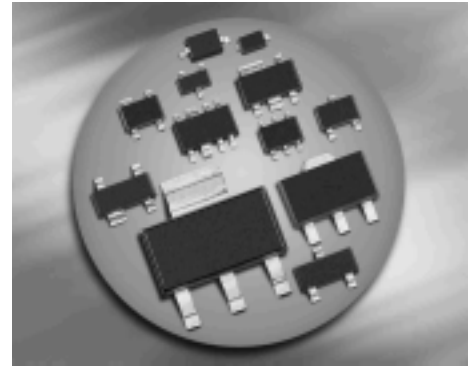


Silicon N-Channel MOSFET Tetrode

- For low noise , high gain controlled input stages up to 1GHz
- Operating voltage 5 V
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



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

| Type | Package | Pin Configuration | | | | | | Marking |
|---------|---------|-------------------|-----|------|------|---|---|---------|
| BF2040 | SOT143 | 1=S | 2=D | 3=G2 | 4=G1 | - | - | NFs |
| BF2040R | SOT143R | 1=D | 2=S | 3=G1 | 4=G2 | - | - | NFs |
| BF2040W | SOT343 | 1=D | 2=S | 3=G1 | 4=G2 | - | - | NFs |

Maximum Ratings

| Parameter | Symbol | Value | Unit |
|--|------------------|-------------|------------------|
| Drain-source voltage | V_{DS} | 8 | V |
| Continuous drain current | I_D | 40 | mA |
| Gate 1/ gate 2-source current | $\pm I_{G1/2SM}$ | 10 | |
| Gate 1 (external biasing) | $+V_{G1SE}$ | 7 | V |
| Total power dissipation | P_{tot} | | mW |
| $T_S \leq 76 \text{ }^\circ\text{C}$, BF2040, BF2040R | | 200 | |
| $T_S \leq 94 \text{ }^\circ\text{C}$, BF2040W | | 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 |
| BF2040, BF2040R | | ≤ 370 | |
| BF2040W | | ≤ 280 | |

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

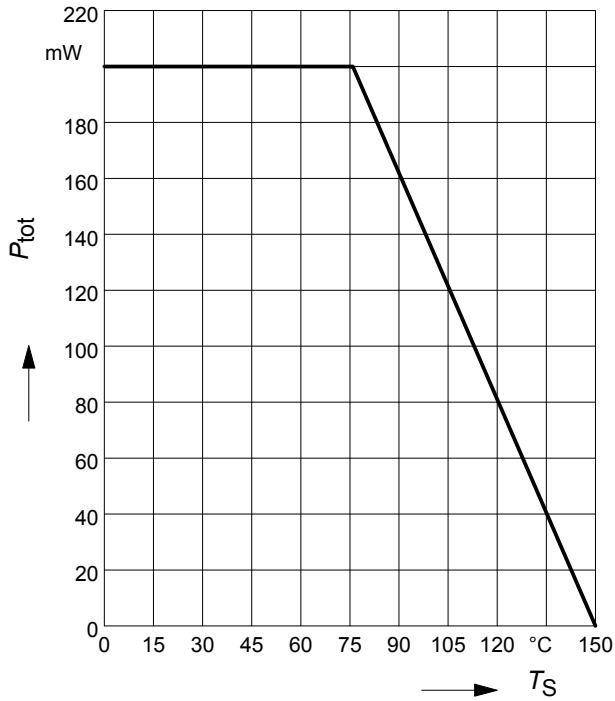
| Parameter | Symbol | Values | | | Unit |
|---|-----------------|--------|------|------|---------------|
| | | min. | typ. | max. | |
| DC Characteristics | | | | | |
| Drain-source breakdown voltage $I_D = 20 \mu\text{A}$, $V_{G1S} = 0$, $V_{G2S} = 0$ | $V_{(BR)DS}$ | 10 | - | - | V |
| Gate1-source breakdown voltage $+I_{G1S} = 10 \text{ mA}$, $V_{G2S} = 0$, $V_{DS} = 0$ | $+V_{(BR)G1SS}$ | 6 | - | 15 | |
| Gate2-source breakdown voltage $+I_{G2S} = 10 \text{ mA}$, $V_{G1S} = 0$, $V_{DS} = 0$ | $+V_{(BR)G2SS}$ | 6 | - | 15 | |
| Gate1-source leakage current $V_{G1S} = 5 \text{ V}$, $V_{G2S} = 0$, $V_{DS} = 0$ | $+I_{G1SS}$ | - | - | 50 | nA |
| Gate2-source leakage current $V_{G2S} = 5 \text{ V}$, $V_{G1S} = 0$, $V_{DS} = 0$ | $+I_{G2SS}$ | - | - | 50 | |
| Drain current $V_{DS} = 5 \text{ V}$, $V_{G1S} = 0$, $V_{G2S} = 4 \text{ V}$ | I_{DSS} | - | - | 50 | μA |
| Drain-source current $V_{DS} = 5 \text{ V}$, $V_{G2S} = 4 \text{ V}$, $R_{G1} = 100 \text{ k}\Omega$ | I_{DSX} | - | 15 | - | mA |
| Gate1-source pinch-off voltage $V_{DS} = 5 \text{ V}$, $V_{G2S} = 4 \text{ V}$, $I_D = 20 \mu\text{A}$ | $V_{G1S(p)}$ | 0.3 | 0.6 | - | V |
| Gate2-source pinch-off voltage $V_{DS} = 5 \text{ V}$, $I_D = 20 \mu\text{A}$ | $V_{G2S(p)}$ | 0.3 | 0.7 | - | |

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

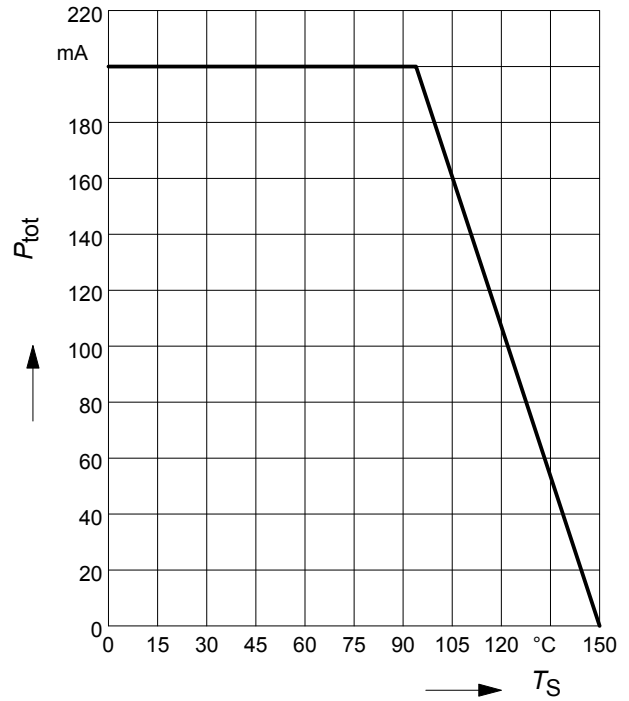
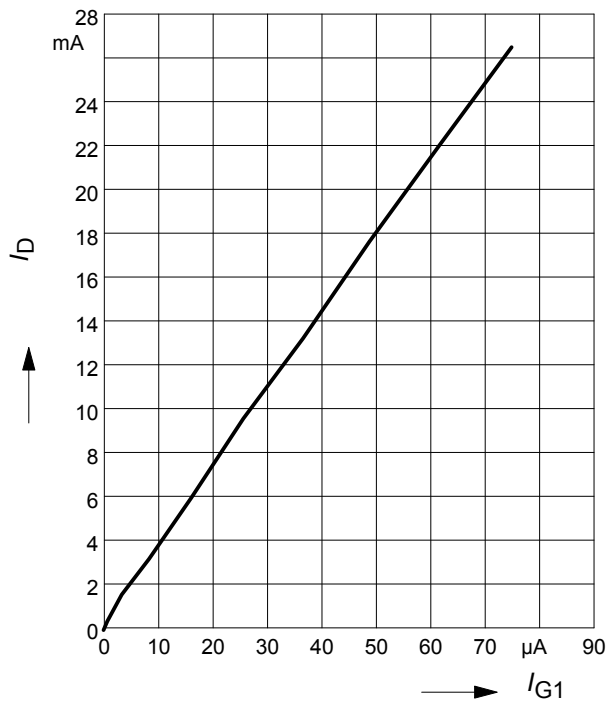
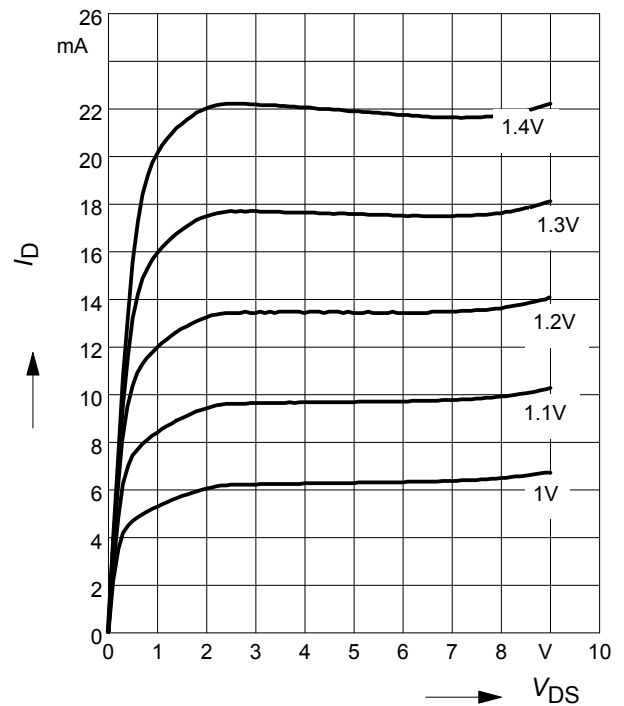
| Parameter | Symbol | Values | | | Unit |
|---|--------------|--------|------|------|------|
| | | min. | typ. | max. | |
| AC Characteristics - (verified by random sampling) | | | | | |
| Forward transconductance $V_{DS} = 5\text{ V}$, $I_D = 15\text{ mA}$, $V_{G2S} = 4\text{ V}$ | g_{fs} | 37 | 42 | - | mS |
| Gate1 input capacitance $V_{DS} = 5\text{ V}$, $I_D = 15\text{ mA}$, $V_{G2S} = 4\text{ V}$, $f = 10\text{ MHz}$ | C_{g1ss} | - | 2.9 | 3.4 | pF |
| Output capacitance $V_{DS} = 5\text{ V}$, $I_D = 15\text{ mA}$, $V_{G2S} = 4\text{ V}$, $f = 10\text{ MHz}$ | C_{dss} | - | 1.6 | - | |
| Power gain $V_{DS} = 5\text{ V}$, $I_D = 15\text{ mA}$, $V_{G2S} = 4\text{ V}$, $f = 800\text{ MHz}$ | G_p | 20 | 23 | - | dB |
| Noise figure $V_{DS} = 5\text{ V}$, $I_D = 15\text{ mA}$, $V_{G2S} = 4\text{ V}$, $f = 800\text{ MHz}$ | F | - | 1.6 | 2.2 | dB |
| Gain control range $V_{DS} = 5\text{ V}$, $V_{G2S} = 4 \dots 0\text{ V}$, $f = 800\text{ GHz}$ | ΔG_p | 45 | 50 | - | |

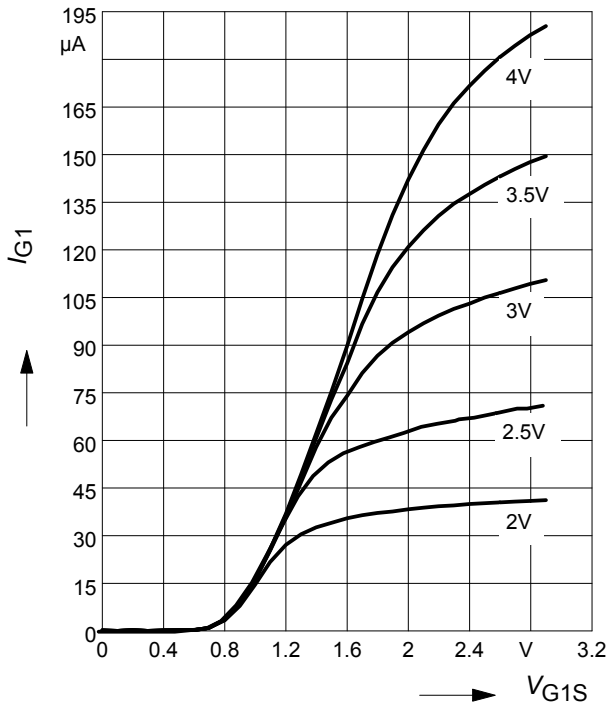
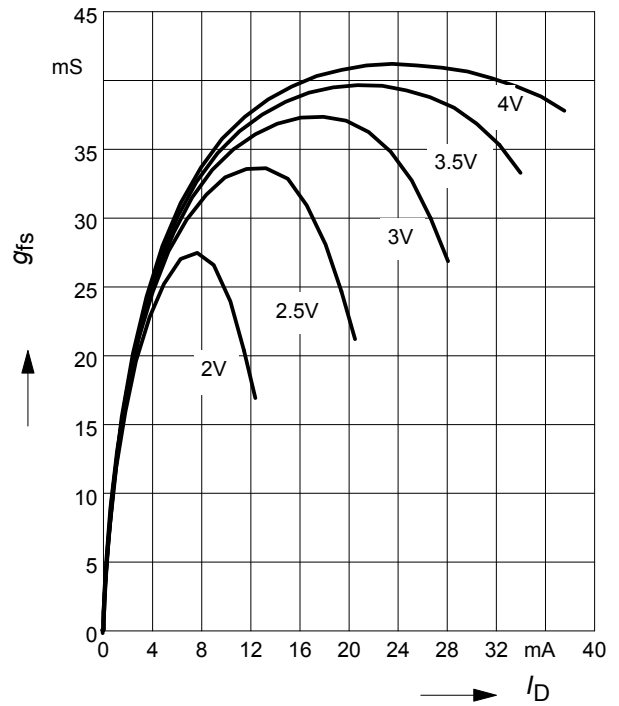
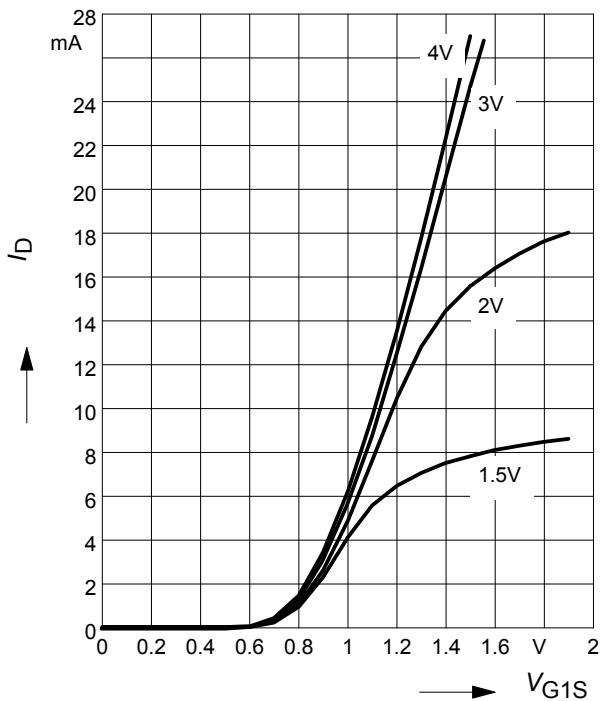
Total power dissipation $P_{tot} = f(T_S)$

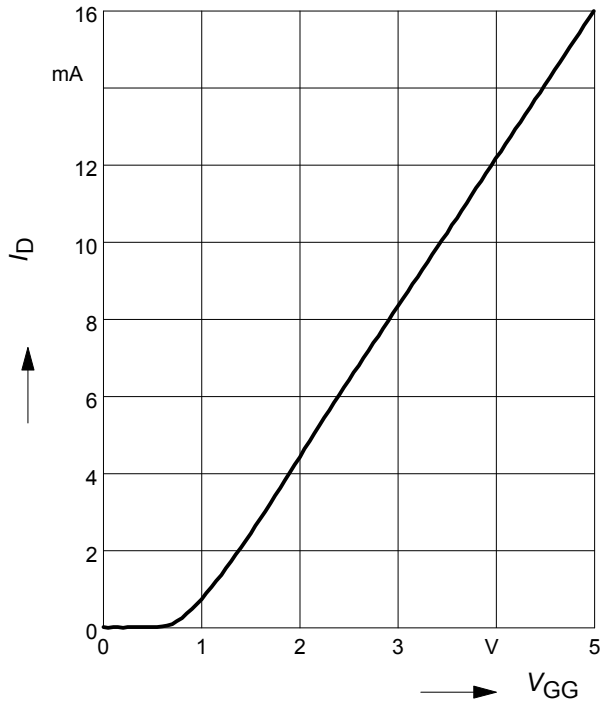
BF2040, BFD2040R

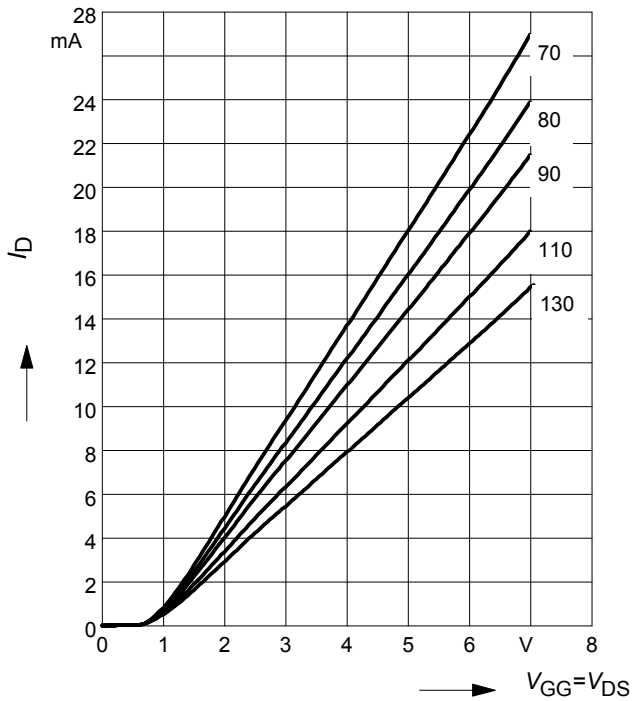
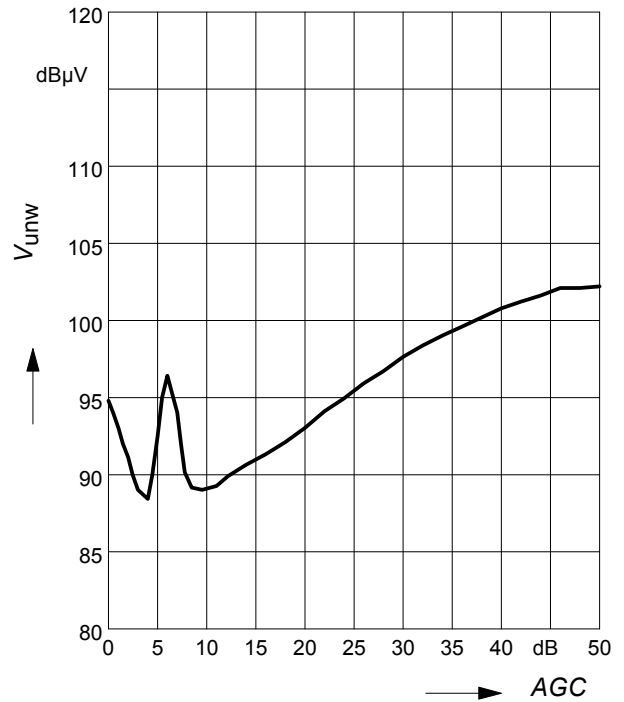

Total power dissipation $P_{tot} = f(T_S)$

BF2040W

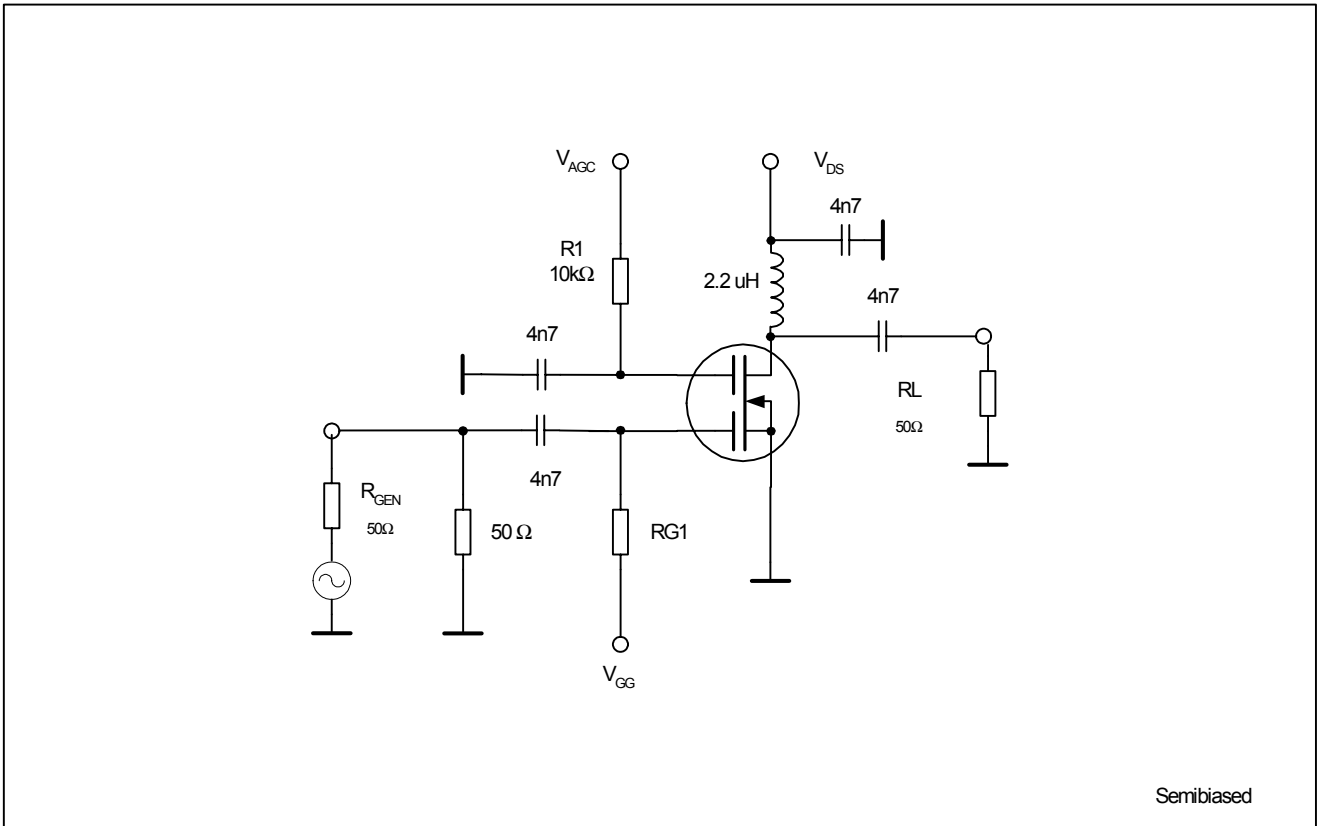

Drain current $I_D = f(I_{G1})$
 $V_{G2S} = 4V$

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


Gate 1 current $I_{G1} = f(V_{G1S})$
 $V_{DS} = 5V$
 $V_{G2S} = \text{Parameter}$

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

Drain current $I_D = f(V_{G1S})$
 $V_{DS} = 5V$
 $V_{G2S} = \text{Parameter}$

Drain current $I_D = f(V_{GG})$
 $V_{DS} = 5V, V_{G2S} = 4V, R_{G1} = 80k\Omega$

