

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



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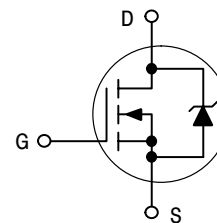
<http://onsemi.com>

200 mAmps

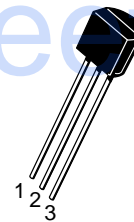
60 Volts

$R_{DS(on)} = 5 \Omega$

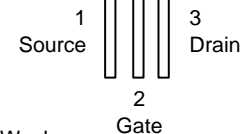
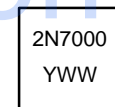
N-Channel



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 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.

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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 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	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%.

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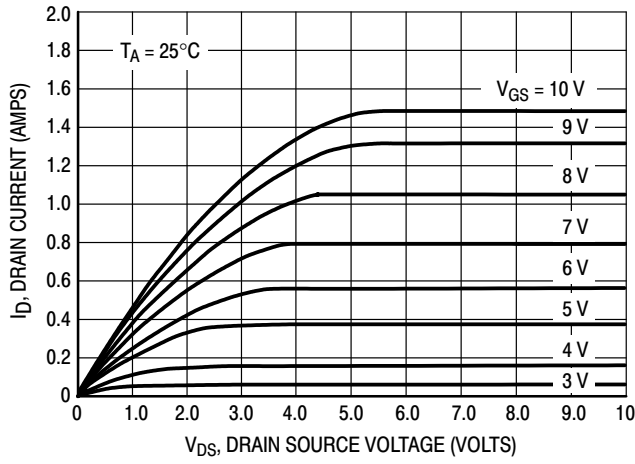


Figure 1. Ohmic Region

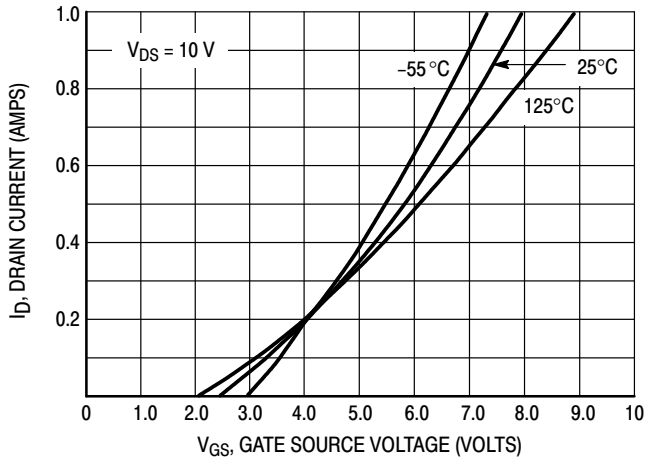


Figure 2. Transfer Characteristics

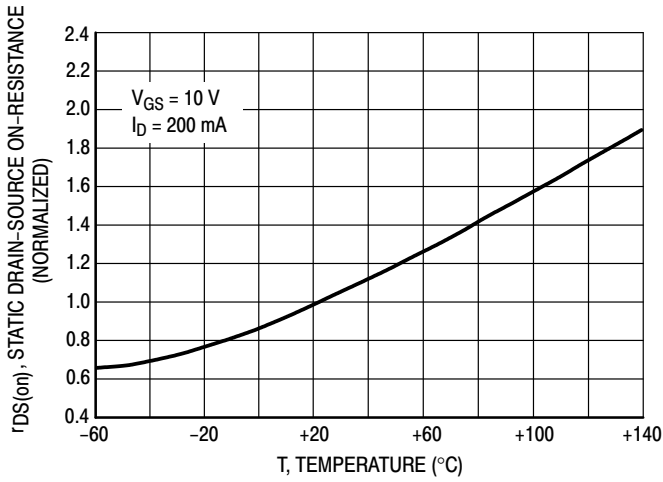


Figure 3. Temperature versus Static Drain-Source On-Resistance

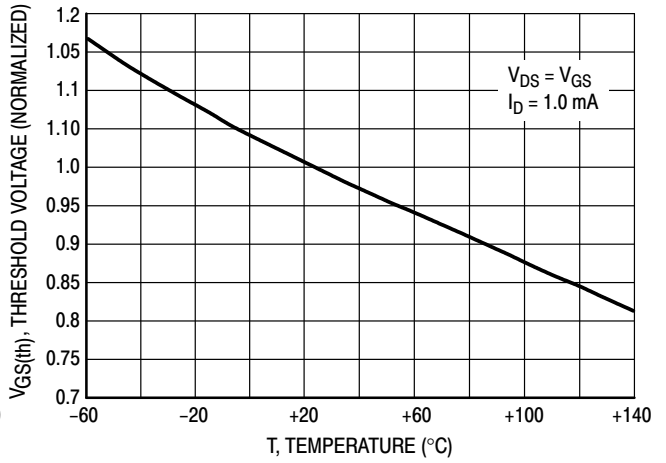


Figure 4. Temperature versus Gate Threshold Voltage

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ORDERING INFORMATION

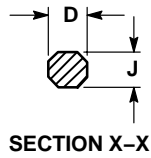
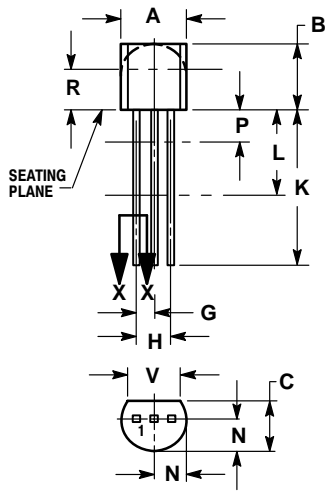
Device	Package	Shipping†
2N7000	TO-92	1000 Unit/Box
2N7000G	TO-92 (Pb-Free)	1000 Unit/Box
2N7000RLRA	TO-92	2000 Tape & Reel
2N7000RLRAG	TO-92 (Pb-Free)	2000 Tape & Reel
2N7000RLRM	TO-92	2000 Ammo Pack
2N7000RLRMG	TO-92 (Pb-Free)	2000 Ammo Pack
2N7000RLRP	TO-92	2000 Ammo Pack
2N7000RLRPG	TO-92 (Pb-Free)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

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PACKAGE DIMENSIONS

TO-92
CASE 29-11
ISSUE AL



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.

DIM	INCHES		MILLIMETERS	
	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

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