



Matched N-Channel JFET Pairs

| PRODUCT SUMMARY | | | | | |
|-----------------|-------------------|-----------------------|-------------------|----------------|--------------------------------|
| Part Number | $V_{GS(off)}$ (V) | $V_{(BR)GSS}$ Min (V) | g_{fs} Min (mS) | I_G Typ (pA) | $ V_{GS1} - V_{GS2} $ Max (mV) |
| 2N5564 | -0.5 to -3 | -40 | 7.5 | -3 | 5 |
| 2N5565 | -0.5 to -3 | -40 | 7.5 | -3 | 10 |
| 2N5566 | -0.5 to -3 | -40 | 7.5 | -3 | 20 |

FEATURES

- Two-Chip Design
- High Slew Rate
- Low Offset/Drift Voltage
- Low Gate Leakage: 3 pA
- Low Noise: 12 nV/√Hz @ 10 Hz
- Good CMRR: 76 dB
- Minimum Parasitics

BENEFITS

- Tight Differential Match vs. Current
- Improved Op Amp Speed, Settling Time Accuracy
- Minimum Input Error/Trimming Requirement
- Insignificant Signal Loss/Error Voltage
- High System Sensitivity
- Minimum Error with Large Input Signals
- Maximum High Frequency Performance

APPLICATIONS

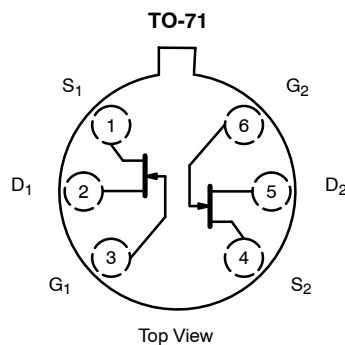
- Wideband Differential Amps
- High-Speed, Temp-Compensated, Single-Ended Input Amps
- High-Speed Comparators
- Impedance Converters
- Matched Switches

DESCRIPTION

The 2N5564/5565/5566 are matched pairs of JFETs mounted in a TO-71 package. This two-chip design reduces parasitics for good performance at high frequency while ensuring extremely tight matching. This series features high breakdown voltage ($V_{(BR)DSS}$ typically > 55 V), high gain (typically > 9 mS), and <5 mV offset between the two die.

The hermetically-sealed TO-71 package is available with full military processing (see Military Information).

For similar products see the low-noise U/SST401 series, and the low-leakage 2N5196/5197/5198/5199 data sheets.



ABSOLUTE MAXIMUM RATINGS

Gate-Drain, Gate-Source Voltage -40 V
 Gate-Gate Voltage ±80 V
 Gate Current 50 mA
 Lead Temperature ($1/16$ " from case for 10 sec.) 300 °C
 Storage Temperature -65 to 200 °C

Operating Junction Temperature -55 to 150 °C
 Power Dissipation : Per Side^a 325 mW
 Total^b 650 mW

