

2N4416, 2N4416A

N-Channel Silicon Junction Field-Effect Transistor

- Mixers
- VHF Amplifiers

Absolute maximum ratings at $T_A = 25^\circ\text{C}$

Reverse Gate Source & Reverse Gate Drain Voltage	2N4416	- 30 V	2N4416A	- 35 V
Gate Current		10 mA		10 mA
Continuous Device Dissipation		300 mW		300 mW
Power Derating		2 mW/°C		2 mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		2N4416		2N4416A		Process NJ26	
		Min	Max	Min	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 30		- 35		V	$I_G = - 1\mu\text{A}, V_{DS} = \emptyset\text{V}$
Gate Reverse Current	I_{GSS}		- 0.1		- 0.1	nA	$V_{GS} = - 20\text{V}, V_{DS} = \emptyset\text{V}$
			- 0.1		- 0.1	μA	$V_{GS} = - 20\text{V}, V_{DS} = \emptyset\text{V}$ $T_A = 150^\circ\text{C}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$		- 6	- 2.5	- 6	V	$V_{DS} = 15\text{V}, I_D = 1\text{nA}$
Drain Saturation Current (Pulsed)	I_{DSS}	5	15	5	15	mA	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	4500	7500	4500	7500	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{ kHz}$
		4000		4000		μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 400\text{ MHz}$
Common Source Output Conductance	g_{os}		50		50	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{ kHz}$
			75		75	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 100\text{ MHz}$
			100		100	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 400\text{ MHz}$
Common Source Input Capacitance	C_{iss}		4		4	pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{ MHz}$
Common Source Output Capacitance	C_{oss}		2		2	pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{ MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		0.8		0.8	pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{ MHz}$
Common Source Input Conductance	g_{is}		100		100	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 100\text{ MHz}$
			1000		1000	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 400\text{ MHz}$
Common Source Input Susceptance	b_{is}		2500		2500	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 100\text{ MHz}$
			10000		10000	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 400\text{ MHz}$
Common Source Output Susceptance	b_{os}		1000		1000	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 100\text{ MHz}$
			4000		4000	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 400\text{ MHz}$
Common Source Power Gain	G_{ps}	18		18		dB	$V_{DS} = 15\text{V}, I_D = 5\text{mA}$	$f = 100\text{ MHz}$
		10		10		dB	$V_{DS} = 15\text{V}, I_D = 5\text{mA}$	$f = 400\text{ MHz}$
Noise Figure	NF		2		2	dB	$V_{DS} = 15\text{V}, I_D = 5\text{mA}$	$f = 100\text{ MHz}$
			4		4	dB	$R_G = 1\text{k}\Omega$	$f = 400\text{ MHz}$

TO-72 Package

See Section G for Outline Dimensions

Surface Mount

SMP4416, SMP4416A

Pin Configuration

1 Source, 2 Drain, 3 Gate, 4 Case

Note: rf parameters guaranteed, but not 100% tested.



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2N5484, 2N5485, 2N5486

N-Channel Silicon Junction Field-Effect Transistor

• VHF/UHF Amplifiers

Absolute maximum ratings at $T_A = 25^\circ\text{C}$

Reverse Gate Source Voltage	- 25 V
Reverse Gate Drain Voltage	- 25 V
Continuous Device Power Dissipation	360 mW
Power Derating	3.27 mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		2N5484		2N5485		2N5486		Process NJ26	
		Min	Max	Min	Max	Min	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 25		- 25		- 25		V	$I_G = 1\ \mu\text{A}, V_{DS} = \emptyset\text{V}$
Gate Reverse Current	I_{GSS}		- 1		- 1		- 1	nA	$V_{GS} = - 20\text{V}, V_{DS} = \emptyset\text{V}$
			- 0.2		- 0.2		- 0.2	μA	$V_{GS} = - 20\text{V}, V_{DS} = \emptyset\text{V}$ $T_A = 100^\circ\text{C}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 0.3	- 3	- 0.5	- 4	- 2	- 6	V	$V_{DS} = 15\text{V}, I_D = 10\ \text{nA}$
Drain Saturation Current (Pulsed)	I_{DSS}	1	5	4	10	8	20	mA	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$

