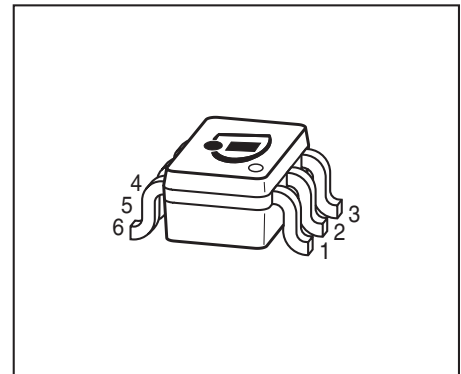
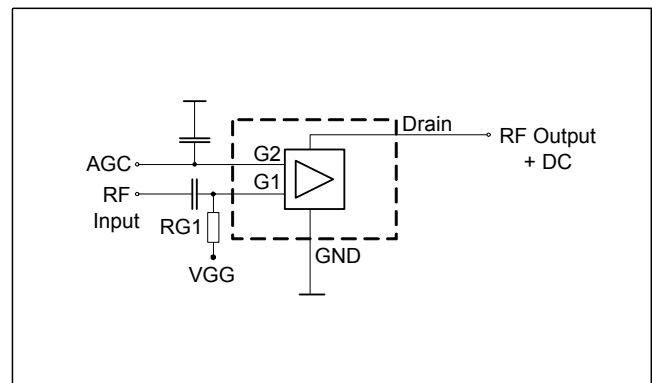
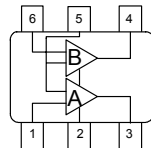
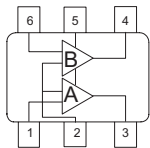


DUAL N-Channel MOSFET Tetrode

- Two gain controlled input stages for UHF and VHF -tuners e.g. (NTSC, PAL)
- Optimized for UHF (amp. B) and VHF (amp. A)
- Integrated gate protection diodes
- High AGC-range, low noise figure, high gain
- Improved cross modulation at gain reduction


BG3123
BG3123R


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

Type	Package	Pin Configuration						Marking
BG3123	SOT363	1=G1*	2=G2	3=D*	4=D**	5=S	6=G1**	KOs
BG3123R	SOT363	1=G1*	2=S	3=D*	4=D**	5=G2	6=G1**	KRs

* For amp. A; ** for amp. B

180° rotated tape loading orientation available

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	8	V
Continuous drain current	I_D		mA
amp. A		25	
amp. B		20	
Gate 1/ gate 2-source current	$\pm I_{G1/2SM}$	1	
Gate 1/ gate 2-source voltage	$\pm V_{G1/G2S}$	6	V
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}	≤ 150	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 $I_D = 10 \mu\text{A}$, $V_{G1S} = 0 \text{ V}$, $V_{G2S} = 0 \text{ V}$	$V_{(BR)DS}$	12	-	-	V
Gate1-source breakdown voltage $+I_{G1S} = 10 \text{ mA}$, $V_{G2S} = 0 \text{ V}$, $V_{DS} = 0 \text{ V}$	$+V_{(BR)G1SS}$	6	-	15	
Gate2-source breakdown voltage $+I_{G2S} = 10 \text{ mA}$, $V_{G1S} = 0 \text{ V}$, $V_{DS} = 0 \text{ V}$	$+V_{(BR)G2SS}$	6	-	15	
Gate1-source leakage current $V_{G1S} = 6 \text{ V}$, $V_{G2S} = 0 \text{ V}$	$+I_{G1SS}$	-	-	50	μA
Gate2-source leakage current $V_{G2S} = 8 \text{ V}$, $V_{G1S} = 0 \text{ V}$, $V_{DS} = 0 \text{ V}$	$+I_{G2SS}$	-	-	50	nA
Drain current $V_{DS} = 5 \text{ V}$, $V_{G1S} = 0 \text{ V}$, $V_{G2S} = 4.5 \text{ V}$	I_{DSS}	-	-	10	μA
Drain-source current $V_{DS} = 5 \text{ V}$, $V_{G2S} = 4 \text{ V}$, $R_{G1} = 60 \text{ k}\Omega$, amp. A $V_{DS} = 5 \text{ V}$, $V_{G2S} = 4 \text{ V}$, $R_{G1} = 50 \text{ k}\Omega$, amp. B	I_{DSX}	-	14	-	mA
Gate1-source pinch-off voltage $V_{DS} = 5 \text{ V}$, $V_{G2S} = 4 \text{ V}$, $I_D = 20 \mu\text{A}$	$V_{G1S(p)}$	-	0.7	-	V
Gate2-source pinch-off voltage $V_{DS} = 5 \text{ V}$, $I_D = 20 \mu\text{A}$	$V_{G2S(p)}$	-	0.6	-	

