DIGITRON SEMICONDUCTORS

3N211-3N213

DUAL-GATE VHF AMPLIFIER
N-CHANNEL - DEPLETION

MAXIMUM RATINGS

Rating	Symbol	3N211 3N212	3N213	Unit
Drain Source Voltage	V_{DS}	27	35	Vdc
Drain Gate Voltage	V_{DG1} V_{DG2}	35 35	40 40	Vdc
Drain Current	I_D	50		mAdc
Gate Current	I_{G1} I_{G2}	±10 ±10		mAdc
Total Device Dissipation @ T_A = 25°C **Derate above 25°C**	P_D	360 2.4		mW mW/°C
Total Device Dissipation @ T_C = 25°C **Derate above 25°C**	P_D	1.2 8.0		Watt mW/°C
Lead Temperature, 1/16" from Seated Surface for 10 seconds	T_L	300		°C
Junction Temperature Range	T_J	-65 to +175		°C
Storage Temperature Range	T_{stg}	-65 to +175		°C

ELECTRICAL CHARACTERISTICS (T_A = 25° unless otherwise noted)

Characteristics		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Drain Source Breakdown Voltage (1) (I_D = 10 µAdc, V_{G1S} = V_{G2S} = -4.0 Vdc)	3N211, 3N212 3N213	$V_{(BR)DSX}$	25 30	- -	Vdc
Instantaneous Drain Source Breakdown Voltage (I_D = 10 µAdc, V_{G1S} = V_{G2S} = -4.0 Vdc)	3N211, 3N212 3N213	$V_{(BR)DSX}$	27 35	- -	Vdc
Gate 1 – Source Breakdown Voltage (2) (I_{G1} = ±10 mAdc, V_{G2S} = V_{DS} = 0)		$V_{(BR)G1SO}$	±6.0	-	Vdc
Gate 2 – Source Breakdown Voltage (2) (I_{G2} = ±10 mAdc, V_{G1S} = V_{DS} = 0)		$V_{(BR)G2SO}$	±6.0	-	Vdc
Gate 1 Leakage Current (V_{G1S} = ±5.0 Vdc, V_{G2S} = V_{DS} = 0) (V_{G1S} = -5.0 Vdc, V_{G2S} = V_{DS} = 0, T_A = 150°C)		I_{G1SS}	- -	±10 -10	nAdc µAdc
Gate 2 Leakage Current (V_{G2S} = ±5.0 Vdc, V_{G1S} = V_{DS} = 0) (V_{G2S} = -5.0 Vdc, V_{G1S} = V_{DS} = 0, T_A = 150°C)		I_{G2SS}	- -	±10 -10	nAdc µAdc
Gate 1 to Source Cutoff Voltage (V_{DS} = 15 Vdc, V_{G2S} = 4.0 Vdc, I_D = 20 µ Adc)	3N211, 3N213 3N212	$V_{G1S(off)}$	-0.5 -0.5	-5.5 -4.0	Vdc
Gate 2 Source to Cutoff Voltage (V_{DS} = 15 Vdc, V_{G1S} = 0, I_D = 20 µAdc)	3N211 3N212, 3N213	$V_{G2S(off)}$	-0.2 -0.2	-2.5 -4.0	Vdc
ON CHARACTERISTICS					
Zero Gate Voltage Drain Current (3) (V_{DS} = 15 Vdc, V_{G1S} = 0, V_{G2S} = 4.0 Vdc)		I_{DSS}	6.0	40	mAdc
SMALL SIGNAL CHARACTERISTICS					
Forward Transfer Admittance (4) (V_{DS} = 15 Vdc, V_{G2S} = 4.0 Vdc, V_{G1S} = 0, f = 1.0 kHz)	3N211, 3N212 3N213	$\|yfs\|$	17 15	40 35	mmhos
Reverse Transfer Capacitance (V_{DS} = 15 Vdc, V_{G2S} = 4.0 Vdc, I_D = 1.0 mAdc, f = 1.0 MHz)		C_{rss}	0.005	0.05	pF
FUNCTIONAL CHARACTERISTICS					
Noise Figure (V_{DD} = 18 Vdc, V_{GG} = 7.0 Vdc, f = 200 MHz) (V_{DD} = 24 Vdc, V_{GG} =6.0 Vdc, f = 45 MHz)	3N211 3N211, 3N213	NF	- -	3.5 4.0	dB

