

2N4117, 2N4117A, 2N4118, 2N4118A, 2N4119, 2N4119A

N-Channel Silicon Junction Field-Effect Transistor

- Audio Amplifiers
- Ultra-High Input Impedance Amplifiers

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

Reverse Gate Source & Reverse Gate Drain Voltage	- 40 V
Continuous Forward Gate Current	50 mA
Continuous Device Power Dissipation	300 mW
Power Derating (to 175°C)	2 mW/°C

At 25°C free air temperature:
Static Electrical Characteristics

		2N4117 2N4117A		2N4118 2N4118A		2N4119 2N4119A		Process NJ01	
		Min	Max	Min	Max	Min	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 40		- 40		- 40		V	$I_G = - 1\mu\text{A}, V_{DS} = \emptyset\text{V}$
Gate Reverse Current 2N4117, 2N4118, 2N4119 2N4117A, 2N4118A, 2N4119A	I_{GSS}		- 10		- 10		- 10	pA	$V_{GS} = - 20\text{V}, V_{DS} = \emptyset\text{V}$
			- 1		- 1		- 1	pA	$V_{GS} = - 20\text{V}, V_{DS} = \emptyset\text{V}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 0.6	- 1.8	- 1	- 3	- 2	- 6	V	$V_{DS} = 10\text{V}, I_D = 1\text{nA}$
Drain Saturation Current (Pulsed) 2N4117, 2N4118, 2N4119 2N4117A, 2N4118A, 2N4119A	I_{GSS}	0.03	0.09	0.08	0.24	0.2	0.6	mA	$V_{DS} = 10\text{V}, V_{GS} = \emptyset\text{V}$
		0.015	0.09	0.08	0.24	0.2	0.6	mA	$V_{DS} = 10\text{V}, V_{GS} = \emptyset\text{V}$

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	70	210	80	250	100	330	μS	$V_{DS} = 10\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{kHz}$
Common Source Output Conductance	g_{os}		3		5		10	μS	$V_{DS} = 10\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{kHz}$
Common Source Input Capacitance	C_{iss}		3		3		3	pF	$V_{DS} = 10\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		1.5		1.5		1.5	pF	$V_{DS} = 10\text{V}, V_{GS} = \emptyset\text{V}$	$f = 1\text{MHz}$

TO-72 Package

Dimensions in Inches (mm)

Pin Configuration

1 Source, 2 Drain, 3 Gate, 4 Case



2N4338, 2N4339

N-Channel Silicon Junction Field-Effect Transistor

- Audio Amplifiers
- Small Signal Amplifiers
- Voltage-Controlled Resistors
- Current Limiters & Regulators

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

Reverse Gate Source & Reverse Gate Drain Voltage	- 50 V
Continuous Forward Gate Current	50 mA
Continuous Device Power Dissipation	300 mW
Power Derating (to 175°C)	2mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		2N4338		2N4339		Process NJ16	
		Min	Max	Min	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 50		- 50		V	$I_G = - 1 \mu\text{A}$, $V_{DS} = 0\text{V}$
Gate Reverse Current	I_{GSS}		- 100		- 100	pA	$V_{GS} = - 30\text{V}$, $V_{DS} = 0\text{V}$
			- 100		- 100	nA	$V_{GS} = - 30\text{V}$, $V_{DS} = 0\text{V}$ $T_A = 150^\circ\text{C}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 0.3	- 1	- 0.6	- 1.8	V	$V_{DS} = 15\text{V}$, $I_D = 0.1 \mu\text{A}$
Drain Saturation Current (Pulsed)	I_{DSS}	0.2	0.6	0.5	1.5	mA	$V_{DS} = 15\text{V}$, $V_{GS} = 0\text{V}$
Drain Cutoff Current	$I_{D(OFF)}$		0.05 (- 5)		0.05 (- 5)	nA V	$V_{DS} = 15\text{V}$, $V_{GS} = ()$

Dynamic Electrical Characteristics

Drain Source ON Resistance	$r_{ds(on)}$		2500		1700	Ω	$V_{GS} = 0\text{V}$, $I_D = 0\text{A}$	$f = 1 \text{ kHz}$
Common Source Forward Transconductance	g_{fs}	600	1800	800	2400	μS	$V_{DS} = 15\text{V}$, $V_{GS} = 0\text{V}$	$f = 1 \text{ kHz}$
Common Source Output Conductance	g_{os}		5		15	μS	$V_{DS} = 15\text{V}$, $V_{GS} = 0\text{V}$	$f = 1 \text{ kHz}$
Common Source Input Capacitance	C_{iss}		7		7	pF	$V_{DS} = 15\text{V}$, $V_{GS} = 0\text{V}$	$f = 1 \text{ MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		3		3	pF	$V_{DS} = 15\text{V}$, $V_{GS} = 0\text{V}$	$f = 1 \text{ MHz}$
Noise Figure	NF		1		1	dB	$V_{DS} = 15\text{V}$, $V_{GS} = 0\text{V}$ $R_G = 1 \text{ M}\Omega$, $\text{BW} = 200 \text{ Hz}$	$f = 1 \text{ kHz}$

