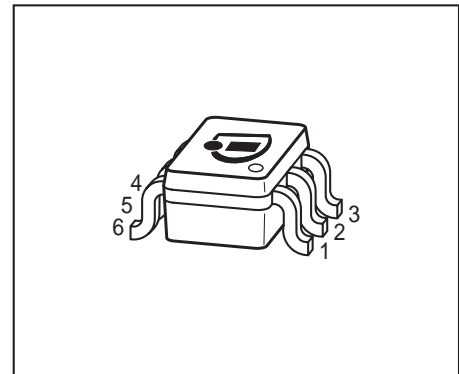
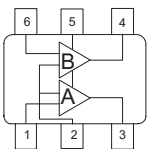
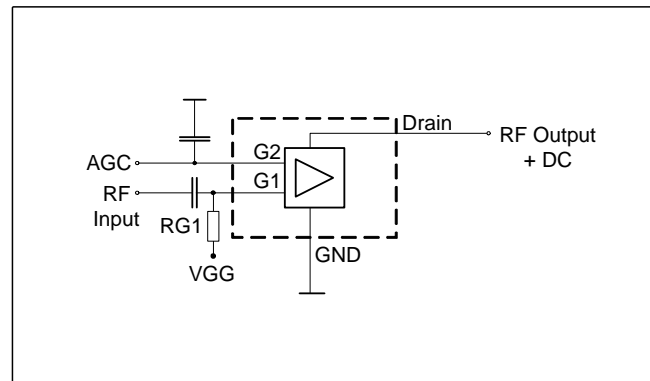
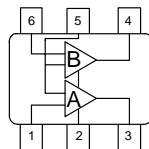


**DUAL N-Channel MOSFET Tetrode**

- 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
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101


**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 amp. A	$I_D$	25	mA
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 <sup>1)</sup>	$R_{thchs}$	≤ 150	K/W

<sup>1)</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

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

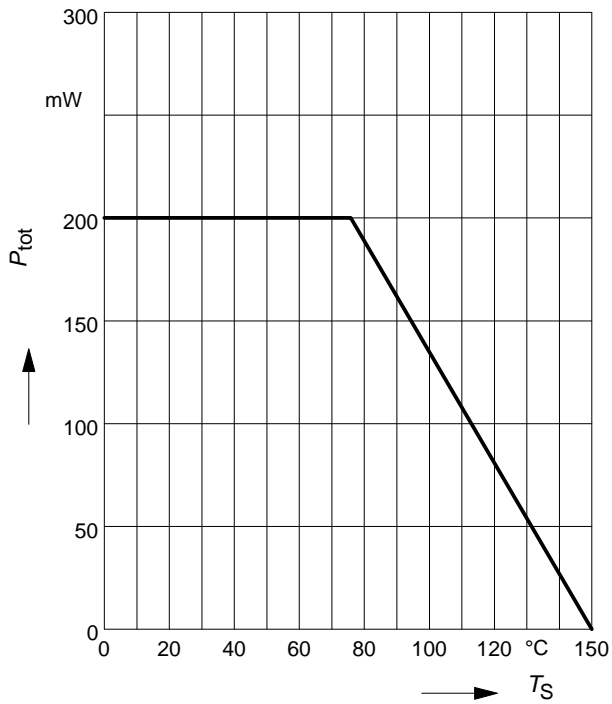
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Drain-source breakdown voltage $I_D = 10 \mu\text{A}$ , $V_{G1S} = 0 \text{ V}$ , $V_{G2S} = 0 \text{ V}$	$V_{(BR)DS}$	12	-	-	V
Gate1-source breakdown voltage $+I_{G1S} = 10 \text{ mA}$ , $V_{G2S} = 0 \text{ V}$ , $V_{DS} = 0 \text{ V}$	$+V_{(BR)G1SS}$	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	$\mu\text{A}$
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	$\mu\text{A}$
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	-	

