

## IF170A, IF170B, IF170C, IF170D N-Channel JFET

### Features

- InterFET [N0132L Geometry](#)
- Low noise: 1.0 nV/√Hz typical
- High gain: 22mS typical
- Low gate leakage: 750fA typical @10V
- 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](#)

### Industry Standard Crosses

- 2SK152, 2SK170, 2N6451, 2N6452, 2N3972, MMBF4393
- NSVJ3557SA3, NSVJ5908DSG5, NSVJ2394SA3

### InterFET Similar Parts

- IF1320, IFN152, SMP6451, SMP6452, SMP3972, SMP4393

### InterFET Dual Parts

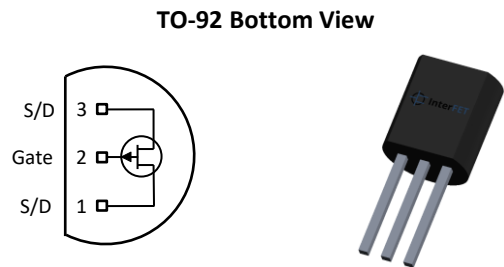
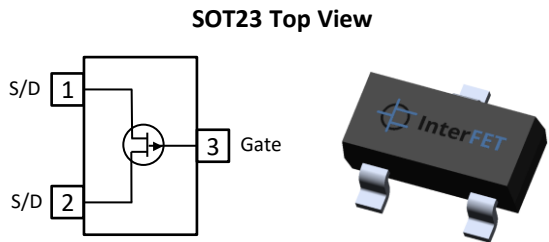
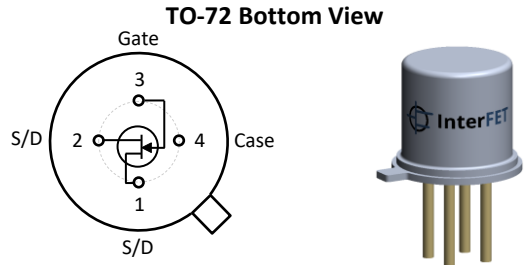
- IF389A, IF389B, IF389C, IF389D, IFN146, IF1322A

### 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 -30V InterFET IF170x JFET is targeted for sensitive amplifier stages for mid-frequencies designs. Higher breakdown voltage parts are available through InterFET custom ordering. IF389x is the dual matched option.



NOTE: S/D pins are interchangeable Source Drain connections

### Ordering Information Custom Part and Binning Options Available

Part Number	Description	Case	Packaging
IF170AT72, IF170BT72, IF170CT72, IF170DT72	Through-Hole	TO-72	Bulk
IF170AT92, IF170BT92, IF170CT92, IF170DT92	Through-Hole	TO-92	Bulk
IF170AST3, IF170BST3, IF170CST3, IF170DST3	Surface Mount	SOT23	Bulk
IF170AST3TR, IF170BST3TR, IF170CST3TR, IF170DST3TR	7" Tape and Reel: 1,000 and 3,000 Pieces 13" Tape and Reel: 9,000 Pieces	SOT23	Minimum 1,000 Pieces Tape and Reel
IF170ACOT, IF170BCOT, IF170CCOT, IF170DCOT	Chip Orientated Tray (COT Waffle Pack)	COT	400/Waffle Pack
IF170ACFT, IF170BCFT, IF170CCFT, IF170DCFT	Chip Face-up Tray (CFT Waffle Pack)	CFT	400/Waffle Pack



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

## Electrical Characteristics

### Maximum Ratings (@ $T_A = 25^\circ\text{C}$ , Unless otherwise specified)

Parameters	TO-72	SOT-23	TO-92	Unit
$V_{RGS}$ Reverse Gate Source and Gate Drain Voltage	-30	-30	-30	V
$I_{FG}$ Continuous Forward Gate Current	50	50	50	mA
$P_D$ Continuous Device Power Dissipation <sup>1</sup>	500	350	500	mW
$P$ Power Derating <sup>1</sup>	3.3	2.8	4	mW/ $^\circ\text{C}$
$T_J$ Operating Junction Temperature	-65 to 175	-55 to 150	-55 to 150	$^\circ\text{C}$
$T_{STG}$ Storage Temperature	-65 to 175	-55 to 150	-55 to 150	$^\circ\text{C}$