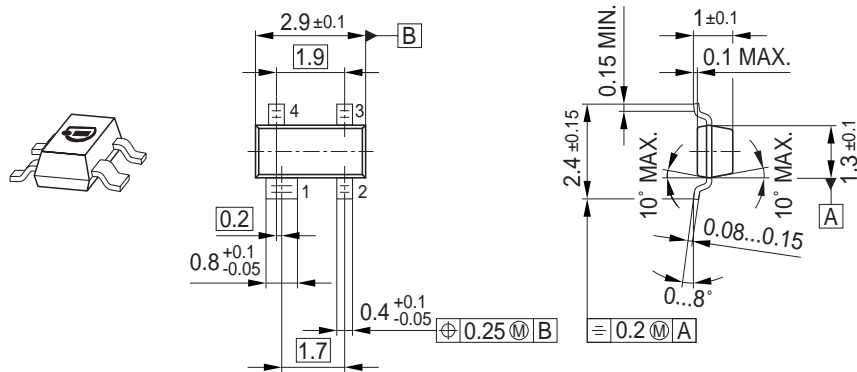
 (connected to V_{GG} , V_{GG} =gate1 supply voltage)


Drain current $I_D = f(V_{GG})$
 $V_{G2S} = 4V$
 $R_{G1} = \text{Parameter in } k\Omega$

Crossmodulation $V_{unw} = (AGC)$
 $V_{DS} = 5 V$


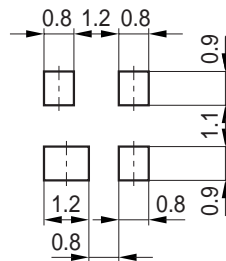
Cossmodulation test circuit



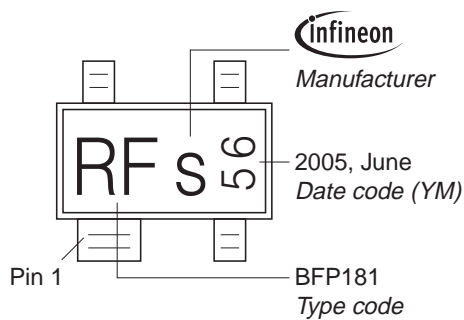
Package Outline



Foot Print

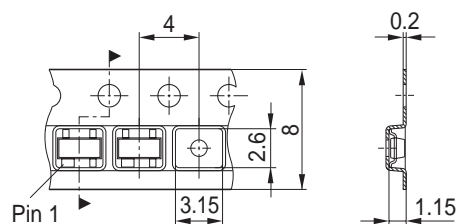


Marking Layout (Example)

