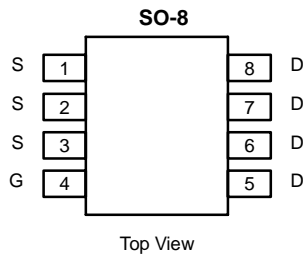


N-Channel 30-V (D-S) MOSFET

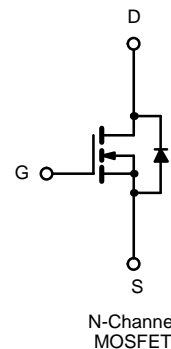
| PRODUCT SUMMARY | | |
|-----------------|---------------------------|-----------|
| V_{DS} (V) | $r_{DS(on)}$ (Ω) | I_D (A) |
| 30 | 0.018 @ $V_{GS} = 10$ V | 9.0 |
| | 0.028 @ $V_{GS} = 4.5$ V | 7.3 |

FEATURES

- TrenchFET® Power MOSFET



Ordering Information: Si4416DY
Si4416DY-T1 (with Tape and Reel)



| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | | |
|---|----------------|--------------------------|--------------|------------------|---|
| Parameter | Symbol | 10 secs | Steady State | Unit | |
| Drain-Source Voltage | V_{DS} | 30 | | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | | | |
| Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a | I_D | $T_A = 25^\circ\text{C}$ | 9.0 | 6.9 | A |
| | | $T_A = 70^\circ\text{C}$ | 7.5 | 5.6 | |
| Pulsed Drain Current (10 μs Pulse Width) | I_{DM} | 50 | | | |
| Continuous Source Current (Diode Conduction) ^a | I_S | 2.1 | 1.2 | | |
| Maximum Power Dissipation ^a | P_D | $T_A = 25^\circ\text{C}$ | 2.5 | 1.4 | W |
| | | $T_A = 70^\circ\text{C}$ | 1.6 | 0.9 | |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 150 | | $^\circ\text{C}$ | |

| THERMAL RESISTANCE RATINGS | | | | | |
|--|------------|-----------------|-----|------|--------------------|
| Parameter | Symbol | Typ | Max | Unit | |
| Maximum Junction-to-Ambient ^a | R_{thJA} | $t \leq 10$ sec | 40 | 50 | $^\circ\text{C/W}$ |
| | | Steady-State | 72 | 90 | |
| Maximum Junction-to-Foot (Drain) | R_{thJF} | 16 | 20 | | |

Notes

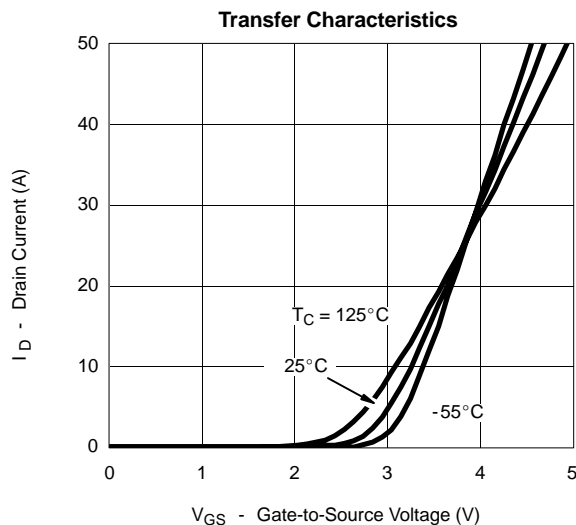
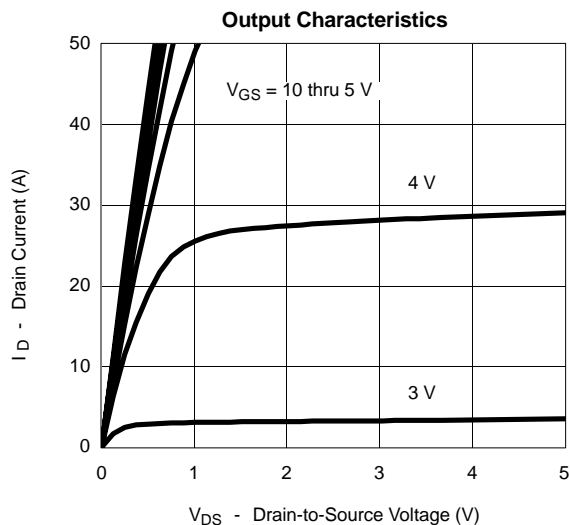
a. Surface Mounted on 1" x 1" FR4 Board.

