

MPF930, MPF960, MPF990

Preferred Device

Small Signal MOSFET 2 Amps, 35, 60, 90 Volts N-Channel TO-92



ON Semiconductor

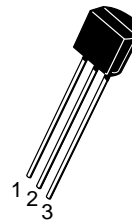
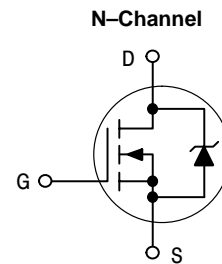
<http://onsemi.com>

2 AMPERES
35, 60, 90 VOLTS
 $R_{DS(on)} = 0.7 \Omega$ (MPF930)
 $R_{DS(on)} = 0.8 \Omega$ (MPF960)
 $R_{DS(on)} = 1.2 \Omega$ (MPF990)

MAXIMUM RATINGS

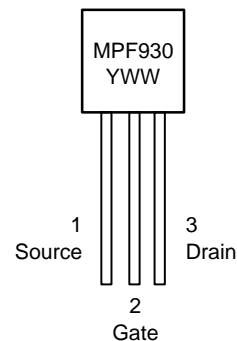
Rating	Symbol	MPF930	MPF960	MPF990	Unit
Drain-Source Voltage	V_{DS}	35	60	90	Vdc
Drain-Gate Voltage	V_{DG}	35	60	90	Vdc
Gate-Source Voltage - Continuous - Non-repetitive ($t_p \leq 50 \mu s$)	V_{GS} V_{GSM}		± 20 ± 40		Vdc Vpk
Drain Current Continuous (Note 1.) Pulsed (Note 2.)	I_D I_{DM}		2.0 3.0		Adc
Total Device Dissipation @ $T_A = 25^\circ C$ Derate above $25^\circ C$	P_D		1.0 8.0		Watts mW/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{stg}		-55 to 150		$^\circ C$
Thermal Resistance	θ_{JA}		125		$^\circ C/W$

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 $\leq 2.0\%$.



TO-92
CASE 29
Style 22

MARKING DIAGRAM & PIN ASSIGNMENT



Y = Year
WW = Work Week

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

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ELECTRICAL CHARACTERISTICS (T_A = 25°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 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 (Note 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	V _{DS(on)}	– – –	0.4 0.6 0.6	0.7 0.8 1.2	Vdc
(I _D = 1.0 Adc)	MPF930 MPF960 MPF990		– – –	0.9 1.2 1.2	1.4 1.7 2.4	
(I _D = 2.0 Adc)	MPF930 MPF960 MPF990		– – –	2.2 2.8 2.8	3.0 3.5 4.8	
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%.

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RESISTIVE SWITCHING

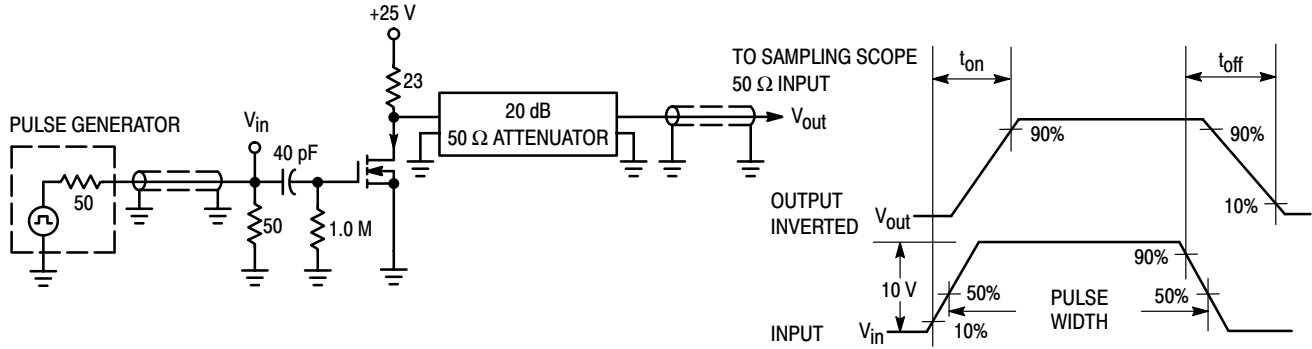


Figure 1. Switching Test Circuit

Figure 2. Switching Waveforms

ORDERING INFORMATION

Device	Package	Shipping
MPF930	TO-92	1000 Unit/Box
MPF930RLRE	TO-92	2000 Tape & Reel
MPF930A	TO-92	1000 Unit/Box
MPF930ARLRE	TO-92	2000 Tape & Reel
MPF960	TO-92	1000 Unit/Box
MPF960RLRA	TO-92	2000 Tape & Reel
MPF990	TO-92	1000 Unit/Box
MPF990RLRA	TO-92	2000 Tape & Reel
MPF990RLRP	TO-92	2000 Ammo Pack

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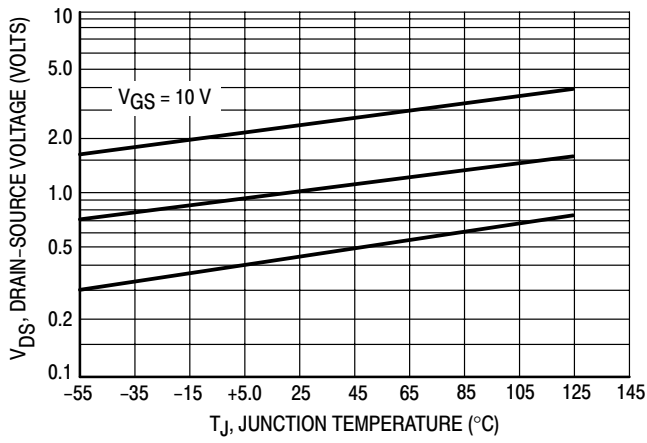


