



Dual P-Channel 12-V (D-S) MOSFET

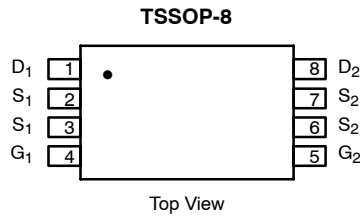
| PRODUCT SUMMARY | | |
|-----------------|---------------------------|-----------|
| V_{DS} (V) | $r_{DS(on)}$ (Ω) | I_D (A) |
| -12 | 0.021 @ $V_{GS} = -4.5$ V | -5.8 |
| | 0.028 @ $V_{GS} = -2.5$ V | -5.0 |
| | 0.037 @ $V_{GS} = -1.8$ V | -4.4 |

FEATURES

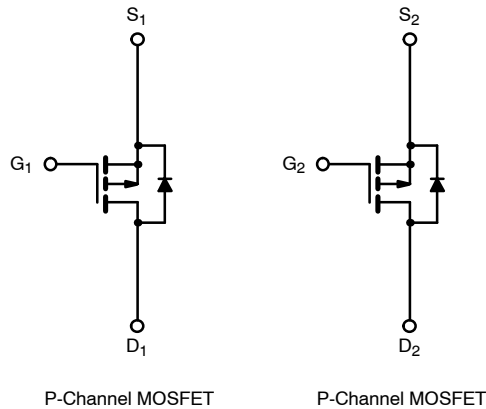
- TrenchFET® Power MOSFET

APPLICATIONS

- Load Switch
- Battery Switch



Ordering Information: Si6913DQ-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} | -12 | | V |
| Gate-Source Voltage | | V_{GS} | ± 8 | | |
| Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a | $T_A = 25^\circ\text{C}$ | I_D | -5.8 | -4.9 | A |
| | $T_A = 70^\circ\text{C}$ | | -4.6 | -3.9 | |
| Pulsed Drain Current (10 μs Pulse Width) | | I_{DM} | -30 | | |
| Continuous Source Current (Diode Conduction) ^a | | I_S | -1.0 | -0.7 | |
| Maximum Power Dissipation ^a | $T_A = 25^\circ\text{C}$ | P_D | 1.14 | 0.83 | W |
| | $T_A = 70^\circ\text{C}$ | | 0.73 | 0.53 | |
| 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 | $t \leq 10$ sec | R_{thJA} | 86 | 110 | $^\circ\text{C/W}$ |
| | Steady State | | 124 | 150 | |
| Maximum Junction-to-Foot (Drain) | Steady State | R_{thJF} | 52 | 65 | |

Notes

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

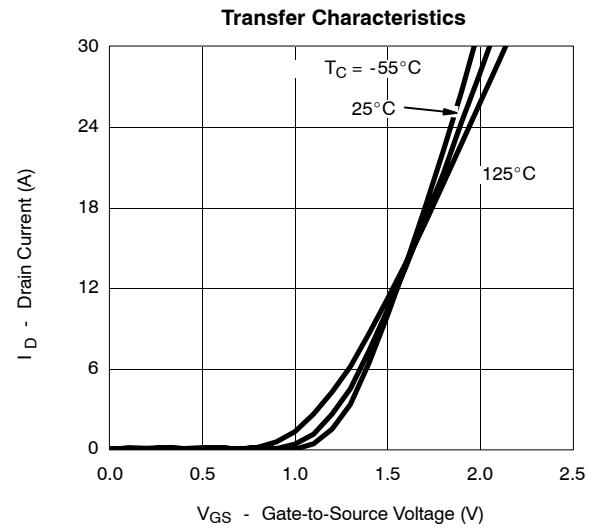
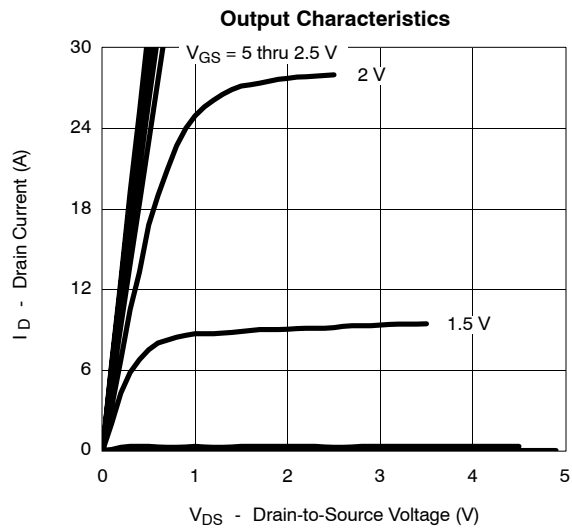


| SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED) | | | | | | |
|--|---------------------|--|---|-------|-------|------|
| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
| Static | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = -400 μA | -0.40 | | -0.9 | V |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±8 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = -12 V, V _{GS} = 0 V | | | -1 | μA |
| | | V _{DS} = -12 V, V _{GS} = 0 V, T _J = 70 °C | | | -25 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} = -5 V, V _{GS} = -4.5 V | -20 | | | A |
| Drain-Source On-State Resistance ^a | r _{DS(on)} | V _{GS} = -4.5 V, I _D = -5.8 A | | 0.016 | 0.021 | Ω |
| | | V _{GS} = -2.5 V, I _D = -5.0 A | | 0.021 | 0.028 | |
| | | V _{GS} = -1.8 V, I _D = -4.4 A | | 0.029 | 0.037 | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = -5 V, I _D = -5.8 A | | 25 | | S |
| Diode Forward Voltage ^a | V _{SD} | I _S = -1.0 A, V _{GS} = 0 V | | -0.61 | -1.1 | V |
| Dynamic^b | | | | | | |
| Total Gate Charge | Q _g | V _{DS} = -6 V, V _{GS} = -4.5 V, I _D = -5.8 A | | 18.5 | 28 | nC |
| Gate-Source Charge | Q _{gs} | | | 2.7 | | |
| Gate-Drain Charge | Q _{gd} | | | 5.0 | | |
| Gate Resistance | R _g | f = 1.0 MHz | | 4.6 | | Ω |
| Turn-On Delay Time | t _{d(on)} | V _{DD} = -6 V, R _L = 6 Ω I _D ≅ -1 A, V _{GEN} = -4.5 V, R _G = 6 Ω | | 45 | 70 | ns |
| Rise Time | t _r | | | 80 | 120 | |
| Turn-Off Delay Time | t _{d(off)} | | | 130 | 200 | |
| Fall Time | t _f | | | 80 | 120 | |
| Source-Drain Reverse Recovery Time | t _{rr} | | I _F = -1.0 A, di/dt = 100 A/μs | | 65 | |

Notes

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

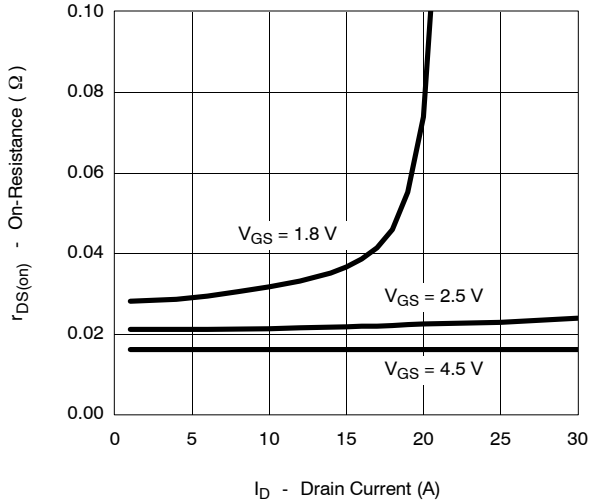
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