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

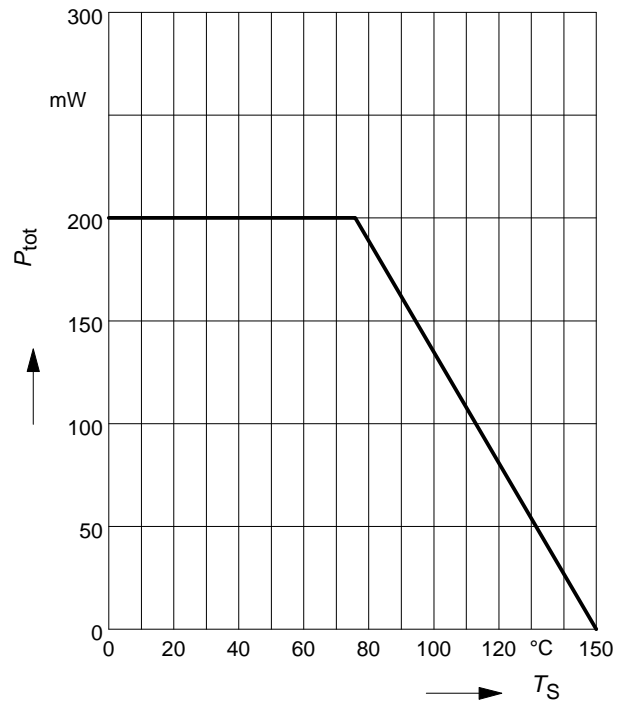
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics</b> $V_{DS} = 5\text{V}$ , $V_{G2S} = 4\text{V}$ , ( $I_D = 14\text{ mA}$ ) (verified by random sampling)					
Forward transconductance amp. A amp. B	$g_{fs}$	- - -	30 25	- - -	mS
Gate1 input capacitance $f = 10\text{ MHz}$ , amp. 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 $V_{G2S} = 4 \dots 0\text{ V}$ , $f = 800\text{ MHz}$	$\Delta G_p$	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  $P_{tot} = f(T_S)$** 

