

# MPF930

## TMOS Switching N-Channel — Enhancement

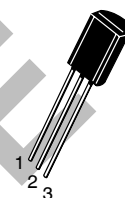


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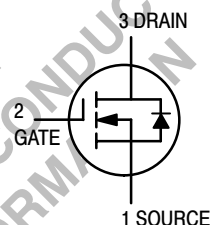
<http://onsemi.com>

### 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 ( $t_p \leq 50 \mu s$ )	$V_{GS}$ $V_{GSM}$		$\pm 20$ $\pm 40$		Vdc Vpk
Drain Current Continuous <sup>(1)</sup> Pulsed <sup>(2)</sup>	$I_D$ $I_{DM}$		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/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$		-55 to 150		$^\circ C$
Thermal Resistance	$\theta_{JA}$		125		$^\circ C/W$



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
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### 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<sup>(2)</sup>

Zero-Gate-Voltage Drain Current ( $V_{DS} = \text{Maximum Rating}, V_{GS} = 0$ )	$I_{DSS}$	—	—	10	$\mu A_{dc}$
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 ( $V_{GS} = 10 V_{dc}$ ) ( $I_D = 0.5 \text{ Adc}$ )	$V_{DS(on)}$	—	0.4 0.6 0.6	0.7 0.8 1.2	Vdc
( $I_D = 1.0 \text{ Adc}$ )		—	0.9 1.2 1.2	1.4 1.7 2.4	
( $I_D = 2.0 \text{ Adc}$ )		—	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

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS<sup>(2)</sup> (Continued)</b>					
Static Drain-Source On Resistance ( $V_{GS} = 10\text{ Vdc}$ , $I_D = 1.0\text{ Adc}$ )	$r_{DS(on)}$	—	0.9	1.4	$\Omega$
	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  $\leq 2.0\%$ .

