

# VN30AB, VN35AB, VN67AB, VN89AB, VN90AB n-Channel Enhancement-mode Vertical Power MOSFET

## FEATURES

- High speed, high current switching
- Current sharing capability when paralleled
- Directly interface to CMOS, DTL, TTL logic
- Simple DC biasing
- Extended safe operating area
- Inherently temperature stable

## APPLICATIONS

- Switching power supplies
- DC to DC inverters
- CMOS and TTL to high current interface
- Line drivers
- Logic buffers
- Pulse amplifiers

## ABSOLUTE MAXIMUM RATINGS

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

|   |               |
|---|---------------|
| Drain-source Voltage                        |               |
| VN30AB, VN35AB .....                        | 35V           |
| VN67AB .....                                | 60V           |
| VN89AB .....                                | 80V           |
| VN90AB .....                                | 90V           |
| Drain-gate Voltage                          |               |
| VN30AB, VN35AB .....                        | 35V           |
| VN67AB .....                                | 60V           |
| VN89AB .....                                | 80V           |
| VN90AB .....                                | 90V           |
| Continuous Drain Current (see note 1) ..... | 1.2A          |
| Peak Drain Current (see note 2) .....       | 3.0A          |
| Continuous Forward Gate Current .....       | 2.0mA         |
| Peak-gate Forward Current .....             | 100mA         |
| Peak-gate Reverse Current .....             | 100mA         |
| Gate-source Forward (Zener) Voltage .....   | +15V          |
| Gate-source Reverse (Zener) Voltage .....   | -0.3V         |
| Thermal Resistance, Junction to Case .....  | 20°C/W        |
| Continuous Device Dissipation at (or below) |               |
| 25°C Case Temperature .....                 | 6.25W         |
| Linear Derating Factor .....                | 50mW/°C       |
| Operating Junction                          |               |
| Temperature Range .....                     | -55 to +150°C |
| Storage Temperature Range .....             | -55 to +150°C |
| Lead Temperature                            |               |
| (1/16 in. from case for 10 sec) .....       | +300°C        |

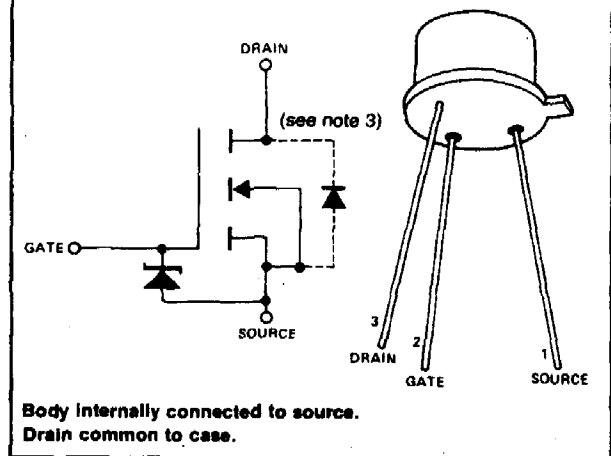
**Note 1.**  $T_c = 25^\circ\text{C}$ ; controlled by typical  $r_{DS(on)}$  and maximum power dissipation.

**Note 2.** Pulse width 80 $\mu\text{sec}$ , duty cycle 1.0%.

**Note 3.** The Drain-source diode is an integral part of the MOSFET structure.

## SCHEMATIC DIAGRAM

(OUTLINE DWG. TO-39)



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

# VN30AB, VN35AB, VN67AB, VN89AB, VN90AB

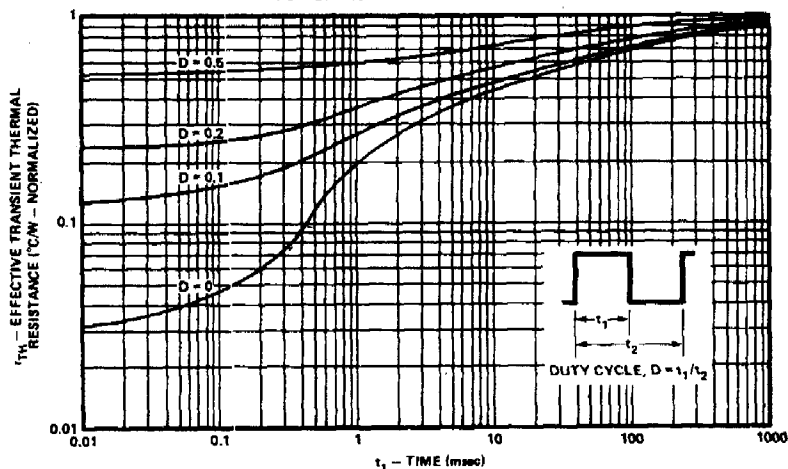
## ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

| CHARACTERISTIC  | VN30AB |      |     | VN35AB |      |     | VN67AB |      |     | VN89AB |      |     | VN90AB |      |     | UNIT   | TEST CONDITIONS  |
|---|--------|------|-----|--------|------|-----|--------|------|-----|--------|------|-----|--------|------|-----|--|--|
|   | MIN    | TYP  | MAX | MIN    | TYP  | MAX | MIN    | TYP  | MAX | MIN    | TYP  | MAX | MIN    | TYP  | MAX |  |  |
| 1 BV <sub>DSS</sub> Drain-Source Breakdown                      | 35     |      |     | 35     |      |     | 60     |      |     | 80     |      |     | 90     |      |     | V  | I <sub>D</sub> = 10 μA, V <sub>GS</sub> = 0  |
| 2 V <sub>GS(th)</sub> Gate Threshold Voltage                    | 0.8    | 1.2  |     | 0.8    | 1.2  |     | 0.8    | 1.2  |     | 0.8    | 1.2  |     | 0.8    | 1.2  |     |  | I <sub>D</sub> = 1.0 mA, V <sub>DS</sub> = V <sub>GS</sub>                                   |
| 3 I <sub>GSS</sub> Gate-Body Leakage                            |        | 0.01 | 0.5 |        | 0.01 | 0.5 |        | 0.01 | 0.5 |        | 0.01 | 0.5 |        | 0.01 | 0.5 | μA   | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0   |
| 4 I <sub>SS</sub> Zero Gate Voltage Drain Current               |        |      | 10  |        |      | 10  |        |      | 10  |        |      | 10  |        |      | 10  |  | V <sub>GS</sub> = 25V, V <sub>DS</sub> = 0   |
| 5 R <sub>DS(on)</sub> Drain-Source ON-State Resistance (Note 1) |        | 2.2  | 5.0 |        | 2.2  | 2.5 |        | 2.2  | 3.5 |        | 2.2  | 4.5 |        | 2.2  | 5.0 | Ω  | V <sub>GS</sub> = 5V, I <sub>D</sub> = 300mA<br>V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.0A |
| 6 I <sub>D(on)</sub> ON-State Drain Current (Note 1)            | 1.0    | 2.0  |     | 1.0    | 2.0  |     | 1.0    | 2.0  |     | 1.0    | 2.0  |     | 1.0    | 2.0  | A   | V <sub>GS</sub> = 25V, V <sub>DS</sub> = 10V |  |
| 7 g <sub>fs</sub> Forward Transconductance                      |        | 250  |     |        | 250  |     |        | 250  |     |        | 250  |     |        | 250  | mΩ  | V <sub>GS</sub> = 25V, I <sub>D</sub> = 0.5A |  |
| 8 C <sub>iss</sub> Input Capacitance (Note 2)                   |        |      | 50  |        |      | 50  |        |      | 50  |        |      | 50  |        |      | 50  | pF   | V <sub>GS</sub> = 0, V <sub>DS</sub> = 24V,<br>f = 1.0MHz                                    |
| 9 C <sub>res</sub> Reverse Transfer Capacitance (Note 2)        |        |      | 10  |        |      | 10  |        |      | 10  |        |      | 10  |        |      | 10  |  |  |
| 10 C <sub>oss</sub> Common Source Output Capacitance (Note 2)   |        |      | 40  |        |      | 40  |        |      | 40  |        |      | 40  |        |      | 40  |  |  |
| 11 t <sub>on</sub> Turn-ON Time (Note 2)                        |        | 4    | 10  |        | 4    | 10  |        | 4    | 10  |        | 4    | 10  |        | 4    | 10  | ns   |  |
| 12 t <sub>off</sub> Turn-OFF Time (Note 2)                      |        | 4    | 10  |        | 4    | 10  |        | 4    | 10  |        | 4    | 10  |        | 4    | 10  | ns   |  |

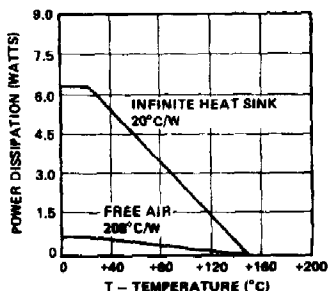
Note 1. Pulse Test — 80 μs, 1% duty cycle.

Note 2. Sample Test.

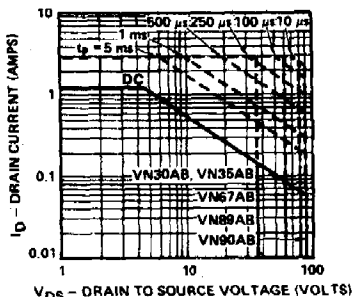
### THERMAL RESPONSE



### POWER DISSIPATION vs CASE OR AMBIENT TEMPERATURE



### DC SAFE OPERATING REGION T<sub>C</sub> = 25°C



### BREAKDOWN VOLTAGE VARIATION WITH TEMPERATURE

