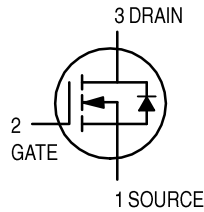


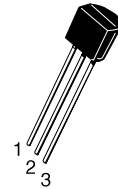


# FET Transistor

## N-Channel — Enhancement



**2N7000**



TO-92 (TO-226AA)

### MAXIMUM RATINGS

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

### THERMAL CHARACTERISTICS

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

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Drain-Source Breakdown Voltage ( $V_{GS} = 0, I_D = 10\ \mu\text{Adc}$ )	$V_{(BR)DSS}$	60	—	Vdc
Zero Gate Voltage Drain Current ( $V_{DS} = 48\ \text{Vdc}, V_{GS} = 0$ ) ( $V_{DS} = 48\ \text{Vdc}, V_{GS} = 0, T_J = 125^\circ\text{C}$ )	$I_{DSS}$	—	1.0 1.0	$\mu\text{Adc}$ mAdc
Gate-Body Leakage Current, Forward ( $V_{GSF} = 15\ \text{Vdc}, V_{DS} = 0$ )	$I_{GSSF}$	—	-10	nAdc

### ON CHARACTERISTICS(1)

Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 1.0\ \text{mAdc}$ )	$V_{GS(th)}$	0.8	3.0	Vdc
Static Drain-Source On-Resistance ( $V_{GS} = 10\ \text{Vdc}, I_D = 0.5\ \text{Adc}$ ) ( $V_{GS} = 4.5\ \text{Vdc}, I_D = 75\ \text{mAdc}$ )	$r_{DS(on)}$	— —	5.0 6.0	Ohm
Drain-Source On-Voltage ( $V_{GS} = 10\ \text{Vdc}, I_D = 0.5\ \text{Adc}$ ) ( $V_{GS} = 4.5\ \text{Vdc}, I_D = 75\ \text{mAdc}$ )	$V_{DS(on)}$	— —	2.5 0.45	Vdc

1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS(1) (continued)</b>				
On-State Drain Current ( $V_{GS} = 4.5\text{ Vdc}$ , $V_{DS} = 10\text{ Vdc}$ )	$I_{d(on)}$	75	—	mAdc
Forward Transconductance ( $V_{DS} = 10\text{ Vdc}$ , $I_D = 200\text{ mAdc}$ )	$g_{fs}$	100	—	$\mu\text{mhos}$

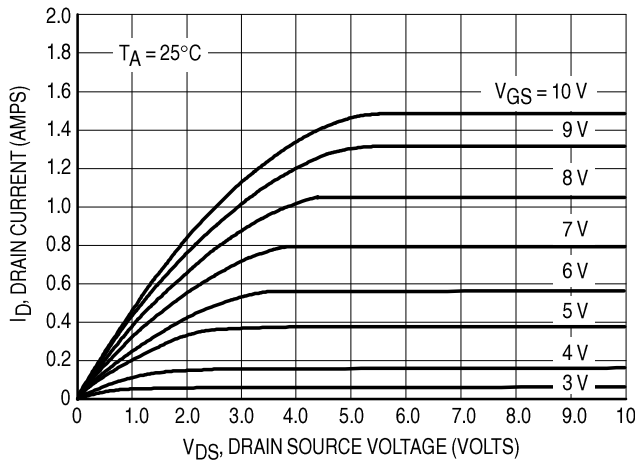
**DYNAMIC CHARACTERISTICS**

Input Capacitance	$(V_{DS} = 25\text{ V}, V_{GS} = 0,$ $f = 1.0\text{ MHz})$	$C_{iss}$	—	60	pF
Output Capacitance		$C_{oss}$	—	25	
Reverse Transfer Capacitance		$C_{rss}$	—	5.0	

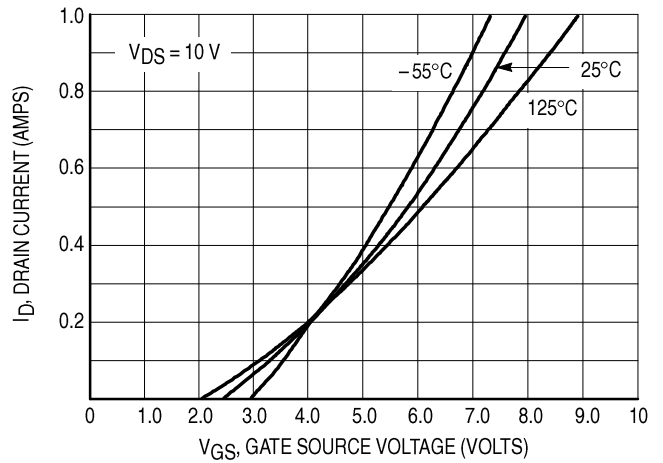
**SWITCHING CHARACTERISTICS(1)**

Turn-On Delay Time	$(V_{DD} = 15\text{ V}, I_D = 500\text{ mA},$ $R_G = 25\ \Omega, R_L = 30\ \Omega, V_{gen} = 10\text{ V})$	$t_{on}$	—	10	ns
Turn-Off Delay Time		$t_{off}$	—	10	

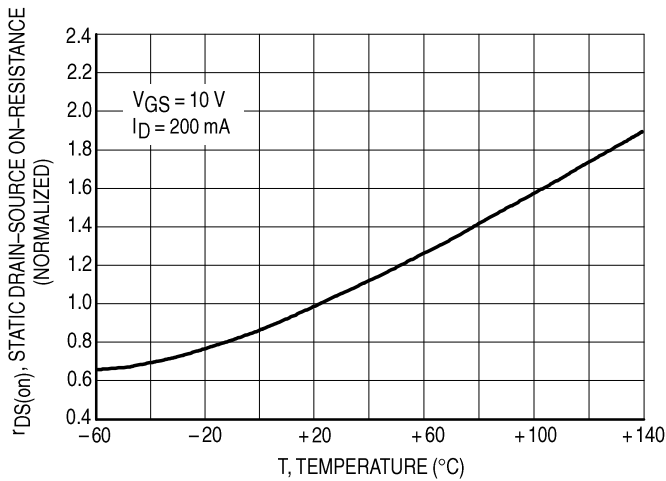
1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .



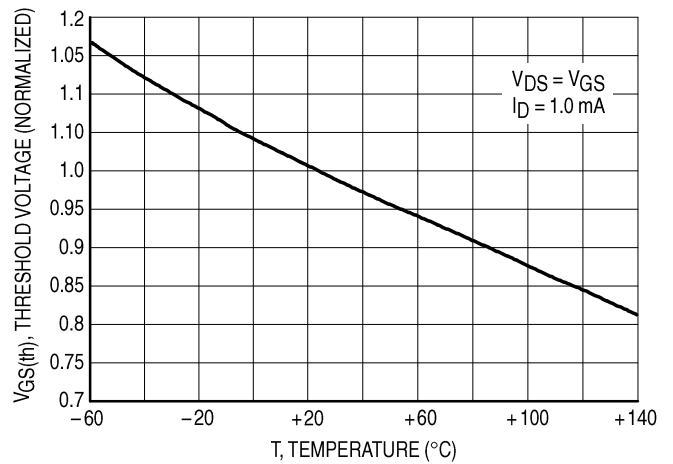
**Figure 1. Ohmic Region**



**Figure 2. Transfer Characteristics**



**Figure 3. Temperature versus Static Drain-Source On-Resistance**



**Figure 4. Temperature versus Gate Threshold Voltage**

