



N-Channel JFETs

| PRODUCT SUMMARY | | | | |
|-----------------|--------------------------|-----------------------------|------------------------------|--------------------------|
| Part Number | V _{GS(off)} (V) | r _{DS(on)} Max (Ω) | I _{D(off)} Typ (pA) | t _{ON} Typ (ns) |
| J105 | -4.5 to -10 | 3 | 10 | 14 |
| J106 | -2 to -6 | 6 | 10 | 14 |
| J107 | -0.5 to -4.5 | 8 | 10 | 14 |

FEATURES

- Low On-Resistance: J105 < 3 Ω
- Fast Switching—t_{ON}: 14 ns
- Low Leakage: 10 pA
- Low Capacitance: 20 pF
- Low Insertion Loss

BENEFITS

- Low Error Voltage
- High-Speed Analog Circuit Performance
- Negligible “Off-Error,” Excellent Accuracy
- Good Frequency Response
- Eliminates Additional Buffering

APPLICATIONS

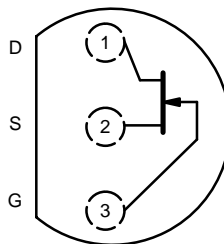
- Analog Switches
- Choppers
- Sample-and-Hold
- Normally “On” Switches
- Current Limiters

DESCRIPTION

The J105/106/107 are high-performance JFET analog switches designed to offer low on-resistance and fast switching. r_{DS(on)} < 3 Ω is guaranteed for the J105 making this device the lowest of any commercially available JFET.

The low cost TO-226AA (TO-92) plastic package is available in a wide range of tape-and-reel options (see Packaging Information). For similar products in TO-206AC (TO-52) packaging, see the U290/291 data sheet.

TO-226AA
(TO-92)



Top View

ABSOLUTE MAXIMUM RATINGS

Gate-Drain, Gate-Source Voltage -25 V
 Gate Current 50 mA
 Storage Temperature -55 to 150°C
 Operating Junction Temperature -55 to 150°C

Power Dissipation^a 350 mW

Notes
 a. Derate 2.8 mW/°C above 25°C



| SPECIFICATIONS (T _A = 25 °C UNLESS OTHERWISE NOTED) | | | | | | | | | | |
|--|----------------------|--|------------------|--------|-----|------|-----|------|------|------------|
| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | | | Unit |
| | | | | J105 | | J106 | | J107 | | |
| | | | | 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} = 5 V, I _D = 1 μA | | -4.5 | -10 | -2 | -6 | -0.5 | -4.5 | |
| Saturation Drain Current ^b | I _{DSS} | V _{DS} = 15 V, V _{GS} = 0 V | | 500 | | 200 | | 100 | | mA |
| Gate Reverse Current | I _{GSS} | V _{GS} = -15 V, V _{DS} = 0 V T _A = 125 °C | -0.02 | | | -3 | | -3 | | nA |
| | | | -10 | | | | | | | |
| Gate Operating Current ^b | I _G | V _{DG} = 10 V, I _D = 25 mA | -0.01 | | | | | | | |
| Drain Cutoff Current | I _{D(off)} | V _{DS} = 5 V, V _{GS} = -10 V T _A = 125 °C | 0.01 | | 3 | | 3 | | 3 | Ω |
| | | | 5 | | | | | | | |
| Drain-Source On-Resistance | r _{DS(on)} | V _{GS} = 0 V, I _D = 1 mA | | | 3 | | 6 | | 8 | |
| Gate-Source Forward Voltage | V _{GS(F)} | I _G = 1 mA, V _{DS} = 0 V | 0.7 | | | | | | | V |
| Dynamic | | | | | | | | | | |
| Common-Source Forward Transconductance ^b | g _{fs} | V _{DS} = 10 V, I _D = 25 mA f = 1 kHz | 55 | | | | | | | mS |
| Common-Source Output Conductance ^b | g _{os} | | 5 | | | | | | | |
| Drain-Source On-Resistance | r _{ds(on)} | V _{GS} = 0 V, I _D = 0 mA f = 1 kHz | | | 3 | | 6 | | 8 | Ω |
| Common-Source Input Capacitance | C _{iss} | V _{DS} = 0 V, V _{GS} = 0 V f = 1 MHz | 120 | | 160 | | 160 | | 160 | pF |
| Common-Source Reverse Transfer Capacitance | C _{rss} | V _{DS} = 0 V, V _{GS} = -10 V f = 1 MHz | 20 | | 35 | | 35 | | 35 | |
| Equivalent Input Noise Voltage | e _n | V _{DG} = 10 V, I _D = 25 mA f = 1 kHz | 3 | | | | | | | nV/ √Hz |
| Switching | | | | | | | | | | |
| Turn-On Time | t _{d(on)} | V _{DD} = 1.5 V, V _{GS(H)} = 0 V See Switching Diagram | 6 | | | | | | | ns |
| | t _r | | 8 | | | | | | | |
| Turn-Off Time | t _{d(off)} | | 5 | | | | | | | |
| | t _f | | 9 | | | | | | | |

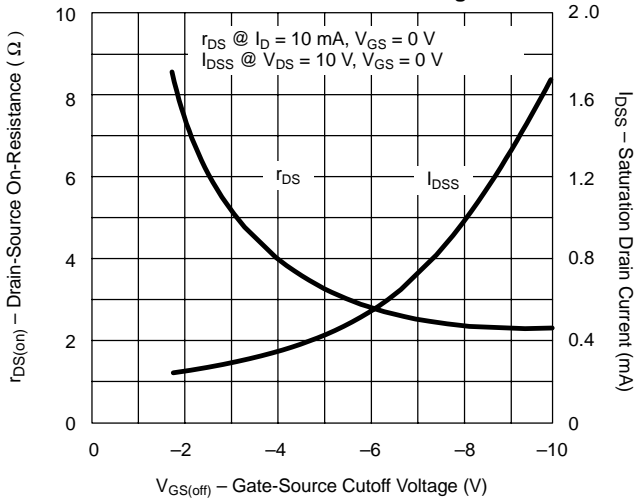
Notes
a. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
b. Pulse test: PW ≤ 300 μs duty cycle ≤ 3%.

NVA

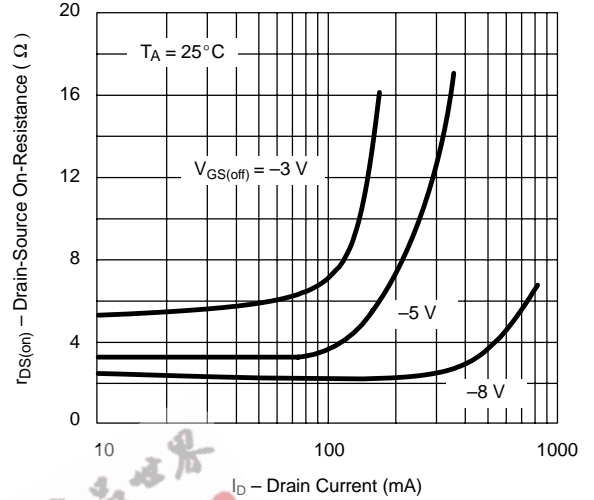


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

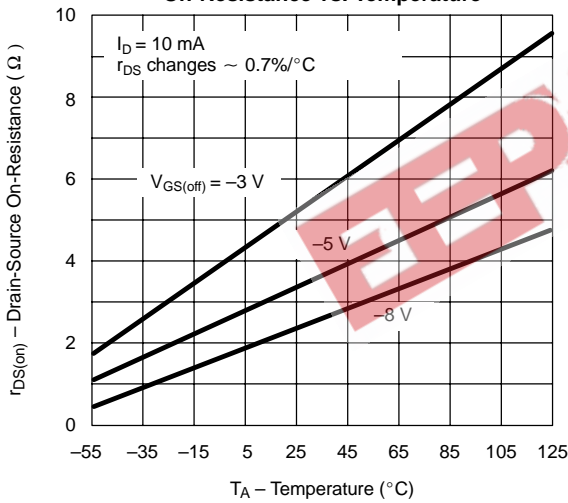
On-Resistance and Drain Current vs. Gate-Source Cutoff Voltage



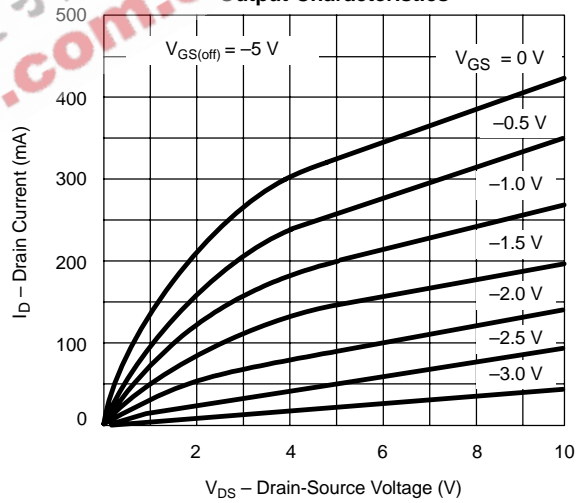
On-Resistance vs. Drain Current



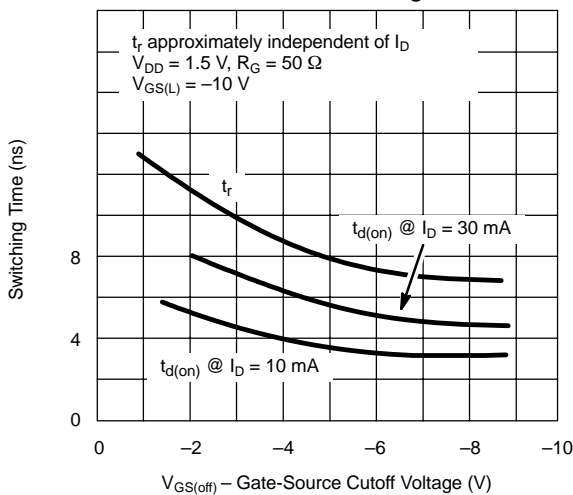
On-Resistance vs. Temperature



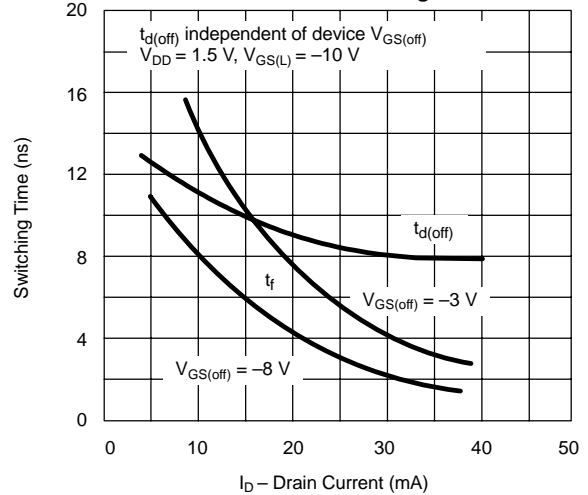
Output Characteristics



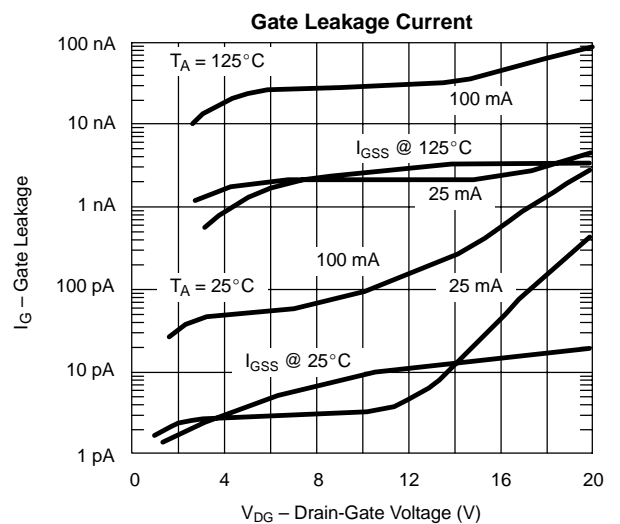
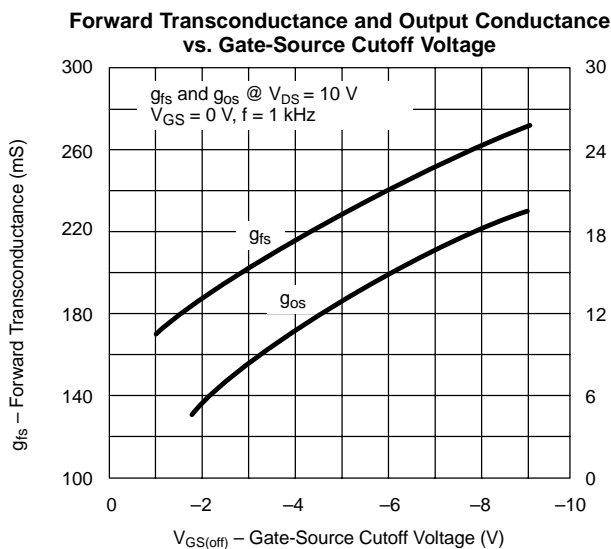
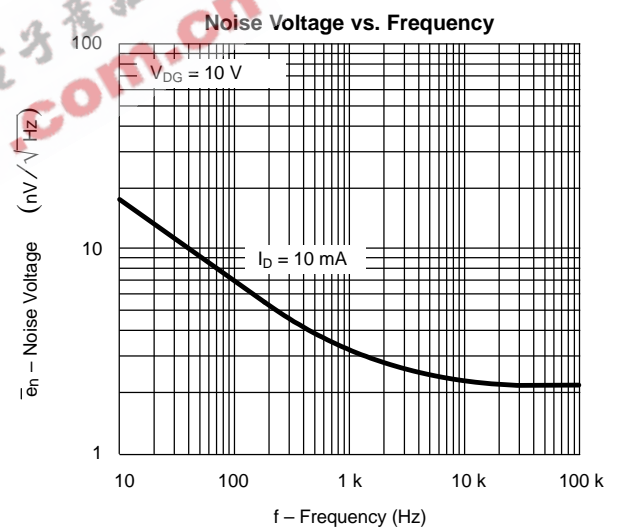
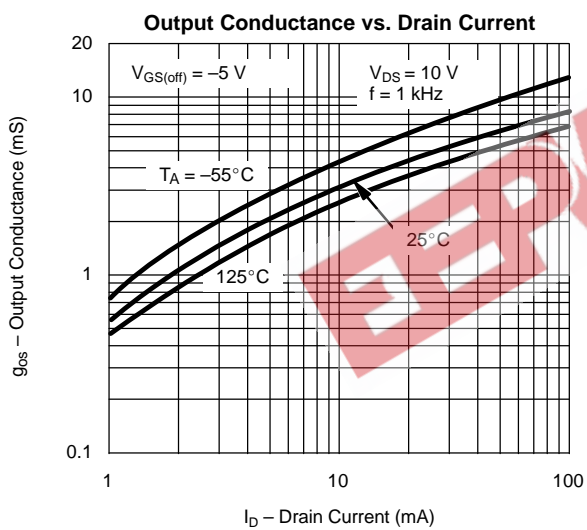
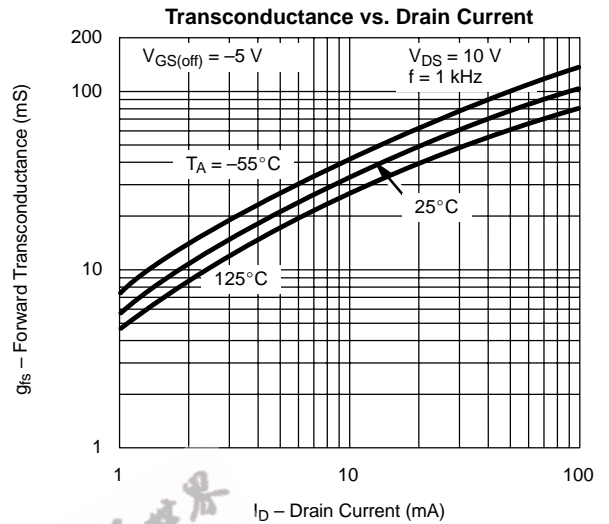
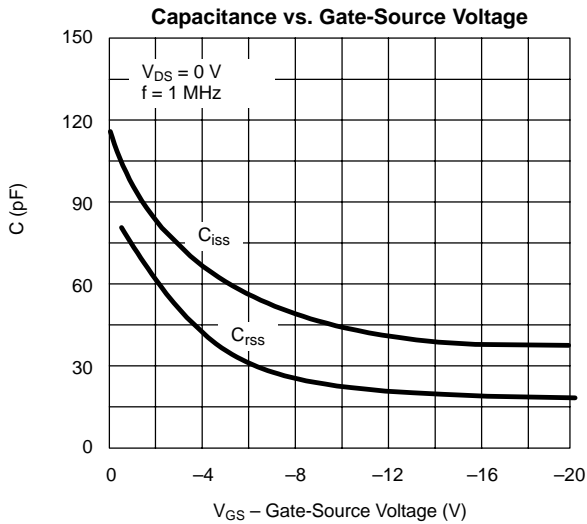
Turn-On Switching



Turn-Off Switching



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





| SWITCHING TIME TEST CIRCUIT | | | |
|-----------------------------|-------------|-------------|-------------|
| | J105 | J106 | J107 |
| $V_{GS(L)}$ | -12V | -7V | -5V |
| R_L^* | 50 Ω | 50 Ω | 50 Ω |
| $I_{D(on)}$ | 28 mA | 27 mA | 26 mA |

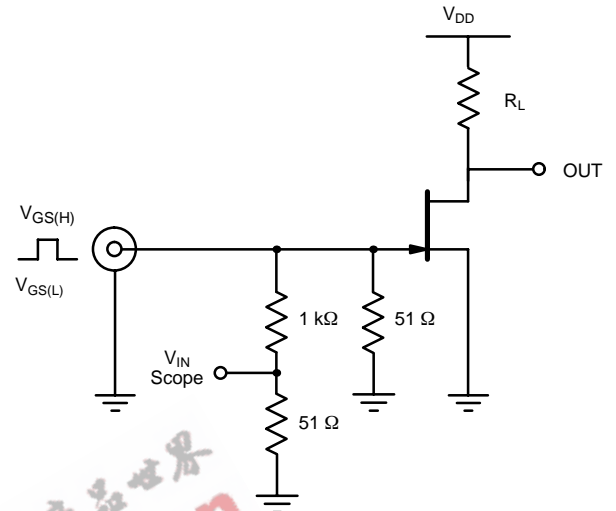
*Non-inductive

Input Pulse

Rise Time < 1 ns
Fall Time < 1 ns
Pulse Width 100 ns
PRF 1 MHz

Sampling Scope

Rise Time 0.4 ns
Input Resistance 10 M Ω
Input Capacitance 1.5 pF



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