## DUAL - N-Channel MOSFET Tetrode

- Low noise gain controlled input
  stages of UHF-and VHF - tuners
  with 3V up to 5V supply voltage
- Integrated gate protection diodes
- Low noise figure
- High gain, high forward transadmittance
- Improved cross modulation at gain reduction
- Biasing network partially integrated
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101

**AEC** Qualified

**RoHS**
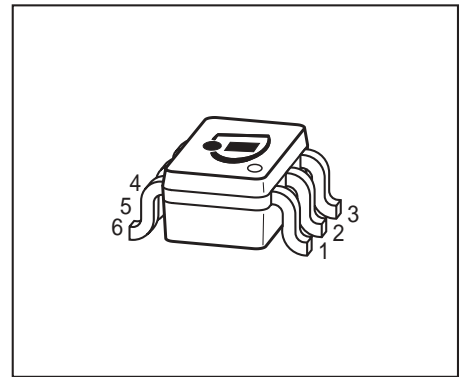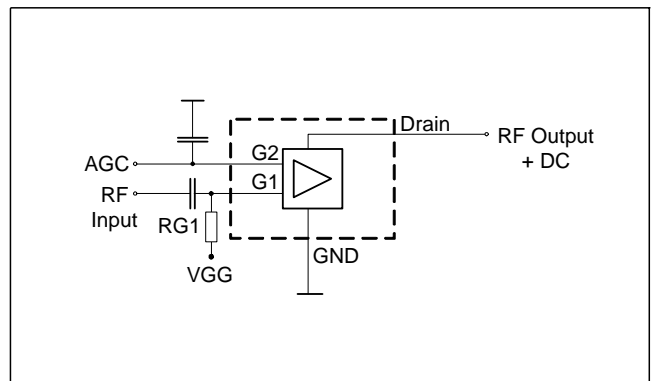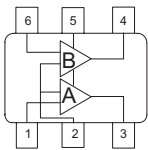
**BG5130R**

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

| Type | Package | Pin Configuration | | | | | | Marking |
|------|---------|------|------|------|-------|------|--------|---------|
| BG5130R | SOT363 | 1=G1* | 2=S | 3=D* | 4=D** | 5=G2 | 6=G1** | KYs |

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

## Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 8 | V |
| Continuous drain current | $I_D$ | 25 | mA |
| 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<br>$T_S \leq 78\ °C$ | $P_{tot}$ | 200 | mW |
| Storage temperature | $T_{stg}$ | -55 ... 150 | °C |
| Channel temperature | $T_{ch}$ | 150 | |

## Thermal Resistance

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Channel - soldering point[1] | $R_{thchs}$ | ≤ 280 | K/W |

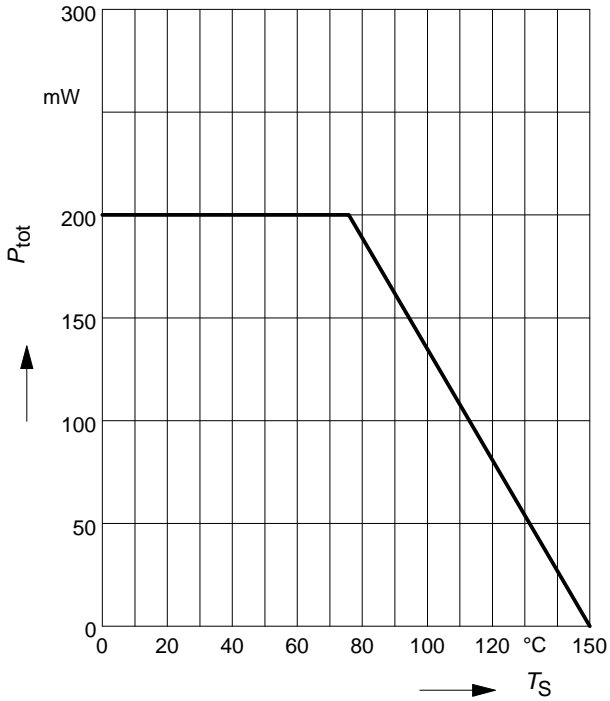[1]For calculation of $R_{thJA}$ please refer to Application Note Thermal Resistance