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

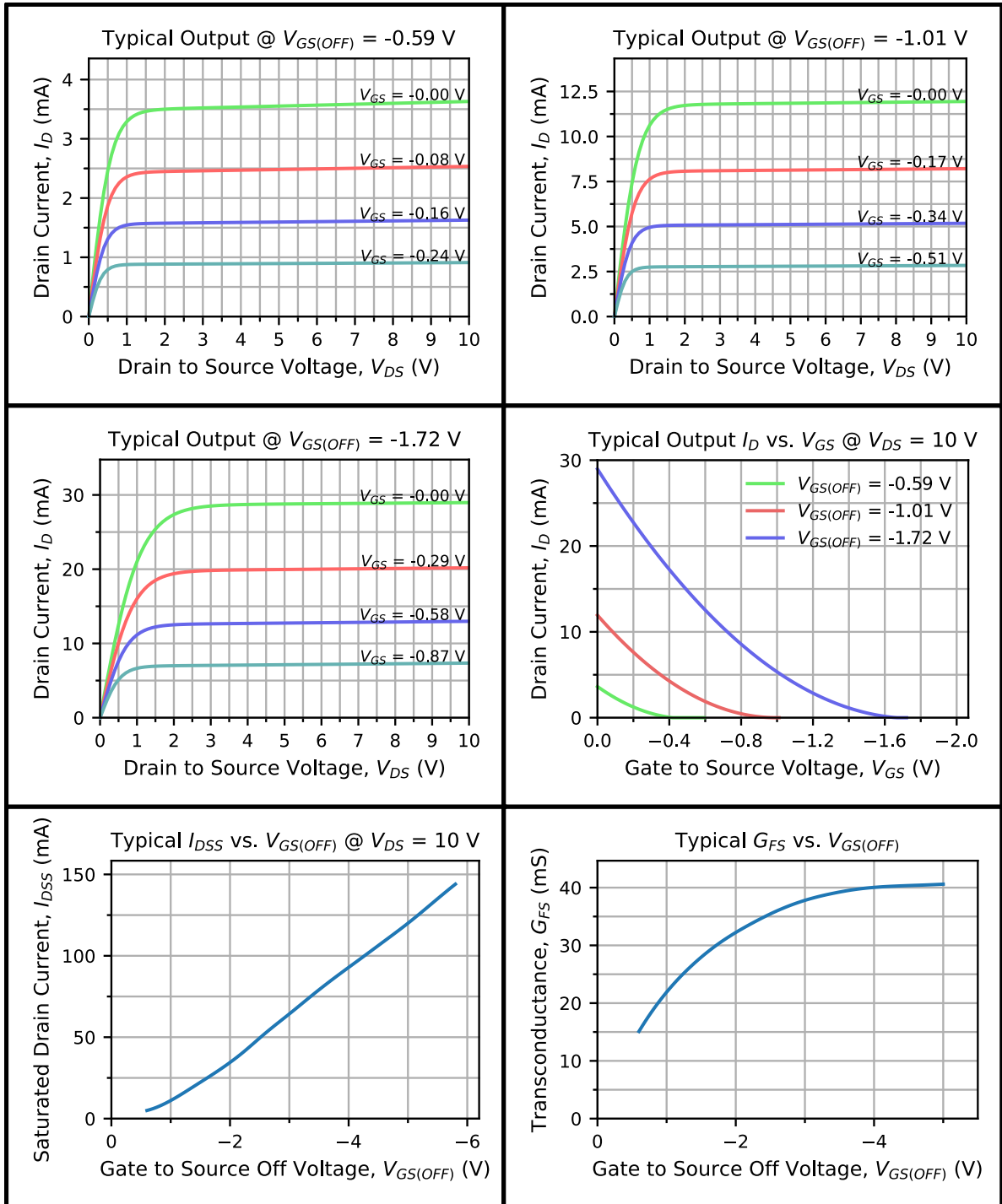
### Static Characteristics (@ $T_A = 25^\circ\text{C}$ , Unless otherwise specified)

