

MOSFET – Dual, N-Channel, Small Signal, XLLGA6, 0.65mm x 0.90mm x 0.4mm 20 V, 200 mA



ON Semiconductor®

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NTND31015NZ

Features

- Dual N-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

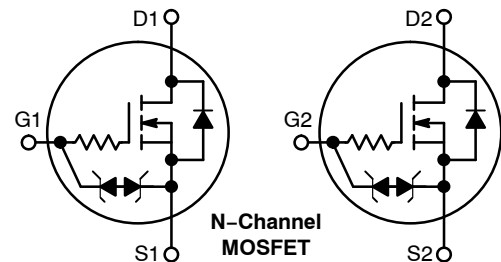
MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

| 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 | 200 | mA |
| | | | $T_A = 85^\circ\text{C}$ | 140 | |
| | $t \leq 5$ s | $T_A = 25^\circ\text{C}$ | | 220 | |
| Power Dissipation (Note 1) | Steady State | $T_A = 25^\circ\text{C}$ | P_D | 125 | mW |
| | $t \leq 5$ s | | | 166 | |
| Pulsed Drain Current | | $t_p = 10$ μs | I_{DM} | 800 | 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.

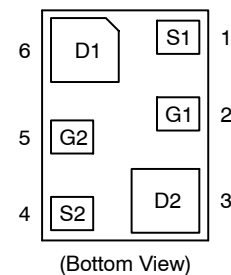
1. Surface-mounted on FR4 board using the minimum recommended pad size, 1 oz Cu.
2. Pulse Test: pulse width ≤ 300 μs , duty cycle $\leq 2\%$

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ MAX | I_D Max |
|---------------|----------------------|-----------|
| 20 V | 1.5 Ω @ 4.5 V | 200 mA |
| | 2.0 Ω @ 2.5 V | |
| | 3.0 Ω @ 1.8 V | |
| | 4.5 Ω @ 1.5 V | |



XLLGA6
Case 713AC

PINOUT DIAGRAM



MARKING DIAGRAM



D = Specific Device Code
M = Date Code

ORDERING INFORMATION

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

NTND31015NZ

THERMAL RESISTANCE RATINGS

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

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 |
|-----------------------------------|---------------|--|--------------------------|-----|-----------|------|
| 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} | $V_{GS} = 0\text{ V}, V_{DS} = 5\text{ V}$ | $T_J = 25^\circ\text{C}$ | | 50 | nA |
| | | | $T_J = 85^\circ\text{C}$ | | 200 | nA |
| | | $V_{GS} = 0\text{ V}, V_{DS} = 16\text{ V}$ | $T_J = 25^\circ\text{C}$ | | 100 | nA |
| Gate-to-Source Leakage Current | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 5.0\text{ V}$ | | | ± 100 | nA |

ON CHARACTERISTICS (Note 4)

| | | | | | | |
|-------------------------------|--------------|--|-----|------|-----|----------|
| 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 | $R_{DS(ON)}$ | $V_{GS} = 4.5\text{ V}, I_D = 100\text{ mA}$ | | 0.8 | 1.5 | Ω |
| | | $V_{GS} = 2.5\text{ V}, I_D = 50\text{ mA}$ | | 1.1 | 2.0 | |
| | | $V_{GS} = 1.8\text{ V}, I_D = 20\text{ mA}$ | | 1.4 | 3.0 | |
| | | $V_{GS} = 1.5\text{ V}, I_D = 10\text{ mA}$ | | 1.8 | 4.5 | |
| Forward Transconductance | g_{FS} | $V_{DS} = 5.0\text{ V}, I_D = 125\text{ mA}$ | | 0.48 | | S |
| Forward Diode Voltage | V_{SD} | $V_{GS} = 0\text{ V}, I_S = 10\text{ mA}$ | | 0.6 | 1.0 | V |

CAPACITANCES

| | | | | | | |
|------------------------------|-----------|---|--|------|--|----|
| Input Capacitance | C_{ISS} | $f = 1\text{ MHz}, V_{GS} = 0\text{ V}$ $V_{DS} = 15\text{ V}$ | | 12.3 | | pF |
| Output Capacitance | C_{OSS} | | | 3.4 | | |
| Reverse Transfer Capacitance | C_{RSS} | | | 2.5 | | |