2007-06-01

**Electrical Characteristics** at $T_A$ = 25°C, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **DC Characteristics** | | | | | |
| Drain-source breakdown voltage $I_D$ = 1 µA, $V_{G1S}$ = 0 , $V_{G2S}$ = 0 | $V_{(BR)DS}$ | 12 | - | - | V |
| Gate1-source breakdown voltage $+I_{G1S}$ = 10 mA, $V_{G2S}$ = 0 , $V_{DS}$ = 0 | $+V_{(BR)G1SS}$ | 6 | - | 15 | |
| Gate2-source breakdown voltage $+I_{G2S}$ = 10 mA, $V_{G1S}$ = 0 , $V_{DS}$ = 0 | $+V_{(BR)G2SS}$ | 6 | - | 15 | |
| Gate1-source leakage current $V_{G1S}$ = 6 V, $V_{G2S}$ = 0 | $+I_{G1SS}$ | - | - | 50 | nA |
| Gate2-source leakage current $V_{G2S}$ = 6 V, $V_{G1S}$ = 0 , $V_{DS}$ = 0 | $+I_{G2SS}$ | - | - | 50 | |
| Drain current $V_{DS}$ = 3 V, $V_{G1S}$ = 0 , $V_{G2S}$ = 3 V | $I_{DSS}$ | - | - | 100 | |
| Drain-source current $V_{DS}$ = 3 V, $V_{G2S}$ = 3 V, $R_{G1}$ = 100 kΩ | $I_{DSX}$ | - | 10 | - | mA |
| Gate1-source pinch-off voltage $V_{DS}$ = 3 V, $V_{G2S}$ = 3 V, $I_D$ = 20 µA | $V_{G1S(p)}$ | - | 0.6 | - | V |
| Gate2-source pinch-off voltage $V_{DS}$ = 3 V, $V_{G1S}$ = 3 V, $I_D$ = 20 µA | $V_{G2S(p)}$ | - | 0.7 | - | |

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**Electrical Characteristics** at $T_A$ = 25°C, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **AC Characteristics** - (verified by random sampling) | | | | | |
| Forward transconductance $V_{DS}$ = 3 V, $V_{G2S}$ = 3 V | $g_{fs}$ | - | 41 | - | mS |
| Gate1 input capacitance $V_{DS}$ = 3 V, $V_{G2S}$ = 3 V, $f$ = 10 MHz | $C_{g1ss}$ | - | 2.7 | - | pF |
| Output capacitance $V_{DS}$ = 3 V, $V_{G2S}$ = 3 V, $f$ = 10 MHz | $C_{dss}$ | - | 1.6 | - | |
| Power gain $V_{DS}$ = 3 V, $I_D$ = 10 mA, $V_{G2S}$ = 3 V, $f$ = 800 MHz | $G_p$ | - | 24 | - | dB |
| $V_{DS}$ = 3 V, $I_D$ = 10 mA, $V_{G2S}$ = 3 V, $f$ = 45 MHz | | - | 35 | - | |
| Noise figure $V_{DS}$ = 3 V, $I_D$ = 10 mA, $V_{G2S}$ = 3 V, $f$ = 800 MHz | $F$ | - | 1.3 | - | dB |
| $V_{DS}$ = 3 V, $I_D$ = 10 mA, $V_{G2S}$ = 3 V, $f$ = 45 MHz | | - | 1 | - | |
| Gain control range $V_{DS}$ = 3 V, $V_{G2S}$ = 3...0 V, $f$ = 800 MHz | $\Delta G_p$ | 45 | - | - | |
| Cross-modulation $k$=1%, $f_w$=50MHz, $f_{unw}$=60MHz $AGC$ = 0 | $X_{mod}$ | 90 | 94 | - | dB |
| $AGC$ = 10 dB | | - | 92 | - | |
| $AGC$ = 40 dB | | 96 | 98 | - | |

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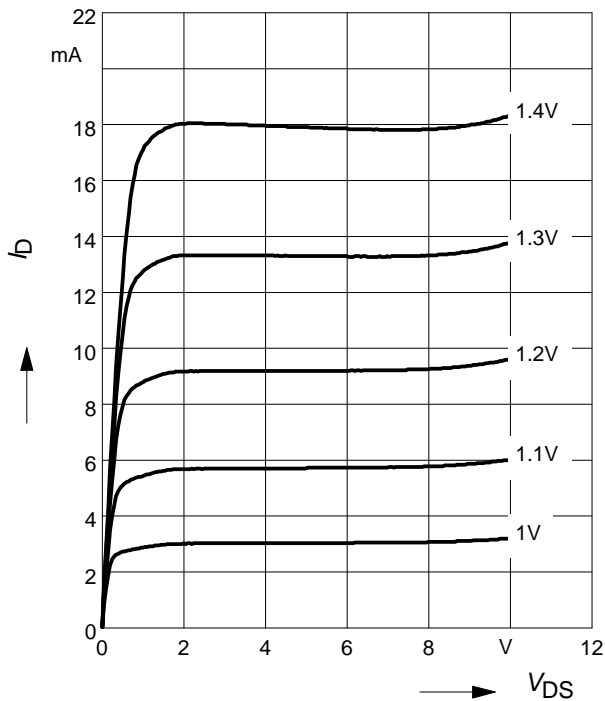
**Total power dissipation** $P_{tot} = f(T_S)$