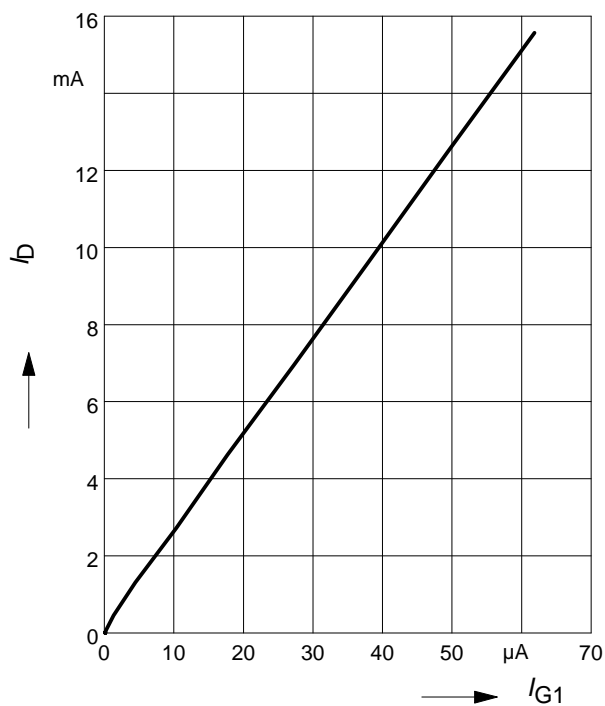
amp. A


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

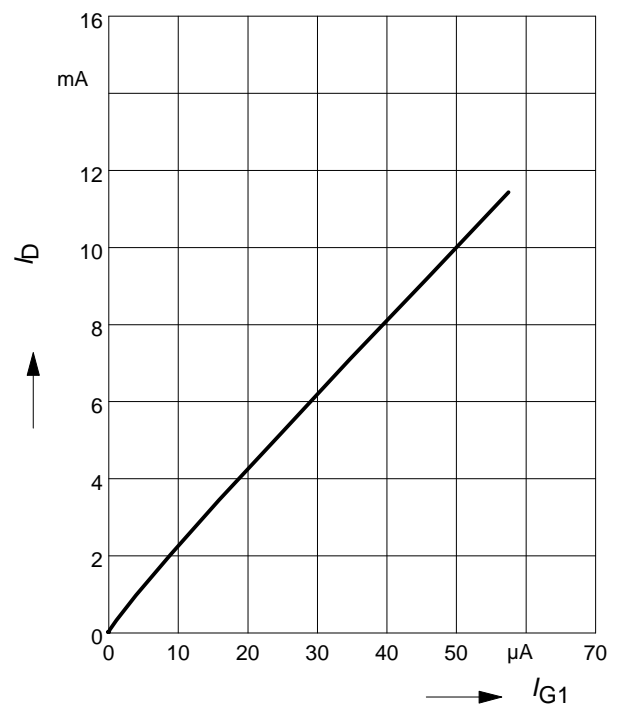
amp. B

