



ELECTRONICS, INC.  
 44 FARRAND STREET  
 BLOOMFIELD, NJ 07003  
 (973) 748-5089  
<http://www.nteinc.com>

## NTE222

### Field Effect Transistor Dual Gate N-Channel MOSFET TO72 Type Package

**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 ( $T_A = +25\text{ C}$ ), $P_D$ .....	360mW
Derate Above 25 C .....	2.4mW/ C
Total Device Dissipation ( $T_C = +25\text{ C}$ ), $P_D$ .....	1.2mW
Derate Above 25 C .....	0.8mW/ C
Operating Junction Temperature Range, $T_J$ .....	-65 to +175 C
Storage Temperature Range, $T_{stg}$ .....	-65 to +175 C
Lead Temperature (During Soldering), $T_L$ .....	+300 C

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSX}$	$I_D = 10\mu A, V_{G1} = V_{G2} = -5V$	25	-	-	V
Gate 1-Source Breakdown Voltage	$V_{(BR)G1SO}$	$I_{G1} = \Delta 10mA$ , Note 1	$\Delta 6$	-	$\Delta 30$	V
Gate 2-Source Breakdown Voltage	$V_{(BR)G2SO}$	$I_{G2} = \Delta 10mA$ , Note 1	$\Delta 6$	-	$\Delta 30$	V
Gate 1 Leakage Current	$I_{G1SS}$	$V_{G1S} = \Delta 5V, V_{G2S} = V_{DS} = 0$	-	-	$\Delta 10$	nA
Gate 2 Leakage Current	$I_{G2SS}$	$V_{G2S} = \Delta 5V, V_{G1S} = V_{DS} = 0$	-	-	$\Delta 10$	nA
Gate 1 to Source Cutoff Voltage	$V_{G1S(off)}$	$V_{DS} = 15V, V_{G2S} = 4V, I_D = 20\mu A$	-0.5	-	-4.0	V
Gate 2 to Source Cutoff Voltage	$V_{G2S(off)}$	$V_{DS} = 15V, V_{G1S} = 0V, I_D = 20\mu A$	-0.2	-	-4.0	V
<b>ON Characteristics</b> (Note 2)						
Zero-Gate-Voltage Drain Current	$I_{DSS}$	$V_{DS} = 15V, V_{G2S} = 4V, V_{G1S} = 0V$	6	-	30	mA
<b>Small-Signal Characteristics</b>						
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 15V, V_{G2S} = 4V, V_{G1S} = 0V,$ $f = 1kHz$ , 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 $\mu s$ , Duty Cycle  $\mu$  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):** ( $T_A = +25\text{ C}$  unless otherwise specified)

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

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

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

