

# NTBLS001N06C

## Product Preview Power MOSFET

60 V, 1 mΩ, 297 A, Single N-Channel,  
TOLL

### Features

- Low  $R_{DS(on)}$  to Minimize Conduction Losses
- Low  $Q_G$  and Capacitance to Minimize Driver Losses
- Lowers Switching Noise/EMI
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### Applications

- Power Tools, Battery Operated Vacuums
- UAV/Drones, Material Handling
- BMS/Storage, Home Automation

### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		$V_{DSS}$	60	V	
Gate-to-Source Voltage		$V_{GS}$	$\pm 20$	V	
Continuous Drain Current $R_{\theta JC}$ (Note 2)	Steady State	$T_C = 25^\circ\text{C}$	$I_D$	297	A
		$T_C = 25^\circ\text{C}$	$P_D$	188	W
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2)	Steady State	$T_A = 25^\circ\text{C}$	$I_D$	41	A
		$T_A = 25^\circ\text{C}$	$P_D$	3.5	W
Pulsed Drain Current		$T_A = 25^\circ\text{C}, t_p = 10 \mu\text{s}$	$I_{DM}$	TBD	A
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to +175	$^\circ\text{C}$	
Source Current (Body Diode)		$I_S$	TBD	A	
Single Pulse Drain-to-Source Avalanche Energy ( $I_{L(pk)} = \text{TBD A}, L = \text{TBD mH}$ )		$E_{AS}$	TBD	mJ	
Lead Temperature Soldering Reflow for Soldering Purposes (1/8" from case for 10 s)		$T_L$	260	$^\circ\text{C}$	

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.

### THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case - Steady State (Note 2)	$R_{\theta JC}$	0.8	$^\circ\text{C/W}$
Junction-to-Ambient - Steady State (Note 2)	$R_{\theta JA}$	43	

1. Surface-mounted on FR4 board using a 1 in<sup>2</sup> pad size, 1 oz. Cu pad.
2. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.

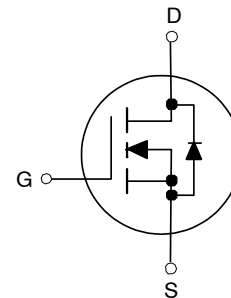
This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.



ON Semiconductor®

[www.onsemi.com](http://www.onsemi.com)

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	$I_D$ MAX
60 V	1 mΩ @ 10 V	297 A
	TBD mΩ @ 6 V	



MO-299A  
TOLL  
CASE 100CU

### ORDERING INFORMATION

Device	Package	Shipping†
NTBLS001N06C	MO-299A (Pb-Free)	2000 / Tape & Reel

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

# NTBLS001N06C

**Table 1. ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units	
<b>OFF CHARACTERISTICS</b>							
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250 \mu\text{A}, V_{GS} = 0 \text{V}$	60	-	-	V	
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = 562 \mu\text{A}, \text{ref to } 25^\circ\text{C}$	-	TBD	-	mV/ $^\circ\text{C}$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60 \text{V}, V_{GS} = 0 \text{V}$	$T_J = 25^\circ\text{C}$	-	-	10	$\mu\text{A}$
			$T_J = 125^\circ\text{C}$	-	-	100	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{DS} = 0 \text{V}, V_{GS} = 20 \text{V}$	-	-	100	nA	

**ON CHARACTERISTICS** (Note 3)

Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 562 \mu\text{A}$	2.0	3.0	4.0	V
Negative Threshold Temperature Coefficient	$V_{GS(th)}/T_J$	$I_D = 562 \mu\text{A}, \text{ref to } 25^\circ\text{C}$	-	TBD	-	mV/ $^\circ\text{C}$
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10 \text{V}, I_D = 80 \text{A}$	-	TBD	1	m $\Omega$
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 6 \text{V}, I_D = 56 \text{A}$	-	TBD	-	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = 5 \text{V}, I_D = 80 \text{A}$	-	TBD	-	S
Gate-Resistance	$R_G$	$T_A = 25^\circ\text{C}$	-	1	-	$\Omega$

**CHARGES & CAPACTIANCES**

Input Capacitance	$C_{iss}$	$V_{GS} = 0 \text{V}, V_{DS} = 30 \text{V}, f = 1 \text{MHz}$	-	9628	-	pF
Output Capacitance	$C_{oss}$		-	5719	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	53	-	pF
Total Gate Charge	$Q_{G(tot)}$	$V_{GS} = 10 \text{V}, V_{DS} = 30 \text{V}, I_D = 80 \text{A}$	-	119	-	nC
Threshold Gate Charge	$Q_{G(th)}$		-	TBD	-	nC
Gate-to-Source Charge	$Q_{gs}$		-	41	-	nC
Gate-to-Drain Charge	$Q_{gd}$		-	18	-	nC
Total Gate Charge	$Q_{G(tot)}$	$V_{GS} = 6 \text{V}, V_{DS} = 30 \text{V}, I_D = 80 \text{A}$	-	TBD	-	nC

**SWITCHING CHARACTERISTICS,  $V_{GS} = 10 \text{V}$**  (Note 3)

Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10 \text{V}, V_{DS} = 30 \text{V}, I_D = 80 \text{A}, R_G = 6 \Omega$	-	TBD	-	ns
Rise Time	$t_r$		-	TBD	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	TBD	-	ns
Fall Time	$t_f$		-	TBD	-	ns