Dynamic Electrical Characteristics

Forward Transconductance	$R_e(Y_{fs})$	2500						μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 100 MHz
				3000		3500			μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$
Common Source Forward Transadmittance	Y_{fs}	3000	6000	3500	7000	4000	8000	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 1 kHz
Input Admittance	$R_e(Y_{is})$		100					μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 100 MHz
					1000		1000		μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$
Output Conductance	$R_e(Y_{os})$		75					μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 100 MHz
					100		100		μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$
Common Source Output Admittance	Y_{os}		50		60		75	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 1 MHz
Common Source Input Capacitance	C_{iss}		5		5		5	pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 1 MHz
Common Source Reverse Transfer Capacitance	C_{rss}		1		1		1	pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 1 MHz
Output Capacitance	C_{oss}		2		2		2	pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 1 MHz

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

Surface Mount

SMP5484, SMP5485, SMP5486



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IFN5911, IFN5912

N-Channel Dual Silicon Junction Field-Effect Transistor

- VHF Amplifiers
- Wideband Differential Amplifiers

Absolute maximum ratings at $T_A = 25^\circ\text{C}$

Continuous Forward Gate Current	50 mA
Continuous Device Power Dissipation	500 mW
Power Derating	4 mW/ $^\circ\text{C}$
Storage Temperature Range	-65 $^\circ\text{C}$ to 200 $^\circ\text{C}$

At 25 $^\circ\text{C}$ free air temperature:

Static Electrical Characteristics

		IFN5911		IFN5912		Process NJ30L or NJ36D	
		Min	Max	Min	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	-25		-25		V	$I_G = -1\ \mu\text{A}$, $V_{DS} = 0\text{V}$
Gate Reverse Current	I_{GSS}		-100		-100	pA	$V_{GS} = -15\text{V}$, $V_{DS} = 0\text{V}$
			-250		-250	nA	$V_{GS} = -15\text{V}$, $V_{DS} = 0\text{V}$, $T_A = 150^\circ\text{C}$
Gate Operating Current	I_G		-100		-100	pA	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$
			-100		-100	nA	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$, $T_A = 125^\circ\text{C}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	-1	-5	-1	-5	V	$V_{DS} = 10\text{V}$, $I_D = 1\ \text{nA}$
Gate Source Voltage	V_{GS}	-0.3	-4	-0.3	-4	V	$V_{DS} = 10\text{V}$, $I_D = 5\ \text{mA}$
Drain Saturation Current (Pulsed)	I_{DSS}	7	40	7	40	mA	$V_{DS} = 10\text{V}$, $V_{GS} = 0\text{V}$

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	3000	10000	3000	10000	μS	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$f = 1\ \text{kHz}$
		3000	10000	3000	10000	μS	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$f = 100\ \text{MHz}$
Common Source Output Conductance	g_{os}		100		100	μS	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$f = 1\ \text{kHz}$
			150		150	μS	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$f = 100\ \text{MHz}$
Common Source Input Capacitance	C_{iss}		5		5	pF	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$f = 1\ \text{MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		1.2		1.2	pF	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$f = 1\ \text{MHz}$
Equivalent Short Circuit Input Noise Voltage	\bar{e}_N		20		20	nV/ $\sqrt{\text{Hz}}$	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$f = 10\ \text{kHz}$
Noise Figure	NF		1		1	dB	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$ $R_G = 100\ \text{K}\Omega$	$f = 10\ \text{Hz}$
Differential Gate Current	$ I_{G1} - I_{G2} $		20		20	nA	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$T_A = 125^\circ\text{C}$
Saturation Drain Current Ratio	I_{DSS1}/I_{DSS2}	0.95	1	0.95	1		$V_{DS} = 10\text{V}$, $V_{GS} = 0\text{V}$	
Differential Gate Source Voltage	$V_{GS1} - V_{GS2}$		10		15	mV	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	
Gate Source Voltage Differential Drift	$\frac{\Delta V_{GS1} - V_{GS2}}{\Delta T}$		20		40	$\mu\text{V}/^\circ\text{C}$	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$T_A = 25^\circ\text{C}$ $T_B = 125^\circ\text{C}$
			20		40	$\mu\text{V}/^\circ\text{C}$	$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$T_A = -55^\circ\text{C}$ $T_B = 25^\circ\text{C}$
Transconductance Ratio	g_{fs1}/g_{fs2}	0.95	1	0.95	1		$V_{DG} = 10\text{V}$, $I_D = 5\ \text{mA}$	$f = 1\ \text{kHz}$