Parameters	Conditions	IF170A		IF170B		IF170C		IF170D		Unit
		Min	Max	Min	Max	Min	Max	Min	Max	
$V_{(BR)GSS}$ Gate to Source Breakdown Voltage	$I_G = -1\mu\text{A}$ , $V_{DS} = 0\text{V}$	-30		-30		-30		-30		V
$I_{GSS}$ Gate to Source Reverse Current	$V_{DS} = 0\text{V}$ , $V_{GS} = -10\text{V}$		-0.1		-0.1		-0.1		-0.1	nA
$V_{GS(OFF)}$ Gate to Source Cutoff Voltage	$V_{DS} = 10\text{V}$ , $I_D = 1\text{mA}$	-0.2	-2.0	-0.2	-2.0	-0.2	-2.0	-0.2	-2.0	V
$I_{DSS}$ Drain to Source Saturation Current	$V_{DS} = 10\text{V}$ , $V_{GS} = 0\text{V}$ (Pulsed)	2.6	6.5	6.0	12.0	10.0	20.0	18.0	30.0	mA

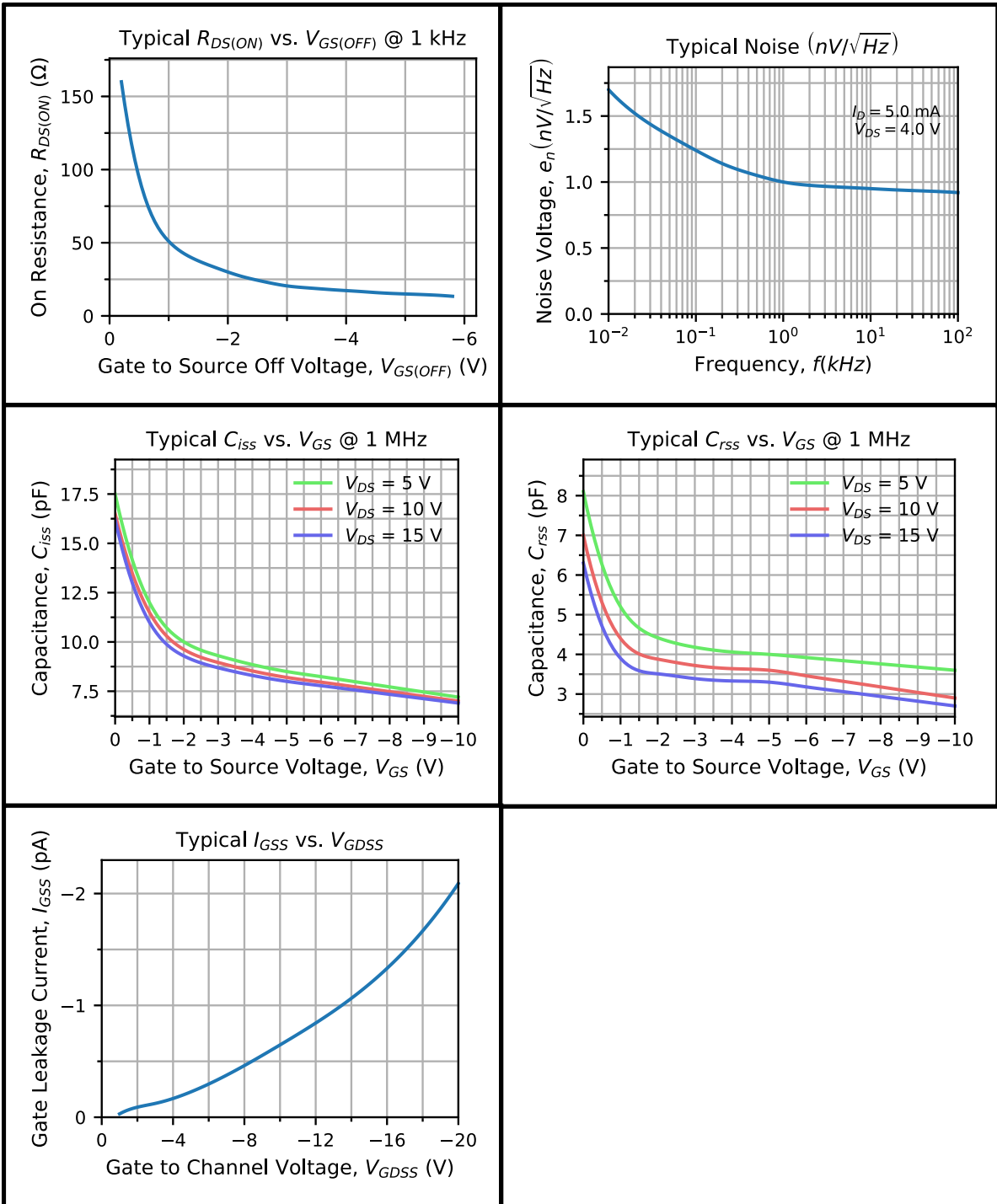
### Dynamic Characteristics (@ $T_A = 25^\circ\text{C}$ , Unless otherwise specified)

