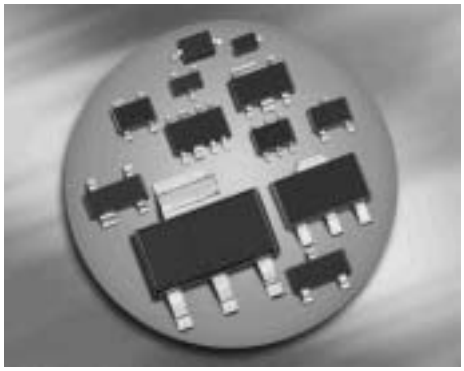
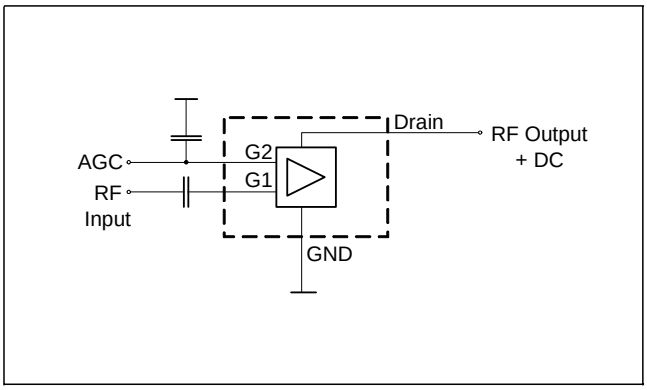
## Silicon N-Channel MOSFET Tetrode



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

AEC Qualified RoHS




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

| Type | Package | Pin Configuration | | | | | | Marking |
|---|---|---|---|---|---|---|---|---|
| BF1005S | SOT143 | 1=S | 2=D | 3=G2 | 4=G1 | - | - | NZs |
| BF1005SR | SOT143R | 1=D | 2=S | 3=G1 | 4=G2 | - | - | NZs |

**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 | $\pm I_{G1/2SM}$ | 10 | |
| Gate 1 (external biasing) | $+V_{G1SE}$ | 3 | V |
| Total power dissipation $T_S \leq 76$ °C | $P_{tot}$ | 200 | mW |
| Storage temperature | $T_{stg}$ | -55 ... 150 | °C |
| Channel temperature | $T_{ch}$ | 150 | |

[1]Pb-containing package may be available upon special request

**Note:**
**It is not recommended to apply external DC-voltage on Gate 1 in active mode.**

## Thermal Resistance

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

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

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **DC Characteristics** | | | | | |
| Drain-source breakdown voltage<br>$I_D$ = 650 µA, $V_{G1S}$ = 0 , $V_{G2S}$ = 0 | $V_{(BR)DS}$ | 12 | - | - | V |
| Gate1-source breakdown voltage<br>+$I_{G1S}$ = 10 mA, $V_{G2S}$ = 0 , $V_{DS}$ = 0 | +$V_{(BR)G1SS}$ | 8 | - | 12 | |
| Gate2 source breakdown voltage<br>±$I_{G2S}$ = 10 mA, $V_{G1S}$ = 0 , $V_{DS}$ = 0 | ±$V_{(BR)G2SS}$ | 8 | - | 13 | |
| Gate1-source leakage current<br>$V_{G1S}$ = 6 V, $V_{G2S}$ = 0 | +$I_{G1SS}$ | - | 100 | - | µA |
| Gate 2 source leakage current<br>±$V_{G2S}$ = 8 V, $V_{G1S}$ = 0 , $V_{DS}$ = 0 | ±$I_{G2SS}$ | - | - | 50 | nA |
| Drain current<br>$V_{DS}$ = 5 V, $V_{G1S}$ = 0 , $V_{G2S}$ = 4 V | $I_{DSS}$ | - | - | 800 | µA |
| Operating current (selfbiased)<br>$V_{DS}$ = 5 V, $V_{G2S}$ = 4 V | $I_{DSO}$ | 8 | 13 | 16 | mA |
| Gate2-source pinch-off voltage<br>$V_{DS}$ = 5 V, $I_D$ = 100 µA | $V_{G2S(p)}$ | - | 1 | - | V |

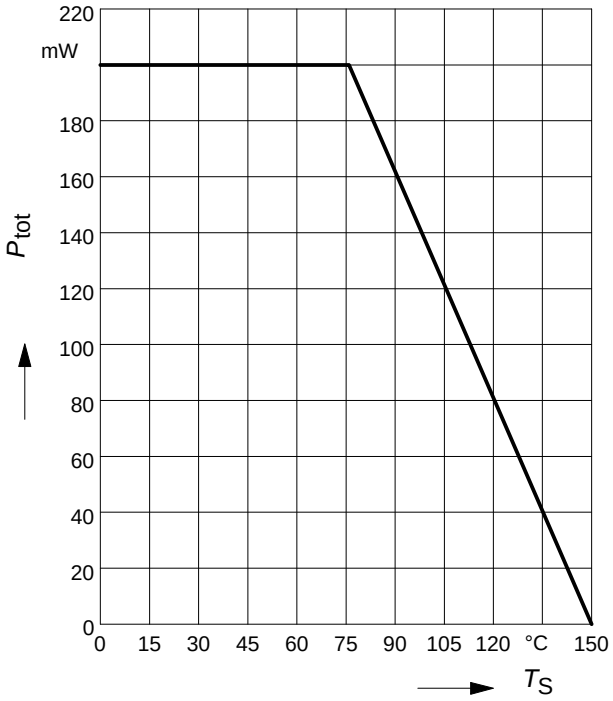
[1]For calculation of $R_{thJA}$ please refer to Application Note Thermal Resistance

**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<br>$V_{DS}$ = 5 V, $V_{G2S}$ = 4.5 V | $g_{fs}$ | 26 | 30 | - | mS |
| Gate1 input capacitance<br>$V_{DS}$ = 5 V, $V_{G2S}$ = 4 V, $f$ = 1 MHz | $C_{g1ss}$ | - | 2.4 | 2.7 | pF |
| Output capacitance<br>$V_{DS}$ = 5 V, $V_{G2S}$ = 4 V, $f$ = 100 MHz | $C_{dss}$ | - | 1.3 | - | |
| Power gain (self biased)<br>$V_{DS}$ = 5 V, $V_{G2S}$ = 4 V, $f$ = 800 MHz | $G_p$ | 20 | 22 | - | dB |
| Noise figure<br>$V_{DS}$ = 5 V, $V_{G2S}$ = 4 V, $f$ = 800 MHz | $F$ | - | 1.6 | 2.1 | dB |
| Gain control range<br>$V_{DS}$ = 5 V, $V_{G2S}$ = 4 V ... 0 V, $f$ = 800 MHz | $\Delta G_p$ | 40 | 50 | - | |

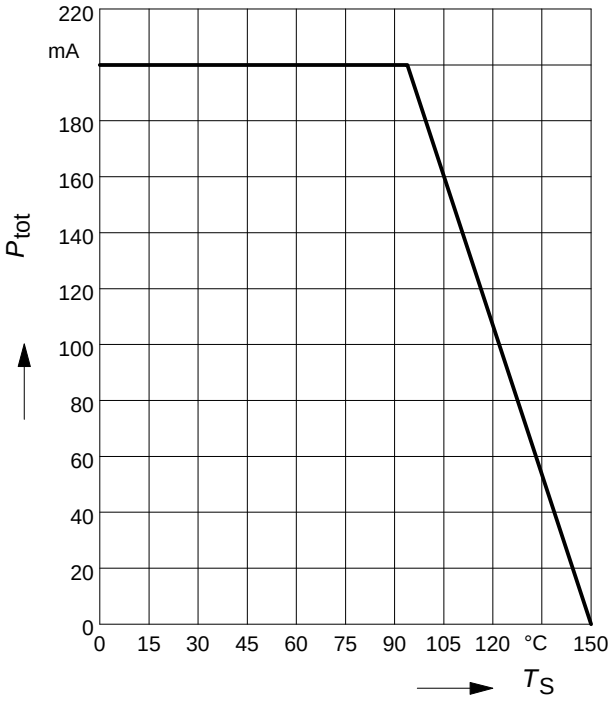
**Total power dissipation $P_{tot} = f(T_S)$**

BF1005S, BF1005SR

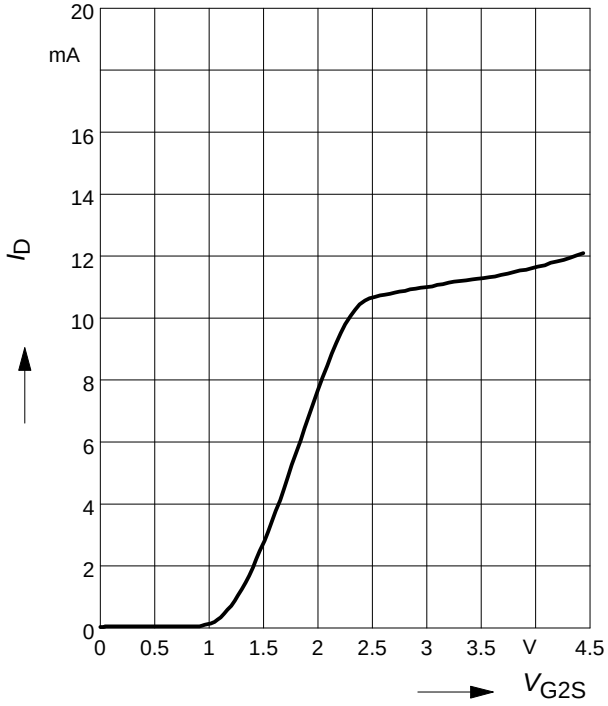



**Total power dissipation $P_{tot} = f(T_S)$**

BF1005SW

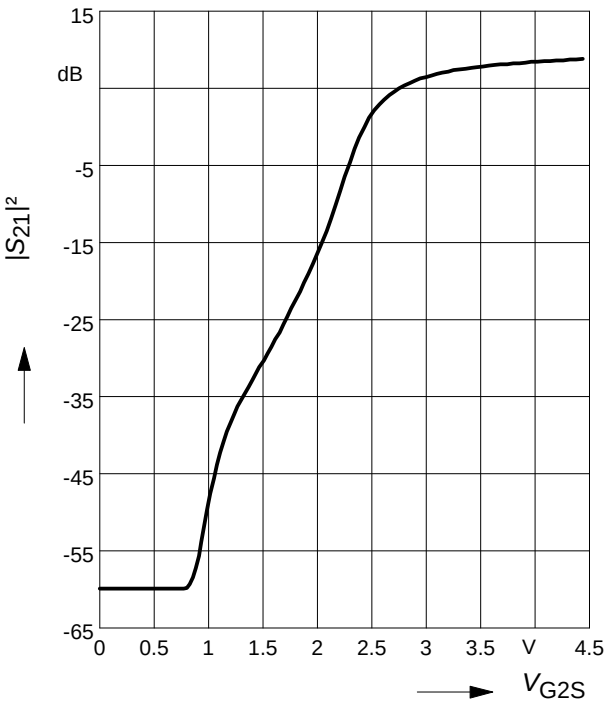



**Drain current $I_D = f(V_{G2S})$**



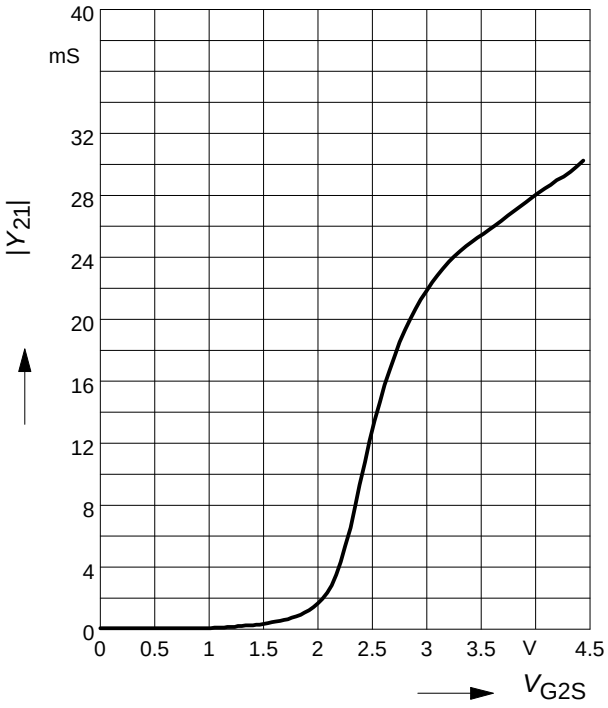

**Insertion power gain**

**$|S_{21}|^2 = f(V_{G2S})$**



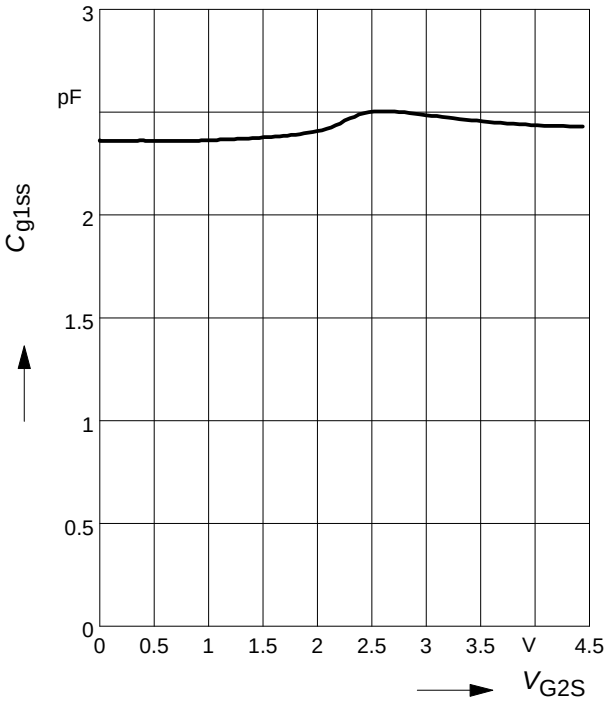
**Forward transfer admittance**

$|Y_{21}| = f(V_{G2S})$



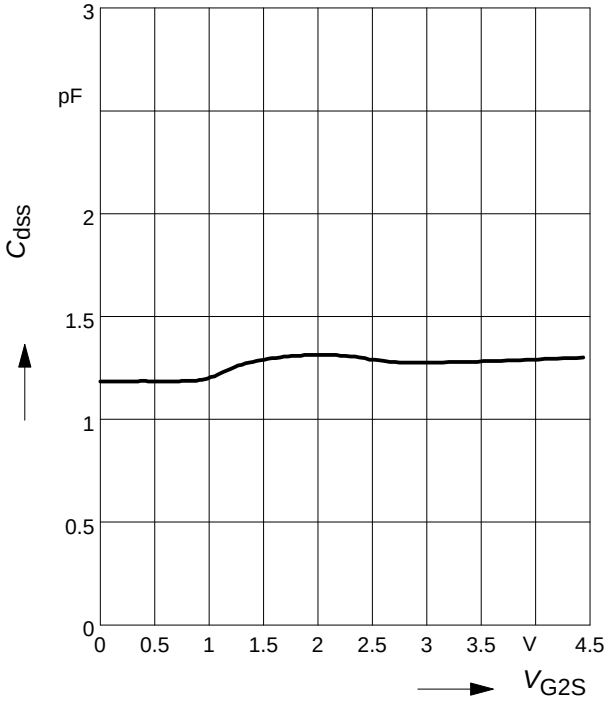

**Gate 1 input capacitance** $C_{g1ss} = f(V_{g2s})$

f = 200MHz

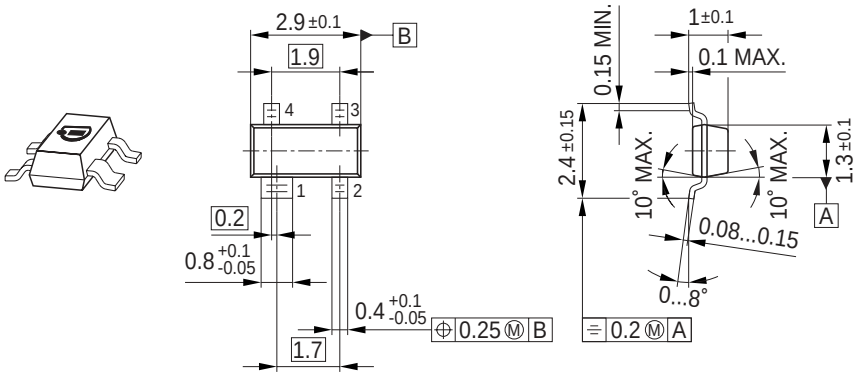



**Output capacitance** $C_{dss} = f(V_{G2S})$

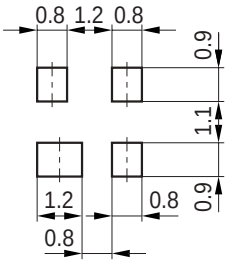
$f$ = 200MHz



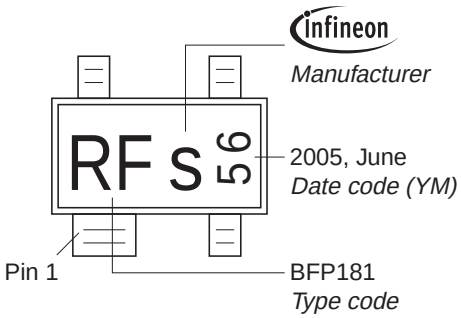
## Package Outline




## Foot Print

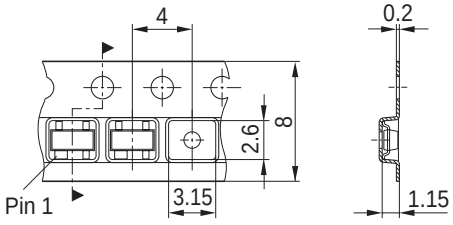



## Marking Layout (Example)




## Standard Packing

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



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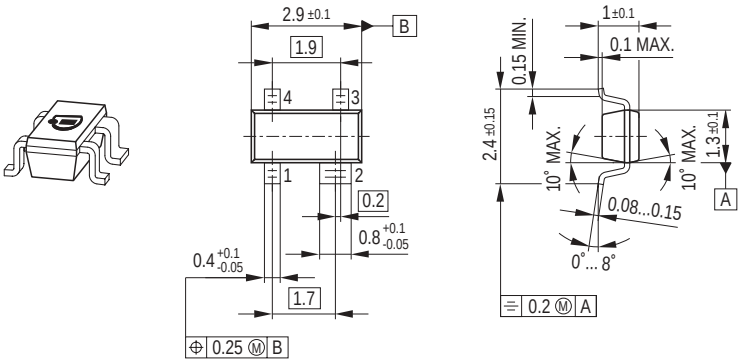


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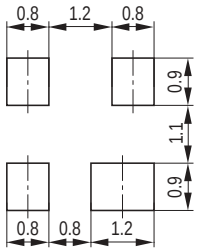


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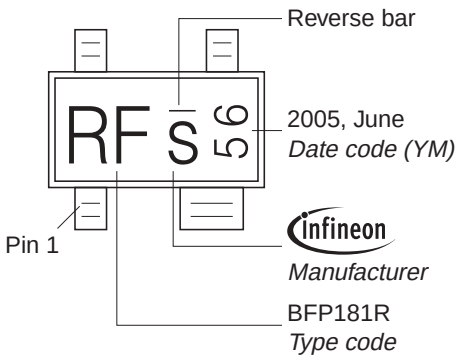


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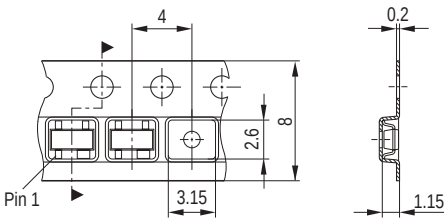

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