



N-Channel 240-V (D-S) MOSFETs

| PRODUCT SUMMARY | | | | |
|-----------------|-----------------------|-------------------------------|------------------|-----------|
| Part Number | $V_{(BR)DSS}$ Min (V) | $r_{DS(on)}$ Max (Ω) | $V_{GS(th)}$ (V) | I_D (A) |
| TN2410L | 240 | 10 @ $V_{GS} = 4.5$ V | 0.5 to 1.8 | 0.18 |
| VN2406D | | 6 @ $V_{GS} = 10$ V | 0.8 to 2 | 1.12 |
| VN2406L | | 6 @ $V_{GS} = 10$ V | 0.8 to 2 | 0.18 |
| VN2410L | | 10 @ $V_{GS} = 10$ V | 0.8 to 2 | 0.18 |
| VN2410LS | | 10 @ $V_{GS} = 10$ V | 0.8 to 2 | 0.19 |

FEATURES

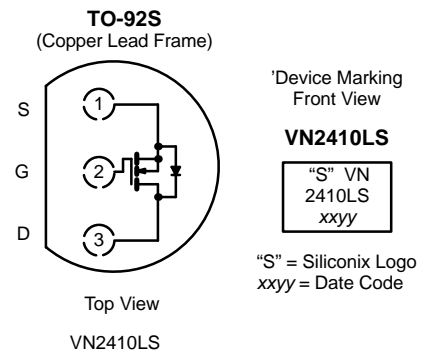
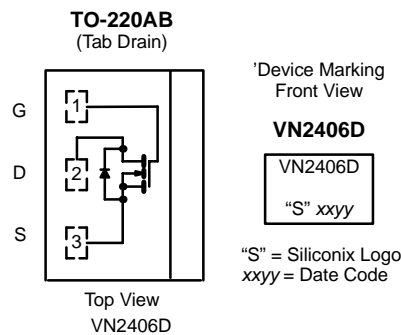
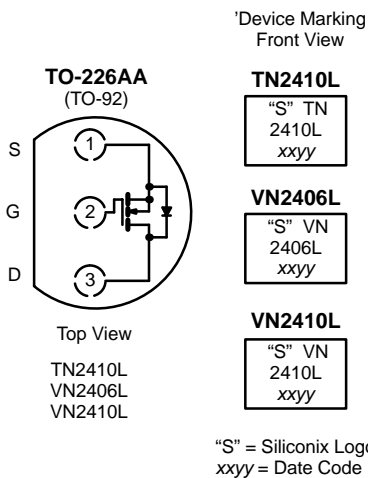
- Low On-Resistance: 3.5 Ω
- Secondary Breakdown Free: 260 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

BENEFITS

- Low Offset Voltage
- Full-Voltage Operation
- Easily Driven Without Buffer
- Low Error Voltage
- No High-Temperature "Run-Away"

APPLICATIONS

- High-Voltage Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Transistors, etc.
- Telephone Mute Switches, Ringer Circuits
- Power Supply, Converters
- Motor Control



| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | | | | | |
|---|---------------------------|------------|----------------------|----------|----------|----------|--------------------|---|
| Parameter | Symbol | TN2410L | VN2406D ^b | VN2406L | VN2410L | VN2410LS | Unit | |
| Drain-Source Voltage | V_{DS} | 240 | 240 | 240 | 240 | 240 | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | ± 20 | ± 20 | ± 20 | ± 20 | | |
| Continuous Drain Current ($T_J = 150^\circ\text{C}$) | $T_A = 25^\circ\text{C}$ | I_D | 0.18 | 1.12 | 0.18 | 0.18 | 0.19 | A |
| | $T_A = 100^\circ\text{C}$ | | 0.11 | 0.7 | 0.11 | 0.11 | 0.12 | |
| Pulsed Drain Current ^a | I_{DM} | 1 | 3 | 1.7 | 1.7 | 2 | | |
| Power Dissipation | $T_A = 25^\circ\text{C}$ | P_D | 0.8 | 20 | 0.8 | 0.8 | 0.9 | W |
| | $T_A = 100^\circ\text{C}$ | | 0.32 | 8 | 0.32 | 0.32 | 0.4 | |
| Thermal Resistance, Junction-to-Ambient | R_{thJA} | 156 | 6.25 ^c | 156 | 156 | 139 | $^\circ\text{C/W}$ | |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 150 | | | | | $^\circ\text{C}$ | |

