

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

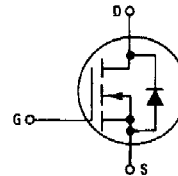
These TMOS Power FETs are designed for high voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

- 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}		± 20 ± 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°C	P_D		150 1.2	Watts W/°C
Operating and Storage Temperature Range	T_J, T_{stg}	-65 to 150		°C

THERMAL CHARACTERISTICS

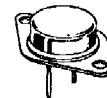
Thermal Resistance — Junction to Case — Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$		0.83 30	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds	T_L		275	°C

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	$V_{(BR)DSS}$			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_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Gate-Body Leakage Current, Forward (V _{GSF} = 20 Vdc, V _{DS} = 0)	I _{GSSF}	—	100	nAdc
Gate-Body Leakage Current, Reverse (V _{GSR} = 20 Vdc, V _{DS} = 0)	I _{GSSR}	—	100	nAdc

ON CHARACTERISTICS*

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

DYNAMIC CHARACTERISTICS

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

SWITCHING CHARACTERISTICS* (T_J = 100°C)

Turn-On Delay Time	(V _{DD} = 25 V, I _D = 0.6 Rated I _D R _{gen} = 50 ohms) See Figures 13 and 14	t _{d(on)}	—	60	ns
Rise Time		t _r	—	150	
Turn-Off Delay Time		t _{d(off)}	—	200	
Fall Time		t _f	—	120	
Total Gate Charge	(V _{DS} = 0.8 Rated V _{DSS} , I _D = Rated I _D , V _{GS} = 10 V) See Figure 12	Q _g	65 (Typ)	65	nC
Gate-Source Charge		Q _{gs}	25 (Typ)	—	
Gate-Drain Charge		Q _{gd}	30 (Typ)	—	

SOURCE DRAIN DIODE CHARACTERISTICS*

Forward On-Voltage	(I _S = Rated I _D , V _{GS} = 0)	V _{SD}	1 (Typ)	1.4	Vdc
Forward Turn-On Time		t _{on}	Limited by stray inductance		
Reverse Recovery Time		t _{rr}	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 _d	5 (Typ)	—	nH
Internal Source Inductance (Measured from the source pin, 0.25" from the package to the source bond part)	L _s	12.5 (Typ)	—	nH

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 _d	4 (Typ) 5 (Typ)	—	nH
Internal Source Inductance (Measured from the source lead 0.25" from package to center of die)	L _s	10 (Typ)	—	nH

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