

P-Channel 60-V (D-S) MOSFET

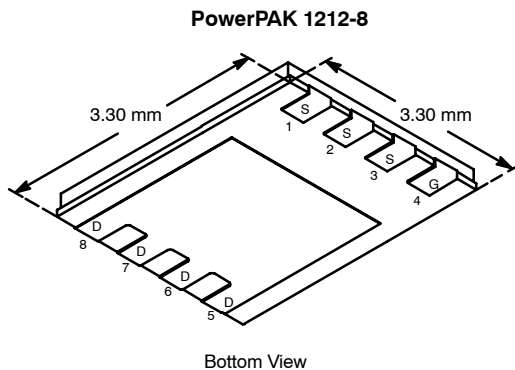
| PRODUCT SUMMARY | | |
|-----------------|---------------------------|-----------|
| V_{DS} (V) | $r_{DS(on)}$ (Ω) | I_D (A) |
| -60 | 0.065 @ $V_{GS} = -10$ V | -5.7 |
| | 0.110 @ $V_{GS} = -4.5$ V | -4.4 |

FEATURES

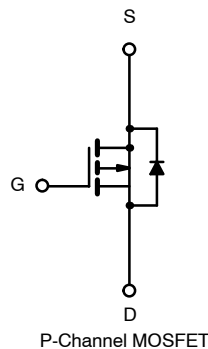
- TrenchFET® Power MOSFET
- New PowerPAK® Package
 - Low Thermal Resistance, R_{thJC}
 - Low 1.07-mm Profile
- Fast Switching

APPLICATIONS

- Load Switches
- Half-Bridge Motor Drives
- High voltage Non-Synchronous Buck Converters



Ordering Information: Si7415DN-T1



| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | | |
|---|----------------|--------------------------|--------------|------------------|---|
| Parameter | Symbol | 10 secs | Steady State | Unit | |
| Drain-Source Voltage | V_{DS} | -60 | | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | | | |
| Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a | I_D | $T_A = 25^\circ\text{C}$ | -5.7 | -3.6 | A |
| | | $T_A = 70^\circ\text{C}$ | -4.6 | -2.9 | |
| Pulsed Drain Current | I_{DM} | -30 | | | |
| continuous Source Current (Diode Conduction) ^a | I_S | -3.2 | -1.3 | | |
| Maximum Power Dissipation ^a | P_D | $T_A = 25^\circ\text{C}$ | 3.8 | 1.5 | W |
| | | $T_A = 70^\circ\text{C}$ | 2.0 | 0.8 | |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 150 | | $^\circ\text{C}$ | |

| THERMAL RESISTANCE RATINGS | | | | | |
|--|------------|-----------------|---------|------|--------------------|
| Parameter | Symbol | Typical | Maximum | Unit | |
| Maximum Junction-to-Ambient ^a | R_{thJA} | $t \leq 10$ sec | 26 | 33 | $^\circ\text{C/W}$ |
| | | Steady State | 65 | 81 | |
| Maximum Junction-to-Case (Drain) | R_{thJC} | 1.9 | 2.4 | | |

Notes

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

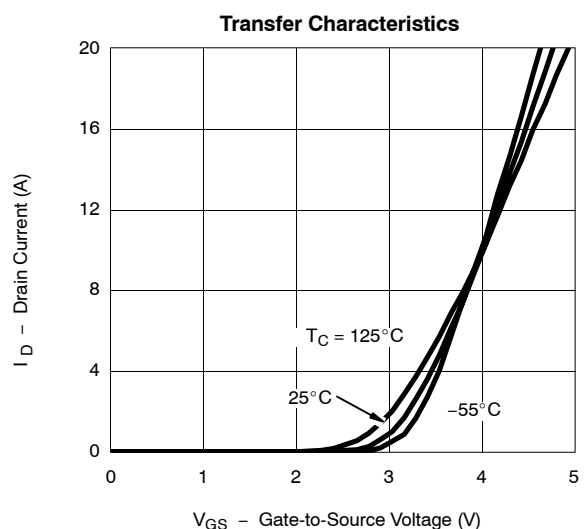
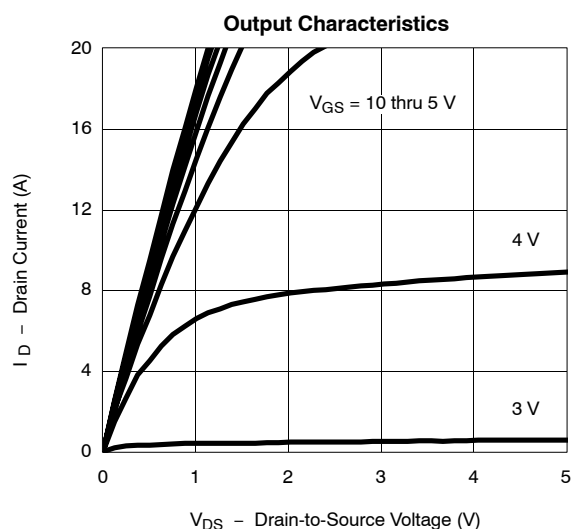
SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