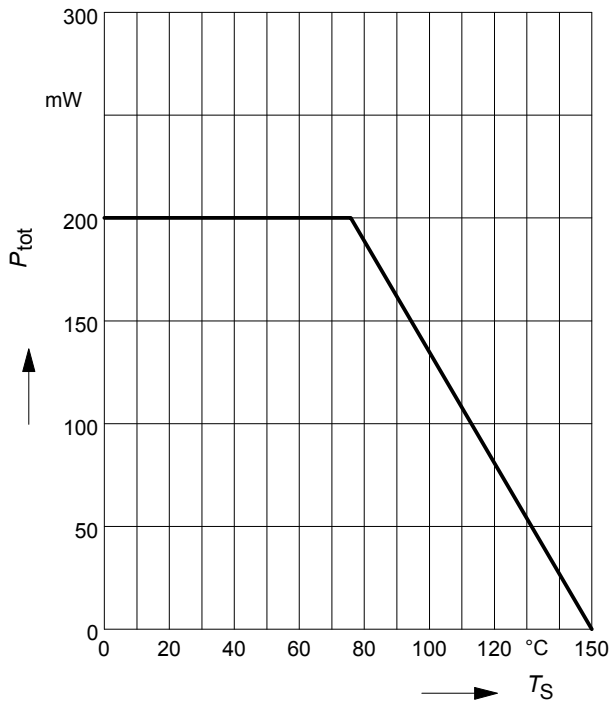
¹⁾For calculation of R_{thJA} please refer to Application Note Thermal Resistance

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics $V_{DS} = 5\text{V}$, $V_{G2S} = 4\text{V}$, ($I_D = 14\text{ mA}$) (verified by random sampling)					
Forward transconductance amp. A amp. B	g_{fs}	- - -	30 25	- -	mS
Gate1 input capacitance $f = 10\text{ MHz}$, amp. A $f = 10\text{ MHz}$, amp. B	C_{g1ss}	- -	1.9 1.5	- -	pF
Output capacitance $f = 10\text{ MHz}$, amp. A $f = 10\text{ MHz}$, amp. B	C_{dss}	- -	1.3 1.1	- -	
Power gain $f = 800\text{ MHz}$, amp. A $f = 800\text{ MHz}$, amp. B $f = 45\text{ MHz}$, amp. A $f = 45\text{ MHz}$, amp. B	G_p	- - - -	25 24 32 30	- - - -	dB
Noise figure $f = 800\text{ MHz}$, amp. A $f = 800\text{ MHz}$, amp. B $f = 45\text{ MHz}$, amp. A $f = 45\text{ MHz}$, amp. B	F	- - - -	1.8 1.8 1.4 1.6	- - - -	dB
Gain control range $V_{G2S} = 4 \dots 0\text{ V}$, $f = 800\text{ MHz}$	ΔG_p	45	-	-	
Cross-modulation $k=1\%$, $f_w=50\text{MHz}$, $f_{unw}=60\text{MHz}$ amp.A , AGC = 0 dB amp. B, AGC = 0 dB amp. A , AGC = 10 dB amp. B , AGC = 10 dB amp. A, AGC = 40 dB amp. B, AGC = 40 dB	X_{mod}	90 90 - - 98 98	96 97 91 94 103 104	- - - - - -	-

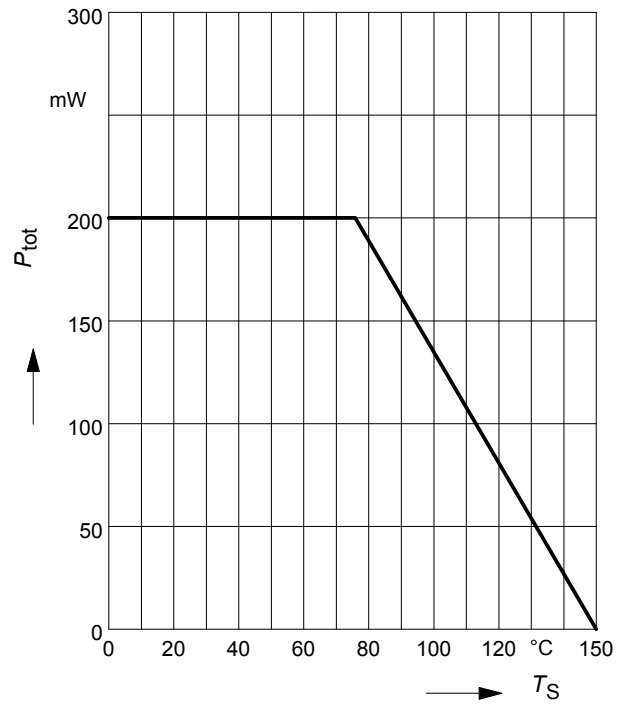
Total power dissipation $P_{tot} = f(T_S)$

