

N-Channel JFETs

J308 SST308 U309
J309 SST309 U310
J310 SST310

| PRODUCT SUMMARY | | | | |
|------------------------|-------------------|-----------------------|-------------------|--------------------|
| Part Number | $V_{GS(off)}$ (V) | $V_{(BR)GSS}$ Min (V) | g_{fs} Min (mS) | I_{DSS} Min (mA) |
| J308 | -1 to -6.5 | -25 | 8 | 12 |
| J309 | -1 to -4 | -25 | 10 | 12 |
| J310 | -2 to -6.5 | -25 | 8 | 24 |
| SST308 | -1 to -6.5 | -25 | 8 | 12 |
| SST309 | -1 to -4 | -25 | 10 | 12 |
| SST310 | -2 to -6.5 | -25 | 8 | 24 |
| U309 | -1 to -4 | -25 | 10 | 12 |
| U310 | -2.5 to -6 | -25 | 10 | 24 |

FEATURES

- Excellent High Frequency Gain: Gps 11.5 dB @ 450 MHz
- Very Low Noise: 2.7 dB @ 450 MHz
- Very Low Distortion
- High ac/dc Switch Off-Isolation

BENEFITS

- Wideband High Gain
- Very High System Sensitivity
- High Quality of Amplification
- High-Speed Switching Capability
- High Low-Level Signal Amplification

APPLICATIONS

- High-Frequency Amplifier/Mixer
- Oscillator
- Sample-and-Hold
- Very Low Capacitance Switches

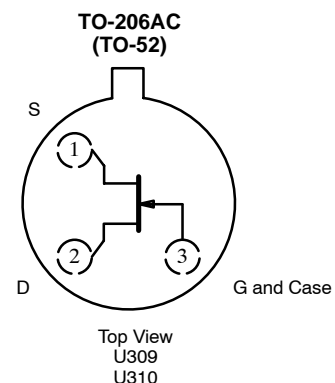
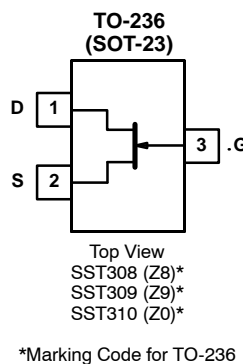
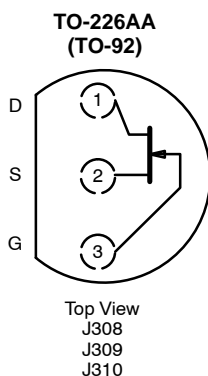
DESCRIPTION

The J/SST/U308 series offers superb amplification characteristics. Of special interest is its high-frequency performance. Even at 450 MHz, this series offers high power gain at low noise.

Low-cost J series TO-226AA (TO-92) packaging supports automated assembly with tape-and-reel options. The SST series TO-236 (SOT-23) package provides surface-mount capabilities

and is available with tape-and-reel options. The U series hermetically-sealed TO-206AC (TO-52) package supports full military processing. (See Military and Packaging Information for further details.)

For similar dual products packaged in the TO-78, see the U430/431 data sheet.



For applications information see AN104.

ABSOLUTE MAXIMUM RATINGS

| | | |
|--|------------------------|--------------|
| Gate-Drain, Gate-Source Voltage | | -25 V |
| Gate Current : | (J/SST Prefixes) | 10 mA |
| | (U Prefix) | 20 mA |
| Lead Temperature (1/16" from case for 10 sec.) | | 300°C |
| Storage Temperature : | (J/SST Prefixes) | -55 to 150°C |
| | (U Prefix) | -65 to 175°C |

| | | |
|--------------------------------|-------------------------------------|--------------|
| Operating Junction Temperature | | -55 to 150°C |
| Power Dissipation : | (J/SST Prefixes) ^a | 350 mW |
| | (U Prefix) ^b | 500 mW |