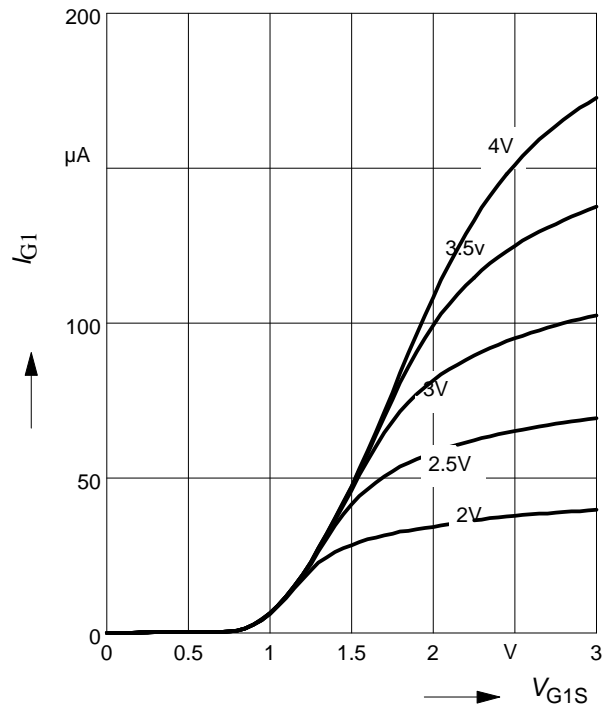**Drain current** $I_D = f(I_{G1})$

$V_{G2S} = 3V$
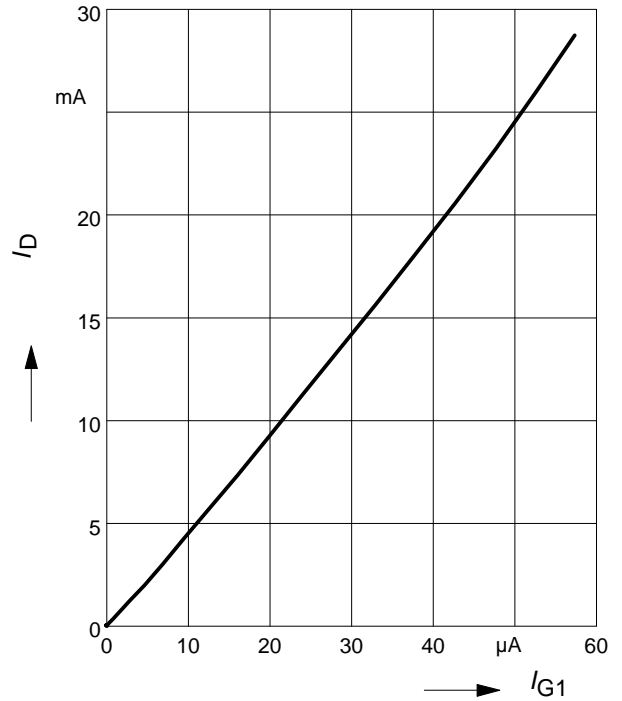




**Output characteristics** $I_D = f(V_{DS})$
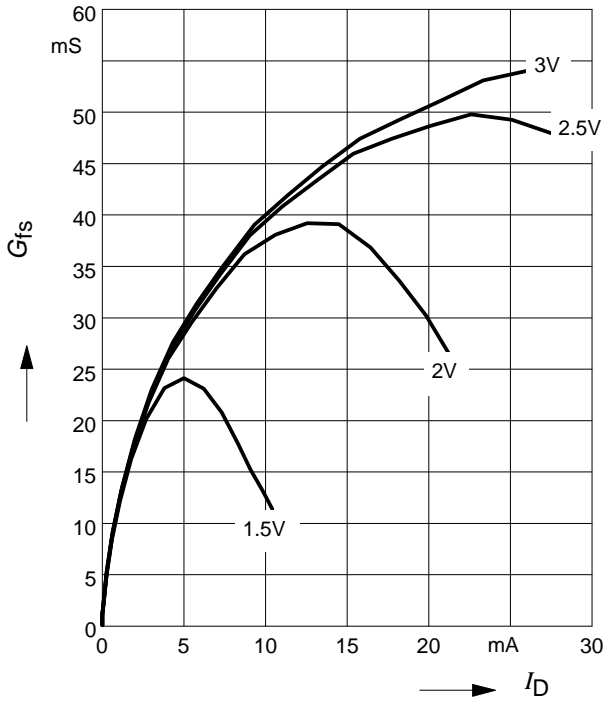
**Gate 1 current** $I_{G1} = f(V_{G1S})$

$V_{DS} = 3V$
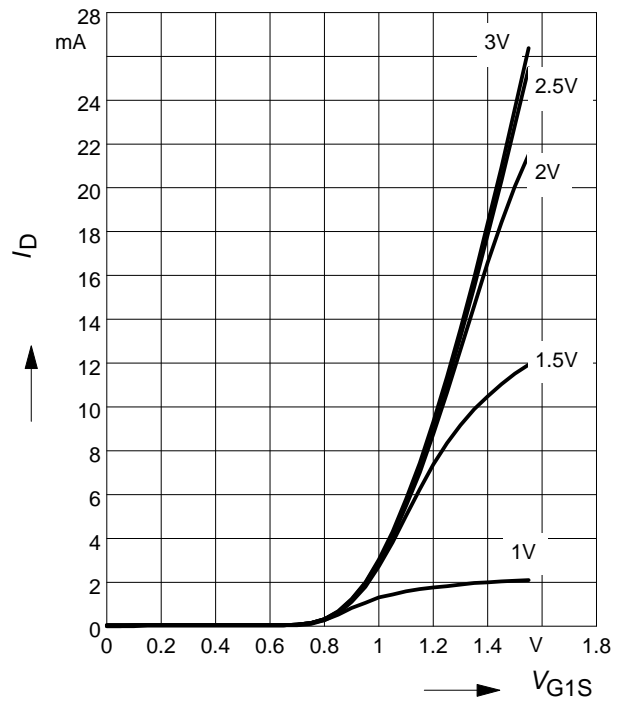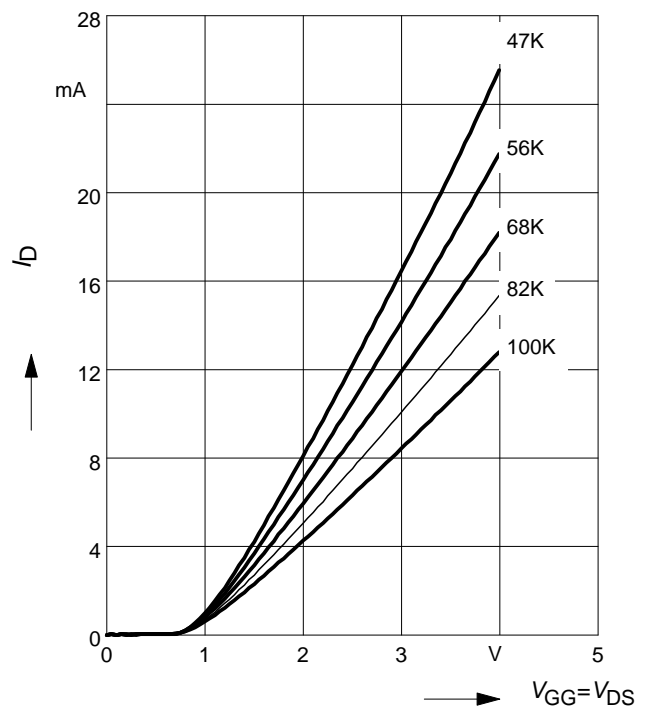
$V_{G2S} = $ Parameter
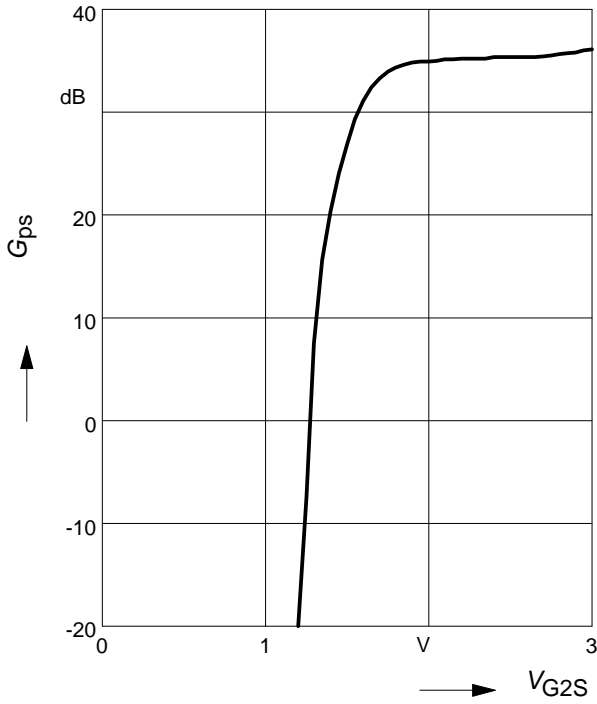




