



## Quad N-Channel 30-V (D-S) MOSFETs

| PRODUCT SUMMARY |                       |                               |                  |           |
|-----------------|-----------------------|-------------------------------|------------------|-----------|
| Part Number     | $V_{(BR)DSS}$ Min (V) | $r_{DS(on)}$ Max ( $\Omega$ ) | $V_{GS(th)}$ (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

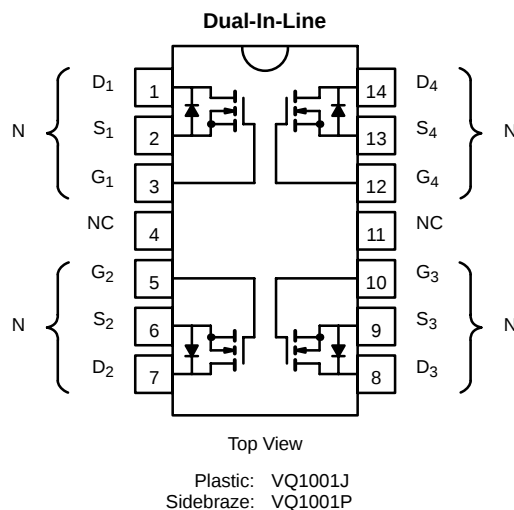
- Low On-Resistance: 0.85  $\Omega$
- Low Threshold: 1.4 V
- Low Input Capacitance: 38 pF
- Fast Switching Speed: 9 ns
- Low Input and Output Leakage

### 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



Device Marking  
Top View

VQ1001J  
"S" flxxyy

VQ1001P  
"S" flxxyy

"S" = Siliconix Logo  
f = Factory Code  
// = Lot Traceability  
xyy = Date Code

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) |                           |                |            |            |
|-----------------------------------------------------------------------------|---------------------------|----------------|------------|------------|
| Parameter                                                                   |                           | Symbol         | Single     | Total Quad |
| Drain-Source Voltage                                                        |                           | $V_{DS}$       | 30         |            |
| Gate-Source Voltage                                                         | VQ1001J                   | $V_{GS}$       | $\pm 30$   |            |
|                                                                             | VQ1001P                   |                | $\pm 20$   |            |
| Continuous Drain Current ( $T_J = 150^\circ\text{C}$ )                      | $T_A = 25^\circ\text{C}$  | $I_D$          | 0.83       |            |
|                                                                             | $T_A = 100^\circ\text{C}$ |                | 0.53       |            |
| Pulsed Drain Current <sup>a</sup>                                           |                           | $I_{DM}$       | 3          |            |
| Power Dissipation (Single)                                                  | $T_A = 25^\circ\text{C}$  | $P_D$          | 1.3        | 2          |
|                                                                             | $T_A = 100^\circ\text{C}$ |                | 0.52       | 0.8        |
| Thermal Resistance, Junction-to-Ambient (Single)                            |                           | $R_{thJA}$     | 96         | 62.5       |
| Operating Junction and Storage Temperature Range                            |                           | $T_J, T_{stg}$ | -55 to 150 |            |

Notes

a. Pulse width limited by maximum junction temperature.

**SPECIFICATIONS ( $T_A = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**

| Parameter                               | Symbol               | Test Conditions                                                                                                         | Limits |                  |      | Unit |
|-----------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------|--------|------------------|------|------|
|                                         |                      |                                                                                                                         | Min    | Typ <sup>a</sup> | Max  |      |
| Static                                  |                      |                                                                                                                         |        |                  |      |      |
| Drain-Source Breakdown Voltage          | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0 V, I <sub>D</sub> = 10 μA                                                                           | 30     | 45               |      | V    |
| Gate-Threshold Voltage                  | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1 mA                                                               | 0.8    | 1.5              | 2.5  |      |
| Gate-Body Leakage                       | I <sub>GSS</sub>     | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±16 V                                                                          |        |                  | ±100 | nA   |
|                                         |                      | T <sub>J</sub> = 125°C                                                                                                  |        |                  | ±500 |      |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>     | V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V                                                                           |        |                  | 10   | μA   |
|                                         |                      | V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125°C                                                   |        |                  | 500  |      |
| On-State Drain Current <sup>b</sup>     | I <sub>D(on)</sub>   | V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 12 V                                                                          | 2      | 3.5              |      | A    |
| Drain-Source On-Resistance <sup>b</sup> | r <sub>DS(on)</sub>  | V <sub>GS</sub> = 5 V, I <sub>D</sub> = 0.2 A                                                                           |        | 1.2              | 1.75 | Ω    |
|                                         |                      | V <sub>GS</sub> = 12 V, I <sub>D</sub> = 1 A                                                                            |        | 0.8              | 1    |      |
|                                         |                      | T <sub>J</sub> = 125°C                                                                                                  |        | 1.5              | 2    |      |
| Forward Transconductance <sup>b</sup>   | g <sub>fs</sub>      | V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.5 A                                                                          | 200    | 500              |      | mS   |
| Dynamic                                 |                      |                                                                                                                         |        |                  |      |      |
| Input Capacitance                       | C <sub>iss</sub>     | V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 0 V, f = 1 MHz                                                                |        | 38               | 110  | pF   |
| Output Capacitance                      | C <sub>oss</sub>     |                                                                                                                         |        | 33               | 110  |      |
| Reverse Transfer Capacitance            | C <sub>rss</sub>     |                                                                                                                         |        | 8                | 35   |      |
| Switching <sup>c</sup>                  |                      |                                                                                                                         |        |                  |      |      |
| Turn-On Time                            | t <sub>ON</sub>      | V <sub>DD</sub> = 15 V, R <sub>L</sub> = 23 Ω, I <sub>D</sub> ≅ 0.6 A<br>V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 25 Ω |        | 9                | 30   | ns   |
| Turn-Off Time                           | t <sub>OFF</sub>     |                                                                                                                         |        | 14               | 30   |      |

