



N-Channel JFETs

| PRODUCT SUMMARY | | | | |
|-----------------|--------------------------|------------------------------|--------------------------|---------------------------|
| Part Number | V _{GS(off)} (V) | V _{(BR)GSS} Min (V) | g _{fs} Min (mS) | I _{DSS} Min (mA) |
| 2N4416 | -≤6 | -30 | 4.5 | 5 |
| 2N4416A | -2.5 to -6 | -35 | 4.5 | 5 |
| SST4416 | -≤6 | -30 | 4.5 | 5 |

FEATURES

- Excellent High-Frequency Gain: 2N4416/A, Gps 13 dB (typ) @ 400 MHz
- Very Low Noise: 3 dB (typ) @ 400 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

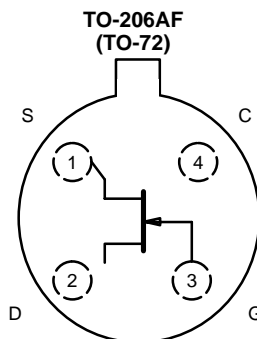
APPLICATIONS

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

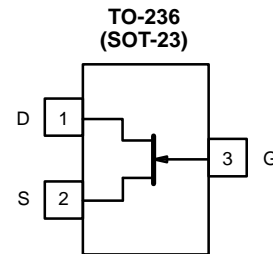
DESCRIPTION

The 2N4416/2N4416A/SST4416 n-channel JFETs are designed to provide high-performance amplification at high frequencies.

The TO-206AF (TO-72) hermetically-sealed package is available with full military processing (see Military Information.) The TO-236 (SOT-23) package provides a low-cost option and is available with tape-and-reel options (see Packaging Information). For similar products in the TO-226AA (TO-92) package, see the J304/305 data sheet.



Top View
2N4416
2N4416A



Top View
SST4416 (H1)*
*Marking Code for TO-236

For applications information see AN104.



ABSOLUTE MAXIMUM RATINGS

| | | | |
|-----------------------------------|-------------------------------------|--|---|
| Gate-Drain, Gate-Source Voltage : | | Operating Junction Temperature | -55 to 150 °C |
| (2N/SST4416) | -30 V | Power Dissipation : | (2N Prefix) ^a 300 mW |
| (2N4416A) | -35 V | (SST Prefix) ^b | 350 mW |
| Gate Current | 10 mA | Notes | |
| Lead Temperature | 300 °C | a. Derate 2.4 mW/°C above 25°C | |
| Storage Temperature : | (2N Prefix) -65 to 200 °C | b. Derate 2.8 mW/°C above 25°C | |
| (SST Prefix) | -65 to 150°C | | |

| SPECIFICATIONS (T _A = 25 °C UNLESS NOTED) | | | | | | | | | | |
|--|----------------------|--|------------------|--------|------|---------|------|---------|-----|------------|
| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | | | Unit |
| | | | | 2N4416 | | 2N4416A | | SST4416 | | |
| | | | | Min | Max | Min | Max | Min | Max | |
| Static | | | | | | | | | | |
| Gate-Source Breakdown Voltage | V _{(BR)GSS} | I _G = -1 μA, V _{DS} = 0 V | -36 | -30 | | -35 | | -30 | | V |
| Gate-Source Cutoff Voltage | V _{GS(off)} | V _{DS} = 15 V, I _D = 1 nA | -3 | | -6 | -2.5 | -6 | | -6 | |
| Saturation Drain Current ^b | I _{DSS} | V _{DS} = 15 V, V _{GS} = 0 V | 10 | 5 | 15 | 5 | 15 | 5 | 15 | mA |
| Gate Reverse Current | I _{GSS} | V _{GS} = -20 V, V _{DS} = 0 V (2N) | -2 | | -100 | | -100 | | | pA |
| | | T _A = 150°C | -4 | | -100 | | -100 | | | nA |
| | | V _{GS} = -15 V, V _{DS} = 0 V (SST) | -0.002 | | | | | | -1 | |
| | | T _A = 125°C | -0.6 | | | | | | | |
| Gate Operating Current | I _G | V _{DG} = 10 V, I _D = 1 mA | -20 | | | | | | | pA |
| Drain Cutoff Current ^c | I _{D(off)} | V _{DS} = 10 V, V _{GS} = -6 V | 2 | | | | | | | |
| Drain-Source On-Resistance ^c | r _{DS(on)} | V _{GS} = 0 V, I _D = 1 mA | 150 | | | | | | | Ω |
| Gate-Source Forward Voltage ^c | V _{GS(F)} | I _G = 1 mA, V _{DS} = 0 V | 0.7 | | | | | | | V |
| Dynamic | | | | | | | | | | |
| Common-Source Forward Transconductance ^b | g _{fs} | V _{DS} = 15 V, V _{GS} = 0 V f = 1 kHz | 6 | 4.5 | 7.5 | 4.5 | 7.5 | 4.5 | 7.5 | mS |
| Common-Source Output Conductance ^b | g _{os} | | 15 | | 50 | | 50 | | 50 | μS |
| Common-Source Input Capacitance | C _{iss} | V _{DS} = 15 V, V _{GS} = 0 V f = 1 MHz | 2.2 | | 4 | | 4 | | | pF |
| Common-Source Reverse Transfer Capacitance | C _{rss} | | 0.7 | | 0.8 | | 0.8 | | | |
| Common-Source Output Capacitance | C _{oss} | | 1 | | 2 | | 2 | | | |
| Equivalent Input Noise Voltage ^c | e _n | V _{DS} = 10 V, V _{GS} = 0 V f = 1 kHz | 6 | | | | | | | nV/ √Hz |