TO-18 Package

Dimensions in Inches (mm)

Pin Configuration

1 Source, 2 Drain, 3 Gate & Case

2N4340, 2N4341

N-Channel Silicon Junction Field-Effect Transistor

- Small Signal Amplifiers
- Current Regulators
- Voltage-Controlled Resistors

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

Reverse Gate Source & Reverse Gate Drain Voltage	- 50 V
Continuous Forward Gate Current	50 mA
Continuous Device Power Dissipation	300 mW
Power Derating (to 175°C)	2mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		2N4340		2N4341		Process NJ16	
		Min	Max	Min	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 50		- 50		V	$I_G = - 1 \mu\text{A}, V_{DS} = \emptyset\text{V}$
Gate Reverse Current	I_{GSS}		- 100		- 100	pA	$V_{GS} = - 30\text{V}, V_{DS} = \emptyset\text{V}$
			- 100		- 100	nA	$V_{GS} = - 30\text{V}, V_{DS} = \emptyset\text{V}$ $T_A = 150^\circ\text{C}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 1	- 3	- 2	- 6	V	$V_{DS} = 15\text{V}, I_D = 0.1 \mu\text{A}$
Drain Saturation Current (Pulsed)	I_{DSS}	1.2	3.6	3	9	mA	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$
Drain Cutoff Current	$I_{D(OFF)}$		0.05 (- 5)		0.07 (- 10)	nA V	$V_{DS} = 15\text{V}, V_{GS} = ()$

Dynamic Electrical Characteristics

Drain Source ON Resistance	$r_{ds(on)}$		1500		800	Ω	$V_{GS} = \emptyset\text{V}, I_D = \emptyset\text{A}$	f = 1 kHz
Common Source Forward Transconductance	g_{fs}	1300	3000	2000	4000	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 1 kHz
Common Source Output Conductance	g_{os}		30		60	μS	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 1 kHz
Common Source Input Capacitance	C_{iss}		7		7	pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 1 MHz
Common Source Reverse Transfer Capacitance	C_{rss}		3		3	pF	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$	f = 1 MHz
Noise Figure	NF		1		1	dB	$V_{DS} = 15\text{V}, V_{GS} = \emptyset\text{V}$ $R_G = 1\text{M}\Omega, \text{BW} = 200\text{Hz}$	f = 1 kHz

TO-18 Package

Dimensions in Inches (mm)

Pin Configuration

1 Source, 2 Drain, 3 Gate & Case

Surface Mount

SMP4340, SMP4341



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2N4867, 2N4867A, 2N4868, 2N4868A, 2N4869, 2N4869A

N-Channel Silicon Junction Field-Effect Transistor

• Audio Amplifiers

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

Reverse Gate Source & Reverse Gate Drain Voltage	- 40 V
Gate Current	50 mA
Continuous Device Power Dissipation	300mW
Power Derating	1.7 mW/°C
Storage Temperature Range	- 65°C to + 200°C

At 25°C free air temperature:

Static Electrical Characteristics

		2N4867 2N4867A		2N4868 2N4868A		2N4869 2N4869A		Process NJ16	
		Min	Max	Min	Max	Min	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 40		- 40		- 40		V	$I_G = - 1\mu\text{A}, V_{DS} = 0\text{V}$
Gate Reverse Current	I_{GSS}		- 0.25		- 0.25		- 0.25	nA	$V_{GS} = - 30\text{V}, V_{DS} = 0\text{V}$
			- 0.25		- 0.25		- 0.25	μA	$V_{GS} = - 30\text{V}, V_{DS} = 0\text{V}$ $T_A = 150^\circ\text{C}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 0.7	- 2	- 1	- 3	- 1.8	- 5	V	$V_{DS} = 20\text{V}, I_D = 1\mu\text{A}$
Drain Saturation Current (Pulsed)	I_{DSS}	0.4	1.2	1	3	2.5	7.5	mA	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	700	2000	1000	3000	1300	4000	μS	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ kHz}$
Common Source Output Conductance	g_{os}		1.5		4		10	μS	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ kHz}$
Common Source Input Capacitance	C_{iss}		25		25		25	pF	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		5		5		5	pF	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ MHz}$
Equivalent Short Circuit Input Noise Voltage	e_N		20		20		20	nV/ $\sqrt{\text{HZ}}$	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 10\text{ Hz}$
			10		10		10	nV/ $\sqrt{\text{HZ}}$	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ kHz}$
Noise Figure	NF		1		1		1	dB	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ kHz}$
									(2N4867, 68, 69) $R_G = 20\text{ k}\Omega$ (2N4867A, 68A, 69A) $R_G = 5\text{ k}\Omega$	

TO-72 Package

Dimensions in Inches (mm)

Pin Configuration

1 Source, 2 Drain, 3 Gate, 4 Case

Surface Mount

SMP4867, SMP4867A, SMP4868,
SMP4868A, SMP4869, SMP4869A



2N6451, 2N6452

N-Channel Silicon Junction Field-Effect Transistor

- Audio Amplifiers
- Low-Noise, High Gain Amplifiers
- Low-Noise Preamplifiers

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

Reverse Gate Source Voltage	2N6451	2N6452
	- 20 V	- 25 V
Reverse Gate Drain Voltage	- 20 V	- 25 V
Continuous Forward Gate Current	10 mA	10 mA
Continuous Device Power Dissipation	360 mW	360 mW
Power Derating	2.88 mW/°C	2.88 mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		2N6451		2N6452		Unit	Process NJ132L	
		Min	Max	Min	Max		Test Conditions	
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 20		- 25		V	$I_G = - 1 \mu\text{A}$, $V_{DS} = \emptyset\text{V}$	
Gate Reverse Current	I_{GSS}		- 0.1			nA	$V_{GS} = - 10\text{V}$, $V_{DS} = \emptyset\text{V}$	
				- 0.5		nA	$V_{GS} = - 15\text{V}$, $V_{DS} = \emptyset\text{V}$	
			- 0.2			μA	$V_{GS} = - 10\text{V}$, $V_{DS} = \emptyset\text{V}$	
				- 1		μA	$V_{GS} = - 15\text{V}$, $V_{DS} = \emptyset\text{V}$	
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 0.5	- 3.5	- 0.5	- 3.5	V	$V_{DS} = 10\text{V}$, $I_D = 0.5 \text{ nA}$	
Drain Saturation Current (Pulsed)	I_{DSS}	5	20	5	20	mA	$V_{DS} = 10\text{V}$, $V_{GS} = \emptyset\text{V}$	

Dynamic Electrical Characteristics

Common Source Forward Transmittance	$ Y_{fs} $	15	30	15	30	mS	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 1 \text{ kHz}$
						mS	$V_{DS} = 10\text{V}$, $I_D = 15 \text{ mA}$	$f = 1 \text{ kHz}$
Common Source Output Conductance	$ Y_{os} $		50		50	μS	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 1 \text{ kHz}$
						μS	$V_{DS} = 10\text{V}$, $I_D = 15 \text{ mA}$	$f = 1 \text{ kHz}$
Common Source Input Capacitance	C_{iss}		25		25	pF	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 1 \text{ kHz}$
						pF	$V_{DS} = 10\text{V}$, $I_D = 15 \text{ mA}$	$f = 1 \text{ kHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		5		5	pF	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 1 \text{ kHz}$
						pF	$V_{DS} = 10\text{V}$, $I_D = 15 \text{ mA}$	$f = 1 \text{ kHz}$
Equivalent Short Circuit Input Noise Voltage	\bar{e}_N		5		10	nV/√Hz	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 10 \text{ kHz}$
			3		8	nV/√Hz	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 1 \text{ kHz}$
Noise Figure	NF		1.5		2.5	dB	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$ $R_G = 10 \text{ k}\Omega$	$f = 10 \text{ Hz}$

TO-72 Package

Dimensions in Inches (mm)

Pin Configuration

1 Source, 2 Drain, 3 Gate, 4 Case



2N6453, 2N6454

N-Channel Silicon Junction Field-Effect Transistor

- Audio Amplifiers
- Low-Noise, High Gain Amplifiers
- Low-Noise Preamplifiers

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

	2N6453	2N6454
Reverse Gate Source Voltage	-20 V	-25 V
Reverse Gate Drain Voltage	-20 V	-25 V
Continuous Forward Gate Current	10 mA	10 mA
Continuous Device Power Dissipation	360 mW	360 mW
Power Derating	2.88 mW/°C	2.88 mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		2N6453		2N6454		Process NJ132L		
		Min	Max	Min	Max	Unit	Test Conditions	
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	-20		-25		V	$I_G = -1 \mu\text{A}$, $V_{DS} = 0\text{V}$	
Gate Reverse Current	I_{GSS}		-0.1			nA	$V_{GS} = -10\text{V}$, $V_{DS} = 0\text{V}$	
					-0.5	nA	$V_{GS} = -15\text{V}$, $V_{DS} = 0\text{V}$	
			-0.2			μA	$V_{GS} = -10\text{V}$, $V_{DS} = 0\text{V}$	$T_A = 125^\circ\text{C}$
					-1	μA	$V_{GS} = -15\text{V}$, $V_{DS} = 0\text{V}$	$T_A = 125^\circ\text{C}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	-0.75	-5	-0.75	-5	V	$V_{DS} = 10\text{V}$, $I_D = 0.5 \text{ nA}$	
Drain Saturation Current (Pulsed)	I_{DSS}	15	50	15	50	mA	$V_{DS} = 10\text{V}$, $V_{GS} = 0\text{V}$	

