New Jersey Semi-Conductor Products, Inc.

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MTM12P05
MTM12P06
MTM12P08
MTM12P10
MTP12P05
MTP12P06
MTP12P08
MTP12P10

Designer's Data Sheet

Power Field Effect Transistor

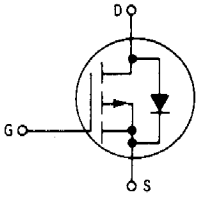
P-Channel Enhancement-Mode Silicon Gate TMOS

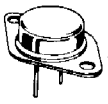
These TMOS Power FETs are designed for medium voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

- 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

TMOS™

TMOS POWER FETs
12 AMPERES
$r_{DS(on)}$ = 0.3 OHM
50, 60, 80 and 100 VOLTS





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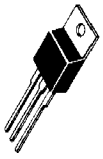
TO-204AA



MTP12P05
MTP12P06
MTP12P08
MTP12P10

TO-220AB

MAXIMUM RATINGS

Rating	Symbol	MTM OR MTP				Unit
		12P05	12P06	12P08	12P10	
Drain-Source Voltage	V_{DSS}	50	60	80	100	Vdc
Drain-Gate Voltage (R_{GS} = 1 MΩ)	V_{DGR}	50	60	80	100	Vdc
Gate-Source Voltage — Continuous	V_{GS}	±20				Vdc
— Non-repetitive ($t_p \leq 50\ \mu s$)	V_{GSM}	±40				Vpk
Drain Current						Adc
Continuous	I_D	12				
Pulsed	I_{DM}	28				
Total Power Dissipation @ T_C = 25°C	P_D	75				Watts
Derate above 25°C		0.6				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		T_L	275	°C

Quality Semi-Conductors

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MTM/MTP12P05, 06, 08, 10

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/MTP12P05	$V_{(BR)DSS}$	50	—	Vdc
	MTM/MTP12P06		60	—	
	MTM/MTP12P08		80	—	
	MTM/MTP12P10		100	—	
Zero Gate Voltage Drain Current (V_{DS} = Rated V_{DSS}, V_{GS} = 0)		I_{DSS}	—	10	μAdc
(V_{DS} = Rated V_{DSS}, V_{GS} = 0, T_J = 125°C)			—	100	
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)		$V_{GS(th)}$	2	4.5	Vdc
T_J = 100°C			1.5	4	
Static Drain-Source On-Resistance (V_{GS} = 10 Vdc, I_D = 6 Adc)		$r_{DS(on)}$	—	0.3	Ohm
Drain-Source On-Voltage (V_{GS} = 10 V)		$V_{DS(on)}$			Vdc
(I_D = 12 Adc)			—	4.2	
(I_D = 6 Adc, T_J = 100°C)			—	3.8	
Forward Transconductance (V_{DS} = 15 V, I_D = 6 A)		g_{FS}	2	—	mhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0, f = 1 MHz) See Figure 10	C_{iss}	—	920	pF
Output Capacitance		C_{oss}	—	575	
Reverse Transfer Capacitance		C_{rss}	—	200	
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 12 and 13	$t_{d(on)}$	—	50	ns
Rise Time		t_r	—	150	
Turn-Off Delay Time		$t_{d(off)}$	—	150	
Fall Time		t_f	—	150	
Total Gate Charge	(V_{DS} = 0.8 Rated V_{DSS}, I_D = Rated I_D, V_{GS} = 10 V) See Figure 11	Q_g	33 (Typ)	50	nC
Gate-Source Charge		Q_{gs}	16 (Typ)	—	
Gate-Drain Charge		Q_{gd}	17 (Typ)	—	
SOURCE DRAIN DIODE CHARACTERISTICS*					
Forward On-Voltage	(I_S = Rated I_D, V_{GS} = 0)	V_{SD}	4 (Typ)	5.5	Vdc
Forward Turn-On Time		t_{on}	Limited by stray inductance		
Reverse Recovery Time		t_{rr}	300 (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 pad)		L_s	12.5 (Typ)	—	
INTERNAL PACKAGE INDUCTANCE (TO-220)					
Internal Drain Inductance		L_d			nH
(Measured from the contact screw on tab to center of die)			3.5 (Typ)	—	
(Measured from the drain lead 0.25" from package to center of die)			4.5 (Typ)	—	
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%.