| HIGH-FREQUENCY SPECIFICATIONS FOR 2N4416/2N4416A (T _A = 25 °C UNLESS NOTED) | | | | | | | |
|--|-----------|---|---------|-------|---------|--------|---------------|
| Parameter | Symbol | Test Conditions | Limits | | | | Unit |
| | | | 100 MHz | | 400 MHz | | |
| | | | Min | Max | Min | Max | |
| Common Source Input Conductance | g_{iss} | $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}$ | | 100 | | 1,000 | μS |
| Common Source Input Susceptance | b_{iss} | | | 2,500 | | 10,000 | |
| Common Source Output Conductance | g_{oss} | | | 75 | | 100 | |
| Common Source Output Susceptance | b_{oss} | | | 1,000 | | 4,000 | |
| Common Source Forward Transconductance | g_{fs} | | | | 4,000 | | |
| Common-Source Power Gain | G_{ps} | $V_{DS} = 15\text{ V}, I_D = 5\text{ mA}$ | 18 | | 10 | | dB |
| Noise Figure | NF | $R_G = 1\text{ k}\Omega$ | | 2 | | 4 | |

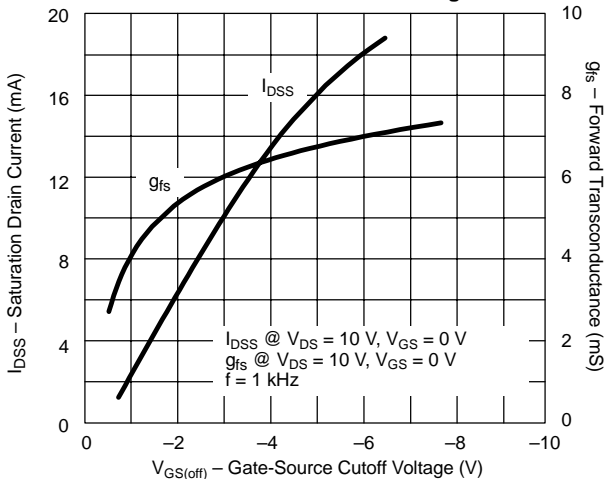
Notes

- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- b. Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 3\%$.
- c. This parameter not registered with JEDEC.