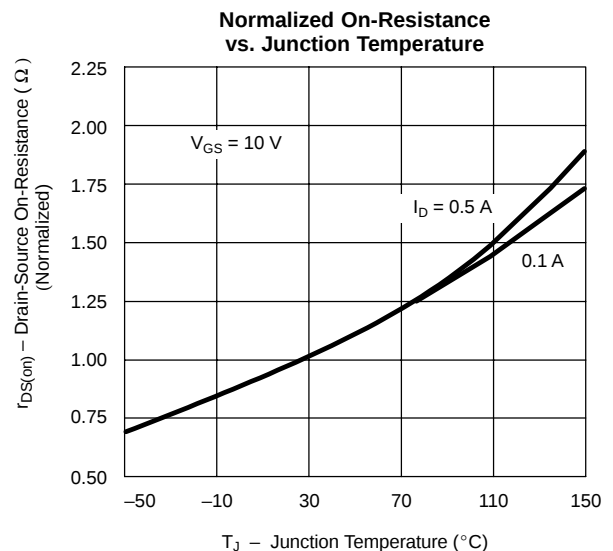
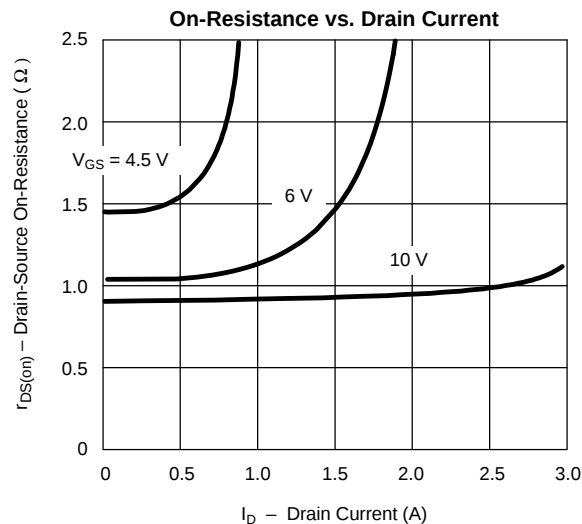
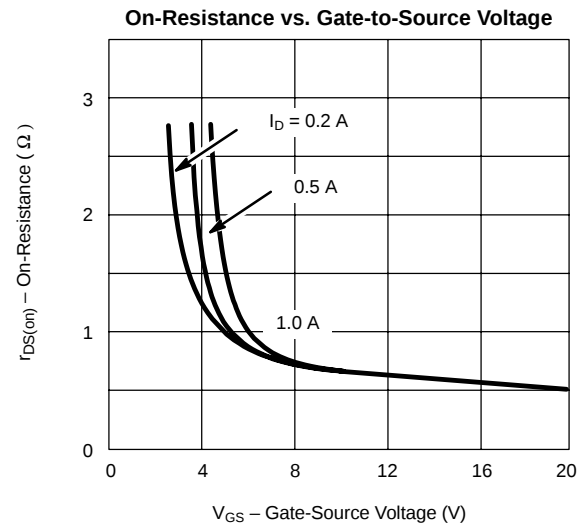
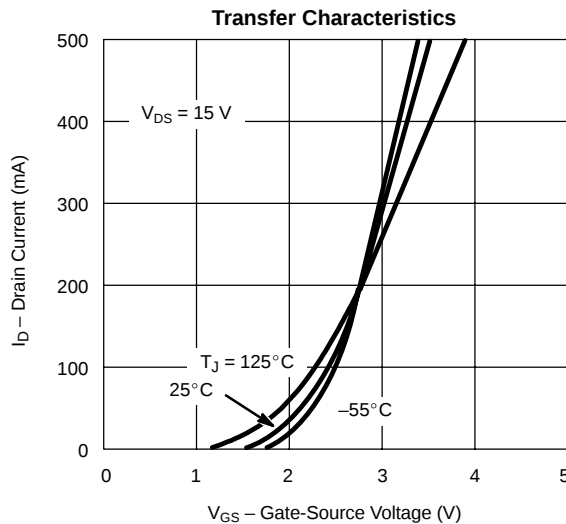
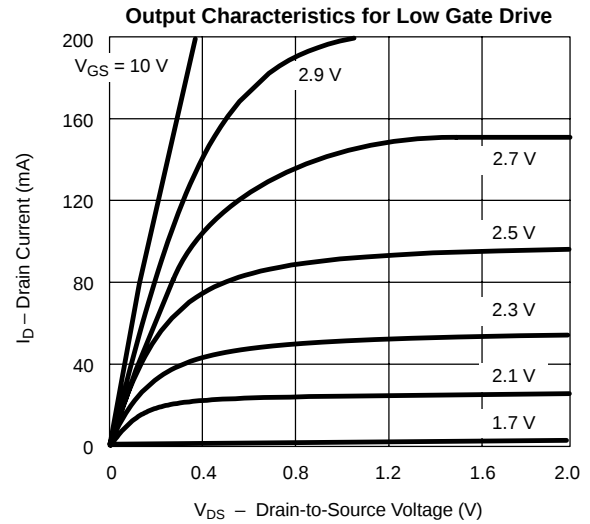
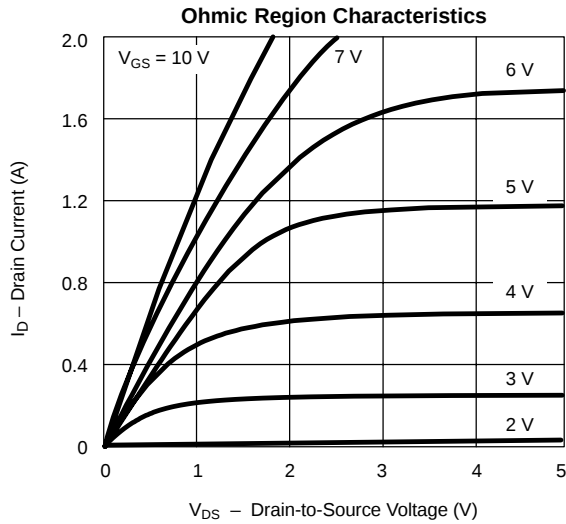
## Notes

