



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

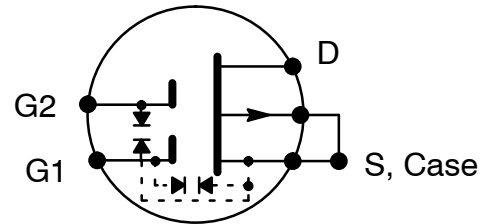
## NTE221 MOSFET Dual Gate, N-Channel for VHF TV Receivers Applications TO72 Type Package

**Description:**

The NTE221 is an N-channel depletion type, dual-insulated gate, field-effect transistor that utilizes MOS construction. This device has characteristics which makes it highly desirable for use in RF-amplifier applications.

**Features:**

- Extremely Low Feedback Capacitance
- High Power Gain



**Absolute Maximum Ratings:** ( $T_A = +25\mu\text{C}$  unless otherwise specified)

Drain-to-Source Voltage, $V_{DS}$ .....	0 to +20V
Gate 1-to-Source Voltage, $V_{G1S}$	
Continuous (DC) .....	+1V to -8V
Peak AC .....	+20V to -8V
Gate 2-to-Source Voltage, $V_{G2S}$	
Continuous (DC) .....	-8V to 40% of $V_{DS}$
Peak AC .....	-8V to +20V
Drain-to-Gate Voltage, $V_{DG1}$ or $V_{DG2}$ .....	+20V
Pulsed Drain Current (Note 1), $I_D$ .....	50mA
Transistor Dissipation ( $T_A = +25\mu\text{C}$ ), $P_T$ .....	400mW
Derate Linearly Above $25\mu\text{C}$ .....	2.67mW/ $\mu\text{C}$
Operating Ambient Temperature Range, $T_{opr}$ .....	-65 $\mu\text{C}$ to +175 $\mu\text{C}$
Storage Temperature Range, $T_{stg}$ .....	-65 $\mu\text{C}$ to +175 $\mu\text{C}$
Lead Temperature (During Soldering, 1/32" from seating surface, 10sec max), $T_L$ .....	+265 $\mu\text{C}$

Note 1. Pulse test: Pulse Width  $\Omega$ 20ms, Duty Cycle  $\Omega$ 15%.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Gate 1-to-Source Cutoff Voltage	$V_{G1S(off)}$	$V_{DS} = 15V, V_{G2S} = 4V, I_D = 200mA$	-	-2	-	V
Gate 2-to-Source Cutoff Voltage	$V_{G2S(off)}$	$V_{DS} = 15V, V_{G1S} = 0, I_D = 200mA$	-	-2	-	V
Gate 1 Leakage Current	$I_{G1SS}$	$V_{G1S} = 20V, V_{G2S} = 0, V_{DS} = 0$	-	-	1	nA
Gate 2 Leakage Current	$I_{G2SS}$	$V_{G2S} = 20V, V_{G1S} = 0, V_{DS} = 0$	-	-	1	nA

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain Current	$I_{DSS}$	$V_{DS} = 13\text{V}, V_{G1S} = 0, V_{G2S} = 4\text{V}$	-	18	-	mA
Forward Transconductance	$g_{fs}$	$V_{DS} = 13\text{V}, I_D = 10\text{mA}, V_{G2S} = 4\text{V}, f = 1\text{kHz}$	-	1000	-	$\mu\text{mhos}$

**Performance Characteristics:** ( $T_A = +25\mu\text{C}, f = 200\text{MHz}$ , Note 2 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Small-Signal, Short Circuit Reverse Transfer Capacitance	$C_{rss}$	(Drain-to-Gate 1) at $f = 1\text{MHz}$	-	0.02	0.03	pF
Output Capacitance	$C_{oss}$		-	2.2	-	pF
Input Capacitance	$C_{iss}$		-	5.5	-	pF
Input Resistance	$r_{iss}$		-	1.2	-	$\text{k}\Omega$
Output Resistance	$r_{oss}$		-	2.8	-	$\text{k}\Omega$
Magnitude of Forward Transconductance	$ Y_{fs} $		-	11000	-	$\mu\text{mhos}$
Phase Angle of Forward Transadmittance			-	-46	-	deg
Maximum Available Power Gain	MAG		-	20	-	dB
Maximum Usable Power Gain (Unneutralized)	$MUG_u$	Note 3	-	20	-	dB
Power Gain	$G_{PS}$		-	17.5	-	dB
Noise Figure	NF		-	-	5	dB

Note 2.  $V_{G1S}$  is adjusted for  $I_D = 10\text{mA}$ , Gate 2 at AC ground potential,  $V_{DS} = 13\text{V}, V_{G2S} = 4\text{V}$ .

Note 3. Limited by practical design considerations.