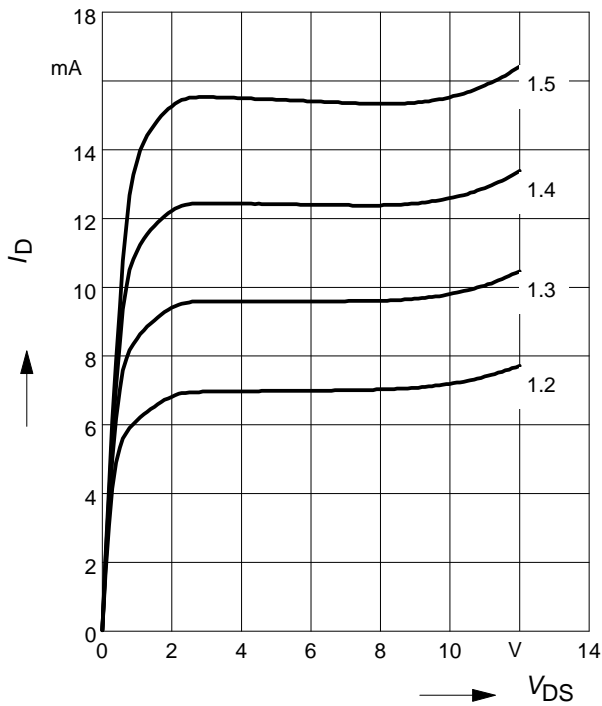
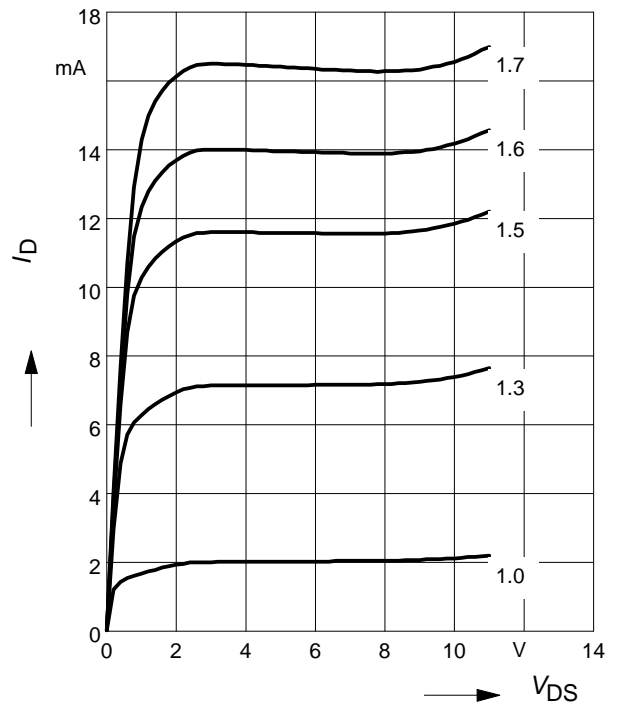
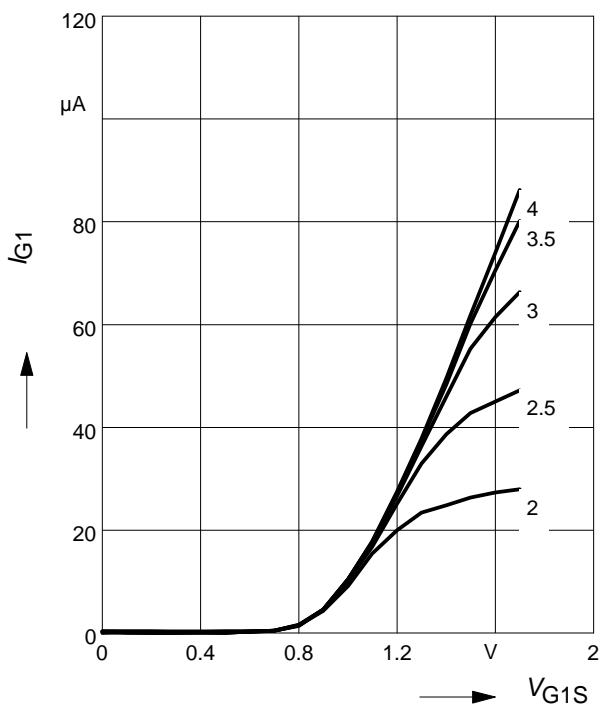
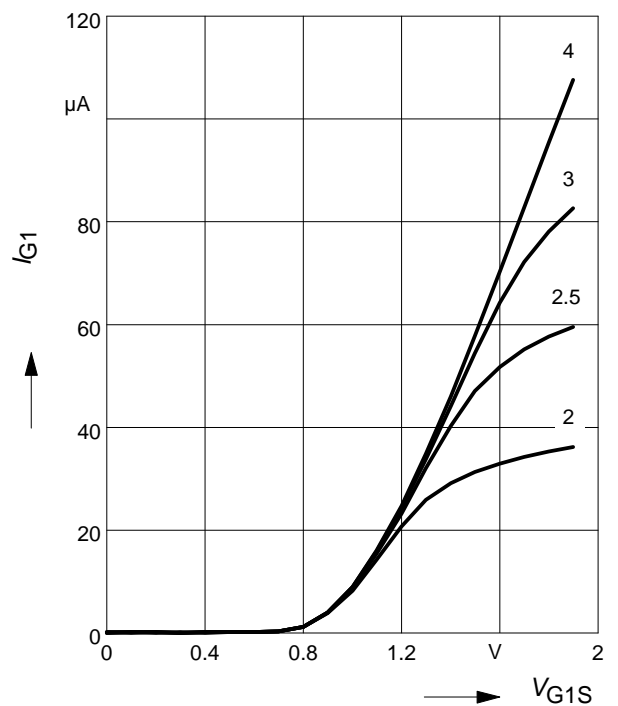