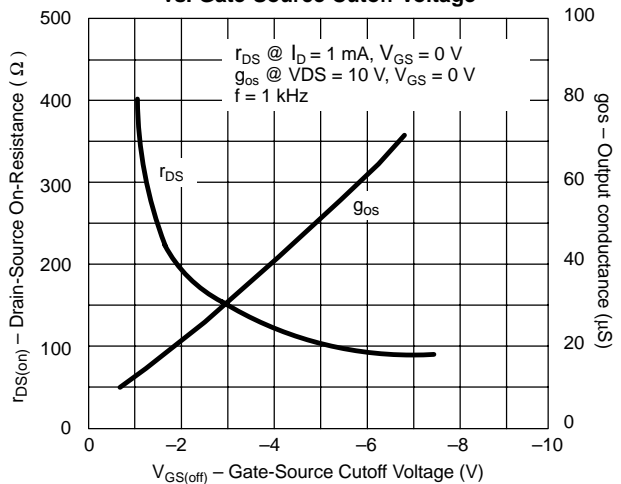
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TYPICAL CHARACTERISTICS (T_A = 25 °C UNLESS OTHERWISE NOTED)

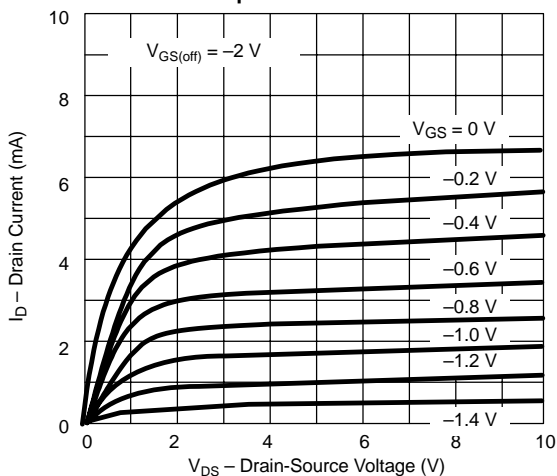
Drain Current and Transconductance vs. Gate-Source Cutoff Voltage



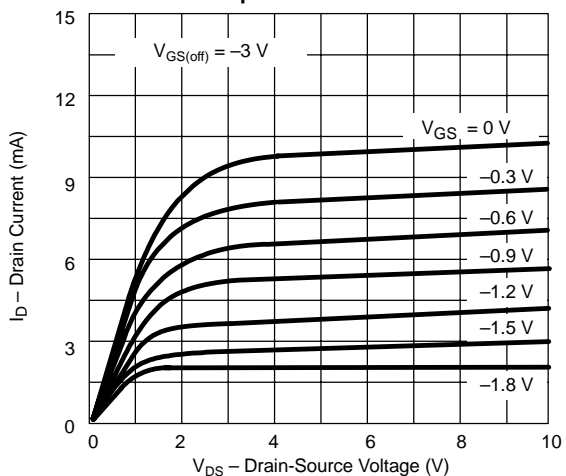
On-Resistance and Output Conductance vs. Gate-Source Cutoff Voltage



