

NTE222 Field Effect Transistor Dual Gate N-Channel MOSFET

Absolute Maximum Ratings:

Drain-Source Voltage, V_{DS}	25V
Drain-Gate Voltage, V_{DG}	30V
Drain Current, I_D	50mA
Reverse Gate Current, I_G	-10mA
Forward Gate Current, I_{GF}	10mA
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_D	360mW
Derate Above 25°C	2.4mW/ $^\circ\text{C}$
Total Device Dissipation ($T_C = +25^\circ\text{C}$), P_D	1.2mW
Derate Above 25°C	0.8mW/ $^\circ\text{C}$
Operating Junction Temperature Range, T_J	-65° to $+175^\circ\text{C}$
Storage Temperature Range, T_{stg}	-65° to $+175^\circ\text{C}$
Lead Temperature (During Soldering), T_L	$+300^\circ\text{C}$

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSX}$	$I_D = 10\mu\text{A}$, $V_{G1} = V_{G2} = -5\text{V}$	25	—	—	V
Gate 1-Source Breakdown Voltage	$V_{(BR)G1SO}$	$I_{G1} = \pm 10\text{mA}$, Note 1	± 6	—	± 30	V
Gate 2-Source Breakdown Voltage	$V_{(BR)G2SO}$	$I_{G2} = \pm 10\text{mA}$, Note 1	± 6	—	± 30	V
Gate 1 Leakage Current	I_{G1SS}	$V_{G1S} = \pm 5\text{V}$, $V_{G2S} = V_{DS} = 0$	—	—	± 10	nA
Gate 2 Leakage Current	I_{G2SS}	$V_{G2S} = \pm 5\text{V}$, $V_{G1S} = V_{DS} = 0$	—	—	± 10	nA
Gate 1 to Source Cutoff Voltage	$V_{G1S(off)}$	$V_{DS} = 15\text{V}$, $V_{G2S} = 4\text{V}$, $I_D = 20\mu\text{A}$	-0.5	—	-4.0	V
Gate 2 to Source Cutoff Voltage	$V_{G2S(off)}$	$V_{DS} = 15\text{V}$, $V_{G1S} = 0\text{V}$, $I_D = 20\mu\text{A}$	-0.2	—	-4.0	V
ON Characteristics (Note 2)						
Zero-Gate-Voltage Drain Current	I_{DSS}	$V_{DS} = 15\text{V}$, $V_{G2S} = 4\text{V}$, $V_{G1S} = 0\text{V}$	6	—	30	mA
Small-Signal Characteristics						
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 15\text{V}$, $V_{G2S} = 4\text{V}$, $V_{G1S} = 0\text{V}$, $f = 1\text{kHz}$, Note 3	10	—	22	mmhos

Note 1. All gated breakdown voltages are measured while the device is conducting rated gate current. This insures that the gate voltage limiting network is functioning properly.

Note 2. Pulse Test: Pulse Width = $30\mu\text{s}$, Duty Cycle $\leq 2\%$.

Note 3. This parameter must be measured with bias voltages applied for less than five (5) seconds to avoid overheating.

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Small-Signal Characteristics (Cont'd)						
Input Capacitance	C_{iss}	$V_{DS} = 15\text{V}$, $V_{G2S} = 4\text{V}$, $I_D = I_{DSS}$, $f = 1\text{MHz}$	–	3.3	–	pF
Reverse Transfer Capacitance	C_{rss}	$V_{DS} = 15\text{V}$, $V_{G2S} = 4\text{V}$, $I_D = 10\text{mA}$, $f = 1\text{MHz}$	0.005	–	0.03	pF
Output Capacitance	C_{oss}	$V_{DS} = 15\text{V}$, $V_{G2S} = 4\text{V}$, $I_D = I_{DSS}$, $f = 1\text{MHz}$	–	1.4	–	pF
Functional Characteristics						
Noise Figure	NF	$V_{DD} = 18\text{V}$, $V_{GG} = 7\text{V}$, $f = 200\text{MHz}$	–	–	3.5	dB
		$V_{DD} = 15\text{V}$, $V_{G2S} = 4\text{V}$, $I_D = 10\text{mA}$, $f = 200\text{MHz}$	–	–	5.0	dB
Common Source Power Gain	G_{ps}	$V_{DD} = 18\text{V}$, $V_{GG} = 7\text{V}$, $f = 200\text{MHz}$	20	–	28	dB
		$V_{DD} = 15\text{V}$, $V_{G2S} = 4\text{V}$, $I_D = 10\text{mA}$, $f = 200\text{MHz}$	14	–	–	dB
Bandwidth	BW	$V_{DD} = 18\text{V}$, $V_{GG} = 7\text{V}$, $f = 200\text{MHz}$	7	–	12	MHz
		$V_{DD} = 18\text{V}$, $f_{LO} = 245\text{MHz}$, $f_{RF} = 200\text{MHz}$, Note 5	4	–	7	MHz
Gain Contol Gate–Supply Voltage	$V_{GG(GC)}$	$V_{DD} = 18\text{V}$, $\Delta G_{ps} = 300\text{dB}$, $f = 200\text{MHz}$, Note 4	0	–	–2.0	V

Note 4. ΔG_{ps} is defined as the change in G_{ps} from the value at $V_{GG} = 7\text{V}$.

Note 5. Amplitude at input from local oscillator is 3V RMS.