Notes

- Derate 2.8 mW/°C above 25°C
- Derate 4 mW/°C above 25°C

SPECIFICATIONS FOR J/SST308, J/SST309 AND J/SST310 (T_A = 25°C UNLESS NOTED)

| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | | | Unit | |
|--|----------------------|--|------------------|----------|------|----------|-----|----------|------|------------|----|
| | | | | J/SST308 | | J/SST309 | | J/SST310 | | | |
| | | | | Min | Max | Min | Max | Min | Max | | |
| Static | | | | | | | | | | | |
| Gate-Source Breakdown Voltage | V _{(BR)GSS} | I _G = -1 μA, V _{DS} = 0 V | -35 | -25 | | -25 | | -25 | | V | |
| Gate-Source Cutoff Voltage | V _{GS(off)} | V _{DS} = 10 V, I _D = 1 nA | | -1 | -6.5 | -1 | -4 | -2 | -6.5 | V | |
| Saturation Drain Current ^b | I _{DSS} | V _{DS} = 10 V, V _{GS} = 0 V | | 12 | 60 | 12 | 30 | 24 | 60 | mA | |
| Gate Reverse Current | I _{GSS} | V _{GS} = -15 V, V _{DS} = 0 V | -0.002 | | -1 | | -1 | | -1 | nA | |
| | | T _A = 125°C | -0.001 | | -1 | | -1 | | -1 | μA | |
| Gate Operating Current | I _G | V _{DG} = 9 V, I _D = 10 mA | -15 | | | | | | | pA | |
| Drain-Source On-Resistance | r _{DS(on)} | V _{GS} = 0 V, I _D = 1 mA | 35 | | | | | | | Ω | |
| Gate-Source Forward Voltage | V _{GS(F)} | I _G = 10 mA V _{DS} = 0 V | J | 0.7 | | 1 | | 1 | | V | |
| Dynamic | | | | | | | | | | | |
| Common-Source Forward Transconductance | g _{fs} | V _{DS} = 10 V, I _D = 10 mA f = 1 kHz | 14 | 8 | | 10 | | 8 | | mS | |
| Common-Source Output Conductance | g _{os} | | 110 | | 250 | | 250 | | 250 | | μS |
| Common-Source Input Capacitance | C _{iss} | V _{DS} = 10 V V _{GS} = -10 V f = 1 MHz | J | 4 | | 5 | | 5 | | 5 | pF |
| | | | SST | 4 | | | | | | | |
| Common-Source Reverse Transfer Capacitance | C _{rss} | | J | 1.9 | | 2.5 | | 2.5 | | 2.5 | |
| | | | SST | 1.9 | | | | | | | |
| Equivalent Input Noise Voltage | e _n | V _{DS} = 10 V, I _D = 10 mA f = 100 Hz | 6 | | | | | | | nV/ √Hz | |
| High Frequency | | | | | | | | | | | |
| Common-Gate Forward Transconductance | g _{fg} | V _{DS} = 10 V I _D = 10 mA | f = 105 MHz | 14 | | | | | | | mS |
| | | | f = 450 MHz | 13 | | | | | | | |
| Common-Gate Output Conductance | g _{og} | | f = 105 MHz | 0.16 | | | | | | | |
| | | | f = 450 MHz | 0.55 | | | | | | | |
| Common-Gate Power Gain ^c | G _{pg} | | f = 105 MHz | 16 | | | | | | | dB |
| | | | f = 450 MHz | 11.5 | | | | | | | |
| Noise Figure | NF | | f = 105 MHz | 1.5 | | | | | | | |
| | | | f = 450 MHz | 2.7 | | | | | | | |

Notes

- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Pulse test: PW ≤ 300 μs duty cycle ≤ 3%.
- Gain (G_{pg}) measured at optimum input noise match.