Dynamic Electrical Characteristics

		2N6453		2N6454		Unit	Test Conditions	
Common Source Forward Transmittance	$ Y_{fs} $					mS	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 1 \text{ kHz}$
		20	40	20	40	mS	$V_{DS} = 10\text{V}$, $I_D = 15 \text{ mA}$	$f = 1 \text{ kHz}$
Common Source Output Conductance	$ Y_{os} $					μS	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 1 \text{ kHz}$
			100		100	μS	$V_{DS} = 10\text{V}$, $I_D = 15 \text{ mA}$	$f = 1 \text{ kHz}$
Common Source Input Capacitance	C_{iss}					pF	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 1 \text{ kHz}$
			25		25	pF	$V_{DS} = 10\text{V}$, $I_D = 15 \text{ mA}$	$f = 1 \text{ kHz}$
Common Source Reverse Transfer Capacitance	C_{rss}					pF	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 1 \text{ kHz}$
			5		5	pF	$V_{DS} = 10\text{V}$, $I_D = 15 \text{ mA}$	$f = 1 \text{ kHz}$
Equivalent Short Circuit Input Noise Voltage	\hat{e}_N		5		10	nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 10 \text{ kHz}$
			3		8	nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$	$f = 1 \text{ kHz}$
Noise Figure	NF		1.5		2.5	dB	$V_{DS} = 10\text{V}$, $I_D = 5 \text{ mA}$ $R_G = 10 \text{ k}\Omega$	$f = 10 \text{ Hz}$

TO-72 Package

Dimensions in Inches (mm)

Pin Configuration

1 Source, 2 Drain, 3 Gate, 4 Case



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J201, J202

N-Channel Silicon Junction Field-Effect Transistor

- Audio Amplifiers
- General Purpose Amplifiers

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

Reverse Gate Source & Reverse Gate Drain Voltage	- 40 V
Continuous Forward Gate Current	50 mA
Continuous Device Power Dissipation	360 mW
Power Derating	3.27 mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		J201			J202			Process NJ16	
		Min	Typ	Max	Min	Typ	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 40			- 40			V	$I_G = -1\mu\text{A}, V_{DS} = 0\text{V}$
Gate Reverse Current	I_{GSS}			- 100			- 100	pA	$V_{GS} = -20\text{V}, V_{DS} = 0\text{V}$
Gate Operating Current	I_G		- 10			- 10		pA	$V_{DG} = 20\text{V}, I_D = I_{DSS(\text{min})}$
Gate Source Cutoff Voltage	$V_{GS(\text{OFF})}$	- 0.3		- 1.5	- 0.8		- 4	V	$V_{DS} = 20\text{V}, I_D = 10\text{ nA}$
Drain Saturation Current (Pulsed)	I_{DSS}	0.2		1	0.9		4.5	mA	$V_{DSS} = 15\text{V}, V_{GS} = 0\text{V}$

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	500			1000			μS	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ kHz}$
Common Source Output Conductance	g_{os}		1			3.5		μS	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ kHz}$
Common Source Input Capacitance	C_{iss}		4			4		pF	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		1			1		pF	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ MHz}$
Equivalent Short Circuit Input Noise Voltage	e_N		5			5		nV/√Hz	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ kHz}$

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

Surface Mount

SMPJ201, SMPJ202



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J203, J204

N-Channel Silicon Junction Field-Effect Transistor

- Audio Amplifiers
- General Purpose Amplifiers

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

Reverse Gate Source & Reverse Gate Drain Voltage	- 40 V
Continuous Forward Gate Current	50 mA
Continuous Device Power Dissipation	360 mW
Power Derating	3.27 mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		J203			J204			Unit	Process NJ16	
		Min	Typ	Max	Min	Typ	Max		Test Conditions	
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 40			- 25			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 Operating Current	I_G		- 10			- 10		pA	$V_{DG} = 20\text{V}$, $I_D = I_{DSS(\text{min})}$	
Gate Source Cutoff Voltage	$V_{GS(\text{OFF})}$	- 2		- 10	- 0.3		- 2	V	$V_{DS} = 20\text{V}$, $I_D = 10\text{ nA}$	
Drain Saturation Current (Pulsed)	I_{DSS}	4		20	0.2	1.2	3	mA	$V_{DS} = 15\text{V}$, $V_{GS} = \emptyset\text{V}$	

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	1500			500	1500		μS	$V_{DS} = 20\text{V}$, $V_{GS} = \emptyset\text{V}$	$f = 1\text{ kHz}$
Common Source Output Conductance	g_{os}		10			2.5		μS	$V_{DS} = 20\text{V}$, $V_{GS} = \emptyset\text{V}$	$f = 1\text{ kHz}$
Common Source Input Capacitance	C_{iss}		4			4		pF	$V_{DS} = 20\text{V}$, $V_{GS} = \emptyset\text{V}$	$f = 1\text{ MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		1			1		pF	$V_{DS} = 20\text{V}$, $V_{GS} = \emptyset\text{V}$	$f = 1\text{ MHz}$
Equivalent Short Circuit Input Noise Voltage	\hat{e}_N		5			10		nV/√Hz	$V_{DS} = 10\text{V}$, $V_{GS} = \emptyset\text{V}$	$f = 1\text{ kHz}$

