TMOS FET Transistor
N–Channel — Enhancement

3 DRAIN

2 GATE

1 SOURCE

2N7000

Motorola Preferred Device

CASE 29–04, STYLE 22
TO–92 (TO–226AA)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain Source Voltage	V_{DSS}	60	Vdc
Drain–Gate Voltage (R_{GS} = 1.0 MΩ)	V_{DGR}	60	Vdc
Gate–Source Voltage — Continuous — Non–repetitive ($t_p \le 50$ µs)	V_{GS} V_{GSM}	±20 ±40	Vdc Vpk
Drain Current Continuous Pulsed	 I_D I_{DM}	 200 500	mAdc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	350 2.8	mW mW/°C
Operating and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	357	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/16″ from case for 10 seconds	T_L	300	°C

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 = 10 µAdc)	$V_{(BR)DSS}$	60	—	Vdc
Zero Gate Voltage Drain Current (V_{DS} = 48 Vdc, V_{GS} = 0) (V_{DS} = 48 Vdc, V_{GS} = 0, T_J = 125°C)	I_{DSS}	 — —	 1.0 1.0	 µAdc mAdc
Gate–Body Leakage Current, Forward (V_{GSF} = 15 Vdc, V_{DS} = 0)	I_{GSSF}	—	−10	nAdc
ON CHARACTERISTICS(1)				
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 1.0 mAdc)	$V_{GS(th)}$	0.8	3.0	Vdc
Static Drain–Source On–Resistance (V_{GS} = 10 Vdc, I_D = 0.5 Adc) (V_{GS} = 4.5 Vdc, I_D = 75 mAdc)	$r_{DS(on)}$	 — —	 5.0 6.0	Ohm
Drain–Source On–Voltage (V_{GS} = 10 Vdc, I_D = 0.5 Adc) (V_{GS} = 4.5 Vdc, I_D = 75 mAdc)	$V_{DS(on)}$	 — —	 2.5 0.45	Vdc

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

Preferred devices are Motorola recommended choices for future use and best overall value.

REV 3

2N7000

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

Characteristic		Symbol	Min	Max	Unit
ON CHARACTERISTICS[1] **(continued)**					
On–State Drain Current (V_{GS} = 4.5 Vdc, V_{DS} = 10 Vdc)		$I_{d(on)}$	75	—	mAdc
Forward Transconductance (V_{DS} = 10 Vdc, I_D = 200 mAdc)		g_{fs}	100	—	μmhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0, f = 1.0 MHz)	C_{iss}	—	60	pF
Output Capacitance		C_{oss}	—	25	
Reverse Transfer Capacitance		C_{rss}	—	5.0	
SWITCHING CHARACTERISTICS[1]					
Turn–On Delay Time	(V_{DD} = 15 V, I_D = 500 mA, R_{gen} = 25 ohms, R_L = 25 ohms)	t_{on}	—	10	ns
Turn–Off Delay Time		t_{off}	—	10	

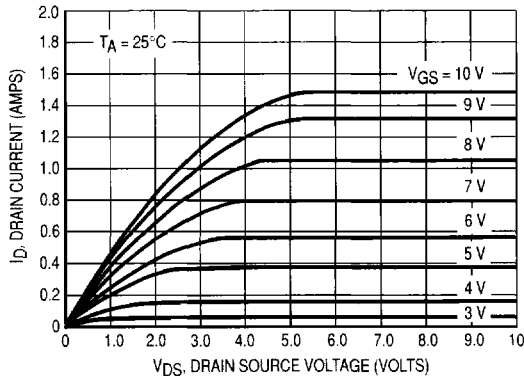1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
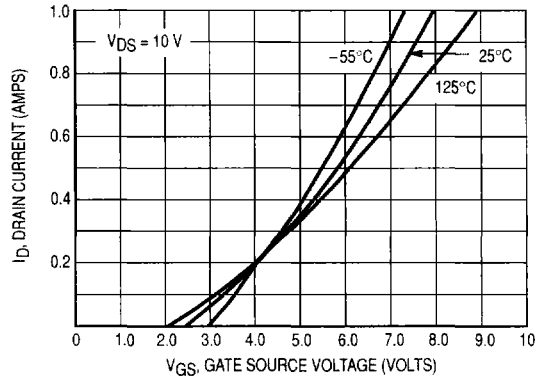

Figure 1. Ohmic Region

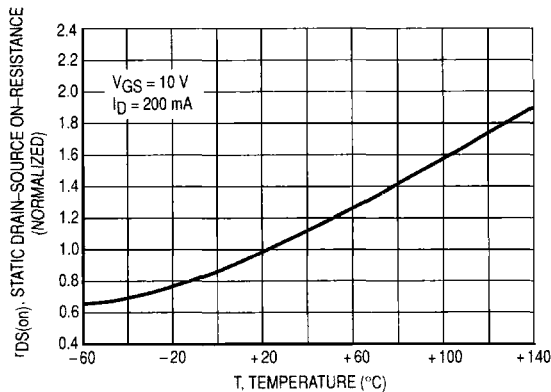**Figure 2. Transfer Characteristics**
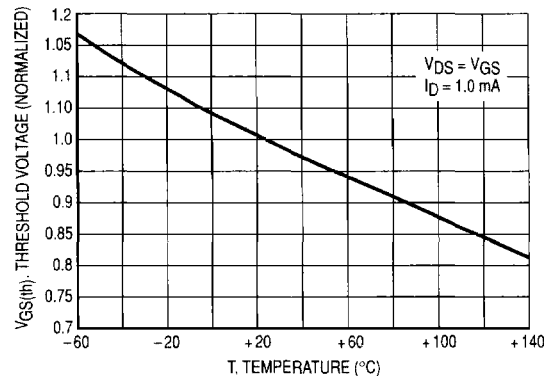

Figure 3. Temperature versus Static Drain–Source On–Resistance

Figure 4. Temperature versus Gate Threshold Voltage