

این دیتاشیت توسط توکل الکترونیک تهیه و ارائه شده است.  
جهت مشاهده قیمت، موجودی و ثبت سفارش این قطعه به وبسایت توکل الکترونیک مراجعه فرمایید.



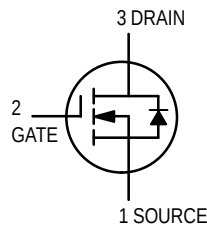
مشاهده قیمت و خرید  
برای خرید و مشاهده سایر محصولات کلیک کنید



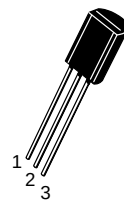
## MOTOROLA SEMICONDUCTOR TECHNICAL DATA

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by MPF930/D

### 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<br>— Continuous<br>— Non-repetitive ( $t_p \leq 50 \mu s$ ) | $V_{GS}$<br>$V_{GSM}$ | $\pm 20$<br>$\pm 40$ |        |        | Vdc<br>Vpk              |
| Drain Current<br>Continuous(1)<br>Pulsed(2)                                     | $I_D$<br>$I_{DM}$     | 2.0<br>3.0           |        |        | Adc                     |
| Total Device Dissipation<br>@ $T_A = 25^\circ C$<br>Derate above $25^\circ C$   | $P_D$                 | 1.0<br>8.0           |        |        | Watts<br>mW/ $^\circ C$ |
| Operating and Storage Junction<br>Temperature Range                             | $T_J, T_{stg}$        | -55 to 150           |        |        | $^\circ C$              |
| Thermal Resistance                                                              | $\theta_{JA}$         | 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<br>( $V_{GS} = 0, I_D = 10 \mu A_{dc}$ ) | MPF930<br>MPF960<br>MPF990 | $V_{(BR)DSX}$ | 35<br>60<br>90 | —<br>—<br>— | —<br>—<br>— | Vdc  |
| Gate Reverse Current ( $V_{GS} = 15 V_{dc}, V_{DS} = 0$ )               |                            | $I_{GSS}$     | —              | —           | 50          | nAdc |

#### ON CHARACTERISTICS(2)

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

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

| Characteristic                                                                             | Symbol       | Min | Typ | Max | Unit     |
|--------------------------------------------------------------------------------------------|--------------|-----|-----|-----|----------|
| <b>ON CHARACTERISTICS(2) (Continued)</b>                                                   |              |     |     |     |          |
| Static Drain–Source On Resistance<br>( $V_{GS} = 10\text{ Vdc}$ , $I_D = 1.0\text{ Adc}$ ) | $r_{DS(on)}$ | —   | 0.9 | 1.4 | $\Omega$ |
| MPF930                                                                                     |              | —   | 1.2 | 1.7 |          |
| MPF960                                                                                     |              | —   | 1.2 | 2.0 |          |
| MPF990                                                                                     |              |     |     |     |          |
| On–State Drain Current<br>( $V_{DS} = 25\text{ Vdc}$ , $V_{GS} = 10\text{ Vdc}$ )          | $I_{D(on)}$  | 1.0 | 2.0 | —   | Amps     |

### SMALL–SIGNAL CHARACTERISTICS

|                                                                                                    |           |     |     |   |       |
|----------------------------------------------------------------------------------------------------|-----------|-----|-----|---|-------|
| Input Capacitance<br>( $V_{DS} = 25\text{ Vdc}$ , $V_{GS} = 0$ , $f = 1.0\text{ MHz}$ )            | $C_{iss}$ | —   | 70  | — | pF    |
| Reverse Transfer Capacitance<br>( $V_{DS} = 25\text{ Vdc}$ , $V_{GS} = 0$ , $f = 1.0\text{ MHz}$ ) | $C_{rss}$ | —   | 20  | — | pF    |
| Output Capacitance<br>( $V_{DS} = 25\text{ Vdc}$ , $V_{GS} = 0$ , $f = 1.0\text{ MHz}$ )           | $C_{oss}$ | —   | 49  | — | pF    |
| Forward Transconductance<br>( $V_{DS} = 25\text{ Vdc}$ , $I_D = 0.5\text{ Adc}$ )                  | $g_{fs}$  | 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  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

