

TYPES 2N3821 THRU 2N3824 N-CHANNEL SILICON JUNCTION FIELD-EFFECT TRANSISTORS

BULLETIN NO. DL-S 7311919, MARCH 1973

2N3821, 2N3822 FOR SMALL-SIGNAL APPLICATIONS

- Low I_{GSS} : ≤ 100 pA
- Low C_{iss} : ≤ 6 pF
- High y_{fs}/C_{iss} Ratio (High-Frequency Figure-of-Merit)

2N3823 FOR VHF AMPLIFIER AND MIXER APPLICATIONS

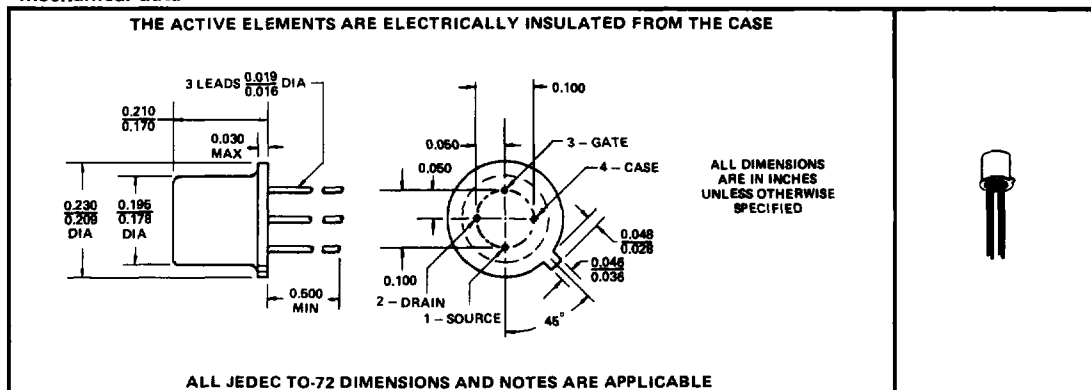
- Low Noise Figure: ≤ 2.5 dB at 100 MHz
- Low C_{rss} : ≤ 2 pF
- High y_{fs}/C_{iss} Ratio (High-Frequency Figure-of-Merit)

2N3824 FOR HIGH-SPEED COMMUTATOR AND CHOPPER APPLICATIONS

- Low $r_{ds(on)}$: ≤ 250 Ω
- Low $I_{D(off)}$: ≤ 100 pA
- Low C_{rss} : ≤ 3 pF

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*mechanical data



*JEDEC registered data. This data sheet contains all applicable registered data in effect at the time of publication.

USES CHIP JN51

TYPES 2N3821 THRU 2N3824

N-CHANNEL SILICON JUNCTION FIELD-EFFECT TRANSISTORS

*absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

	2N3821	2N3822	2N3823	2N3824
Drain-Gate Voltage	50 V	50 V	30 V	30 V
Drain-Source Voltage	50 V	50 V	30 V	30 V
Reverse Gate-Source Voltage	-50 V	-50 V	-30 V	-30 V
Continuous Forward Gate Current	← 10 mA →			
Continuous Device Dissipation at (or below) 25°C Free-Air Temperature (See Note 1)	← 300 mW →			
Storage Temperature Range	-65°C to 200°C			
Lead Temperature 1/16 Inch from Case for 10 Seconds	← 300°C →			

2N3821, 2N3822

*electrical characteristics at 25°C free-air temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	2N3821		2N3822		UNIT
		MIN	MAX	MIN	MAX	
$V_{(BR)GSS}$ Gate-Source Breakdown Voltage	$I_G = -1 \mu A, V_{DS} = 0$	-50		-50		V
I_{GSS} Gate Cutoff Current	$V_{GS} = -30 V, V_{DS} = 0$	-0.1		-0.1		nA
	$V_{GS} = -30 V, V_{DS} = 0, T_A = 150^\circ C$	-0.1		-0.1		μA
$V_{GS(off)}$ Gate-Source Cutoff Voltage	$V_{DS} = 15 V, I_D = 0.5 nA$	-4		-6		V
V_{GS} Gate-Source Voltage	$V_{DS} = 15 V, I_D = 50 \mu A$	-0.5	-2			V
	$V_{DS} = 15 V, I_D = 200 \mu A$			-1	-4	
I_{DSS} Zero-Gate-Voltage Drain Current	$V_{DS} = 15 V, V_{GS} = 0, \text{ See Note 2}$	0.5	2.5	2	10	mA
$ y_{fs} $ Small-Signal Common-Source Forward Transfer Admittance	$V_{DS} = 15 V, V_{GS} = 0, f = 1 \text{ kHz}, \text{ See Note 2}$	1500	4500	3000	6500	μmho
$ y_{os} $ Small-Signal Common-Source Output Admittance	$V_{DS} = 15 V, V_{GS} = 0, f = 1 \text{ kHz}, \text{ See Note 2}$	10		20		μmho
C_{iss} Common-Source Short-Circuit Input Capacitance	$V_{DS} = 15 V, V_{GS} = 0,$	6		6		pF
C_{rss} Common-Source Short-Circuit Reverse Transfer Capacitance	$V_{GS} = 0, f = 1 \text{ MHz}$	3		3		pF
$ y_{fs} $ Small-Signal Common-Source Forward Transfer Admittance	$V_{DS} = 15 V, V_{GS} = 0, f = 100 \text{ MHz}$	1500		3000		μmho