**Drain current  $I_D = f(I_{G1})$** 
 $V_{G2S} = 4V$ 

amp. A


**Drain current  $I_D = f(I_{G1})$** 
 $V_{G2S} = 4V$ 

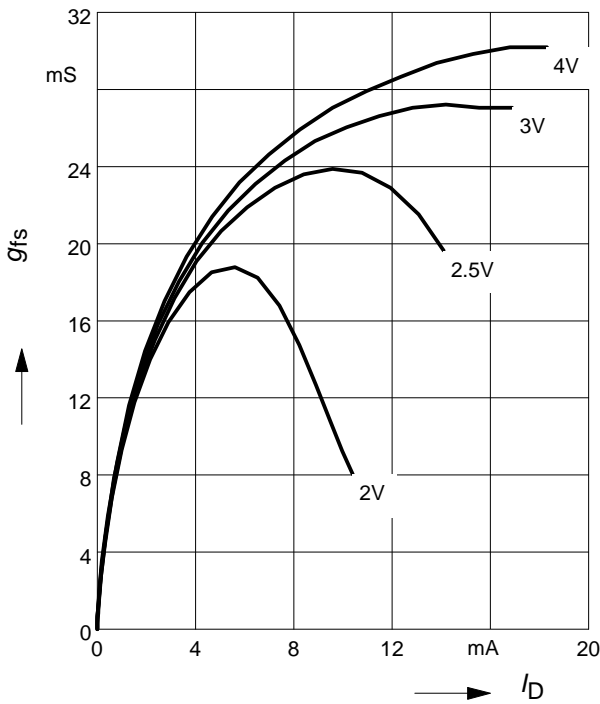
amp. B



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

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

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

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


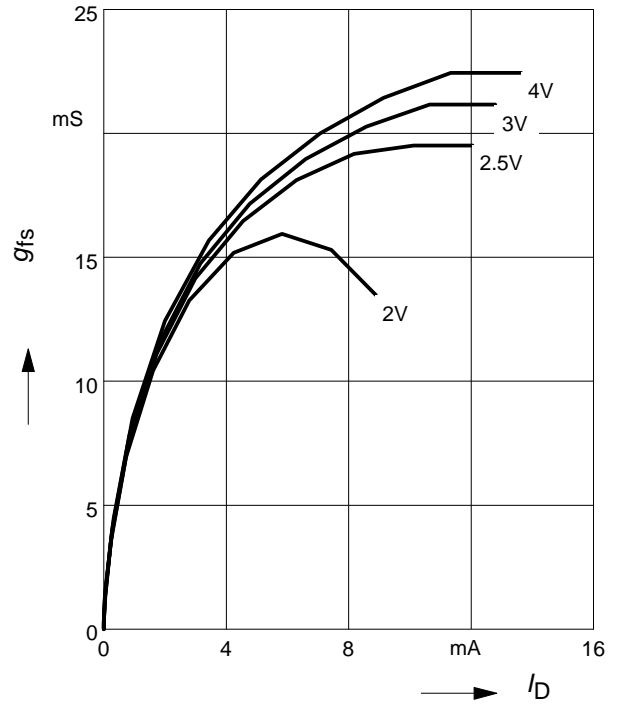
**Gate 1 forward transconductance**

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



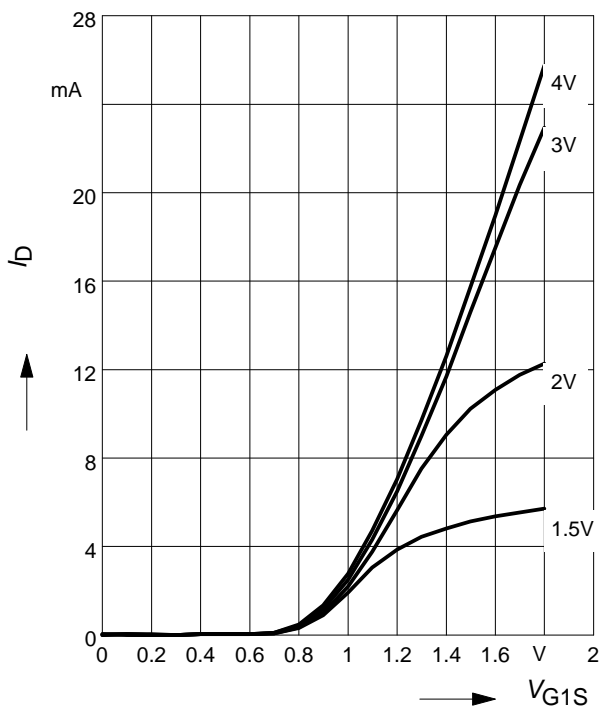
**Gate 1 forward transconductance**

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



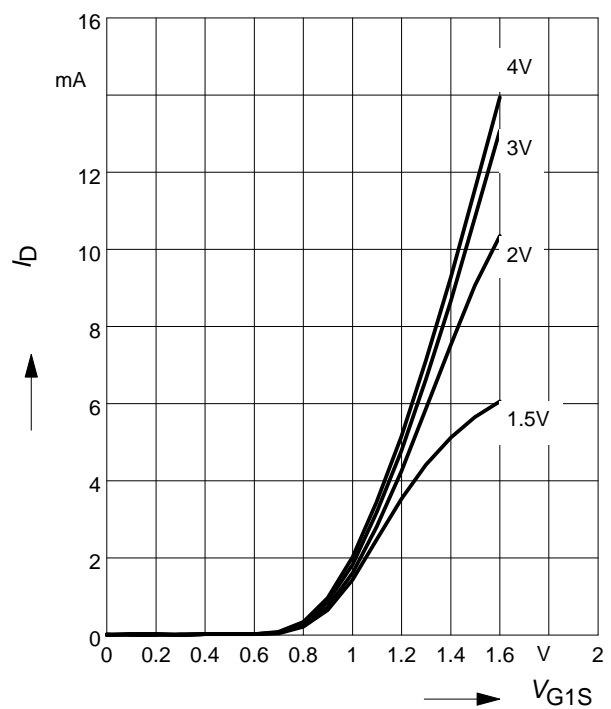
**Drain current  $I_D = f(V_{G1S})$**

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



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

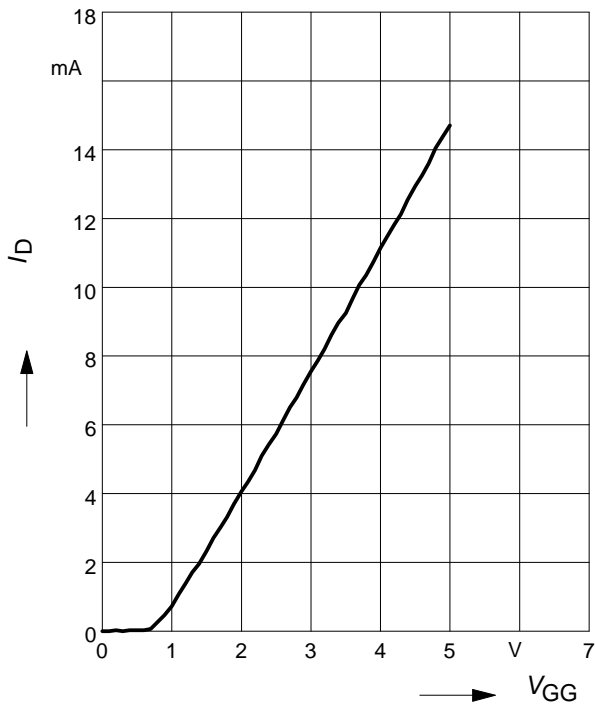
$V_{DS} = 5V$ ,  $V_{G2S} = \text{Parameter}$   
amp. B



