



THE DATASHEET OF
2N4339





N-Channel JFETs

| PRODUCT SUMMARY | | | | |
|-----------------|--------------------------|------------------------------|--------------------------|---------------------------|
| Part Number | V _{GS(off)} (V) | V _{(BR)GSS} Min (V) | g _{fs} Min (mS) | I _{DSS} Max (mA) |
| 2N4338 | -0.3 to -1 | -50 | 0.6 | 0.6 |
| 2N4339 | -0.6 to -1.8 | -50 | 0.8 | 1.5 |
| 2N4340 | -1 to -3 | -50 | 1.3 | 3.6 |
| 2N4341 | -2 to -6 | -50 | 2 | 9 |

FEATURES

- Low Cutoff Voltage: 2N4338 <1 V
- High Input Impedance
- Very Low Noise
- High Gain: A_V = 80 @ 20 μA

BENEFITS

- Full Performance from Low-Voltage Power Supply: Down to 1 V
- Low Signal Loss/System Error
- High System Sensitivity
- High-Quality Low-Level Signal Amplification

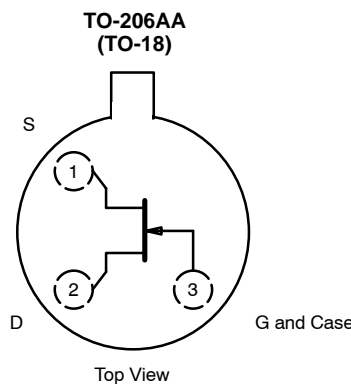
APPLICATIONS

- High-Gain, Low-Noise Amplifiers
- Low-Current, Low-Voltage Battery-Powered Amplifiers
- Infrared Detector Amplifiers
- Ultrahigh Input Impedance Pre-Amplifiers

DESCRIPTION

The 2N4338/4339/4340/4341 n-channel JFETs are designed for sensitive amplifier stages at low- to mid-frequencies. Low cut-off voltages accommodate low-level power supplies and low leakage for improved system accuracy.

The TO-206AA (TO-18) package is hermetically sealed and suitable for military processing (see Military Information). For similar products in TO-226AA (TO-92) and TO-236 (SOT-23) packages, see the J/SST201 series data sheet.



ABSOLUTE MAXIMUM RATINGS

| | |
|--------------------------------|--------------|
| Gate-Source/Gate-Drain Voltage | -50 V |
| Forward Gate Current | 50 mA |
| Storage Temperature | -65 to 200°C |
| Operating Junction Temperature | -55 to 175°C |

| | |
|--|--------|
| Lead Temperature (¹ / ₁₆ " from case for 10 sec.) | 300°C |
| Power Dissipation ^a | 300 mW |

Notes
a. Derate 2 mW/°C above 25°C

For applications information see AN102 and AN106.

SPECIFICATIONS FOR 2N4338 AND 2N4339 (T_A = 25 °C UNLESS OTHERWISE NOTED)

| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | Unit |
|---|----------------------|---|------------------|--------|------|--------|------|------------|
| | | | | 2N4338 | | 2N4339 | | |
| | | | | Min | Max | Min | Max | |
| Static | | | | | | | | |
| Gate-Source Breakdown Voltage | V _{(BR)GSS} | I _G = -1 μA, V _{DS} = 0 V | -57 | -50 | | -50 | | V |
| Gate-Source Cutoff Voltage | V _{GS(off)} | V _{DS} = 15 V, I _D = 0.1 μA | | -0.3 | -1 | -0.6 | -1.8 | |
| Saturation Drain Current ^b | I _{DSS} | V _{DS} = 15 V, V _{GS} = 0 V | | 0.2 | 0.6 | 0.5 | 1.5 | mA |
| Gate Reverse Current | I _{GSS} | V _{GS} = -30 V, V _{DS} = 0 V T _A = 150 °C | -2 | | -100 | | -100 | pA |
| | | | -4 | | -100 | | -100 | nA |
| Gate Operating Current ^b | I _G | V _{DG} = 15 V, I _D = 0.1 mA | -2 | | | | | pA |
| Drain Cutoff Current | I _{D(off)} | V _{DS} = 15 V, V _{GS} = -5 V | 2 | | 50 | | 50 | |
| Gate-Source Forward Voltage ^c | V _{GS(F)} | I _G = 1 mA, V _{DS} = 0 V | 0.7 | | | | | V |
| Dynamic | | | | | | | | |
| Common-Source Forward Transconductance | g _{fs} | V _{DS} = 15 V, V _{GS} = 0 V, f = 1 kHz | | 0.6 | 1.8 | 0.8 | 2.4 | mS |
| Common-Source Output Conductance | g _{os} | | | | | 5 | | 15 |
| Drain-Source On-Resistance | r _{ds(on)} | V _{DS} = 0 V, V _{GS} = 0 V, f = 1 kHz | | | 2500 | | 1700 | Ω |
| Common-Source Input Capacitance | C _{iss} | V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz | 5 | | 7 | | 7 | pF |
| Common-Source Reverse Transfer Capacitance | C _{rss} | | 1.5 | | 3 | | 3 | |
| Equivalent Input Noise Voltage ^c | e _n | V _{DS} = 10 V, V _{GS} = 0 V, f = 1 kHz | 6 | | | | | nV/ √Hz |
| Noise Figure | NF | V _{DS} = 15 V, V _{GS} = 0 V f = 1 kHz, R _G = 1 MΩ | | | 1 | | 1 | dB |

SPECIFICATIONS FOR 2N4340 AND 2N4341 (T_A = 25 °C UNLESS OTHERWISE NOTED)

| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | Unit |
|---------------------------------------|----------------------|---|-------------------------|--------|------|--------|------|------|
| | | | | 2N4340 | | 2N4341 | | |
| | | | | Min | Max | Min | Max | |
| Static | | | | | | | | |
| Gate-Source Breakdown Voltage | V _{(BR)GSS} | I _G = -1 μA, V _{DS} = 0 V | -57 | -50 | | -50 | | V |
| Gate-Source Cutoff Voltage | V _{GS(off)} | V _{DS} = 15 V, I _D = 0.1 μA | | -1 | -3 | -2 | -6 | |
| Saturation Drain Current ^b | I _{DSS} | V _{DS} = 15 V, V _{GS} = 0 V | | 1.2 | 3.6 | 3 | 9 | mA |
| Gate Reverse Current | I _{GSS} | V _{GS} = -30 V, V _{DS} = 0 V T _A = 150 °C | -2 | | -100 | | -100 | pA |
| | | | -4 | | -100 | | -100 | nA |
| Gate Operating Current ^b | I _G | V _{DG} = 15 V, I _D = 0.1 mA | -2 | | | | | pA |
| Drain Cutoff Current | I _{D(off)} | V _{DS} = 15 V | V _{GS} = -5 V | 2 | | 50 | | |
| | | | V _{GS} = -10 V | 3 | | | 70 | |
| Gate-Source Forward Voltage | V _{GS(F)} | I _G = 1 mA, V _{DS} = 0 V | 0.7 | | | | | V |



SPECIFICATIONS FOR 2N4340 AND 2N4341 (T_A = 25 °C UNLESS OTHERWISE NOTED)