amp. A



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

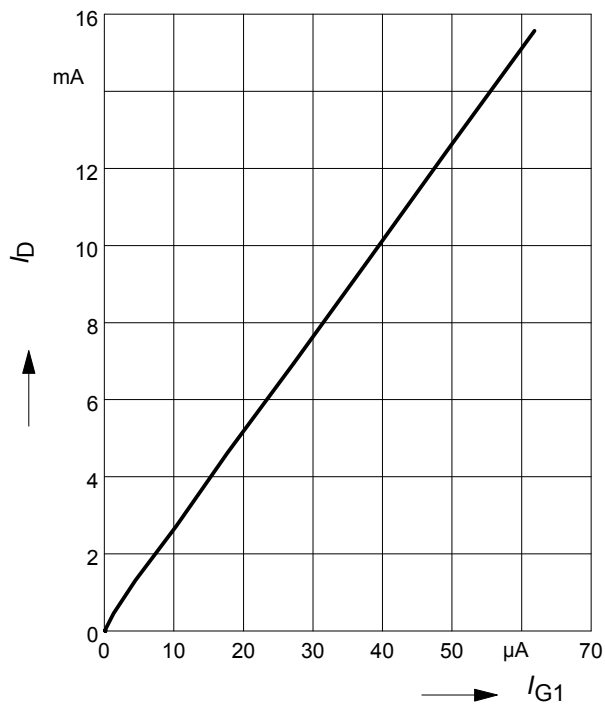
amp. B



Drain current $I_D = f(I_{G1})$

$V_{G2S} = 4V$

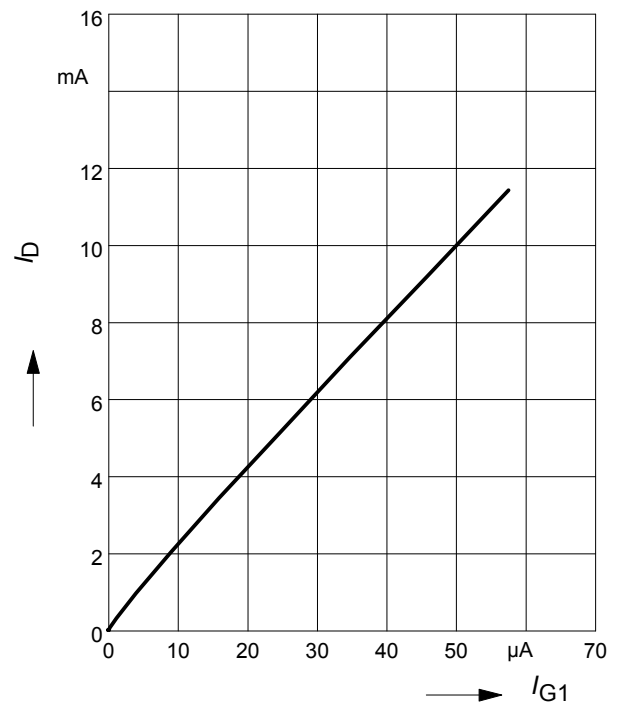
amp. A

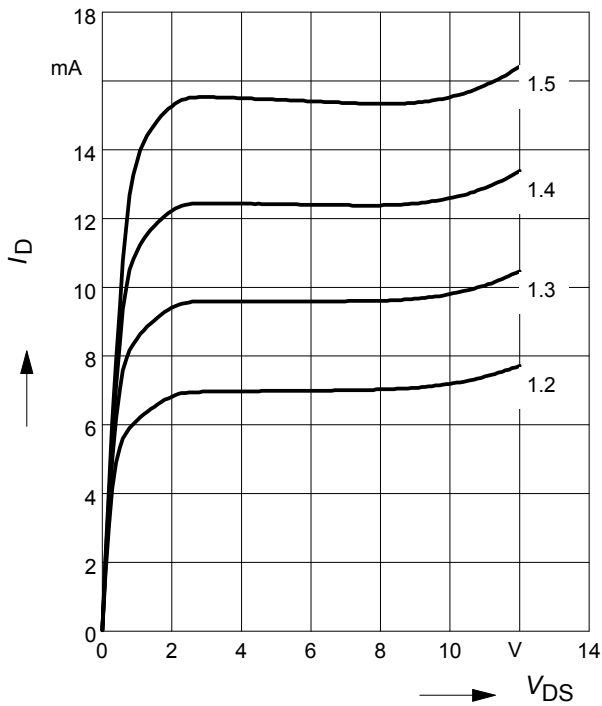
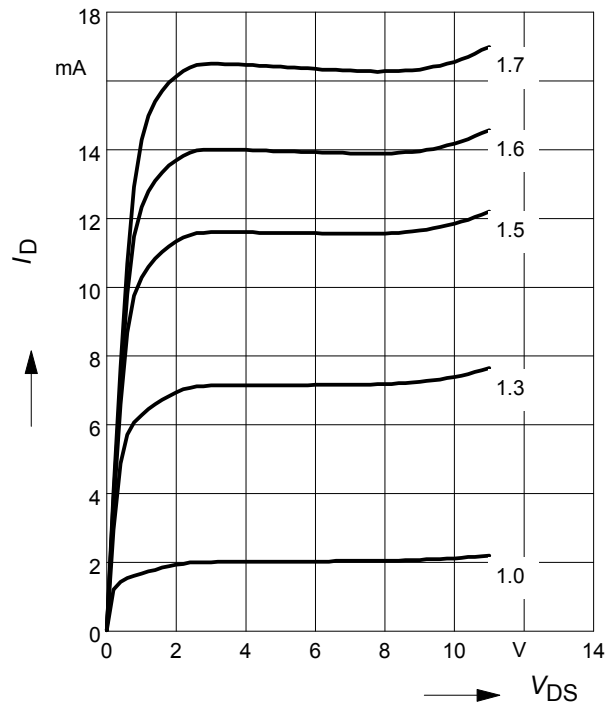
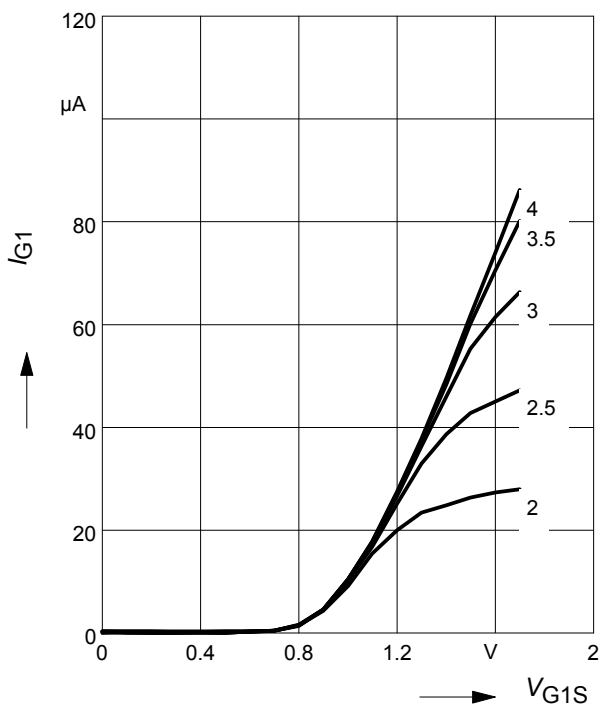
