

MPF930

TMOS Switching N-Channel — Enhancement



ON Semiconductor®

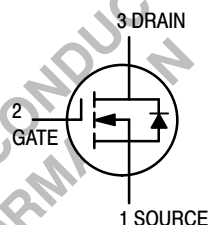
<http://onsemi.com>

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}	± 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/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to 150			$^\circ C$
Thermal Resistance	θ_{JA}	125			$^\circ C/W$



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 ($V_{GS} = 0, I_D = 10 \mu A_{dc}$)	$V_{(BR)DSX}$	35 60 90	— — —	— — —	Vdc
Gate Reverse Current ($V_{GS} = 15 V_{dc}, V_{DS} = 0$)	I_{GSS}	—	—	50	nAdc

ON CHARACTERISTICS⁽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)	V _{DS(on)}	—	0.4	0.7	Vdc
MPF930		—	0.6	0.8	
MPF960		—	0.6	1.2	
MPF990		—	0.9	1.4	
(I _D = 1.0 Adc)		—	1.2	1.7	
MPF930		—	1.2	2.4	
MPF960		—	2.2	3.0	
MPF990		—	2.8	3.5	
(I _D = 2.0 Adc)		—	2.8	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 $\leq 2.0\%$.

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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 $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

RESISTIVE SWITCHING

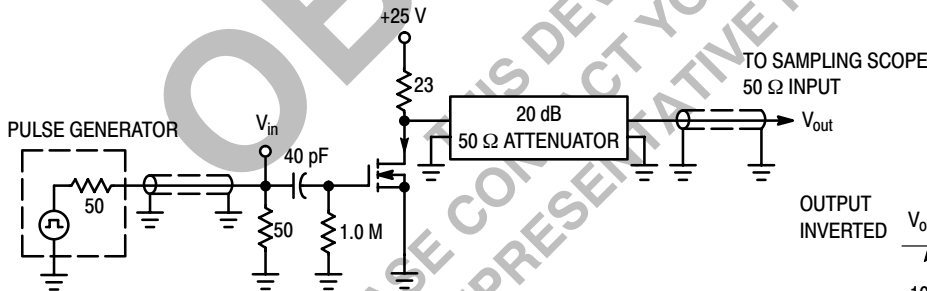


Figure 1. Switching Test Circuit

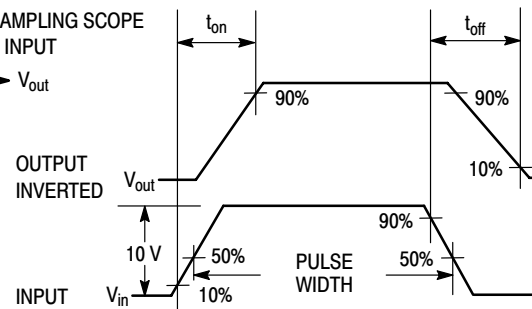


Figure 2. Switching Waveforms

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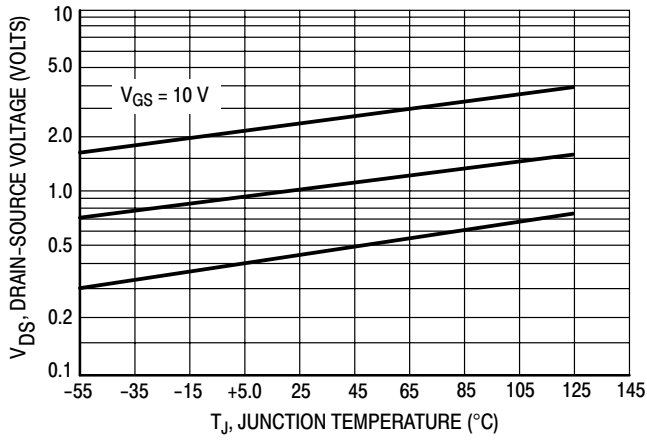


