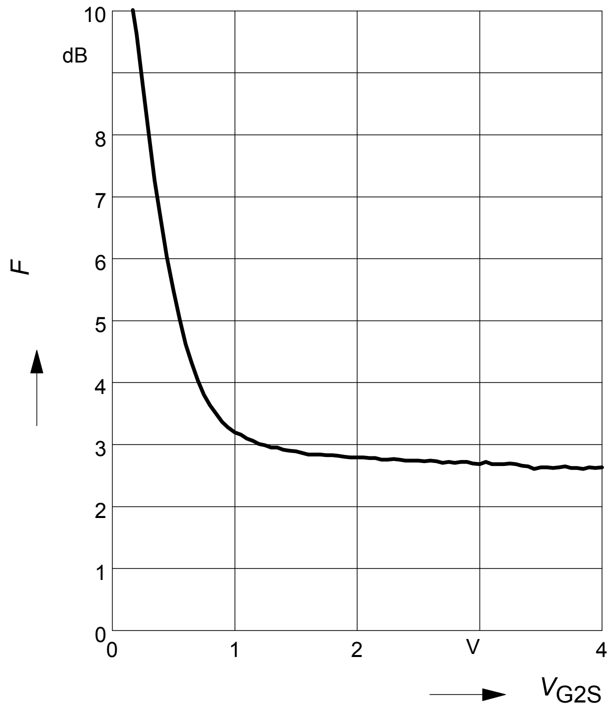
Power gain $G_{ps} = f(V_{G2S})$

f = 45 MHz



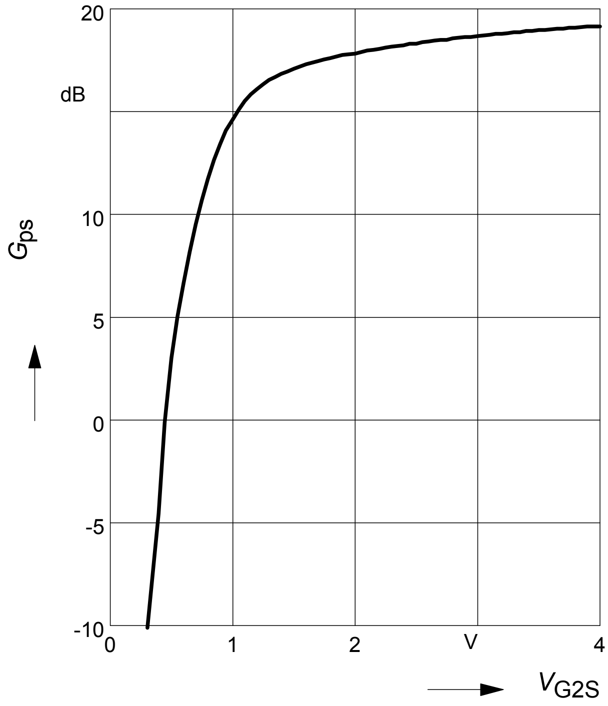
Noise figure $F = f(V_{G2S})$

f = 45 MHz



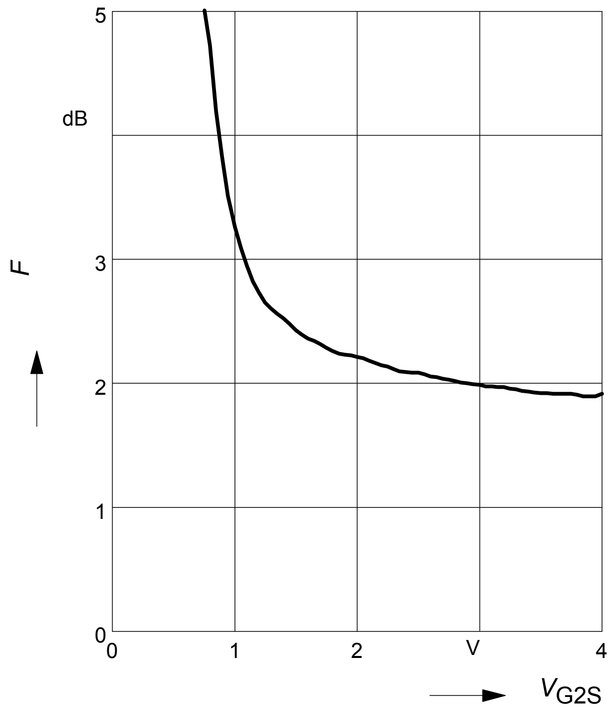
Power gain $G_{ps} = f(V_{G2S})$

f = 800 MHz

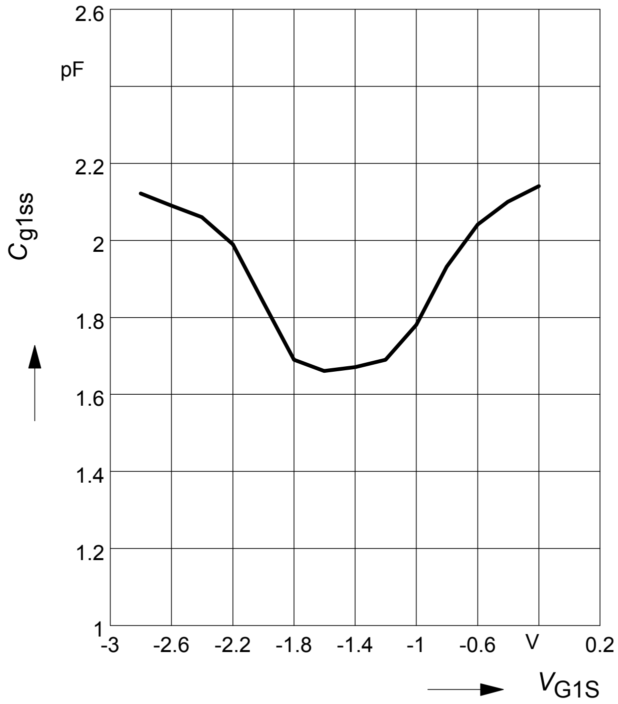


Noise figure $F = f\,(V_{G2S})$

f = 800 MHz



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



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