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**Gate 1 forward transconductance**

$g_{fs} = f(I_D)$

$V_{DS} = 3V$, $V_{G2S}$ = Parameter



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

$V_{DS} = 3V$

$V_{G2S}$ = Parameter



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

$V_{DS} = 3V$, $V_{G2S} = 3V$, $R_{G1} = 68k\Omega$

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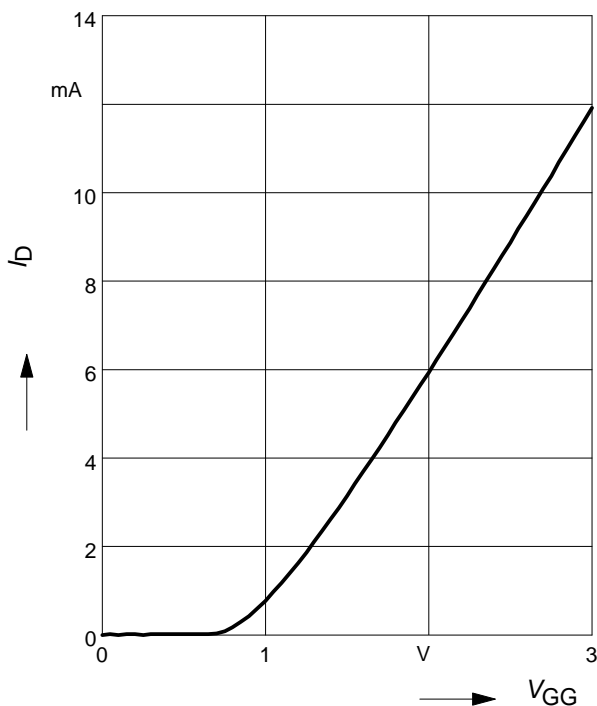


