

NTNS3A91PZ

Advance Information

Small Signal MOSFET

-20 V, -214 mA, Single P-Channel,
0.62 x 0.62 x 0.4 mm XLLGA3 Package



ON Semiconductor®

<http://onsemi.com>

Features

- Single P-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	$T_A = 25^\circ\text{C}$	I_D	-214	mA
			$T_A = 85^\circ\text{C}$	-155	
	$t \leq 5$ s	$T_A = 25^\circ\text{C}$	-277		
Power Dissipation (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	P_D	125	mW
			$t \leq 5$ s	$T_A = 25^\circ\text{C}$	
Pulsed Drain Current		$t_p = 10 \mu\text{s}$	I_{DM}	-643	mA
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150		$^\circ\text{C}$
Source Current (Body Diode) (Note 2)		I_S	-208		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	

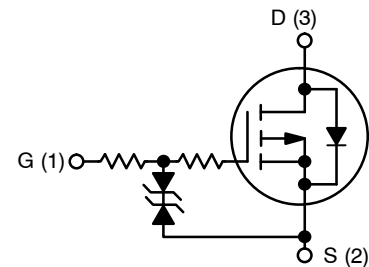
1. Surface Mounted on FR4 Board using the minimum recommended pad size, (or 2 mm²), 1 oz Cu.

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	1.6 Ω @ -4.5 V	-214 mA
	2.4 Ω @ -2.5 V	
	3.3 Ω @ -1.8 V	
	4.5 Ω @ -1.5 V	

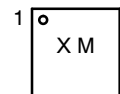
P-Channel MOSFET



MARKING DIAGRAM



XLLGA3
CASE 713AA



X = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NTNS3A91PZT5G	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.

NTNS3A91PZ

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
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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	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -100\text{ mA}$		1.3	1.6	Ω
		$V_{GS} = -2.5\text{ V}, I_D = -50\text{ mA}$		1.8	2.4	
		$V_{GS} = -1.8\text{ V}, I_D = -20\text{ mA}$		2.3	3.3	
		$V_{GS} = -1.5\text{ V}, I_D = -10\text{ mA}$		2.8	4.5	
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}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = -15\text{ V}$		22		μF
Output Capacitance	C_{OSS}			4.5		
Reverse Transfer Capacitance	C_{RSS}			2.5		

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

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = -4.5\text{ V}, V_{DD} = -15\text{ V}, I_D = -200\text{ mA}, R_G = 2\ \Omega$		41		ns
Rise Time	t_r			97		
Turn-Off Delay Time	$t_{d(OFF)}$			571		
Fall Time	t_f			286		

3. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

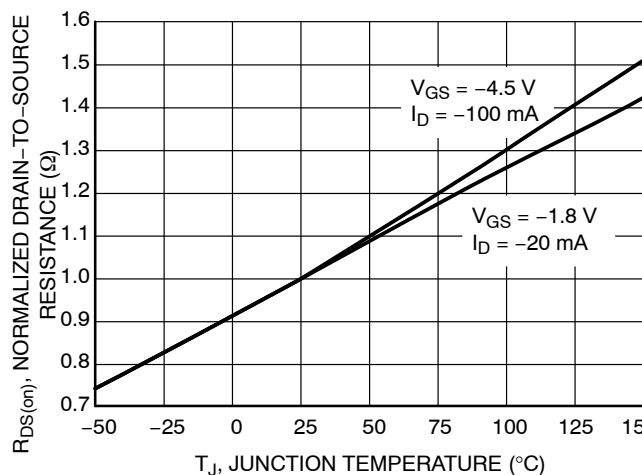


Figure 1. On Resistance Variation with Temperature

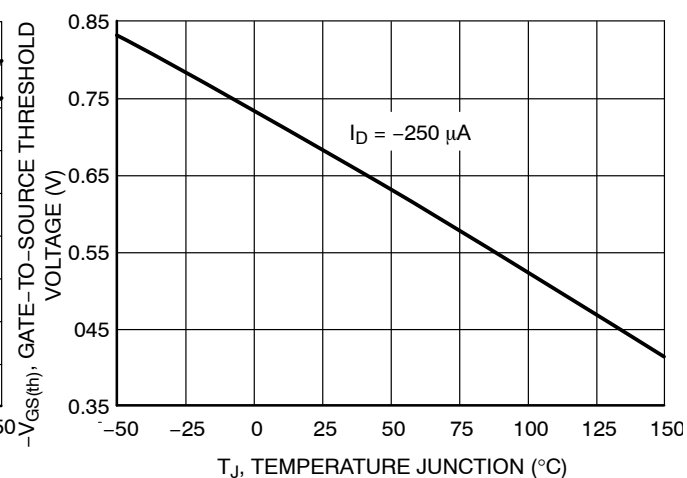
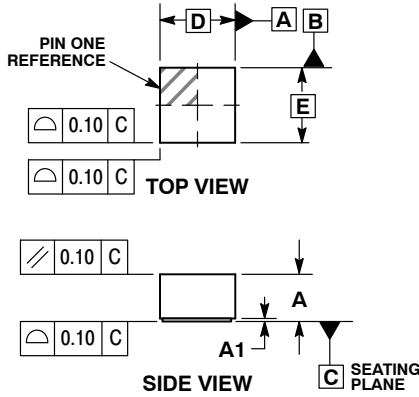


Figure 2. Threshold Voltage

NTNS3A91PZ

PACKAGE DIMENSIONS

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

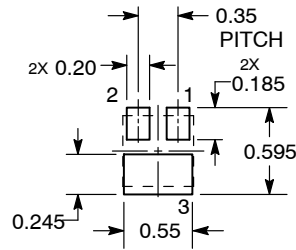


NOTES:

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

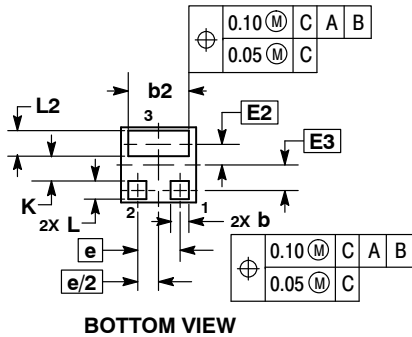
MILLIMETERS		
DIM	MIN	MAX
A	0.340	0.440
A1	0.000	0.030
b	0.100	0.200
b2	0.400	0.600
D	0.620 BSC	
E	0.620 BSC	
E2	0.175 BSC	
E3	0.205 BSC	
e	0.350 BSC	
K	0.200 REF	
L	0.090	0.210
L2	0.110	0.310

**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.



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