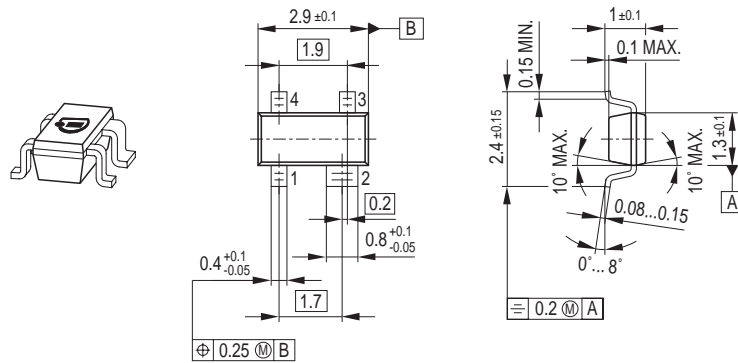


Standard Packing

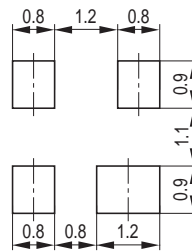
Reel $\phi 180$ mm = 3.000 Pieces/Reel
 Reel $\phi 330$ mm = 10.000 Pieces/Reel



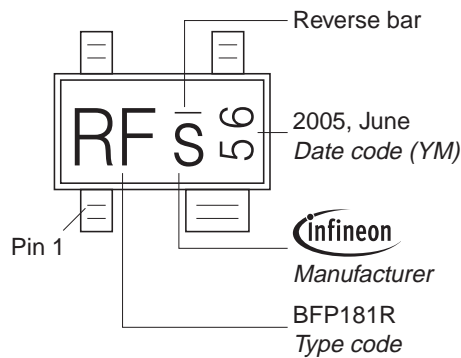
Package Outline



Foot Print

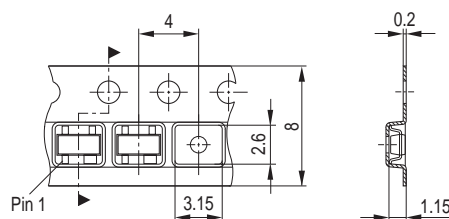


Marking Layout (Example)

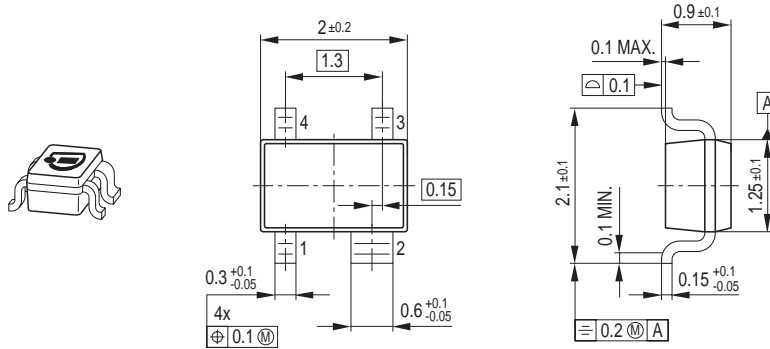


Standard Packing

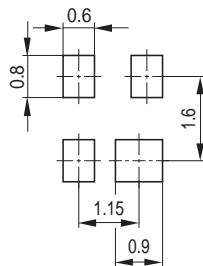
Reel \varnothing 180 mm = 3.000 Pieces/Reel
 Reel \varnothing 330 mm = 10.000 Pieces/Reel



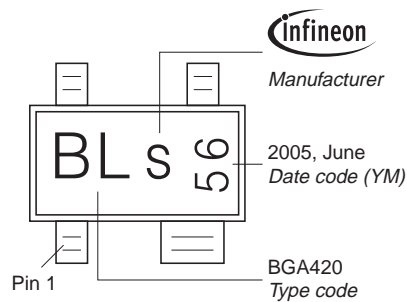
Package Outline



Foot Print

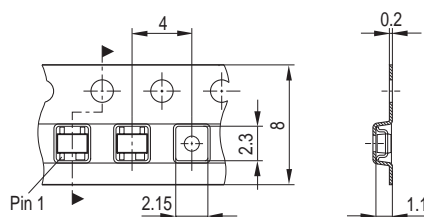


Marking Layout (Example)



Standard Packing

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



Edition 2006-02-01
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Infineon Technologies AG
81726 München, Germany
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- Защита от снятия компонента с производства.



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