

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	$R_G = 1\ \text{k}\Omega$	$f = 400\ \text{MHz}$

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

TO-72 Package

See Section G for Outline Dimensions

Pin Configuration

1 Source, 2 Drain, 3 Gate, 4 Case

Surface Mount

SMP4416, SMP4416A



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