Notes
 a. Derate 2.6 mW/°C above 25 °C
 b. Derate 5.2 mW/°C above 25 °C



| SPECIFICATIONS (T _A = 25 °C UNLESS OTHERWISE NOTED) | | | | | | | | | | |
|--|--|---|------------------|--------|------|--------|------|--------|------|------------|
| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | | | Unit |
| | | | | 2N5564 | | 2N5565 | | 2N5566 | | |
| | | | | Min | Max | Min | Max | Min | Max | |
| Static | | | | | | | | | | |
| Gate-Source Breakdown Voltage | V _{(BR)GSS} | I _G = -1 μA, V _{DS} = 0 V | -55 | -40 | | -40 | | -40 | | V |
| Gate-Source Cutoff Voltage | V _{GS(off)} | V _{DS} = 15 V, I _D = 1 nA | -2 | -0.5 | -3 | -0.5 | -3 | -0.5 | -3 | V |
| Saturation Drain Current ^b | I _{DSS} | V _{DS} = 15 V, V _{GS} = 0 V | 20 | 5 | 30 | 5 | 30 | 5 | 30 | mA |
| Gate Reverse Current | I _{GSS} | V _{GS} = -20 V, V _{DS} = 0 V | -5 | | -100 | | -100 | | -100 | pA |
| | | T _A = 150 °C | -10 | | -200 | | -200 | | -200 | nA |
| Gate Operating Current ^c | I _G | V _{DG} = 15 V, I _D = 2 mA | -3 | | | | | | | pA |
| | | T _A = 125 °C | -1 | | | | | | | nA |
| Drain-Source On-Resistance | r _{DS(on)} | V _{GS} = 0 V, I _D = 1 mA | 50 | | 100 | | 100 | | 100 | Ω |
| Gate-Source Voltage ^c | V _{GS} | V _{DG} = 15 V, I _D = 2 mA | -1.2 | | | | | | | V |
| Gate-Source Forward Voltage | V _{GS(F)} | I _G = 2 mA, V _{DS} = 0 V | 0.7 | | 1 | | 1 | | 1 | V |
| Dynamic | | | | | | | | | | |
| Common-Source Forward Transconductance | g _{fs} | V _{DS} = 15 V, I _D = 2 mA f = 1 kHz | 9 | 7.5 | 12.5 | 7.5 | 12.5 | 7.5 | 12.5 | mS |
| Common-Source Output Conductance | g _{os} | | 35 | | 45 | | 45 | | 45 | μS |
| Common-Source Forward Transconductance ^d | g _{fs} | V _{DS} = 15 V, I _D = 2 mA f = 100 MHz | 8.5 | 7 | | 7 | | 7 | | mS |
| Common-Source Input Capacitance | C _{iss} | V _{DS} = 15 V, I _D = 2 mA f = 1 MHz | 10 | | 12 | | 12 | | 12 | pF |
| Common-Source Reverse Transfer Capacitance | C _{rss} | | 2.5 | | 3 | | 3 | | 3 | |
| Equivalent Input Noise Voltage | e _n | V _{DS} = 15 V, I _D = 2 mA f = 10 Hz | 12 | | 50 | | 50 | | 50 | nV/ √Hz |
| Noise Figure | NF | R _G = 10 MΩ | | | 1 | | 1 | | 1 | dB |
| Matching | | | | | | | | | | |
| Differential Gate-Source Voltage | V _{GS1} - V _{GS2} | V _{DG} = 15 V, I _D = 2 mA | | | 5 | | 10 | | 20 | mV |
| Gate-Source Voltage Differential Change with Temperature | $\frac{\Delta V_{GS1} - V_{GS2} }{\Delta T}$ | V _{DG} = 15 V, I _D = 2 mA T _A = -55 to 125 °C | | | 10 | | 25 | | 50 | μV/ °C |
| Saturation Drain Current Ratio ^c | $\frac{I_{DSS1}}{I_{DSS2}}$ | V _{DS} = 15 V, V _{GS} = 0 V | 0.98 | 0.95 | 1 | 0.95 | 1 | 0.95 | 1 | |
| Transconductance Ratio | $\frac{g_{fs1}}{g_{fs2}}$ | V _{DS} = 15 V, I _D = 2 mA f = 1 kHz | 0.98 | 0.95 | 1 | 0.90 | 1 | 0.90 | 1 | |
| Common Mode Rejection Ratio ^c | CMRR | V _{DG} = 10 to 20 V I _D = 2 mA | 76 | | | | | | | dB |

Notes

- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- b. Pulse test: PW ≤ 300 μs duty cycle ≤ 3%.
- c. This parameter not registered with JEDEC.
- d. Not a production test.