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

Surface Mount

SMPJ203, SMPJ204



J210, J211

N-Channel Silicon Junction Field-Effect Transistor

- Audio Amplifiers
- General Purpose 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

At 25°C free air temperature:

Static Electrical Characteristics

		J210			J211			Process NJ26L	
		Min	Typ	Max	Min	Typ	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 25			- 25			V	$I_G = -1\mu\text{A}, V_{DS} = 0\text{V}$
Gate Reverse Current	I_{GSS}			- 100			- 100	pA	$V_{GS} = -15\text{V}, V_{DS} = 0\text{V}$
Gate Operating Current	I_G		- 10			- 10		pA	$V_{DS} = 20\text{V}, I_D = 1\text{mA}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 1		- 3	- 2.5		- 4.5	V	$V_{DS} = 15\text{V}, I_D = 1\text{nA}$
Drain Saturation Current (Pulsed)	I_{DSS}	2		15	7		20	mA	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	4000		12000	6000		12000	μS	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{kHz}$
Common Source Output Conductance	g_{os}			150			200	μS	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{kHz}$
Common Source Input Capacitance	C_{iss}		4			4		pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		1			1		pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{MHz}$
Equivalent Short Circuit Input Noise Voltage	e_N		10			10		nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{kHz}$

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

Surface Mount

SMPJ210, SMPJ211



1000 N. Shiloh Road, Garland, TX 75042
(972) 487-1287 FAX (972) 276-3375

www.interfet.com

N-Channel Silicon Junction Field-Effect Transistor

- Audio Amplifier
- General Purpose Amplifier

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

At 25°C free air temperature:

Static Electrical Characteristics

		J212			Unit	Process NJ26L	
		Min	Typ	Max		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}			- 100	pA	$V_{GS} = -15\text{V}, V_{DS} = 0\text{V}$	
Gate Operating Current	I_G		- 10		pA	$V_{DS} = 20\text{V}, I_D = 1\text{mA}$	
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 4		- 6	V	$V_{DS} = 15\text{V}, I_D = 1\text{nA}$	
Drain Saturation Current (Pulsed)	I_{DSS}	15		40	mA	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	7000		12000	μS	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{kHz}$
Common Source Output Conductance	g_{os}			200	μS	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{kHz}$
Common Source Input Capacitance	C_{iss}		4		pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		1		pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{MHz}$
Equivalent Short Circuit Input Noise Voltage	\bar{e}_N		10		nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{kHz}$

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

Surface Mount

SMPJ212



J230, J231

N-Channel Silicon Junction Field-Effect Transistor

• Audio Amplifiers

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

Reverse Gate Source & Reverse Gate Drain Voltage	- 40 V
Continuous Forward Gate Current	50 mA
Continuous Device Power Dissipation	360 mW
Power Derating	3.27 mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		J230			J231			Process NJ16	
		Min	Typ	Max	Min	Typ	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 40			- 40			V	$I_G = -1\mu\text{A}, V_{DS} = 0\text{V}$
Gate Reverse Current	I_{GSS}			- 250			- 250	pA	$V_{GS} = -30\text{V}, V_{DS} = 0\text{V}$
Gate Operating Current	I_G		- 2			- 2		pA	$V_{DS} = 20\text{V}, I_D = 0\text{V}$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 0.5		- 3	- 1.5		- 5	V	$V_{DS} = 20\text{V}, I_D = 1\mu\text{A}$
Drain Saturation Current (Pulsed)	I_{DSS}	0.7		3	2		6	mA	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	1000		3500	1500		4000	μS	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ kHz}$
Common Source Output Conductance	g_{os}		1.5			3		μS	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ kHz}$
Common Source Input Capacitance	C_{iss}		4			4		pF	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		1			1		pF	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ MHz}$
Equivalent Short Circuit Input Noise Voltage	\hat{e}_N		8	30		8	30	nV/√Hz	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 10\text{ Hz}$
			2			2		nV/√Hz	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 1\text{ kHz}$

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

Surface Mount

SMPJ230, SMPJ231



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www.interfet.com

N-Channel Silicon Junction Field-Effect Transistor

• Audio Amplifier

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

Reverse Gate Source & Reverse Gate Drain Voltage	- 40 V
Continuous Forward Gate Current	50 mA
Continuous Device Power Dissipation	360 mW
Power Derating	3.27 mW/°C

At 25°C free air temperature:

Static Electrical Characteristics

		J232			Unit	Process NJ16	
		Min	Typ	Max		Test Conditions	
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	- 40			V	$I_G = -1\ \mu\text{A}, V_{DS} = 0\text{V}$	
Gate Reverse Current	I_{GSS}			- 250	pA	$V_{GS} = -30\text{V}, V_{DS} = 0\text{V}$	
Gate Operating Current	I_G		- 2		pA	$V_{DS} = 20\text{V}, I_D = 0\text{V}$	
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	- 3		- 6	V	$V_{DS} = 20\text{V}, I_D = 1\ \mu\text{A}$	
Drain Saturation Current (Pulsed)	I_{DSS}	5		10	mA	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	2500		5000	μS	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\ \text{kHz}$
Common Source Output Conductance	g_{os}		5		μS	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\ \text{kHz}$
Common Source Input Capacitance	C_{iss}		4		pF	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\ \text{MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}		1		pF	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$	$f = 1\ \text{MHz}$
Equivalent Short Circuit Input Noise Voltage	\bar{e}_N		20	30	nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 10\ \text{Hz}$
			6		nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 1\ \text{kHz}$