*operating characteristics at 25°C free-air temperature

PARAMETER	TEST CONDITIONS†	2N3821	2N3822	UNIT
		MAX		
\bar{F} Average Noise Figure	$V_{DS} = 15 V, V_{GS} = 0, R_G = 1 \text{ M}\Omega, f = 10 \text{ Hz}, \text{ Noise Bandwidth} = 5 \text{ Hz}$	5		dB
V_n Equivalent Input Noise Voltage	$V_{DS} = 15 V, V_{GS} = 0, f = 10 \text{ Hz}, \text{ Noise Bandwidth} = 5 \text{ Hz}$	200		nV/\sqrt{Hz}

NOTES: 1. Derate linearly to 175°C free-air temperature at the rate of 2 mW/°C.
 2. These parameters must be measured using pulse techniques. $t_w = 100 \text{ ms}$, duty cycle $\leq 10\%$.

*JEDEC registered data

†The fourth lead (case) is connected to the source for all measurements.

TYPES 2N3821 THRU 2N3824

N-CHANNEL SILICON JUNCTION FIELD-EFFECT TRANSISTORS

2N3823

*electrical characteristics at 25°C free-air temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	2N3823		UNIT
		MIN	MAX	
V(BR)GSS Gate-Source Breakdown Voltage	I _G = -1 μA, V _{DS} = 0	-30		V
I _{GSS} Gate Cutoff Current	V _{GS} = -20 V, V _{DS} = 0		-0.5	nA
	V _{GS} = -20 V, V _{DS} = 0, T _A = 150°C		-0.5	μA
V _{GS(off)} Gate-Source Cutoff Voltage	V _{DS} = 15 V, I _D = 0.5 nA		-8	V
V _{GS} Gate-Source Voltage	V _{DS} = 15 V, I _D = 400 μA	-1	-7.5	V
I _{DSS} Zero-Gate-Voltage Drain Current	V _{DS} = 15 V, V _{GS} = 0, See Note 2	4	20	mA
y _{fs} Small-Signal Common-Source Forward Transfer Admittance	V _{DS} = 15 V, V _{GS} = 0, f = 1 kHz, See Note 2	3500	6500	μmho
y _{os} Small-Signal Common-Source Output Admittance	V _{DS} = 15 V, V _{GS} = 0, f = 1 kHz, See Note 2		35	μmho
C _{iss} Common-Source Short-Circuit Input Capacitance	V _{DS} = 15 V, V _{GS} = 0,		6	pF
C _{rss} Common-Source Short-Circuit Reverse Transfer Capacitance	f = 1 MHz		2	pF
y _{fs} Small-Signal Common-Source Forward Transfer Admittance	V _{DS} = 15 V, V _{GS} = 0,	3200		μmho
g _{is} Small-Signal Common-Source Input Conductance	f = 200 MHz		800	μmho
g _{os} Small-Signal Common-Source Output Conductance			200	μmho

*operating characteristics at 25°C free-air temperature

PARAMETER	TEST CONDITIONS†	2N3823		UNIT
		MAX		
F Common-Source Spot Noise Figure	V _{DS} = 15 V, V _{GS} = 0, R _G = 1 kΩ, f = 100 MHz	2.5		dB

2N3824

electrical characteristics at 25°C free-air temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	2N3824		UNIT
		MIN	MAX	
*V(BR)GSS Gate-Source Breakdown Voltage	I _G = -1 μA, V _{DS} = 0	-50		V
*I _{GSS} Gate Cutoff Current	V _{GS} = -30 V, V _{DS} = 0		-0.1	nA
	V _{GS} = -30 V, V _{DS} = 0, T _A = 150°C		-0.1	μA
*I _{D(off)} Drain Cutoff Current	V _{DS} = 15 V, V _{GS} = -8 V		0.1	nA
	V _{DS} = 15 V, V _{GS} = -8 V, T _A = 150°C		0.1	μA
I _{DSS} Zero-Gate-Voltage Drain Current	V _{DS} = 15 V, V _{GS} = 0, See Note 2	12	24	mA
*r _{ds(on)} Small-Signal Drain-Source On-State Resistance	V _{GS} = 0, I _D = 0, f = 1 MHz		250	Ω
*C _{iss} Common-Source Short-Circuit Input Capacitance	V _{DS} = 15 V, V _{GS} = 0, f = 1 MHz		6	pF
*C _{rss} Common-Source Short-Circuit Reverse Transfer Capacitance	V _{DS} = 0, V _{GS} = -8 V, f = 1 MHz		3	pF

NOTE 2: These parameters must be measured using pulse techniques. t_w = 100 ms, duty cycle ≤ 10%.

*JEDEC registered data

†The fourth lead (case) is connected to the source for all measurements.