Figure 3. On Voltage versus Temperature

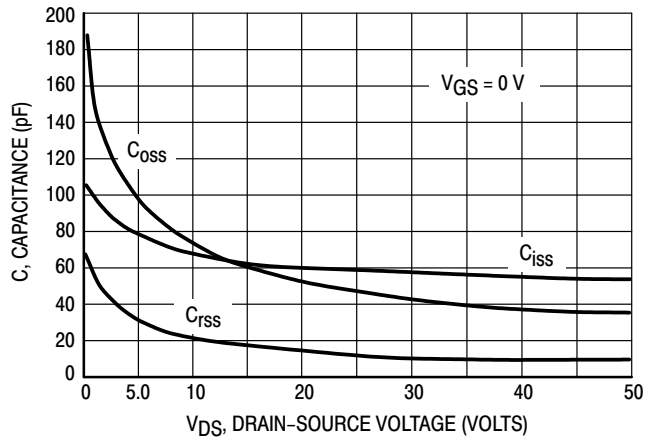


Figure 4. Capacitance Variation

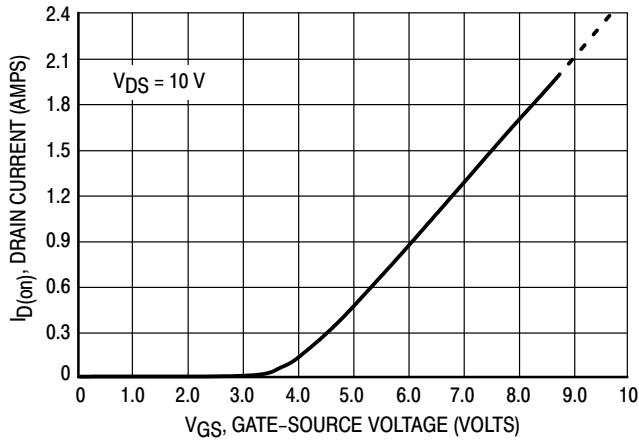


Figure 5. Transfer Characteristic

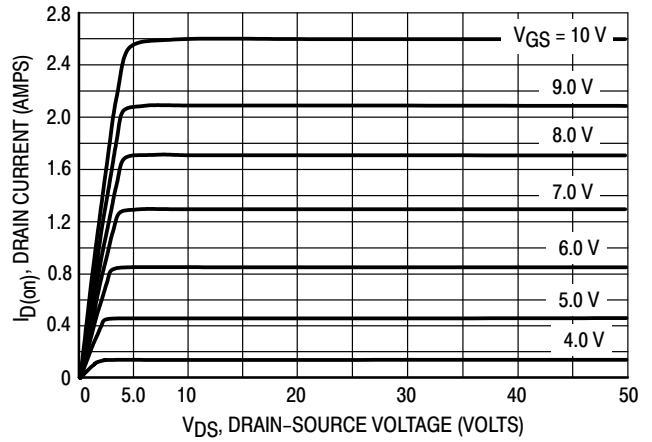


Figure 6. Output Characteristic

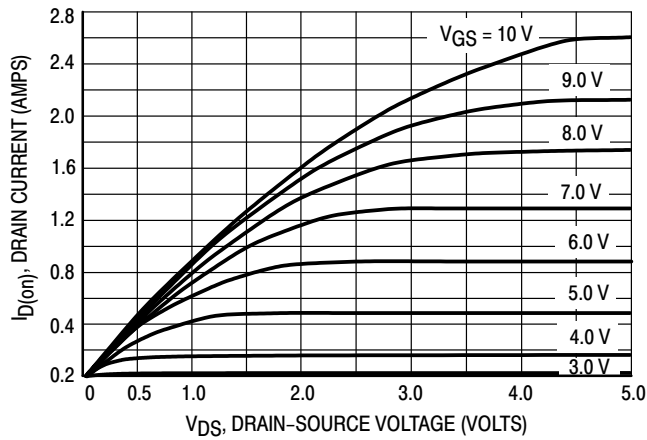
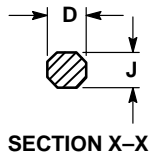
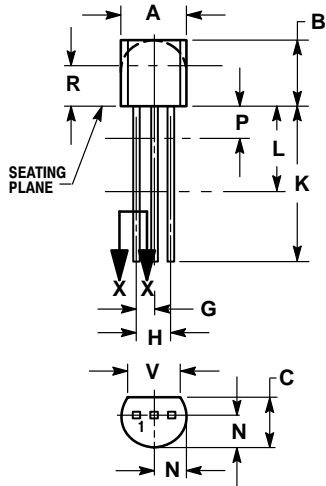


Figure 7. Saturation Characteristic

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PACKAGE DIMENSIONS

TO-92
CASE 29-11
ISSUE AL



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
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	0.115	---	2.93	---
V	0.135	---	3.43	---

STYLE 22:

- PIN 1. SOURCE
2. GATE
3. DRAIN

Notes

Notes

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