Parameters	Conditions	Min	Max	Unit
$G_{FS}$ Full Forward Transconductance	$V_{DS} = 10\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{kHz}$	14		mS
$G_{FS(TYP)}$ Typical Transconductance	$V_{DS} = 15\text{V}$ , $I_D = 1\text{mA}$	6		mS
$C_{iss}$ Input Capacitance	$V_{DS} = 10\text{V}$ , $I_D = 2\text{mA}$ , $f = 1\text{MHz}$		20	pF
$C_{rss}$ Reverse Transfer Capacitance	$V_{DS} = 10\text{V}$ , $I_D = 2\text{mA}$ , $f = 1\text{MHz}$		4.5	pF
$e_n$ Noise Voltage	$V_{DS} = 10\text{V}$ , $I_D = 2\text{mA}$ , $f = 1\text{kHz}$	1.0 (Typical)		nV/ $\sqrt{\text{Hz}}$

## Typical IF170x Characteristics



### Typical IF170x Characteristics (Continued)



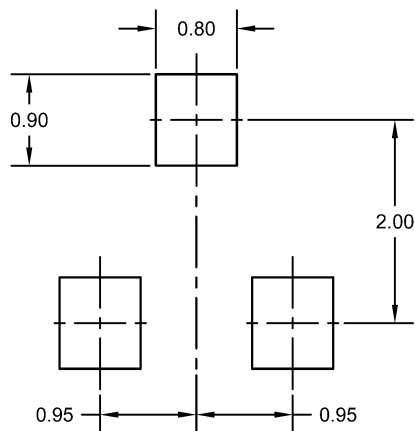
## SOT23 (TO-236AB) Mechanical and Layout Data

### Package Outline Data



1. All linear dimensions are in millimeters.
2. Package weight approximately 0.12 grams
3. Molded plastic case UL 94V-0 rated
4. For Tape and Reel specifications refer to InterFET CTC-021 Tape and Reel Specification, Document number: IF39002
5. Bulk product is shipped in standard ESD shipping material
6. Refer to JEDEC standards for additional information.

