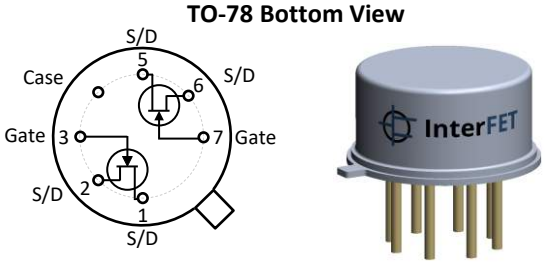
# IF3602 Dual Matched N-Channel JFET

## Features

- InterFET N3600L Geometry
- Low noise: 0.35 nV/√Hz typical
- High gain: 175mS typical
- Low $V_{GS(OFF)}$: -1.5 typical
- Typical $I_{DSS}$: 300mA
- Typical $BV_{GSS}$: -30V
- High radiation tolerance
- RoHS, REACH, CMR compliant
- Custom test and binning options available
- SMT, TH, and bare die package options
- Edge case SPICE modeling: InterFET SPICE

**TO-78 Bottom View**




NOTE: S/D pins are interchangeable Source Drain connections

## Industry Standard Crosses

- InterFET exclusive

## InterFET Similar Parts

- IF3601

## Applications

- General: Amplifiers; Switches; Voltage regulators; Oscillators; Signal mixers; Noise generators
- Military/Aero: Radar; Communications; Satellites; Missiles guidance; Hydrophone Preamplifiers
- Medical: Medical imaging systems; Medical monitors and recorders; Ultrasound equipment
- Audio: Tone control circuits; Headphone amplifiers; Audio filters; Electret Microphone

## Description

The -20V InterFET IF3602 JFET is presently the lowest noise JFET on the market. Targeted for ultra low noise high gain differential amplifier designs the IF3602 is the default standard for ultra low noise measurement equipment at very low frequencies. Custom specifications, matching, and packaging options are available.

## Ordering Information Custom Part and Binning Options Available

| Part Number | Description | Case | Packaging |
|---|---|---|---|
| IF3602T78 | Through-Hole | TO-78 | Bulk |
| IF3602COT * | Chip Orientated Tray (COT Waffle Pack) | COT | 30/Waffle Pack |
| IF3602CFT * | Chip Face-up Tray (CFT Waffle Pack) | CFT | 30/Waffle Pack |

* Bare die packaged options are designed for matched specifications but not 100% tested

**NOTICE:** Please refer to the end of this document for information on product materials, compliance, safety, and legal statements.

# Electrical Characteristics

## Maximum Ratings (@ $T_A$ = 25°C, Unless otherwise specified)

| Parameters | | TO-78 | Unit |
|---|---|---|---|
| $V_{RGS}$ | Reverse Gate Source and Gate Drain Voltage | -20 | V |
| $I_{FG}$ | Continuous Forward Gate Current | 50 | mA |
| $P_D$ | Continuous Device Power Dissipation[1] | 500 | mW |
| P | Power Derating[1] | 3.3 | mW/°C |
| $T_J$ | Operating Junction Temperature | -65 to 175 | °C |
| $T_{STG}$ | Storage Temperature | -65 to 175 | °C |

[1] Thermal power dissipation and derating values obtained with gate pin (substrate) thermally connected to pad and/or internal layer.

## Static Characteristics (@ TA = 25°C, Unless otherwise specified)

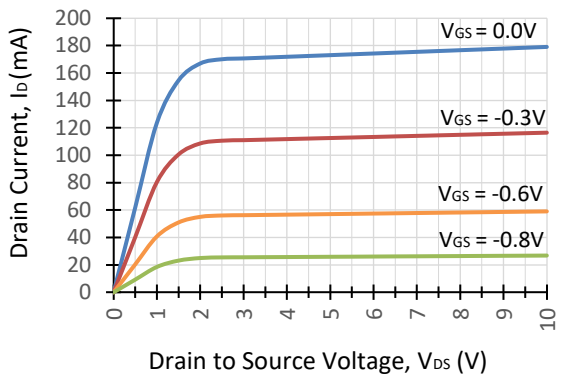
| Parameters | | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{(BR)GSS}$ | Gate to Source Breakdown Voltage | $V_{DS}$ = 0V, $I_G$ = -1µA | -20 | | | V |
| $I_{GSS}$ | Gate to Source Reverse Current | $V_{GS}$ = -10V, $V_{DS}$ = 0V | | | -0.5 | nA |
| $V_{GS(OFF)}$ | Gate to Source Cutoff Voltage | $V_{DS}$ = 10V, $I_D$ = 0.5nA | -0.35 | | -3.0 | V |
| $I_{DSS}$ | Drain to Source Saturation Current | $V_{GS}$ = 0V, $V_{DS}$ = 10V (Pulsed) | 30 | 300 | | mA |

## Dynamic Characteristics (@ TA = 25°C, Unless otherwise specified)

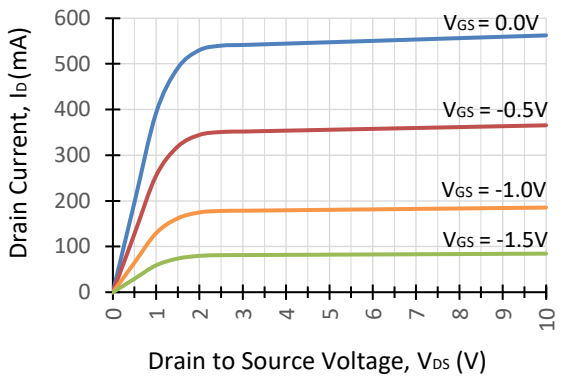
| Parameters | | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $G_{FS}$ | Forward Transconductance | $V_{DS}$ = 10V, $V_{GS}$ = 0V, f = 1kHz | | 175 | | mS |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = 0V, $V_{GS}$ = -4V, f = 1MHz | | 650 | | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | $V_{DS}$ = 0V, $V_{GS}$ = -4V, f = 1MHz | | 80 | | pF |
| $e_n$ | Equivalent Circuit Input Noise Voltage | $V_{DS}$ = 3V, $I_D$ = 5mA, f = 100Hz | | 0.35 | | nV/√Hz |
| $\lvert V_{GS1} - V_{GS2} \rvert$ | Differential Gate Source Voltage | $V_{DS}$ = 10V, $I_D$ = 500pA | | | 100 | mV |

## Typical IF3602 Characteristics

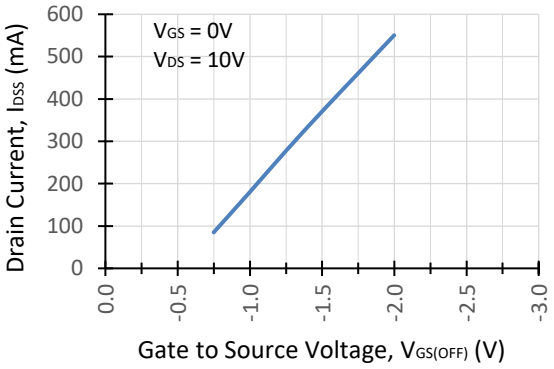
Typical Output @ $V_{GS(OFF)}$ = -1.0V



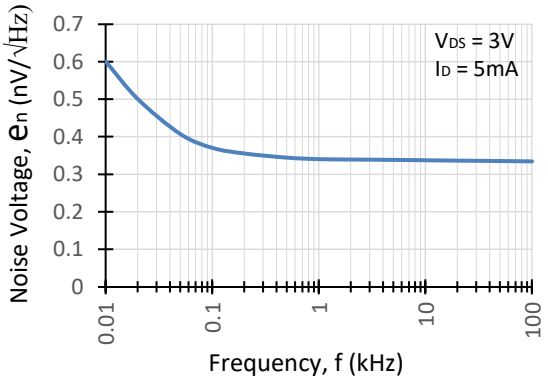

Typical Output @ $V_{GS(OFF)}$ = -2.0V



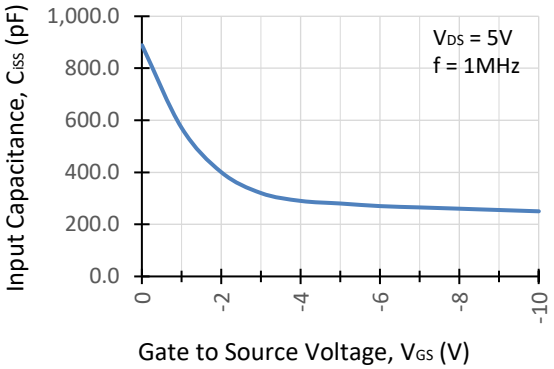

Typical $I_{DSS}$ - $V_{GS(OFF)}$



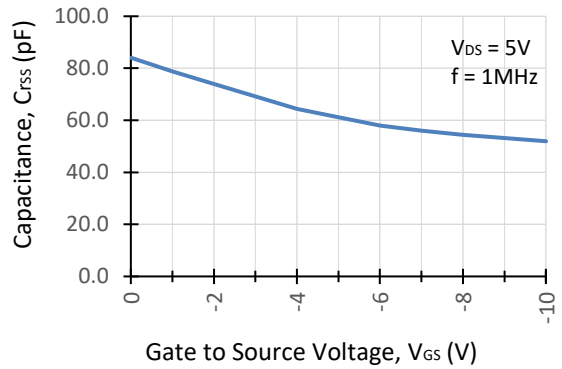

Typical Noise (nV/√Hz)