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

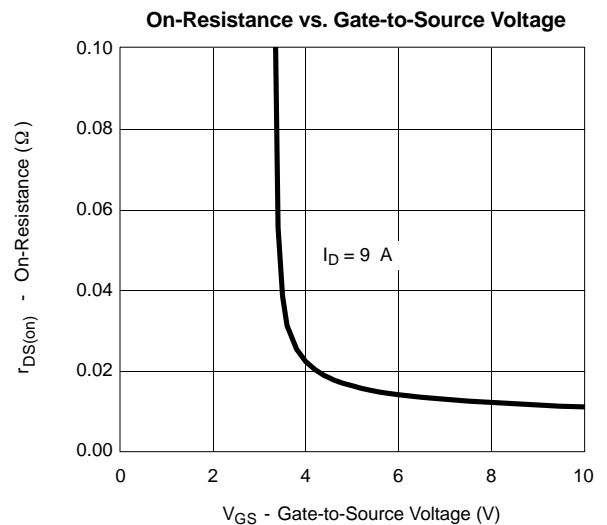
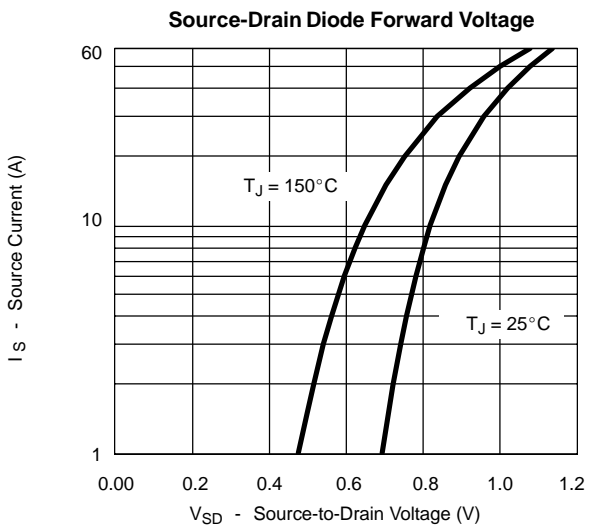
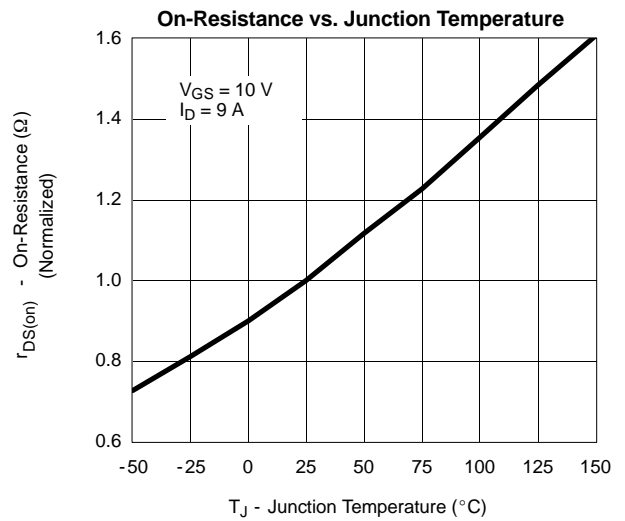
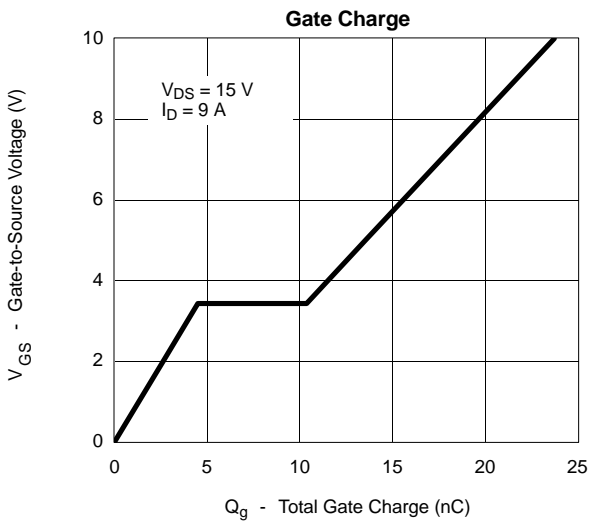
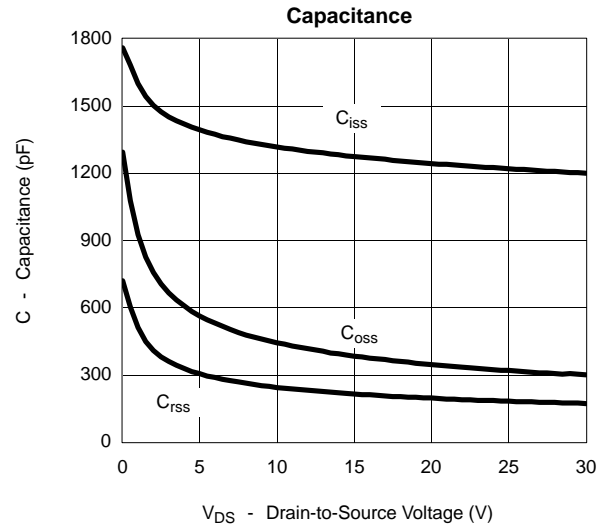
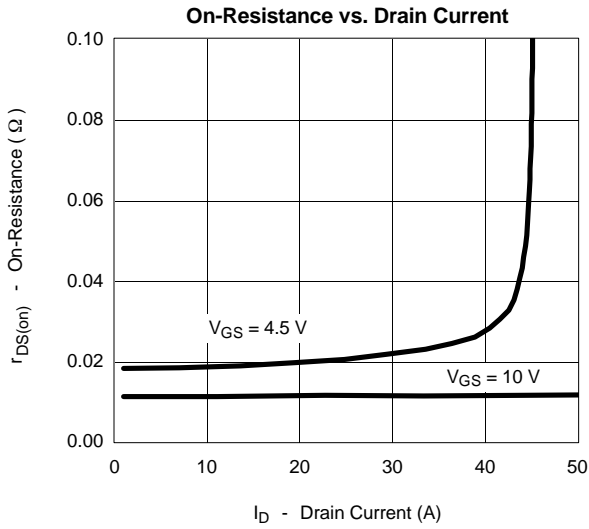
| Parameter | Symbol | Test Condition | Min | Typ ^a | Max | Unit |
|---|--------------|---|-----|------------------|-----------|---------------|
| Static | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$ | 1 | | | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 24 \text{ V}, V_{GS} = 0 \text{ V}$ | | | 1 | μA |
| | | $V_{DS} = 24 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$ | | | 25 | |
| On-State Drain Current ^b | $I_{D(on)}$ | $V_{DS} \geq 5 \text{ V}, V_{GS} = 10 \text{ V}$ | 20 | | | A |
| Drain-Source On-State Resistance ^b | $r_{DS(on)}$ | $V_{GS} = 10 \text{ V}, I_D = 9.0 \text{ A}$ | | 0.012 | 0.018 | Ω |
| | | $V_{GS} = 4.5 \text{ V}, I_D = 7.3 \text{ A}$ | | 0.019 | 0.028 | |