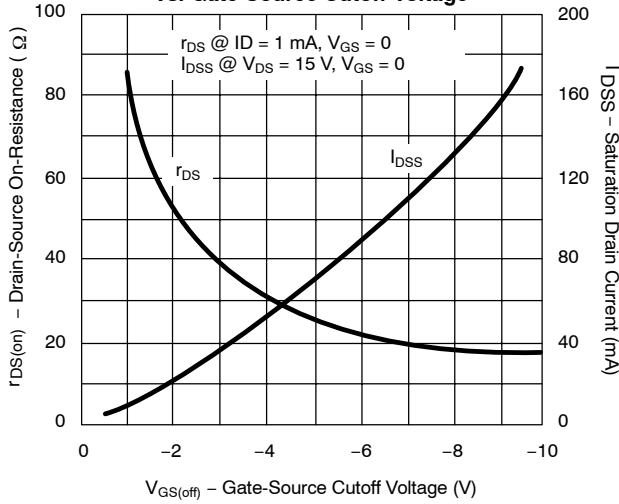
NCBD

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

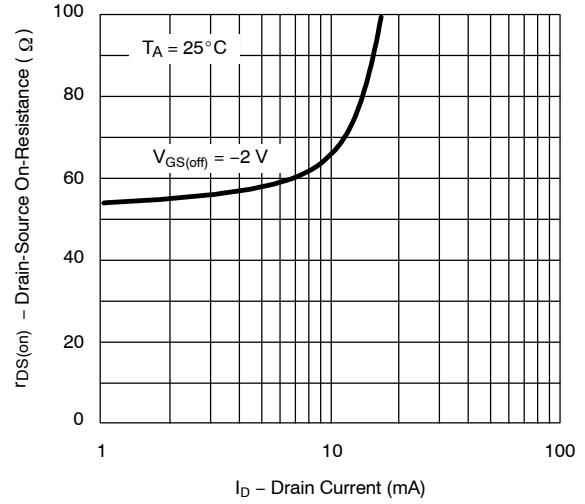


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

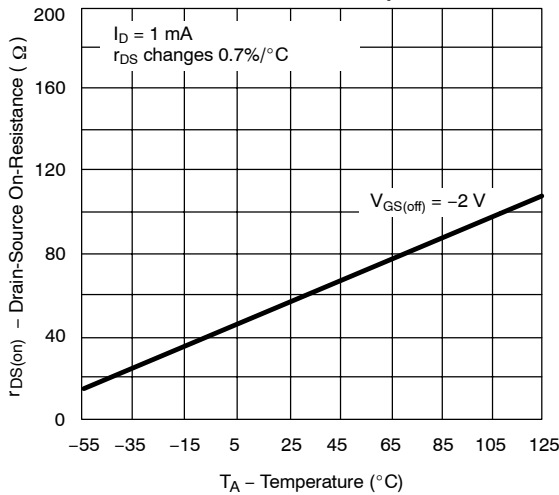
On-Resistance and Drain Current vs. Gate-Source Cutoff Voltage