- a. For DESIGN AID ONLY, not subject to production testing.  
b. Pulse test:  $PW \leq 300\text{ }\mu\text{s}$  duty cycle  $\leq 2\%$ .  
c. Switching time is essentially independent of operating temperature.

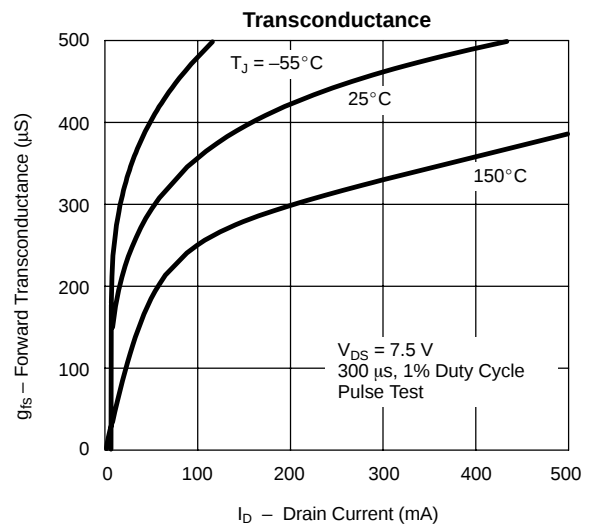
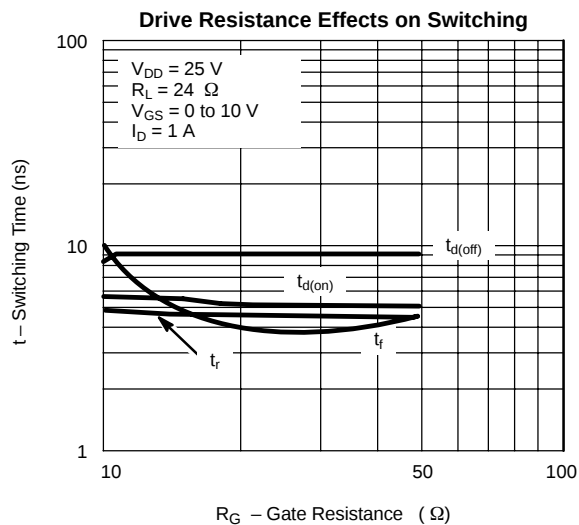
