

NTNS3190NZ

Advance Information

Small Signal MOSFET

20 V, 230 mA, Single N-Channel,
0.62 x 0.62 x 0.4 mm XLLGA3 Package



ON Semiconductor®

<http://onsemi.com>

Features

- Single N-Channel MOSFET
- Ultra Small and Thin Package (0.62 x 0.62 x 0.4 mm)
- Low $R_{DS(on)}$ Solution in 0.62 x 0.62 mm Package
- 1.5 V Gate Voltage Rating
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Small Signal Load Switch
- Analog Switch
- High Speed Interfacing
- Optimized for Power Management in Ultra Portable Products

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

Parameter		Symbol	Value	Units	
Drain-to-Source Voltage		V_{DSS}	20	V	
Gate-to-Source Voltage		V_{GS}	± 8.0	V	
Continuous Drain Current (Note 1)	Steady State	I_D	$T_A = 25^\circ\text{C}$	230	mA
			$T_A = 85^\circ\text{C}$	165	
	$t \leq 5$ s	$T_A = 25^\circ\text{C}$	296		
Power Dissipation (Note 1)	Steady State	P_D	$T_A = 25^\circ\text{C}$	125	mW
			$T_A = 25^\circ\text{C}$	208	
Pulsed Drain Current		$t_p = 10 \mu\text{s}$	I_{DM}	688	mA
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150		$^\circ\text{C}$
Source Current (Body Diode) (Note 2)		I_S	125		mA
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260		$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

THERMAL RESISTANCE RATINGS

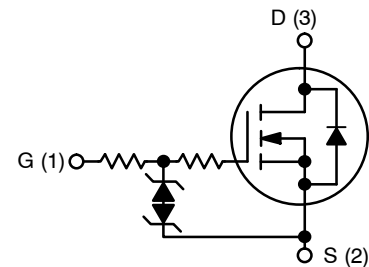
Parameter	Symbol	Max	Units
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	1000	$^\circ\text{C}/\text{W}$
Junction-to-Ambient – $t \leq 5$ s (Note 1)	$R_{\theta JA}$	600	

1. Surface Mounted on FR4 Board using the minimum recommended pad size, (or 2 mm²), 1 oz Cu.
2. Pulse Test: pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

This document contains information on a new product. Specifications and information herein are subject to change without notice.

MOSFET		
$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX
20 V	1.4 Ω @ 4.5 V	230 mA
	1.9 Ω @ 2.5 V	
	2.2 Ω @ 1.8 V	
	4.3 Ω @ 1.5 V	

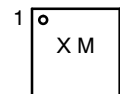
N-Channel MOSFET



MARKING DIAGRAM



XLLGA3
CASE 713AA



X = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NTNS3190NZT5G	XLLGA3 (Pb-Free)	8000 / Tape & Reel

†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.

NTNS3190NZ

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
-----------	--------	----------------	-----	-----	-----	-------

OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 20\text{ V}$			1.0	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8.0\text{ V}$			± 2.0	μA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	0.4		1.0	V
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 100\text{ mA}$		0.75	1.4	Ω
		$V_{GS} = 2.5\text{ V}, I_D = 50\text{ mA}$		1.0	1.9	
		$V_{GS} = 1.8\text{ V}, I_D = 20\text{ mA}$		1.3	2.2	
		$V_{GS} = 1.5\text{ V}, I_D = 10\text{ mA}$		1.6	4.3	
Source-Drain Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 10\text{ mA}$		0.7	1.0	V

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = 15\text{ V}$		15.8		pF
Output Capacitance	C_{OSS}			4.6		
Reverse Transfer Capacitance	C_{RSS}			3.3		

SWITCHING CHARACTERISTICS, $V_{GS} = 4.5\text{ V}$ (Note 3)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 4.5\text{ V}, V_{DD} = 15\text{ V}, I_D = 200\text{ mA}, R_G = 2\ \Omega$		20		ns
Rise Time	t_r			45		
Turn-Off Delay Time	$t_{d(OFF)}$			240		
Fall Time	t_f			140		

3. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

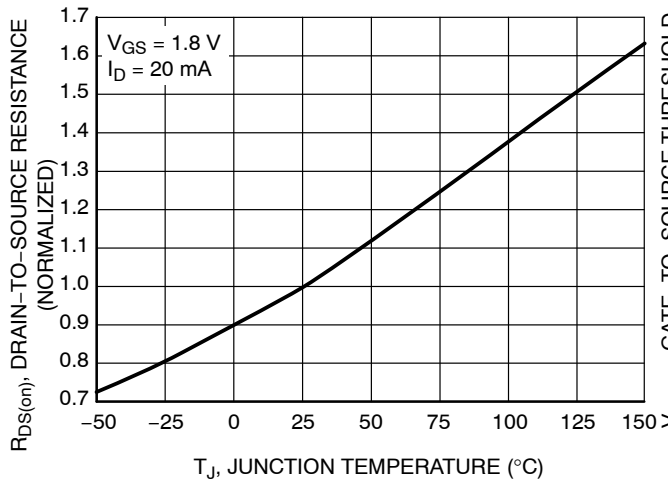


Figure 1. On-Resistance Variation with Temperature

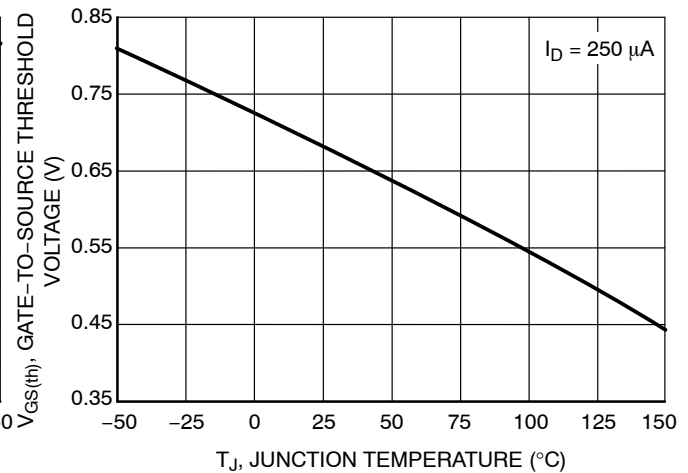
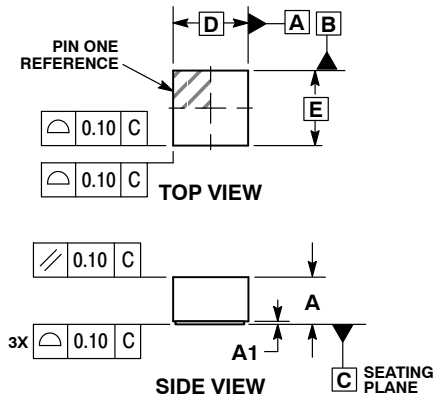


Figure 2. Threshold Voltage

NTNS3190NZ

PACKAGE DIMENSIONS

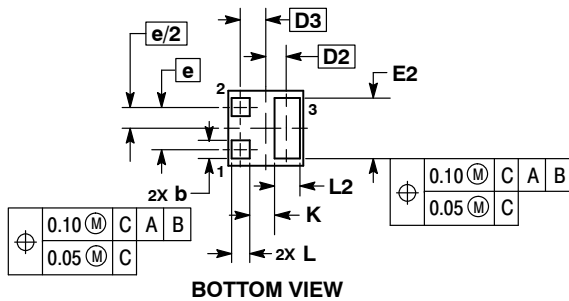
XLLGA3, 0.62x0.62, 0.35P
CASE 713AA
ISSUE A



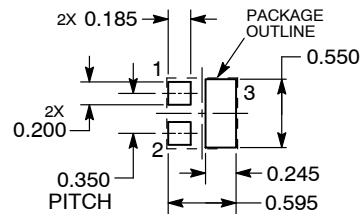
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.

MILLIMETERS		
DIM	MIN	MAX
A	0.340	0.440
A1	0.000	0.030
b	0.100	0.200
D	0.620 BSC	
D2	0.175 BSC	
D3	0.205 BSC	
E	0.620 BSC	
E2	0.400	0.600
e	0.350 BSC	
K	0.200 REF	
L	0.090	0.210
L2	0.110	0.310



RECOMMENDED SOLDER FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC 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
 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
Europe, Middle East and Africa Technical Support:
 Phone: 421 33 790 2910
Japan Customer Focus Center
 Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative