

N-Channel Enhancement-Mode MOS Transistors

Product Summary

| Part Number | $V_{(BR)DSS}$ Min (V) | $r_{DS(on)}$ Max (Ω) | $V_{GS(th)}$ (V) | I_D (A) |
|-------------|-----------------------|-------------------------------|------------------|-----------|
| VQ1001J | 30 | 1 @ $V_{GS} = 12$ V | 0.8 to 2.5 | 0.83 |
| VQ1001P | | 1 @ $V_{GS} = 12$ V | 0.8 to 2.5 | 0.53 |

Features

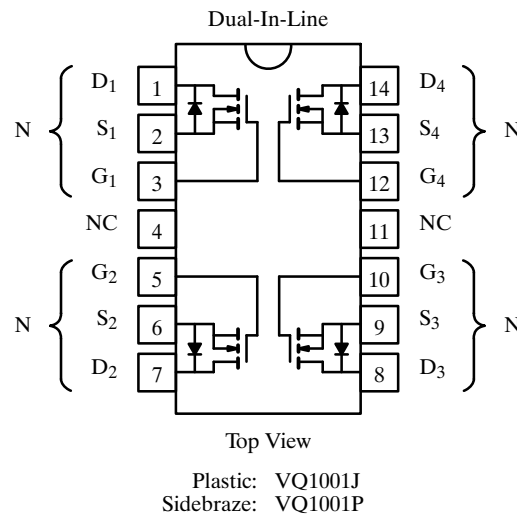
- Low On-Resistance: 0.85 Ω
- Low Threshold: 1.4 V
- Low Input Capacitance: 38 pF
- Fast Switching Speed: 9 ns
- Low Input and Output Leakage

Benefits

- Low Offset Voltage
- Low-Voltage Operation
- Easily Driven Without Buffer
- High-Speed Circuits
- Low Error Voltage

Applications

- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

| Parameter | Symbol | Single | Total Quad | Unit |
|--|----------------|------------|------------|---------------------------|
| Drain-Source Voltage | V_{DS} | 30 | | V |
| Gate-Source Voltage | V_{GS} | ± 30 | | |
| | | ± 20 | | |
| Continuous Drain Current ($T_J = 150^\circ\text{C}$) | I_D | 0.83 | | A |
| | | 0.53 | | |
| Pulsed Drain Current | I_{DM} | 3 | | |
| Power Dissipation (Single) | P_D | 1.3 | 2 | W |
| | | 0.52 | 0.8 | |
| Maximum Junction-to-Ambient (Single) | R_{thJA} | 96 | 62.5 | $^\circ\text{C}/\text{W}$ |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 150 | | $^\circ\text{C}$ |

Notes

a. Pulse width limited by maximum junction temperature.

