

# VN2222 Series

## N-Channel Enhancement-Mode

## MOS Transistors



### VN2222 Series

#### FEATURES

- Low  $r_{DS(on)}$   $<7.5\Omega$

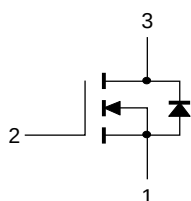
#### APPLICATIONS

- Switching
- Amplification

#### ORDERING INFORMATION

| Part                                    | Package        | Temperature Range |
|-----------------------------------------|----------------|-------------------|
| VN2222LL                                | Plastic TO-92  | -55°C to +150°C   |
| VN2222LM                                | Plastic TO-237 | -55°C to +150°C   |
| For sorted chips in carriers see 2N7000 |                |                   |

#### PIN CONNECTIONS

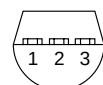


CD5

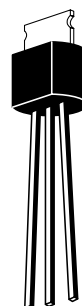


TO-92  
(TO-226AA)

#### BOTTOM VIEW



1. SOURCE
2. GATE
3. DRAIN



TO-237

#### BOTTOM VIEW



1. SOURCE
2. GATE
3. TAB-DRAIN

#### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| SYMBOL                            | PARAMETERS/TEST CONDITIONS                     |                        | LIMITS     |          | UNITS |
|-----------------------------------|------------------------------------------------|------------------------|------------|----------|-------|
|                                   |                                                |                        | VN2222LL   | VN2222LM |       |
| V <sub>DS</sub>                   | Drain-Source Voltage                           |                        | 60         | 60       | V     |
| V <sub>GS</sub>                   | Gate-Source Voltage                            |                        | ±30        | ±30      |       |
| I <sub>D</sub>                    | Continuous Drain Current                       | T <sub>A</sub> = 25°C  | 0.23       | 0.26     | A     |
|                                   |                                                | T <sub>A</sub> = 100°C | 0.14       | 0.16     |       |
| I <sub>DM</sub>                   | Pulsed Drain Current <sup>1</sup>              |                        | 1          | 1        |       |
| P <sub>D</sub>                    | Power Dissipation                              | T <sub>A</sub> = 25°C  | 0.8        | 1        | W     |
|                                   |                                                | T <sub>A</sub> = 100°C | 0.32       | 0.4      |       |
| T <sub>J</sub> , T <sub>stg</sub> | Operating Junction & Storage Temperature Range |                        | -55 to 150 |          | °C    |
| T <sub>L</sub>                    | Lead Temperature (1/16" from case for 10 sec.) |                        | 300        |          |       |

#### THERMAL RESISTANCE RATINGS

| SYMBOL     | THERMAL RESISTANCE  | LIMITS   |          | UNITS |
|------------|---------------------|----------|----------|-------|
|            |                     | VN2222LL | VN2222LM |       |
| $R_{thJA}$ | Junction-to-Ambient | 156      | 125      | K/W   |

<sup>1</sup>Pulse width limited by maximum junction temperature.

| SPECIFICATIONS <sup>a</sup> |                                               | LIMITS           |     |      |      |                                                                                                                    |
|-----------------------------|-----------------------------------------------|------------------|-----|------|------|--------------------------------------------------------------------------------------------------------------------|
| SYMBOL                      | PARAMETER                                     | TYP <sup>b</sup> | MIN | MAX  | UNIT | TEST CONDITIONS                                                                                                    |
| STATIC                      |                                               |                  |     |      |      |                                                                                                                    |
| V <sub>(BR)DSS</sub>        | Drain-Source Breakdown Voltage                | 70               | 60  |      | V    | I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0V                                                                       |
| V <sub>GS(th)</sub>         | Gate-Threshold Voltage                        | 2.3              | 0.6 | 2.5  |      | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA                                                           |
| I <sub>GSS</sub>            | Gate-Body Leakage                             |                  |     | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                                       |
| I <sub>DSS</sub>            | Zero Gate Voltage Drain Current               |                  |     | 10   | μA   | V <sub>DS</sub> = 48V, V <sub>GS</sub> = 0V                                                                        |
|                             |                                               |                  |     | 500  |      | T <sub>J</sub> = 125°C                                                                                             |
| I <sub>D(ON)</sub>          | On-State Drain Current <sup>c</sup>           | 1000             | 750 |      | mA   | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 10V                                                                       |
| r <sub>DS(ON)</sub>         | Drain-Source On-Resistance <sup>c</sup>       | 5                |     | 7.5  | Ω    | V <sub>GS</sub> = 5V, I <sub>D</sub> = 0.2A                                                                        |
|                             |                                               | 2.5              |     | 7.5  |      | V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.5A                                                                       |
|                             |                                               | 4.4              |     | 13.5 |      | T <sub>J</sub> = 125°C                                                                                             |
| g <sub>FS</sub>             | Forward Transconductance <sup>c</sup>         | 230              | 100 |      | mS   | V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.5A                                                                       |
| g <sub>OS</sub>             | Common Source Output Conductance <sup>c</sup> | 1200             |     |      | μS   | V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.2A                                                                       |
| DYNAMIC                     |                                               |                  |     |      |      |                                                                                                                    |
| C <sub>iss</sub>            | Input Capacitance                             | 16               |     | 60   | pF   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz                                                              |
| C <sub>oss</sub>            | Output Capacitance                            | 11               |     | 25   |      |                                                                                                                    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance                  | 2                |     | 5    |      |                                                                                                                    |
| SWITCHING                   |                                               |                  |     |      |      |                                                                                                                    |
| t <sub>ON</sub>             | Turn-On Time                                  | 7                |     | 10   | ns   | V <sub>DD</sub> = 15V, R <sub>L</sub> = 23Ω, I <sub>D</sub> = 0.6A<br>V <sub>GEN</sub> = 10V, R <sub>G</sub> = 25Ω |
| t <sub>OFF</sub>            | Turn-Off Time                                 | 7                |     | 10   |      | (Switching time is essentially independent of operating temperature)                                               |

**Notes:**

a. T<sub>A</sub> = 25°C unless otherwise noted.

b. For design aid only, not subject to production testing.

c. Pulse test; PW = ≤300μS, duty cycle ≤2%.