



### N-Channel JFETs

|             |               |             |
|-------------|---------------|-------------|
| <b>J308</b> | <b>SST308</b> | <b>U309</b> |
| <b>J309</b> | <b>SST309</b> | <b>U310</b> |
| <b>J310</b> | <b>SST310</b> |             |

| 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

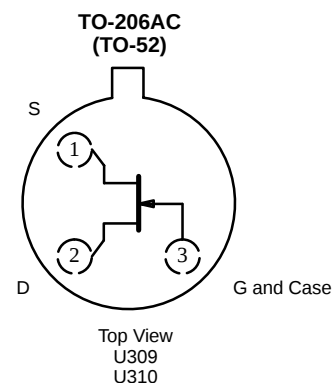
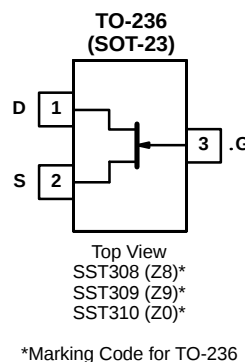
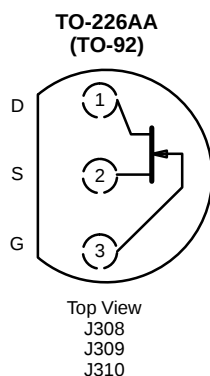
#### DESCRIPTION

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) <sup>a</sup> 350 mW |
|                                | (U Prefix) <sup>b</sup> 500 mW       |

## Notes

- a. Derate 2.8 mW/°C above 25°C  
b. Derate 4 mW/°C above 25°C

SPECIFICATIONS FOR J/SST308, J/SST309 AND J/SST310 ( $T_A = 25^\circ\text{C}$  UNLESS NOTED)