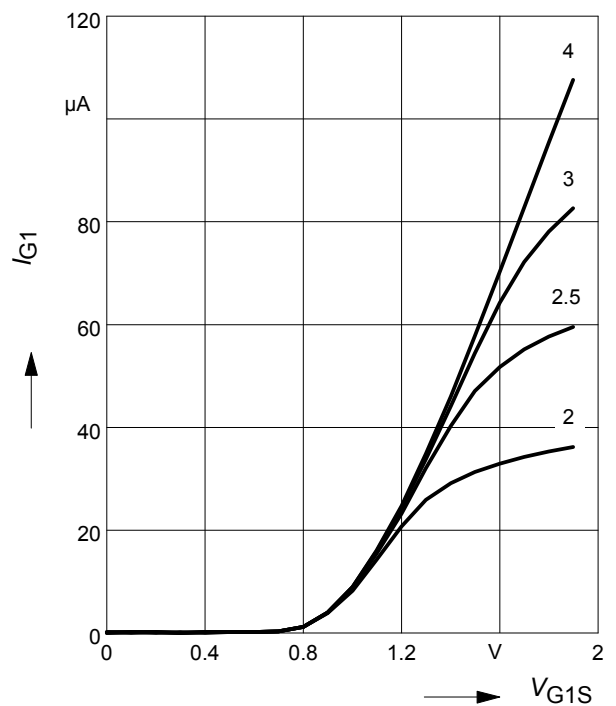


Drain current $I_D = f(I_{G1})$

$V_{G2S} = 4V$

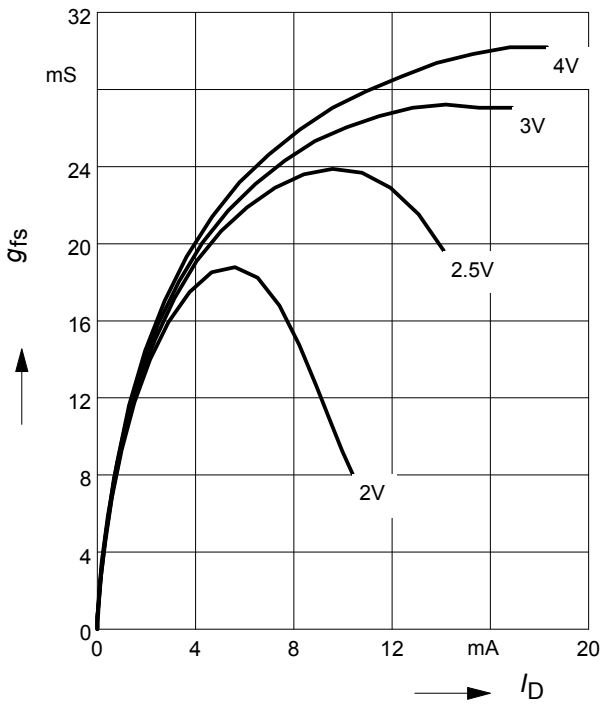
amp. B



Output characteristics $I_D = f(V_{DS})$
 $V_{G2S} = 4V$, $V_{G1S} =$ Parameter in V
 amp. A

Output characteristics $I_D = f(V_{DS})$
 $V_{G2S} = 4V$, $V_{G1S} =$ Parameter in V
 amp. B

