



2N4220 SERIES

N-Channel JFETs

T-27-25

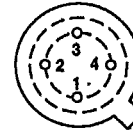
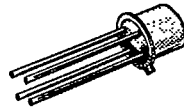
The 2N4220 Series of multi-purpose JFETs is designed for a wide range of applications. It features extremely low gate leakage and capacitance, and when coupled with its high gain, the 2N4220 Series will make a perfect broad band amplifier. The 2N4220A Series features a guaranteed noise figure of 2.5 dB. For military designs, this series is available with full high-rel processing. (See Section 1.)

For further design information please consult the typical performance curves NRL which are located in Section 7.

PART NUMBER	V _{GS(OFF)} MAX (V)	V _{(BR)GSS} MIN (V)	g _{fs} MIN (mS)	I _{DSS} MAX (mA)
2N4220	-4	-30	1	3
2N4221	-6	-30	2	6
2N4222	-8	-30	2.5	15
2N4220A	-4	-30	1	3
2N4221A	-6	-30	2	6
2N4222A	-8	-30	2.5	15

TO-72

BOTTOM VIEW



1 DRAIN
2 SOURCE
3 GATE
4 CASE

SIMILAR PRODUCTS

- TO-92, See J201 Series
- SOT-23, See SST201 Series
- Chips, Order 2N422XCHP

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	SYMBOL	LIMIT	UNITS
Gate-Drain Voltage	V _{GD}	-30	V
Gate-Source Voltage	V _{GS}	-30	
Gate Current	I _G	10	mA
Drain Current	I _D	15	
Power Dissipation	P _D	300	mW
Power Derating		2	mW/°C
Operating Junction Temperature	T _J	-55 to 175	°C
Storage Temperature	T _{stg}	-65 to 200	
Lead Temperature (1/16" from case for 10 seconds)	T _L	300	

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ELECTRICAL CHARACTERISTICS ¹				LIMITS						
PARAMETER	SYMBOL	TEST CONDITIONS	TYP ²	2N4220		2N4221		2N4222		UNIT
				MIN	MAX	MIN	MAX	MIN	MAX	
STATIC										
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G = -10 \mu A, V_{DS} = 0 V$	-57	-30		-30		-30		V
Gate-Source Cutoff Voltage	$V_{GS(OFF)}$	$V_{DS} = 15 V, I_D = 0.1 nA$			-4		-6		-8	V
Saturation Drain Current ³	I_{DSS}	$V_{DS} = 15 V, V_{GS} = 0 V$		0.5	3	2	6	5	15	mA
Gate Reverse Current	I_{GSS}	$V_{GS} = -15 V, V_{DS} = 0 V, T_A = 150^\circ C$	-2		-100		-100		-100	pA
			-4		-100		-100		-100	nA
Gate Operating Current ⁴	I_G	$V_{DG} = 15 V, I_D = 0.1 mA$	-2							pA
Drain Cutoff Current ⁴	$I_{D(OFF)}$	$V_{DS} = 10 V, V_{GS} = -10 V$	2							pA
Gate-Source Voltage	V_{GS}	$V_{DS} = 15 V$	$I_D = 50 \mu A$	-0.8	-0.5	-2.5				V
			$I_D = 200 \mu A$	-1.5			-1	-5		
			$I_D = 500 \mu A$	-3.5					-2	
Gate-Source Forward Voltage ⁴	$V_{GS(F)}$	$I_G = 1 mA, V_{DS} = 0 V$	0.7							
DYNAMIC										
Common-Source Forward Transconductance	g_{fs}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 kHz$		1	4	2	5	2.5	6	mS
Common-Source Output Conductance	g_{os}				10		20		40	μS
Common-Source Forward Transmittance	g_{fs}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 100 MHz$		750		750		750		μS
Common-Source Input Capacitance	C_{iss}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz$	5		6		6		6	pF
Common-Source Reverse Transfer Capacitance	C_{rss}		1.5		2		2		2	
Equivalent Input Noise Voltage ⁴	\bar{e}_n	$V_{DS} = 10 V, V_{GS} = 0 V, f = 1 kHz$	6							nV/\sqrt{Hz}

- NOTES: 1. $T_A = 25^\circ C$ unless otherwise noted.
 2. For design aid only, not subject to production testing.
 3. Pulse test; $PW = 300 \mu s$, duty cycle $\leq 3\%$.
 4. This parameter not registered with JEDEC.



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ELECTRICAL CHARACTERISTICS ¹			LIMITS							
PARAMETER	SYMBOL	TEST CONDITIONS	TYP ²	2N4220A		2N4221A		2N4222A		UNIT
				MIN	MAX	MIN	MAX	MIN	MAX	
STATIC										
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G = -10 \mu A, V_{DS} = 0 V$	-57	-30		-30		-30		V
Gate-Source Cutoff Voltage	$V_{GS(OFF)}$	$V_{DS} = 15 V, I_D = 0.1 mA$			-4		-6		-8	
Saturation Drain Current ³	I_{DSS}	$V_{DS} = 15 V, V_{GS} = 0 V$		0.5	3	2	6	5	15	mA
Gate Reverse Current	I_{GSS}	$V_{GS} = -15 V, V_{DS} = 0 V$		-2		-100		-100		pA
			$T_A = 150^\circ C$	-4		-100		-100		nA
Gate Operating Current ⁴	I_G	$V_{DG} = 15 V, I_D = 0.1 mA$	-2							pA
Drain Cutoff Current ⁴	$I_{D(OFF)}$	$V_{DS} = 10 V, V_{GS} = -10 V$	2							
Gate-Source Voltage	V_{GS}	$V_{DS} = 15 V$	$I_D = 50 \mu A$	-0.8	-0.5	-2.5				
			$I_D = 200 \mu A$	-1.5			-1	-5		
			$I_D = 500 \mu A$	-3.5					-2	-6
Gate-Source Forward Voltage ⁴	$V_{GS(F)}$	$I_G = 1 mA, V_{DS} = 0 V$	0.7							
DYNAMIC										
Common-Source Forward Transconductance	g_{fs}	$V_{DS} = 15 V, V_{GS} = 0 V$ $f = 1 kHz$		1	4	2	5	2.5	6	mS
Common-Source Output Conductance	g_{os}				10		20		40	μS
Common-Source Forward Transmittance	g_{fs}	$V_{DS} = 15 V, V_{GS} = 0 V$ $f = 100 MHz$		750		750		750		
Common-Source Input Capacitance	C_{iss}	$V_{DS} = 15 V, V_{GS} = 0 V$ $f = 1 MHz$	5		6		6		6	pF
Common-Source Reverse Transfer Capacitance	C_{rss}		1.5		2		2		2	
Equivalent Input Noise Voltage ⁴	\bar{e}_n	$V_{DS} = 10 V, V_{GS} = 0 V$ $f = 1 kHz$	6							nV/\sqrt{Hz}
Noise Figure	NF	$V_{DS} = 15 V, V_{GS} = 0 V$ $f = 100 Hz, R_G = 1 M\Omega$ $BW = 6 Hz$			2.5		2.5		2.5	dB

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