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

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

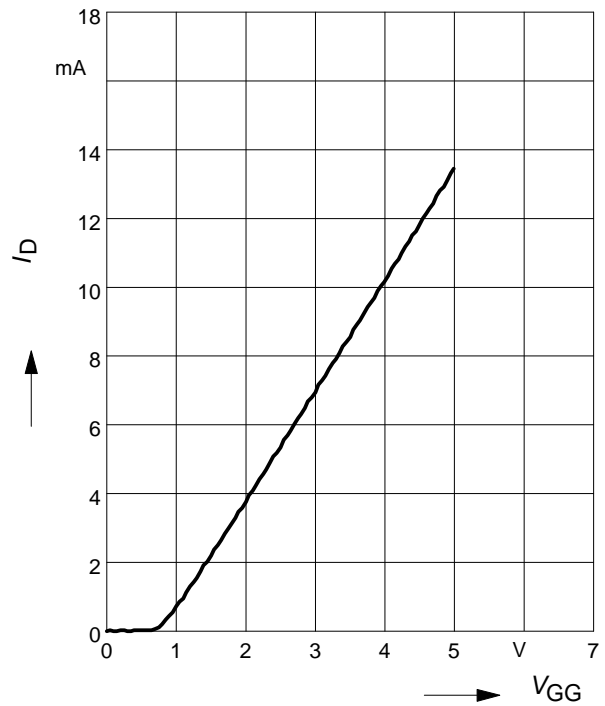
(connected to  $V_{GG}, V_{GG}=\text{gate1}$  supply voltage)



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

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

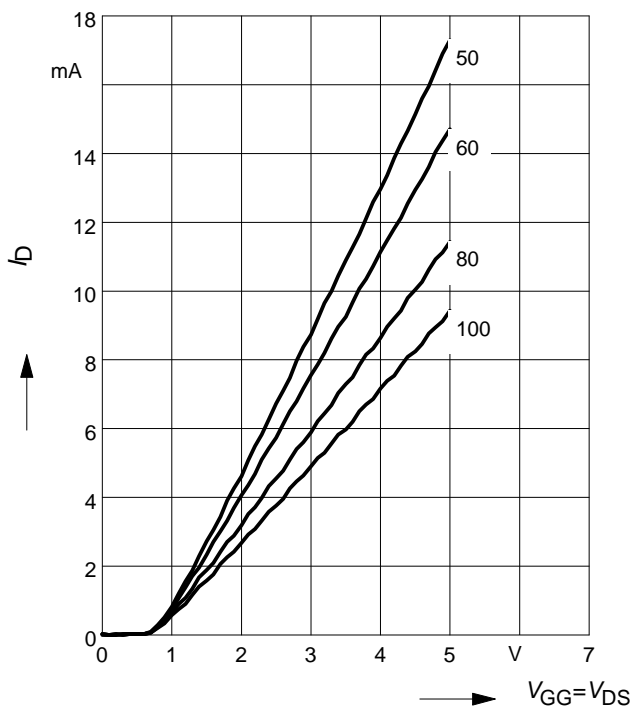
(connected to  $V_{GG}, V_{GG}=\text{gate1}$  supply voltage)