Gate 1 current $I_{G1} = f(V_{G1S})$
 $V_{DS} = 5V$, $V_{G2S} =$ Parameter in V
 amp. A

Gate 1 current $I_{G1} = f(V_{G1S})$
 $V_{DS} = 5V$, $V_{G2S} =$ Parameter in V
 amp. B


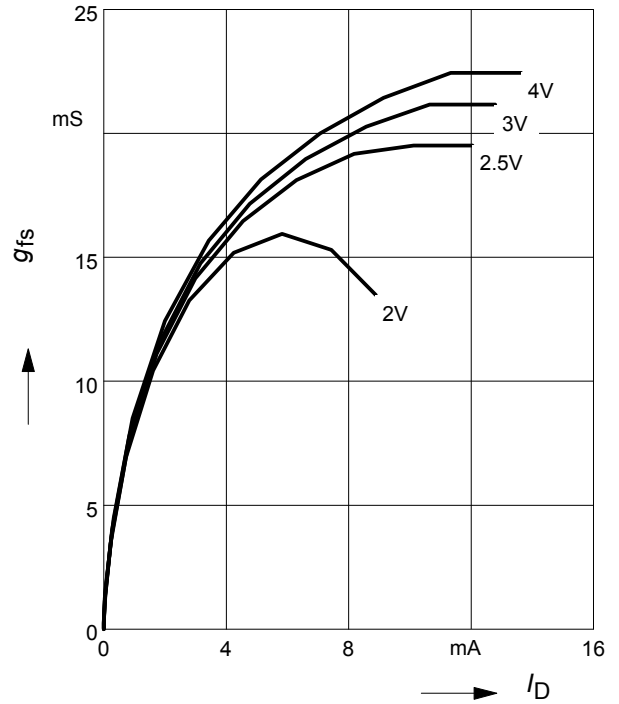
Gate 1 forward transconductance

$g_{fs} = f(I_D)$, $V_{DS} = 5V$, $V_{G2S} = \text{Parameter}$
amp. A



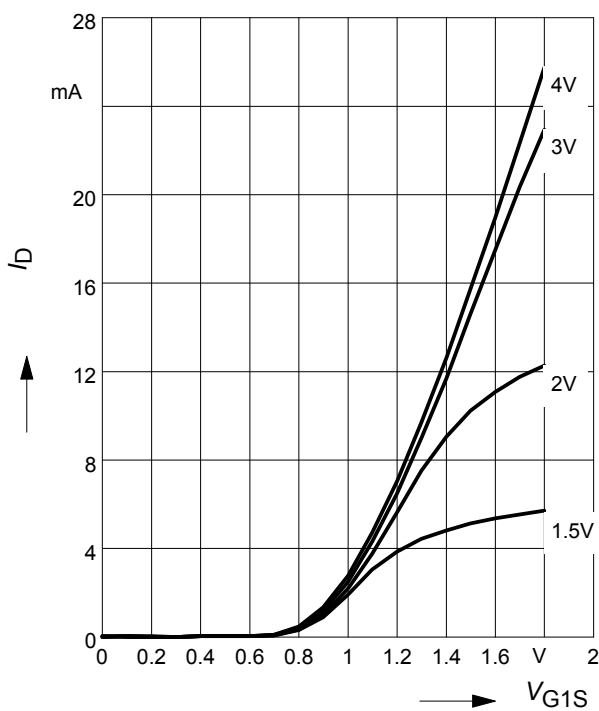
Gate 1 forward transconductance

$g_{fs} = f(I_D)$, $V_{DS} = 5V$, $V_{G2S} = \text{Parameter}$
amp. B



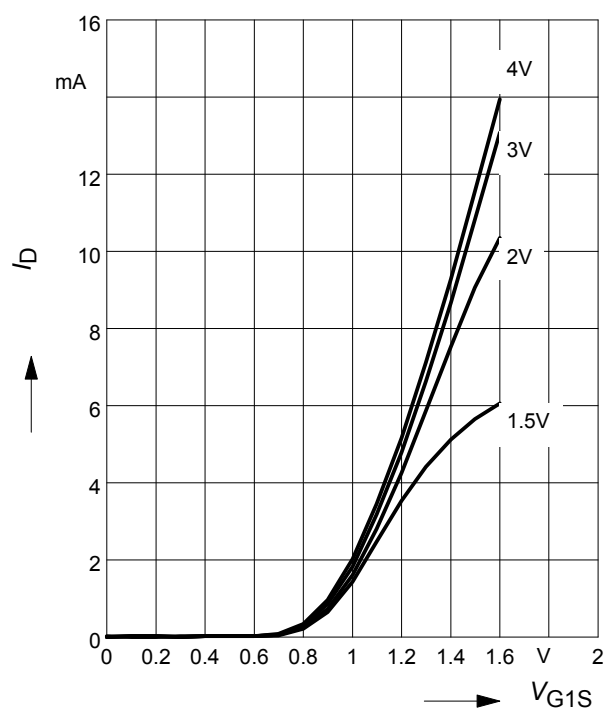
Drain current $I_D = f(V_{G1S})$

$V_{DS} = 5V$, $V_{G2S} = \text{Parameter}$