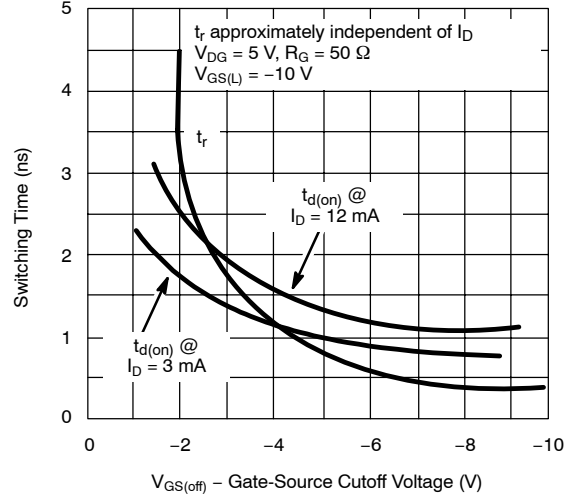
On-Resistance vs. Drain Current



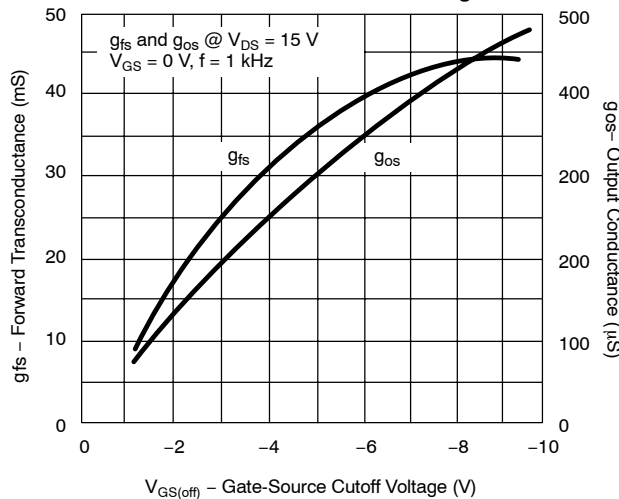
On-Resistance vs. Temperature



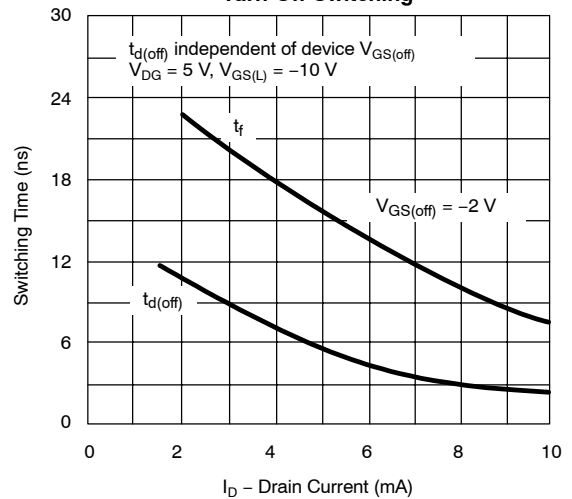
Turn-On Switching



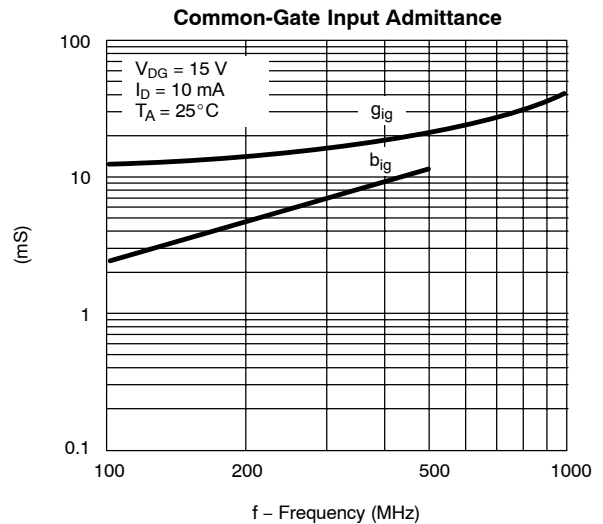