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

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

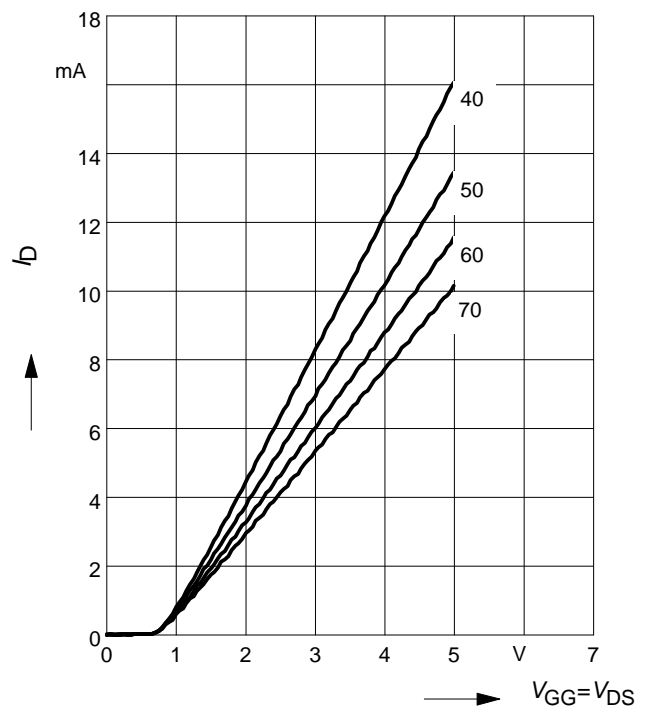
amp. A



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

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

amp. B

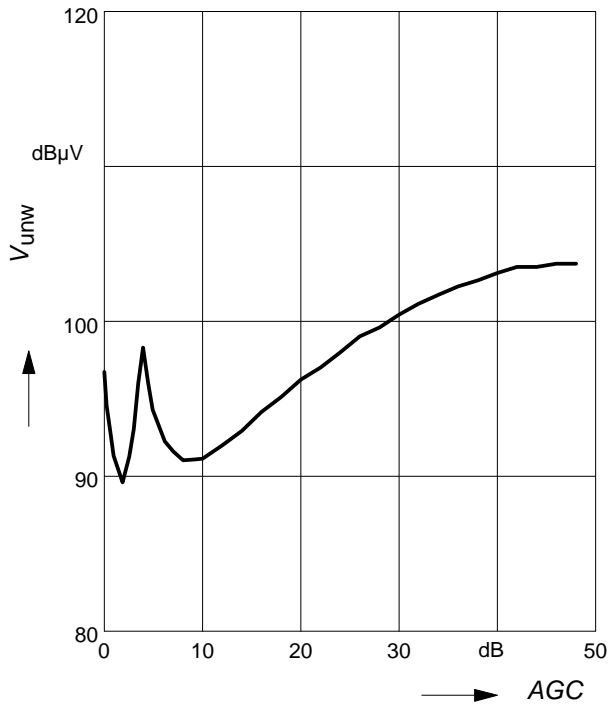




**Crossmodulation  $V_{unw} = (AGC)$**

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

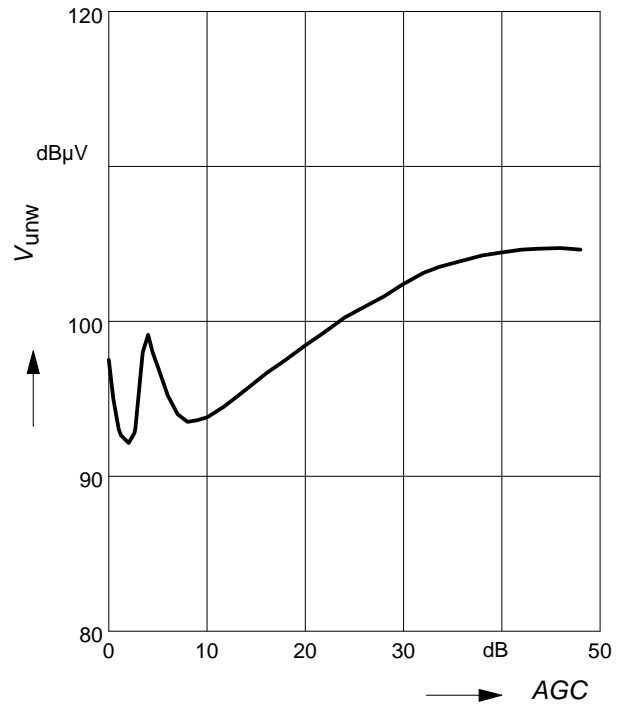
amp.A



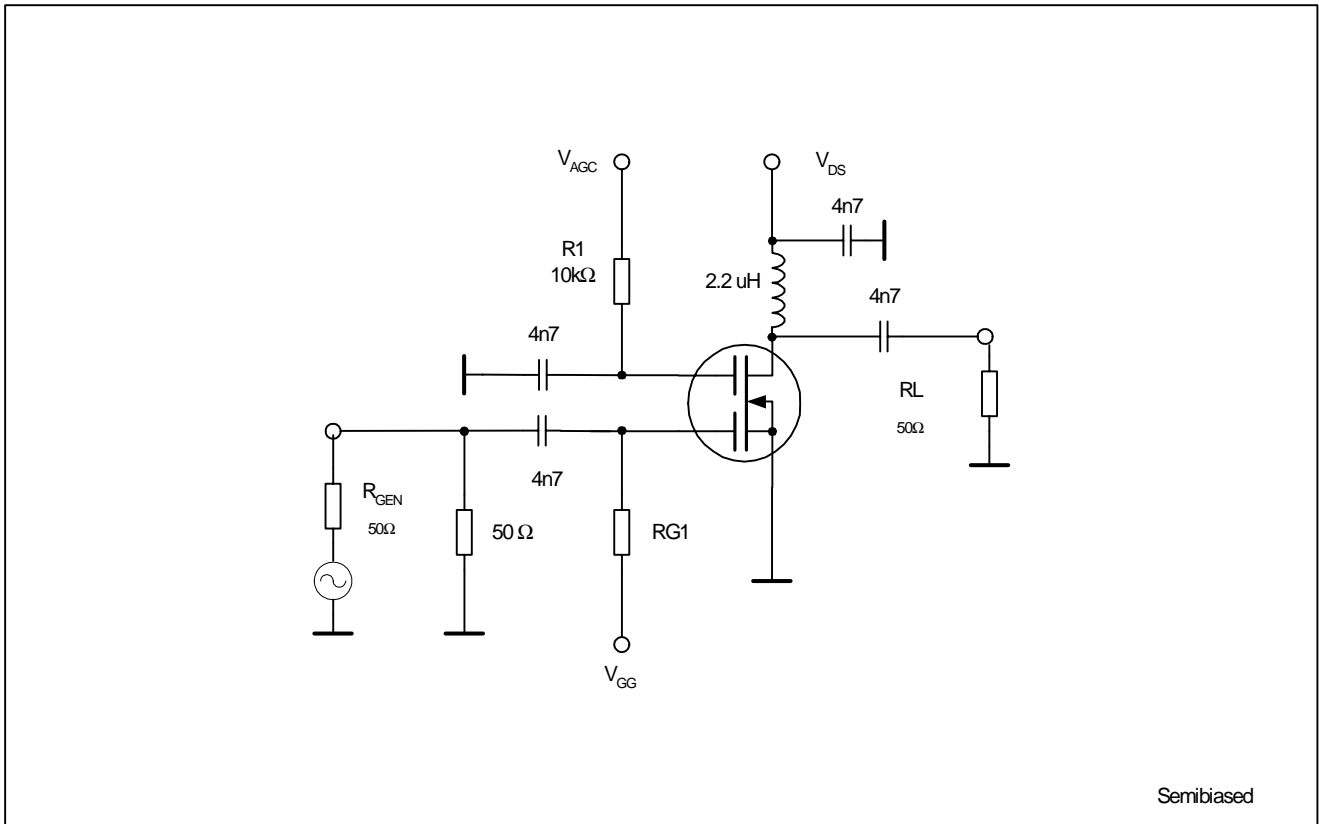
**Crossmodulation  $V_{unw} = (AGC)$**

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