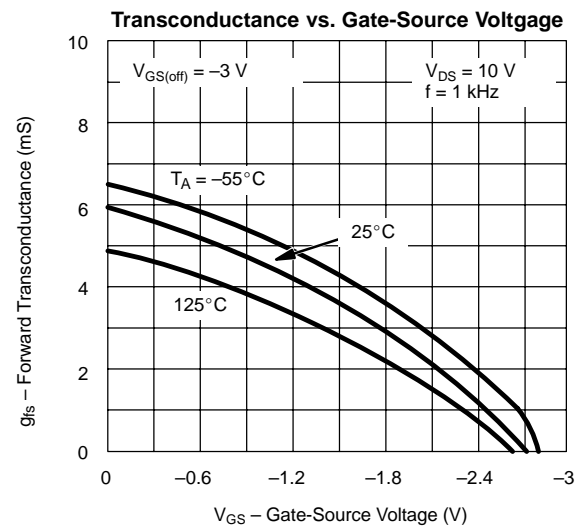
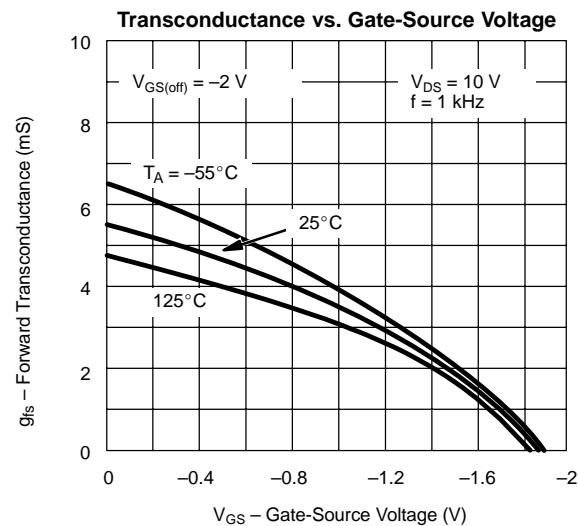
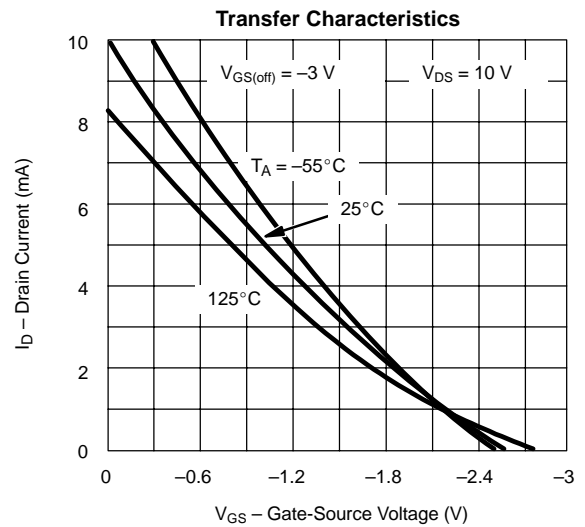
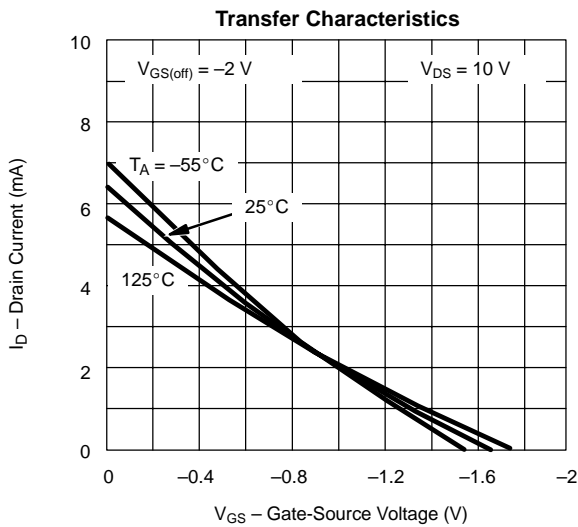
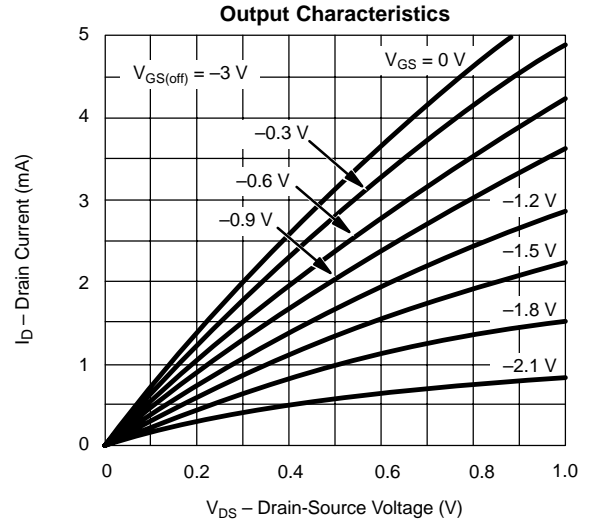
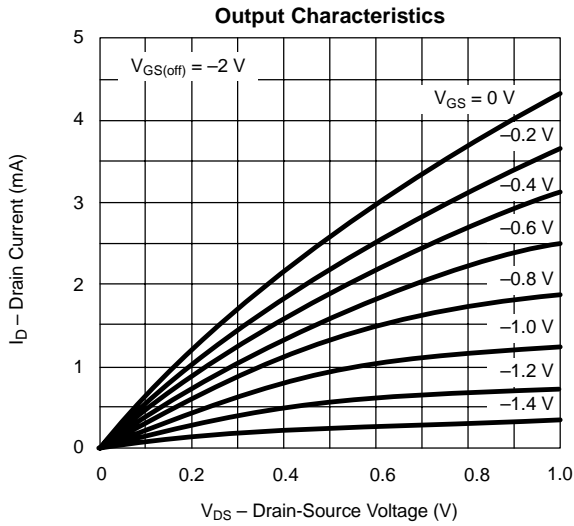
Output Characteristics