NZB



| SPECIFICATIONS FOR U309 AND U310 (T _A = 25 °C UNLESS NOTED) | | | | | | | | | |
|--|----------------------|--|------------------|--------|-------|------|-------|------------|-----|
| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | Unit | |
| | | | | U309 | | U310 | | | |
| | | | | Min | Max | Min | Max | | |
| Static | | | | | | | | | |
| Gate-Source Breakdown Voltage | V _{(BR)GSS} | I _G = -1 μA, V _{DS} = 0 V | -35 | -25 | | -25 | | V | |
| Gate-Source Cutoff Voltage | V _{GS(off)} | V _{DS} = 10 V, I _D = 1 nA | | -1 | -4 | -2.5 | -6 | V | |
| Saturation Drain Current ^b | I _{DSS} | V _{DS} = 10 V, V _{GS} = 0 V | | 12 | 30 | 24 | 60 | mA | |
| Gate Reverse Current | I _{GSS} | V _{GS} = -15 V, V _{DS} = 0 V | -0.002 | | -0.15 | | -0.15 | nA | |
| | | T _A = 125 °C | -0.001 | | -0.15 | | -0.15 | μA | |
| Gate Operating Current | I _G | V _{DG} = 9 V, I _D = 10 mA | -15 | | | | | pA | |
| Drain-Source On-Resistance | r _{DS(on)} | V _{GS} = 0 V, I _D = 1 mA | 35 | | | | | Ω | |
| Gate-Source Forward Voltage | V _{GS(F)} | I _G = 10 mA, V _{DS} = 0 V | 0.7 | | 1 | | 1 | V | |
| Dynamic | | | | | | | | | |
| Common-Source Forward Transconductance | g _{fs} | V _{DS} = 10 V, I _D = 10 mA f = 1 kHz | 14 | 10 | | 10 | | mS | |
| Common-Source Output Conductance | g _{os} | | 110 | | 250 | | 250 | μS | |
| Common-Source Input Capacitance | C _{iss} | V _{DS} = 10 V, V _{GS} = -10 V f = 1 MHz | 4 | | 5 | | 5 | pF | |
| Common-Source Reverse Transfer Capacitance | C _{rss} | | 1.9 | | 2.5 | | 2.5 | | |
| Equivalent Input Noise Voltage | e _n | V _{DS} = 10 V, I _D = 10 mA f = 100 Hz | 6 | | | | | nV/ √Hz | |
| High Frequency | | | | | | | | | |
| Common-Gate Forward Transconductance | g _{fg} | V _{DS} = 10 V I _D = 10 mA | f = 105 MHz | 14 | | | | mS | |
| | | | f = 450 MHz | 13 | | | | | |
| Common-Gate Output Conductance | g _{og} | | f = 105 MHz | 0.16 | | | | | |
| | | | f = 450 MHz | 0.55 | | | | | |
| Common-Gate Power Gain ^{c, d} | G _{pg} | | f = 105 MHz | 16 | 14 | | 14 | dB | |
| | | | f = 450 MHz | 11.5 | 10 | | 10 | | |
| Noise Figure ^d | NF | | f = 105 MHz | 1.5 | | 2 | | | 2 |
| | | | f = 450 MHz | 2.7 | | 3.5 | | | 3.5 |

