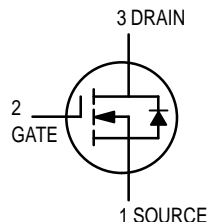
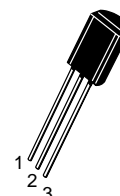


TMOS Switching

N-Channel — Enhancement



MPF930
MPF960
MPF990



CASE 29-05, STYLE 22
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 ($V_{GS} = 0, I_D = 10 \mu A_{dc}$) | MPF930 MPF960 MPF990 | $V_{(BR)DSX}$ | 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 ($V_{GS} = 10 V_{dc}$) ($I_D = 0.5 \text{ Adc}$) | MPF930 MPF960 MPF990 | $V_{DS(on)}$ | — — — | 0.4 0.6 0.6 | 0.7 0.8 1.2 | Vdc |
| ($I_D = 1.0 \text{ Adc}$) | 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 $\leq 2.0\%$.

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 |
| | MPF930 | — | 1.2 | 1.7 | |
| | MPF960 | — | 1.2 | 2.0 | |
| | MPF990 | — | — | — | |
| 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

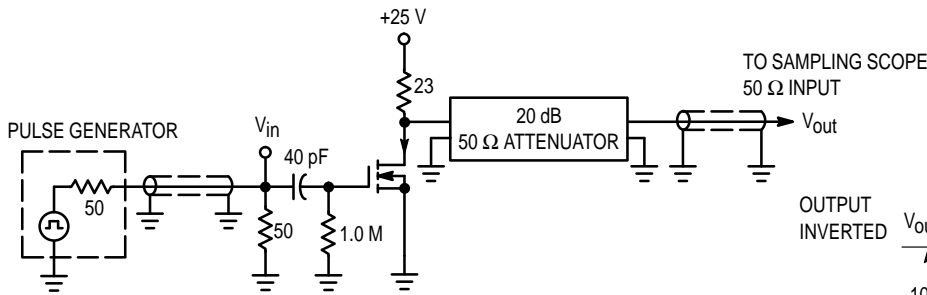


Figure 1. Switching Test Circuit

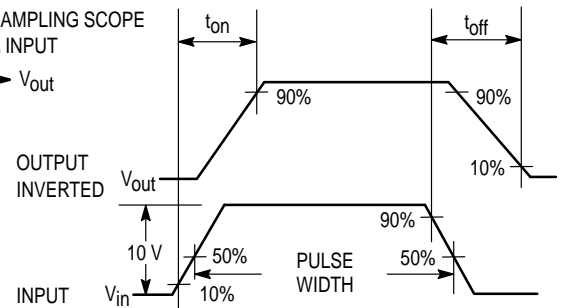


Figure 2. Switching Waveforms

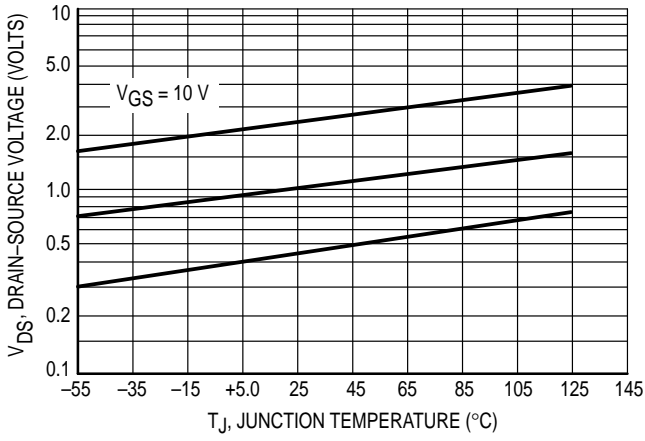


Figure 3. On Voltage versus Temperature

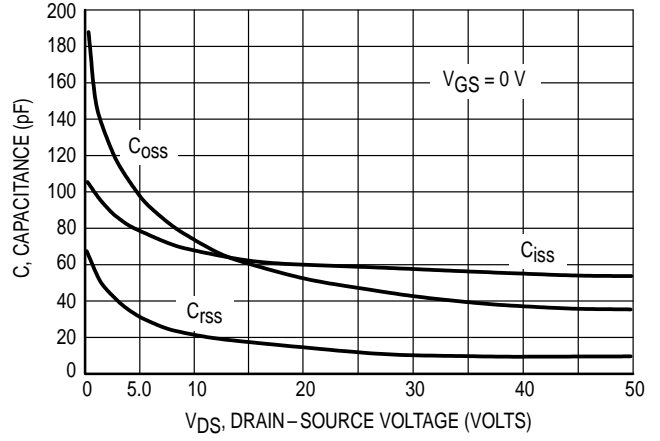


Figure 4. Capacitance Variation