TO-78 Package

See Section G for Outline Dimensions

Pin Configuration

1 Source, 2 Drain, 3 Gate, 4 Case,
5 Source, 6 Drain, 7 Gate, 8 Omitted

J304, J305

N-Channel Silicon Junction Field-Effect Transistor

- Mixers
- Oscillators
- VHF/UHF Amplifiers

Absolute maximum ratings at $T_A = 25^\circ\text{C}$

Reverse Gate Source & Reverse Gate Drain Voltage	- 30 V
Continuous Forward Gate Current	10 mA
Continuous Device Power Dissipation	360 mW
Power Derating	3.27 mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		J304			J305			Process NJ26	
		Min	Typ	Max	Min	Typ	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 30			- 30			V	$I_G = -1\mu\text{A}, V_{DS} = \emptyset\text{V}$
Gate Reverse Current	I_{GSS}			- 100			- 100	pA	$V_{GS} = -20\text{V}, V_{DS} = \emptyset\text{V}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 2		- 6	- 0.5		- 3	V	$V_{DS} = 15\text{V}, I_D = 1\text{nA}$
Drain Saturation Current (Pulsed)	I_{DSS}	5		15	1		8	mA	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	4500		7500	3000			μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{ kHz}$	
						3000			μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 100\text{ MHz}$
		4200							μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 400\text{ MHz}$
Common Source Output Conductance	g_{os}			50			50	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{ kHz}$	
Common Source Input Capacitance	C_{iss}		3			3		pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{ MHz}$	
Common Source Reverse Transfer Capacitance	C_{rss}		0.85			0.85		pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{ MHz}$	
Common Source Output Capacitance	C_{oss}		1			1		pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{ MHz}$	
Common Source Output Conductance	g_{os}		60			60		μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 100\text{ MHz}$	
			80					μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 400\text{ MHz}$	
Common Source Output Susceptance	b_{os}		800			800		μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 100\text{ MHz}$	
			3600					μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 400\text{ MHz}$	
Common Source Input Conductance	g_{is}		80			80		μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 100\text{ MHz}$	
			800					μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 400\text{ MHz}$	
Common Source Input Susceptance	b_{is}		2000			2000		μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 100\text{ MHz}$	
			7500					μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	$f = 400\text{ MHz}$	
Common Source Power Gain	G_{ps}		20					dB	$V_{DS} = 15\text{V}, I_D = 5\text{ mA}$	$f = 100\text{ MHz}$	
			11					dB	$V_{DS} = 15\text{V}, I_D = 5\text{ mA}$	$f = 400\text{ MHz}$	
Noise Figure	NF		1.7					dB	$V_{DS} = 15\text{V}, I_D = 5\text{ mA}$	$f = 100\text{ MHz}$	
			3.8					dB	$R_G = 1\ \Omega$	$f = 400\text{ MHz}$	

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

Surface Mount

SMPJ304, SMPJ305



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J308, J309

N-Channel Silicon Junction Field-Effect Transistor

- Mixers
- Oscillators
- VHF/UHF Amplifiers

Absolute maximum ratings at $T_A = 25^\circ\text{C}$

Reverse Gate Source & Reverse Gate Drain Voltage	- 25 V
Continuous Forward Gate Current	10 mA
Continuous Device Power Dissipation	360 mW
Power Derating	3.27 mW/°C

		J308			J309			Process NJ72		
		Min	Typ	Max	Min	Typ	Max	Unit	Test Conditions	
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 25			- 25			V	$I_G = - 1\mu\text{A}, V_{DS} = \emptyset\text{V}$	
Gate Reverse Current	I_{GSS}			- 1			- 1	nA	$V_{GS} = - 15\text{V}, V_{DS} = \emptyset\text{V}$	
				- 1			- 1	μA	$V_{GS} = - 15\text{V}, V_{DS} = \emptyset\text{V}$ $T_A = +125^\circ\text{C}$	
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 1		- 6.5	- 1		- 4	V	$V_{DS} = 10\text{V}, I_D = 1\text{ nA}$	
Gate Source Forward Voltage	$V_{GS(F)}$			1			1	V	$V_{DS} = \emptyset\text{V}, I_G = 1\text{ mA}$	
Drain Saturation Current (Pulsed)	I_{DSS}	12		60	12		30	mA	$V_{DS} = 10\text{V}, V_{GS} = \emptyset\text{V}$	

Dynamic Electrical Characteristics

		J308		J309							
Common Source Forward Transconductance	g_{fs}	8000	17000		10000	17000		μS	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 1\text{ kHz}$	
Common Source Output Conductance	g_{os}			250			250	μS	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 1\text{ kHz}$	
Common Gate Forward Transconductance	g_{fg}		13000			13000		μS	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 1\text{ kHz}$	
Common Gate Output Transconductance	g_{og}		150			100		μS	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 1\text{ kHz}$	
Gate Drain Capacitance	C_{dg}		1.8	2.5		1.8	2.5	pF	$V_{DS} = \emptyset\text{V}, V_{GS} = - 10\text{V}$	$f = 1\text{ MHz}$	
Gate Source Capacitance	C_{gs}		4	5		4	5	pF	$V_{DS} = \emptyset\text{V}, V_{GS} = - 10\text{V}$	$f = 1\text{ MHz}$	
Equivalent Short Circuit Input Noise Voltage	\bar{e}_N		10			10		nV/√Hz	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 100\text{ kHz}$	
Common Source Forward Transconductance	$Re_{(Yfs)}$		12			12		μS	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 105\text{ MHz}$	
Common Gate Input Conductance	$Re_{(Yig)}$		14			14		μS	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 105\text{ MHz}$	
Common Source Input Conductance	$Re_{(Yis)}$		0.4			0.4		μS	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 105\text{ MHz}$	
Common Source Output Conductance	$Re_{(Gos)}$		0.15			0.15		μS	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 105\text{ MHz}$	
Common Gate Power Gain at Noise Match	G_{pg}		16			16		dB	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 105\text{ MHz}$	
			11			11		dB	$V_{DS} = 10\text{V}, I_D = 10\text{ mA}$	$f = 450\text{ MHz}$	
Noise Figure	NF		1.5			1.5		dB	$V_{DS} = 15\text{V}, I_D = 10\text{ mA}$	$f = 105\text{ MHz}$	
			2.7			2.7		dB	$V_{DS} = 15\text{V}, I_D = 10\text{ mA}$	$f = 450\text{ MHz}$	

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

Surface Mount

SMPJ308, SMPJ309

J310

N-Channel Silicon Junction Field-Effect Transistor

- Mixer
- Oscillator
- VHF/UHF Amplifier

Absolute maximum ratings at $T_A = 25^\circ\text{C}$

Reverse Gate Source Voltage	- 25 V
Reverse Gate Drain Voltage	- 25 V
Continuous Forward Gate Current	10 mA
Continuous Device Power Dissipation	360 mW

At 25°C free air temperature:

Static Electrical Characteristics

		J310			Process NJ72		
		Min	Typ	Max	Unit	Test Conditions	
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 25			V	$I_G = -1 \mu\text{A}, V_{DS} = 0\text{V}$	
Gate Reverse Current	I_{GSS}			- 1	nA	$V_{GS} = -15\text{V}, V_{DS} = 0\text{V}$	
				- 1	μA	$V_{GS} = -15\text{V}, V_{DS} = 0\text{V}$	
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 2		- 6.5	V	$V_{DS} = 10\text{V}, I_D = 1 \text{ nA}$	
Gate Source Forward Voltage	$V_{GS(F)}$			1	V	$V_{DS} = 0\text{V}, I_G = 1 \text{ mA}$	
Drain Saturation Current (Pulsed)	I_{DSS}	24		60	mA	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	8000	17000		μS	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 1 \text{ kHz}$
Common Source Output Conductance	g_{os}			250	μS	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 1 \text{ kHz}$
Common Gate Forward Transconductance	g_{fg}		1200		μS	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 1 \text{ kHz}$
Common Gate Output Transconductance	g_{og}		150		μS	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 1 \text{ kHz}$
Gate Drain Capacitance	C_{dg}		1.8	2.5	pF	$V_{DS} = 0\text{V}, V_{GS} = -10\text{V}$	$f = 1 \text{ MHz}$
Gate Source Capacitance	C_{gs}		4	5	pF	$V_{DS} = 0\text{V}, V_{GS} = -10\text{V}$	$f = 1 \text{ MHz}$
Equivalent Short Circuit Input Noise Voltage	\hat{e}_N		10		nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 100 \text{ Hz}$
Common Source Forward Transconductance	$\text{Re}(Y_{fs})$		12		μS	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 105 \text{ MHz}$
Common Gate Input Conductance	$\text{Re}(Y_{ig})$		14		μS	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 105 \text{ MHz}$
Common Source Input Conductance	$\text{Re}(Y_{is})$		0.4		μS	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 105 \text{ MHz}$
Common Source Output Conductance	$\text{Re}(g_{os})$		0.15		μS	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 105 \text{ MHz}$
Common Gate Power Gain at Noise Match	G_{pg}		16		dB	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 105 \text{ MHz}$
			11		dB	$V_{DS} = 10\text{V}, I_D = 10 \text{ mA}$	$f = 450 \text{ MHz}$
Noise Figure	NF		1.5		dB	$V_{DS} = 15\text{V}, I_D = 10 \text{ mA}$	$f = 105 \text{ MHz}$
			2.7		dB	$V_{DS} = 15\text{V}, I_D = 10 \text{ mA}$	$f = 450 \text{ MHz}$