Notes

- Pulse width limited by maximum junction temperature.
- Reference case for all temperature testing.
- Maximum junction-to-case

| SPECIFICATIONS (T _A = 25 °C UNLESS OTHERWISE NOTED) | | | | | | | | | | |
|--|----------------------|--|------------------|---------|-----|-----------|------|------------|------|------|
| Parameter | Symbol | Test Conditions | Typ ^a | Limits | | | | | | Unit |
| | | | | TN2410L | | VN2406D/L | | VN2410L/LS | | |
| | | | | Min | Max | Min | Max | Min | Max | |
| Static | | | | | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0 V, I _D = 100 μA | 260 | 240 | | 240 | | 240 | | V |
| Gate-Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 1 mA | 1.4 | 0.5 | 1.8 | 0.8 | 2 | 0.8 | 2 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±15 V | | | | | ±100 | | ±100 | nA |
| | | T _J = 125 °C | | | | | ±500 | | ±500 | |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 192 V, V _{GS} = 0 V | 0.01 | | 1 | | | | | μA |
| | | T _J = 125 °C | 1 | | 100 | | | | | |
| | | V _{DS} = 120 V, V _{GS} = 0 V | | | | | 10 | | 10 | |
| On-State Drain Current ^b | I _{D(on)} | V _{DS} = 10 V, V _{GS} = 4.5 V | 0.8 | 0.25 | | | | | | A |
| | | V _{DS} = 15 V, V _{GS} = 10 V | 1.5 | | | 1 | | 1 | | |
| Drain-Source On-Resistance ^b | r _{DS(on)} | V _{GS} = 2.5 V, I _D = 0.1 A | 7.5 | | | | 10 | | 10 | Ω |
| | | V _{GS} = 3.5 V, I _D = 0.05 A | 4.5 | | 15 | | | | | |
| | | V _{GS} = 4.5 V, I _D = 0.2 A | 4 | | 10 | | | | | |
| | | T _J = 125 °C | 7.5 | | 20 | | | | | |
| | | V _{GS} = 10 V, I _D = 0.5 A | 3.5 | | | | 6 | | 10 | |
| Forward Transconductance ^b | g _{fs} | V _{DS} = 10 V, I _D = 0.2 A | 500 | 100 | | | | | | mS |
| | | V _{DS} = 10 V, I _D = 0.5 A | 530 | | | 300 | | 300 | | |
| Input Capacitance | C _{iSS} | V _{DS} = 25 V, V _{GS} = 0 V f = 1 MHz | 115 | | 135 | | 135 | | 135 | pF |
| Output Capacitance | C _{oss} | | 30 | | 50 | | 50 | | 50 | |
| Reverse Transfer Capacitance | C _{rSS} | | 5 | | 20 | | 20 | | 20 | |
| Switching^c | | | | | | | | | | |
| Turn-On Time | t _{ON} | V _{DD} = 60 V, R _L = 150 Ω I _D ≅ 0.4 A, V _{GEN} = 10 V R _G = 25 Ω | 5 | | 35 | | | | | ns |
| | t _{d(on)} | | 3 | | | | 8 | | 8 | |
| | t _r | | 2 | | | | 8 | | 8 | |
| Turn-Off Time | t _{OFF} | | 26 | | 60 | | | | | |
| | t _{d(off)} | | 20 | | | | 23 | | 23 | |
| | t _f | | 6 | | | | 34 | | 34 | |

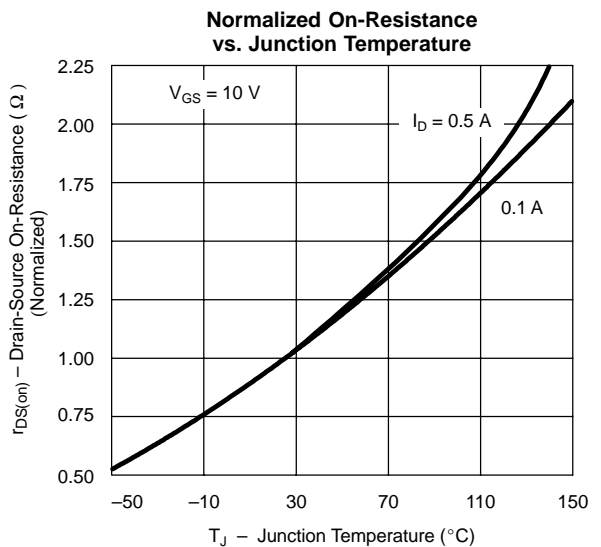
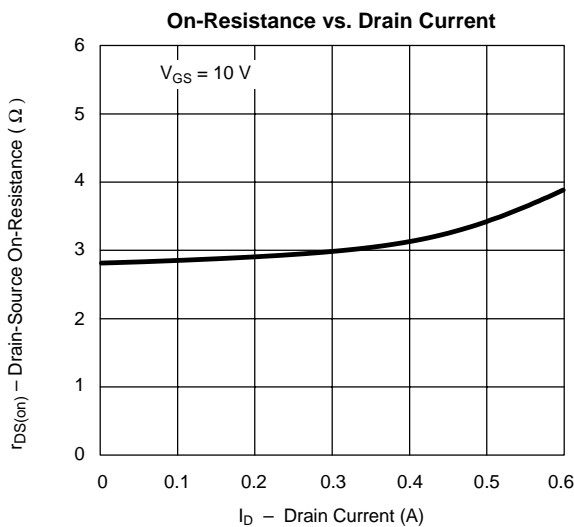
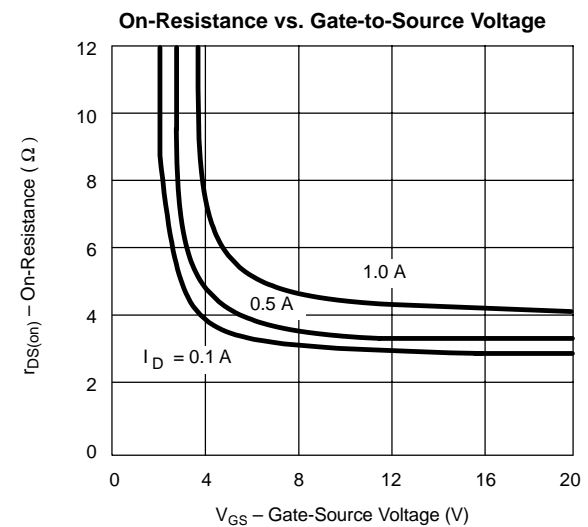
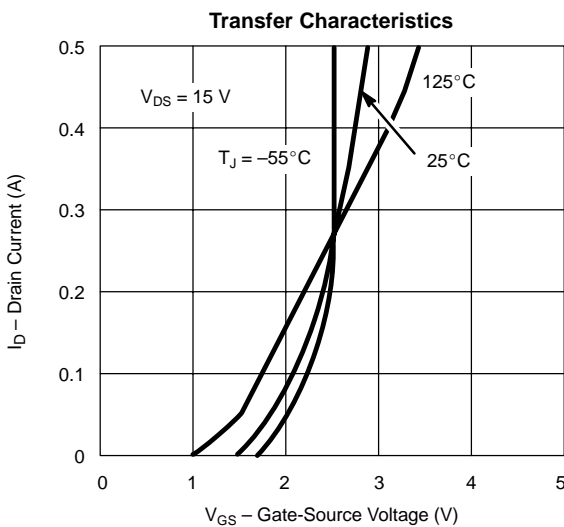
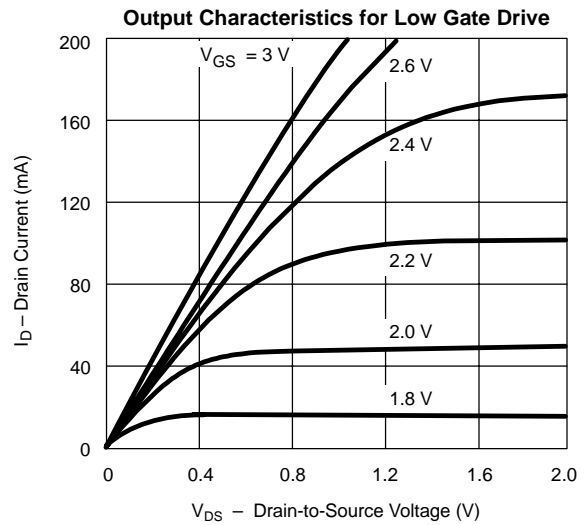
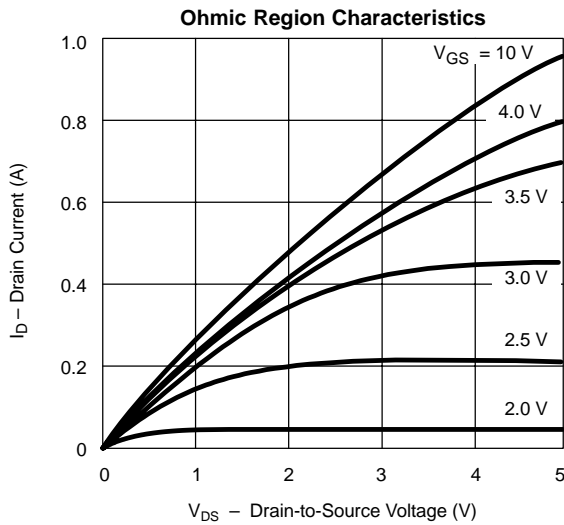
Notes

- For DESIGN AID ONLY, not subject to production testing.
- Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- Switching time is essentially independent of operating temperature.

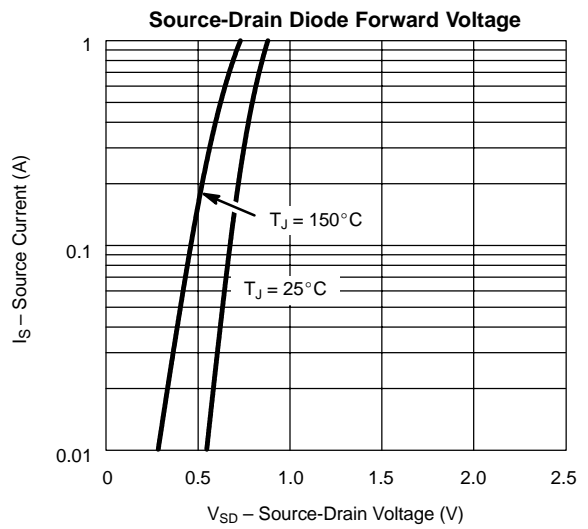
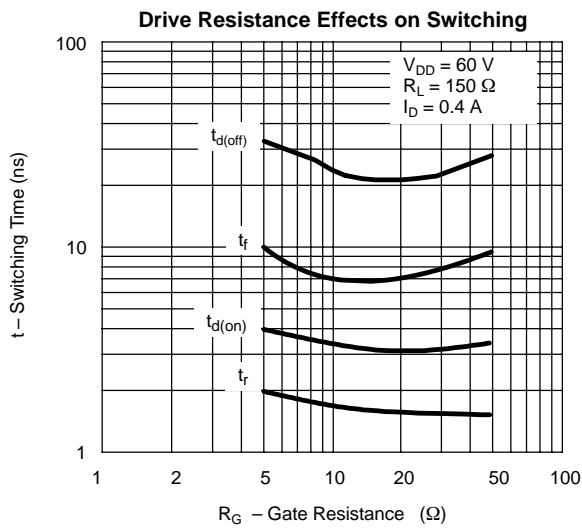
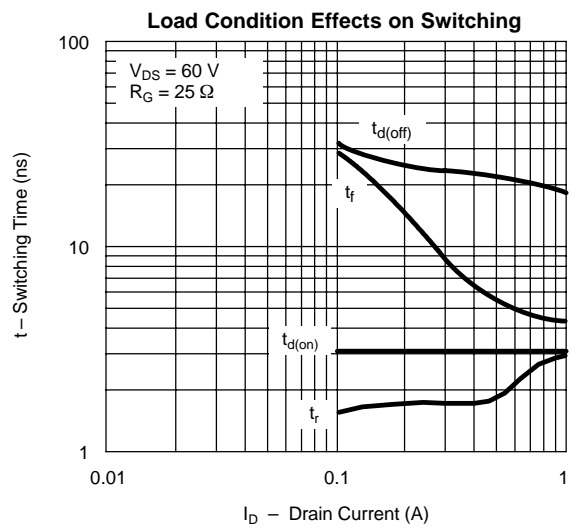
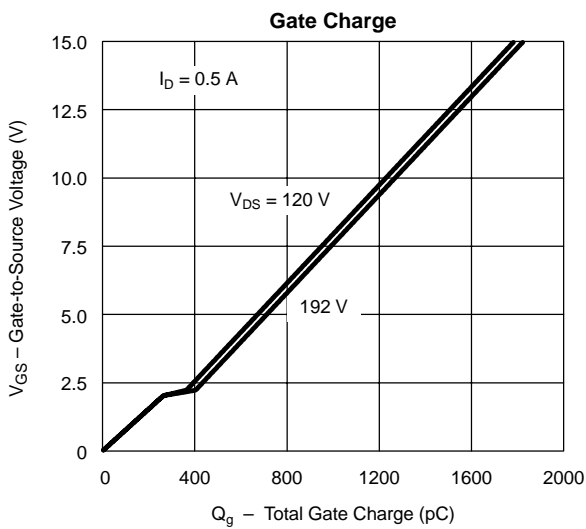
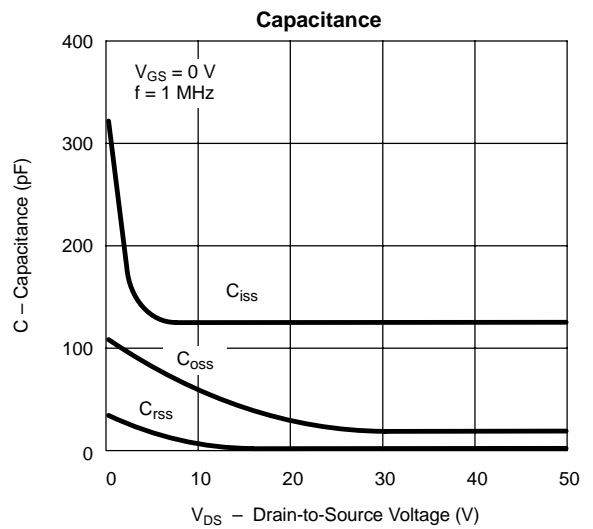
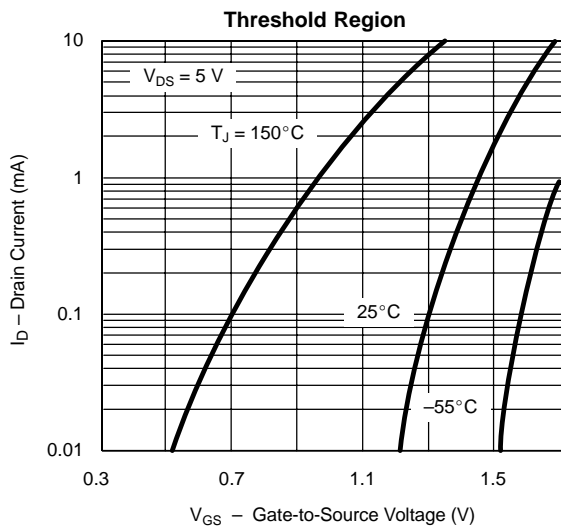
VNDB24



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



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