MOSFET – Single, P-Channel, Small Signal, XLLGA3, 0.62 x 0.62 x 0.4 mm -20 V, -223 mA

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°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 | Steady State | $T_A = 25^{\circ}C$ | I _D | -223 | mA |
| Current (Note 1) | | T _A = 85°C | | -161 | |
| | t≤5 s | $T_A = 25^{\circ}C$ | | -240 | |
| Power Dissipa- tion (Note 1) | Steady State | T _A = 25°C | P _D | 121 | mW |
| | t ≤ 5 s | T _A = 25°C | | 140 | |
| Pulsed Drain Current $t_p = 10 \ \mu s$ | | I _{DM} | -669 | mA | |
| Operating Junction and Storage Temperature | | | Tj, T _{STG} | -55 to 150 | °C |
| Source Current (Body Diode) | | | ۱ _S | -121 | mA |
| Lead Temperature for Soldering Purposes (1/8" from case for 10 s) | | | TL | 260 | °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_{\thetaJA} | 1035 | °C/W |
| Junction-to-Ambient – t \leq 5 s (Note 1) | $R_{\theta JA}$ | 895 | |

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



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| MOSFET | | | |
|----------------------|-------------------------|--------------------|--|
| V _{(BR)DSS} | R _{DS(on)} MAX | I _D MAX | |
| 20 V | 1.6 Ω @ –4.5 V | | |
| | 2.4 Ω @ –2.5 V | -223 mA | |
| | 3.3 Ω @ –1.8 V | 220 11/1 | |
| | 4.5 Ω @ –1.5 V | | |



DIAGRAM



D = 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.

2. Pulse Test: pulse width \leq 300 $\mu s,$ duty cycle \leq 2%.

ELECTRICAL CHARACTERISTICS (T_J = 25° C unless otherwise specified)

| Parameter | Symbol | Test Condition | | Min | Тур | Max | Units |
|--|--------------------------------------|--|--------------------------|------|------|------|-------|
| OFF CHARACTERISTICS | | | | | | | |
| Drain-to-Source Breakdown Voltage | V _{(BR)DSS} | $V_{GS} = 0 \text{ V}, \text{ I}_{D} = -250 \ \mu\text{A}$ | | -20 | | | V |
| Drain-to-Source Breakdown Voltage Temperature Coefficient | V _{(BR)DSS} /T _J | I _D = -250 μA, ref to 25°C | | | 11 | | mV/°C |
| Zero Gate Voltage Drain Current | I _{DSS} | V_{GS} = 0 V, V_{DS} = -20 V | $T_J = 25^{\circ}C$ | | | -1.0 | μΑ |
| Gate-to-Source Leakage Current | I _{GSS} | V _{DS} = 0 V, V | / _{GS} = ±8.0 V | | | ±2.0 | μΑ |
| ON CHARACTERISTICS (Note 3) | | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | $V_{GS} = V_{DS},$ | I _D = –250 μA | -0.4 | | -1.0 | V |
| Negative Threshold Temperature Co- efficient | V _{GS(TH)} /T _J | | | | 2.1 | | mV/°C |
| Drain-to-Source On Resistance | R _{DS(on)} | $V_{GS} = -4.5 \text{ V}, \text{ I}_{D} = -100 \text{ mA}$ $V_{GS} = -2.5 \text{ V}, \text{ I}_{D} = -50 \text{ mA}$ $V_{GS} = -1.8 \text{ V}, \text{ I}_{D} = -20 \text{ mA}$ $V_{GS} = -1.5 \text{ V}, \text{ I}_{D} = -10 \text{ mA}$ | | | 1.1 | 1.6 | Ω |
| | | | | | 1.5 | 2.4 | |
| | | | | | 2.0 | 3.3 | |
| | | | | | 2.5 | 4.5 | |
| Forward Transconductance | 9 FS | $V_{DS} = -5 \text{ V}, \text{ I}_{D} = -100 \text{ mA}$ | | | 0.41 | | S |
| Source-Drain Diode Voltage | V _{SD} | $V_{GS} = 0 V, I_S = -10 mA$ | | | -0.6 | -1.0 | V |
| CHARGES & CAPACITANCES | | | | | | | |
| Input Capacitance | C _{ISS} | V_{GS} = 0 V, f = 10 kHz, V_{DS} = -15 V | | | 41 | | pF |
| Output Capacitance | C _{OSS} | | | | 4.6 | | 1 |
| Reverse Transfer Capacitance | C _{RSS} | | | | 4.1 | | |
| Total Gate Charge | Q _{G(TOT)} | $V_{GS} = -4.5 \text{ V}, V_{DS} = -15 \text{ V},$ $I_D = -200 \text{ mA}$ | | | 1.1 | | nC |
| Threshold Gate Charge | Q _{G(TH)} | | | | 0.1 | | |
| Gate-to-Source Charge | Q _{GS} | | | | 0.2 | | |
| Gate-to-Drain Charge | Q _{GD} | | | | 0.23 | | |
| SWITCHING CHARACTERISTICS, VG | S = 4.5 V (Note 3) | | | | | | |
| Turn-On Delay Time | t _{d(ON)} | V_{GS} = -4.5 V, V_{DD} = -15 V, I_{D} = -200 mA, R_{G} = 2 Ω | | | 41 | | ns |
| Rise Time | tr | | | | 97 | | 1 |
| Turn-Off Delay Time | t _{d(OFF)} | | | | 571 | | 1 |

286

3. Switching characteristics are independent of operating junction temperatures.

t_f

Fall Time

TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS









PACKAGE DIMENSIONS

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

AB -D-≻ PIN ONE REFERENCE □ 0.10 C □ 0.10 C



TOP VIEW



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.

2. CONTROLLING DIMENSION: MILLIMETERS.

| | MILLIMETERS | | | |
|-----|-------------|-------|--|--|
| DIM | MIN | MAX | | |
| Α | 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 | | | |
| Ε | 0.620 BSC | | | |
| E2 | 0.400 | 0.600 | | |
| е | 0.350 BSC | | | |
| K | 0.200 REF | | | |
| L | 0.090 | 0.210 | | |
| L2 | 0.110 | 0.310 | | |

RECOMMENDED SOLDER FOOTPRINT*



*Additional information concerning board mounting for this package may be found in Document AND9099/D, "Board Level Application Note for XLLGA 3-Lead 0.62x0.62 Package". 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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