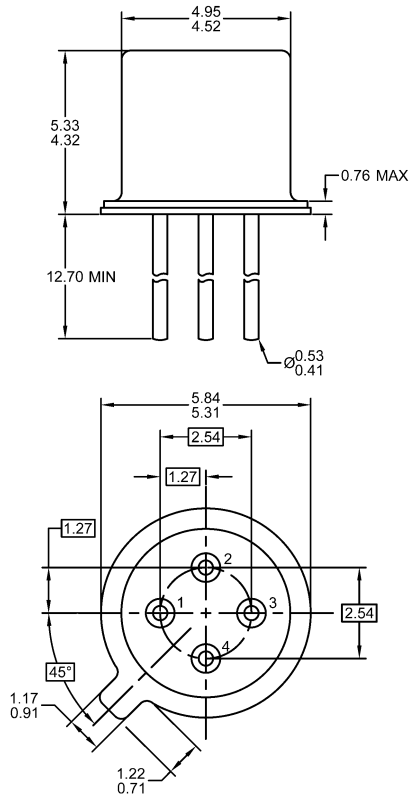
### Suggested Pad Layout



1. All linear dimensions are in millimeters.
2. The suggested land pattern dimensions have been provided for reference only. A more robust pattern may be desired for wave soldering.

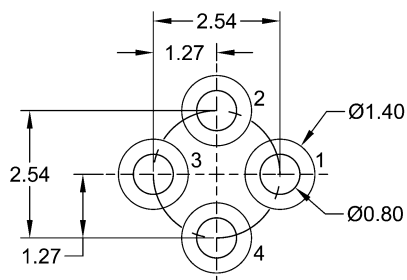
## TO-72 Mechanical and Layout Data

### Package Outline Data



1. All linear dimensions are in millimeters.
2. Four lead device. Not all leads are shown in drawing views.
3. Package weight approximately 0.31 grams
4. Bulk product is shipped in standard ESD shipping material
5. Refer to JEDEC standards for additional information.

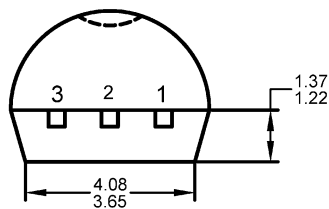
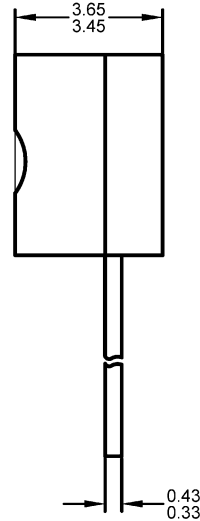
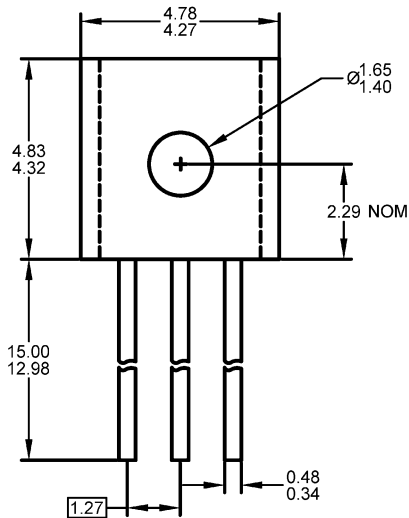
### Suggested Through-Hole Layout



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.

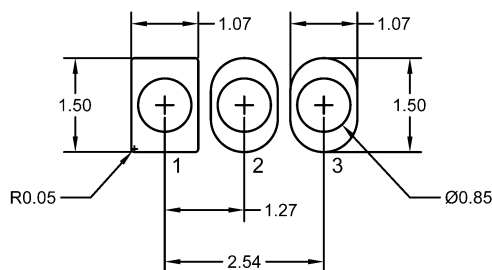
## TO-92 Mechanical and Layout Data

### Package Outline Data



1. All linear dimensions are in millimeters.
2. Package weight approximately 0.19 grams
3. Molded plastic case UL 94V-0 rated
4. Bulk product is shipped in standard ESD shipping material
5. 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/](http://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	TBD	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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