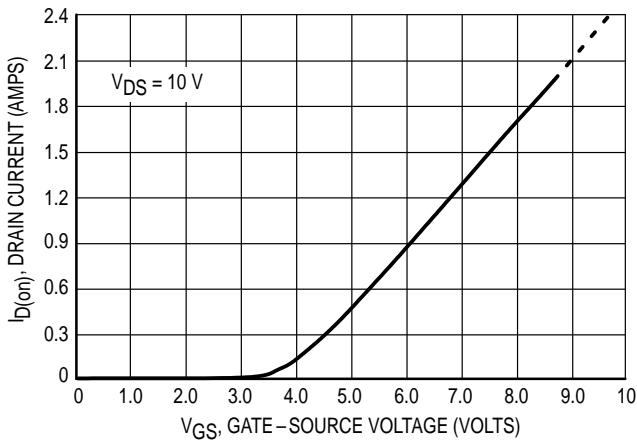


Figure 5. Transfer Characteristic

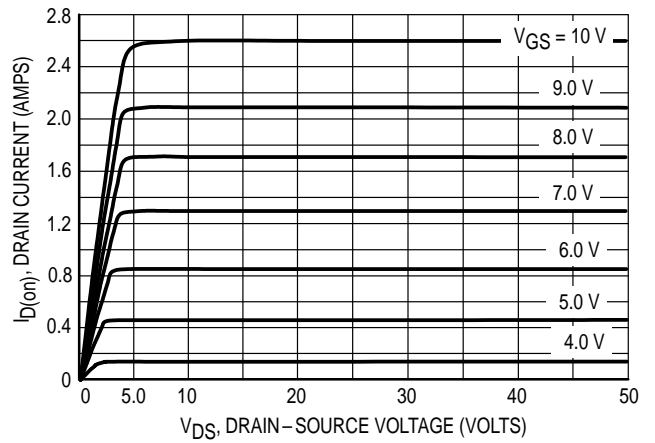


Figure 6. Output Characteristic

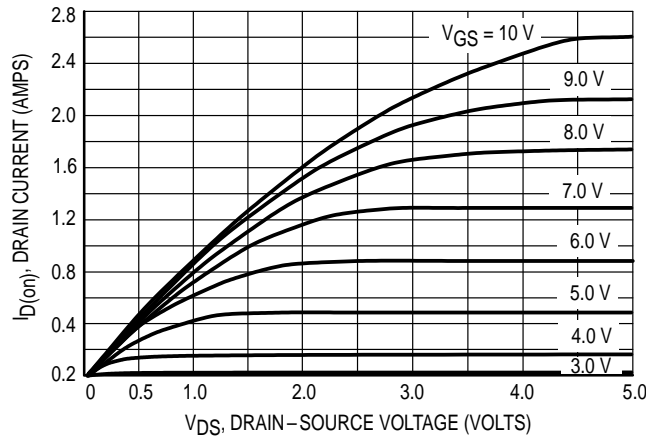
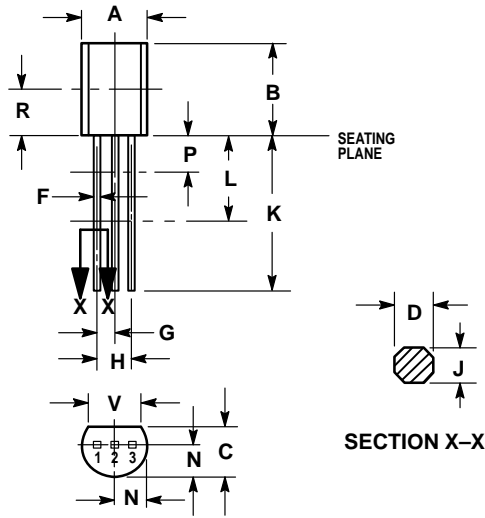


Figure 7. Saturation Characteristic

PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
 4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSIONS D AND J APPLY BETWEEN L AND K MINIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.175 | 0.205 | 4.44 | 5.21 |
| B | 0.290 | 0.310 | 7.37 | 7.87 |
| C | 0.125 | 0.165 | 3.18 | 4.19 |
| D | 0.018 | 0.022 | 0.46 | 0.56 |
| F | 0.016 | 0.019 | 0.41 | 0.48 |
| G | 0.045 | 0.055 | 1.15 | 1.39 |
| H | 0.095 | 0.105 | 2.42 | 2.66 |
| J | 0.018 | 0.024 | 0.46 | 0.61 |
| K | 0.500 | — | 12.70 | — |
| L | 0.250 | — | 6.35 | — |
| N | 0.080 | 0.105 | 2.04 | 2.66 |
| P | — | 0.100 | — | 2.54 |
| R | 0.135 | — | 3.43 | — |
| V | 0.135 | — | 3.43 | — |

- STYLE 22:
 PIN 1. SOURCE
 2. GATE
 3. DRAIN

CASE 029-05
 (TO-226AE)
 ISSUE AD

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