144 Market Street
Kenilworth NJ 07033 USA

phone +1.908.245-7200
fax +1.908.245-0555

sales@digitroncorp.com
www.digitroncorp.com

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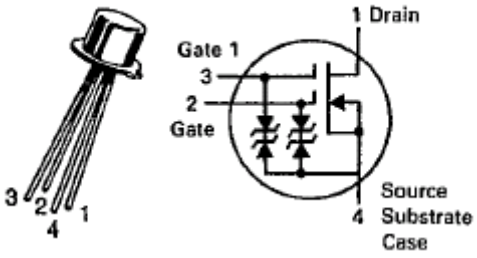
ELECTRICAL CHARACTERISTICS (T_A = 25° unless otherwise noted)

Characteristics		Symbol	Min	Max	Unit
FUNCTIONAL CHARACTERISTICS (con't)					
Common Source Power Gain		G_{ps}			
(V_{DD} = 18 Vdc, V_{GG} = 7.0 Vdc, f = 200 MHz)	3N211		24	35	
(V_{DD} = 24 Vdc, V_{GG} = 6.0 Vdc, f = 45 MHz)	3N211		29	37	dB
(V_{DD} = 24 Vdc, V_{GG} = 6.0 Vdc, f = 45 MHz)	3N213		27	35	
(V_{DD} = 18 Vdc, f_{LO} = 245 MHz, f_{RF} = 200 MHz)	3N212	G_c(6)	21	28	
Bandwidth		BW			
(V_{DD} = 18 Vdc, V_{GG} = 7.0 Vdc, f = 200 MHz)	3N211		5.0	12	MHz
(V_{DD} = 18 Vdc, f_{LO} = 245 MHz, f_{RF} = 200 MHz)	3N212		4.0	7.0	
(V_{DD} = 24 Vdc, V_{GG} = 6.0 Vdc, f = 45 MHz)	3N211, 3N213		3.5	6.0	
Gain Control Gate Supply Voltage(5)		$V_{gg(gc)}$			
(V_{DD} = 18 Vdc, Δ Gps = -30 dB, f = 200 MHz)	3N211		-	-2.0	Vdc
(V_{DD} = 24 Vdc, Δ Gps = -30 dB, f = 45 MHz)	3N211, 3N213		-	±1.0	

(1) Measured after five seconds of applied voltage.
(2) All gate breakdown voltages are measured while the device is conducting rated gate current. This ensures that the gate voltage limiting network is functioning properly.
(3) Pulse test: Pulse width = 300μs, Duty cycle ≤ 2.0%.
(4) This parameter must be measured with bias voltages applied for less than 5 seconds to avoid overheating. The signal is applied to gate 1 with gate 2 at ac ground.
(5) Δ Gps is defined as the change in G_{ps} from the value at V_{GG} = 7.0 Volts (3N211) and V_{GG} = 6.0 Volts (3N213).
(6) Power Gain Conversion. Amplitude at input from local oscillator is adjusted for maximum G_C.



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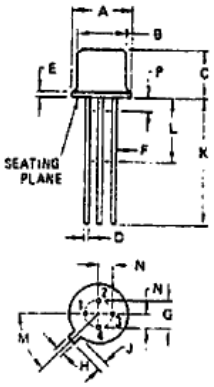

Dim	Inches		Millimeters	
	Min	Max	Min	Max
A	-	0.230	-	5.840
B	-	0.195	-	4.950
C	-	0.210	-	5.330
D	-	0.021	-	0.530
E	-	0.030	-	0.760
F	-	0.019	-	0.480
G	0.100 BSC		2.540 BSC	
H	-	0.046	-	1.170
J	-	0.0480	-	1.220
K	0.500	-	12.700	-
L	0.250	-	6.350	-
M	45°C BSC		45°C BSC	
N	0.050 BSC		1.270 BSC	
P	-	0.050	-	1.270

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).
Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

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