



2N6660, VQ1004J/P

Vishay Siliconix

N-Channel 60-V (D-S) Single and Quad MOSFETs

| PRODUCT SUMMARY | | | | |
|-----------------|-----------------------|-------------------------------|------------------|-----------|
| Part Number | $V_{(BR)DSS}$ Min (V) | $r_{DS(on)}$ Max (Ω) | $V_{GS(th)}$ (V) | I_D (A) |
| 2N6660 | 60 | 3 @ $V_{GS} = 10$ V | 0.8 to 2 | 1.1 |
| VQ1004J/P | | 3.5 @ $V_{GS} = 10$ V | 0.8 to 2.5 | 0.46 |

FEATURES

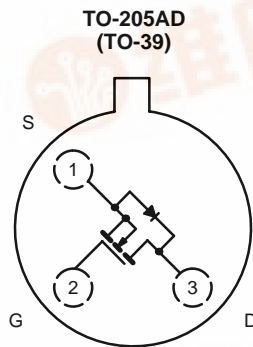
- Low On-Resistance: 1.3 Ω
- Low Threshold: 1.7 V
- Low Input Capacitance: 35 pF
- Fast Switching Speed: 8 ns
- Low Input and Output Leakage

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

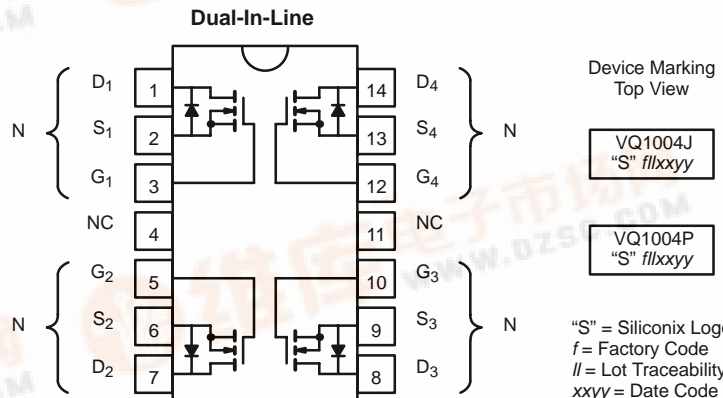


Top View
2N6660

Device Marking
Side View

2N6660
"S" flxxyy

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



Top View
Plastic: VQ1004J
Sidebrazed: VQ1004P

Device Marking
Top View

VQ1004J
"S" flxxyy

VQ1004P
"S" flxxyy

"S" = Siliconix Logo
f = Factory Code
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| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | | | | |
|---|----------------|---------------------------|----------|----------|------------|---------------------------|------------------|
| Parameter | Symbol | 2N6660 | Single | | Total Quad | Unit | |
| | | | VQ1004J | VQ1004P | VQ1004J/P | | |
| Drain-Source Voltage | V_{DS} | 60 | 60 | 60 | | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | ± 30 | ± 20 | | V | |
| Continuous Drain Current ($T_J = 150^\circ\text{C}$) | I_D | $T_C = 25^\circ\text{C}$ | 1.1 | 0.46 | ± 0.46 | A | |
| | | $T_C = 100^\circ\text{C}$ | 0.8 | 0.26 | 0.26 | | |
| Pulsed Drain Current ^a | I_{DM} | 3 | 2 | 2 | | A | |
| Power Dissipation | P_D | $T_C = 25^\circ\text{C}$ | 6.25 | 1.3 | 1.3 | 2 | W |
| | | $T_C = 100^\circ\text{C}$ | 2.5 | 0.52 | 0.52 | 0.8 | |
| Thermal Resistance, Junction-to-Ambient ^b | R_{thJA} | 170 | 0.96 | 0.96 | 62.5 | $^\circ\text{C}/\text{W}$ | |
| Thermal Resistance, Junction-to-Case | R_{thJC} | 20 | | | | $^\circ\text{C}/\text{W}$ | |
| 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.
^b This parameter not registered with JEDEC.

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| SPECIFICATIONS (T _A = 25 °C UNLESS OTHERWISE NOTED) | | | | | | | | |
|--|----------------------|---|------------------|--------|-------|-----------|-------|------|
| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | Unit |
| | | | | 2N6660 | | VQ1004J/P | | |
| | | | | Min | Max | Min | Max | |
| Static | | | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0 V, I _D = 10 μA | 75 | 60 | | 60 | | V |
| Gate-Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 1 mA | 1.7 | 0.8 | 2 | 0.8 | 2.5 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ± 15 V | | | ± 100 | | ± 100 | nA |
| | | T _C = 125 °C | | | ± 500 | | ± 500 | |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 60 V, V _{GS} = 0 V | | | 10 | | | μA |
| | | V _{DS} = 35 V, V _{GS} = 0 V | | | | | | |
| | | V _{DS} = 48 V, V _{GS} = 0 V | | | | | 1 | |
| | | T _C = 125 °C | | | 500 | | 500 | |
| On-State Drain Current ^b | I _{D(on)} | V _{DS} = 10 V, V _{GS} = 10 V | 3 | 1.5 | | 1.5 | | A |
| Drain-Source On-Resistance ^b | r _{DS(on)} | V _{GS} = 5 V, I _D = 0.3 A ^d | 2 | | 5 | | 5 | Ω |
| | | V _{GS} = 10 V, I _D = 1 A | 1.3 | | 3 | | 3.5 | |
| | | T _C = 125 °C ^d | 2.4 | | 4.2 | | 4.9 | |
| Forward Transconductance ^b | g _{fs} | V _{DS} = 10 V, I _D = 0.5 A | 350 | 170 | | 170 | | mS |
| Common Source Output Conductance ^b | g _{os} | V _{DS} = 10 V, I _D = 0.1 A | 1 | | | | | |
| Diode Forward Voltage | V _{SD} | I _S = 0.99 A, V _{GS} = 0 V | 0.8 | | | | | V |
| Dynamic | | | | | | | | |
| Input Capacitance | C _{iSS} | V _{DS} = 24 V, V _{GS} = 0 V f = 1 MHz | 35 | | 50 | | 60 | pF |
| Output Capacitance | C _{oss} | | 25 | | 40 | | 50 | |
| Reverse Transfer Capacitance | C _{rSS} | | 7 | | 10 | | 10 | |
| Drain-Source Capacitance | C _{ds} | | 30 | | 40 | | | |
| Switching^c | | | | | | | | |
| Turn-On Time | t _{ON} | V _{DD} = 25 V, R _L = 23 Ω I _D ≅ 1 A, V _{GEN} = 10 V R _G = 25 Ω | 8 | | 10 | | 10 | ns |
| Turn-Off Time | t _{OFF} | | 8.5 | | 10 | | 10 | |

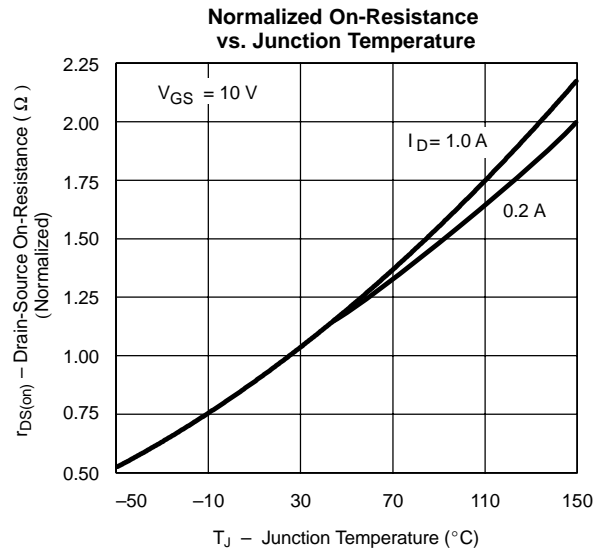
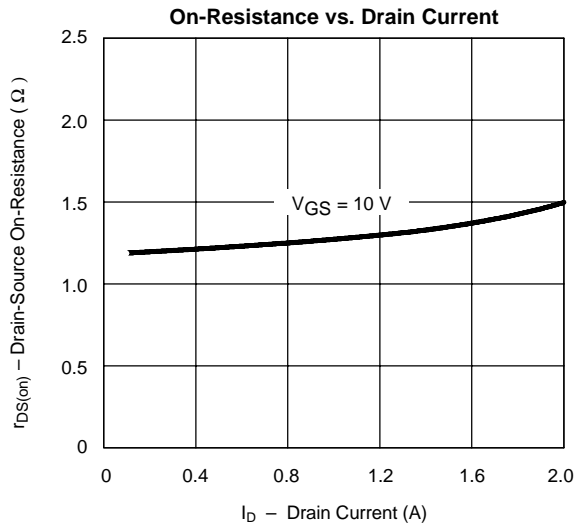
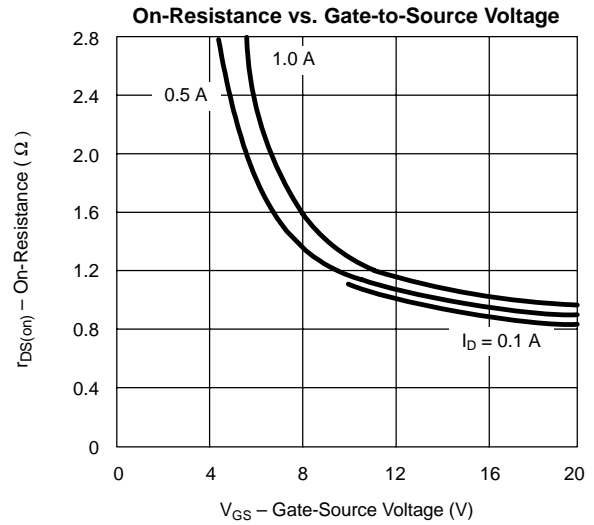
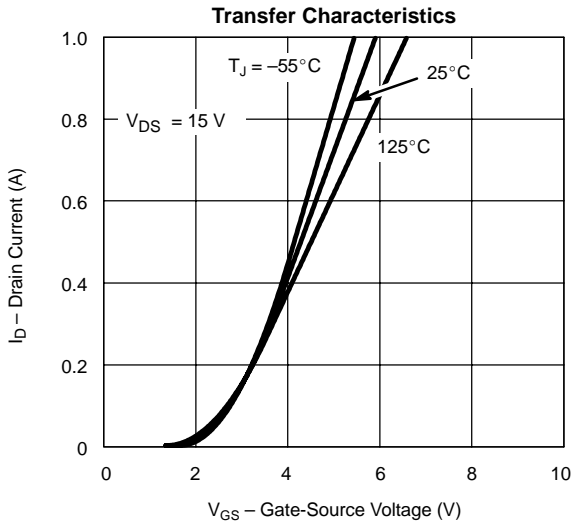
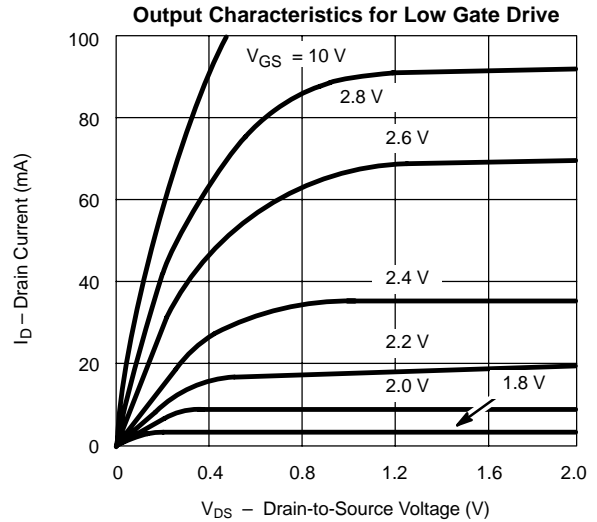
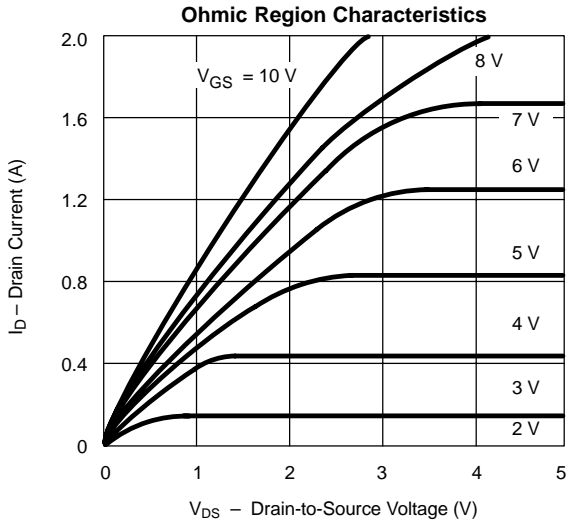
Notes

- a. For DESIGN AID ONLY, not subject to production testing.
- b. Pulse test: PW ≤ 80 μs duty cycle ≤ 1%.
- c. Switching time is essentially independent of operating temperature.
- d. This parameter not registered with JEDEC on 2N6660.

VNDQ06

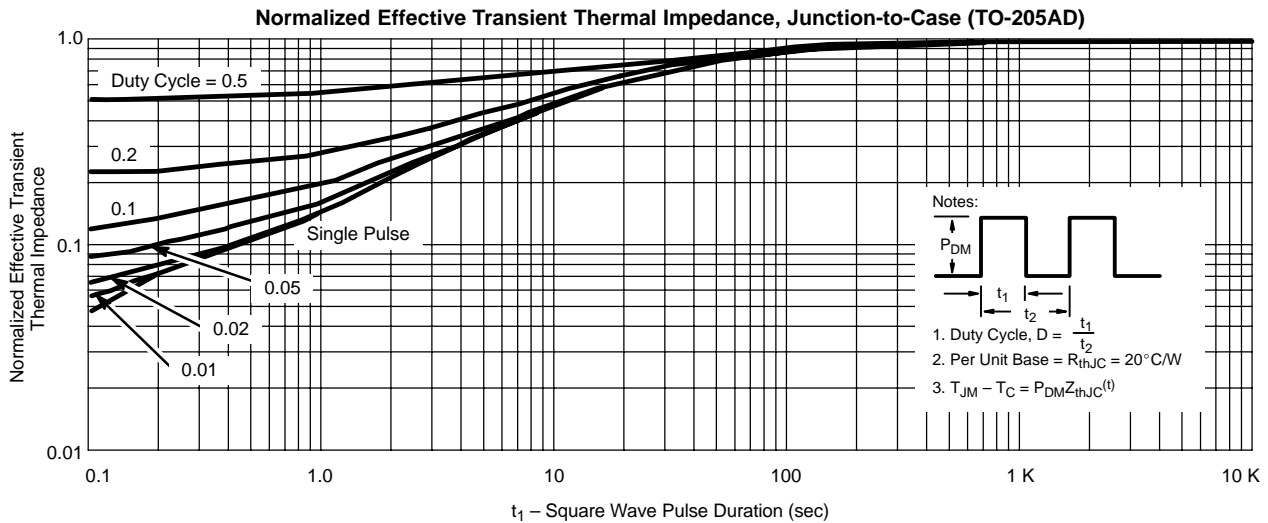
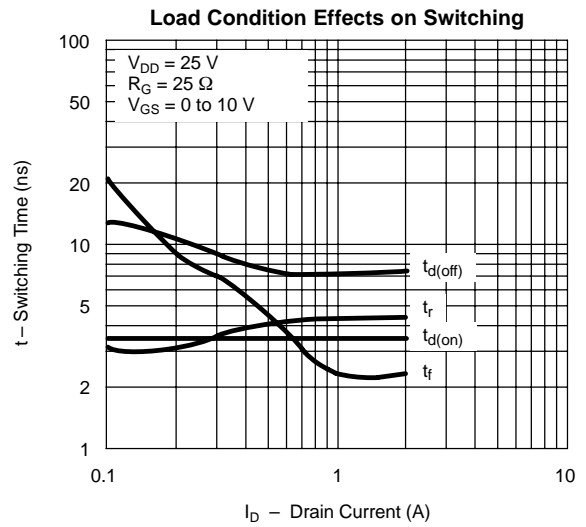
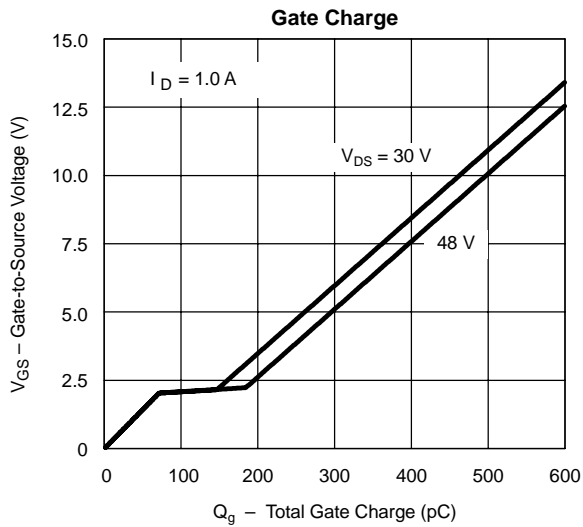
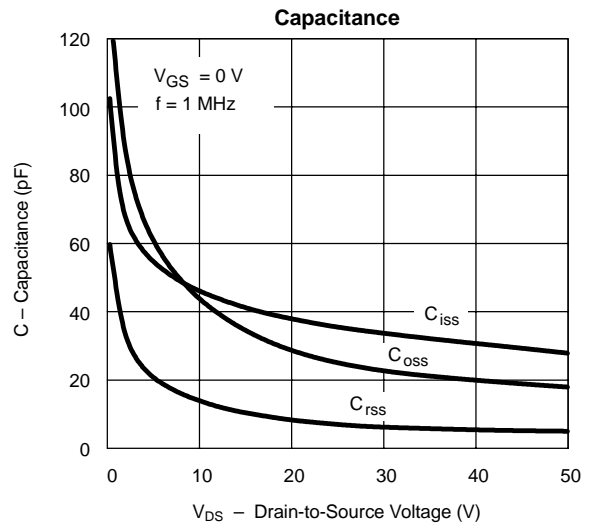
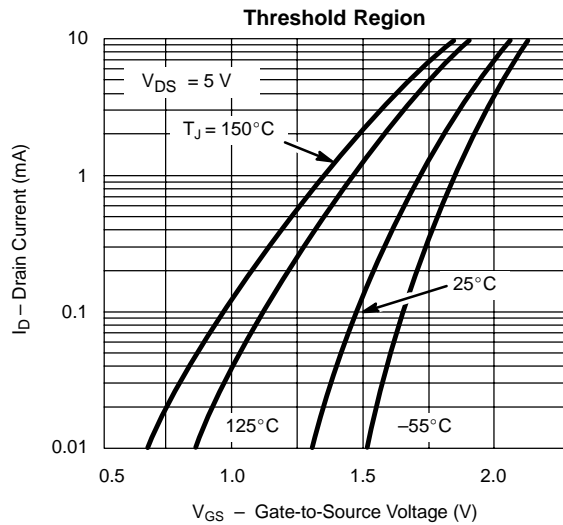


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)





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