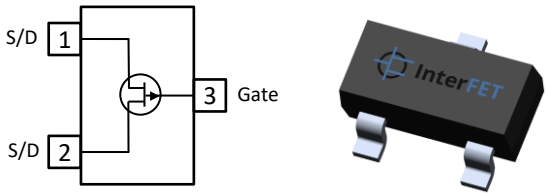
J176, J177 P-Channel JFET

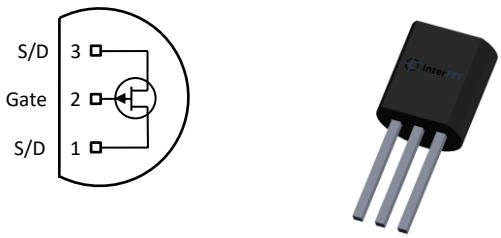
Features

- InterFET P0099F Geometry
- Low noise: 2.0 nV/√Hz typical
- High gain: 10mS typical
- Low gate leakage: 2.5pA typical @10V
- Typical I_{DSS}: 10mA
- Typical BV_{GSS}: 55V
- High radiation tolerance
- RoHS, REACH, CMR compliant
- Custom test and binning options available
- SMT, TH, and bare die package options
- SPICE Edge case modeling: InterFET SPICE

SOT23 Top View



TO-92 Bottom View



NOTE: S/D pins are interchangeable Source Drain connections

Industry Standard Crosses

- SST176, SST177, 2N5116, SST270, SST271

InterFET Similar Parts

- 2N5019, 2N5114, 2N5115, 2N5116
- P1086, P1087, J270, J271, VCR3P
- IFN3993, IFN3994, U304, U305, U306

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 J176 and J177 are very low leakage low noise P-channel JFETs targeted for high gain switching, commutator, and chopper applications. Gate leakages are typically less 3pA at room temperatures. The J177 has a cutoff voltage of less than 2.25V ideal for low-level power supplies. Proprietary InterFET processes yield exceptionally high radiation tolerance.

Ordering Information Custom Part and Binning Options Available

Part Number	Description	Case	Packaging
J176; J177	Through-Hole	TO-92	Bulk
J176TB; J177TB	Ammo Pack	TO-92	Minimum 1200 Typical 2000
SMPJ176:SMPJ177	SOT23	SOT23	Bulk
SMPJ176TR; SMPJ177TR	7" Tape and Reel: Max 3,000 Pieces 13" Tape and Reel: Max 9,000 Pieces	SOT23	Minimum 1,000 Pieces Tape and Reel
J176COT; J177COT	Chip Orientated Tray (COT Waffle Pack)	COT	400/Waffle Pack
J176CFT; J177CFT	Chip Face-up Tray (CFT Waffle Pack)	CFT	400/Waffle Pack

Electrical Characteristics

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

Parameters		SOT-23	TO-92	Unit
V_{RGS}	Reverse Gate Source and Gate Drain Voltage	30	30	V
I_{FG}	Continuous Forward Gate Current	50	50	mA
P_D	Continuous Device Power Dissipation[1]	350	500	mW
P	Power Derating[1]	2.8	4	mW/°C
T_J	Operating Junction Temperature	-55 to 150	-55 to 150	°C
T_{STG}	Storage Temperature	-55 to 150	-55 to 150	°C