SWITCHING CHARACTERISTICS, $V_{GS} = 4.5\text{ V}$ (Note 4)

| | | | | | | |
|---------------------|--------------|--|--|------|--|----|
| Turn-On Delay Time | $t_{d(ON)}$ | $V_{GS} = 4.5\text{ V}, V_{DD} = 10\text{ V},$ $I_D = 200\text{ mA}, R_G = 3\ \Omega$ | | 16.5 | | ns |
| Rise Time | t_r | | | 25.5 | | |
| Turn-Off Delay Time | $t_{d(OFF)}$ | | | 142 | | |
| Fall Time | t_f | | | 80 | | |

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.

4. Switching characteristics are independent of operating junction temperatures.

ORDERING INFORMATION

| Device | Package | Shipping† |
|----------------|---------------------|--------------------|
| NTND31015NZTAG | 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.

NTND31015NZ

TYPICAL CHARACTERISTICS

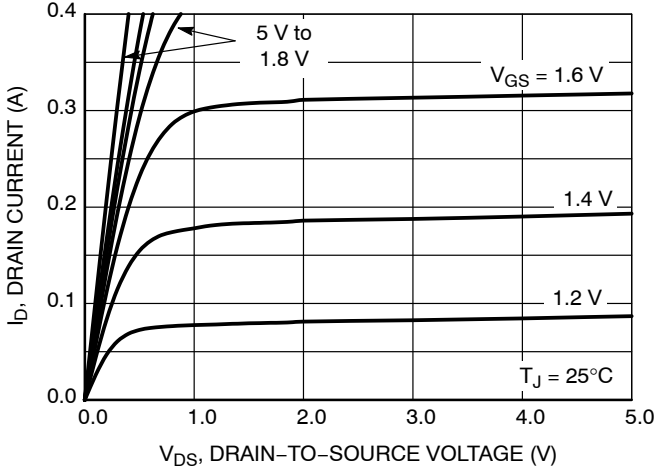


Figure 1. On-Region Characteristics

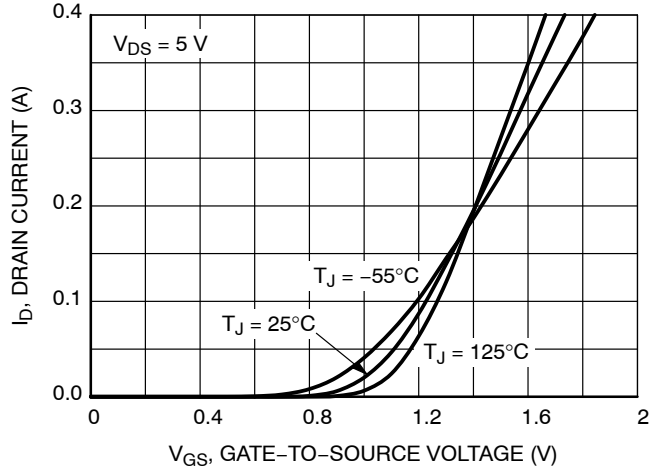


Figure 2. Transfer Characteristics

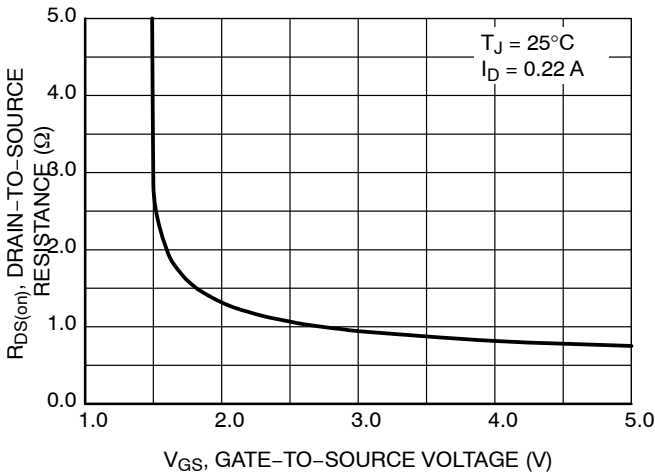


Figure 3. On-Resistance vs. Gate-to-Source Voltage

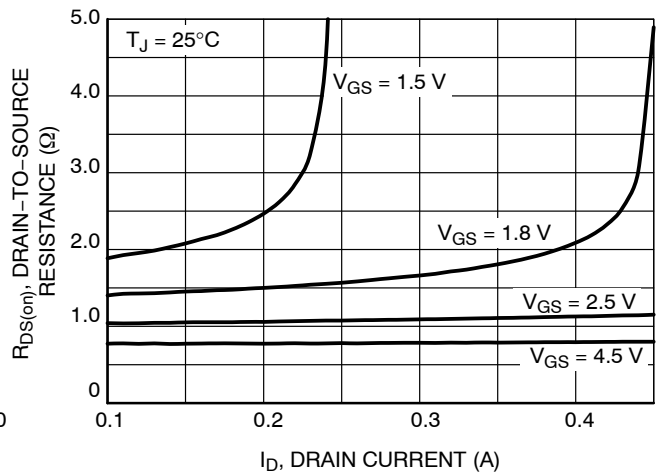


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

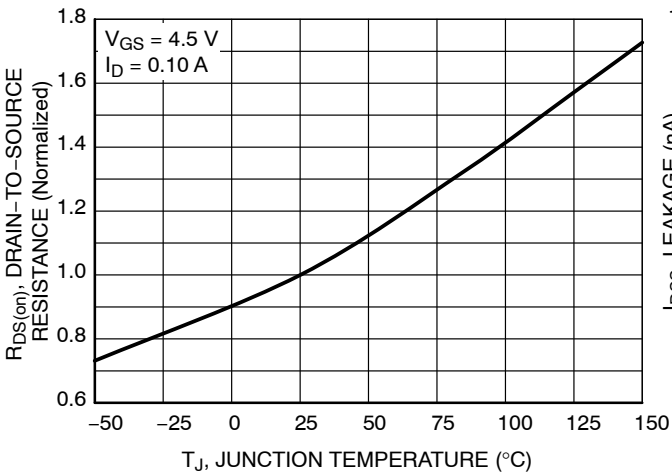


Figure 5. On-Resistance Variation with Temperature

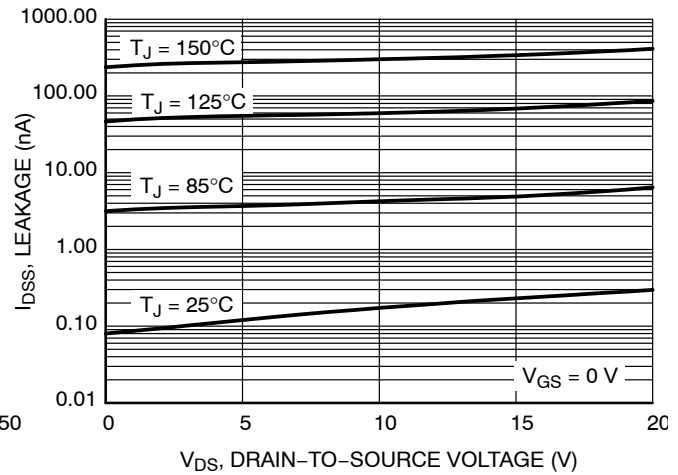


Figure 6. Drain-to-Source Leakage Current vs. Voltage

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TYPICAL CHARACTERISTICS

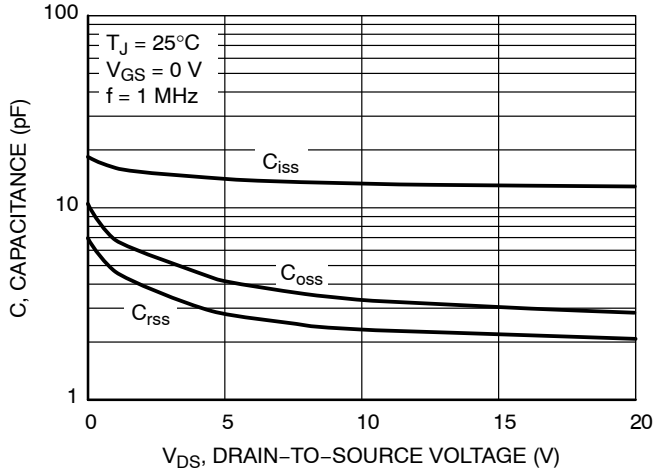


Figure 7. Capacitance Variation

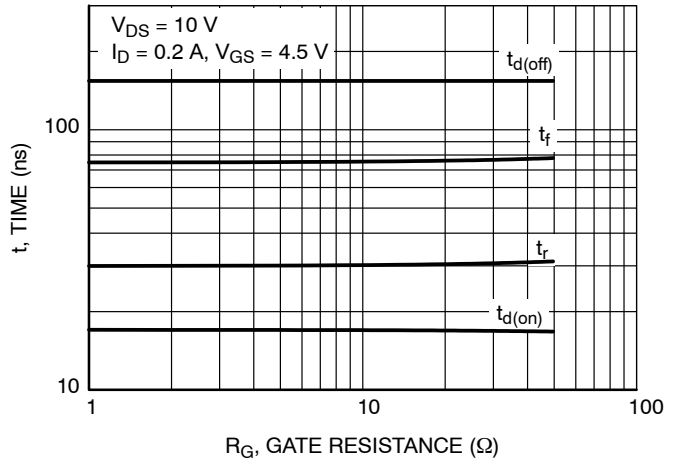


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

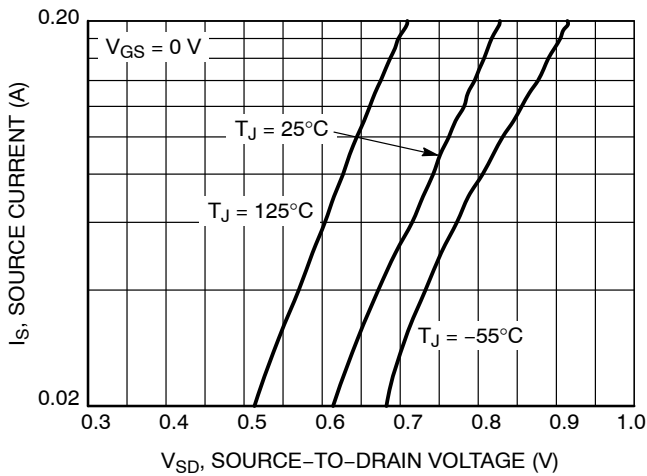


Figure 9. Diode Forward Voltage vs. Current

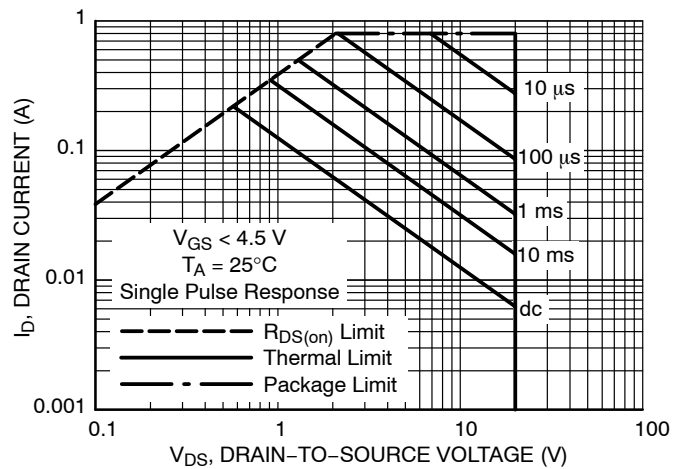


Figure 10. Maximum Rated Forward Biased Safe Operating Area

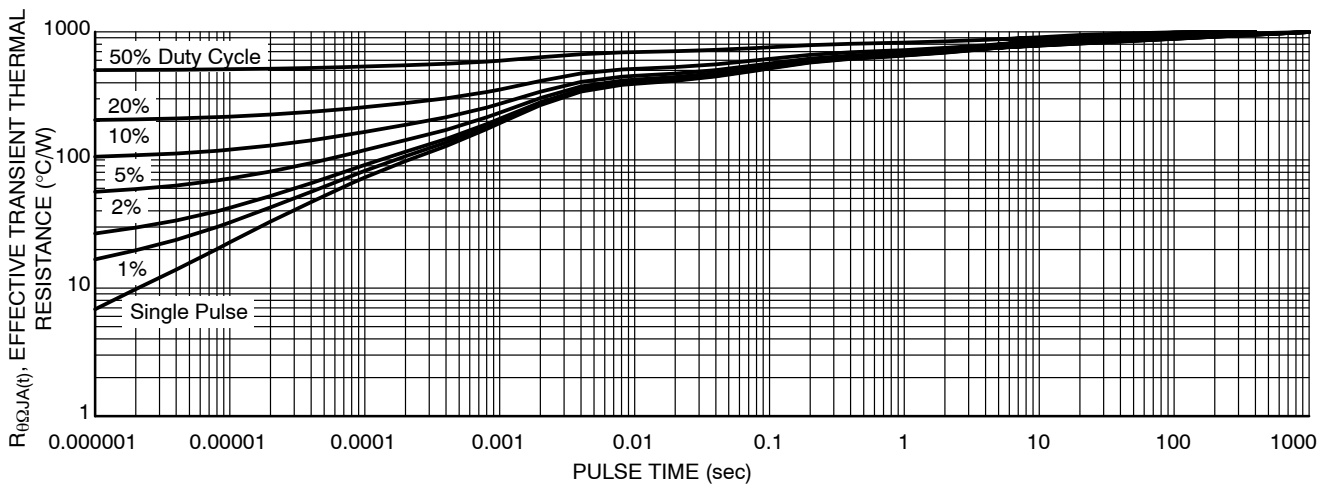


Figure 11. Thermal Response

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

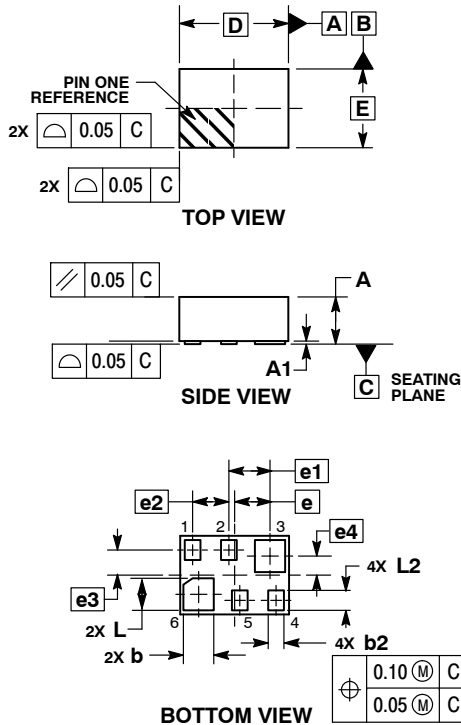
ON Semiconductor®



SCALE 8:1

XLLGA6 0.90x0.65
CASE 713AC
ISSUE O

DATE 19 JUN 2014



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

| MILLIMETERS | | |
|-------------|-----------|-------|
| DIM | 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 |

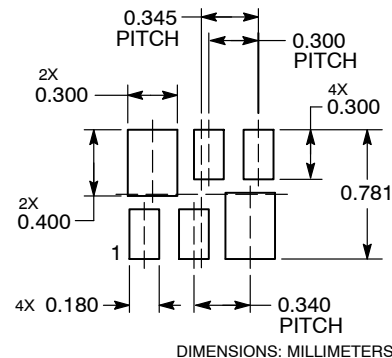
GENERIC MARKING DIAGRAM*



- X = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present.

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, SOLDERRM/D.

| | | |
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| DESCRIPTION: | XLLGA6 0.90X0.65 | PAGE 1 OF 1 |

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