ELECTRONICS, INC.
44 FARRAND STREET
BLOOMFIELD, NJ 07003
(973) 748–5089

NTE221
MOSFET
Dual Gate, N–Channel for VHF TV Receivers Applications

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°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°C), P_T 400mW
  Derate Linearly Above 25°C . . . . . 2.67mW/°C
Operating Ambient Temperature Range, T_{opr} . . . . . –65° to +175°C
Storage Temperature Range, T_{stg} . . . . . –65° to +175°C
Lead Temperature (During Soldering, 1/32” from seating surface, 10sec max), T_L . . . . . +265°C

Note 1. Pulse test: Pulse Width ≤ 20ms, Duty Cycle ≤ 15%.

Electrical Characteristics: (T_A = +25°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°C unless otherwise specified)

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

Performance Characteristics: (T_A = +25°C, f = 200MHz, 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 = 1MHz	–	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	–	kΩ
Output Resistance	r_{oss}		–	2.8	–	kΩ
Magnitude of Forward Transconductance	$\|Y_{fs}\|$		–	11000	–	μmhos
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 = 10mA, Gate 2 at AC ground potential, V_{DS} = 13V, V_{G2S} = 4V.
Note 3. Limited by practical design considerations.