

Designer's Data Sheet

Power Field Effect Transistor

N-Channel Enhancement-Mode

Silicon Gate TMOS

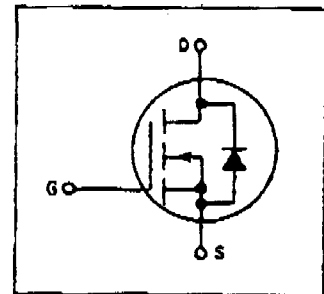
These Logic Level TMOS Power FETs are designed for high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

- Low Drive Requirement to Interface Power Loads to Logic Level ICs or Microprocessors — $V_{GS(th)} = 2$ Volts max
- 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



MTP12N08L
MTP12N10L

TMOS POWER FETs
LOGIC LEVEL
AMPERES
 $r_{DS(on)} = 0.18$ OHM
80 and 100 VOLTS



MAXIMUM RATINGS

Rating	Symbol	MTP12N08L	MTP12N10L	Unit
Drain-Source Voltage	V_{DSS}	80	100	Vdc
Drain-Gate Voltage ($R_{GS} = 1$ M Ω)	V_{DGR}	80	100	Vdc
Gate-Source Voltage	V_{GS}	≈ 15		Vdc
Drain Current — Continuous	I_D	12		Adc
— Pulsed	I_{DM}	30		
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	75 0.6		Watts W/°C
Operating and Storage Temperature Range	T_J, T_{stg}	-65 to 150		°C

THERMAL CHARACTERISTICS

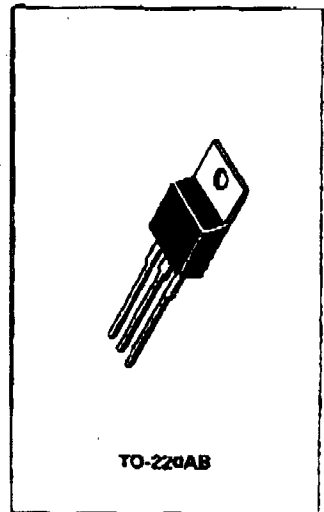
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.67	°C/W
Junction to Ambient	$R_{\theta JA}$	62.5	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds	T_L	275	°C

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 ($V_{GS} = 0$, $I_D = 250$ μA)	$V_{(BR)DSS}$	80 100	—	Vdc
Zero Gate Voltage Drain Current ($V_{DS} = \text{Rated } V_{DSS}$, $V_{GS} = 0$) ($V_{DS} = \text{Rated } V_{DSS}$, $V_{GS} = 0$, $T_J = 125^\circ\text{C}$)	I_{DSS}	— —	1 50	μAdc



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Quality Semi-Conductors



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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS (continued)

Gate-Body Leakage Current, Forward ($V_{GSF} = 15\text{ Vdc}$, $V_{DS} = 0$)	I_{GSSF}	—	100	nAde
Gate Body Leakage Current, Reverse ($V_{GSR} = 15\text{ Vdc}$, $V_{DS} = 0$)	I_{GSSR}	—	100	nAde

ON CHARACTERISTICS

Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 1\text{ mA}$) ($T_J = 100^\circ\text{C}$)	$V_{GS(th)}$	1 0.75	2 1.5	Vdc
Static Drain-Source On-Resistance ($V_{GS} = 5\text{ Vdc}$, $I_D = 6\text{ Ade}$)	$r_{DS(on)}$	—	0.18	Ohm
Drain-Source On-Voltage ($V_{GS} = 5\text{ V}$) ($I_D = 12\text{ Ade}$) ($I_D = 6\text{ Ade}$, $T_J = 100^\circ\text{C}$)	$V_{DS(on)}$	— —	2.4 1.6	Vdc
Forward Transconductance ($V_{DS} = 10\text{ V}$, $I_D = 6\text{ A}$)	g_{FS}	5	—	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	$V_{DS} = 25\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$	C_{iss}	—	800	pF
	$V_{GS} = 15\text{ V}$, $V_{DS} = 0$, $f = 1\text{ MHz}$		—	2600	
Reverse Transfer Capacitance	$V_{DS} = 25\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$	C_{rss}	—	350	pF
	$V_{GS} = 15\text{ V}$, $V_{DS} = 0$, $f = 1\text{ MHz}$		—	1600	
Output Capacitance	$V_{DS} = 25\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$	C_{oss}	—	100	pF

SWITCHING CHARACTERISTICS ($T_J = 100^\circ\text{C}$)

Turn-On Delay Time	$(V_{DD} = 25\text{ V}$, $I_D = 6\text{ A}$, $V_{GS} = 5\text{ V}$, $R_{gen} = 50\text{ ohms}$)	$t_{d(on)}$	—	50	ns
Rise Time		t_r	—	150	
Turn-Off Delay Time		$t_{d(off)}$	—	130	
Fall Time		t_f	—	150	
Total Gate Charge	$(V_{DS} = 0.8\text{ Rated } V_{DSS}$, $I_D = 12\text{ A}$, $V_{GS} = 5\text{ Vdc}$) See Figures 11 and 12.	Q_g	15 (typ)	25	nC
Gate-Source Charge		Q_{gs}	3.7 (typ)	—	
Gate-Drain Charge		Q_{gd}	11.3 (typ)	—	

SOURCE DRAIN DIODE CHARACTERISTICS

Forward On-Voltage	$(I_S = \text{Rated } I_D, V_{GS} = 0)$ See Figures 14 and 15.	V_{SD}	1 (typ)	1.25	Vdc
Forward Turn-On Time		t_{on}	Limited by stray inductance		
Reverse Recovery Time		t_{rr}	325 (typ)	—	ns

INTERNAL PACKAGE INDUCTANCE

Internal Drain Inductance (Measured from the contact screw on tab to center of die) (Measured from the drain lead 0.25" from package to center of die)	L_d	3.5 (typ) 4.5 (typ)	— —	nH
Internal Source Inductance (Measured from the source lead 0.25" from package to source bond pad.)	L_s	7.5 (typ)	—	

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