

# MOSFET – Advanced Small-Signal

## 2N7000BU / 2N7000TA

### Description

These N-channel enhancement mode field effect transistors are produced using onsemi's proprietary, high cell density, DMOS technology. These products minimize on-state resistance while providing rugged, reliable, and fast switching performance. They can be used in most applications requiring up to 400 mA DC and can deliver pulsed currents up to 2 A. These products are particularly suited for low-voltage, low-current applications, such as small servo motor control, power MOSFET gate drivers, and other switching applications.

### Features

- Fast Switching Times
- Improved Inductive Ruggedness
- Lower Input Capacitance
- Extended Safe Operating Area
- Improved High-Temperature Reliability
- This is a Pb-Free Device

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain-to-Source Voltage	60	V
$I_D$	Continuous Drain Current ( $T_C = 25^\circ\text{C}$ )	200	mA
	Continuous Drain Current ( $T_C = 100^\circ\text{C}$ )	110	
$I_{DM}$	Drain Current Pulsed (Note 1)	1000	mA
$V_{GS}$	Gate-to-Source Voltage	$\pm 30$	V
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_L$	Maximum Lead Temperature for Soldering Purposes, 1/8-inch from Case for 5 Seconds	300	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

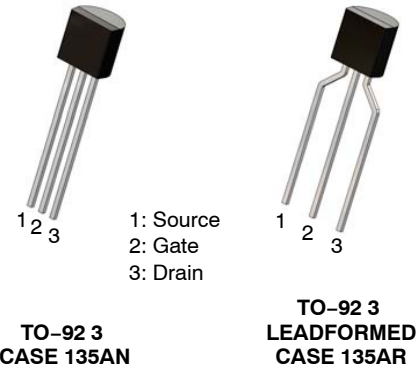
1. Repetitive rating: pulse width limited by maximum junction temperature.

### THERMAL CHARACTERISTICS (Note 2)

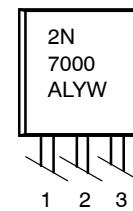
(Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.)

Symbol	Parameter	Value	Unit
$P_D$	Total Power Dissipation ( $T_C = 25^\circ\text{C}$ )	400	mW
	Linear Derating Factor	3.2	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	312.5	$^\circ\text{C}/\text{W}$

2. Device mounted on FR-4 PCB, board size = 101.5 mm x 114.5 mm.



### MARKING DIAGRAM



2N7000 = Device Code  
A = Assembly Site  
L = Wafer Lot Number  
YW = Assembly Start Week

### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
2N7000BU	TO-92 3 / (Pb-Free)	10000 / Bulk Bag
2N7000TA	TO-92 3 (Pb-Free)	2000 / Fan-Fold

## 2N7000BU / 2N7000TA

### ELECTRICAL CHARACTERISTICS

(Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$B_{VDSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	60	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	0.3	-	3.9	V
		$V_{DS} = V_{GS}, I_D = 1\ \text{mA}$	0.4	-	3.0	
$I_{GSS}$	Gate-Source Leakage, Forward	$V_{GS} = 15\ \text{V}$	-	-	100	nA
	Gate-Source Leakage, Reverse	$V_{GS} = -15\ \text{V}$	-	-	-100	
$I_{DSS}$	Drain-to-Source Leakage Current	$V_{DS} = 60\ \text{V}$	-	-	1	mA
		$V_{DS} = 45\ \text{V}, T_C = 125^\circ\text{C}$	-	-	1000	
$R_{DS(ON)}$	Static Drain-Source On-State Resistance (Note 3)	$V_{GS} = 10\ \text{V}, I_D = 0.5\ \text{A}$	-	-	5.0	$\Omega$
$g_{fs}$	Forward Transconductance (Note 3)	$V_{DS} = 15\ \text{V}, I_D = 0.5\ \text{A}$	0.1	0.3	-	S
$C_{iss}$	Input Capacitance	$V_{GS} = 0\ \text{V}, V_{DS} = 25\ \text{V}, f = 1\ \text{MHz}$	-	30	-	pF
$C_{oss}$	Output Capacitance		-	12	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	3.0	-	pF
$t_{d(on)}$	Turn-On Delay	$V_{DD} = 30\ \text{V}, I_D = 0.5\ \text{A},$ $R_G = 15\ \Omega$ (Note 3), (Note 4)	-	-	10	ns
$t_r$	Rise Time		-	-	10	ns
$t_{d(off)}$	Turn-Off Delay		-	-	10	ns
$t_f$	Fall Time		-	-	10	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

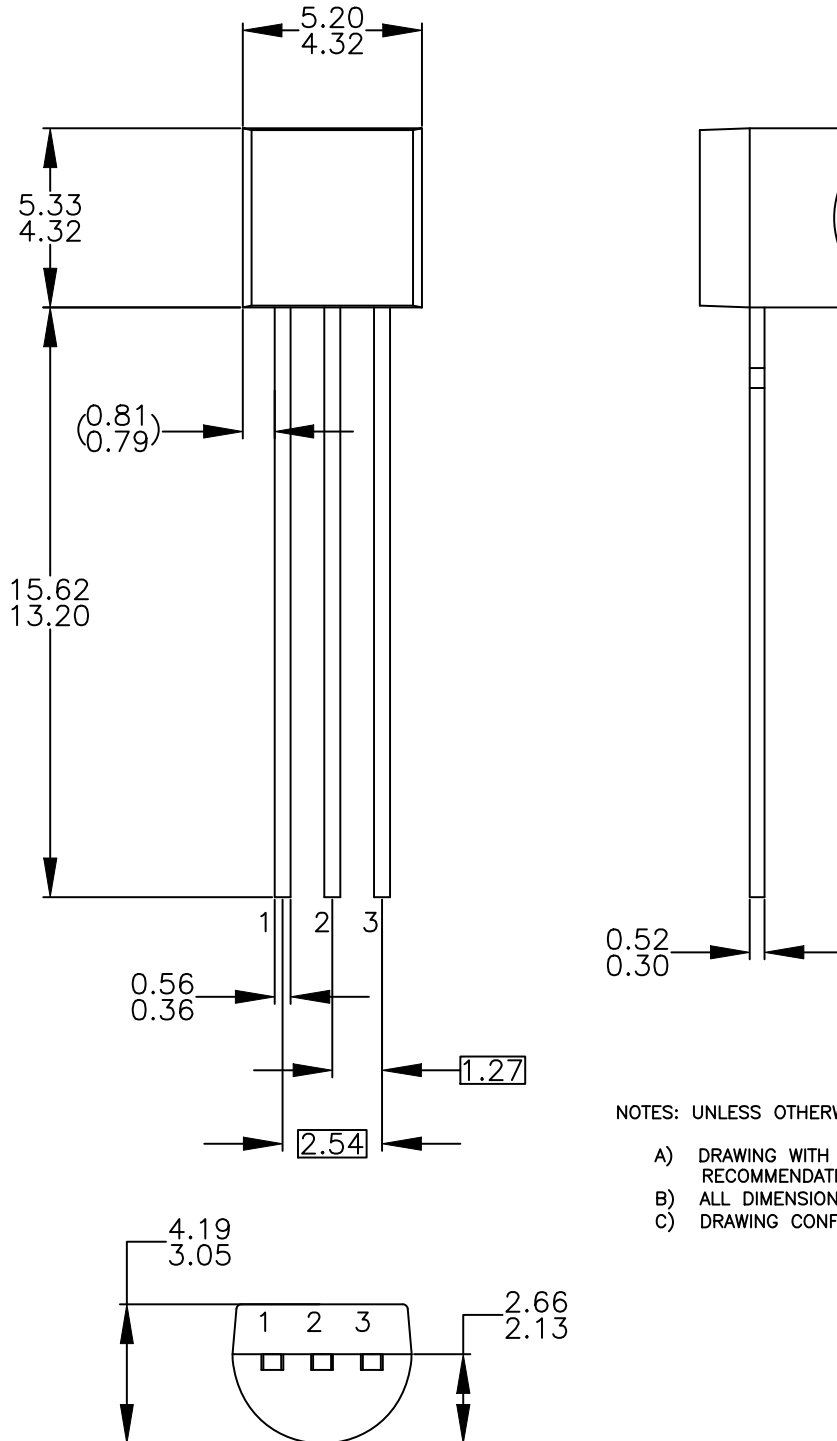
3. Pulse test: pulse width =  $250\ \mu\text{s}$ , duty cycle  $\leq 2\%$

4. Essentially independent of operating temperature.

**MECHANICAL CASE OUTLINE**  
**PACKAGE DIMENSIONS**

TO-92 3 4.825x4.76  
CASE 135AN  
ISSUE O

DATE 31 JUL 2016



NOTES: UNLESS OTHERWISE SPECIFIED

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**MECHANICAL CASE OUTLINE**  
**PACKAGE DIMENSIONS**

**TO-92 3 4.83x4.76 LEADFORMED**  
**CASE 135AR**  
**ISSUE O**


DATE 30 SEP 2016



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