2N7000

Preferred Device

Small Signal MOSFET 200 mAmps, 60 Volts

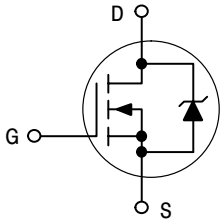
N−Channel TO−92

ON Semiconductor®

http://onsemi.com

200 mAMPS
60 VOLTS
$R_{DS(on)}$ = 5 Ω

N−Channel



Features

- Pb−Free Packages are Available*

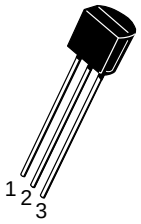
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain Source Voltage	V_{DSS}	60	Vdc
Drain−Gate Voltage (R_{GS} = 1.0 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

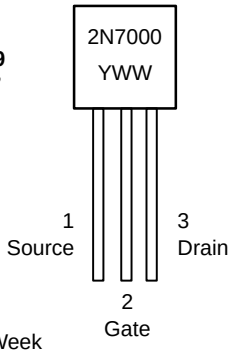
THERMAL CHARACTERISTICS

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

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 4 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.

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 (Note 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
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 (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%.

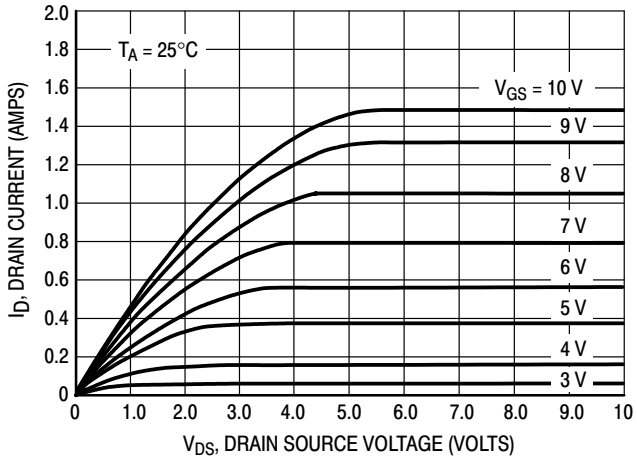


Figure 1. Ohmic Region

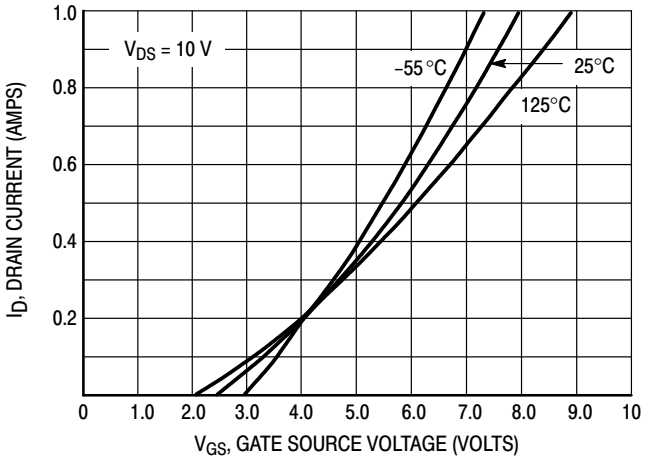


Figure 2. Transfer Characteristics

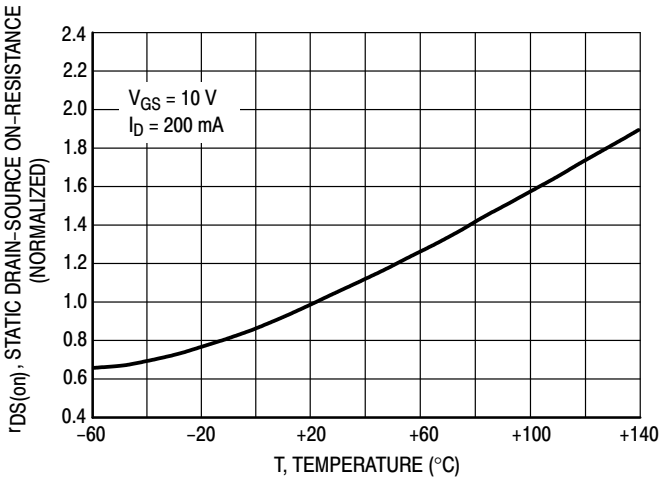


Figure 3. Temperature versus Static Drain−Source On−Resistance

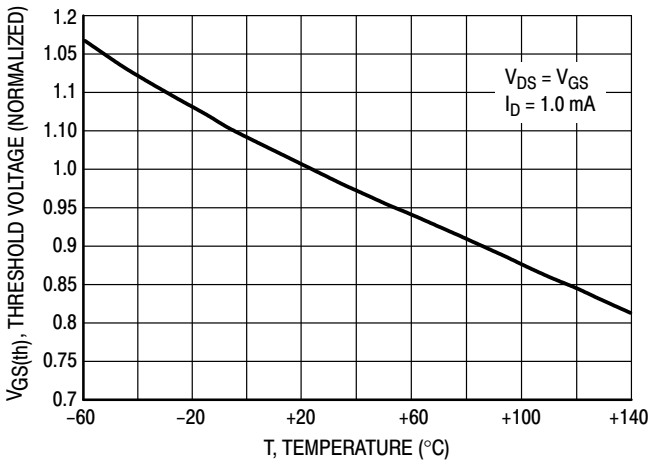


Figure 4. Temperature versus Gate Threshold Voltage

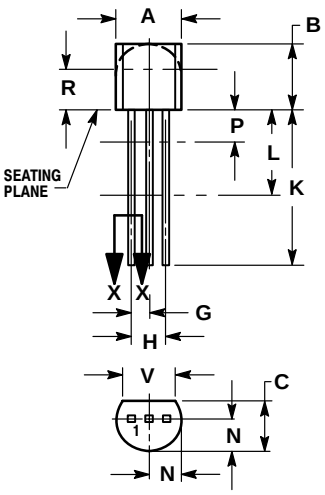
ORDERING INFORMATION

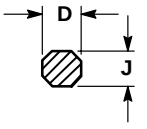
Device	Package	Shipping†
2N7000	TO−92	1000 Unit/Box
2N7000G	TO−92 (Pb−Free)	1000 Unit/Box
2N7000RLRA	TO−92	2000 Tape & Reel
2N7000RLRAG	TO−92 (Pb−Free)	2000 Tape & Reel
2N7000RLRM	TO−92	2000 Ammo Pack
2N7000RLRMG	TO−92 (Pb−Free)	2000 Ammo Pack
2N7000RLRP	TO−92	2000 Ammo Pack
2N7000RLRPG	TO−92 (Pb−Free)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

PACKAGE DIMENSIONS

TO−92
CASE 29−11
ISSUE AL





SECTION X−X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

STYLE 22:
PIN 1. SOURCE
2. GATE
3. DRAIN

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.

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