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

Surface Mount

SMPJ310



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U430, U431

Dual N-Channel Silicon Junction Field-Effect Transistor

- Balanced Mixers
- Differential Amplifiers

Absolute maximum ratings at $T_A = 25^\circ\text{C}$.

Total Device Dissipation (Derate 4 mW/°C to 150°C)	500 mW
Storage Temperature Range	- 65°C to +150°C
Lead Temperature	300°C

At 25°C free air temperature:
Static Electrical Characteristics

		U430			U431			Process NJ72	
		Min	Typ	Max	Min	Typ	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 25			- 25			V	$I_G = - 1\mu\text{A}, V_{DS} = \emptyset\text{V}$
Gate Reverse Current	I_{GSS}			- 150			- 150	pA	$V_{GS} = - 15\text{V}, V_{DS} = \emptyset\text{V}$
				- 150			- 150	nA	$V_{GS} = - 15\text{V}, V_{DS} = \emptyset\text{V}$ $T_A = 150^\circ\text{C}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 1		- 4	- 2		- 6	V	$V_{DS} = 10\text{V}, I_D = 1\text{nA}$
Gate Source Forward Voltage	$V_{GS(F)}$			1			1	V	$V_{DS} = \emptyset\text{V}, I_G = 10\text{mA}$
Drain Saturation Current (Pulsed)	I_{DSS}	12		30	24		60	mA	$V_{DS} = 10\text{V}, V_{GS} = \emptyset\text{V}$

Dynamic Electrical Characteristics

Common Source Forward Transconductance	G_{fs}	10	17		10	17		mS	$V_{DS} = 10\text{V}, I_D = 10\text{mA}$	f = 1 kHz
			12			12		mS	$V_{DS} = 10\text{V}, I_D = 10\text{mA}$	f = 100 MHz
Common Source Output Conductance	G_{os}			250			250	μS	$V_{DS} = 10\text{V}, I_D = 10\text{mA}$	f = 1 kHz
			0.15			0.15		μS	$V_{DS} = 10\text{V}, I_D = 10\text{mA}$	f = 100 MHz
Drain Gate Capacitance	C_{dg}			5			5	pF	$V_{DS} = \emptyset\text{V}, V_{GS} = - 10\text{V}$	f = 1 MHz
Source Gate Capacitance	C_{gs}			2.5			2.5	pF	$V_{DS} = \emptyset\text{V}, V_{GS} = - 10\text{V}$	f = 1 MHz
Equivalent Short Circuit Input Noise Voltage	e_N		10			10		nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 10\text{V}, I_D = 10\text{mA}$	f = 100 kHz
Power Match Source Admittance	g_{ig}		12			12			$V_{DS} = 10\text{V}, I_D = 10\text{mA}$	f = 100 MHz
Conversion Gain	G_c		3			3		dB	$V_{DS} = 20\text{V}, R_L = 2\text{k}\Omega$ $V_{GS} = 1/2 V_{GS(OFF)}$	f = 100 MHz
Saturation Drain Current Ratio	I_{DSS1}/I_{DSS2}	0.9		1	0.9		1		$V_{DS} = 10\text{V}, V_G = \emptyset\text{V}$	
Gate Source Cutoff Voltage Ratio	$\frac{V_{GS(OFF)1}}{V_{GS(OFF)2}}$	0.9		1	0.9		1		$V_{DS} = 10\text{V}, I_D = 1\text{nA}$	
Transconductance Ratio	g_{fs1}/g_{fs2}	0.9		1	0.9		1		$V_{DS} = 10\text{V}, I_D = 10\text{mA}$	