| Forward Transconductance ^b | g_{fs} | $V_{DS} = 15 \text{ V}, I_D = 9.0 \text{ A}$ | | 23 | | S |
| Diode Forward Voltage ^b | V_{SD} | $I_S = 2.1 \text{ A}, V_{GS} = 0 \text{ V}$ | | | 1.2 | V |
| Dynamic^a | | | | | | |
| Gate Charge | Q_g | $V_{DS} = 15 \text{ V}, V_{GS} = 5 \text{ V}, I_D = 9.0 \text{ A}$ | | 14 | 20 | nC |
| Total Gate Charge | Q_{gt} | $V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 9.0 \text{ A}$ | | 24 | 35 | |
| Gate-Source Charge | Q_{gs} | | | 4.5 | | |
| Gate-Drain Charge | Q_{gd} | | | 5.9 | | |
| Gate Resistance | R_g | | 0.2 | 1.0 | 2.4 | Ω |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 15 \text{ V}, R_L = 15 \Omega$ $I_D \cong 1 \text{ A}, V_{GEN} = 10 \text{ V}, R_G = 6 \Omega$ | | 16 | 20 | ns |
| Rise Time | t_r | | | 10 | 20 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 34 | 50 | |
| Fall Time | t_f | | | 13 | 20 | |
| Source-Drain Reverse Recovery Time | t_{rr} | $I_F = 2.1 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}$ | | 50 | 90 | |

Notes

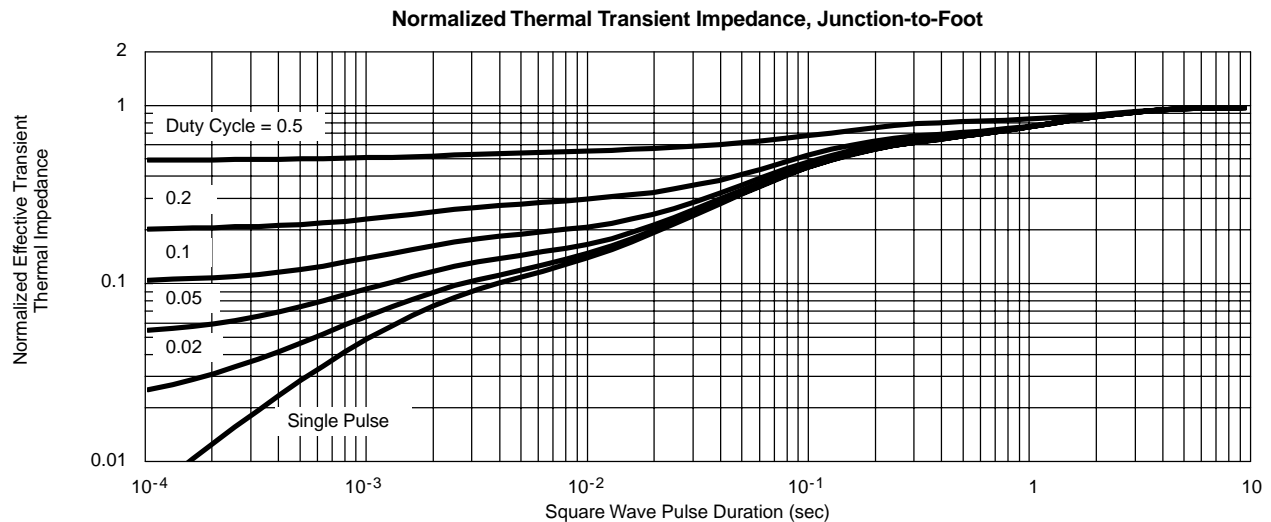
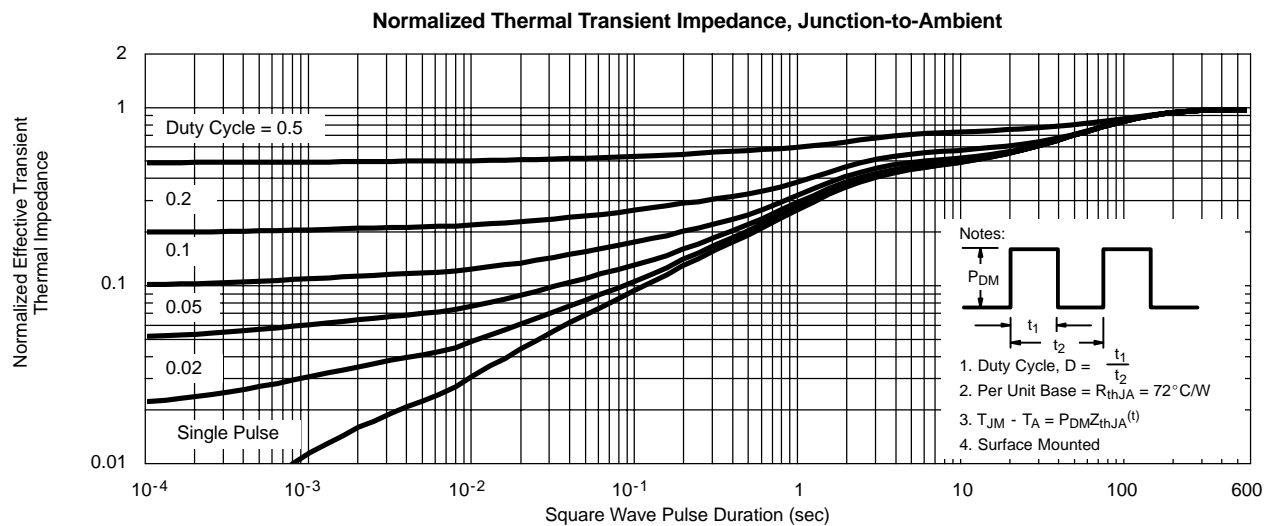
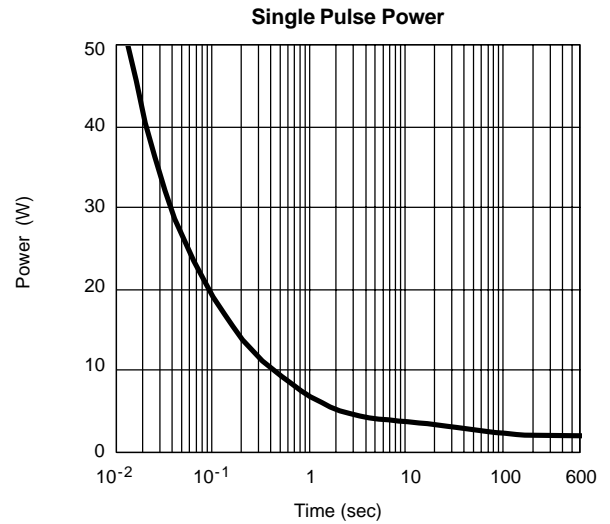
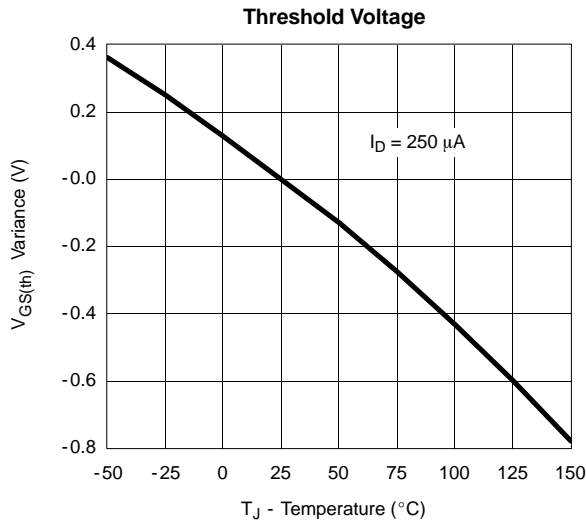
- a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)





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