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MPF930

TMOS Switching N-Channel — Enhancement

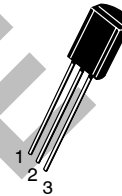


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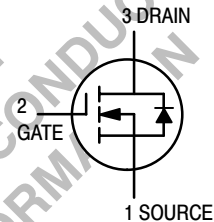
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MAXIMUM RATINGS

| 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 | | W mW/°C |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | | -55 to 150 | | °C |
| Thermal Resistance | θ_{JA} | | 125 | | °C/W |



CASE 29-05, STYLE 22
TO-92 (TO-226AE)



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

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

OFF CHARACTERISTICS

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

ON CHARACTERISTICS⁽²⁾

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

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

MPF930

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 | — | 0.9 | 1.4 | |
| | MPF960 | — | 1.2 | 1.7 | |
| | MPF990 | — | 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 $\leq 2.0\%$.

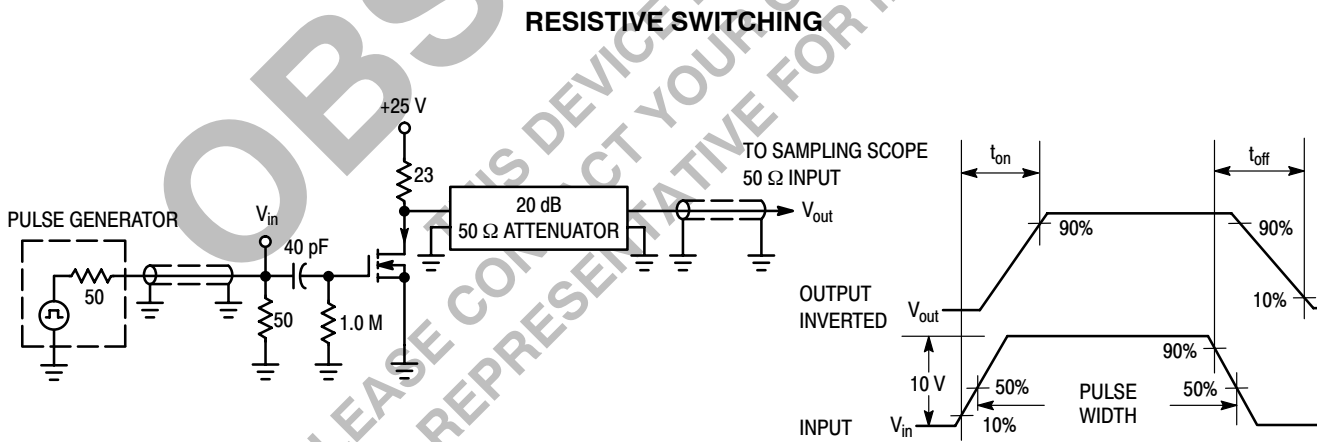


Figure 1. Switching Test Circuit

Figure 2. Switching Waveforms

MPF930

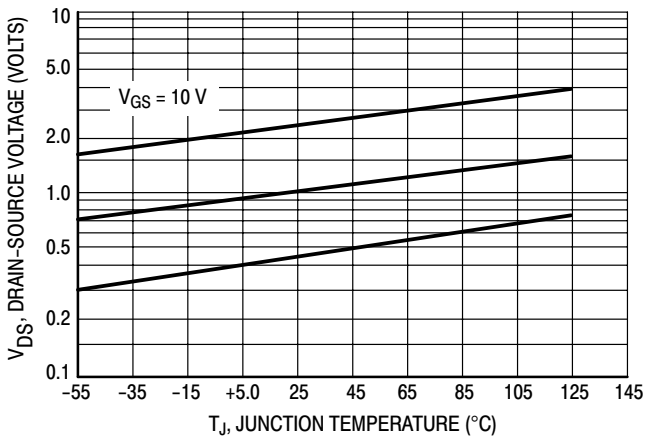


Figure 3. On Voltage versus Temperature

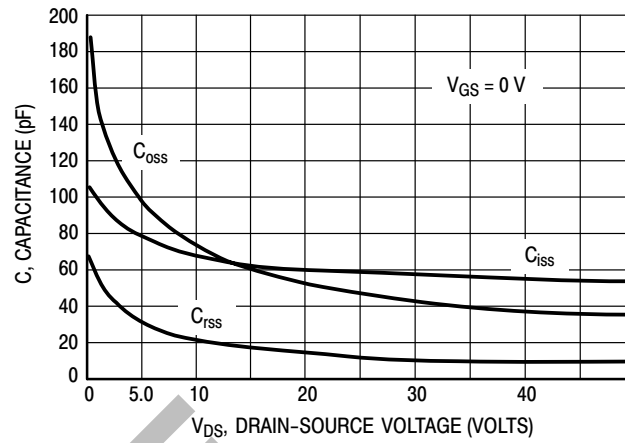


Figure 4. Capacitance Variation

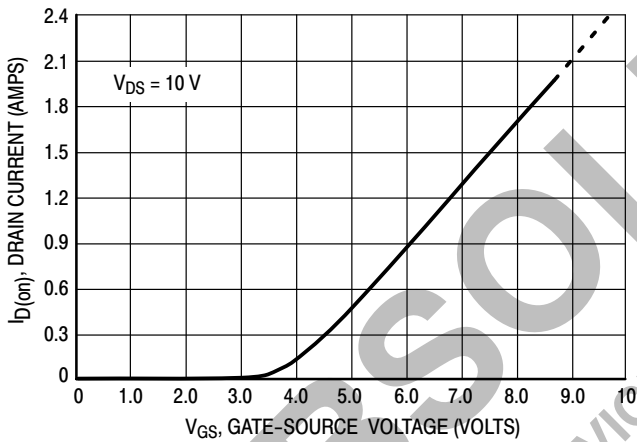


Figure 5. Transfer Characteristic

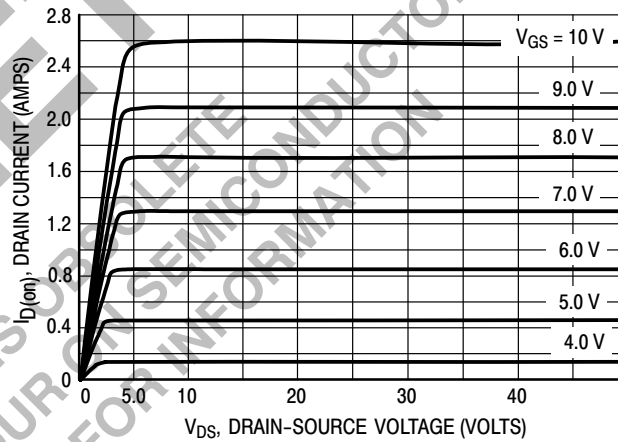


Figure 6. Output Characteristic

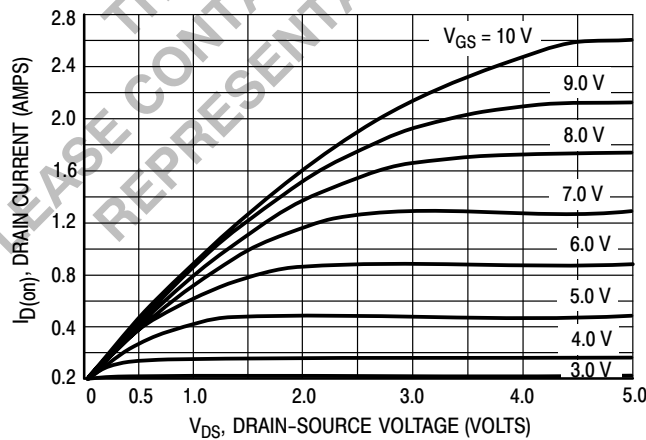
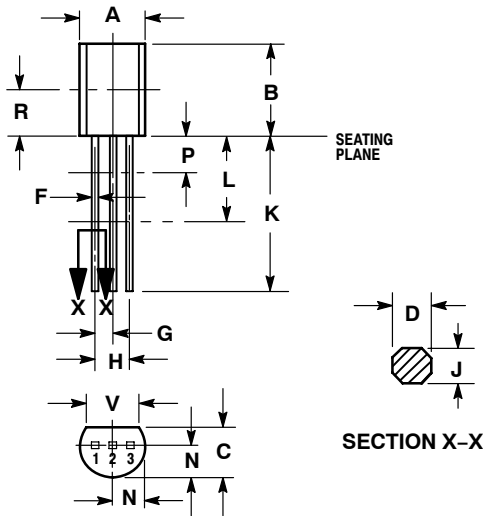


Figure 7. Saturation Characteristic

MPF930

PACKAGE DIMENSIONS

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



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:

1. SOURCE
2. GATE
3. DRAIN

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