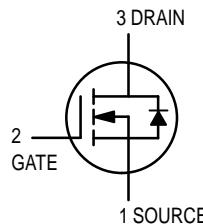
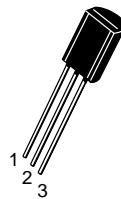


## TMOS FET Transistors

### N-Channel — Enhancement



**MPF6659**  
**MPF6660**  
**MPF6661**



CASE 29-05, STYLE 22  
TO-92 (TO-226AE)

#### MAXIMUM RATINGS

Rating	Symbol	MPF6659	MPF6660	MPF6661	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(1) Pulsed(2)	$I_D$ $I_{DM}$		2.0 3.0		Adc
Total Device Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	$P_D$		2.5 20		Watts mW/ $^\circ C$
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			$^\circ C$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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#### OFF CHARACTERISTICS

Zero-Gate-Voltage Drain Current ( $V_{DS} = \text{Maximum Rating}$ , $V_{GS} = 0$ )	$I_{DSS}$	—	—	10	$\mu\text{Adc}$
Gate-Body Leakage Current ( $V_{GS} = 15 \text{ Vdc}$ , $V_{DS} = 0$ )	$I_{GSS}$	—	—	100	$\text{nAdc}$
Drain-Source Breakdown Voltage ( $V_{GS} = 0$ , $I_D = 10 \mu\text{Adc}$ )	$V_{(BR)DSX}$	35 60 90	— — —	— — —	Vdc

#### ON CHARACTERISTICS(2)

Gate Threshold Voltage ( $V_{DS} = V_{GS}$ , $I_D = 1.0 \text{ mAdc}$ )	$V_{GS(\text{Th})}$	0.8	1.4	2.0	Vdc
Drain-Source On-Voltage ( $V_{GS} = 10 \text{ Vdc}$ , $I_D = 1.0 \text{ Adc}$ )	$V_{DS(\text{on})}$	— — —	— — —	1.8 3.0 4.0	Vdc
( $V_{GS} = 5.0 \text{ Vdc}$ , $I_D = 0.3 \text{ Adc}$ )		— — —	0.8 0.9 0.9	1.5 1.5 1.6	

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  $\leq 2.0\%$ .

# MPF6659 MPF6660 MPF6661

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS(2) (Continued)</b>					
Static Drain-Source On Resistance ( $V_{GS} = 10$ Vdc, $I_D = 1.0$ Adc)	$r_{DS(on)}$	—	—	1.8	$\Omega$
MPF6659		—	—	3.0	
MPF6660		—	—	4.0	
MPF6661		—	—	—	
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)	$C_{iss}$	—	30	—	pF
Reverse Transfer Capacitance ( $V_{DS} = 25$ Vdc, $V_{GS} = 0$ , $f = 1.0$ MHz)	$C_{rss}$	—	3.6	—	pF
Output Capacitance ( $V_{DS} = 25$ Vdc, $V_{GS} = 0$ , $f = 1.0$ MHz)	$C_{oss}$	—	20	—	pF
Forward Transconductance ( $V_{DS} = 25$ Vdc, $I_D = 0.5$ Adc)	$g_{fs}$	170	—	—	mmhos

## SWITCHING CHARACTERISTICS(2)

Rise Time	$t_r$	—	—	5.0	ns
Fall Time	$t_f$	—	—	5.0	ns
Turn-On Time	$t_{on}$	—	—	5.0	ns
Turn-Off Time	$t_{off}$	—	—	5.0	ns

2. Pulse Test: Pulse Width  $\leq 300$   $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

## RESISTIVE SWITCHING

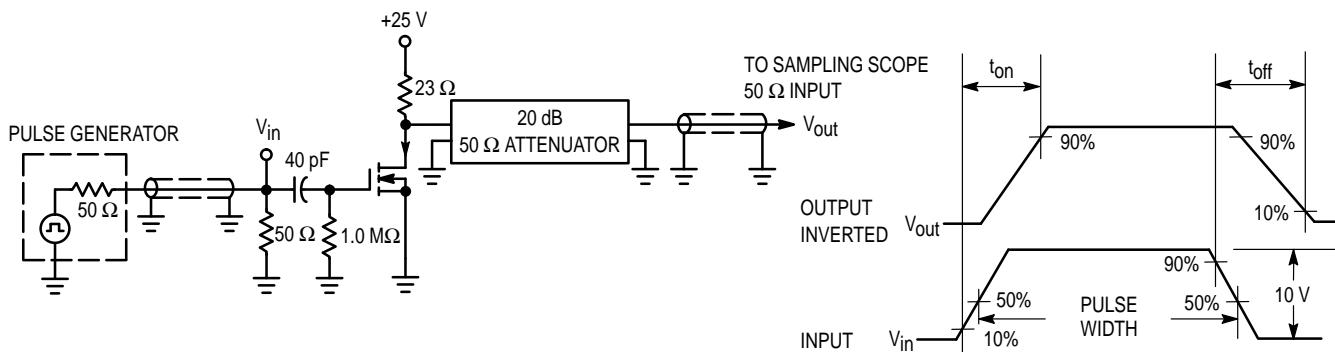
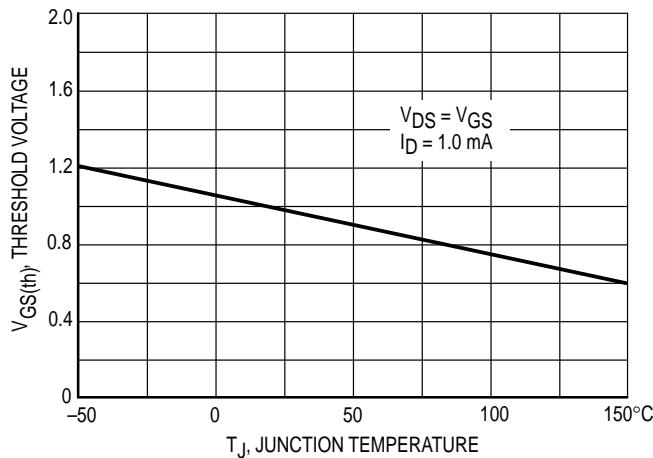
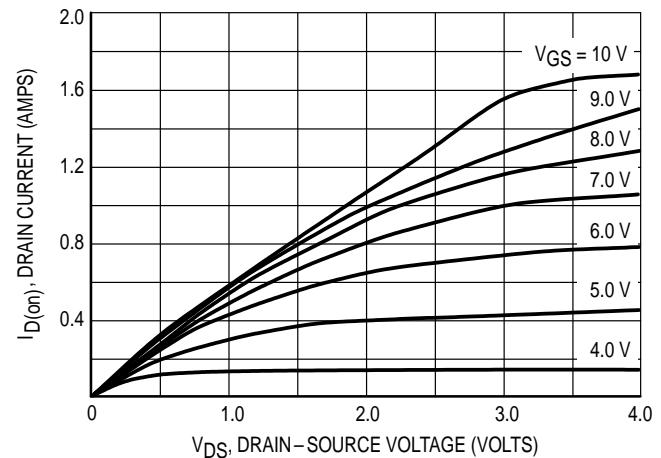
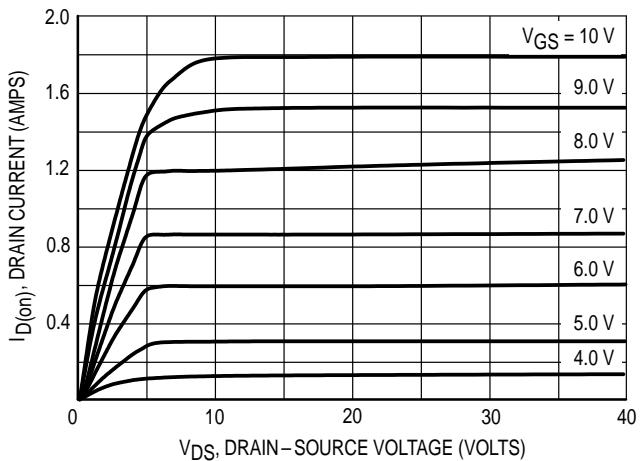
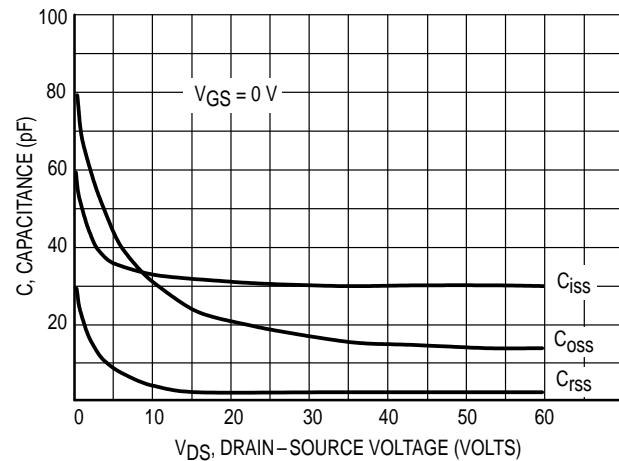
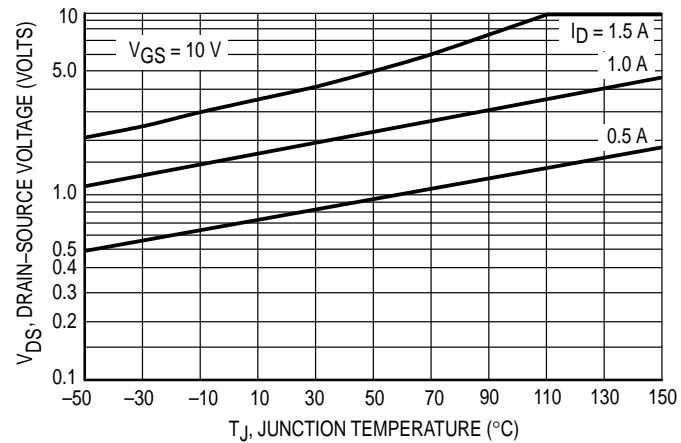
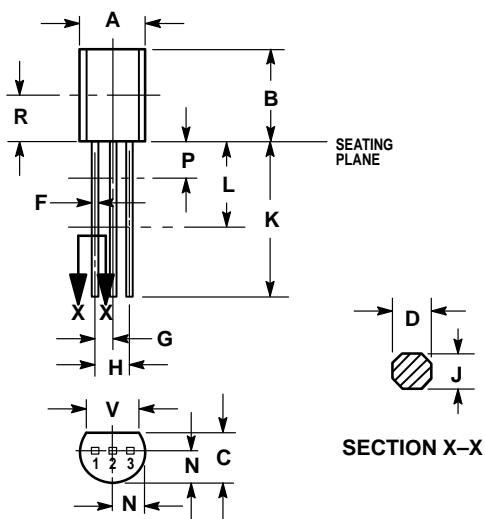


Figure 1. Switching Test Circuit

Figure 2. Switching Waveforms


**Figure 3.  $V_{GS(th)}$  Normalized versus Temperature**

**Figure 4. On-Region Characteristics**

**Figure 5. Output Characteristics**

**Figure 6. Capacitance versus Drain-To-Source Voltage**

**Figure 7. On-Voltage versus Temperature**

## PACKAGE DIMENSIONS



## 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	—

**CASE 029-05  
(TO-226AE)  
ISSUE AD**

STYLE 22:  
PIN 1. SOURCE  
2. GATE  
3. DRAIN

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