VQ1001J/P

Specifications^a

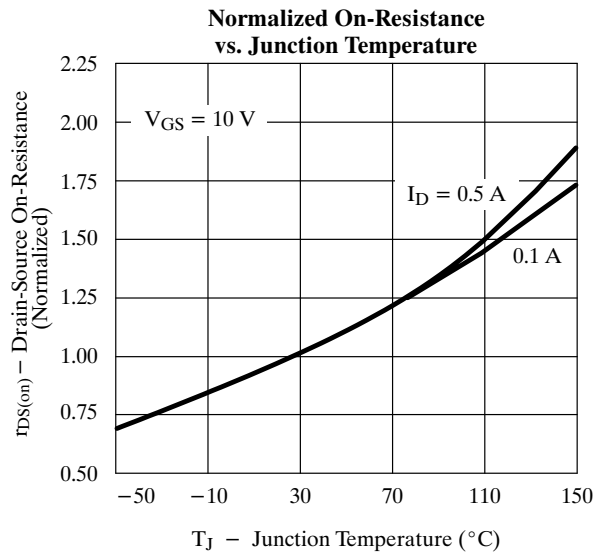
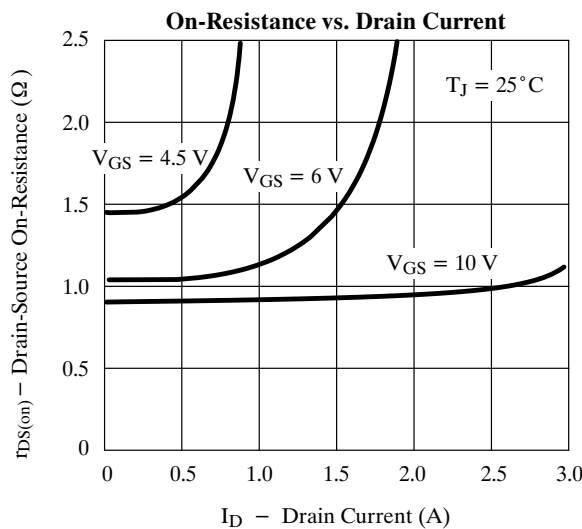
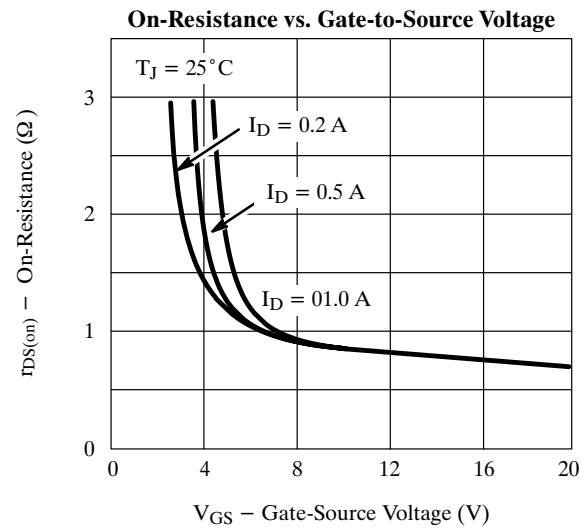
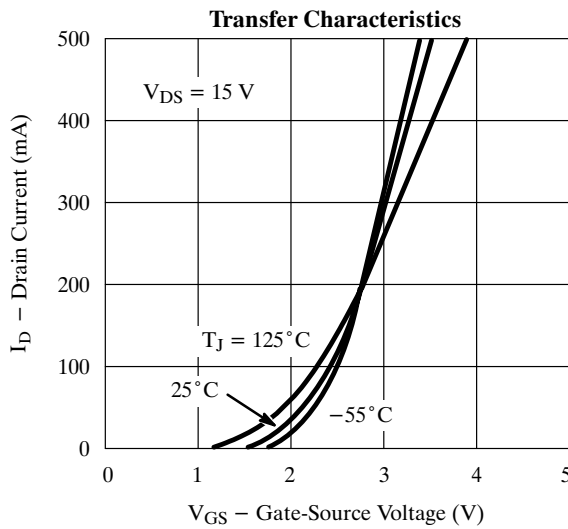
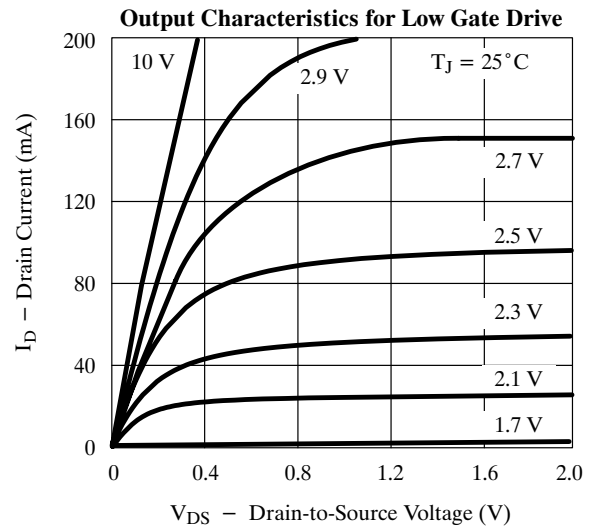
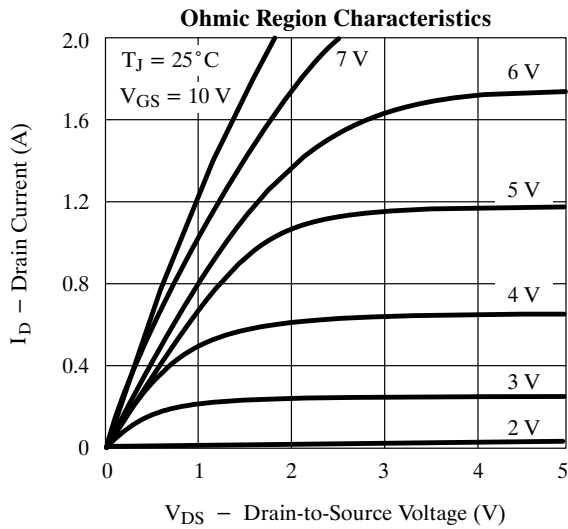
| Parameter | Symbol | Test Conditions | Limits | | | Unit |
|---|---------------|--|--------|------------------|-----------|---------------|
| | | | Min | Typ ^b | Max | |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0\text{ V}, I_D = 10\ \mu\text{A}$ | 30 | 45 | | V |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 1\ \text{mA}$ | 0.8 | 1.5 | 2.5 | |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0\ \text{V}, V_{GS} = \pm 15\ \text{V}$ $T_J = 125^\circ\text{C}$ | | | ± 100 | nA |
| | | | | | ± 500 | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}$ | | | 10 | μA |
| | | $V_{DS} = 24\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 125^\circ\text{C}$ | | | 500 | |
| On-State Drain Current ^c | $I_{D(on)}$ | $V_{DS} = 10\ \text{V}, V_{GS} = 12\ \text{V}$ | 2 | 3.5 | | A |
| Drain-Source On-Resistance ^c | $r_{DS(on)}$ | $V_{GS} = 5\ \text{V}, I_D = 0.2\ \text{A}$ | | 1.2 | 1.75 | Ω |
| | | $V_{GS} = 12\ \text{V}, I_D = 1\ \text{A}$ | | 0.8 | 1 | |
| | | $T_J = 125^\circ\text{C}$ | | 1.5 | 2 | |
| Forward Transconductance ^c | g_{fs} | $V_{DS} = 10\ \text{V}, I_D = 0.5\ \text{A}$ | 200 | 500 | | mS |
| Dynamic | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15\ \text{V}, V_{GS} = 0\ \text{V}, f = 1\ \text{MHz}$ | | 38 | 110 | pF |
| Output Capacitance | C_{oss} | | | 33 | 110 | |
| Reverse Transfer Capacitance | C_{rss} | | | 8 | 35 | |
| Switching^d | | | | | | |
| Turn-On Time | t_{ON} | $V_{DD} = 15\ \text{V}, R_L = 23\ \Omega, I_D \cong 0.6\ \text{A}$ $V_{GEN} = 10\ \text{V}, R_G = 25\ \Omega$ | | 9 | 30 | ns |
| Turn-Off Time | t_{OFF} | | | 14 | 30 | |

Notes

- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

VNDQ03

Typical Characteristics (25°C Unless Otherwise Noted)



VQ1001J/P

Typical Characteristics (25°C Unless Otherwise Noted)