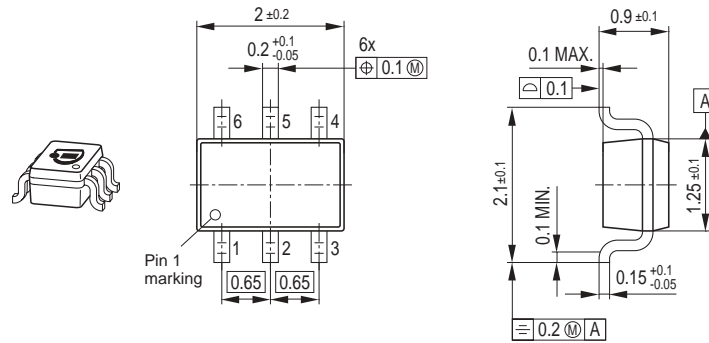
amp.B



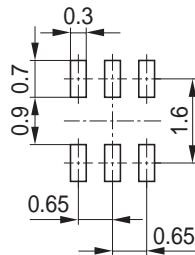
Crossmodulation test circuit



Package Outline

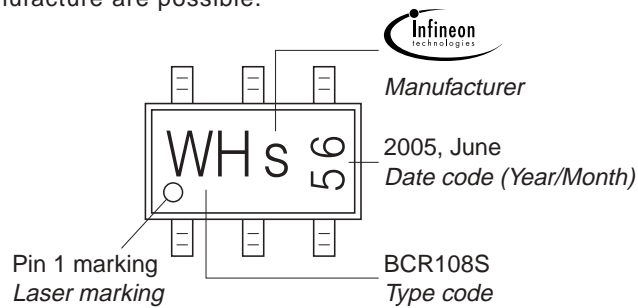


Foot Print



Marking Layout (Example)

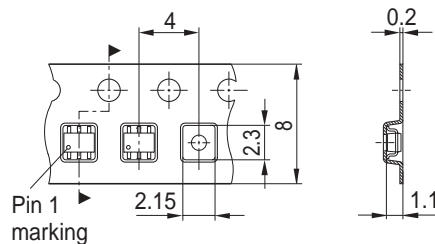
Small variations in positioning of Date code, Type code and Manufacture are possible.



Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel  
 Reel ø330 mm = 10.000 Pieces/Reel

For symmetric types no defined Pin 1 orientation in reel.



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