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

Surface Mount

SMPJ232



2N5460, 2N5461, 2N5462

P-Channel Silicon Junction Field-Effect Transistor

- Audio Amplifiers
- General Purpose Amplifiers

Absolute maximum ratings at 25 °C

Reverse Gate Source & Reverse Gate Drain Voltage	40 V
Continuous Forward Gate Current	- 10 mA
Continuous Device Power Dissipation	310 mW
Power Derating	2.8 mW/°C

At 25°C free air temperature:
Static Electrical Characteristics

		2N5460		2N5461		2N5462		Process PJ32	
		Min	Max	Min	Max	Min	Max	Unit	Test Conditions
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	40		40		40		V	$I_G = 10\mu A, V_{DS} = 0V$
Gate Reverse Current	I_{GSS}		5		5		5	nA	$V_{GS} = 20V, V_{DS} = 0V$
			1		1		1	μA	$V_{GS} = 20V, V_{DS} = 0V$
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	0.75	6	1	7.5	1.8	9	V	$V_{DS} = -15V, I_D = -1\mu A$
Gate Source Voltage	V_{GS}	0.8	4.5					V	$V_{DS} = -15V, I_D = -100\mu A$
				0.8	4.5			V	$V_{DS} = -15V, I_D = -200\mu A$
						1.5	6	V	$V_{DS} = -15V, I_D = -400\mu A$
Drain Saturation Current (Pulsed)	I_{DSS}	- 1	- 5	- 2	- 9	- 4	- 16	mA	$V_{DS} = -15V, V_{GS} = 0V$

Dynamic Electrical Characteristics

Drain Source ON Resistance	$r_{ds(on)}$		2		0.8		0.4	k Ω	$V_{GS} = 0V, I_D = 0A$	f = 1 kHz
Common Source Forward Transadmittance	$ Y_{fs} $	1	4	1.5	5	2	6	mS	$V_{DS} = -15V, V_{GS} = 0V$	f = 1 kHz
Common Source Output Admittance	$ Y_{os} $		75		75		75	μS	$V_{DS} = -15V, V_{GS} = 0V$	f = 1 kHz
Common Source Input Capacitance	C_{iss}		7		7		7	pF	$V_{DS} = -15V, V_{GS} = 0V$	f = 1 MHz
Common Source Reverse Transfer Capacitance	C_{rss}		2		2		2	pF	$V_{DS} = -15V, V_{GS} = 0V$	f = 1 MHz
Equivalent Short Circuit Input Noise Voltage	\bar{e}_N		2.5		2.5		2.5	dB	$V_{DS} = -15V, V_{GS} = 0V$	f = 100 Hz, BW = 1 Hz
Noise Figure	NF		115		115		115	nV \sqrt{Hz}	$V_{DS} = -15V, V_{GS} = 0V,$ $R_G = 1M\Omega$	f = 100 Hz

TO-226AA Package

Dimensions in Inches (mm)

Pin Configuration

1 Drain, 2 Source, 3 Gate

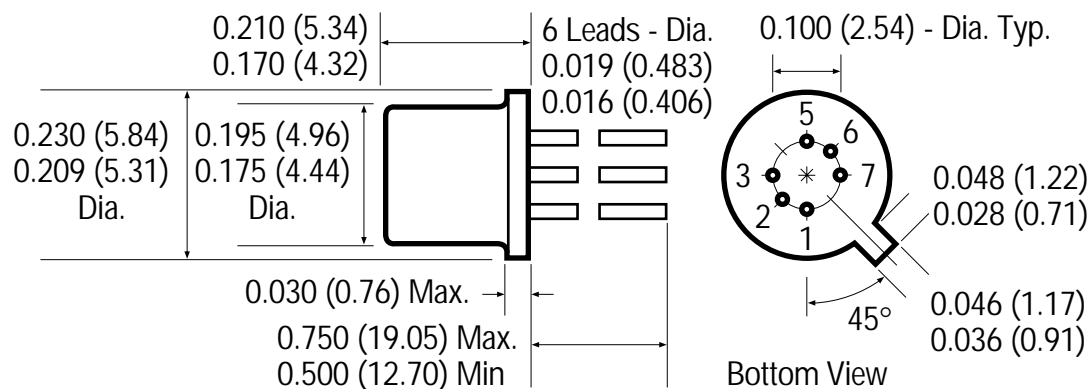
Surface Mount

SMP5460, SMP5461, SMP5462



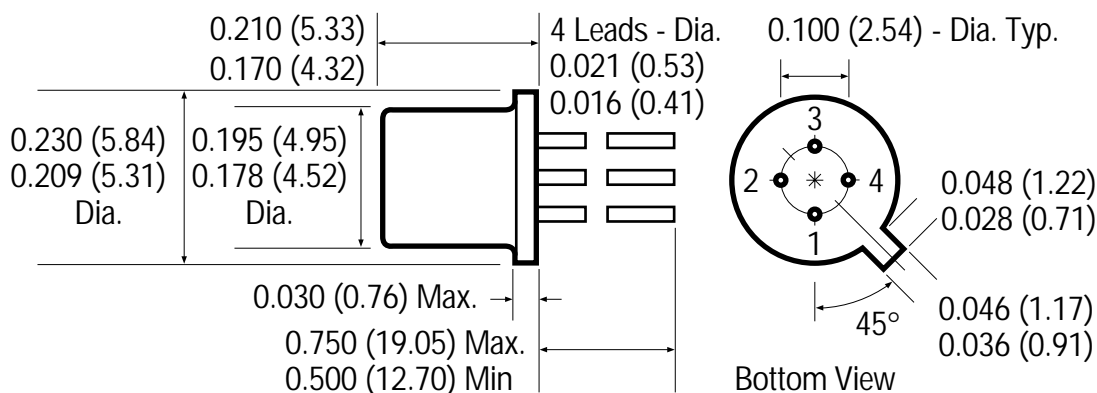
TO-71 Package

Dimensions in Inches (mm)



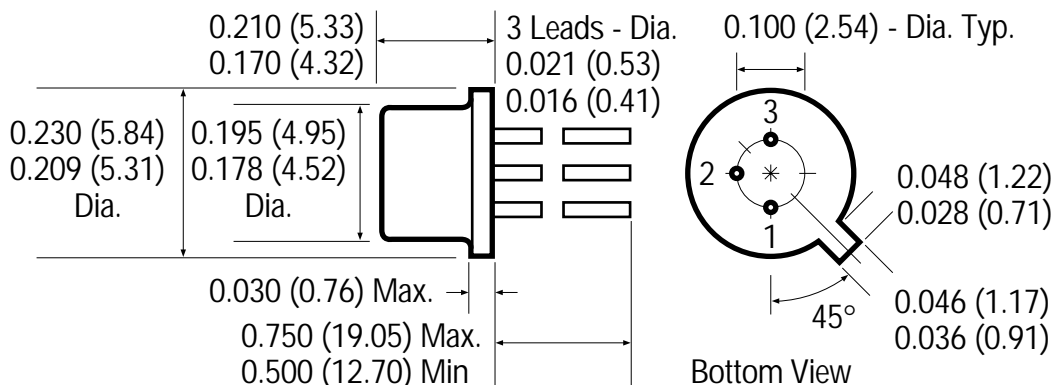
TO-72 Package

Dimensions in Inches (mm)



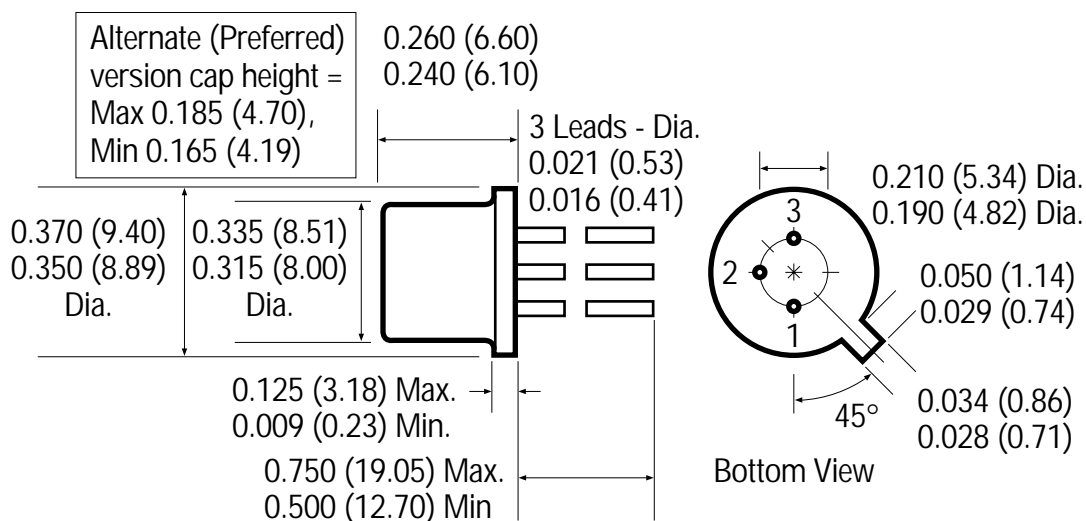
TO-18 Package

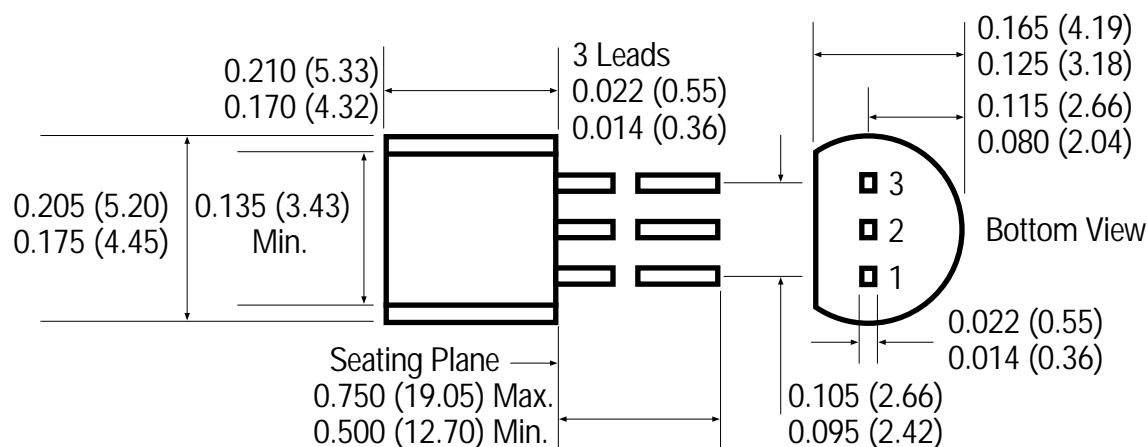
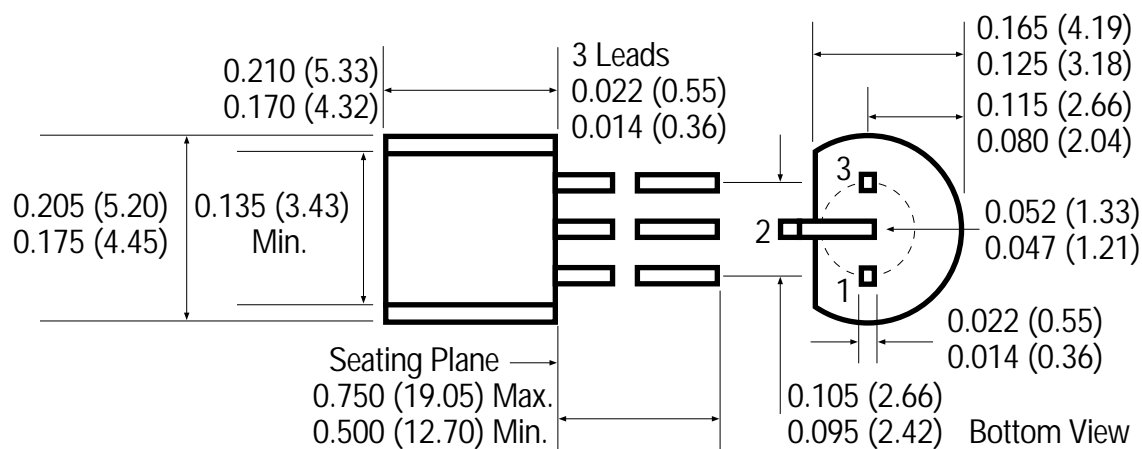
Dimensions in Inches (mm)



TO-39 Package

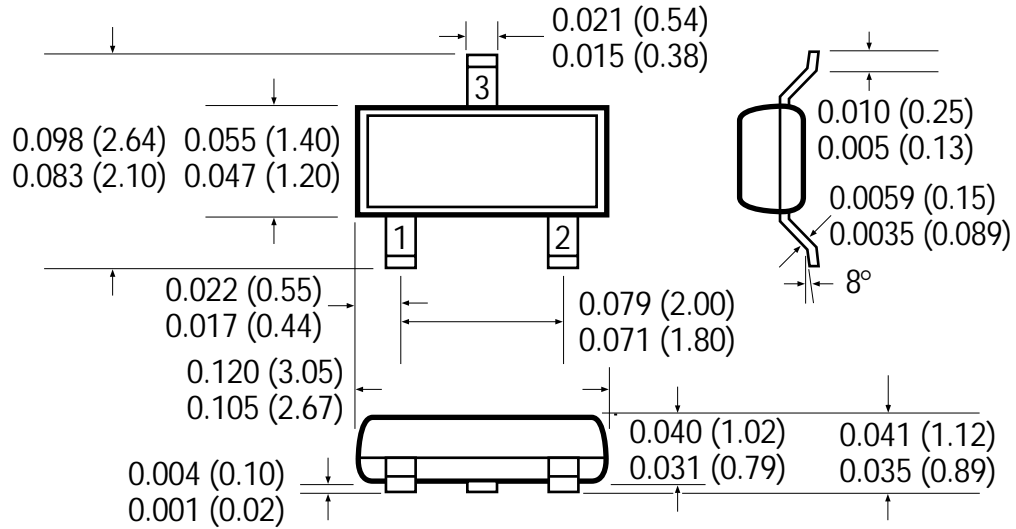
Dimensions in Inches (mm)



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

TO-236AB Package (SOT-23)

Dimensions in Inches (mm)



SOIC-8 Package

Dimensions in Inches (mm)