**Drain current** $I_D = f(V_{GG})$
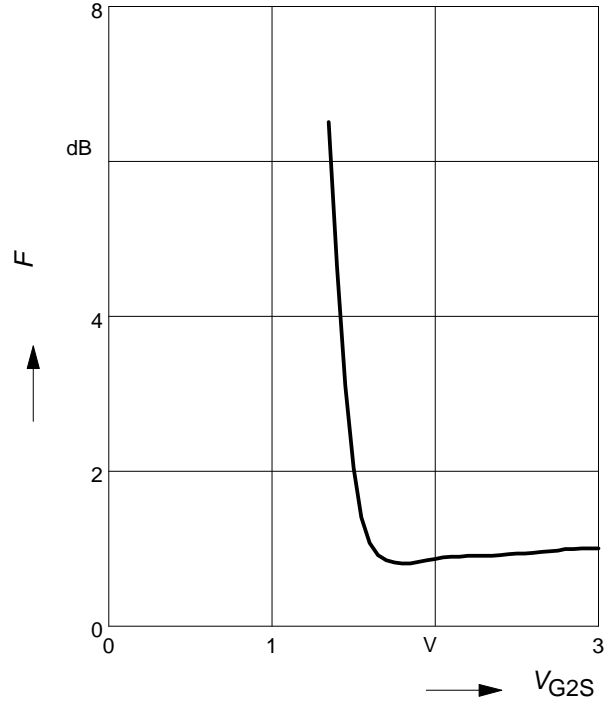
$V_{G2S} = 3V$

$R_{G1}$ = Parameter in k$\Omega$



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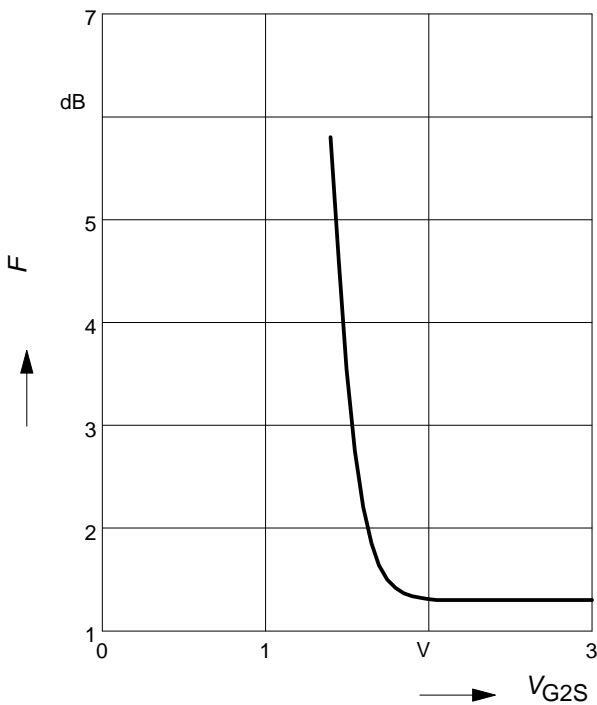
**Power gain** $G_{ps} = f(V_{G2S})$

$f$ = 45 MHz



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

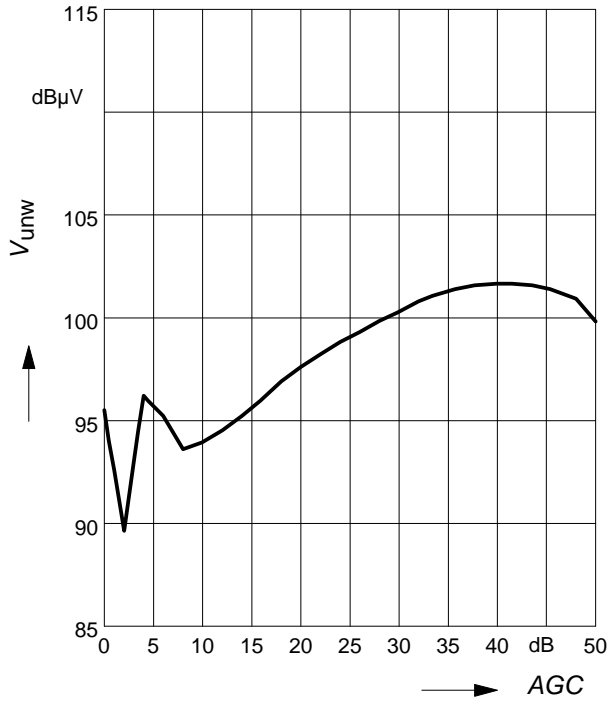$f$ = 45 MHz



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

$f$ = 800 MHz



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

$f$ = 800 GHz

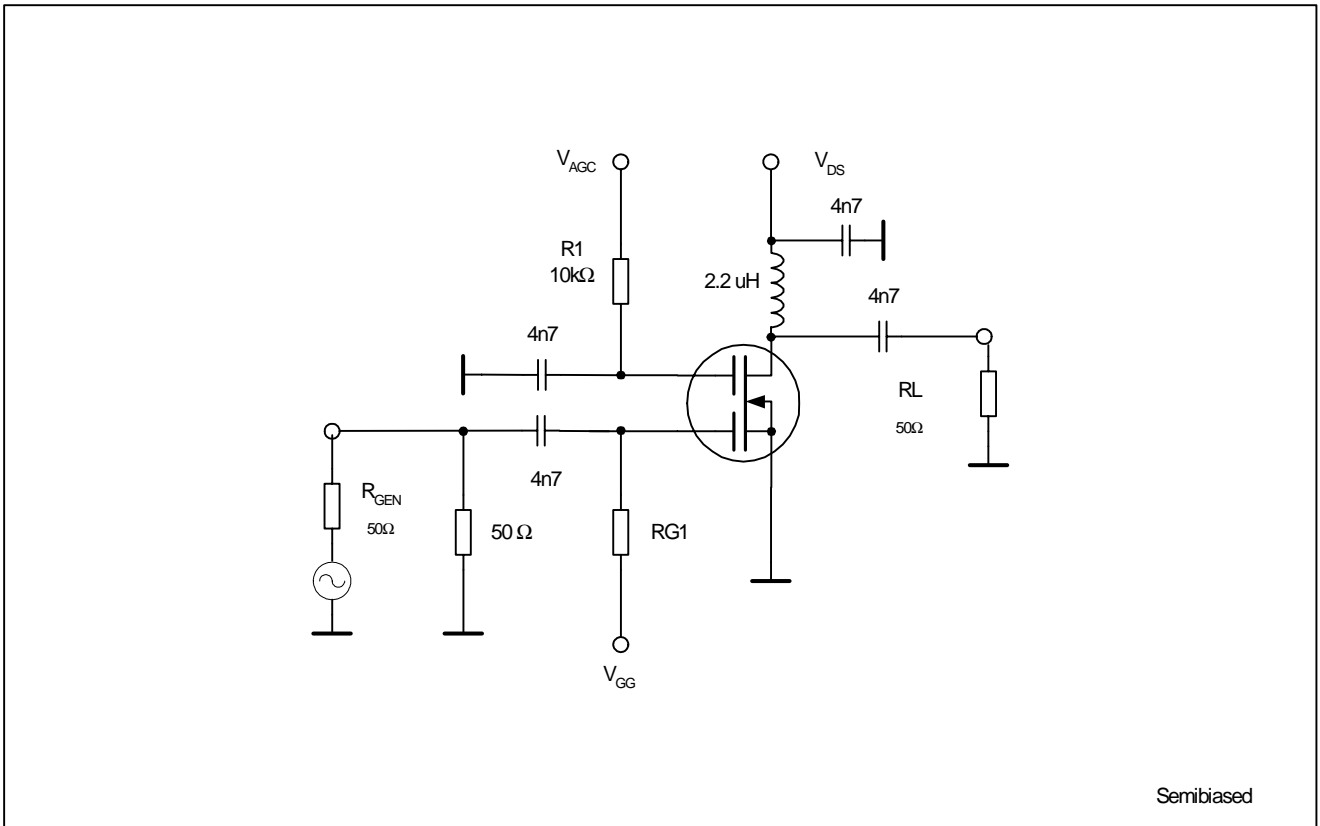2007-06-01
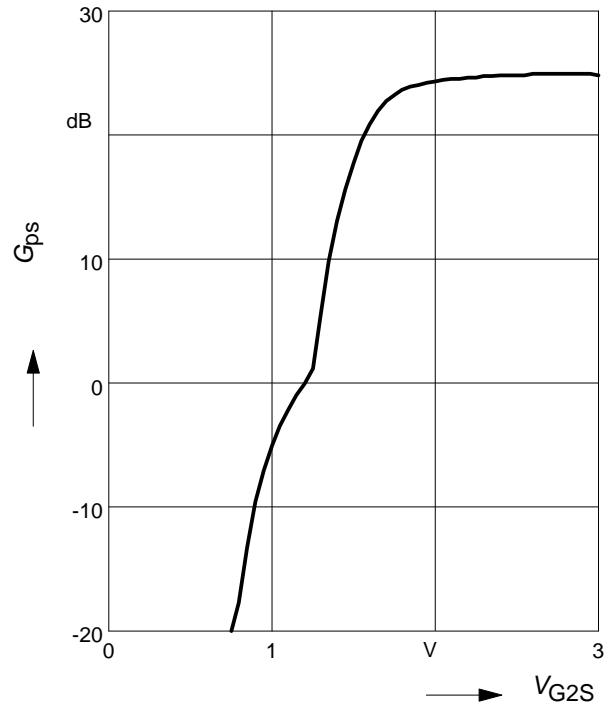
**Crossmodulation** $V_{unw} = (AGC)$

$V_{DS} = 3$ V, $R_{g1} = 68$ kΩ

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## Crossmodulation test circuit



Semibiased

## Package Outline

2 ±0.2

0.2 +0.1 −0.05

6x

⊕ 0.1 Ⓜ

6    5    4

Pin 1 marking

1    2    3

0.65   0.65

0.9 ±0.1

0.1 MAX.

◁ 0.1

A

2.1 ±0.1

0.1 MIN.

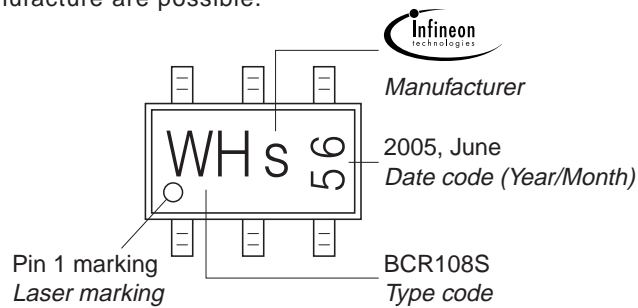1.25 ±0.1

0.15 +0.1 −0.05

⊟ 0.2 Ⓜ A

## Foot Print

0.3

0.9   0.7

1.6

0.65

0.65
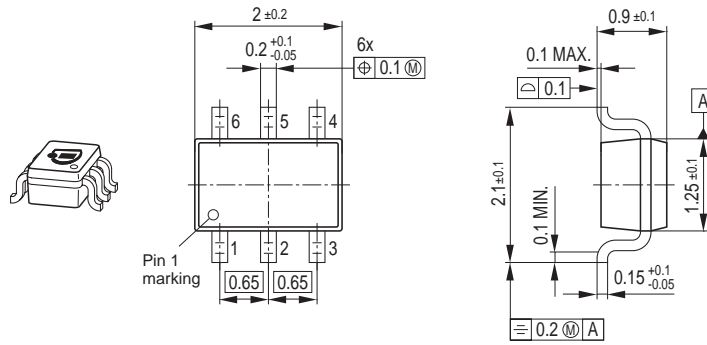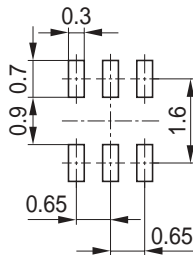
## Marking Layout (Example)

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

**Infineon** technologies

*Manufacturer*

WH s   5 6

2005, June
*Date code (Year/Month)*

Pin 1 marking
*Laser marking*

BCR108S
*Type code*

## 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.
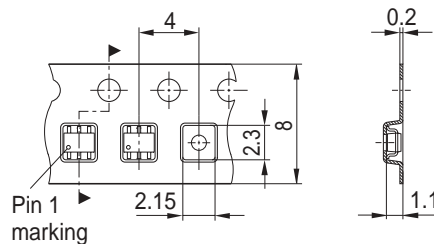
4

0.2

2.3

8

Pin 1 marking

2.15

1.1

**Attention please!**

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