

2N7000

Preferred Device

Small Signal MOSFET 200 mAmps, 60 Volts N-Channel TO-92

Features

- Pb-Free Packages are Available*

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	V_{GS} V_{GSM}	± 20	Vdc
- Continuous - Non-repetitive ($t_p \leq 50 \mu\text{s}$)		± 40	Vpk
Drain Current	I_D I_{DM}	200	mA _{dc}
- Continuous - Pulsed		500	
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°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	$^\circ\text{C}$

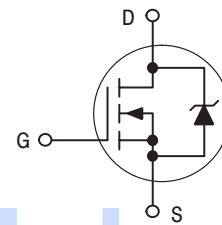


ON Semiconductor®

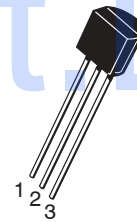
<http://onsemi.com>

**200 mAmps
60 Volts
 $R_{DS(on)} = 5 \Omega$**

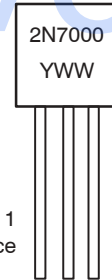
N-Channel



MARKING DIAGRAM & PIN ASSIGNMENT



TO-92
CASE 29
Style 22



Y = Year
WW = Work Week

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 29 of this data sheet.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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

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ELECTRICAL CHARACTERISTICS (T_C = 25°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 μA _{dc})	V _{(BR)DSS}	60	-	V _{dc}
Zero Gate Voltage Drain Current (V _{DS} = 48 V _{dc} , V _{GS} = 0) (V _{DS} = 48 V _{dc} , V _{GS} = 0, T _J = 125°C)	I _{DSS}	-	1.0	μA _{dc} mA _{dc}
Gate-Body Leakage Current, Forward (V _{GSS} = 15 V _{dc} , V _{DS} = 0)	I _{GSSF}	-	-10	nA _{dc}

ON CHARACTERISTICS (Note 1)

Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 1.0 mA _{dc})	V _{GS(th)}	0.8	3.0	V _{dc}
Static Drain-Source On-Resistance (V _{GS} = 10 V _{dc} , I _D = 0.5 A _{dc}) (V _{GS} = 4.5 V _{dc} , I _D = 75 mA _{dc})	r _{DS(on)}	-	5.0 6.0	Ohm
Drain-Source On-Voltage (V _{GS} = 10 V _{dc} , I _D = 0.5 A _{dc}) (V _{GS} = 4.5 V _{dc} , I _D = 75 mA _{dc})	V _{DS(on)}	-	2.5 0.45	V _{dc}
On-State Drain Current (V _{GS} = 4.5 V _{dc} , V _{DS} = 10 V _{dc})	I _{d(on)}	75	-	mA _{dc}
Forward Transconductance (V _{DS} = 10 V _{dc} , I _D = 200 mA _{dc})	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 (Note 1)

Turn-On Delay Time	(V _{DD} = 15 V, I _D = 500 mA, R _G = 25 Ω, R _L = 30 Ω, V _{gen} = 10 V)	t _{on}	-	10	ns
Turn-Off Delay Time		t _{off}	-	10	

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

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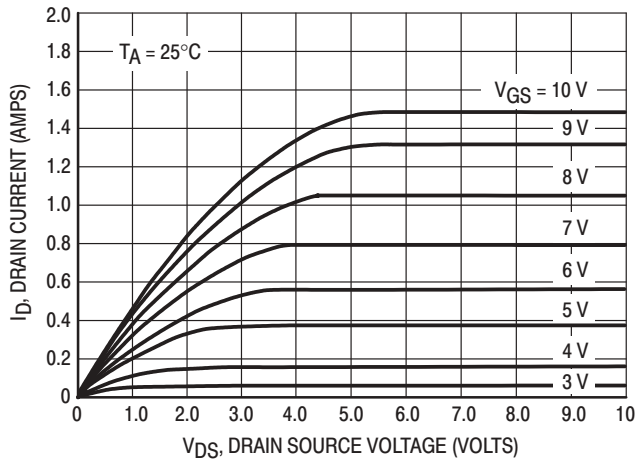