Figure 3. On Voltage versus Temperature

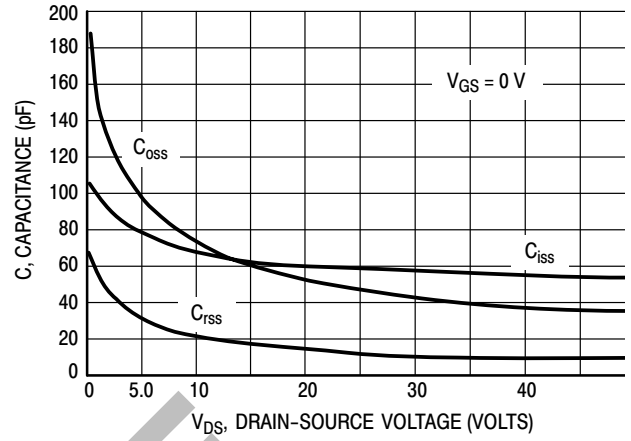


Figure 4. Capacitance Variation

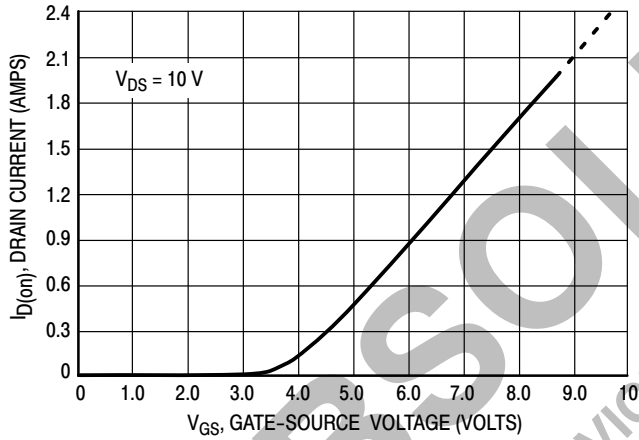


Figure 5. Transfer Characteristic

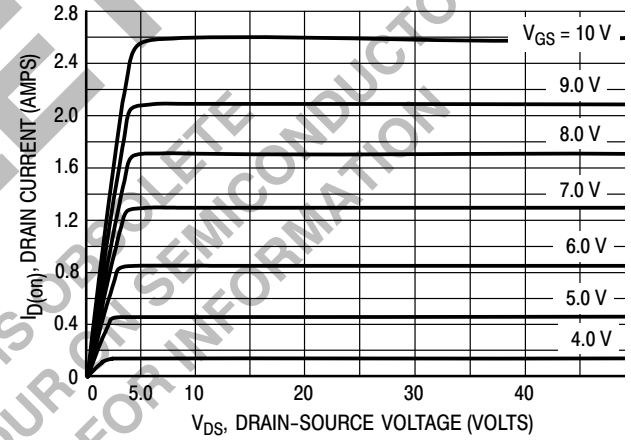


Figure 6. Output Characteristic

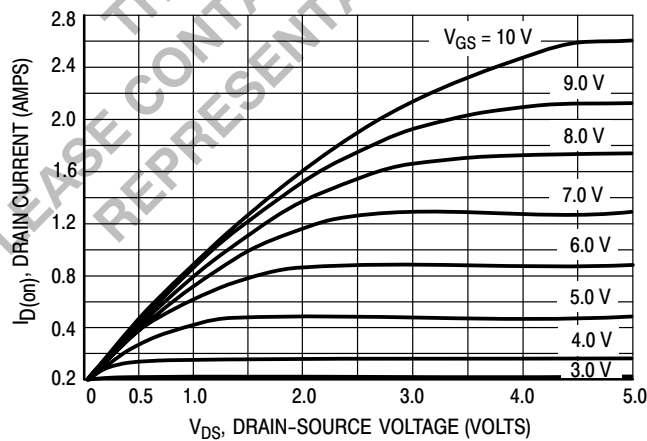
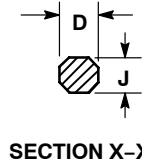
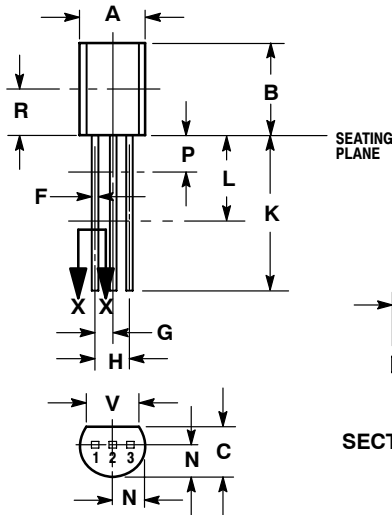


Figure 7. Saturation Characteristic

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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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