Output Characteristics

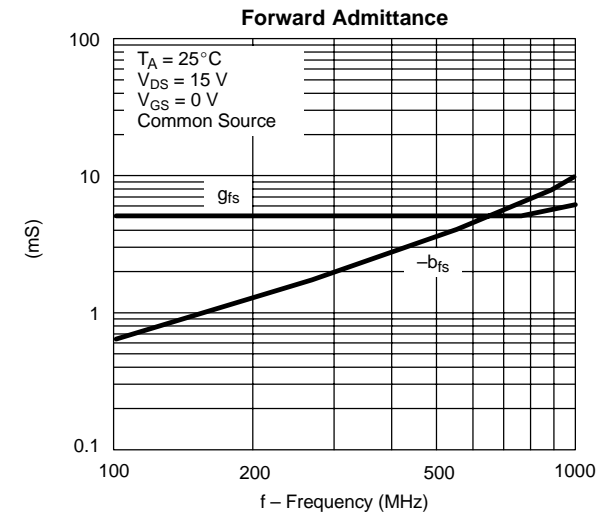
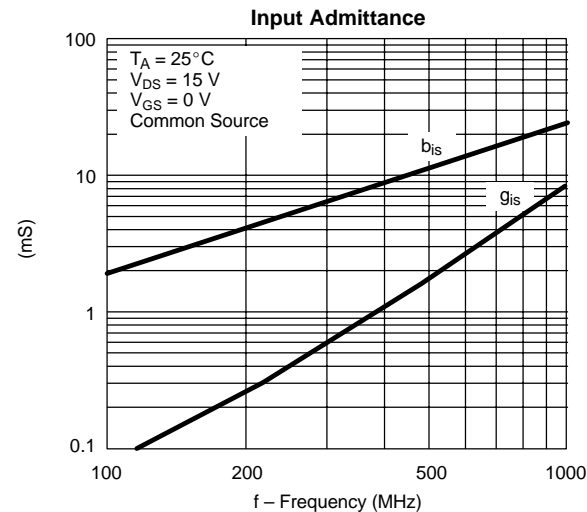
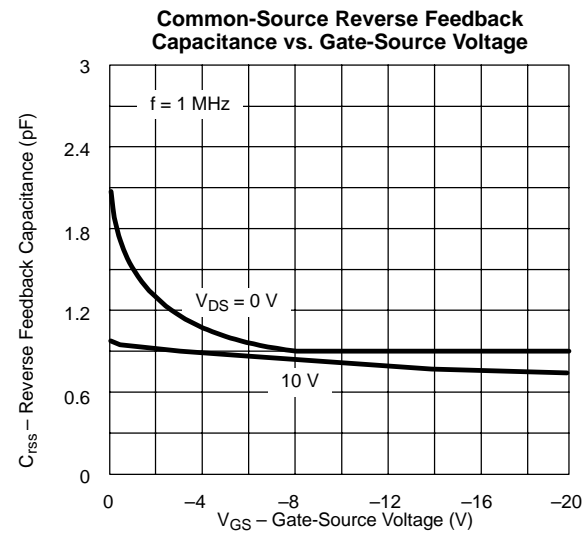
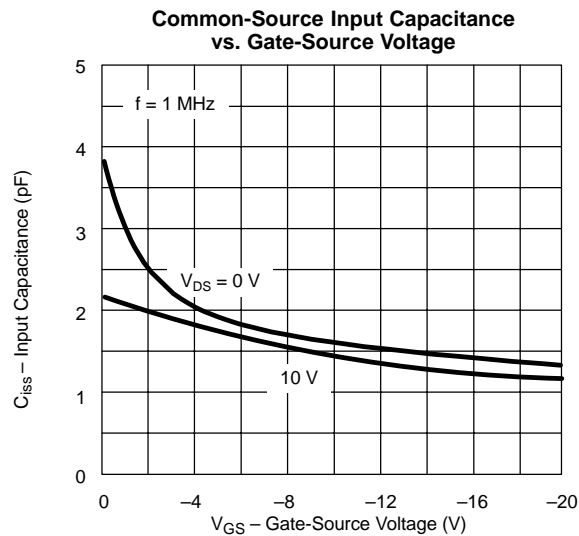
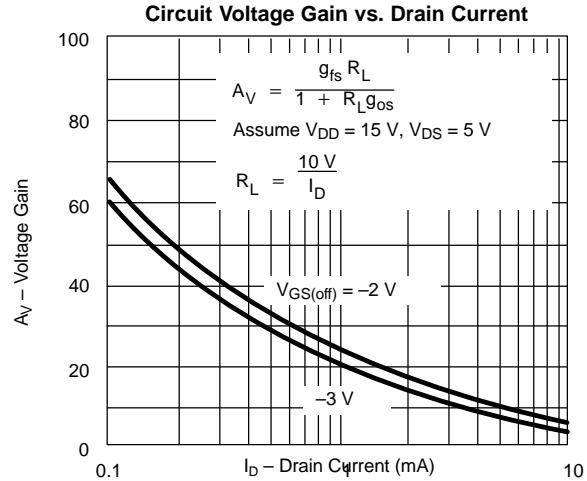
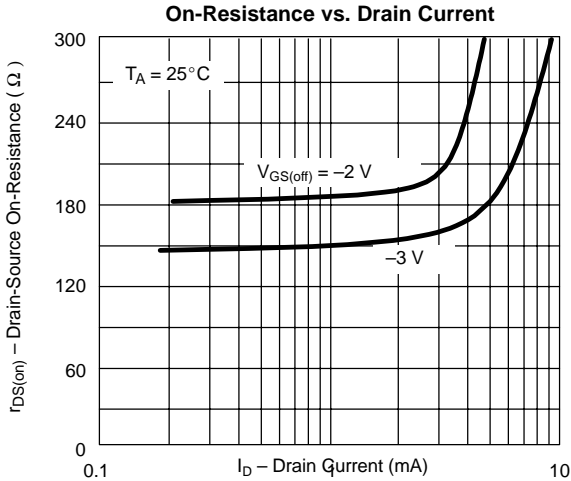