TO-78 Package

Dimensions in Inches (mm)

Pin Configuration

1 Source 1, 2 Gate 1, Drain 1,
4 Case, 5 Drain 2, 6 Gate 2,
7 Source 2, 8 Omitted

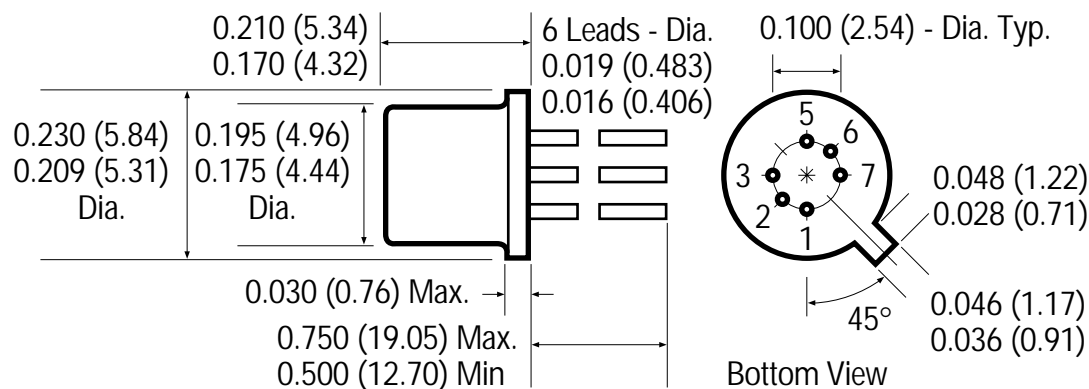


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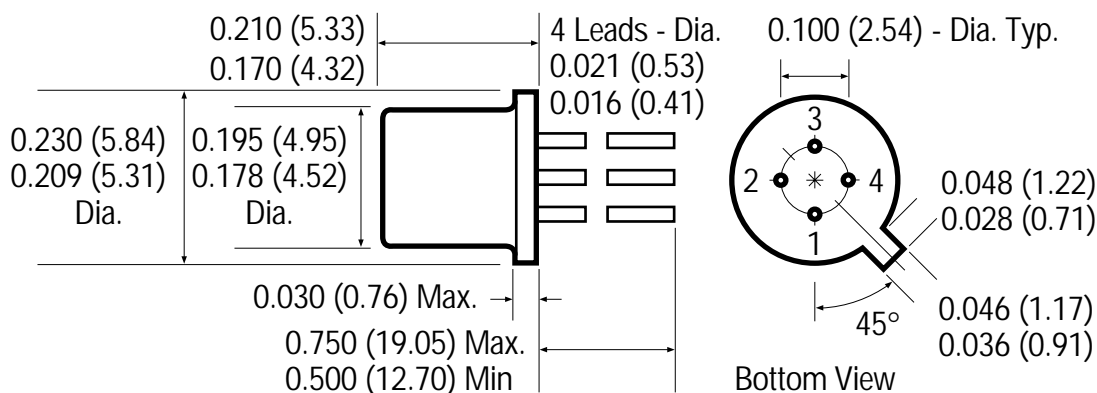
TO-71 Package

Dimensions in Inches (mm)



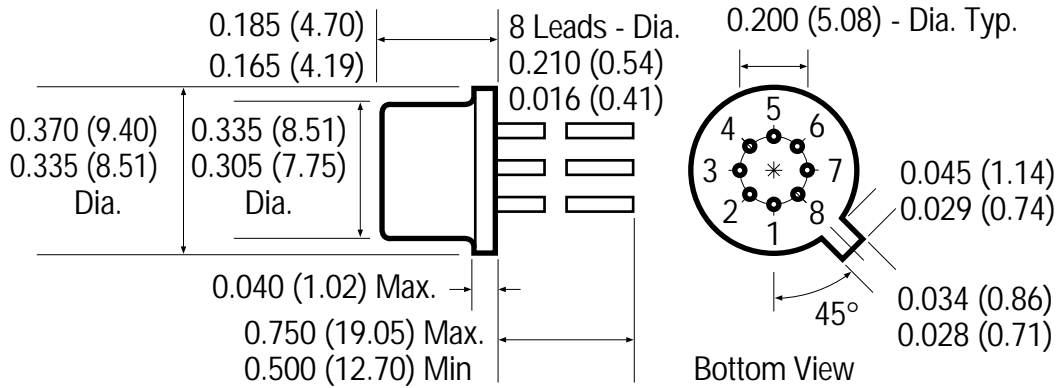
TO-72 Package

Dimensions in Inches (mm)



