MFE930
MFE960
MFE990

2.0 AMPERE

N-CHANNEL TMOS FET

30, 60, 90 VOLTS

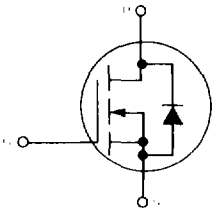
3

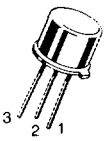
N-CHANNEL ENHANCEMENT-MODE TMOS FIELD-EFFECT TRANSISTOR

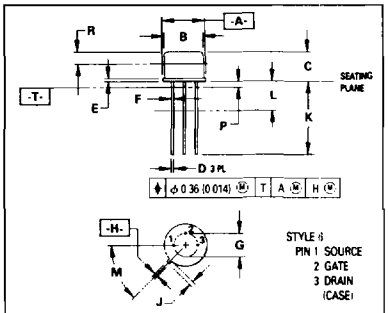
These TMOS FETs are designed for high-speed switching applications such as switching power supplies, CMOS logic, microprocessor or TTL-to-high current interface and line drivers.

- Fast Switching Speed — $t_{on} = t_{off} = 7.0$ ns Typ
- Low On-Resistance — 0.9 Ohm Typ MFE930
  1.2 Ohm Typ MFE960 and MFE990
- Low Drive Requirement, $V_{GS(th)} = 3.5$ V Max
- Inherent Current Sharing Capability Permits Easy Paralleling of Many Devices

TMOS™







NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH
3. DIMENSION J MEASURED FROM DIMENSION A MAXIMUM.
4. DIMENSION B SHALL NOT VARY MORE THAN 0.25 (0.010) IN ZONE R. THIS ZONE CONTROLLED FOR AUTOMATIC HANDLING
5. DIMENSION F APPLIES BETWEEN DIMENSION P AND L. DIMENSION D APPLIES BETWEEN DIMENSION L AND K MINIMUM. LEAD DIAMETER IS UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	8.51	9.39	0.335	0.370
B	7.75	8.50	0.305	0.335
C	6.10	6.60	0.240	0.260
D	0.41	0.53	0.016	0.021
E	0.23	1.04	0.009	0.041
F	0.41	0.48	0.016	0.019
G	5.08 BSC		0.200 BSC	
H	0.72	0.86	0.028	0.034
J	0.74	1.14	0.029	0.045
K	12.70	19.05	0.500	0.750
L	6.35	--	0.250	--
M	45° BSC		45° BSC	
P	--	1.27	--	0.050
R	2.54	--	0.100	--

CASE 79-04
TO-205AD

MAXIMUM RATINGS

Rating	Symbol	MFE930	MFE960	MFE990	Unit
Drain-Source Voltage	V_{DSS}	35	60	90	Vdc
Drain-Gate Voltage	V_{DGO}	35	60	90	Vdc
Gate Source Voltage	V_{GS}	±30			Vdc
Drain Current Continuous (1) Pulsed (2)	 I_D I_{DM}	 2.0 3.0			Adc
Total Power Dissipation @ $T_C = 25°C$ Derate above 25°C	P_D	6.25 50			Watts mW/°C
Operating and Storage Temperature Range	T_J, T_{stg}	−55 to 150			°C

(1) The Power Dissipation of the package may result in a lower continuous drain current.
(2) Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage (V_{GS} = 0, I_D = 10 μA)	MFE930	$V_{(BR)DSS}$	35	—	—	Vdc
	MFE960		60	—	—	
	MFE990		90	—	—	
Zero Gate Voltage Drain Current (V_{DS} = Maximum Rating, V_{GS} = 0)		I_{DSS}	—	—	10	μAdc
Gate-Body Leakage Current (V_{GS} = 15 Vdc, V_{DS} = 0)		I_{GSS}	—	—	50	nAdc
ON CHARACTERISTICS*						
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 1.0 mA)		$V_{GS(th)}$	1.0	—	3.5	Vdc
Drain-Source On-Voltage (V_{GS} = 10 V)		$V_{DS(on)}$				Vdc
(I_D = 0.5A)	MFE930		—	0.4	0.7	
	MFE960		—	0.6	0.8	
	MFE990		—	0.6	1.0	
(I_D = 1.0 A)	MFE930		—	0.9	1.4	
	MFE960		—	1.2	1.7	
	MFE990		—	1.2	2.0	
(I_D = 2.0 A)	MFE930		—	2.2	3.0	
	MFE960		—	2.8	3.5	
	MFE990		—	2.8	4.0	
Static Drain-Source On-Resistance (V_{GS} = 10 Vdc, I_D = 1.0 Adc)	MFE930	$r_{DS(on)}$	—	0.9	1.4	Ohms
	MFE960		—	1.2	1.7	
	MFE990		—	1.2	2.0	
On-State Drain Current (V_{DS} = 25 V, V_{GS} = 10 V)		$I_{D(on)}$	1.0	2.0	—	Amps
Forward Transconductance (V_{DS} = 25 V, I_D = 0.5 A)		g_{FS}	200	380	—	mmhos
DYNAMIC CHARACTERISTICS						
Input Capacitance (V_{DS} = 25 V, V_{GS} = 0, f = 1.0 MHz)		C_{iss}	—	60	70	pF
Output Capacitance (V_{DS} = 25 V, V_{GS} = 0, f = 1.0 MHz)		C_{oss}	—	49	60	pF
Reverse Transfer Capacitance (V_{DS} = 25 V, V_{GS} = 0, f = 1.0 MHz)		C_{rss}	—	13	18	pF
SWITCHING CHARACTERISTICS*						
Turn-On Time See Figure 1		t_{on}	—	7.0	15	ns
Turn-Off Time See Figure 1		t_{off}	—	7.0	15	ns

* Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

RESISTIVE SWITCHING

FIGURE 1 — SWITCHING TEST CIRCUIT

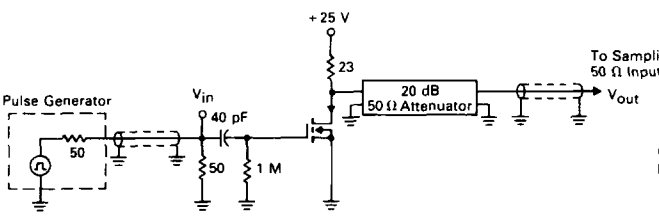


FIGURE 2 — SWITCHING WAVEFORMS

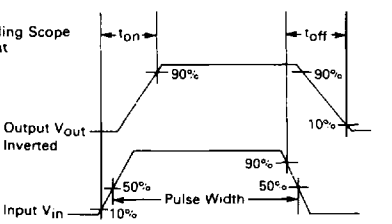


FIGURE 3 — ON VOLTAGE versus TEMPERATURE

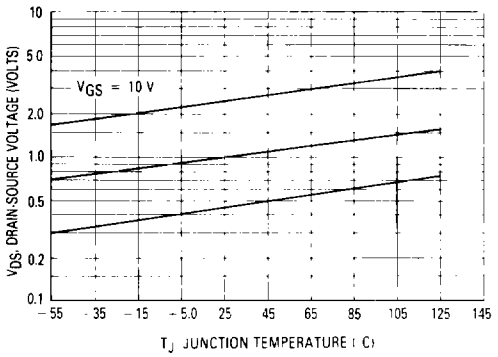


FIGURE 4 — CAPACITANCE VARIATION

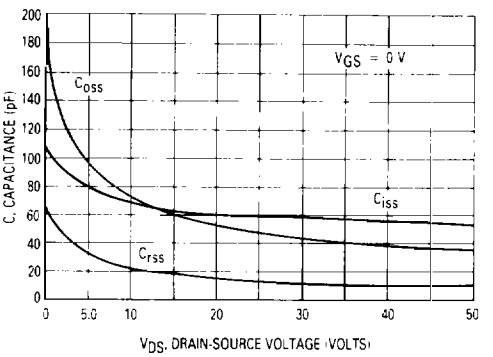


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FIGURE 5 — TRANSFER CHARACTERISTIC

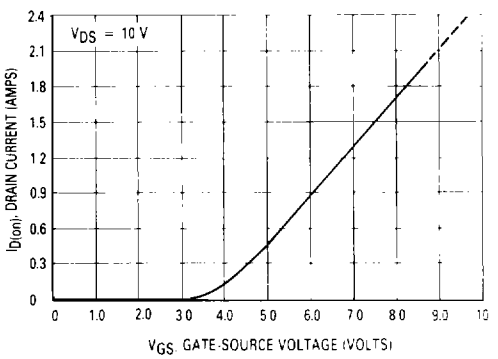

FIGURE 6 — OUTPUT CHARACTERISTIC

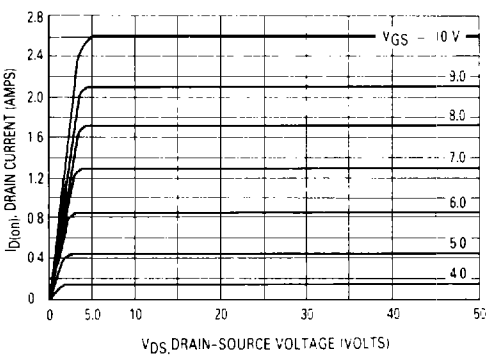

FIGURE 7 — SATURATION CHARACTERISTIC