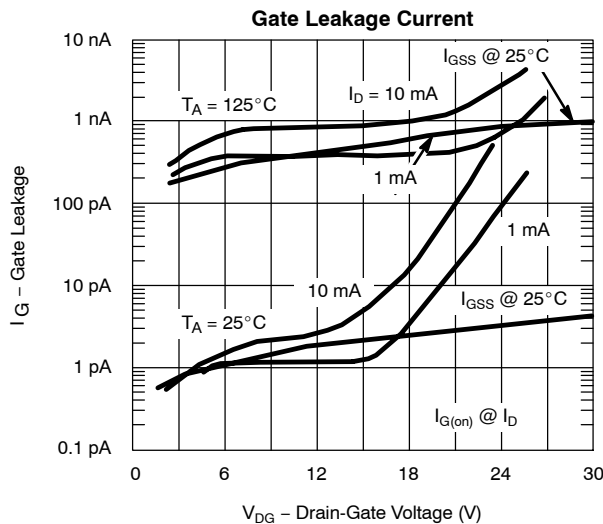
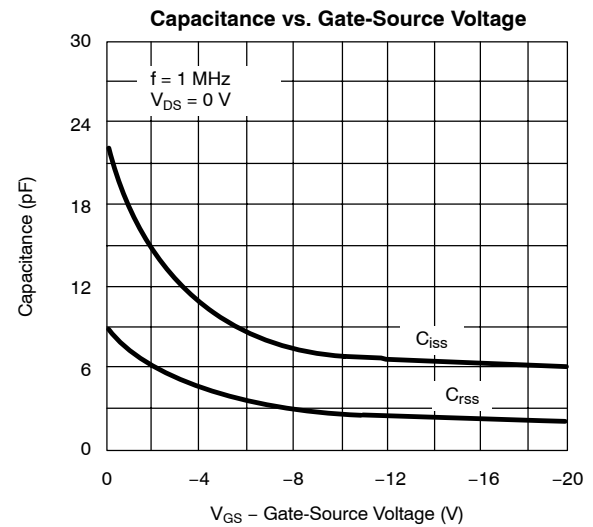
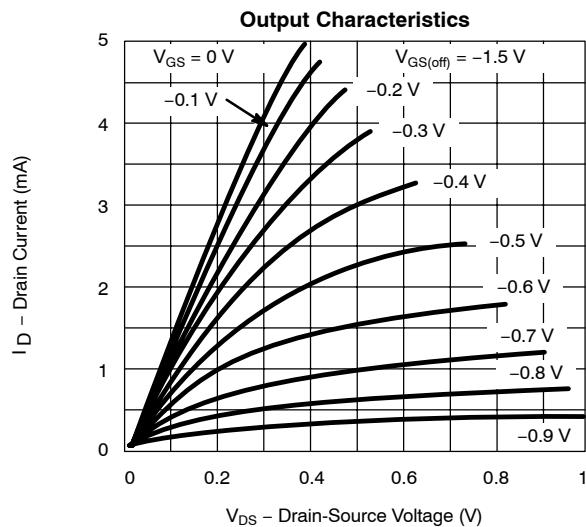
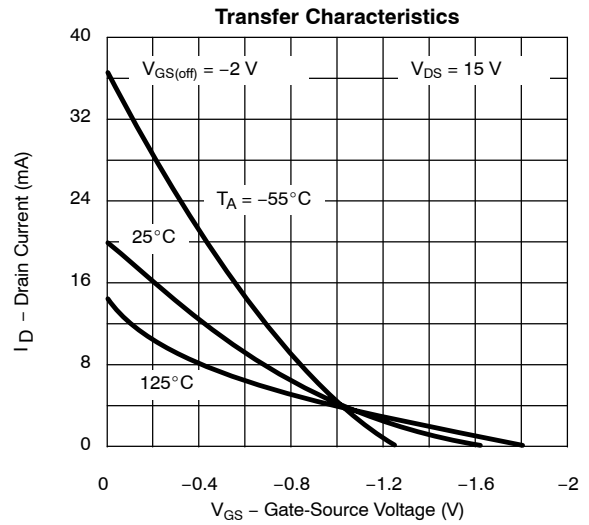
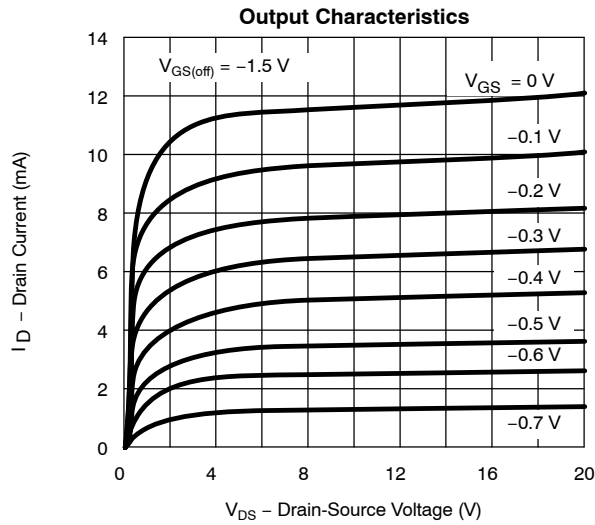
Forward Transconductance and Output Conductance vs. Gate-Source Cutoff Voltage