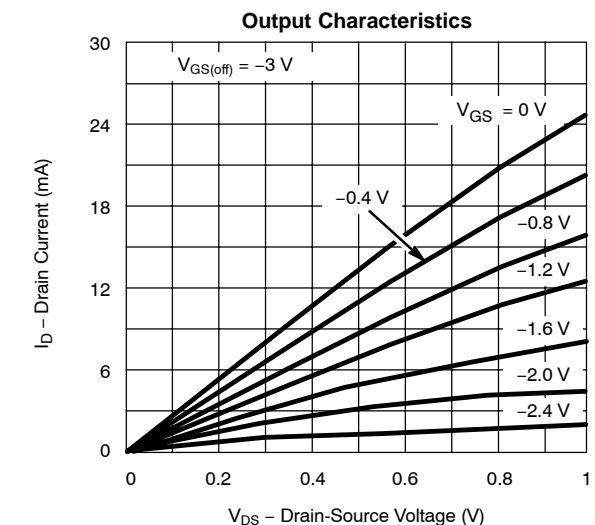
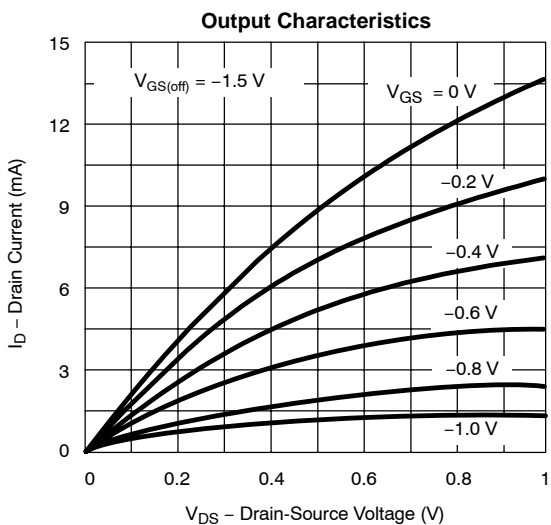
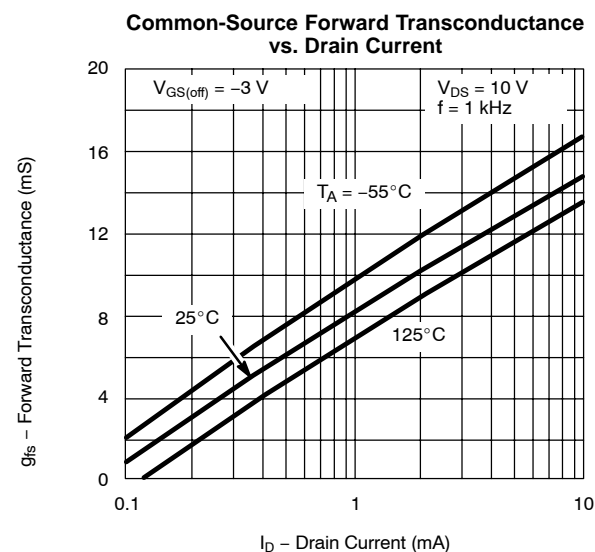
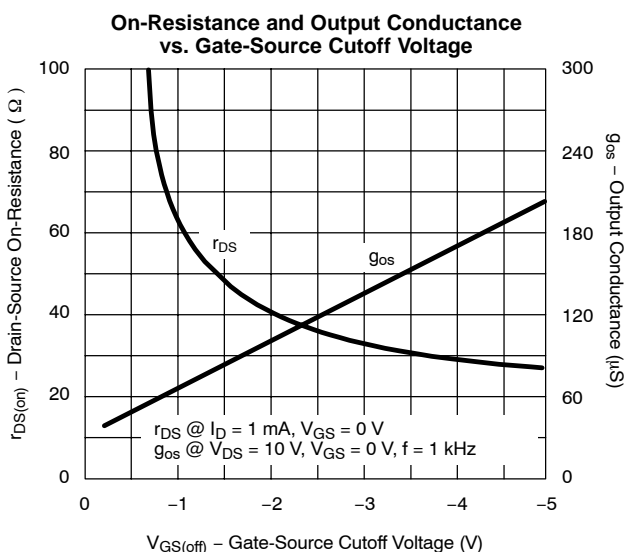
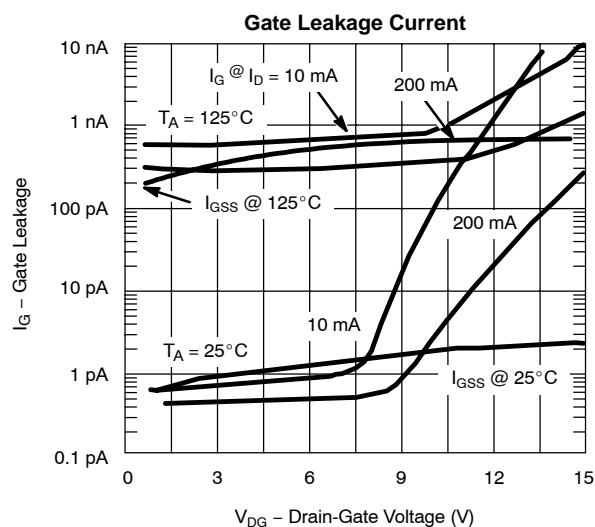
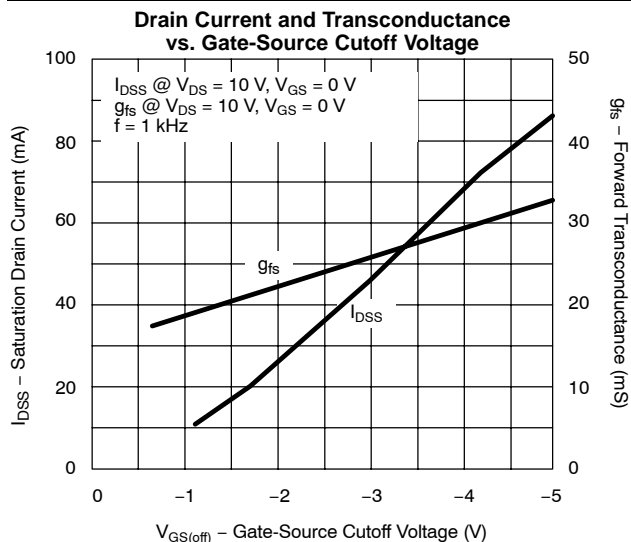
Notes

- 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. Gain (G_{pg}) measured at optimum input noise match.
- d. Not a production test.