## RESISTIVE SWITCHING

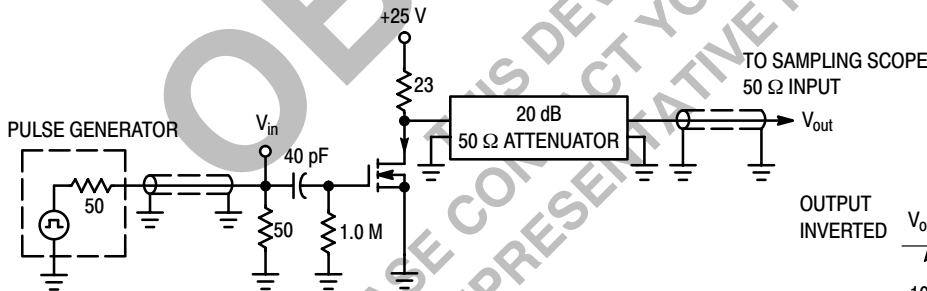


Figure 1. Switching Test Circuit

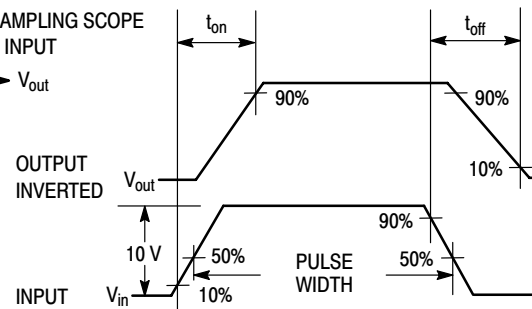


Figure 2. Switching Waveforms

# MPF930

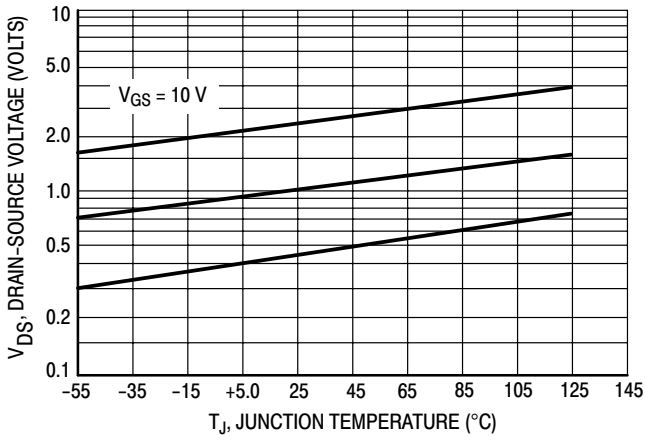


Figure 3. On Voltage versus Temperature

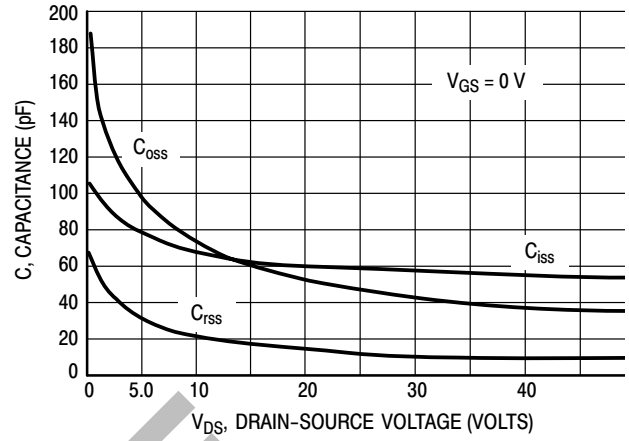


Figure 4. Capacitance Variation

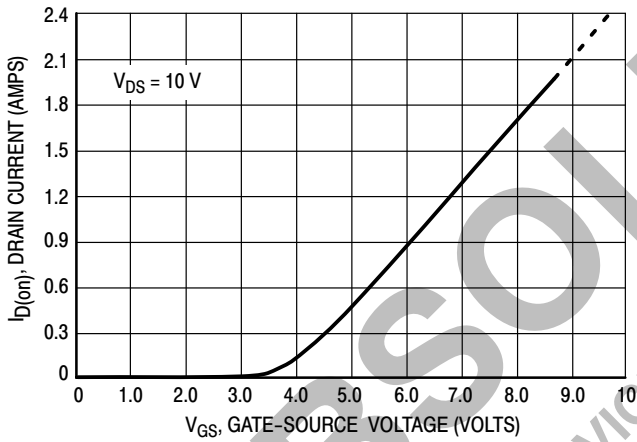


Figure 5. Transfer Characteristic

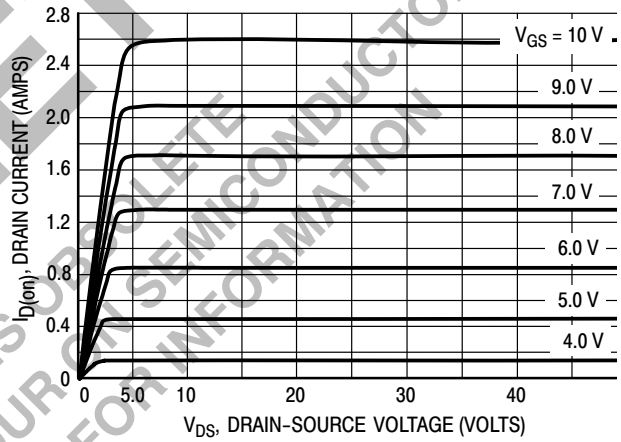


Figure 6. Output Characteristic

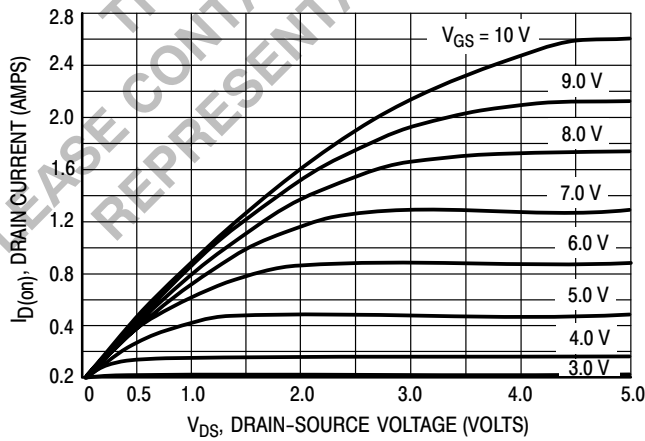
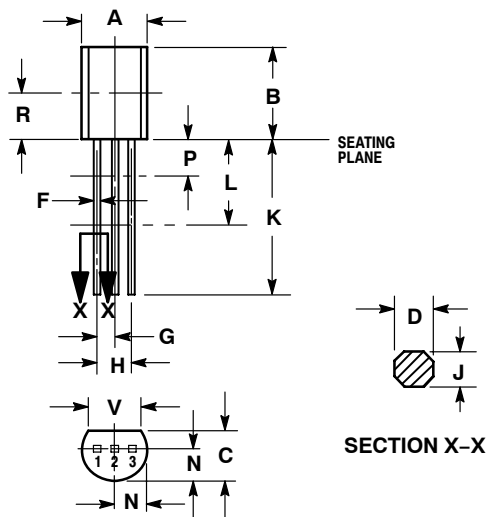


Figure 7. Saturation Characteristic

# 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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