| Parameter | Symbol | Test Condition | Min | Typ | 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} | $V_{DS} = -60\ \text{V}, V_{GS} = 0\ \text{V}$ | | | -1 | μA |
| | | $V_{DS} = -60\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 70^\circ\text{C}$ | | | -5 | |
| On-State Drain Current ^a | $I_{D(on)}$ | $V_{DS} \leq -5\ \text{V}, V_{GS} = -10\ \text{V}$ | -20 | | | A |
| Drain-Source On-State Resistance ^a | $r_{DS(on)}$ | $V_{GS} = -10\ \text{V}, I_D = -5.7\ \text{A}$ | | 0.054 | 0.065 | Ω |
| | | $V_{GS} = -4.5\ \text{V}, I_D = -4.4\ \text{A}$ | | 0.090 | 0.110 | |
| Forward Transconductance ^a | g_{fs} | $V_{DS} = -15\ \text{V}, I_D = -5.7\ \text{A}$ | | 11 | | S |
| Diode Forward Voltage ^a | V_{SD} | $I_S = -3.2\ \text{A}, V_{GS} = 0\ \text{V}$ | | -0.8 | -1.2 | V |
| Dynamic^b | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = -30\ \text{V}, V_{GS} = -10\ \text{V}, I_D = -5.7\ \text{A}$ | | 15 | 25 | nC |
| Gate-Source Charge | Q_{gs} | | | 4 | | |
| Gate-Drain Charge | Q_{gd} | | | 3.2 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = -30\ \text{V}, R_L = 30\ \Omega$ $I_D \cong -1\ \text{A}, V_{GEN} = -10\ \text{V}, R_G = 6\ \Omega$ | | 12 | 20 | ns |
| Rise Time | t_r | | | 12 | 20 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 22 | 35 | |
| Fall Time | t_f | | | 16 | 25 | |
| Source-Drain Reverse Recovery Time | t_{rr} | | $I_F = -3.2\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$ | | 45 | |