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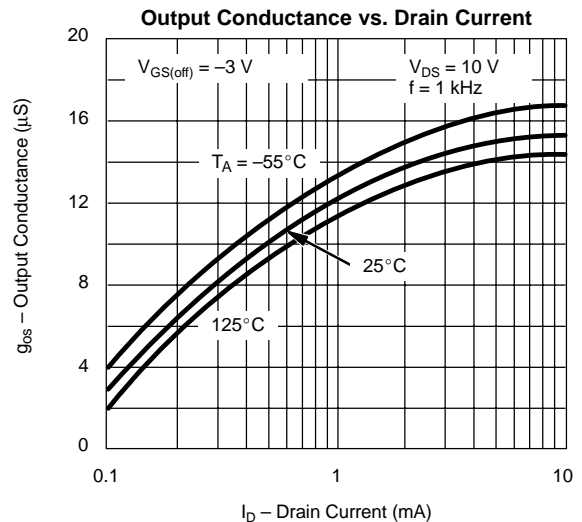
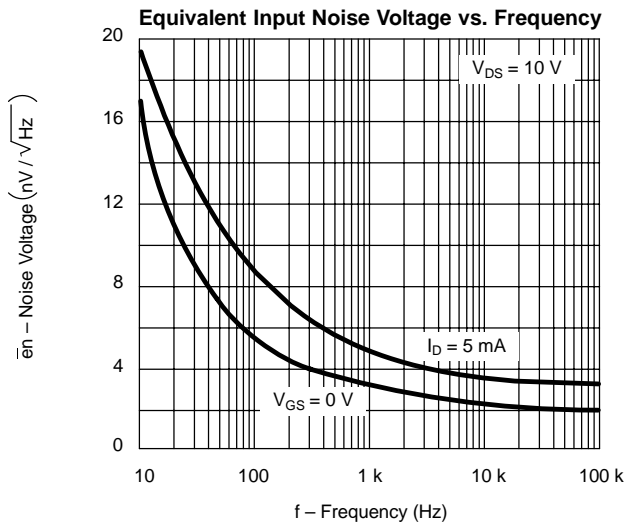
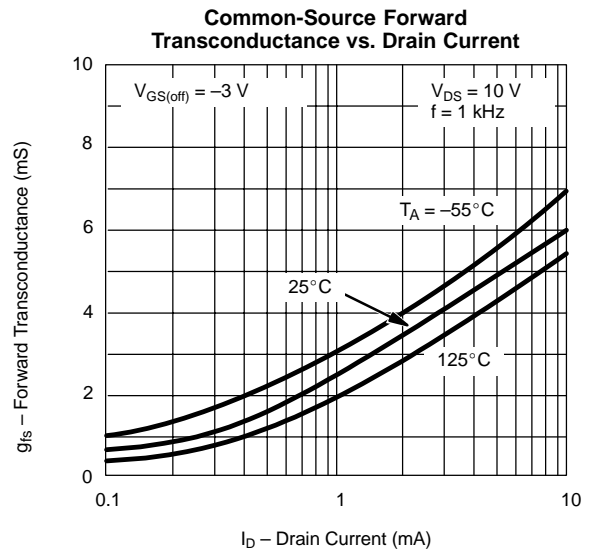
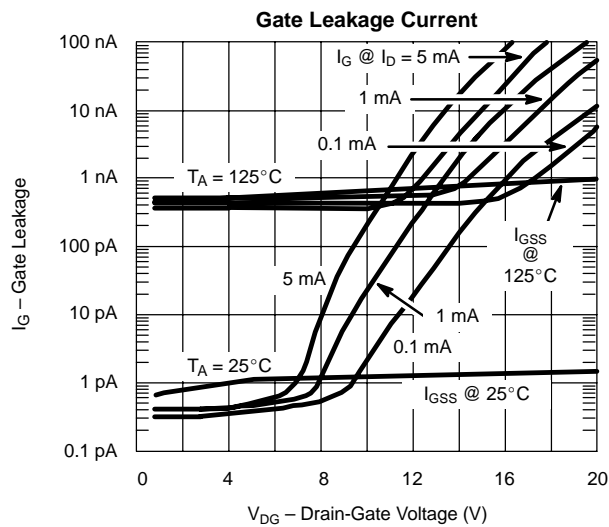