### RESISTIVE SWITCHING

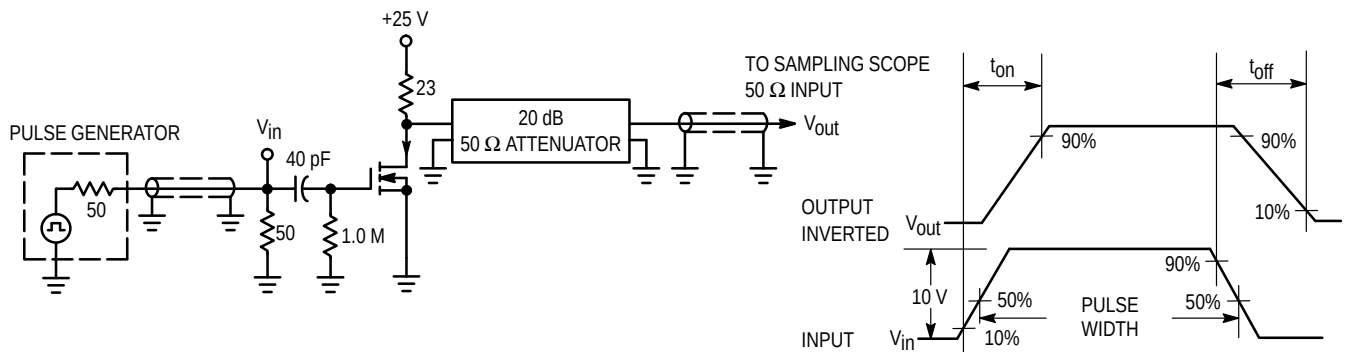


Figure 1. Switching Test Circuit

Figure 2. Switching Waveforms

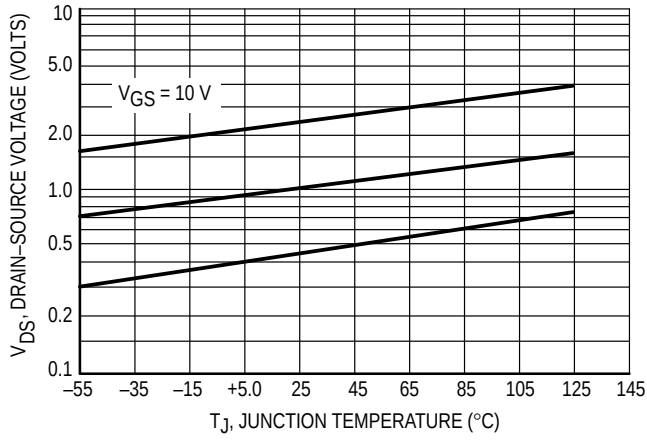


Figure 3. On Voltage versus Temperature

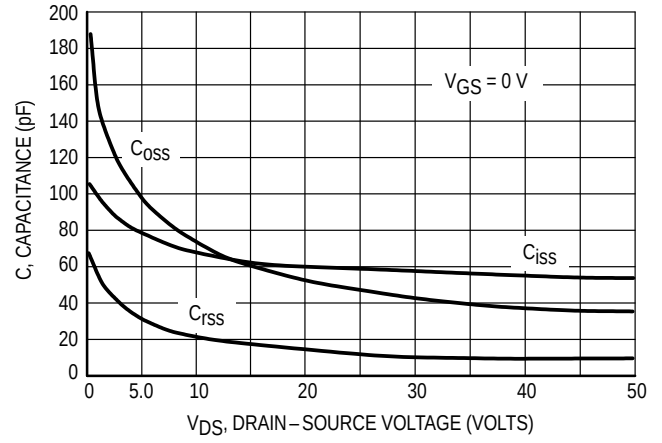


Figure 4. Capacitance Variation

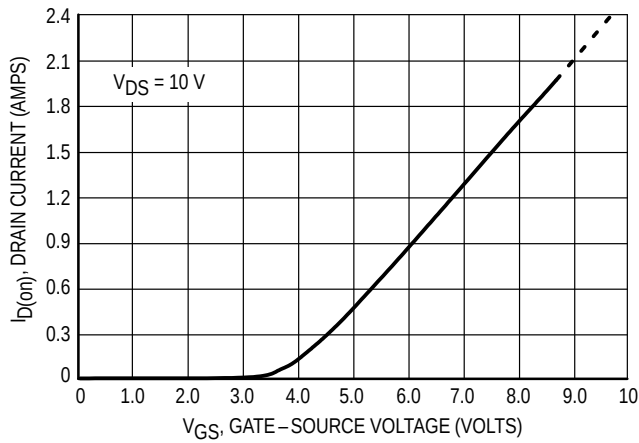


Figure 5. Transfer Characteristic

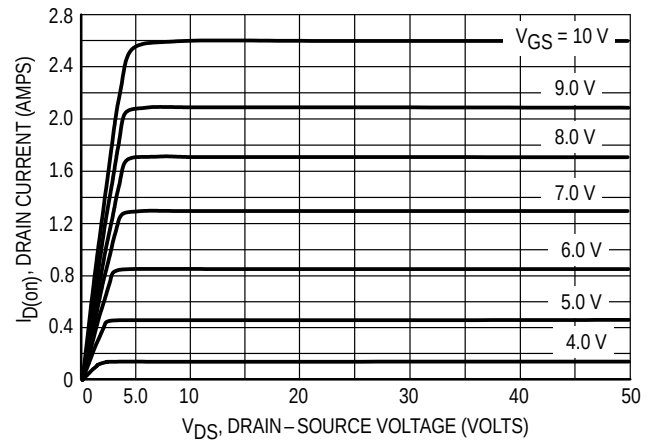


Figure 6. Output Characteristic

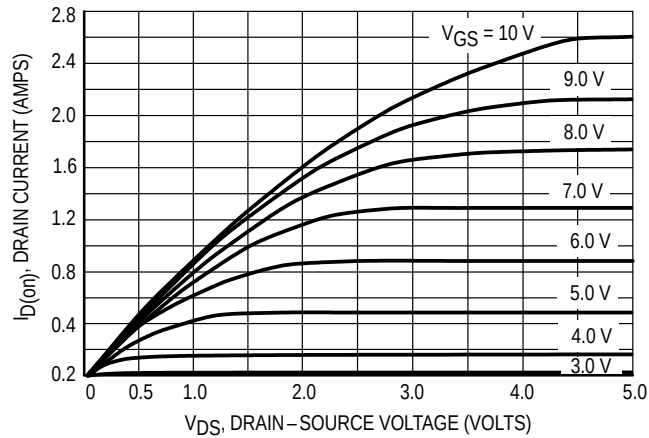
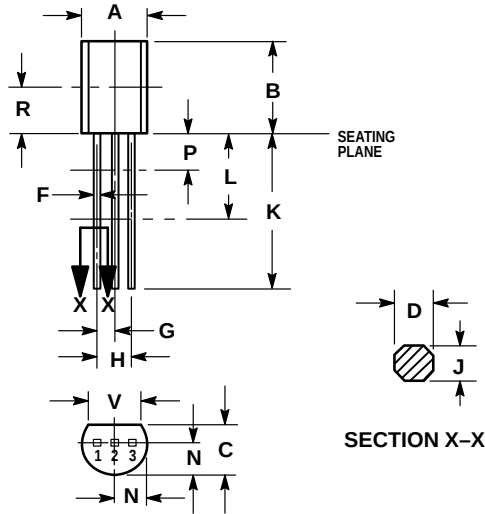


Figure 7. Saturation Characteristic

## 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 |
| E   | 0.016  | 0.019 | 0.41        | 0.48 |
| F   | 0.045  | 0.055 | 1.15        | 1.39 |
| G   | 0.095  | 0.105 | 2.42        | 2.66 |
| H   | 0.018  | 0.024 | 0.46        | 0.61 |
| I   | 0.500  | —     | 12.70       | —    |
| J   | 0.250  | —     | 6.35        | —    |
| K   | 0.080  | 0.105 | 2.04        | 2.66 |
| L   | —      | 0.100 | —           | 2.54 |
| M   | 0.135  | —     | 3.43        | —    |
| N   | 0.135  | —     | 3.43        | —    |

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

## STYLE 22:

1. SOURCE
2. GATE
3. DRAIN

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