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

## 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. Gain ( $G_{pg}$ ) measured at optimum input noise match.

NZB

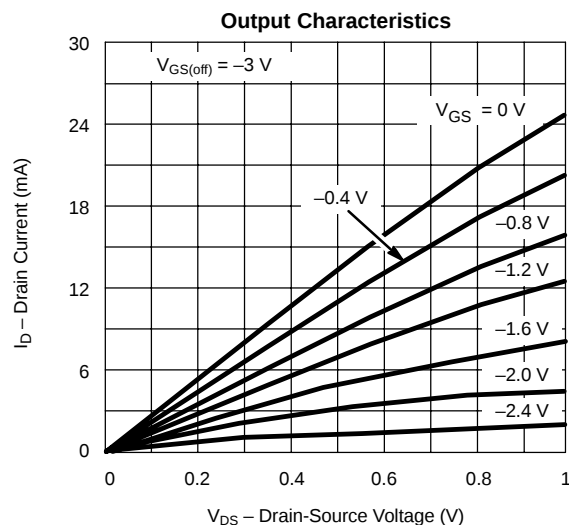
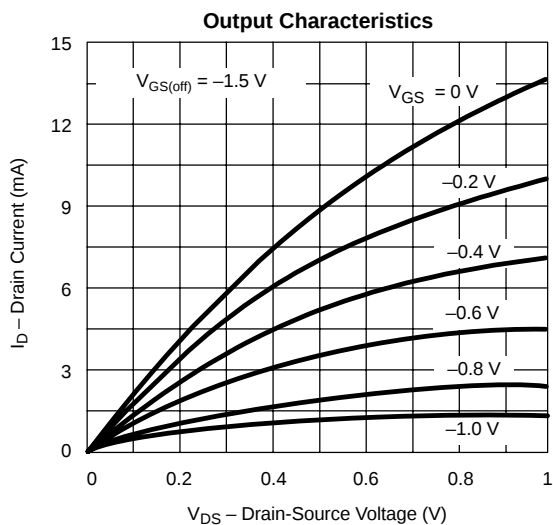