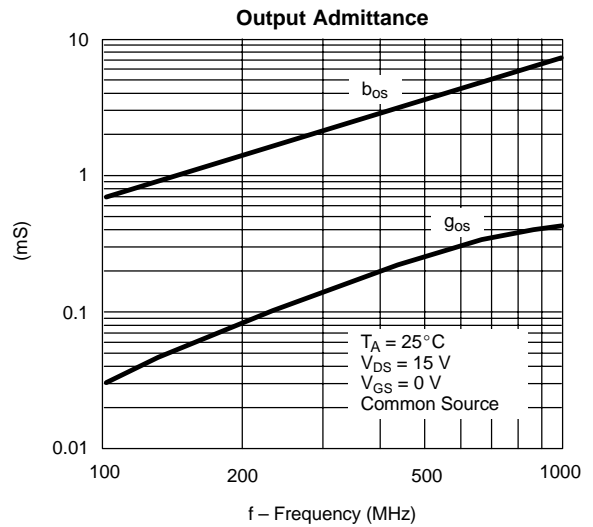
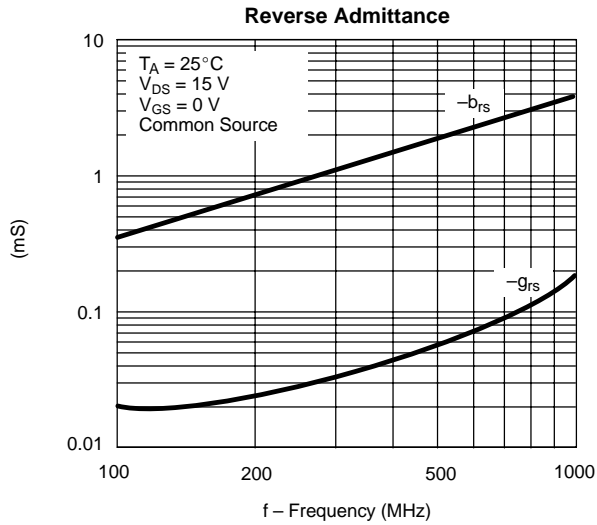




TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)



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



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