**DRAIN-SOURCE DIODE CHARACTERISTICS**

Forward Diode Voltage	$V_{SD}$	$I_S = 80 \text{A}, V_{GS} = 0 \text{V}$	$T_J = 25^\circ\text{C}$	-	TBD	1.2	V
		$I_S = 80 \text{A}, V_{GS} = 0 \text{V}$	$T_J = 125^\circ\text{C}$	-	TBD	-	V
Reverse Recovery Time	$t_{rr}$	$V_{GS} = 0 \text{V}, di_S/dt = 100 \text{A}/\mu\text{s}, I_S = 56 \text{A}$	-	TBD	-	ns	
Charge Time	$t_a$		-	TBD	-	ns	
Discharge Time	$t_b$		-	TBD	-	ns	
Reverse Recovery Charge	$Q_{rr}$		-	TBD	-	nC	

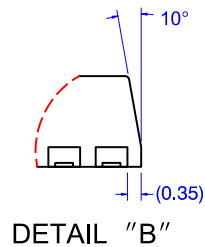
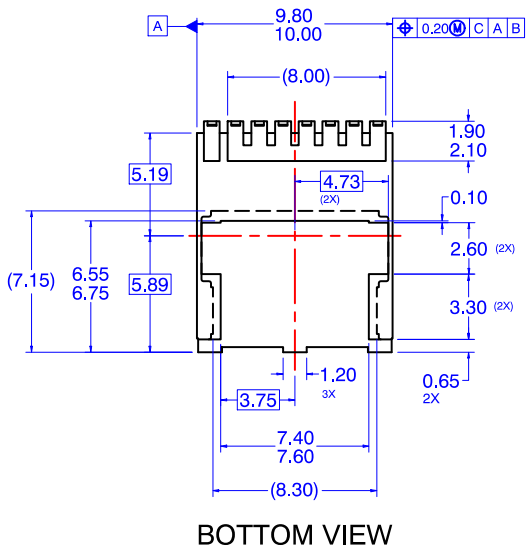
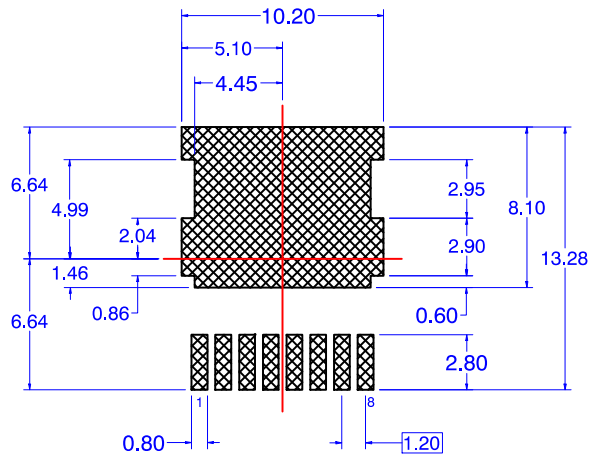
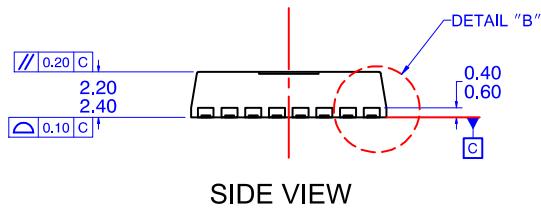
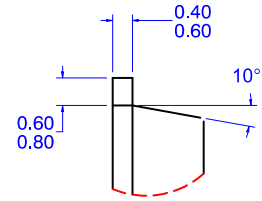
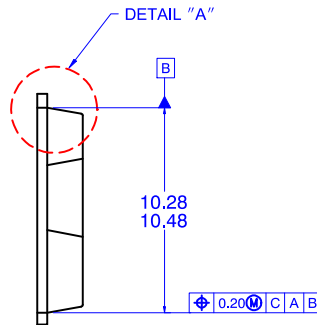
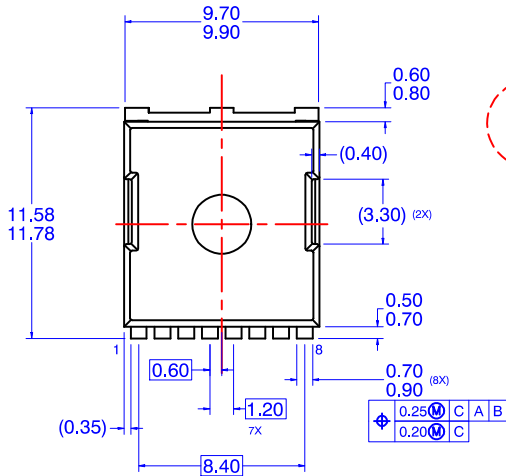
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. Switching characteristics are independent of operating junction temperatures


# NTBLS001N06C

## PACKAGE DIMENSIONS

H-PSOF8L 11.68x9.80  
CASE 100CU  
ISSUE O



- NOTES: UNLESS OTHERWISE SPECIFIED
- PACKAGE STANDARD REFERENCE: JEDEC MO-299, ISSUE A, DATED NOVEMBER 2009.
  - ALL DIMENSIONS ARE IN MILLIMETERS.
  - DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. MOLD FLASH OR BURRS DOES NOT EXCEED 0.10MM.
  - DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

**PUBLICATION ORDERING INFORMATION**

**LITERATURE FULFILLMENT:**

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 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](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative