New Jersey Semi-Conductor Products, Inc.

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

TELEPHONE: (973) 376-2922
(212) 227-6005
FAX: (973) 376-8960

MTM8N20
MTP8N20

Designer's Data Sheet

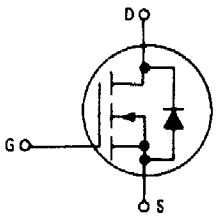
Power Field Effect Transistor
N-Channel Enhancement-Mode
Silicon Gate

TMOS®

TMOS POWER FETs
8 AMPERES
$R_{DS(on)}$ = 0.4 OHM
200 VOLTS

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

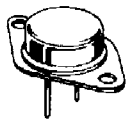


MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	200	Vdc
Drain-Gate Voltage (R_{GS} = 1 MΩ)	V_{DGR}	200	Vdc
Gate-Source Voltage — Continuous — Non-repetitive ($t_p \leq 50\ \mu s$)	V_{GS} V_{GSM}	±20 ±40	Vdc Vpk
Drain Current — Continuous — Pulsed	I_D I_{DM}	8 25	Adc
Total Power Dissipation @ T_C = 25°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

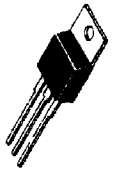
THERMAL CHARACTERISTICS

Thermal Resistance Junction to Case		$R_{\theta JC}$	1.67	°C/W
Junction to Ambient	TO-204	$R_{\theta JA}$	30	
	TO-220		62.5	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds	TO-220	T_L	260	°C
	TO-204		300	



MTM8N20

TO-204AA



MTP8N20

TO-220AB

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

Quality Semi-Conductors

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) MTM/MTP8N20	$V_{(BR)DSS}$	200	—	Vdc
Zero Gate Voltage Drain Current (V_{DS} = Rated V_{DSS}, V_{GS} = 0) (V_{DS} = Rated V_{DSS}, V_{GS} = 0, T_J = 125°C)	I_{DSS}	— —	10 100	μAdc
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 = 4 Adc)	$R_{DS(on)}$	—	0.4	Ohm
Drain-Source On-Voltage (V_{GS} = 10 V) (I_D = 8 Adc) (I_D = 4 Adc, T_J = 100°C)	$V_{DS(on)}$	— —	4 3.6	Vdc
Forward Transconductance (V_{DS} = 15 V, I_D = 4 A)	g_{FS}	3	—	mhos
DYNAMIC CHARACTERISTICS				
Input Capacitance	C_{iss}	—	800	pF
Output Capacitance	C_{oss}	—	300	
Reverse Transfer Capacitance	C_{rss}	—	100	
(V_{DS} = 25 V, V_{GS} = 0, f = 1 MHz) See Figure 11				
SWITCHING CHARACTERISTICS* (T_J = 100°C)				
Turn-On Delay Time	$t_{d(on)}$	—	40	ns
Rise Time	t_r	—	150	
Turn-Off Delay Time	$t_{d(off)}$	—	200	
Fall Time	t_f	—	100	
(V_{DD} = 25 V, I_D = 0.5 Rated I_D, R_{gen} = 50 ohms) See Figures 9, 13 and 14				
Total Gate Charge	Q_g	15 (Typ)	30	nC
Gate-Source Charge	Q_{gs}	8 (Typ)	—	
Gate-Drain Charge	Q_{gd}	7 (Typ)	—	
(V_{DS} = 0.8 Rated V_{DSS}, I_D = Rated I_D, V_{GS} = 10 V)				
SOURCE DRAIN DIODE CHARACTERISTICS*				
Forward On-Voltage	V_{SD}	1 (Typ)	2.5	Vdc
Forward Turn-On Time	t_{on}	Limited by stray inductance		
Reverse Recovery Time	t_{rr}	325 (Typ)	—	ns
(I_S = Rated I_D, V_{GS} = 0)				
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 pad)	L_s	12.5 (Typ)	—	
INTERNAL PACKAGE INDUCTANCE (TO-220)				
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%.