

IFN421, IFN422, IFN423

Dual N-Channel Silicon Junction Field-Effect Transistor

- Very High Input Impedance Differential Amplifiers
- Electrometers

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

Device Dissipation (Derate 3.2 mW/°C to 50°C)	400 mW
Total Device Dissipation (Derate 6 mW/°C to 150°C)	750 mW
Storage Temperature Range	-65°C to 200°C

At 25°C free air temperature:

Static Electrical Characteristics

		IFN421, IFN422, IFN423			Process NJ01		
		Min	Typ	Max	Unit	Test Conditions	
Gate Source Breakdown Voltage	$V_{(BR)GSS}$	-40	-60		V	$I_G = -1\ \mu\text{A}, V_{DS} = 0\text{V}$	
Gate to Gate Breakdown Voltage	BV_{G1G2}	±40			V	$I_G = -1\ \mu\text{A}, I_D = 0\text{A}, I_S = 0\text{A}$	
Gate Reverse Current	I_{GSS}			-1	pA	$V_{GS} = -20\text{V}, V_{DS} = 0\text{V}$	
				-1	nA	$V_{GS} = -20\text{V}, V_{DS} = 0\text{V}$	
Gate Operating Current	I_G			-0.25	pA	$V_{DS} = 10\text{V}, I_D = 30\ \mu\text{A}$	
				-250	pA	$V_{DS} = 10\text{V}, I_D = 30\ \mu\text{A}$	
Gate Source Cutoff Voltage	$V_{GS(OFF)}$	-0.4		-2	V	$V_{DS} = 10\text{V}, I_D = 1\ \text{nA}$	
Gate Source Voltage	V_{GS}			-1.8	V	$V_{DS} = 10\text{V}, I_D = 30\ \mu\text{A}$	
Drain Saturation Current (Pulsed)	I_{DSS}	60		1000	μA	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	

Dynamic Electrical Characteristics

Common Source Forward Transconductance	g_{fs}	100		1500	μS	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 1\ \text{kHz}$
Common Source Output Conductance	g_{os}			3	μS	$V_{DS} = 10\text{V}, I_D = 30\ \mu\text{A}$	$f = 1\ \text{kHz}$
Common Source Input Capacitance	C_{iss}			3	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 1\ \text{MHz}$
Common Source Reverse Transfer Capacitance	C_{rss}			1.5	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$	$f = 1\ \text{MHz}$
Equivalent Circuit Input Noise Voltage	\bar{e}_N		20	70	nV/√Hz	$V_{DS} = 10\text{V}, I_D = 30\ \mu\text{A}$	$f = 10\ \text{Hz}$
Noise Figure	NF			1	dB	$V_{DS} = 10\text{V}, I_D = 30\ \mu\text{A}$ $R_G = 10\ \text{M}\Omega$	$f = 10\ \text{Hz}$

Max - IFN421 IFN422 IFN423

Differential Gate Source Voltage	$ V_{GS1} - V_{GS2} $	10	15	25	mV	$V_{DG} = 10\text{V}, I_D = 30\ \mu\text{A}$	
Differential Gate Source Voltage With Temperature	$\frac{ V_{GS1} - V_{GS2} }{\Delta T}$	10	25	40	$\mu\text{V}/^\circ\text{C}$	$V_{DG} = 10\text{V}, I_D = 30\ \mu\text{A}$	$T_A = -55^\circ\text{C}$ $T_B = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$

Min - IFN421 IFN422 IFN423

Common Mode Rejection Ratio	CMRR	90	80	80	dB	$V_{DG} = 10\text{V to } 20\text{V}, I_D = 30\ \mu\text{A}$	
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TO-78 Package

See Section G for Outline Dimensions

Pin Configuration

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

