

# MPF930, MPF960, MPF990

Preferred Device

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

### 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 (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	$\theta_{JA}$	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  $\leq 2.0\%$ .

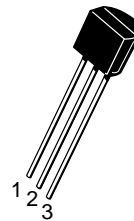
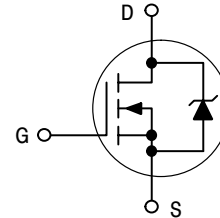


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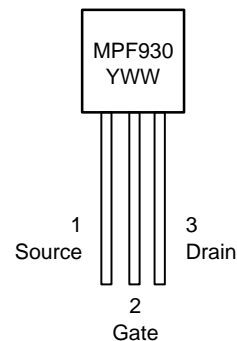
**2 AMPERES**  
**35, 60, 90 VOLTS**  
 **$R_{DS(on)} = 0.7 \Omega$  (MPF930)**  
 **$R_{DS(on)} = 0.8 \Omega$  (MPF960)**  
 **$R_{DS(on)} = 1.2 \Omega$  (MPF990)**

N-Channel



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<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Drain–Source Breakdown Voltage (V <sub>GS</sub> = 0, I <sub>D</sub> = 10 μAdc)	MPF930 MPF960 MPF990	V <sub>(BR)DSX</sub>	35 60 90	– – –	– – –	Vdc
Gate Reverse Current (V <sub>GS</sub> = 15 Vdc, V <sub>DS</sub> = 0)		I <sub>GSS</sub>	–	–	50	nAdc

### ON CHARACTERISTICS (Note 2.)

Zero–Gate–Voltage Drain Current (V <sub>DS</sub> = Maximum Rating, V <sub>GS</sub> = 0)		I <sub>DSS</sub>	–	–	10	μAdc
Gate Threshold Voltage (I <sub>D</sub> = 1.0 mAdc, V <sub>DS</sub> = V <sub>GS</sub> )		V <sub>GS(Th)</sub>	1.0	–	3.5	Vdc
Drain–Source On–Voltage (V <sub>GS</sub> = 10 Vdc) (I <sub>D</sub> = 0.5 Adc)	MPF930 MPF960 MPF990	V <sub>DS(on)</sub>	– – –	0.4 0.6 0.6	0.7 0.8 1.2	Vdc
(I <sub>D</sub> = 1.0 Adc)	MPF930 MPF960 MPF990		– – –	0.9 1.2 1.2	1.4 1.7 2.4	
(I <sub>D</sub> = 2.0 Adc)	MPF930 MPF960 MPF990		– – –	2.2 2.8 2.8	3.0 3.5 4.8	
Static Drain–Source On Resistance (V <sub>GS</sub> = 10 Vdc, I <sub>D</sub> = 1.0 Adc)	MPF930 MPF960 MPF990	r <sub>DS(on)</sub>	– – –	0.9 1.2 1.2	1.4 1.7 2.0	Ω
On–State Drain Current (V <sub>DS</sub> = 25 Vdc, V <sub>GS</sub> = 10 Vdc)		I <sub>D(on)</sub>	1.0	2.0	–	Amps

### SMALL–SIGNAL CHARACTERISTICS

Input Capacitance (V <sub>DS</sub> = 25 Vdc, V <sub>GS</sub> = 0, f = 1.0 MHz)	C <sub>iss</sub>	–	70	–	pF
Reverse Transfer Capacitance (V <sub>DS</sub> = 25 Vdc, V <sub>GS</sub> = 0, f = 1.0 MHz)	C <sub>rss</sub>	–	20	–	pF
Output Capacitance (V <sub>DS</sub> = 25 Vdc, V <sub>GS</sub> = 0, f = 1.0 MHz)	C <sub>oss</sub>	–	49	–	pF
Forward Transconductance (V <sub>DS</sub> = 25 Vdc, I <sub>D</sub> = 0.5 Adc)	g <sub>fs</sub>	200	380	–	mmhos

### SWITCHING CHARACTERISTICS

Turn–On Time	t <sub>on</sub>	–	7.0	15	ns
Turn–Off Time	t <sub>off</sub>	–	7.0	15	ns

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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## RESISTIVE SWITCHING

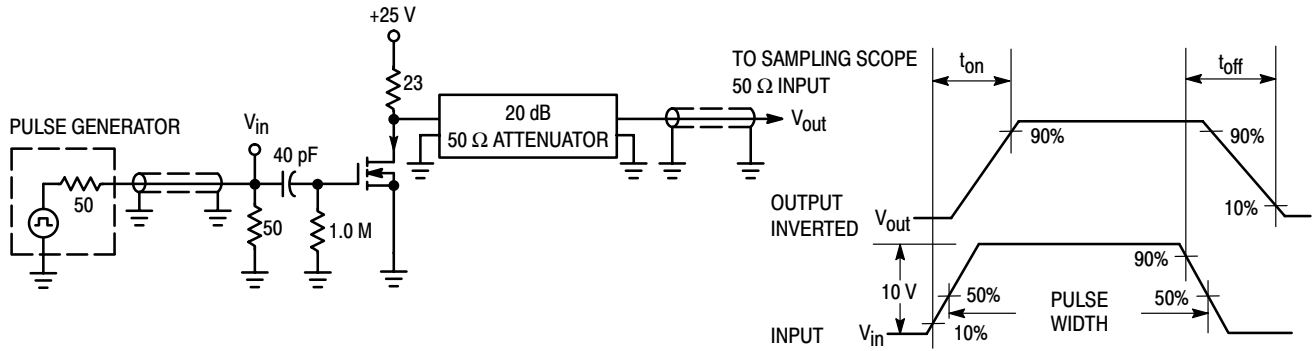


Figure 1. Switching Test Circuit

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

# MPF930, MPF960, MPF990

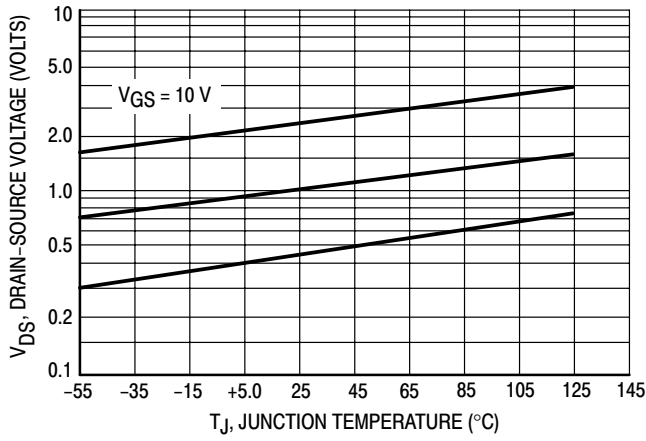


Figure 3. On Voltage versus Temperature

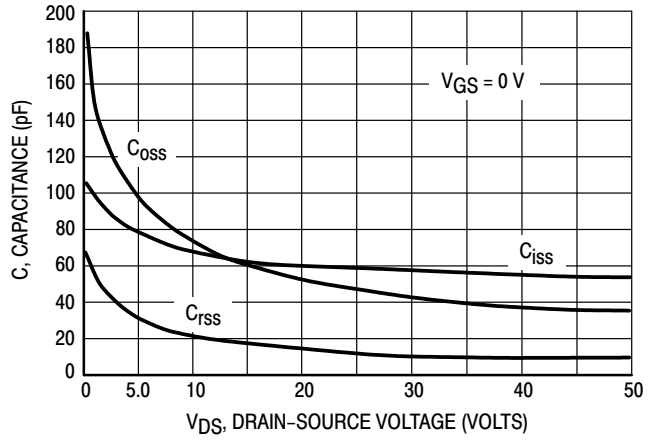


Figure 4. Capacitance Variation

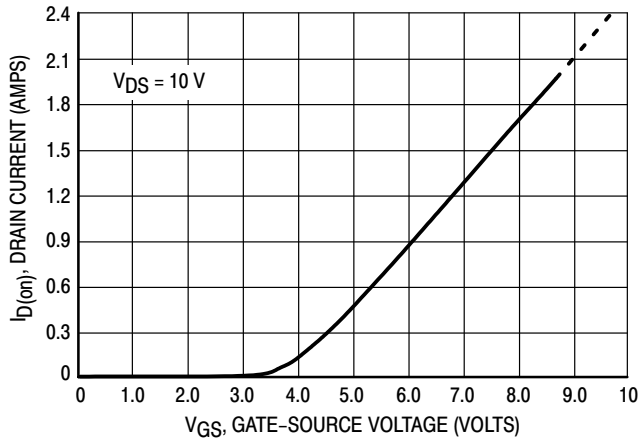


Figure 5. Transfer Characteristic

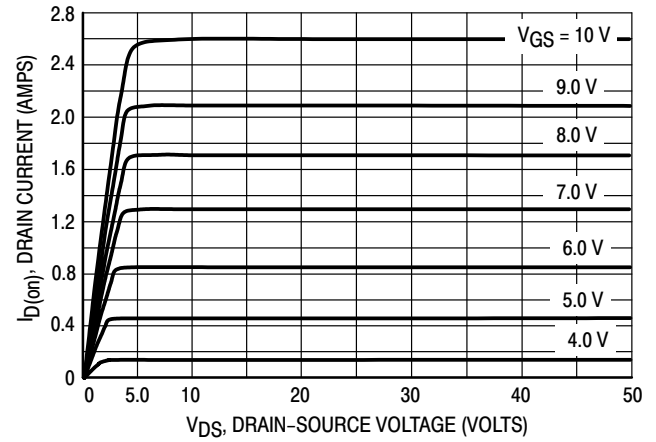


Figure 6. Output Characteristic

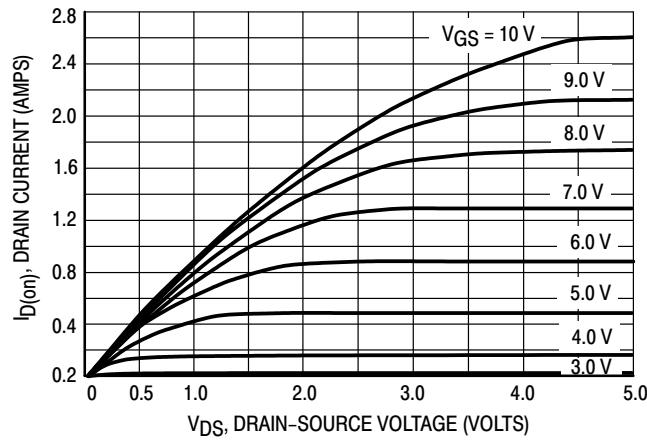
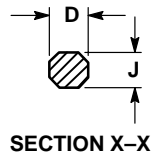
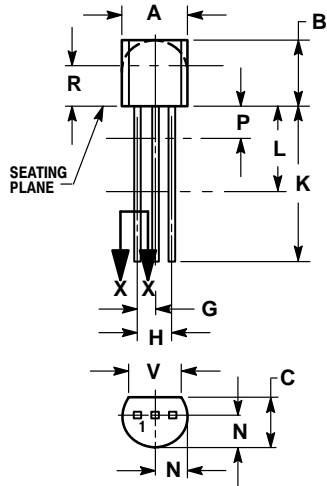


Figure 7. Saturation Characteristic

# MPF930, MPF960, MPF990

## 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
- GATE
- DRAIN

## **Notes**

## **Notes**

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