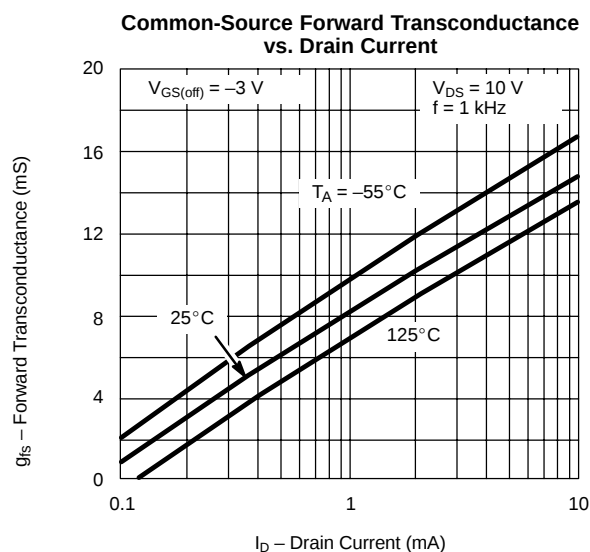
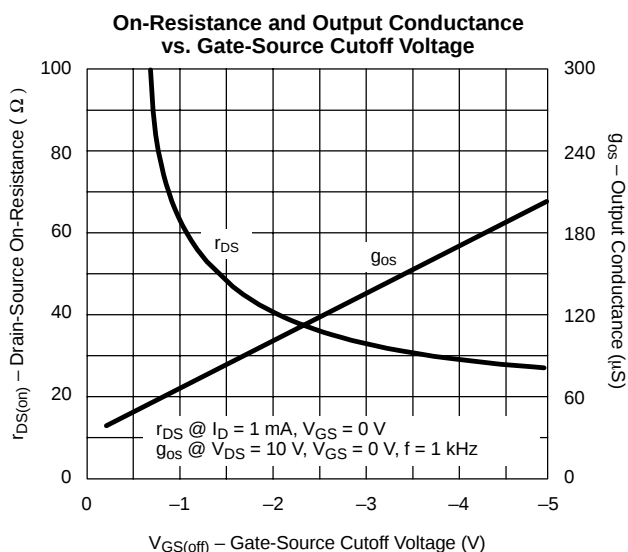
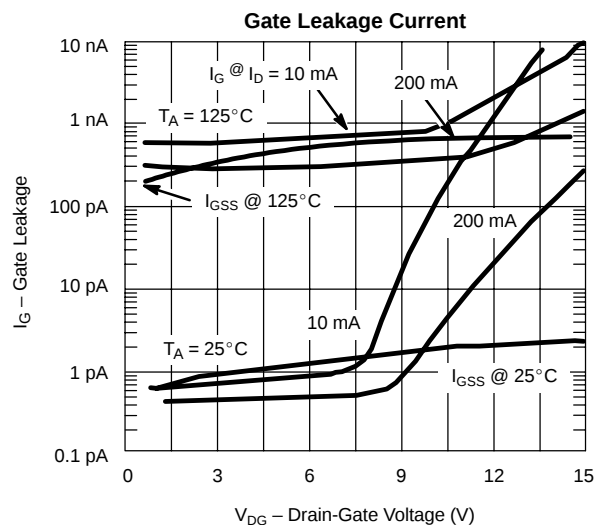
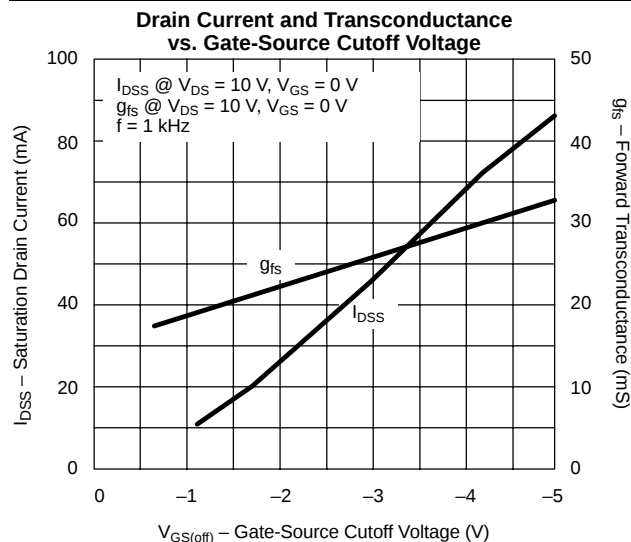
**SPECIFICATIONS FOR U309 AND U310 ( $T_A = 25^\circ\text{C}$  UNLESS NOTED)**

