

2N7000

Preferred Device

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

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	mA dc
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	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes, 1/16" from case for 10 seconds	T_L	300	$^\circ\text{C}$

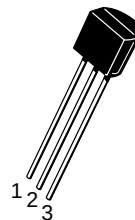
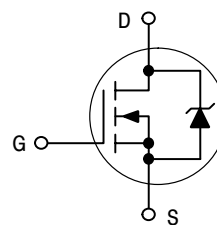


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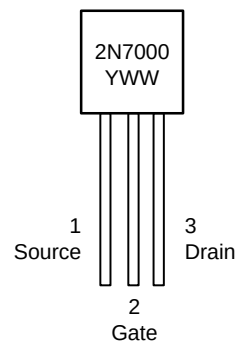
200 mAmps
60 VOLTS
 $R_{DS(on)} = 5 \Omega$

N-Channel



TO-92
CASE 29
Style 22

MARKING DIAGRAM & PIN ASSIGNMENT



Y = Year
WW = Work Week

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

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

2N7000

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	μAdc mAdc
Gate–Body Leakage Current, Forward ($V_{GSF} = 15\ \text{Vdc}$, $V_{DS} = 0$)	I_{GSSF}	–	–10	nAdc

ON CHARACTERISTICS (Note 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
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	–	μmhos

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 (Note 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 $\leq 2.0\%$.

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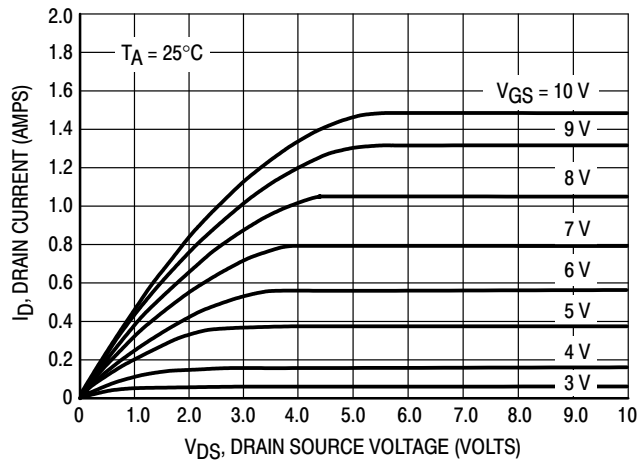


Figure 1. Ohmic Region

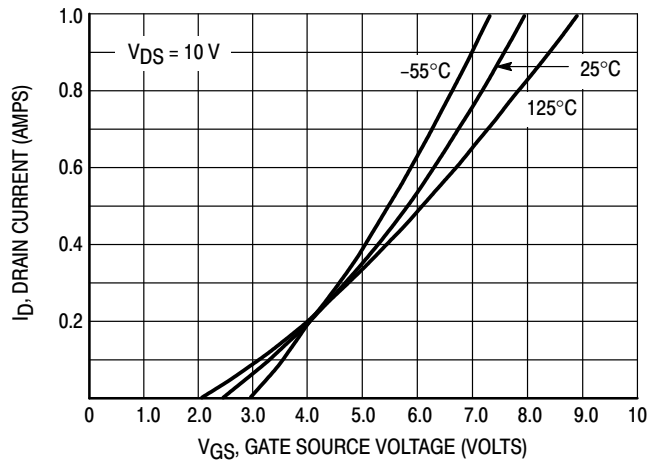


Figure 2. Transfer Characteristics

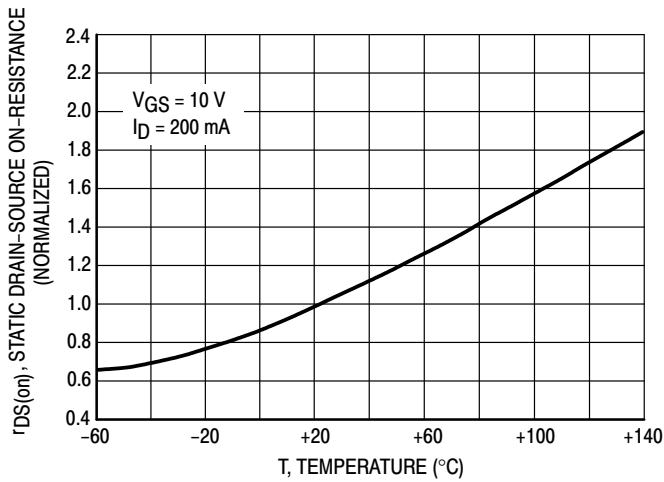


Figure 3. Temperature versus Static Drain-Source On-Resistance

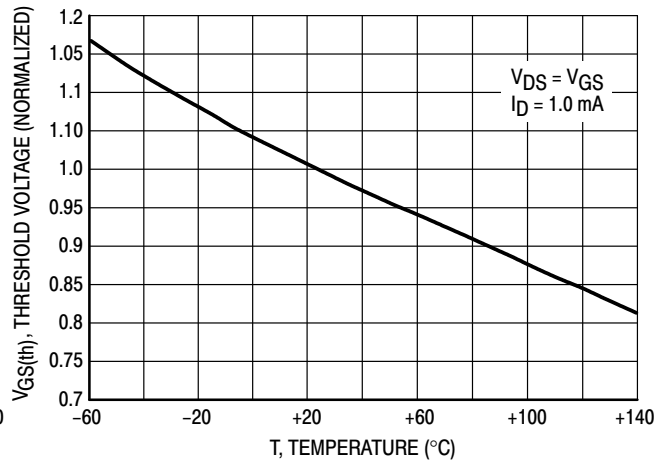


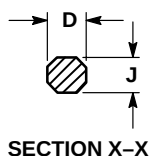
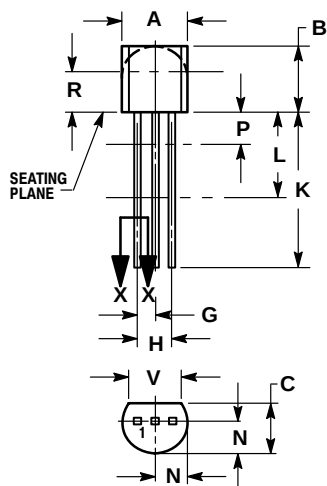
Figure 4. Temperature versus Gate Threshold Voltage

ORDERING INFORMATION

Device	Package	Shipping
2N7000	TO-92	1000 Unit/Box
2N7000RLRA	TO-92	2000 Tape & Reel
2N7000RLRM	TO-92	2000 Ammo Pack
2N7000RLRP	TO-92	2000 Ammo Pack
2N7000ZL1	TO-92	2000 Ammo Pack

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:

1. SOURCE
2. GATE
3. DRAIN

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