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

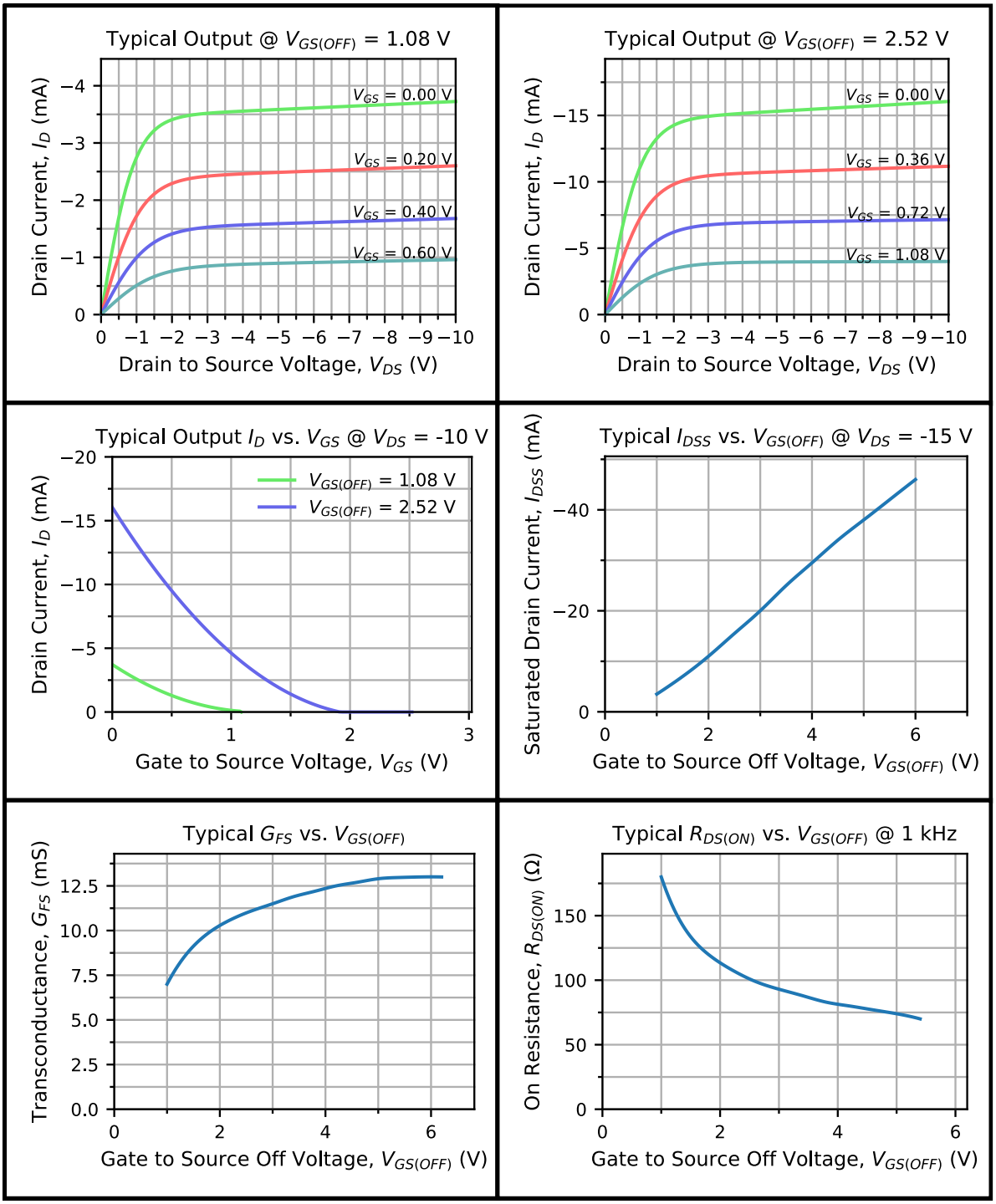
Static Characteristics (@ TA = 25°C, Unless otherwise specified)

	Parameters	Conditions	J176		J177		Unit
			Min	Max	Min	Max	
$V_{(BR)GSS}$	Gate to Source Breakdown Voltage	V_{DS} = 0V, I_G = 1µA	30		30		V
I_{GSS}	Gate to Source Reverse Current	V_{GS} = 20V, V_{DS} = 0V		1		1	nA
$V_{GS(OFF)}$	Gate to Source Cutoff Voltage	V_{DS} = -15V, I_D = -10nA	1	4	0.8	2.25	V
I_{DSS}	Drain to Source Saturation Current	V_{GS} = 0V, V_{DS} = -15V (Pulsed)	-2	-35	-1.5	-20	mA
$I_{D(OFF)}$	Drain Cutoff Current	V_{DS} = -15V, V_{GS} = 10V		-1		-1	nA