NZB

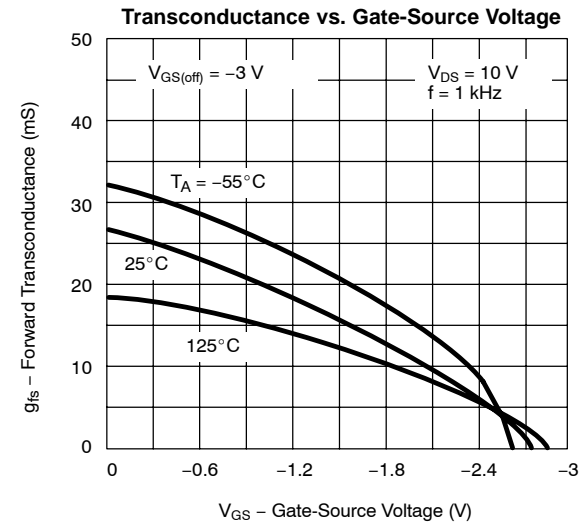
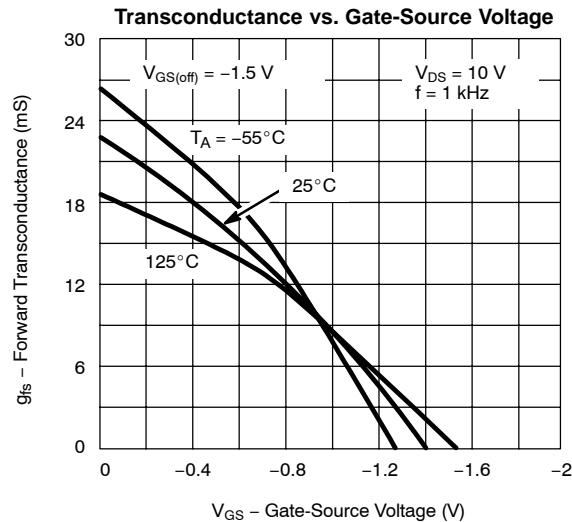
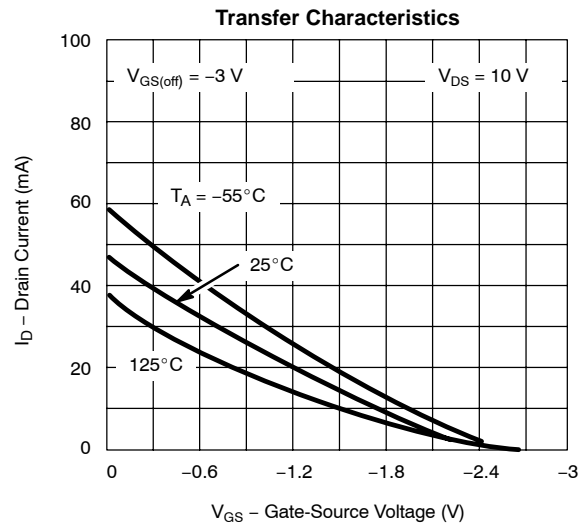
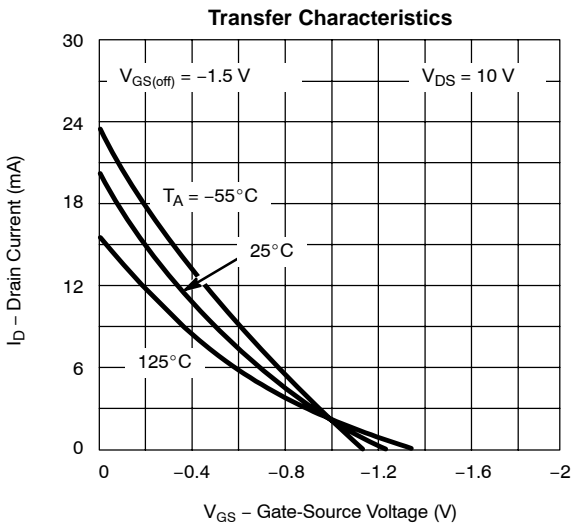
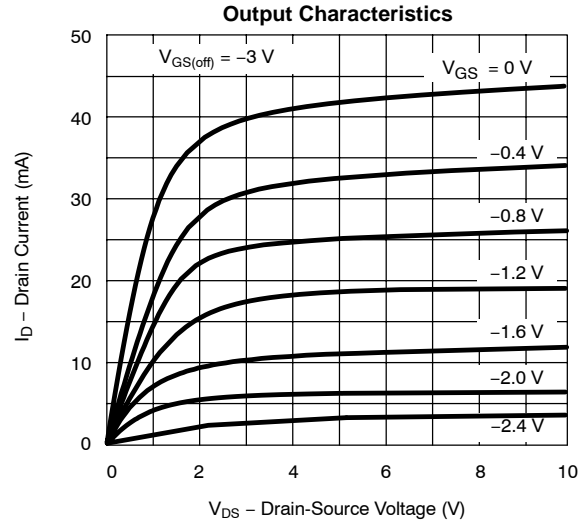
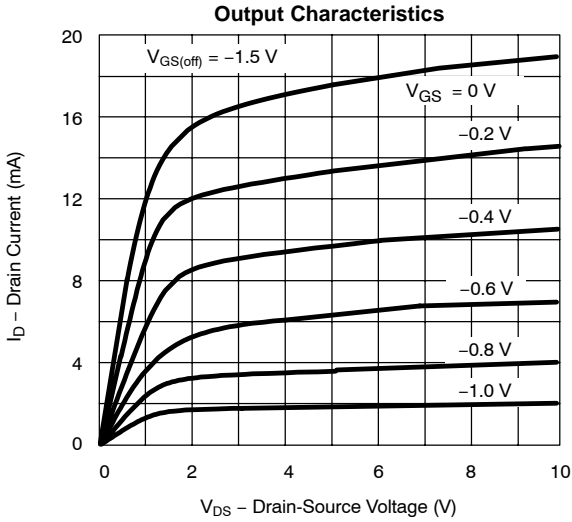
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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

