

Designer's Data Sheet
Power Field Effect Transistor
N-Channel Enhancement-Mode
Silicon Gate TMOS

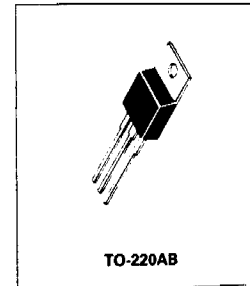
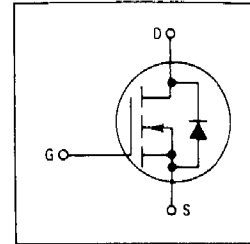
These TMOS Power FETs are designed for medium voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

- 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



MTP10N35
MTP10N40

TMOS POWER FETs
10 AMPERES
 $r_{DS(on)} = 0.55 \text{ OHM}$
350 and 400 VOLTS



MAXIMUM RATINGS

Rating	Symbol	MTP		Unit
		10N35	10N40	
Drain-Source Voltage	V_{DSS}	350	400	Vdc
Drain-Gate Voltage ($R_{GS} = 1 \text{ M}\Omega$)	V_{DGR}	350	400	Vdc
Gate-Source Voltage — Continuous — Non-repetitive ($t_p \approx 50 \mu\text{s}$)	V_{GS}	≈ 20		Vdc
	V_{GSM}	≈ 40		Vpk
Drain Current Continuous Pulsed	I_D	10		Adc
	I_{DM}	40		
Total Power Dissipation (θ $T_C = 25^\circ\text{C}$ Derate above 25°C)	P_D	125	1	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	$R_{\theta JC}$	1	°C/W
	$R_{\theta JA}$	62.5	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds	T_L	275	°C



New Jersey Semi-Conductor Products, Inc.

20 STERN AVE.
SPRINGFIELD, NEW JERSEY 07081
U.S.A.

TELEPHONE: (201) 376-2922
(212) 227-6005
FAX: (201) 376-8960

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

OFF CHARACTERISTICS

Drain-Source Breakdown Voltage (V _{GS} = 0, I _D = 0.25 mA)	MTP10N35 MTP10N40	V(BR)DSS	350 400	—	Vdc
Zero Gate Voltage Drain Current (V _{DS} = Rated V _{DSS} , V _{GS} = 0) (V _{DS} = 0.8 Rated V _{DSS} , V _{GS} = 0, T _J = 125°C)		I _{DSS}	— —	0.2 1	mAdc
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 = 5 Adc)		r _{DS(on)}	—	0.55	Ohm
Drain-Source On-Voltage (V _{GS} = 10 V) (I _D = 10 Adc) (I _D = 5 Adc, T _J = 100°C)		V _{DS(on)}	— —	6 4.75	Vdc
Forward Transconductance (V _{DS} = 10 V, I _D = 5 A)		g _{FS}	4	—	mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	(V _{DS} = 25 V, V _{GS} = 0, f = 1 MHz) See Figure 11	C _{iss}	—	1600	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 = 0.5 Rated I _D R _{gen} = 50 ohms) See Figures 9, 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	40 (Typ)	60	nC
Gate-Source Charge		Q _{gs}	20 (Typ)	—	
Gate-Drain Charge		Q _{gd}	20 (Typ)	—	

SOURCE DRAIN DIODE CHARACTERISTICS*

Forward On-Voltage	(I _S = Rated I _D V _{GS} = 0)	V _{SD}	1.1 (Typ)	2	Vdc
Forward Turn-On Time		t _{on}	Limited by stray inductance		
Reverse Recovery Time		t _{rr}	600 (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 < 300 μs, Duty Cycle < 2%.