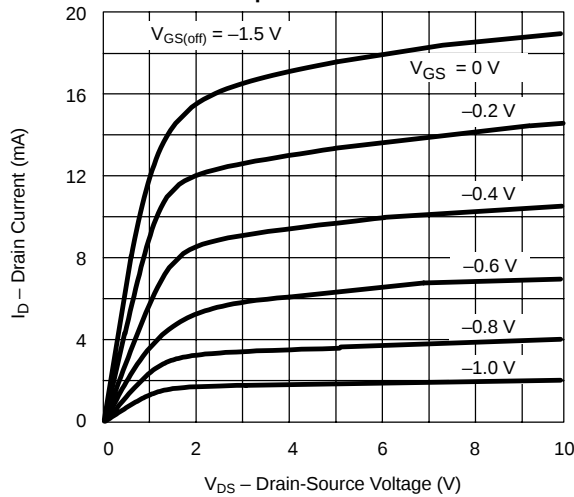
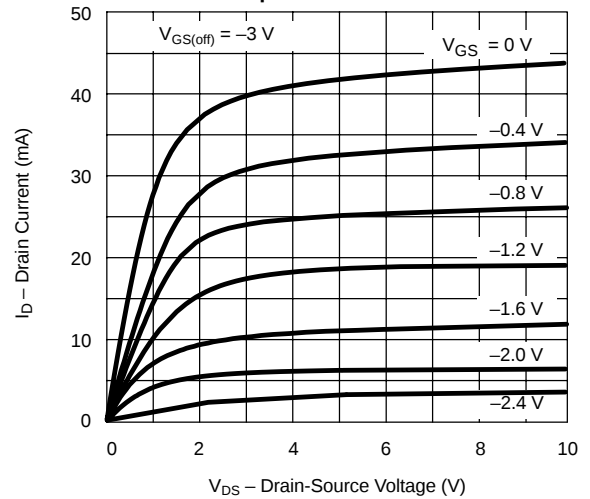
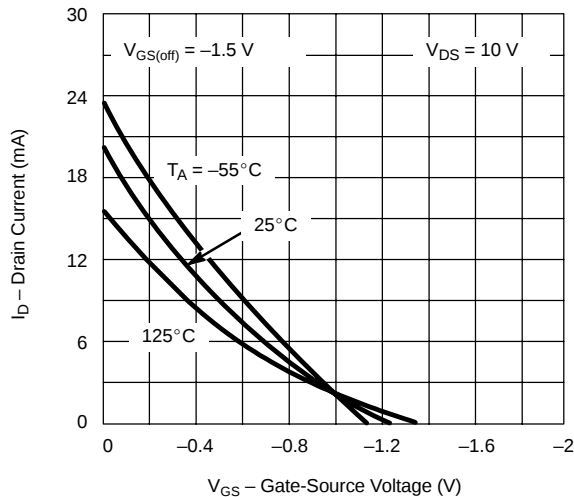
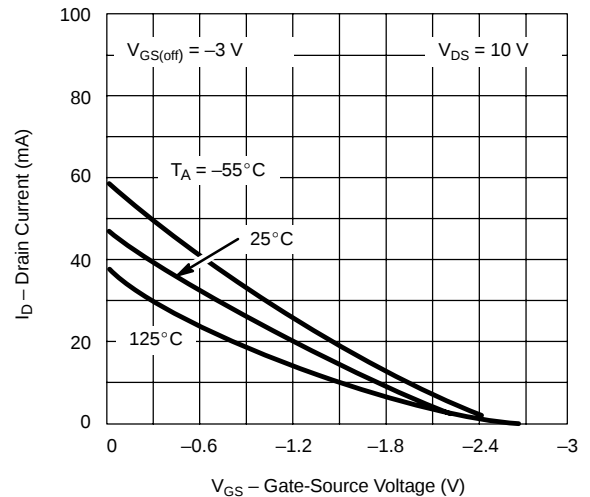
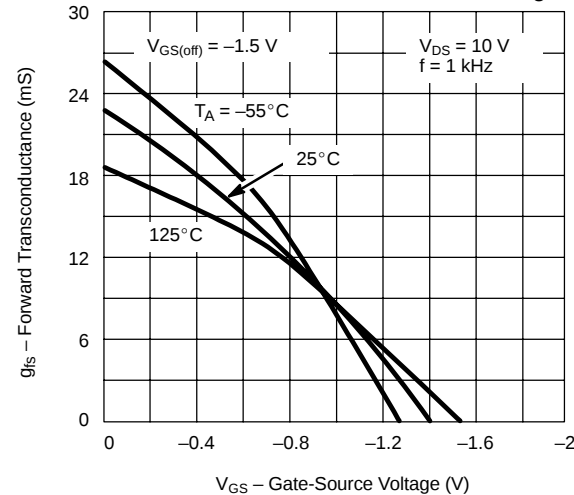
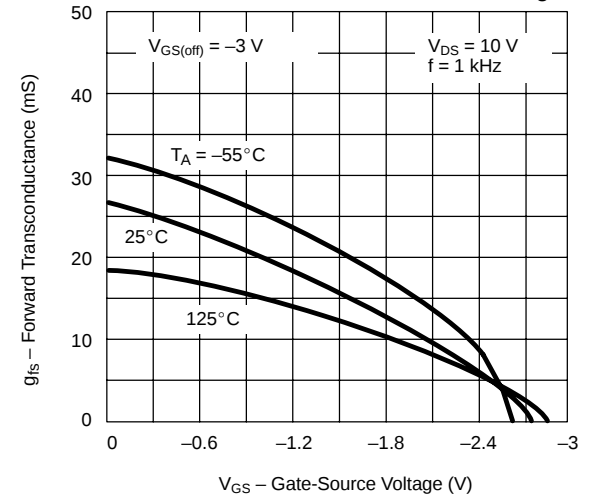
| Parameter                                  | Symbol               | Test Conditions                                              | Typ <sup>a</sup> | Limits |       |      |       | Unit       |
|--------------------------------------------|----------------------|--------------------------------------------------------------|------------------|--------|-------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