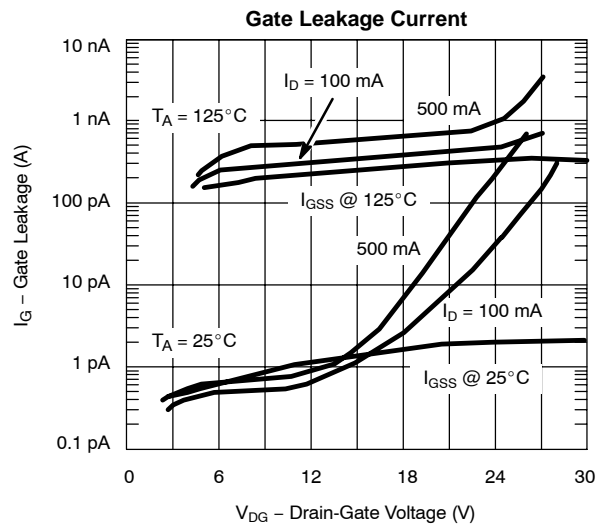
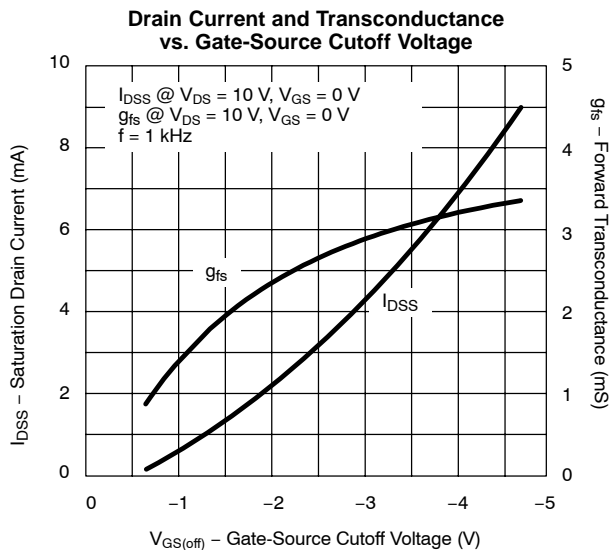
| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | Unit |
|---|--------------|---|------------------|--------|------|--------|-----|------------------------|
| | | | | 2N4340 | | 2N4341 | | |
| | | | | Min | Max | Min | Max | |
| Dynamic | | | | | | | | |
| Common-Source Forward Transconductance | g_{fs} | $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ kHz}$ | | 1.3 | 3 | 2 | 4 | mS |
| Common-Source Output Conductance | g_{os} | | | | 30 | | 60 | μS |
| Drain-Source On-Resistance | $r_{ds(on)}$ | $V_{DS} = 0\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ kHz}$ | | | 1500 | | 800 | Ω |
| Common-Source Input Capacitance | C_{iss} | $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$ | 5 | | 7 | | 7 | pF |
| Common-Source Reverse Transfer Capacitance | C_{rss} | | 1.5 | | 3 | | 3 | |
| Equivalent Input Noise Voltage ^c | \bar{e}_n | $V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ kHz}$ | 6 | | | | | nV/ $\sqrt{\text{Hz}}$ |
| Noise Figure | NF | $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ kHz}, R_G = 1\text{ M}\Omega$ | | | 1 | | 1 | dB |