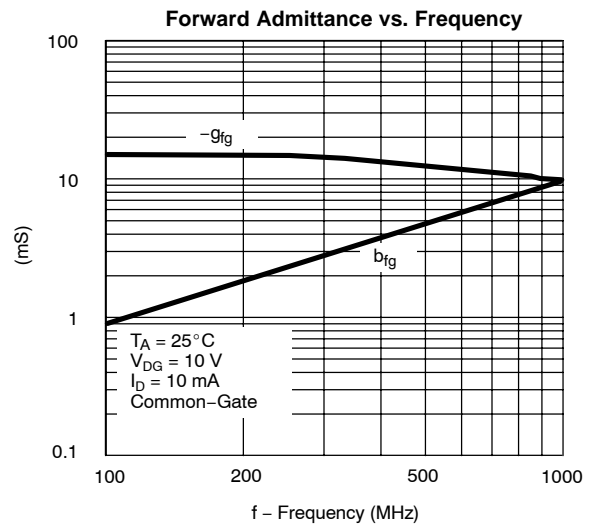
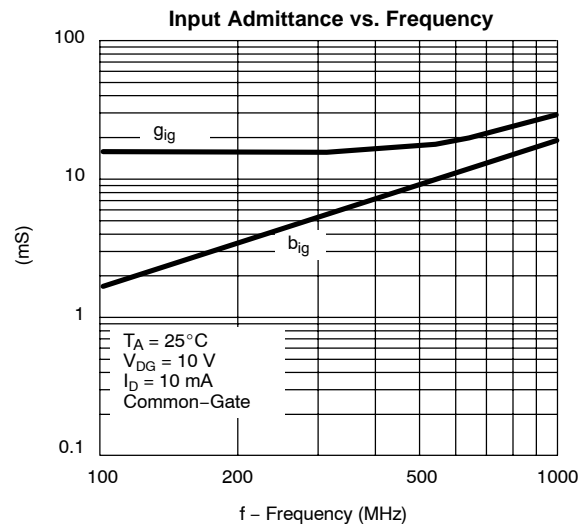
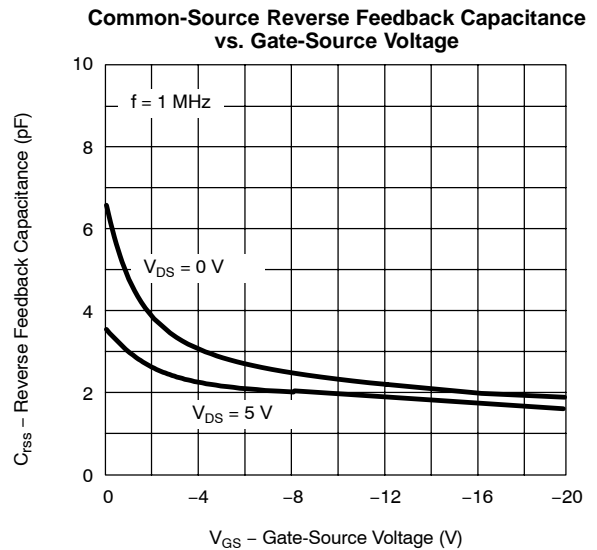
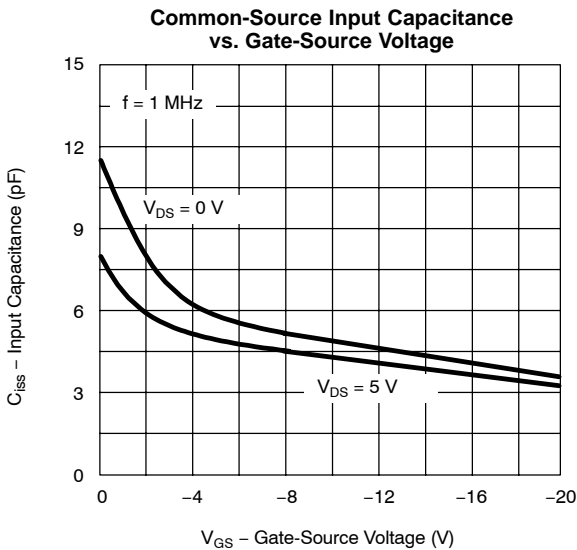
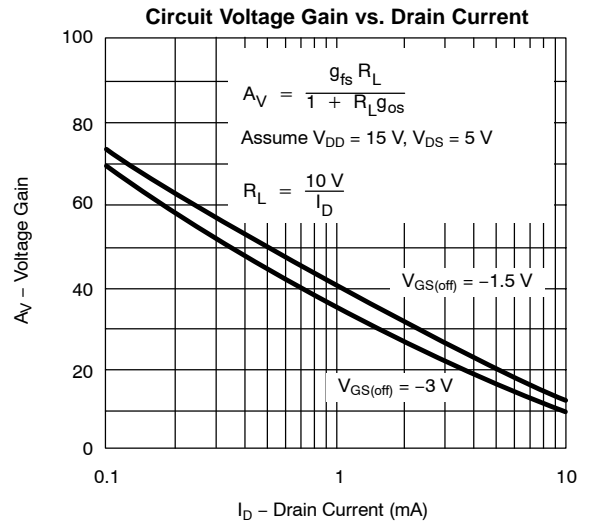
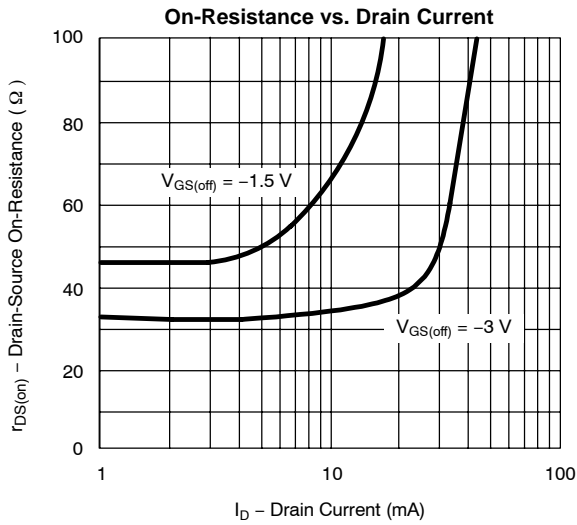




TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



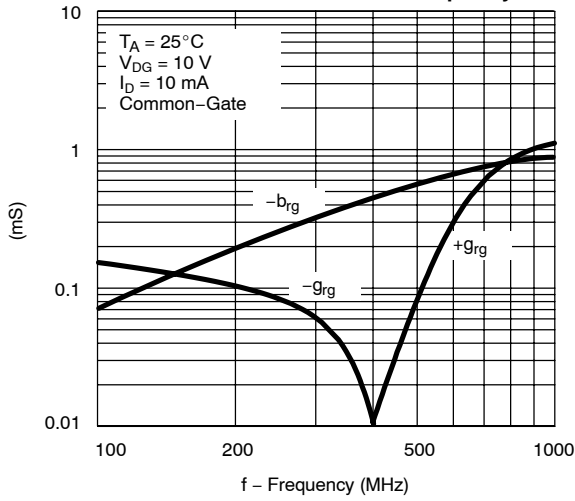
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)



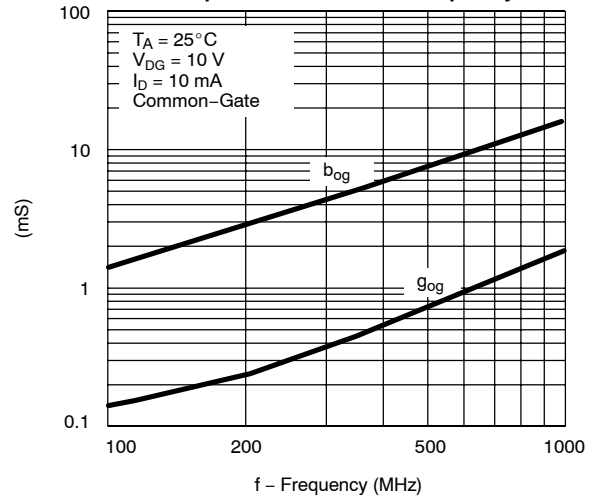


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

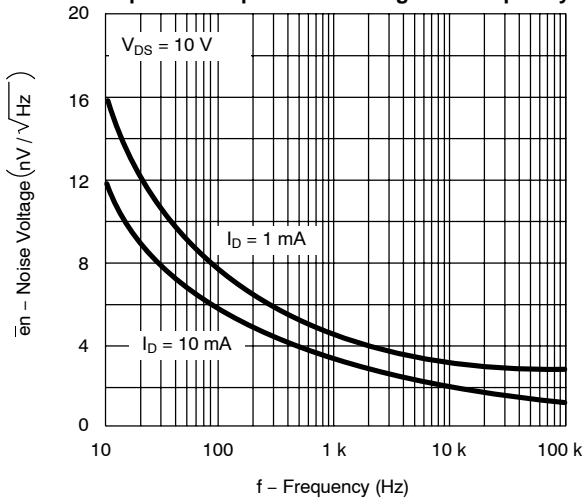
Reverse Admittance vs. Frequency



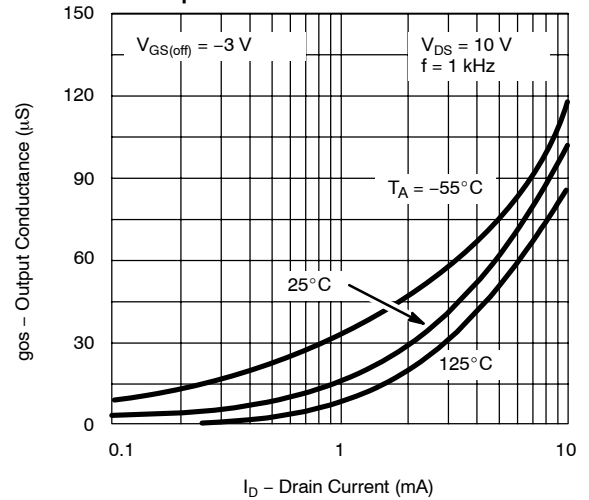
Output Admittance vs. Frequency



Equivalent Input Noise Voltage vs. Frequency



Output Conductance vs. Drain Current





Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.