# VN0300 SERIES

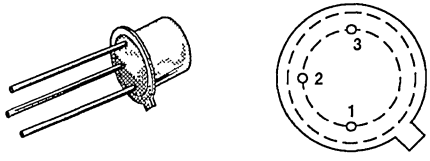
N-Channel Enhancement-Mode MOS Transistors

## PRODUCT SUMMARY

| PART NUMBER | $V_{(BR)DSS}$ (V) | $r_{DS(ON)}$ (Ω) | $I_D$ (A) | PACKAGE |
|---|---|---|---|---|
| VN0300B | 30 | 1.2 | 1.51 | TO-205AD |
| VN0300L | 30 | 1.2 | 0.64 | TO-92 |
| VN0300M | 30 | 1.2 | 0.67 | TO-237 |

Performance Curves: VNDQ03 (See Section 7)

TO-205AD (TO-39) BOTTOM VIEW

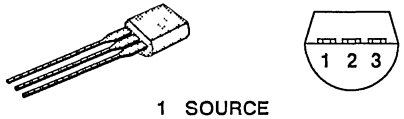



1 SOURCE
2 GATE
3 DRAIN & CASE

TO-237 BOTTOM VIEW


1 SOURCE
2 GATE
3 DRAIN

TO-92 BOTTOM VIEW




1 SOURCE
2 GATE
3 DRAIN

## ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C unless otherwise noted)[3]

| PARAMETERS/TEST CONDITIONS | | SYMBOL | VN0300B[2] | VN0300L | VN0300M | UNITS |
|---|---|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 30 | 30 | 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | ±30 | ±30 | V |
| Continuous Drain Current | $T_A$ = 25°C | $I_D$ | 1.51 | 0.64 | 0.67 | A |
| | $T_A$ = 100°C | | 0.95 | 0.38 | 0.43 | A |
| Pulsed Drain Current[1] | | $I_{DM}$ | 3 | 3 | 3 | A |
| Power Dissipation | $T_A$ = 25°C | $P_D$ | 5 | 0.8 | 1 | W |
| | $T_A$ = 100°C | | 2 | 0.32 | 0.4 | W |
| Operating Junction and Storage Temperature | | $T_j$, $T_{stg}$ | -55 to 150 | | | °C |
| Lead Temperature (1/16" from case for 10 seconds) | | $T_L$ | 300 | | | °C |

## THERMAL RESISTANCE

| THERMAL RESISTANCE | SYMBOL | VN0300B | VN0300L | VN0300M | UNITS |
|---|---|---|---|---|---|
| Junction-to-Ambient | $R_{thJA}$ | 170 | 156 | 125 | °C/W |

[1]Pulse width limited by maximum junction temperature
[2]Reference case temperature for all testing
[3]Absolute maximum ratings have been revised from previous datasheet

| ELECTRICAL CHARACTERISTICS[1] | | | LIMITS | | | |
|---|---|---|---|---|---|---|
| | | | | VN0300[4] | | |
| PARAMETER | SYMBOL | TEST CONDITIONS | TYP[2] | MIN | MAX | UNIT |
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0 V, $I_D$ = 10 µA | 65 | 30 | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 1 mA | 1.5 | 0.8 | 2.5 | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±30 V | ± 1 | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 30 V, $V_{GS}$ = 0 V | 0.0001 | | 10 | µA |
| | | $T_C$ = 125°C | 0.2 | | 500 | µA |
| On-State Drain Current[3] | $I_{D(ON)}$ | $V_{DS}$ = 10 V, $V_{GS}$ = 10 V | 3 | 1 | | A |
| Drain-Source On-Resistance[3] | $r_{DS(ON)}$ | $V_{GS}$ = 5 V, $I_D$ = 0.3 A | 1.4 | | 3.3 | Ω |
| | | $V_{GS}$ = 10 V, $I_D$ = 1 A | 0.85 | | 1.2 | Ω |
| | | $T_C$ = 125°C | 1.8 | | 1.65 | Ω |
| Forward Transconductance[3] | $g_{FS}$ | $V_{DS}$ = 10 V, $I_D$ = 0.5 A | 500 | 200 | | mS |
| Common Source Output Conductance[3] | $g_{OS}$ | $V_{DS}$ = 10 V, $I_D$ = 0.1 A | 1500 | | | µS |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = 15 V, $V_{GS}$ = 0 V, f = 1 MHz | 38 | | 100 | pF |
| Output Capacitance | $C_{oss}$ | | 28 | | 95 | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | 8 | | 25 | pF |
| **SWITCHING** | | | | | | |
| Turn-On Time | $t_{ON}$ | $V_{DD}$ = 25 V, $R_L$ = 24 Ω, $I_D$ = 1 A, $V_{GEN}$ = 10 V, $R_G$ = 25 Ω (Switching time is essentially independent of operating temperature) | 9 | | 30 | ns |
| Turn-Off Time | $t_{OFF}$ | | 13 | | 30 | ns |

NOTES: 1. $T_A$ = 25°C unless otherwise noted.
2. For design aid only, not subject to production testing.
3. Pulse test; PW = 300 µs, duty cycle ≤ 2%
4. Reference case temperature for VN0300B.