Typical $C_{iss}$ - $V_{GS}$

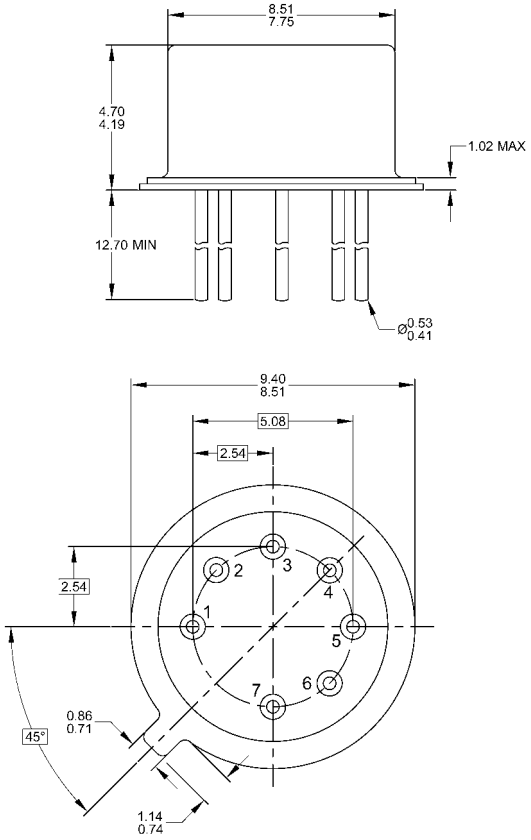



Typical $C_{rss}$ - $V_{GS}$



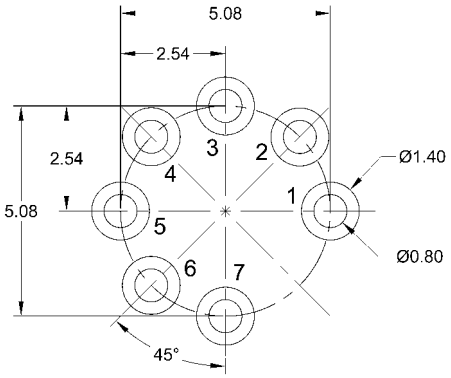
# TO-78 Mechanical and Layout Data

## Package Outline Data




1. All linear dimensions are in millimeters.
2. Eight leaded device. Not all leads are shown in drawing views.
3. Some package configurations will not populate pin 8 and/or pin 7.
4. Package weight approximately 0.44 grams
5. Bulk product is shipped in standard ESD shipping material
6. Refer to JEDEC standards for additional information.

## Suggested Through-Hole Layout




1. All linear dimensions are in millimeters.
2. The suggested land pattern dimensions have been provided as a straight lead reference only. A more robust pattern may be desired for wave soldering and/or bent lead configurations.

# Compliance and Legal

## Environment

InterFET parts follow the latest RoHS Compliance, REACH Compliance, Proposition 65 Statement, TSCA Statement, and Chemical Disposal and Waste Mitigation requirement and guidelines. For more on InterFET's Environmental Commitment please visit www.InterFET.com/environmental/.

## Package materials

| Parameters | SOT23 | SOIC8 | TO-92 | Metal Case |
|---|---|---|---|---|
| Alloy | CDA194 | C194 1/2H | C194 1/2H | Kovar |
| Cu | Balance | 97% min | 97% min | |
| Fe | 2.1 – 2.6% | 2.1 – 2.6% | 2.1 – 2.6% | 53% |
| Zn | 0.05 – 0.2% | 0.05 – 0.2% | 0.05 – 0.15% | |
| P | 0.015 – 0.15% | 0.015 – 0.15% | 0.015 – 0.15% | |
| Pb | 0.03% max | 0.03% max | 0.03% max | |
| Ni | | | | 29% |
| Co | | | | 17% |
| Mn | | | | 0.3% |
| Si | | | | 0.2% |
| C | | | | <0.01% |
| Au | | | | Plating |

## Package tests

| Parameters | SOT23 | SOIC8 | TO-92 | Metal Case |
|---|---|---|---|---|
| MSL | Level 1 | Level 2 | N/A | N/A |
| ESD | Class M4 Machine Model Class 3B HBM | Class M4 Machine Model Class 3B HBM | Class M4 Machine Model Class 3B HBM | Class M4 Machine Model Class 3B HBM |

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