

DIGITRON SEMICONDUCTORS

3N204-3N205

DUAL GATE MOSFET

MAXIMUM RATINGS

| RATING | SYMBOL | VALUE | UNIT |
|--------------------------------------------------------------------------------------|----------------|-------------|-------------|
| Drain-Source Voltage | V_{DS} | 25 | Vdc |
| Drain-Gate Voltage | V_{DG} | 30 | Vdc |
| Drain Current | I_D | 50 | mA |
| Reverse Gate Current | I_G | -10 | mA |
| Forward Gate Current | I_{GF} | 10 | mA |
| Total Device Dissipation @ $T_A=25^\circ\text{C}$ Derate above 25°C | P_D | 360 2.4 | mW mW/°C |
| Lead Temperature | T_L | 300 | °C |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -65 to +175 | °C |

ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise noted)

| CHARACTERISTIC | SYMBOL | MIN | MAX | UNIT |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

OFF CHARACTERISTICS

| | | | | |
|----------------------------------------------------------------------------------------------------|----------------|------|-------|-----|
| Drain-Source Breakdown Voltage ($I_D=10\mu\text{A}, V_{G1}=V_{G2}=-5.0\text{V}$) | $V_{(BR)DSX}$ | 25 | - | Vdc |
| Gate 1-Source Breakdown Voltage ($I_{G1}=+/-10\text{mA}$) <small>Note 1</small> | $V_{(BR)G1SO}$ | +/-6 | +/-30 | Vdc |
| Gate 2-Source Breakdown Voltage ($I_{G2}=+/-10\text{mA}$) <small>Note 1</small> | $V_{(BR)G2SO}$ | +/-6 | +/-30 | Vdc |
| Gate 1 Leakage Current ($V_{G1S}=+/-5.0\text{V}, V_{G2S}=V_{DS}=0$) | I_{G1SS} | - | +/-10 | nA |
| Gate 2 Leakage Current ($V_{G2S}=+/-5.0\text{V}, V_{G1S}=V_{DS}=0$) | I_{G2SS} | - | +/-10 | nA |
| Gate 1 to Source Cutoff Voltage ($V_{DS}=15\text{V}, V_{G2S}=4.0\text{V}, I_D=20\mu\text{A}$) | $V_{G1S(off)}$ | -0.5 | -4.0 | Vdc |
| Gate 2 to Source Cutoff Voltage ($V_{DS}=15\text{V}, V_{G1S}=0\text{V}, I_D=20\mu\text{A}$) | $V_{G2S(off)}$ | -0.2 | -4.0 | Vdc |

ON CHARACTERISTICS

| | | | | |
|------------------------------------------------------------------------------------------------------|-------------|---|----|----|
| Zero-Gate-Voltage Drain Current * ($V_{DS}=15\text{V}, V_{G2S}=4.0\text{V}, V_{G1S}=0\text{V}$) | I_{DSS}^* | 6 | 30 | mA |
|------------------------------------------------------------------------------------------------------|-------------|---|----|----|

SMALL SIGNAL CHARACTERISTICS

| | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------|------------|----------|------|-------|
| Forward Transfer Admittance ($V_{DS}=15\text{V}, V_{G2S}=4.0\text{V}, V_{G1S}=0\text{V}, f=1.0\text{kHz}$) <small>Note 2</small> | $ Y_{fs} $ | 10 | 22 | mmhos |
| Input Capacitance ($V_{DS}=15\text{V}, V_{G2S}=4.0\text{V}, I_D=I_{DSS}, f=1.0\text{MHz}$) | C_{iss} | TYP. 3.0 | | pF |
| Reverse Transfer Capacitance ($V_{DS}=15\text{V}, V_{G2S}=4.0\text{V}, I_D=10\text{mA}, f=1.0\text{MHz}$) | C_{rss} | 0.005 | 0.03 | pF |
| Output Capacitance ($V_{DS}=15\text{V}, V_{G2S}=4.0\text{V}, I_D=I_{DSS}, f=1.0\text{MHz}$) | C_{oss} | TYP. 1.4 | | pF |

FUNCTIONAL CHARACTERISTICS

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------------|-----|
| Noise Figure ($V_{DD}=18\text{V}, V_{GG}=7.0\text{V}, f=200\text{MHz}$) 3N204 ($V_{DS}=15\text{V}, V_{G2S}=4.0\text{V}, I_D=10\text{mA}, f=450\text{MHz}$) 3N204 | NF | - | 3.5 5.0 | dB |
| Common Source Power Gain ($V_{DD}=18\text{V}, V_{GG}=7.0\text{V}, f=200\text{MHz}$) 3N204 ($V_{DS}=15\text{V}, V_{G2S}=4.0\text{V}, I_D=10\text{mA}, f=450\text{MHz}$) 3N204 | G_{ps} | 20 14 | 28 - | dB |
| Bandwidth ($V_{DD}=18\text{V}, V_{GG}=7.0\text{V}, f=200\text{MHz}$) 3N204 ($V_{DD}=18\text{V}, f_{LO}=245\text{MHz}, f_{RF}=200\text{MHz}$) <small>Note 4</small> 3N205 | BW | 7.0 4.0 | 12 7.0 | MHz |
| Gain Control Gate Supply Voltage <small>(Note 3)</small> ($V_{DD}=18\text{V}, \Delta G_{ps}=300\text{dB}, f=200\text{MHz}$) 3N204 | $V_{GG(GC)}$ | 0 | -2.0 | Vdc |
| Conversion Gain <small>(Note 4)</small> ($V_{DD}=18\text{V}, f_{LO}=245\text{MHz}, f_{RF}=200\text{MHz}$) 3N205 | $G_{(conv.)}$ | 17 | 28 | dB |

*PW=30μs, Duty Cycle ≤ 2.0%.

- 1) All gate breakdown voltages are measured while the device is conducting rated gate current. This insures that the gate voltage limiting network is functioning properly.
- 2) This parameter must be measured with bias voltages applied for less than five (5) seconds to avoid overheating.
- 3) ΔG_{ps} is defined as the change in G_{ps} from the value at $V_{GG}=7.0\text{V}$.
- 4) Amplitude at input from local oscillator is 3 volts RMS.

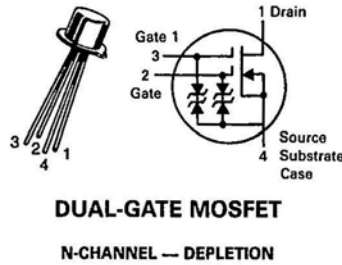
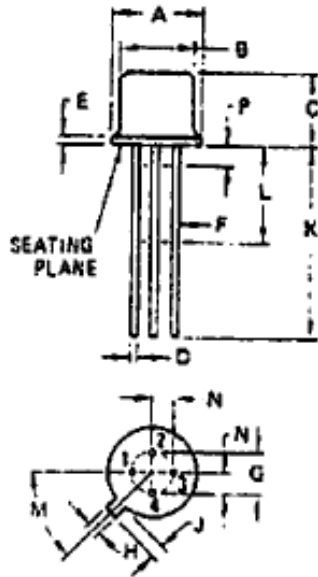
DIGITRON SEMICONDUCTORS

3N204-3N205

DUAL GATE MOSFET

MECHANICAL CHARACTERISTICS

| | |
|-------|-------|
| Case: | TO-72 |
|-------|-------|



| 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.