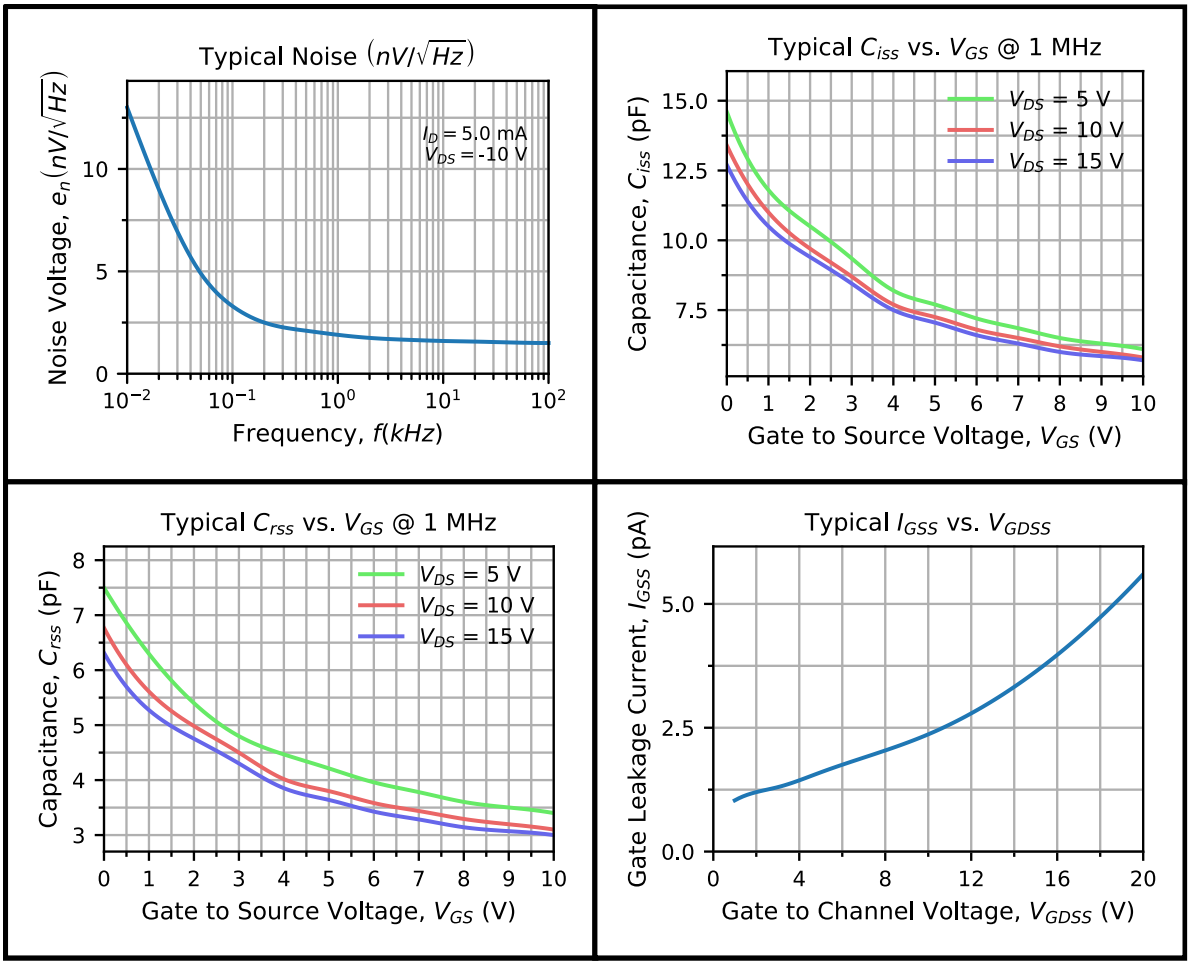
Dynamic Characteristics (@ TA = 25°C, Unless otherwise specified)

	Parameters	Conditions	J176		J177		Unit
			Min	Max	Min	Max	
$R_{DS(ON)}$	Drain to Source ON Resistance	V_{DS} <= 0.1V, V_{GS} = 0V, f = 1kHz		250		300	Ω
C_{gd}	Drain Gate Capacitance	V_{DS} = 0V, V_{GS} = 10V, f = 1MHz	5.5 (typ)		5.5 (typ)		pF
C_{gs}	Input Capacitance	V_{DS} = 0V, V_{GS} = 10V, f = 1MHz	5.5 (typ)		5.5 (typ)		pF
$C_{gd} + C_{gs}$	Drain + Source Gate Capacitance	V_{DS} = V_{GS} = 0V, f = 1MHz	32 (typ)		32 (typ)		pF
$t_{d(ON)}$	Turn ON Delay Time	V_{DD} = -6V J176: $V_{GS(OFF)}$ = 6V, R_L = 5600 Ω J177: $V_{GS(OFF)}$ = 3V, R_L = 10000 Ω	15 (typ)		20 (typ)		ns
t_r	Rise Time		20 (typ)		25 (typ)		ns
$t_{d(OFF)}$	Turn OFF Delay Time		15 (typ)		20 (typ)		ns
t_f	Fall Time		20 (typ)		25 (typ)		ns

