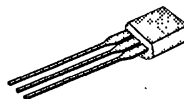


## PRODUCT SUMMARY

| $V_{(BR)DSS}$<br>(V) | $r_{DS(ON)}$<br>( $\Omega$ ) | $I_D$<br>(A) | PACKAGE |
|----------------------|------------------------------|--------------|---------|
| 60                   | 7.5                          | 0.15         | TO-92   |

TO-92



BOTTOM VIEW



- 1 SOURCE
- 2 GATE
- 3 DRAIN

Performance Curves: VNDS06 (See Section 7)

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

| PARAMETERS/TEST CONDITIONS                           |                           | SYMBOL    | 2N7008     | UNITS            |
|------------------------------------------------------|---------------------------|-----------|------------|------------------|
| Drain-Source Voltage                                 |                           | $V_{DS}$  | 60         | V                |
| Gate-Source Voltage                                  |                           | $V_{GS}$  | $\pm 40$   |                  |
| Continuous Drain Current                             | $T_C = 25^\circ\text{C}$  | $I_D$     | 0.15       | A                |
|                                                      | $T_C = 100^\circ\text{C}$ |           | 0.1        |                  |
| Pulsed Drain Current <sup>1</sup>                    |                           | $I_{DM}$  | 1          |                  |
| Power Dissipation                                    | $T_C = 25^\circ\text{C}$  | $P_D$     | 400        | mW               |
|                                                      | $T_C = 100^\circ\text{C}$ |           | 160        |                  |
| Operating Junction Temperature                       |                           | $T_J$     | -55 to 150 | $^\circ\text{C}$ |
| Storage Temperature                                  |                           | $T_{stg}$ | -55 to 150 |                  |
| Lead Temperature<br>(1/16" from case for 10 seconds) |                           | $T_L$     | 300        |                  |

## THERMAL RESISTANCE

| THERMAL RESISTANCE  | SYMBOL     | 2N7008 | UNITS                     |
|---------------------|------------|--------|---------------------------|
| Junction-to-Ambient | $R_{thJA}$ | 312.5  | $^\circ\text{C}/\text{W}$ |

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

| ELECTRICAL CHARACTERISTICS <sup>1</sup>         |                      |                                                                                                                            |                  | LIMITS |              |      |   |
|-------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------|------------------|--------|--------------|------|---|
| PARAMETER                                       | SYMBOL               | TEST CONDITIONS                                                                                                            | TYP <sup>2</sup> | 2N7008 |              | UNIT |   |
|                                                 |                      |                                                                                                                            |                  | MIN    | MAX          |      |   |
| STATIC                                          |                      |                                                                                                                            |                  |        |              |      |   |
| Drain-Source Breakdown Voltage                  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0 V, I <sub>D</sub> = 10 μA                                                                              | 70               | 60     |              | V    |   |
| Gate Threshold Voltage                          | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 0.25 mA                                                               | 2.15             | 1      | 2.5          |      |   |
| Gate-Body Leakage                               | I <sub>GSS</sub>     | V <sub>DS</sub> = 0 V<br>V <sub>GS</sub> = ±30 V <sup>4</sup> T <sub>C</sub> = 125°C                                       | ± 1<br>± 5       |        | ±100         | nA   |   |
| Zero Gate Voltage Drain Current                 | I <sub>DSS</sub>     | V <sub>GS</sub> = 0 V      V <sub>DS</sub> = 50 V<br>V <sub>DS</sub> = 50 V, T <sub>C</sub> = 125°C                        | 0.02<br>1        |        | 1<br>500     | μA   |   |
| On-State Drain Current <sup>3</sup>             | I <sub>D(ON)</sub>   | V <sub>DS</sub> ≥ 2 V <sub>DS(ON)</sub> , V <sub>GS</sub> = 10 V                                                           | 1000             | 500    |              | mA   |   |
| Drain-Source On-Resistance <sup>3</sup>         | r <sub>DS(ON)</sub>  | V <sub>GS</sub> = 5 V<br>I <sub>D</sub> = 50 mA      T <sub>C</sub> = 125°C                                                | 5<br>9           |        | 7.5<br>13.5  | Ω    |   |
|                                                 |                      | V <sub>GS</sub> = 10 V<br>I <sub>D</sub> = 0.5 A      T <sub>C</sub> = 125°C                                               | 2.5<br>4.4       |        | 7.5<br>13.5  |      |   |
|                                                 |                      | V <sub>GS</sub> = 5 V, I <sub>D</sub> = 50 mA                                                                              | 0.25             |        | 0.375        |      | V |
|                                                 |                      | V <sub>GS</sub> = 10 V<br>I <sub>D</sub> = 0.5 A <sup>4</sup> T <sub>C</sub> = 125°C                                       | 1.25<br>2.2      |        | 3.75<br>6.75 |      |   |
| Forward Transconductance <sup>3</sup>           | g <sub>fs</sub>      | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.2 A<br>f = 1 kHz                                                                | 170              | 80     |              | mS   |   |
| Common Source Output Conductance <sup>3,4</sup> | g <sub>OS</sub>      | V <sub>DS</sub> = 5 V, I <sub>D</sub> = 50 mA                                                                              | 500              |        |              | μS   |   |
| DYNAMIC                                         |                      |                                                                                                                            |                  |        |              |      |   |
| Input Capacitance                               | C <sub>iss</sub>     | V <sub>DS</sub> = 25 V<br>V <sub>GS</sub> = 0 V<br>f = 1 MHz                                                               | 16               |        | 50           | pF   |   |
| Output Capacitance                              | C <sub>oss</sub>     |                                                                                                                            | 11               |        | 25           |      |   |
| Reverse Transfer Capacitance                    | C <sub>rss</sub>     |                                                                                                                            | 2                |        | 5            |      |   |
| SWITCHING                                       |                      |                                                                                                                            |                  |        |              |      |   |
| Turn-On Time                                    | t <sub>ON</sub>      | V <sub>DD</sub> = 30 V, R <sub>L</sub> = 150 Ω<br>I <sub>D</sub> = 0.2 A, V <sub>GEN</sub> = 10 V<br>R <sub>G</sub> = 25 Ω | 7                |        | 20           | ns   |   |
| Turn-Off Time                                   | t <sub>OFF</sub>     | (Switching time is essentially independent of operating temperature)                                                       | 7                |        | 20           |      |   |

NOTES: 1.  $T_C = 25^\circ\text{C}$  unless otherwise noted.  
2. For design aid only, not subject to production testing.  
3. Pulse test;  $PW = 80\text{ }\mu\text{s}$ , duty cycle  $\leq 1\%$ .  
4. This parameter not registered with JEDEC.