amp. A



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

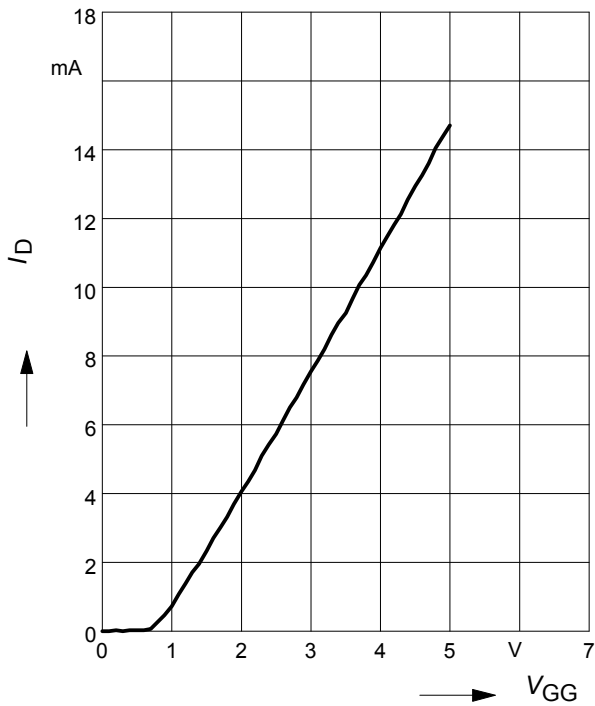
$V_{DS} = 5V$, $V_{G2S} = \text{Parameter}$
amp. B



Drain current $I_D = f(V_{GG})$ amp. A

$V_{DS} = 5V, V_{G2S} = 4V, R_{G1} = 60k\Omega$

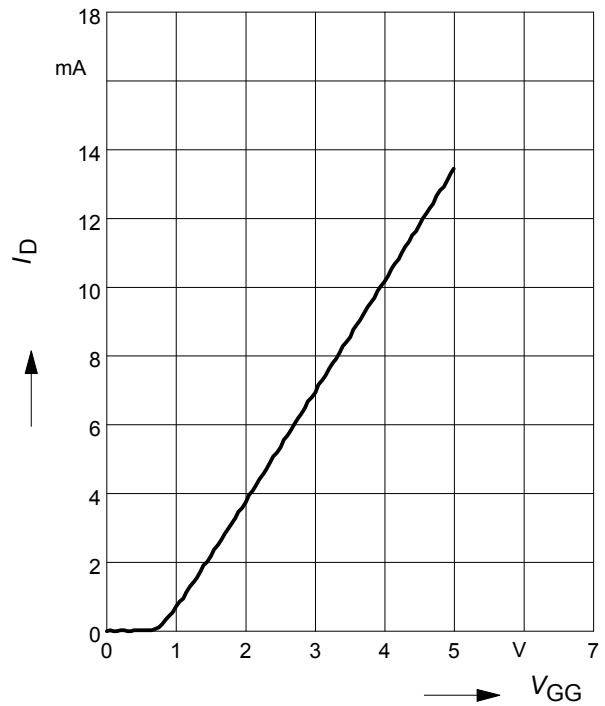
(connected to $V_{GG}, V_{GG} = \text{gate1 supply voltage}$)



Drain current $I_D = f(V_{GG})$ amp. B

$V_{DS} = 5V, V_{G2S} = 4V, R_{G1} = 50k\Omega$

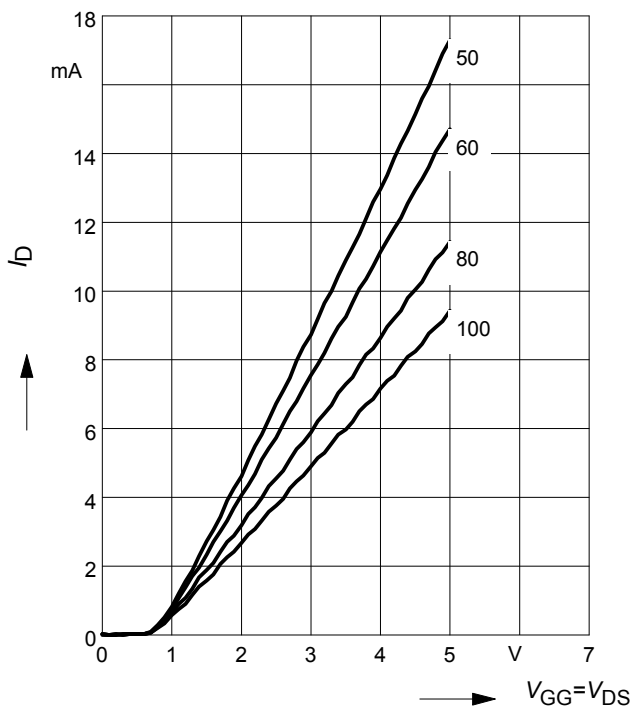
(connected to $V_{GG}, V_{GG} = \text{gate1 supply voltage}$)



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

$V_{G2S} = 4V, R_{G1} = \text{Parameter in } k\Omega$

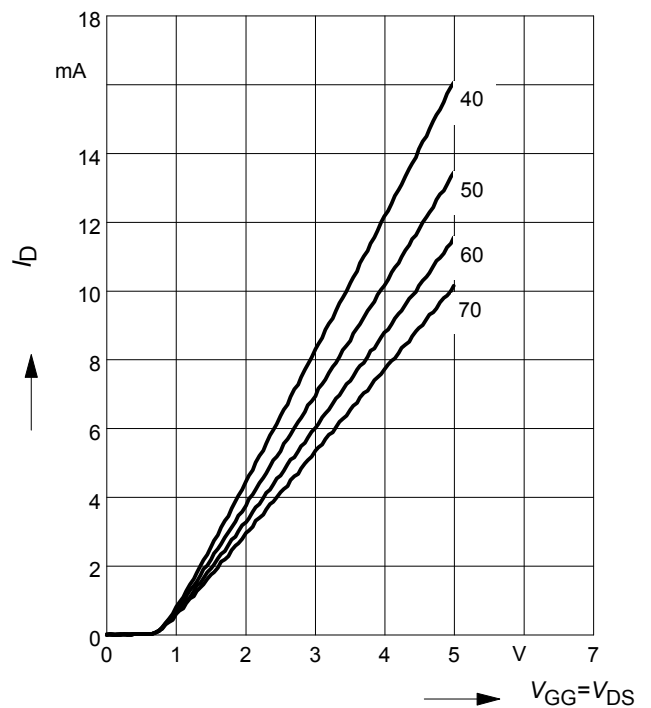
amp. A



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

$V_{G2S} = 4V, R_{G1} = \text{Parameter in } k\Omega$

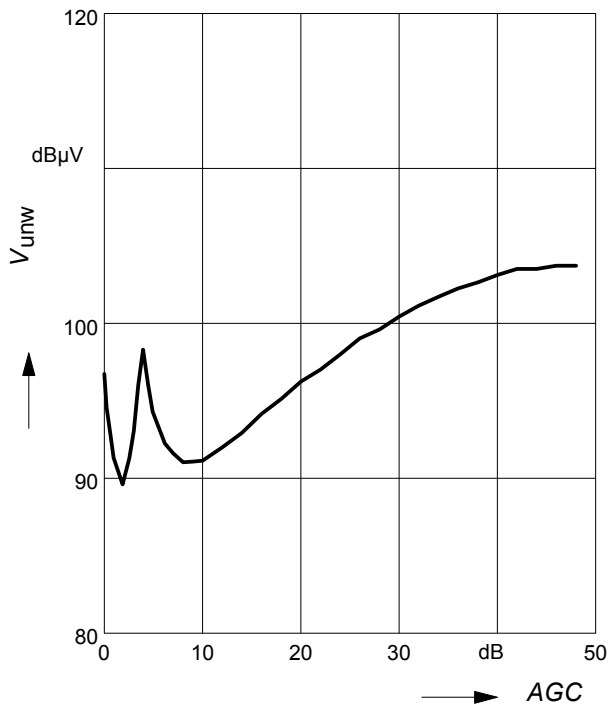
amp. B



Crossmodulation $V_{unw} = (AGC)$

$V_{DS} = 5\text{ V}$, $R_{g1} = 68\text{ k}\Omega$

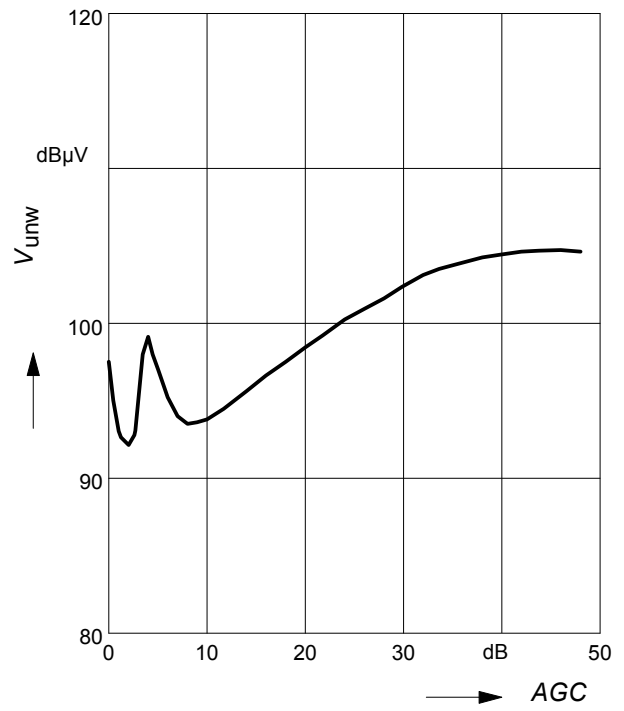
amp.A



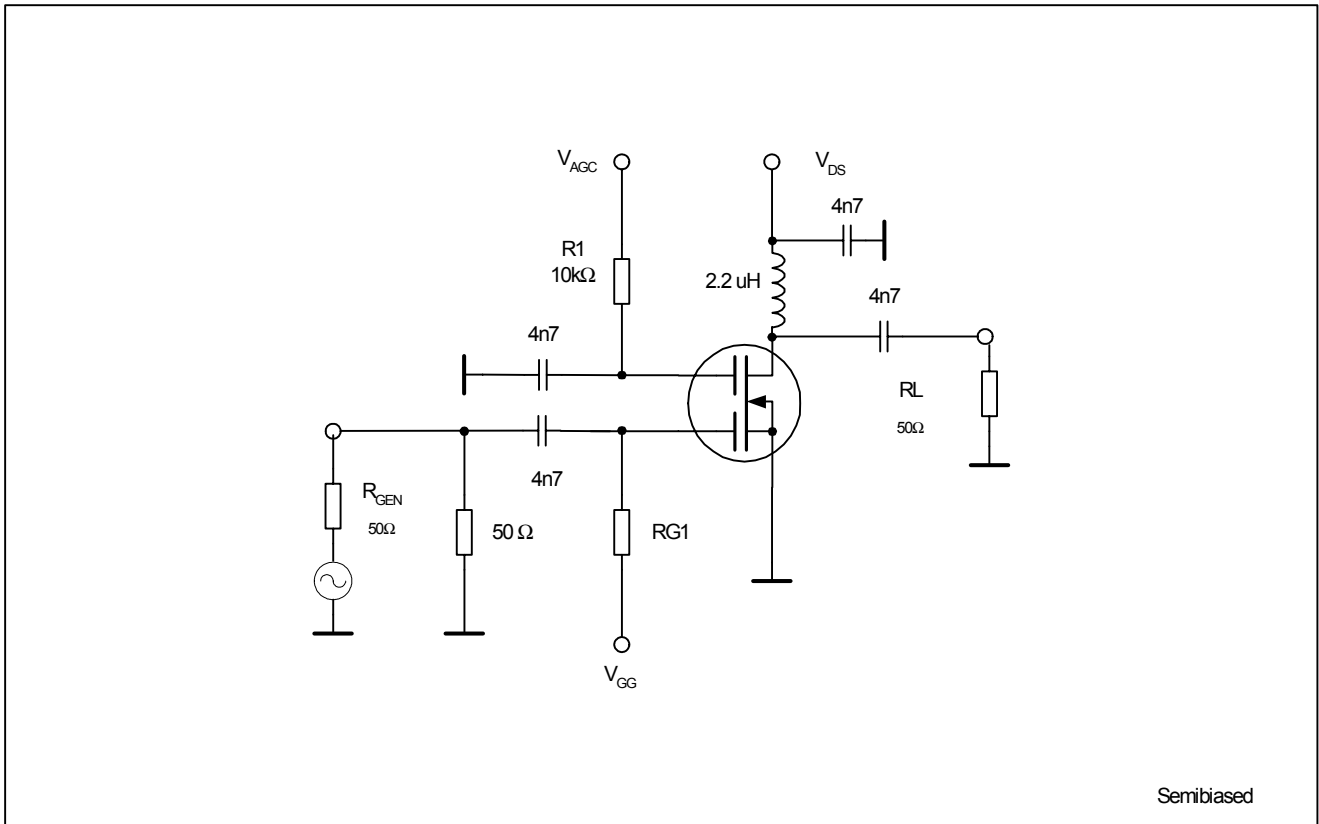
Crossmodulation $V_{unw} = (AGC)$

$V_{DS} = 5\text{ V}$, $R_{g1} = 56\text{ k}\Omega$

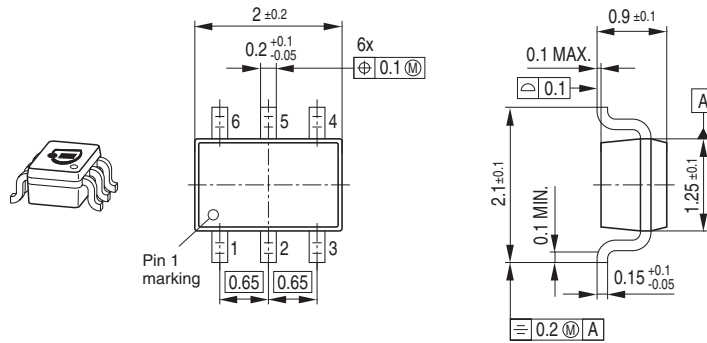
amp.B



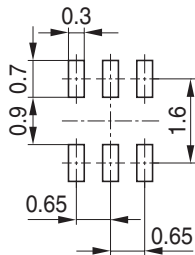
Crossmodulation test circuit



Package Outline



Foot Print



Marking Layout (Example)

Small variations in positioning of Date code, Type code and Manufacture are possible.



Standard Packing

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

For symmetric types no defined Pin 1 orientation in reel.



Edition 2006-02-01
Published by
Infineon Technologies AG
81726 München, Germany
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