Typical J176, J177 Characteristics

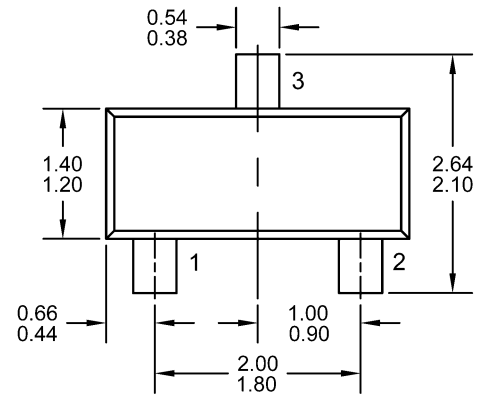


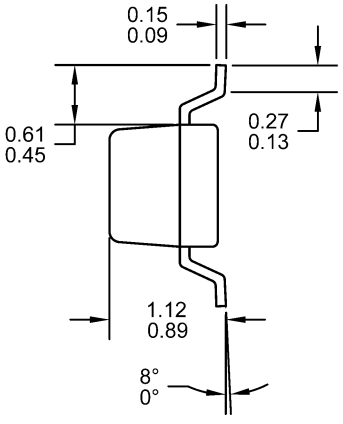
Typical J176, J177 Characteristics (Continued)

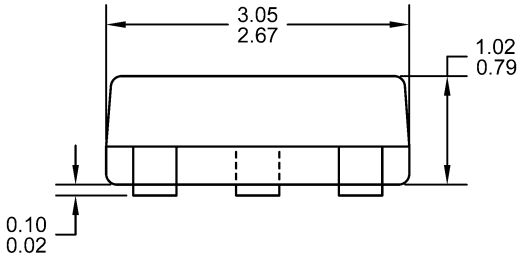


SOT23 (TO-236AB) Mechanical and Layout Data

Package Outline Data

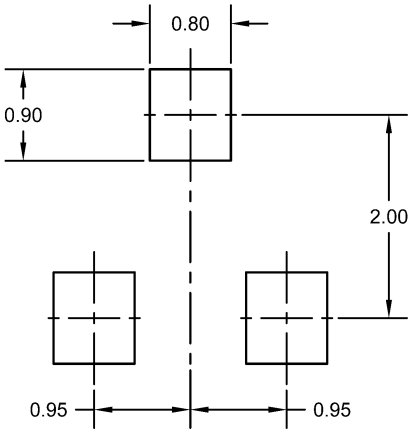






1. All linear dimensions are in millimeters.
2. Package weight approximately 0.12 grams
3. Molded plastic case UL 94V-0 rated
4. For Tape and Reel specifications refer to InterFET CTC-021 Tape and Reel Specification, Document number: IF39002
5. Bulk product is shipped in standard ESD shipping material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

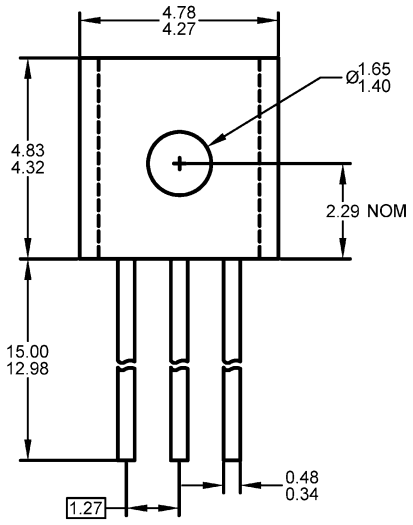
Suggested Pad Layout

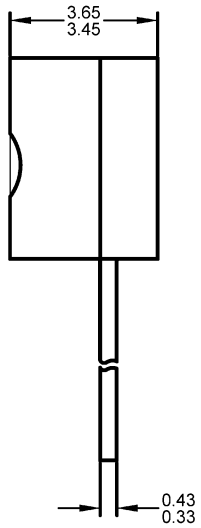


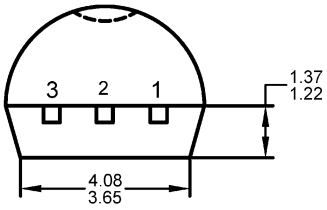
1. All linear dimensions are in millimeters.
2. The suggested land pattern dimensions have been provided for reference only. A more robust pattern may be desired for wave soldering.

TO-92 Mechanical and Layout Data

Package Outline Data

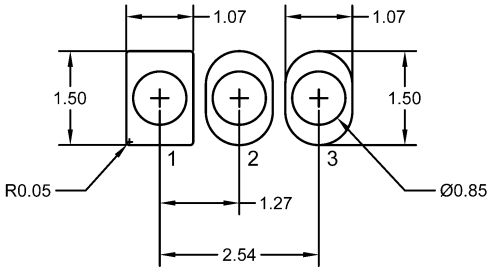






1. All linear dimensions are in millimeters.
2. Package weight approximately 0.19 grams
3. Molded plastic case UL 94V-0 rated
4. Bulk product is shipped in standard ESD shipping material
5. Refer to JEDEC standards for additional information.

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/.

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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