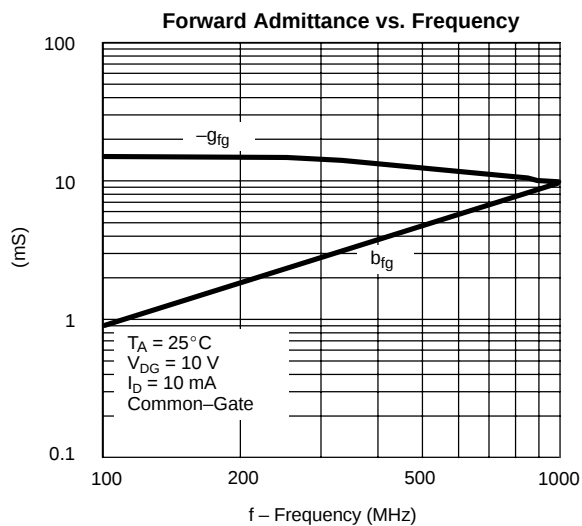
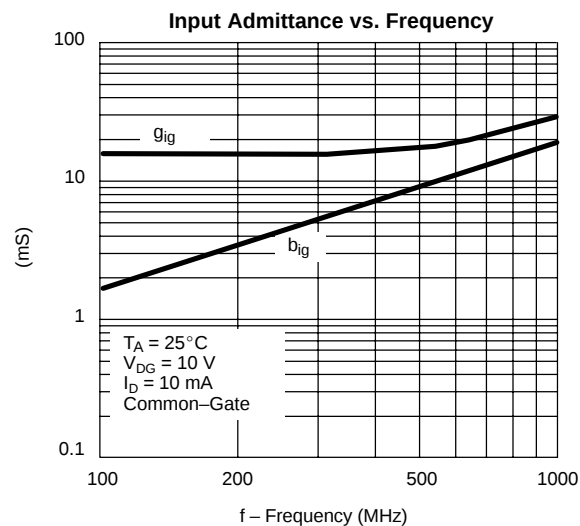
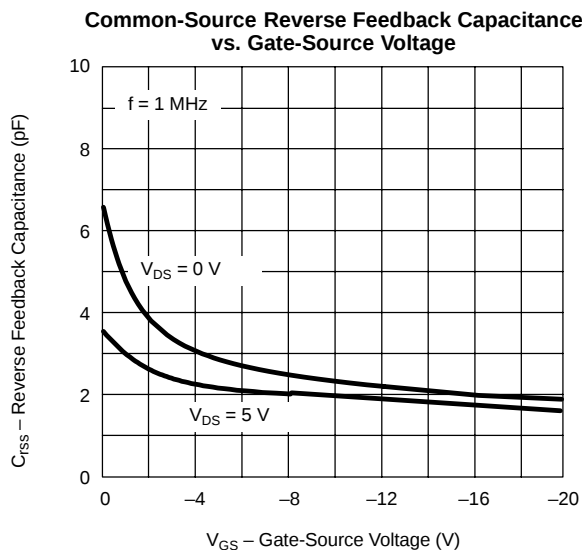
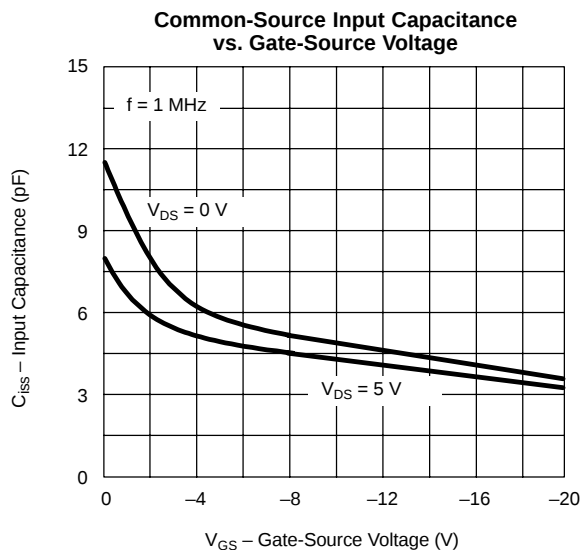
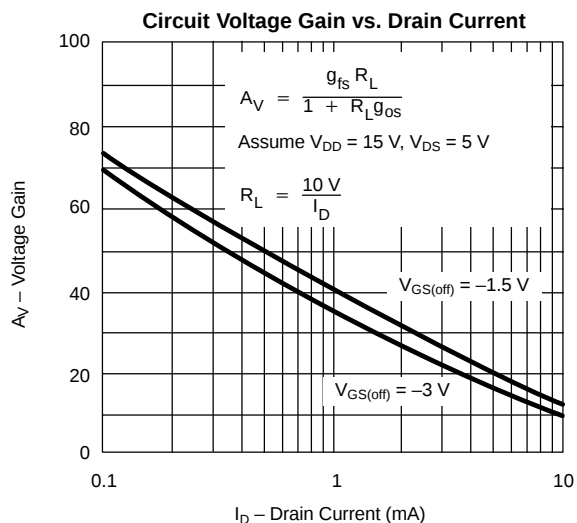
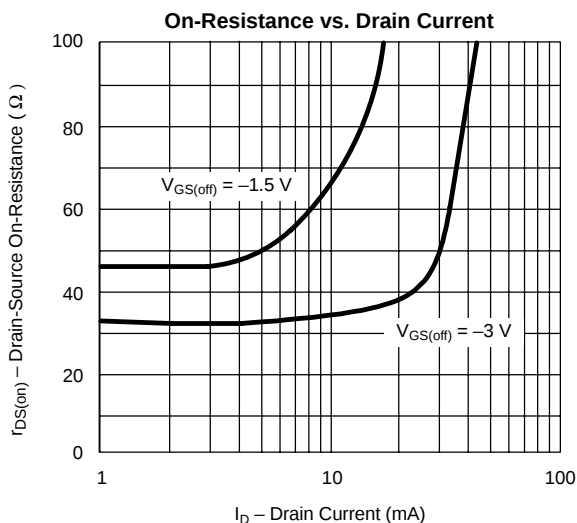
## Notes

