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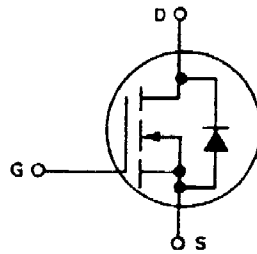
**MTP4N08, MTP5N05  
 MTP4N10, MTP5N06**

**Designer's Data Sheet**

**N-CHANNEL ENHANCEMENT MODE SILICON GATE  
 TMOS POWER FIELD EFFECT TRANSISTOR**

These TMOS Power FETs are designed for low voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

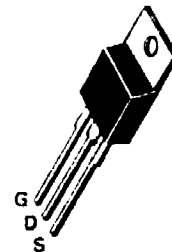
- Silicon Gate for Fast Switching Speeds — Switching Times Specified at 100°C
- Designer's Data —  $I_{DSS}$ ,  $V_{DS(on)}$ ,  $V_{GS(th)}$  and SOA Specified at Elevated Temperature
- Rugged — SOA is Power Dissipation Limited
- Source-to-Drain Diode Characterized for Use With Inductive Loads



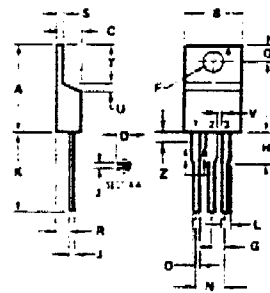
**4.0 and 5.0 AMPERE  
 N-CHANNEL TMOS  
 POWER FET**

$r_{DS(on)} = 0.8 \text{ OHM}$   
 80 and 100 VOLTS

$r_{DS(on)} = 0.6 \text{ OHM}$   
 50 and 60 VOLTS



MTP4N08  
 MTP4N10  
 MTP5N05  
 MTP5N06



STYLE S:  
 1. GATE  
 2. DRAIN  
 3. SOURCE  
 4. DRAIN

	MILLIMETERS		INCHES	
DIM.	MIN.	MAX.	MIN.	MAX.
A	15.11	15.75	0.595	0.620
B	3.81	4.25	0.150	0.168
C	4.08	4.82	0.160	0.190
D	0.84	0.88	0.033	0.035
E	3.81	3.75	0.150	0.147
F	2.64	2.87	0.104	0.113
G	2.79	3.30	0.110	0.130
H	0.50	0.56	0.019	0.022
K	12.70	16.27	0.500	0.640
L	1.14	1.30	0.045	0.051
M	0.25	0.30	0.010	0.012
N	2.54	3.00	0.100	0.118
P	2.04	2.79	0.080	0.110
S	1.14	1.30	0.045	0.051
T	5.97	6.40	0.235	0.252
U	0.76	1.27	0.030	0.050
V	1.14	-	0.045	-
Z	-	2.00	-	0.078

**MAXIMUM RATINGS**

Rating	Symbol	MTP				Unit
		5N05	5N06	4N08	4N10	
Drain-Source Voltage	$V_{DSS}$	50	60	80	100	Vdc
Drain-Gate Voltage ( $R_{GS} = 1.0 \text{ M}\Omega$ )	$V_{DGR}$	50	60	80	100	Vdc
Gate-Source Voltage	$V_{GS}$	$\pm 20$				Vdc
Drain Current Continuous	$I_D$	5.0		4.0		A dc
Pulsed	$I_{DM}$	10		9.0		
Gate Current — Pulsed	$I_{GM}$	1.5				A dc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	50				Watts
		0.4				
Operating and Storage Temperature Range	$T_J, T_{stg}$	-65 to 150				$^\circ\text{C}$

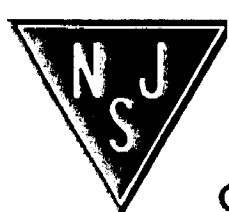
**THERMAL CHARACTERISTICS**

Thermal Resistance Junction to Case	$R_{\theta JC}$	2.5	$^\circ\text{C}/\text{W}$
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	$T_L$	275	$^\circ\text{C}$

**Designer's Data for "Worst Case" Conditions**

The Designer's Data Sheet permits the design of most circuits entirely from the information presented. Limit data — representing device characteristics boundaries — are given to facilitate "worst case" design.

TO-220AB



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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Drain-Source Breakdown Voltage ( $V_{GS} = 0, I_D = 5.0 \text{ mA}$ )	MTP5N05 MTP5N06 MTP4N08 MTP4N10	$V_{(BR)DSS}$	50 60 80 100	Vdc
Zero Gate Voltage Drain Current ( $V_{DS} = 0.85 \text{ Rated } V_{DSS}, V_{GS} = 0$ ) ( $T_J = 100^\circ\text{C}$ )		$I_{DSS}$	— —	mAdc 2.5
Gate-Body Leakage Current ( $V_{GS} = 20 \text{ Vdc}, V_{DS} = 0$ )		$I_{GSS}$	—	500 nAdc

<b>ON CHARACTERISTICS*</b>				
Gate Threshold Voltage ( $I_D = 1.0 \text{ mA}, V_{DS} = V_{GS}$ ) ( $T_J = 100^\circ\text{C}$ )		$V_{GS(th)}$	2.0 1.5	4.5 4.0 Vdc
Static Drain-Source On-Resistance ( $V_{GS} = 10 \text{ Vdc}, I_D = 2.5 \text{ Adc}$ ) ( $V_{GS} = 10 \text{ Vdc}, I_D = 2.0 \text{ Adc}$ )	MTP5N05, MTP5N06 MTP4N08/MTP4N10	$r_{DS(on)}$	— —	0.6 0.8 Ohms
Drain-Source On-Voltage ( $V_{GS} = 10 \text{ V}$ ) ( $I_D = 5.0 \text{ Adc}$ ) ( $I_D = 2.5 \text{ Adc}, T_J = 100^\circ\text{C}$ ) ( $I_D = 4.0 \text{ Adc}$ ) ( $I_D = 2.0 \text{ Adc}, T_J = 100^\circ\text{C}$ )	MTP5N05/MTP5N06 MTP4N08, MTP4N10	$V_{DS(on)}$	— — — —	3.75 3.0 4.8 3.2 Vdc
Forward Transconductance ( $V_{DS} = 15 \text{ V}, I_D = 2.5 \text{ A}$ ) ( $V_{DS} = 15 \text{ V}, I_D = 2.0 \text{ A}$ )	MTP5N05/MTP5N06 MTP4N08/MTP4N10	$g_{fs}$	0.75 0.75	— — mhos

<b>DYNAMIC CHARACTERISTICS</b>				
Input Capacitance ( $V_{DS} = 25 \text{ V}, V_{GS} = 0, f = 1.0 \text{ MHz}$ )		$C_{iss}$	—	300 pF
Output Capacitance ( $V_{DS} = 25 \text{ V}, V_{GS} = 0, f = 1.0 \text{ MHz}$ )		$C_{oss}$	—	250 pF
Reverse Transfer Capacitance ( $V_{DS} = 25 \text{ V}, V_{GS} = 0, f = 1.0 \text{ MHz}$ )		$C_{rss}$	—	60 pF

<b>SWITCHING CHARACTERISTICS* (<math>T_J = 100^\circ\text{C}</math>)</b>					
Turn-On Delay Time	$V_{DS} = 25 \text{ V}, I_D = 0.5 \text{ Rated } I_D,$ $R_{gen} = 50 \text{ ohms},$ See Figures 1 and 2)	$t_{d(on)}$	—	20	ns
Rise Time		$t_r$	—	80	
Turn-Off Delay Time		$t_{d(off)}$	—	30	
Fall Time		$t_f$	—	30	

Characteristic		Symbol	Typ	Unit
Forward On-Voltage	$(I_S = \text{Rated } I_D,$ $V_{GS} = 0.$	$V_{SD}$	2.5	Vdc
Forward Turn-On Time		$t_{on}$	150	ns
Reverse Recovery Time		$t_{rr}$	250	ns

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

FIGURE 1 — SWITCHING TEST CIRCUIT

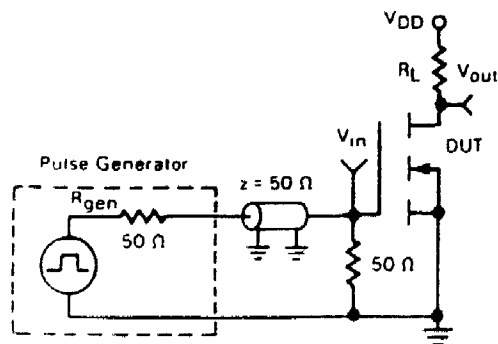


FIGURE 2 — SWITCHING WAVEFORMS