Notes

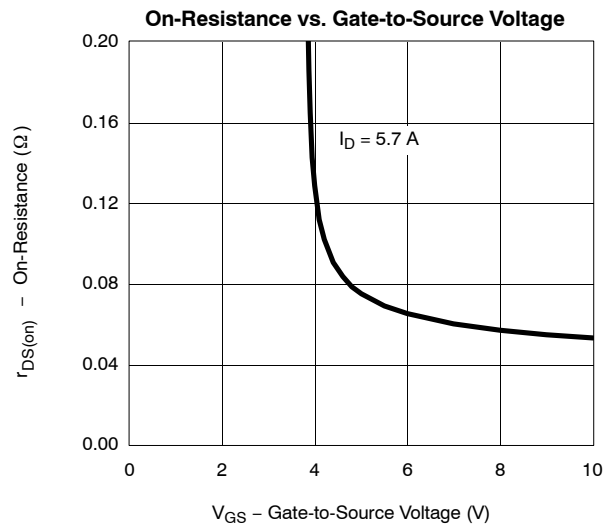
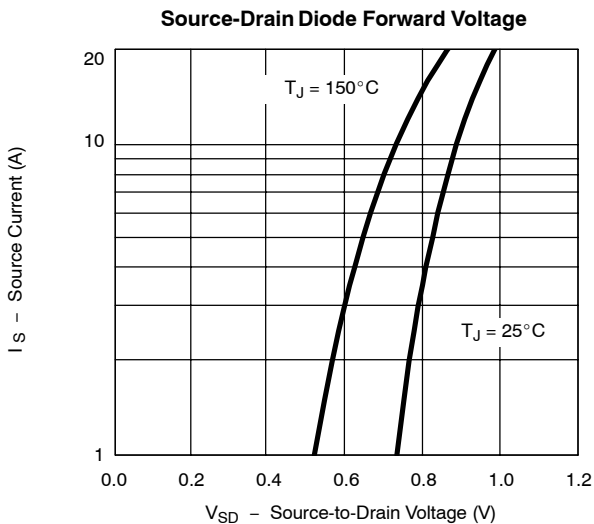
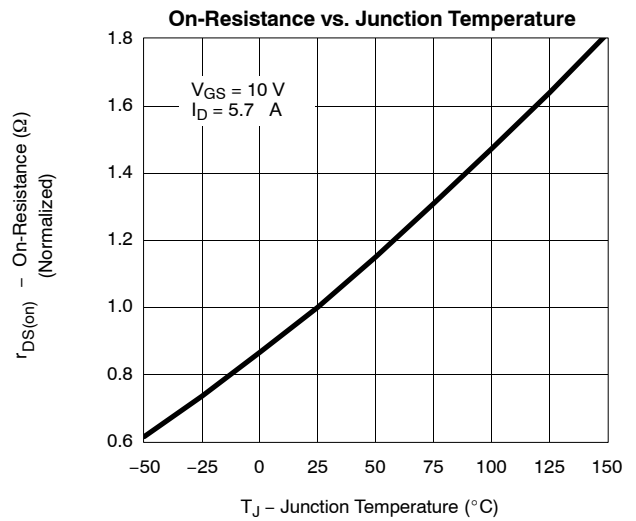
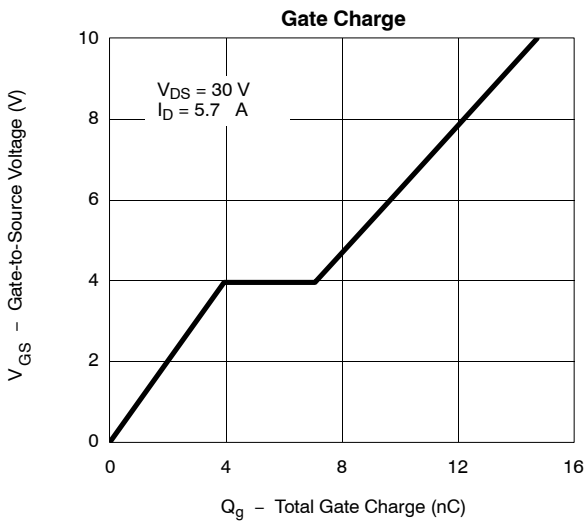
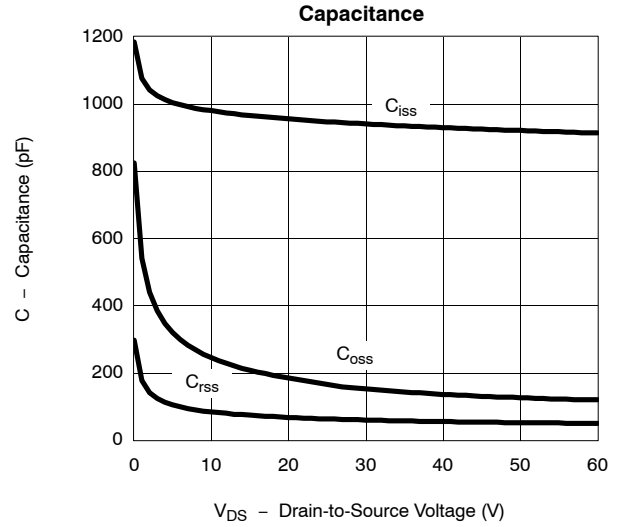
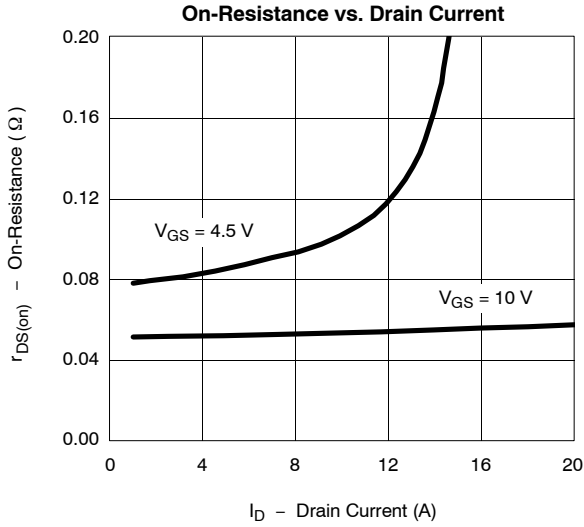
- a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)





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