MPF930

TMOS Switching
N−Channel — Enhancement
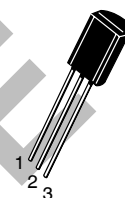
ON Semiconductor®
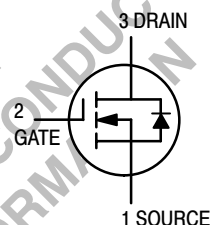
http://onsemi.com

CASE 29−05, STYLE 22
TO−92 (TO−226AE)

3 DRAIN

2 GATE

1 SOURCE

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°C Derate above 25°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

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain−Source Breakdown Voltage (V_{GS} = 0, I_D = 10 μAdc) MPF930 MPF960 MPF990	$V_{(BR)DSX}$	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} = 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) MPF930 MPF960 MPF990 (I_D = 1.0 Adc) MPF930 MPF960 MPF990 (I_D = 2.0 Adc) MPF930 MPF960 MPF990	$V_{DS(on)}$	— — — — — — — — —	0.4 0.6 0.6 0.9 1.2 1.2 2.2 2.8 2.8	0.7 0.8 1.2 1.4 1.7 2.4 3.0 3.5 4.8	Vdc

1. The Power Dissipation of the package may result in a lower continuous drain current.
2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS[2] (Continued)					
Static Drain−Source On Resistance (V_{GS} = 10 Vdc, I_D = 1.0 Adc) MPF930 MPF960 MPF990	$r_{DS(on)}$	— — —	0.9 1.2 1.2	1.4 1.7 2.0	Ω
On−State Drain Current (V_{DS} = 25 Vdc, V_{GS} = 10 Vdc)	$I_{D(on)}$	1.0	2.0	—	Amps
SMALL−SIGNAL CHARACTERISTICS					
Input Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)	C_{iss}	—	70	—	pF
Reverse Transfer Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)	C_{rss}	—	20	—	pF
Output Capacitance (V_{DS} = 25 Vdc, V_{GS} = 0, f = 1.0 MHz)	C_{oss}	—	49	—	pF
Forward Transconductance (V_{DS} = 25 Vdc, I_D = 0.5 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 ≤ 300 µs, Duty Cycle ≤ 2.0%.

