

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: ($T_A = +25^\circ\text{C}$ 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 ($T_A = +25^\circ\text{C}$), P_T	400mW
Derate Linearly Above 25°C	2.67mW/ $^\circ\text{C}$
Operating Ambient Temperature Range, T_{opr}	-65° to $+175^\circ\text{C}$
Storage Temperature Range, T_{stg}	-65° to $+175^\circ\text{C}$
Lead Temperature (During Soldering, 1/32" from seating surface, 10sec max), T_L	+265 $^\circ\text{C}$

Note 1. Pulse test: Pulse Width $\leq 20\text{ms}$, Duty Cycle $\leq 15\%$.

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

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

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

Performance Characteristics: ($T_A = +25^\circ\text{C}$, $f = 200\text{MHz}$, 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	–	$k\Omega$
Output Resistance	r_{oss}		–	2.8	–	$k\Omega$
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 $I_D = 10\text{mA}$, Gate 2 at AC ground potential, $V_{DS} = 13\text{V}$, $V_{G2S} = 4\text{V}$.

Note 3. Limited by practical design considerations.