Notes

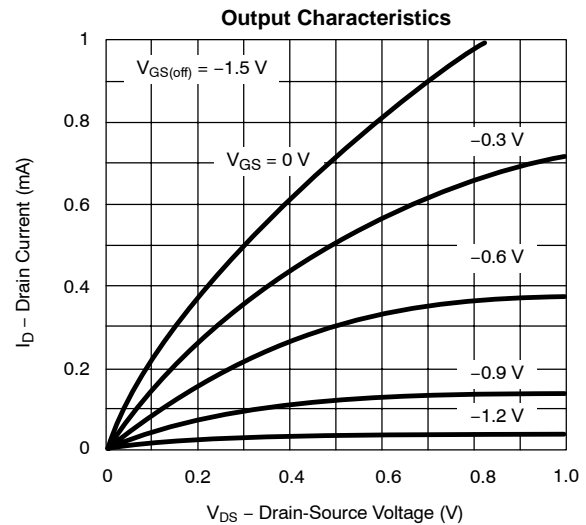
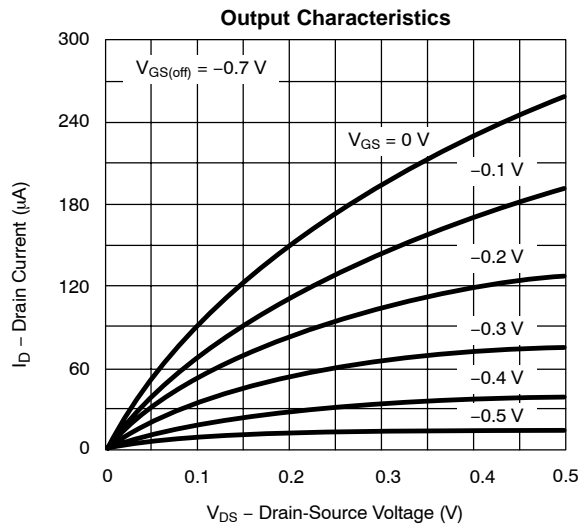
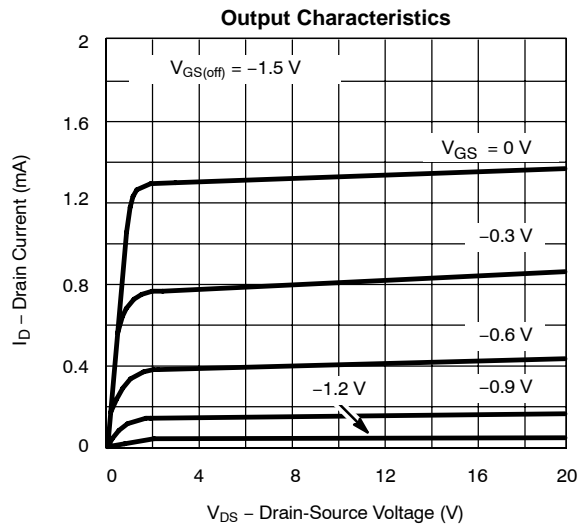
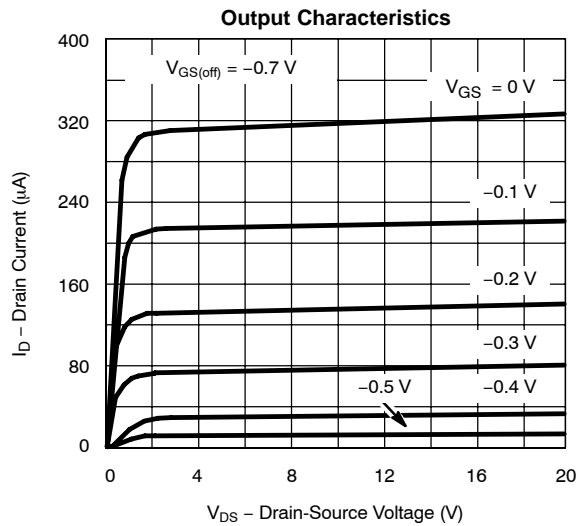
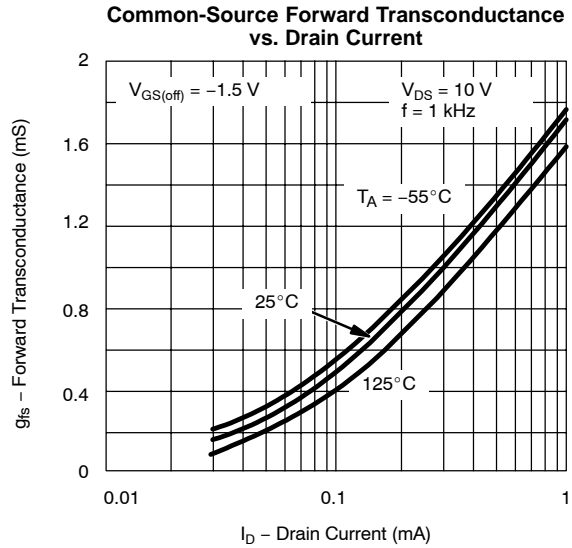
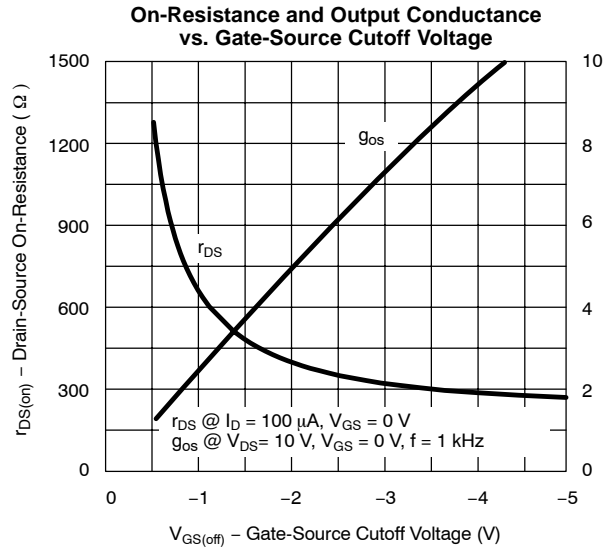
- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- b. Pulse test: PW \leq 300 μs , duty cycle \leq 3%.
- c. This parameter not registered with JEDEC.

NPA

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



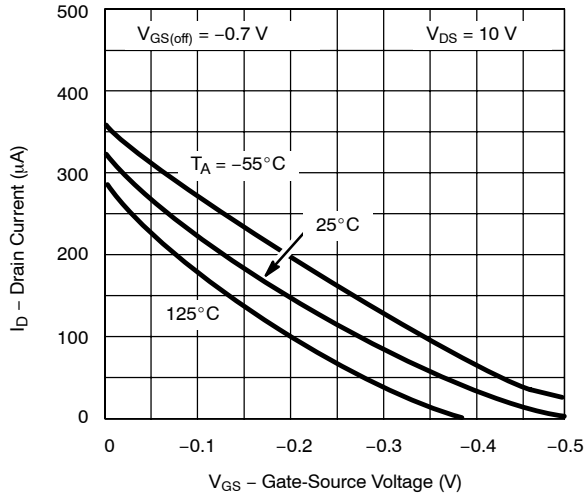
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



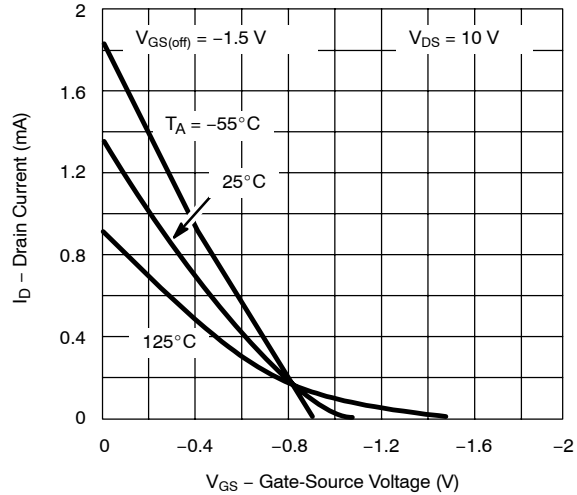


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

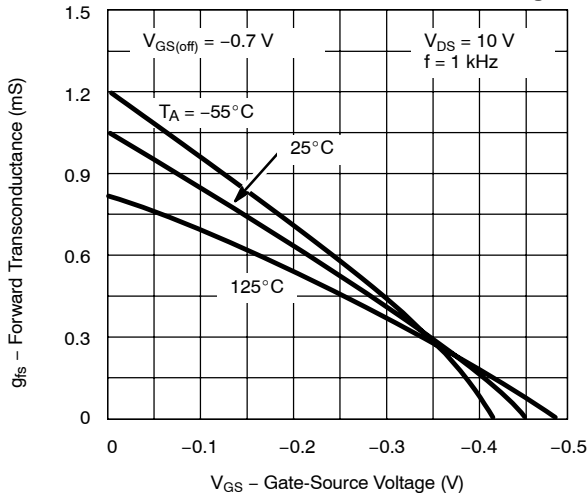
Transfer Characteristics



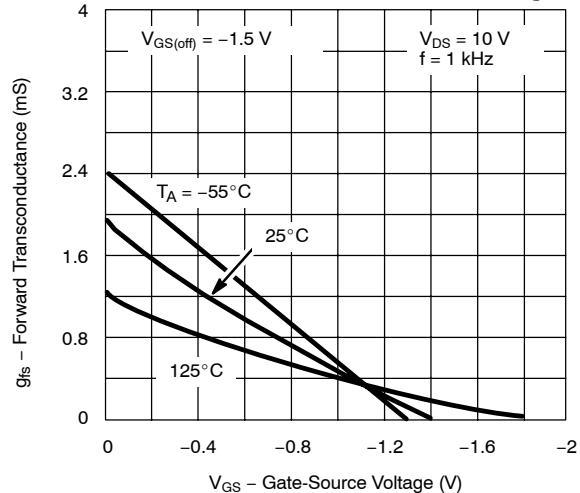
Transfer Characteristics



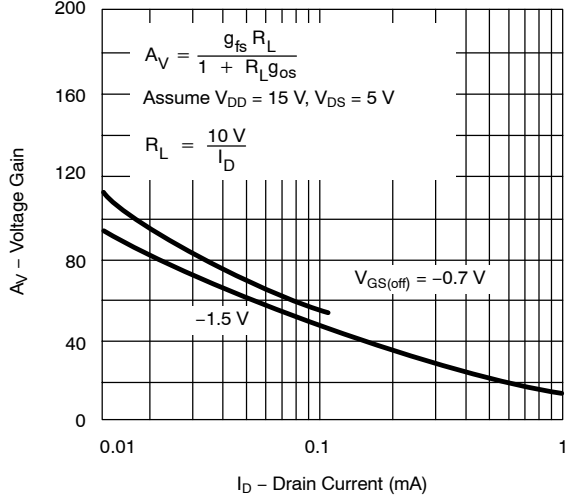
Transconductance vs. Gate-Source Voltage



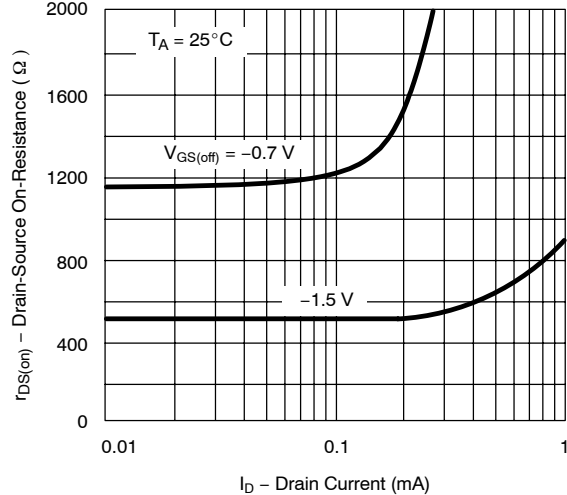
Transconductance vs. Gate-Source Voltage



Circuit Voltage Gain vs. Drain Current

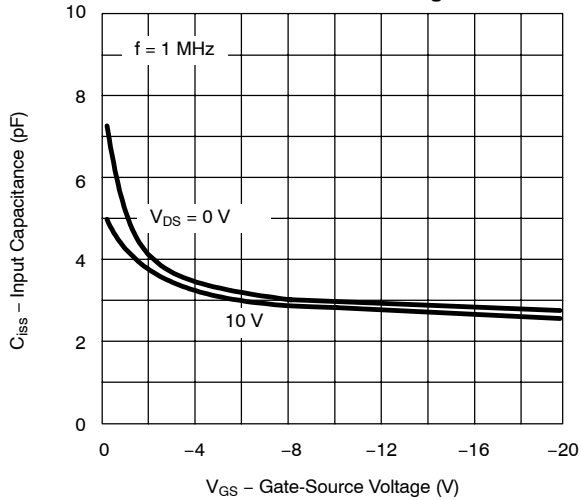


On-Resistance vs. Drain Current

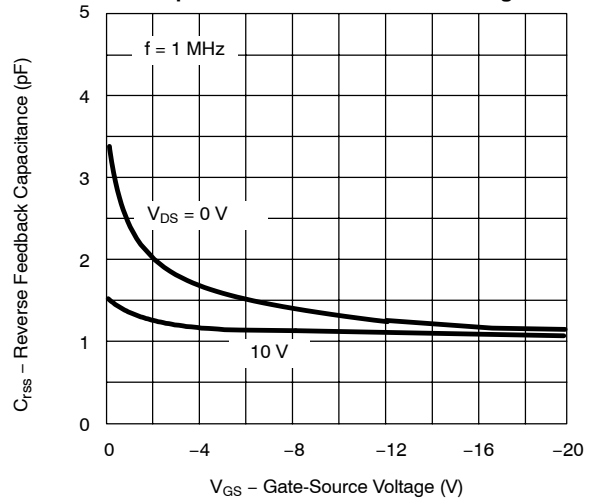


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

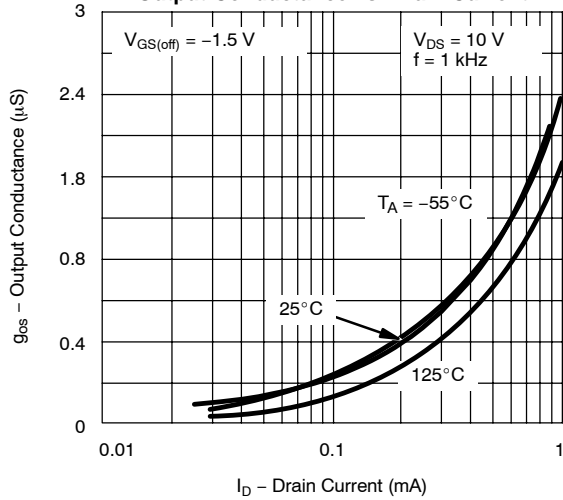
Common-Source Input Capacitance vs. Gate-Source Voltage



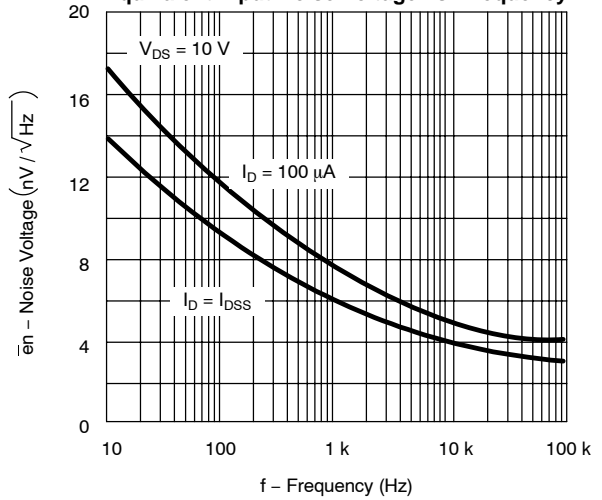
Common-Source Reverse Feedback Capacitance vs. Gate-Source Voltage



Output Conductance vs. Drain Current



Equivalent Input Noise Voltage vs. Frequency





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