RESISTIVE SWITCHING
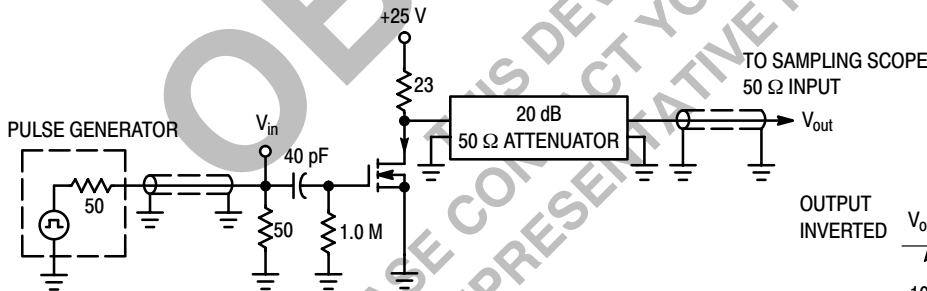
Figure 1. Switching Test Circuit
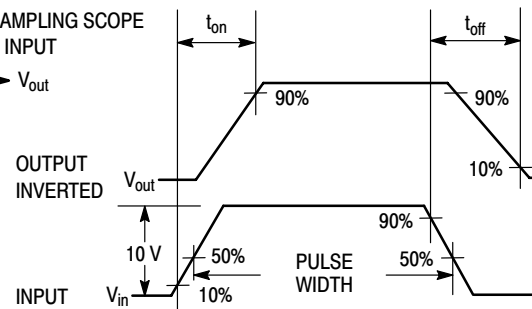
Figure 2. Switching Waveforms
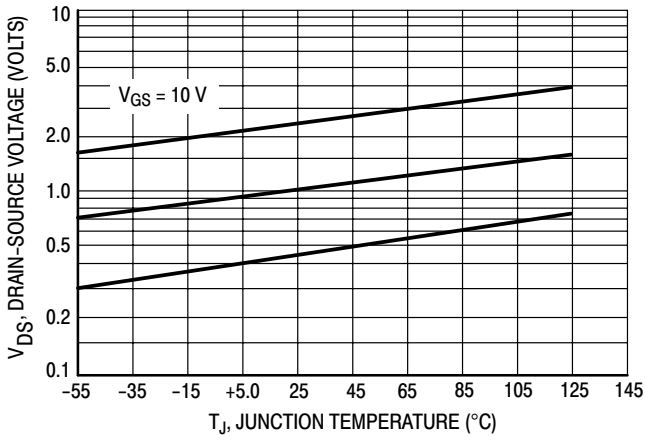
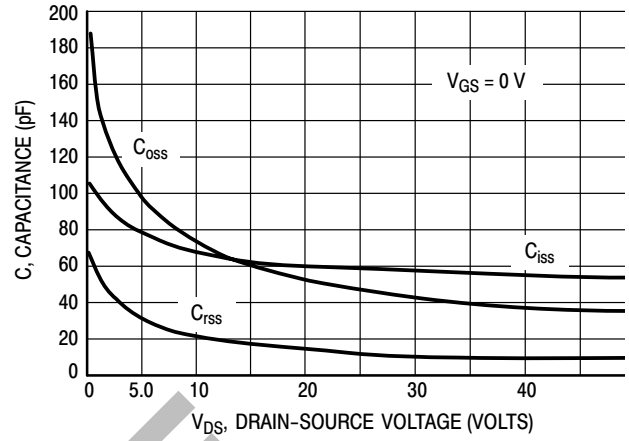**Figure 3. On Voltage versus Temperature**
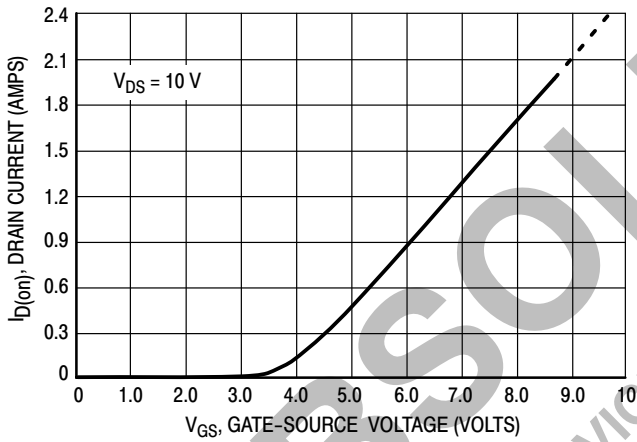
Figure 4. Capacitance Variation
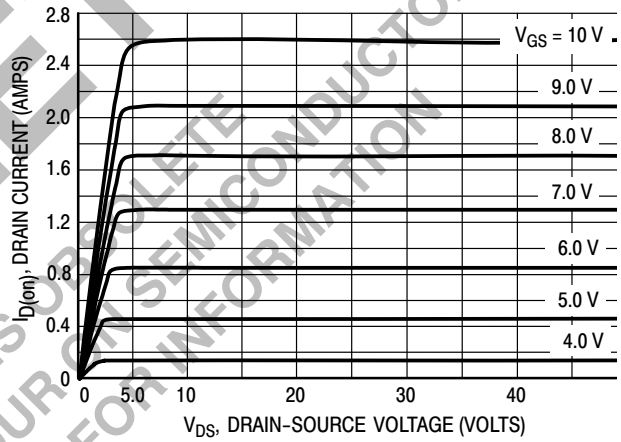
Figure 5. Transfer Characteristic

Figure 6. Output Characteristic
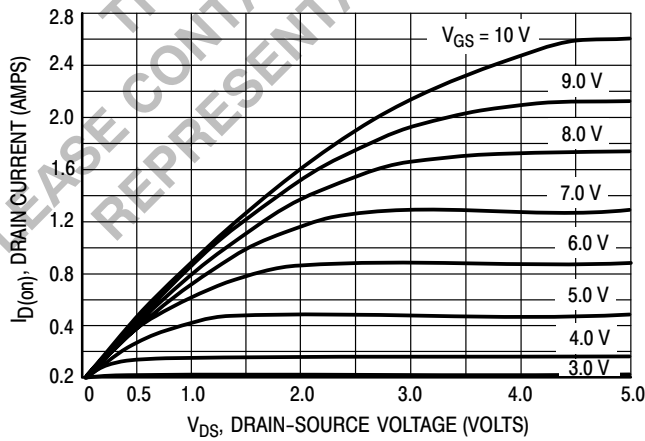
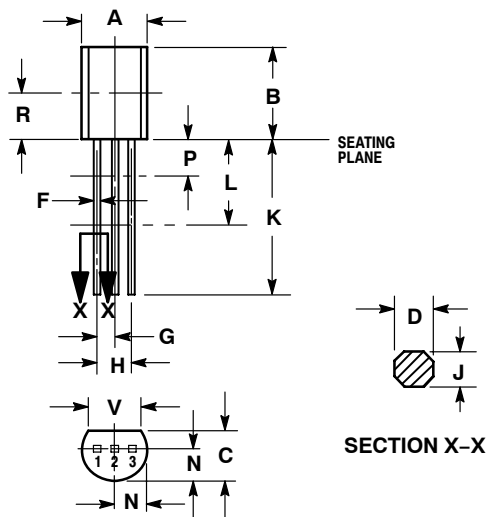**Figure 7. Saturation Characteristic**

MPF930

PACKAGE DIMENSIONS

CASE 029–05
(TO–226AE)
ISSUE AD

SEATING PLANE

SECTION X–X

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 MIMIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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