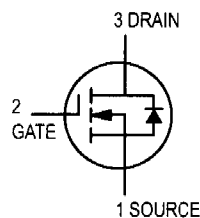
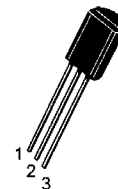


TMOS Switching

N-Channel — Enhancement



MPF930
MPF960
MPF990



TO-92 (TO-226AE)

MAXIMUM RATINGS

| Rating | Symbol | MPF930 | MPF960 | MPF990 | Unit |
|---|-----------------------|--------|----------------------|--------|-------------------------|
| Drain-Source Voltage | V_{DS} | 35 | 60 | 90 | Vdc |
| Drain-Gate Voltage | V_{DG} | 35 | 60 | 90 | Vdc |
| Gate-Source Voltage — Continuous — Non-repetitive ($t_p \leq 50 \mu s$) | V_{GS} V_{GSM} | | ± 20 ± 40 | | Vdc Vpk |
| Drain Current Continuous(1) Pulsed(2) | I_D I_{DM} | | 2.0 3.0 | | Adc |
| Total Device Dissipation @ $T_A = 25^\circ C$ Derate above $25^\circ C$ | P_D | | 1.0 8.0 | | Watts mW/ $^\circ C$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | | -55 to 150 | | $^\circ C$ |
| Thermal Resistance | θ_{JA} | | 125 | | $^\circ C/W$ |

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

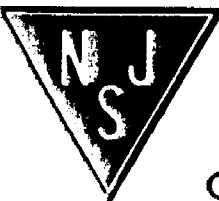
| | | | | | |
|---|---------------|----------------|-------------|-------------|------|
| Drain-Source Breakdown Voltage ($V_{GS} = 0, I_D = 10 \mu A_{dc}$) | $V_{(BR)DSX}$ | 35 60 90 | — — — | — — — | Vdc |
| Gate Reverse Current ($V_{GS} = 15 V_{dc}, V_{DS} = 0$) | I_{GSS} | — | — | 50 | nAdc |

ON CHARACTERISTICS(2)

| | | | | | |
|---|--------------|----------------------------|-------------|-------------------|-------------------|
| Zero-Gate-Voltage Drain Current ($V_{DS} = \text{Maximum Rating}, V_{GS} = 0$) | I_{DSS} | — | — | 10 | μA_{dc} |
| Gate Threshold Voltage ($I_D = 1.0 \text{ mAdc}, V_{DS} = V_{GS}$) | $V_{GS(Th)}$ | 1.0 | — | 3.5 | Vdc |
| Drain-Source On-Voltage ($V_{GS} = 10 V_{dc}$) ($I_D = 0.5 \text{ Adc}$) | $V_{DS(on)}$ | MPF930 MPF960 MPF990 | — — — | 0.4 0.6 0.6 | 0.7 0.8 1.2 |
| ($I_D = 1.0 \text{ Adc}$) | | MPF930 MPF960 MPF990 | — — — | 0.9 1.2 1.2 | 1.4 1.7 2.4 |
| ($I_D = 2.0 \text{ Adc}$) | | MPF930 MPF960 MPF990 | — — — | 2.2 2.8 2.8 | 3.0 3.5 4.8 |

1. The Power Dissipation of the package may result in a lower continuous drain current.
2. Pulse Test: Pulse Width $\leq 300 \mu s$, Duty Cycle $\leq 2.0\%$.

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.



MPF930 MPF960 MPF990

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|--------------|-----|-----|-----|----------|
| ON CHARACTERISTICS⁽²⁾ (Continued) | | | | | |
| Static Drain-Source On Resistance ($V_{GS} = 10\text{ Vdc}$, $I_D = 1.0\text{ Adc}$) | $r_{DS(on)}$ | — | 0.9 | 1.4 | Ω |
| | | | 1.2 | 1.7 | |
| | | | 1.2 | 2.0 | |
| On-State Drain Current ($V_{DS} = 25\text{ Vdc}$, $V_{GS} = 10\text{ Vdc}$) | $I_{D(on)}$ | 1.0 | 2.0 | — | Amps |

SMALL-SIGNAL CHARACTERISTICS

| | | | | | |
|--|-----------|-----|-----|---|-------|
| Input Capacitance ($V_{DS} = 25\text{ Vdc}$, $V_{GS} = 0$, $f = 1.0\text{ MHz}$) | C_{iss} | — | 70 | — | pF |
| Reverse Transfer Capacitance ($V_{DS} = 25\text{ Vdc}$, $V_{GS} = 0$, $f = 1.0\text{ MHz}$) | C_{rss} | — | 20 | — | pF |
| Output Capacitance ($V_{DS} = 25\text{ Vdc}$, $V_{GS} = 0$, $f = 1.0\text{ MHz}$) | C_{oss} | — | 49 | — | pF |
| Forward Transconductance ($V_{DS} = 25\text{ Vdc}$, $I_D = 0.5\text{ Adc}$) | g_{fs} | 200 | 380 | — | mmhos |

SWITCHING CHARACTERISTICS

| | | | | | |
|---------------|-----------|---|-----|----|----|
| Turn-On Time | t_{on} | — | 7.0 | 15 | ns |
| Turn-Off Time | t_{off} | — | 7.0 | 15 | ns |

2. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

RESISTIVE SWITCHING

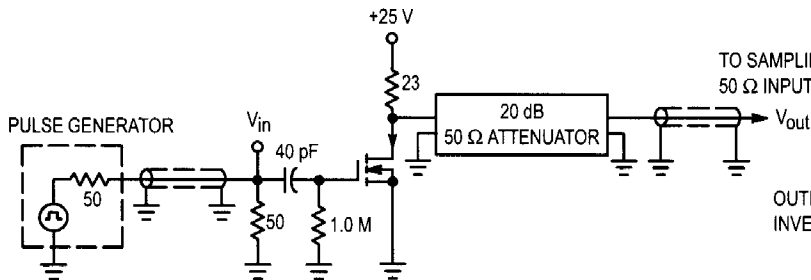


Figure 1. Switching Test Circuit

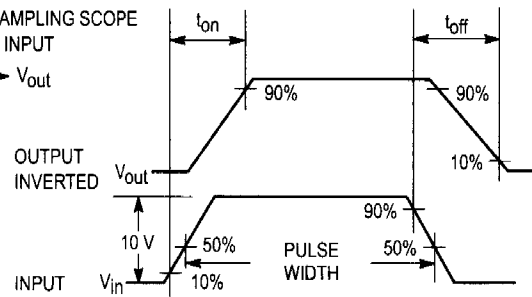


Figure 2. Switching Waveforms