Figure 1. Ohmic Region

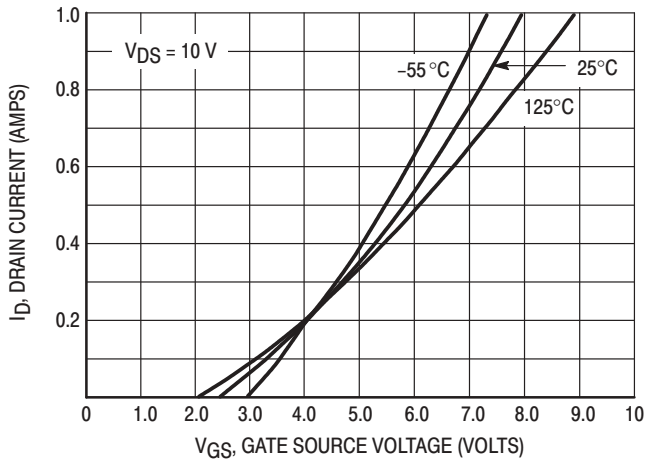


Figure 2. Transfer Characteristics

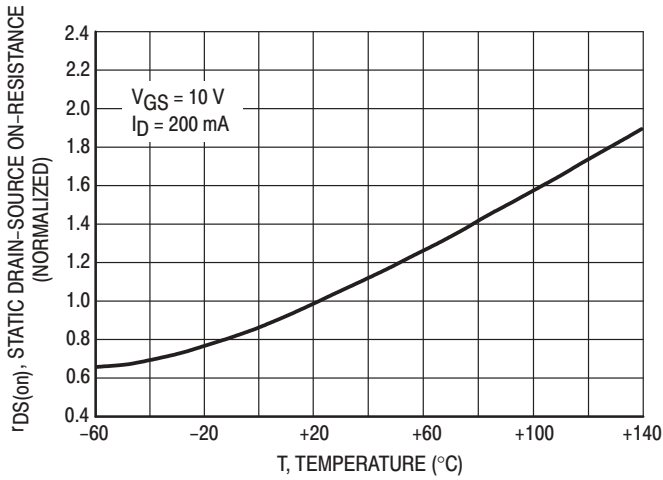


Figure 3. Temperature versus Static Drain-Source On-Resistance

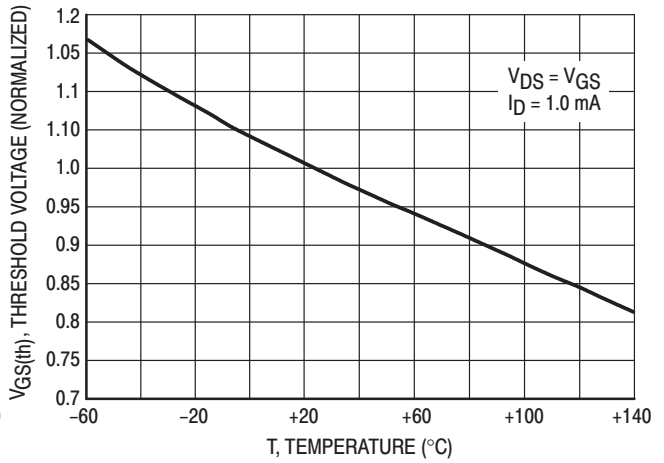


Figure 4. Temperature versus Gate Threshold Voltage

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ORDERING INFORMATION

Device	Package	Shipping†
2N7000	TO-92	1000 Unit/Box
2N7000G	TO-92 (Pb-Free)	1000 Unit/Box
2N7000RLRA	TO-92	2000 Tape & Reel
2N7000RLRAG	TO-92 (Pb-Free)	2000 Tape & Reel
2N7000RLRM	TO-92	2000 Ammo Pack
2N7000RLRMG	TO-92 (Pb-Free)	2000 Ammo Pack
2N7000RLRP	TO-92	2000 Ammo Pack
2N7000RLRPG	TO-92 (Pb-Free)	2000 Ammo Pack
2N7000ZL1	TO-92	2000 Ammo Pack
2N7000ZL1G	TO-92 (Pb-Free)	2000 Ammo Pack

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.