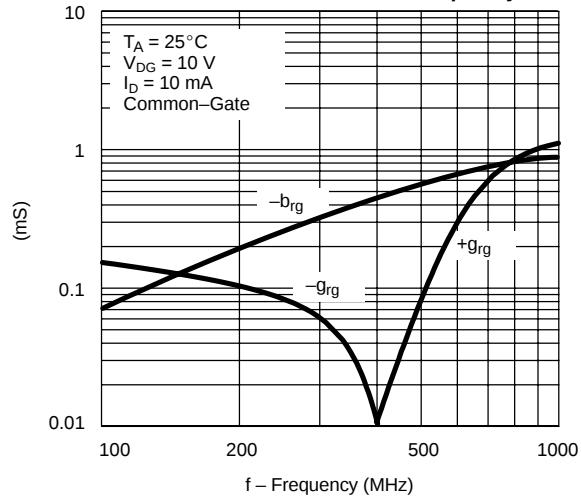
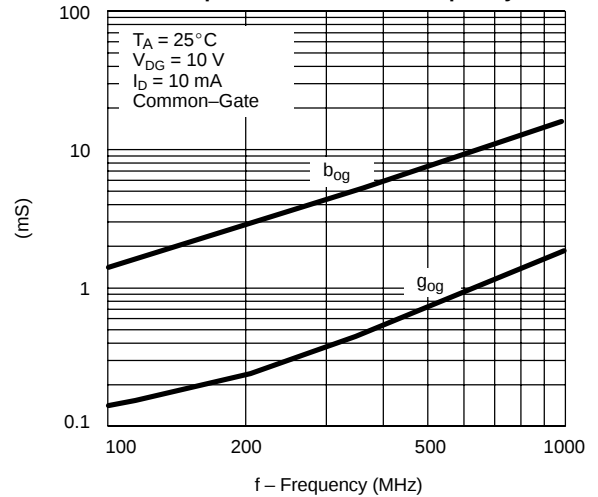
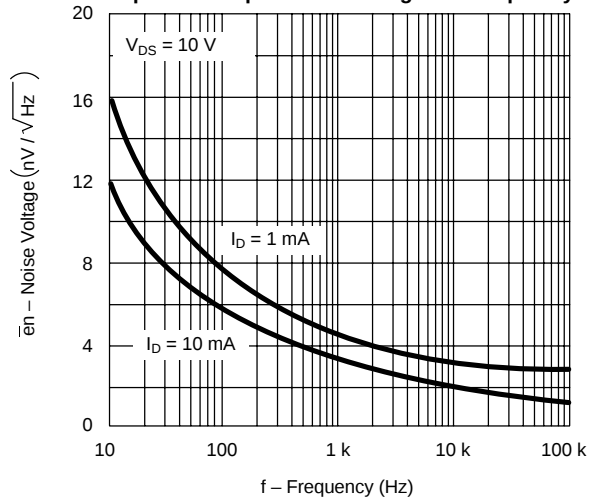
- a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.  
b. Pulse test:  $PW \leq 300\ \mu\text{s}$  duty cycle  $\leq 3\%$ .  
c. Gain ( $G_{pg}$ ) measured at optimum input noise match.

NZB

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


**TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)****Output Characteristics****Output Characteristics****Transfer Characteristics****Transfer Characteristics****Transconductance vs. Gate-Source Voltage****Transconductance vs. Gate-Source Voltage**

**TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  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**