

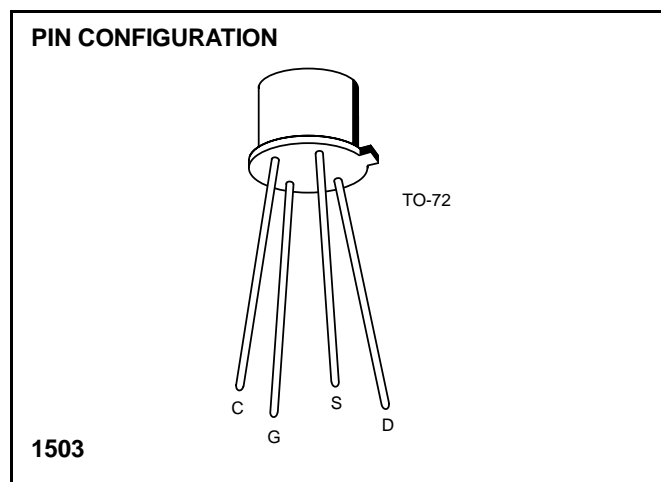
# P-Channel Enhancement Mode MOSFET General Purpose Amplifier Switch



## 3N163 / 3N164

### FEATURES

- Very High Input Impedance
- High Gate Breakdown
- Fast Switching
- Low Capacitance



### ABSOLUTE MAXIMUM RATINGS (Note 1)

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

|  |   |
|--|---|
| Drain-Source or Drain-Gate Voltage     |   |
| 3N163                                  | -40V  |
| 3N164                                  | -30V  |
| Static Gate-Source Voltage             |   |
| 3N163                                  | $\pm 40\text{V}$                            |
| 3N164                                  | $\pm 30\text{V}$                            |
| Transient Gate-Source Voltage (Note 2) | $\pm 125\text{V}$                           |
| Drain Current                          | 50mA  |
| Storage Temperature                    | $-65^\circ\text{C}$ to $+200^\circ\text{C}$ |
| Operating Temperature                  | $-55^\circ\text{C}$ to $+150^\circ\text{C}$ |
| Lead Temperature (Soldering, 10sec)    | $+300^\circ\text{C}$                        |
| Power Dissipation                      | 375mW                                       |
| Derate above $+25^\circ\text{C}$       | 3.0mW/ $^\circ\text{C}$                     |

**NOTE:** Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

### ORDERING INFORMATION

| Part      | Package                  | Temperature Range                           |
|-----------|--------------------------|---|
| 3N163-64  | Hermetic TO-72           | $-55^\circ\text{C}$ to $+150^\circ\text{C}$ |
| X3N163-64 | Sorted Chips in Carriers | $-55^\circ\text{C}$ to $+150^\circ\text{C}$ |

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

| SYMBOL       | PARAMETER                       | 3N163 |       | 3N164 |       | UNITS | TEST CONDITIONS  |
|--------------|---------------------------------|-------|-------|-------|-------|-------|--|
|              |                                 | MIN   | MAX   | MIN   | MAX   |       |  |
| $I_{GSS}$    | Gate-Body Leakage Current       |       | -10   |       | -10   | pA    | $V_{GS} = -40\text{V}, V_{DS} = 0$ (3N163)<br>$V_{GS} = -30\text{V}, V_{DS} = 0$ (3N164)<br>$T_A = +125^\circ\text{C}$ |
| $BV_{DSS}$   | Drain-Source Breakdown Voltage  | -40   |       | -30   |       | V     | $I_D = -10\mu\text{A}, V_{GS} = 0$   |
| $BV_{SDS}$   | Source-Drain Breakdown Voltage  | -40   |       | -30   |       |       | $I_S = -10\mu\text{A}, V_{GD} = 0, V_{BD} = 0$   |
| $V_{GS(th)}$ | Threshold Voltage               | -2.0  | -5.0  | -2.0  | -5.0  |       | $V_{DS} = V_{GS}, I_D = -10\mu\text{A}$  |
| $V_{GS(th)}$ | Threshold Voltage               | -2.0  | -5.0  | -2.0  | -5.0  |       | $V_{DS} = -15\text{V}, I_D = -10\mu\text{A}$   |
| $V_{GS}$     | Gate Source Voltage             | -2.5  | -6.5  | -2.5  | -6.5  |       | $V_{DS} = -15\text{V}, I_D = -0.5\text{mA}$  |
| $I_{DSS}$    | Zero Gate Voltage Drain Current |       | 200   |       | 400   | pA    | $V_{DS} = -15\text{V}, V_{GS} = 0$   |
| $I_{SDS}$    | Source Drain Current            |       | 400   |       | 800   |       | $V_{SD} = 15\text{V}, V_{GS} = V_{DB} = 0$   |
| $r_{DS(on)}$ | Drain-Source on Resistance      |       | 250   |       | 300   | ohms  | $V_{GS} = -20\text{V}, I_D = -100\mu\text{A}$  |
| $I_{D(on)}$  | On Drain Current                | -5.0  | -30.0 | -3.0  | -30.0 | mA    | $V_{DS} = +15\text{V}, V_{GS} = -10\text{V}$   |

**ELECTRICAL CHARACTERISTICS** (Continued) ( $T_A = 25^\circ\text{C}$  and  $V_{BS} = 0$  unless otherwise specified)

| SYMBOL    | PARAMETER                          | 3N163 |      | 3N164 |      | UNITS         | TEST CONDITIONS   |
|-----------|------------------------------------|-------|------|-------|------|---------------|---|
|           |                                    | MIN   | MAX  | MIN   | MAX  |               |   |
| $g_{fs}$  | Forward Transconductance           | 2000  | 4000 | 1000  | 4000 | $\mu\text{S}$ | $V_{DS} = -15\text{V}$ , $I_D = -10\text{mA}$ , $f = 1\text{kHz}$             |
| $g_{os}$  | Output Admittance                  |       | 250  |       | 250  |               |   |
| $C_{iss}$ | Input Capacitance - Output Shorted |       | 2.5  |       | 2.5  | $\text{pF}$   | $V_{DS} = -15\text{V}$ , $I_D = -10\text{mA}$ , $f = 1\text{MHz}$<br>(Note 1) |
| $C_{rss}$ | Reverse Transfer Capacitance       |       | 0.7  |       | 0.7  |               |   |
| $C_{oss}$ | Output Capacitance - Input Shorted |       | 3.0  |       | 3.0  |               |   |

**NOTE 1:** For design reference only, not 100% tested.

**SWITCHING CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  and  $V_{BS} = 0$  unless otherwise specified)

| SYMBOL    | PARAMETER           | 3N163 |     | 3N164 |     | UNITS       | TEST CONDITIONS  |
|-----------|---------------------|-------|-----|-------|-----|-------------|--|
|           |                     | MIN   | MAX | MIN   | MAX |             |  |
| $t_{on}$  | Turn-On Delay Time  |       | 12  |       | 12  | $\text{ns}$ | $V_{DD} = -15\text{V}$<br>$I_{D(on)} = -10\text{mA}$ (Note 1)<br>$R_G = R_L = 1.4\text{k}\Omega$ |
| $t_r$     | Rise Time           |       | 24  |       | 24  |             |  |
| $t_{off}$ | Turn-Off Delay Time |       | 50  |       | 50  |             |  |

