

NTND31211PZ

MOSFET – Dual, P-Channel, Small Signal, XLLGAS6, 0.65mm x 0.90mm x 0.4mm

-20 V, -127 mA

Features

- Dual P-Channel MOSFET
- Offers a Low $R_{DS(ON)}$ Solution in the Ultra Small 0.65 mm x 0.90 mm Package
- 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 specified)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	-20	V
Gate-to-Source Voltage			V_{GS}	± 8	V
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	I_D	-127	mA
		$T_A = 85^\circ\text{C}$		-91	
	$t \leq 5 \text{ s}$	$T_A = 25^\circ\text{C}$		-146	
Power Dissipation (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	P_D	125	mW
	$t \leq 5 \text{ s}$			166	
Pulsed Drain Current		$t_p = 10 \mu\text{s}$	I_{DM}	-488	mA
Operating Junction and Storage Temperature			T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Source Current (Body Diode) (Note 2)			I_S	-200	mA
Lead Temperature 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.

1. Surface-mounted on FR4 board using the minimum recommended pad size, 1 oz Cu.
2. Pulse Test: pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$

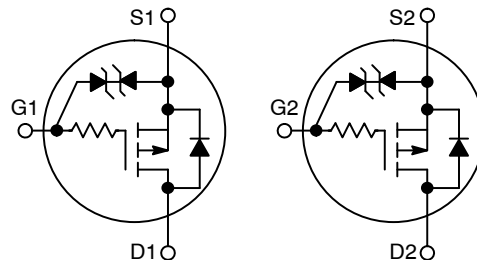


ON Semiconductor®

www.onsemi.com

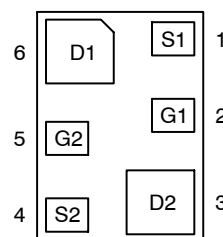
$V_{(BR)DSS}$	$R_{DS(ON)} \text{ MAX}$	$I_D \text{ Max}$
-20 V	5.0 Ω @ -4.5 V	-127 mA
	6.0 Ω @ -2.5 V	
	7.0 Ω @ -1.8 V	
	10.0 Ω @ -1.5 V	

P-Channel MOSFET



XLLGA6
Case 713AC

PINOUT DIAGRAM



(Bottom View)

MARKING DIAGRAM



K = Specific Device Code
M = Date Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

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THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient (Note 3) Steady State $t \leq 5$ s	$R_{\theta JA}$	998 751	$^{\circ}\text{C/W}$

3. Surface-mounted on FR4 board using the minimum recommended pad size, 1 oz Cu.

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0$ V, $I_D = -250$ μA	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0$ V, $V_{DS} = -5$ V	$T_J = 25^{\circ}\text{C}$		-50	nA
			$T_J = 85^{\circ}\text{C}$		-200	nA
		$V_{GS} = 0$ V, $V_{DS} = -16$ V	$T_J = 25^{\circ}\text{C}$		-100	nA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 5.0$ V			± 100	nA

ON CHARACTERISTICS

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}$, $I_D = -250$ μA	-0.4		-1.0	V
Drain-to-Source On Resistance	$R_{DS(ON)}$	$V_{GS} = -4.5$ V, $I_D = -100$ mA		2.1	5.0	Ω
		$V_{GS} = -2.5$ V, $I_D = -50$ mA		2.7	6.0	
		$V_{GS} = -1.8$ V, $I_D = -20$ mA		3.4	7.0	
		$V_{GS} = -1.5$ V, $I_D = -10$ mA		4.2	10.0	
Forward Transconductance	g_{FS}	$V_{DS} = -5.0$ V, $I_D = -125$ mA		0.35		S
Forward Diode Voltage	V_{SD}	$V_{GS} = 0$ V, $I_S = -10$ mA		-0.6	-1.0	V

CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0$ V, $f = 1$ MHz, $V_{DS} = -15$ V		12.8		pF
Output Capacitance	C_{OSS}			2.8		
Reverse Transfer Capacitance	C_{RSS}			2.0		

SWITCHING CHARACTERISTICS, $V_{GS} = 4.5$ V

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = -4.5$ V, $V_{DD} = -15$ V, $I_D = -200$ mA, $R_G = 2.0$ Ω		37		ns
Rise Time	t_r			71		
Turn-Off Delay Time	$t_{d(OFF)}$			280		
Fall Time	t_f			171		

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.

