

## Power Field Effect Transistor N-Channel Enhancement-Mode Silicon Gate TMOS

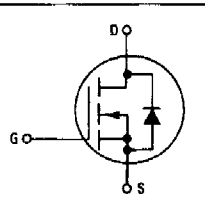
These TMOS Power FETs are designed for high voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

- 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



**MTH6N55  
MTH6N60  
MTM6N60**

**TMOS POWER FETs  
6 AMPERES  
 $r_{DS(on)} = 1.2 \text{ OHMS}$   
550 and 600 VOLTS**



### MAXIMUM RATINGS

Rating	Symbol	MTH6N55	MTH6N60 MTM6N60	Unit
Drain-Source Voltage	$V_{DSS}$	550	600	Vdc
Drain-Gate Voltage ( $R_{GS} = 1 \text{ M}\Omega$ )	$V_{DGR}$	550	600	Vdc
Gate-Source Voltage Continuous Non-repetitive ( $t_p \leq 50 \mu\text{s}$ )	$V_{GS}$ $V_{GSM}$	$\pm 20$ $\pm 40$		Vdc Vpk
Drain Current Continuous Pulsed	$I_D$ $I_{DM}$	6 30		Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	150 1.2		Watts W/°C
Operating and Storage Temperature Range	$T_J, T_{stg}$	-65 to 150		°C

### THERMAL CHARACTERISTICS

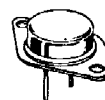
Thermal Resistance — Junction to Case — Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	0.83 30		°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds	$T_L$	275		°C

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

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Drain-Source Breakdown Voltage ( $V_{GS} = 0, I_D = 0.25 \text{ mA}$ ) MTH6N55 MTH6N60, MTM6N60	$V_{(BR)DSS}$	550 600	— —	Vdc
Zero Gate Voltage Drain Current ( $V_{DS} = \text{Rated } V_{DSS}, V_{GS} = 0$ ) ( $V_{DS} = 0.8 \text{ Rated } V_{DSS}$ , $V_{GS} = 0, T_J = 125^\circ\text{C}$ )	$I_{DSS}$	— —	0.2 1	mAdc



MTM6N60  
TO-204AA



MTH6N55  
MTH6N60  
TO-218AC

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MTH/MTM6N65, 60

ELECTRICAL CHARACTERISTICS — continued (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Gate-Body Leakage Current, Forward (V <sub>GSF</sub> = 20 Vdc, V <sub>DS</sub> = 0)	I <sub>GSSF</sub>	—	100	nAdc
Gate-Body Leakage Current, Reverse (V <sub>GSR</sub> = 20 Vdc, V <sub>DS</sub> = 0)	I <sub>GSSR</sub>	—	100	nAdc

**ON CHARACTERISTICS\***

Gate Threshold Voltage (V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1 mA) T <sub>J</sub> = 100°C	V <sub>GS(th)</sub>	2 1.5	4.5 4	Vdc
Static Drain-Source On-Resistance (V <sub>GS</sub> = 10 Vdc, I <sub>D</sub> = 3 Adc)	r <sub>DS(on)</sub>	—	1.2	Ohms
Drain-Source On-Voltage (V <sub>GS</sub> = 10 V) (I <sub>D</sub> = 6 Adc) (I <sub>D</sub> = 3 Adc, T <sub>J</sub> = 100°C)	V <sub>DS(on)</sub>	— —	9 7.2	Vdc
Forward Transconductance (V <sub>DS</sub> = 15 V, I <sub>D</sub> = 3 A)	g <sub>FS</sub>	2	—	mhos

**DYNAMIC CHARACTERISTICS**

Input Capacitance	(V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0, f = 1 MHz) See Figure 11	C <sub>iss</sub>	—	1800	pF
Output Capacitance		C <sub>oss</sub>	—	350	
Reverse Transfer Capacitance		C <sub>rss</sub>	—	150	

**SWITCHING CHARACTERISTICS\* (T<sub>J</sub> = 100°C)**

Turn-On Delay Time	(V <sub>DD</sub> = 25 V, I <sub>D</sub> = 0.6 Rated I <sub>D</sub> R <sub>gen</sub> = 50 ohms) See Figures 13 and 14	t <sub>d(on)</sub>	—	60	ns
Rise Time		t <sub>r</sub>	—	150	
Turn-Off Delay Time		t <sub>d(off)</sub>	—	200	
Fall Time		t <sub>f</sub>	—	120	
Total Gate Charge	(V <sub>DS</sub> = 0.8 Rated V <sub>DSS</sub> , I <sub>D</sub> = Rated I <sub>D</sub> , V <sub>GS</sub> = 10 V) See Figure 12	Q <sub>g</sub>	65 (Typ)	65	nC
Gate-Source Charge		Q <sub>gs</sub>	25 (Typ)	—	
Gate-Drain Charge		Q <sub>gd</sub>	30 (Typ)	—	

**SOURCE DRAIN DIODE CHARACTERISTICS\***

Forward On-Voltage	(I <sub>S</sub> = Rated I <sub>D</sub> , V <sub>GS</sub> = 0)	V <sub>SD</sub>	1 (Typ)	1.4	Vdc
Forward Turn-On Time		t <sub>on</sub>	Limited by stray inductance		
Reverse Recovery Time		t <sub>rr</sub>	600 (Typ)	—	ns

**INTERNAL PACKAGE INDUCTANCE (TO-204)**

Internal Drain Inductance (Measured from the contact screw on the header closer to the source pin and the center of the die)	L <sub>d</sub>	5 (Typ)	—	nH
Internal Source Inductance (Measured from the source pin, 0.25" from the package to the source bond part)	L <sub>s</sub>	12.5 (Typ)	—	

**INTERNAL PACKAGE INDUCTANCE (TO-218)**

Internal Drain Inductance (Measured from screw on tab to center of die) (Measured from the drain lead 0.25" from package to center of die)	L <sub>d</sub>	4 (Typ) 5 (Typ)	—	nH
Internal Source Inductance (Measured from the source lead 0.25" from package to center of die)	L <sub>s</sub>	10 (Typ)	—	

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