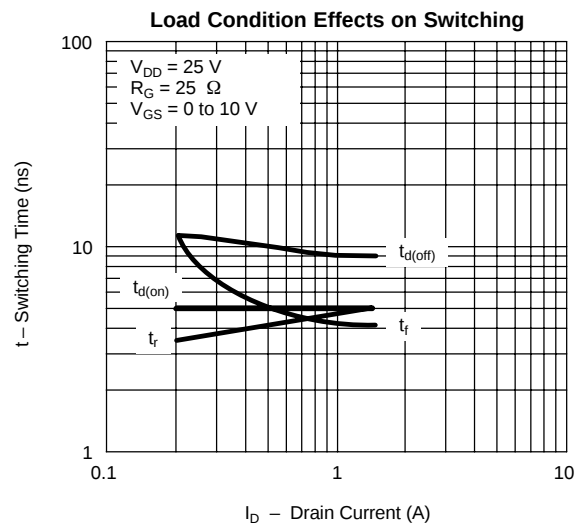
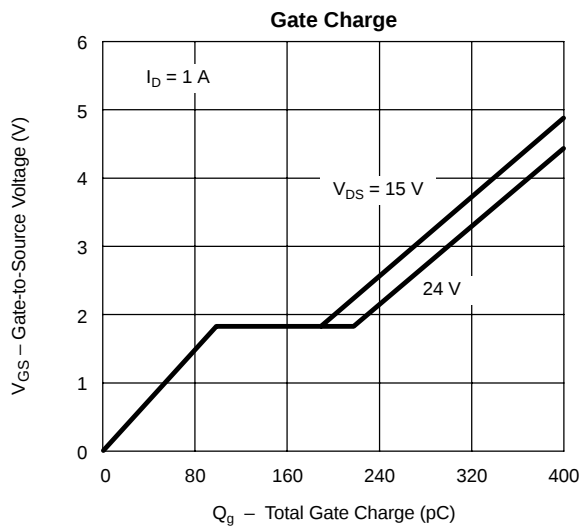
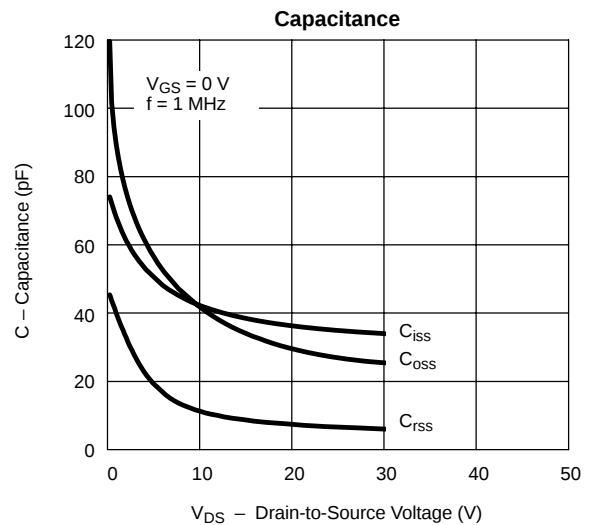
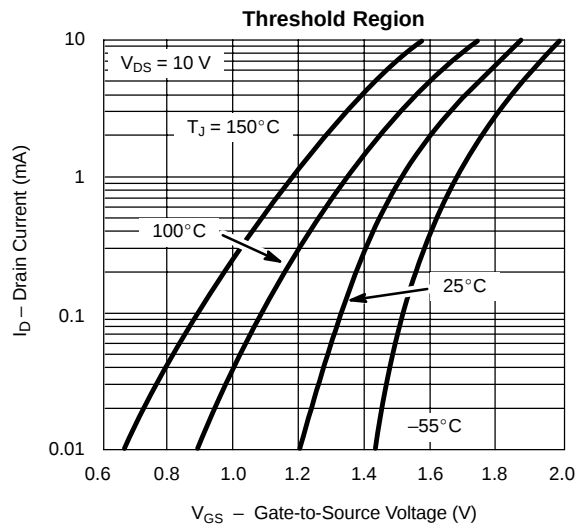
VNDQ03



**TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**



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