ORDERING INFORMATION

Device	Package	Shipping [†]
NTND31211PZTAG	XLLGA6 (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.

TYPICAL CHARACTERISTICS

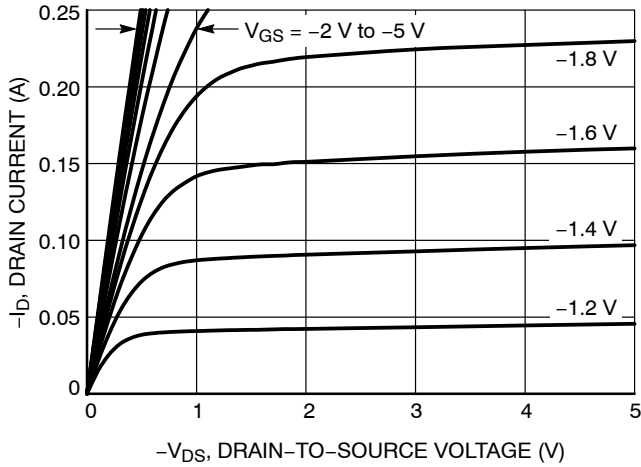


Figure 1. On-Region Characteristics

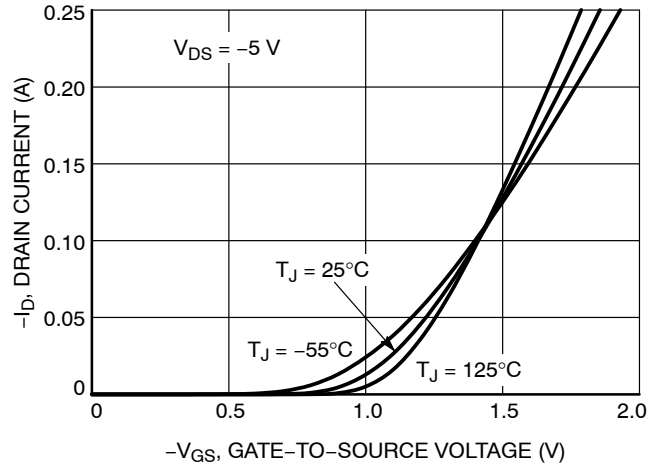


Figure 2. Transfer Characteristics

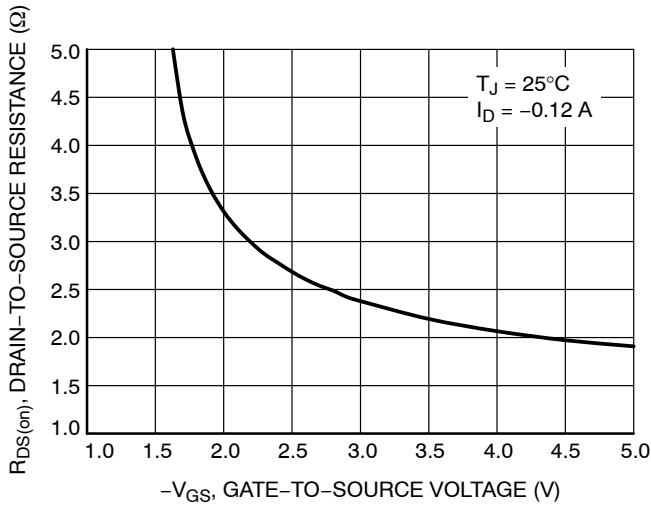


Figure 3. On-Resistance vs. Gate-to-Source Voltage

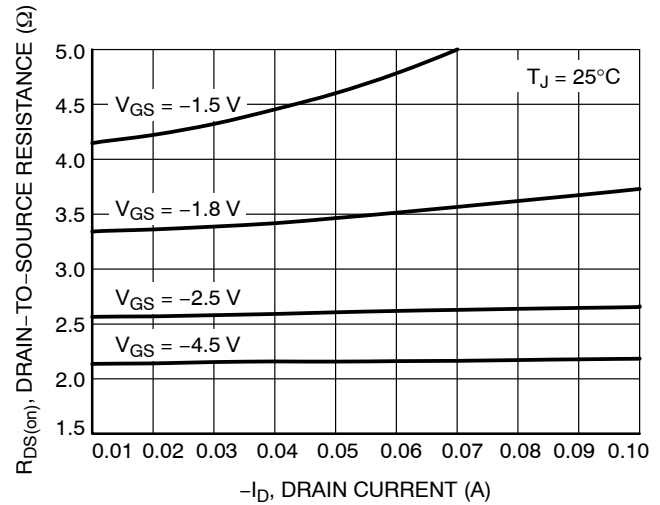


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

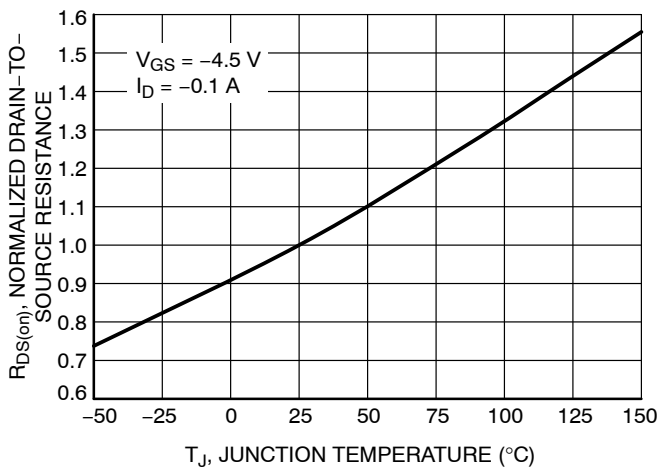


Figure 5. On-Resistance Variation with Temperature

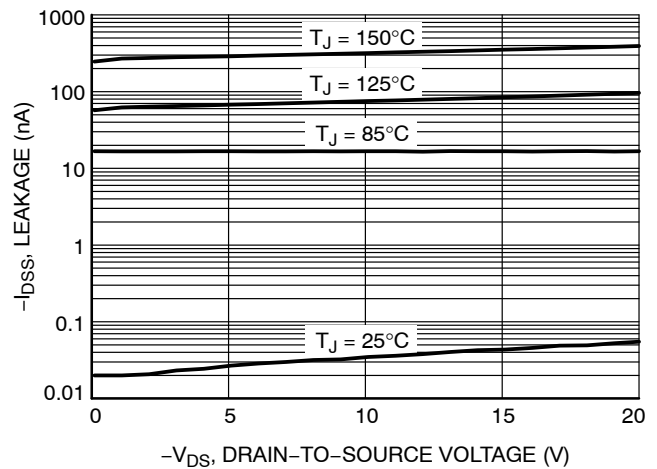


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

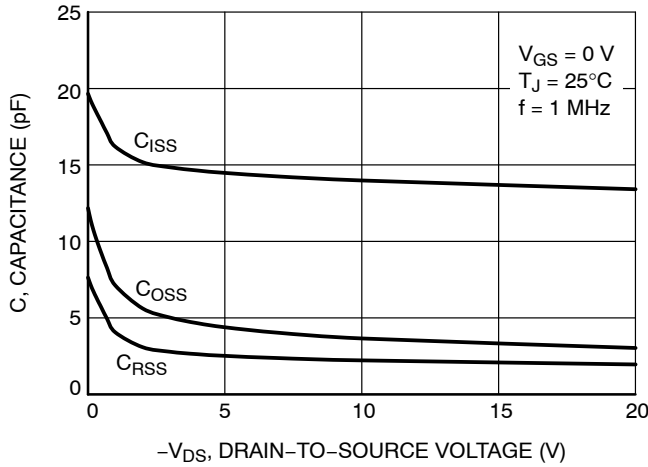


Figure 7. Capacitance Variation

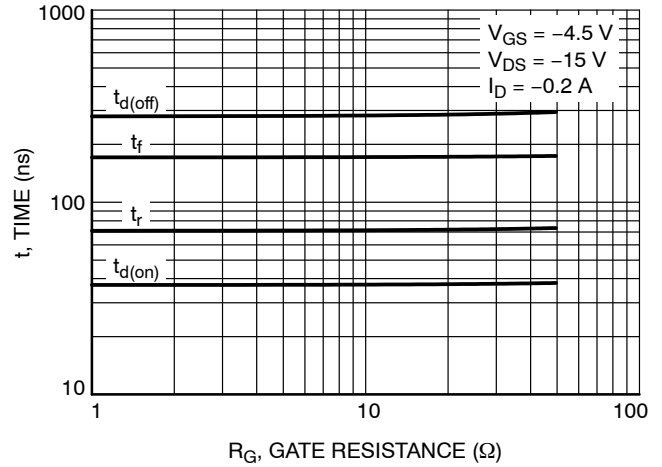


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

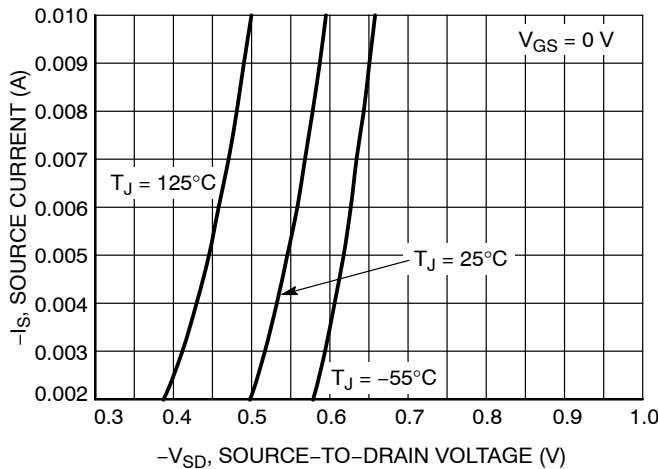


Figure 9. Diode Forward Voltage vs. Current

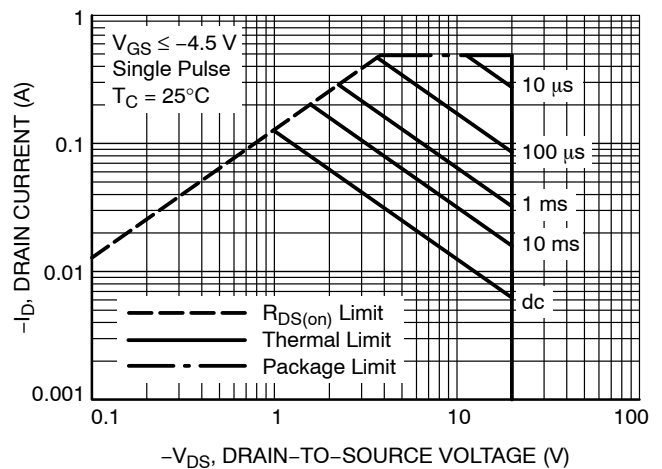


Figure 10. Maximum Rated Forward Biased Safe Operating Area

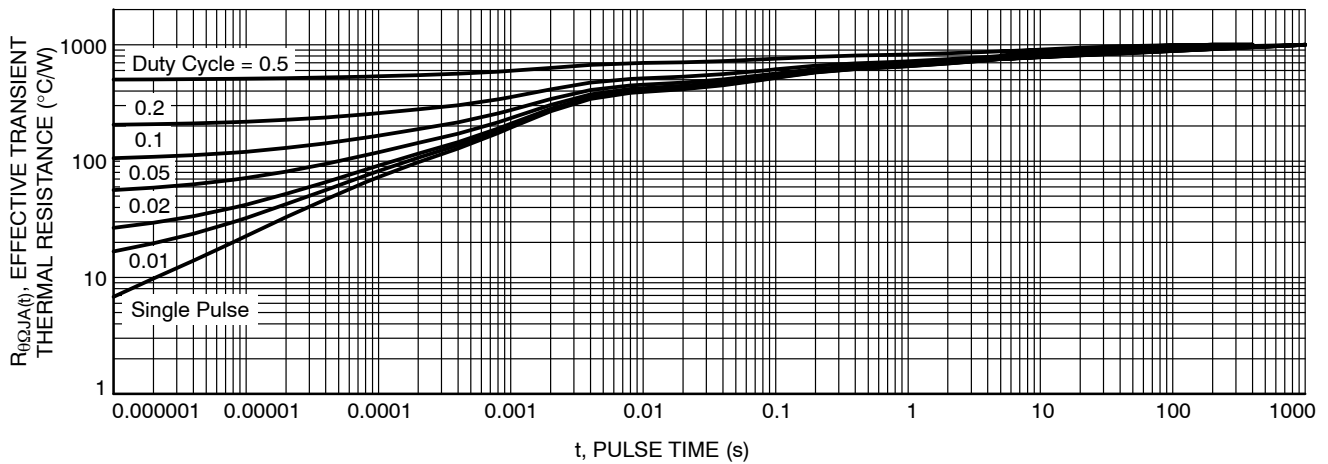
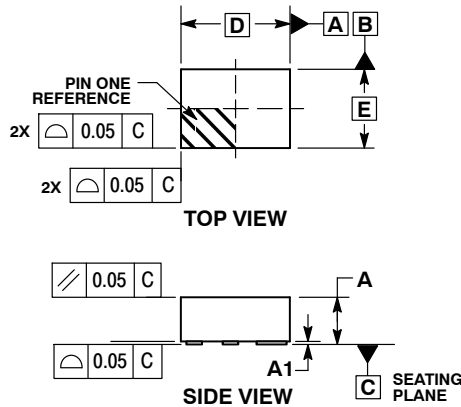


Figure 11. Thermal Response

NTND31211PZ

PACKAGE DIMENSIONS

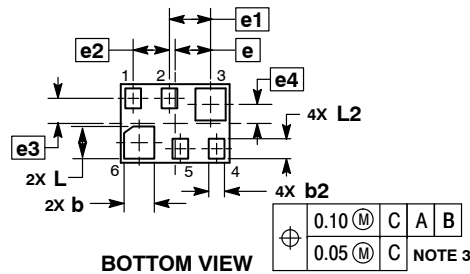
XLLGA6 0.90x0.65 CASE 713AC ISSUE O



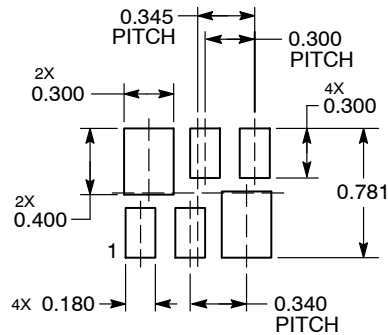
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. POSITIONAL TOLERANCE APPLIES TO ALL SIX LEADS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.340	0.440
A1	0.000	0.050
b	0.200	0.300
b2	0.080	0.180
D	0.900	BSC
E	0.650	BSC
e	0.295	BSC
e1	0.340	BSC
e2	0.300	BSC
e3	0.208	BSC
e4	0.158	BSC
L	0.215	0.315
L2	0.115	0.215



RECOMMENDED SOLDERING FOOTPRINT*



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

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