Turn-Off Switching

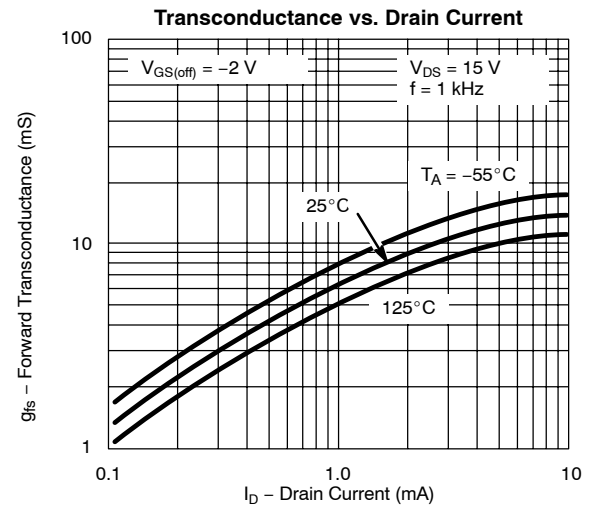
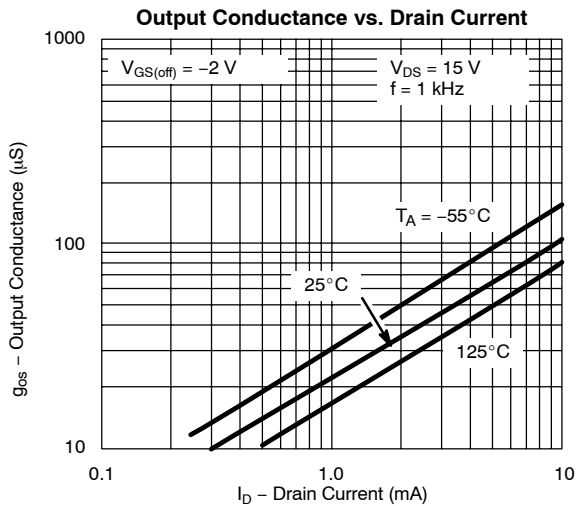
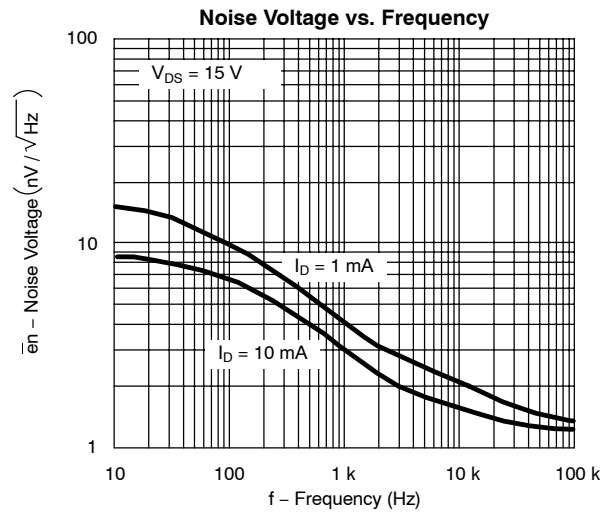
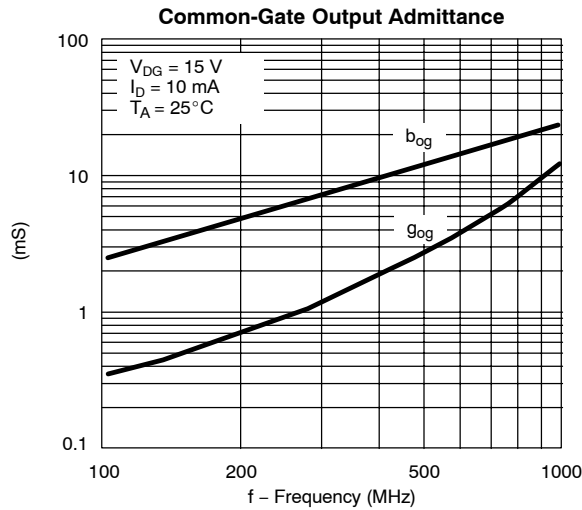
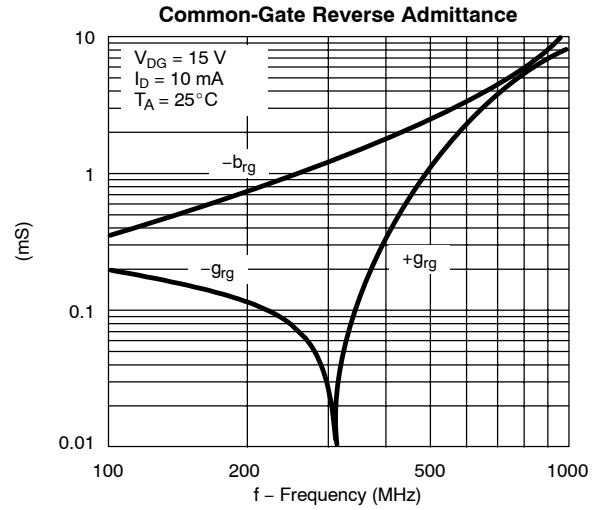
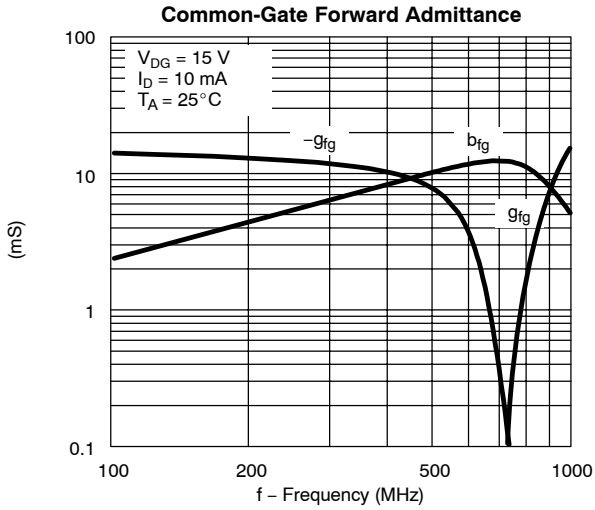


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