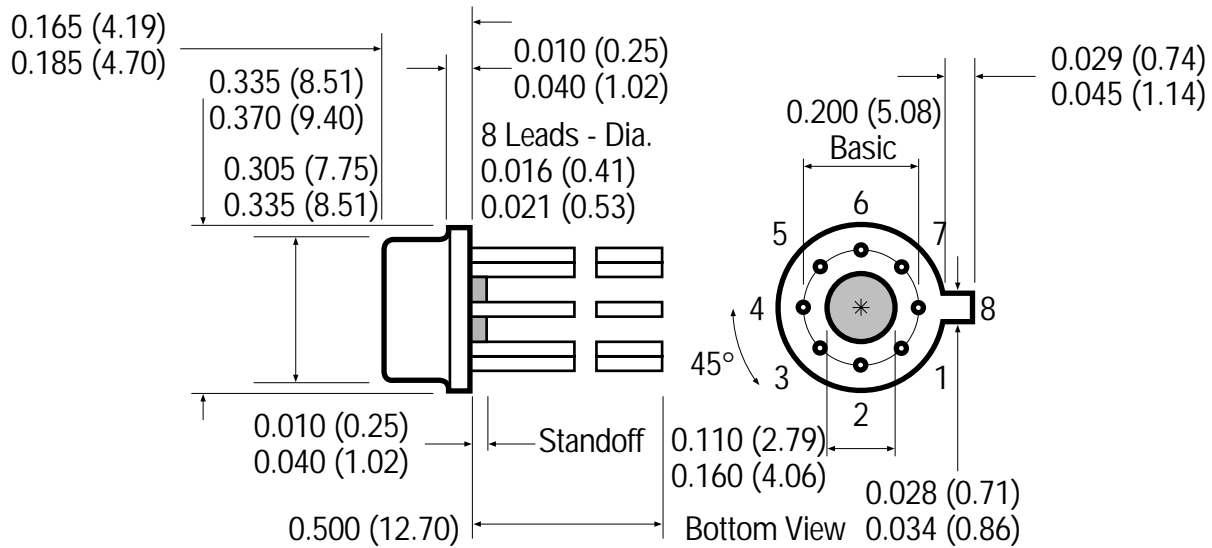
TO-78 Package

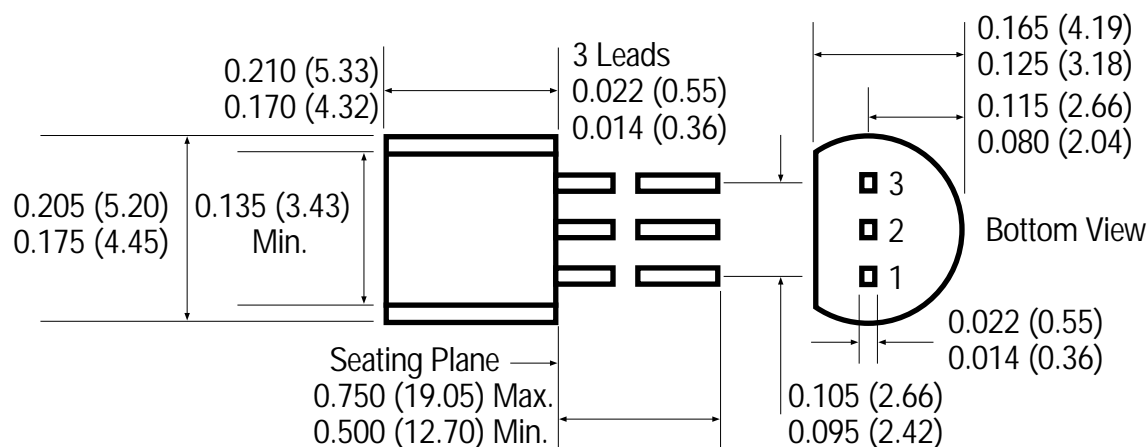
Dimensions in Inches (mm)



TO-99 Package

Dimensions in Inches (mm)



TO-226AA Package (TO-92)**Dimensions in Inches (mm)****TO-226AB Package (TO-92/18)****Dimensions in Inches (mm)**