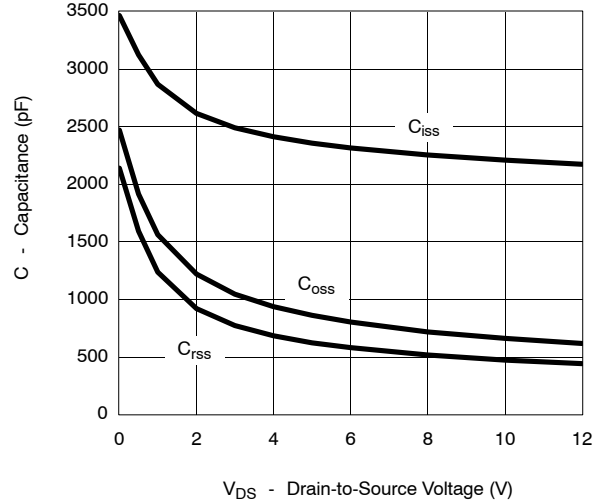


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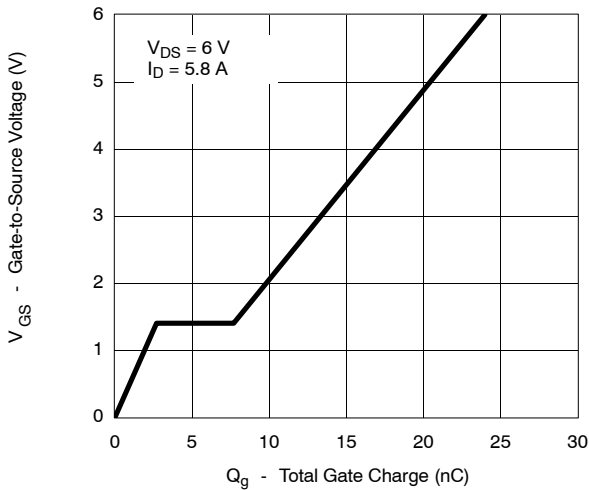
On-Resistance vs. Drain Current



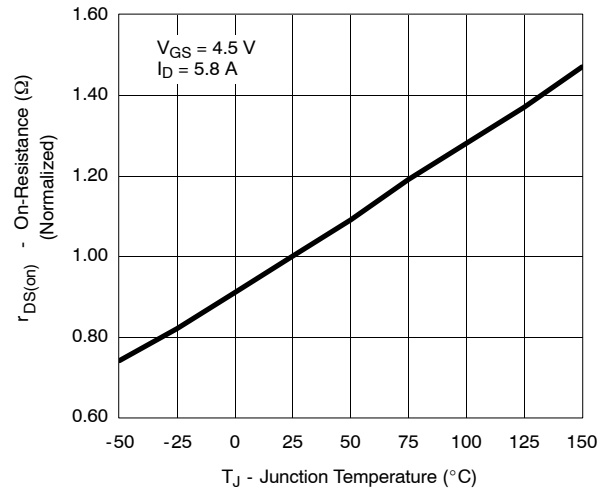
Capacitance



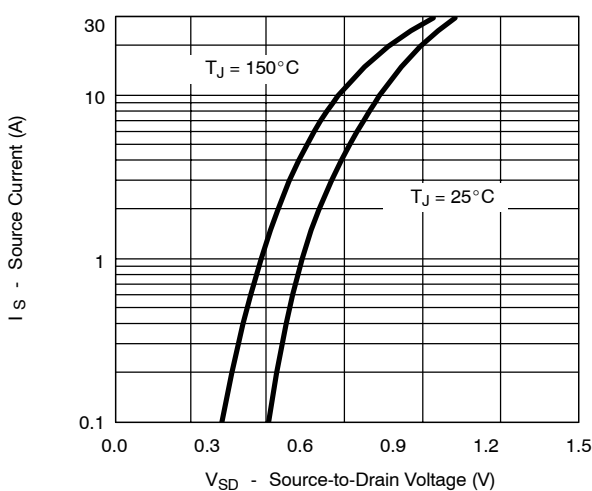
Gate Charge



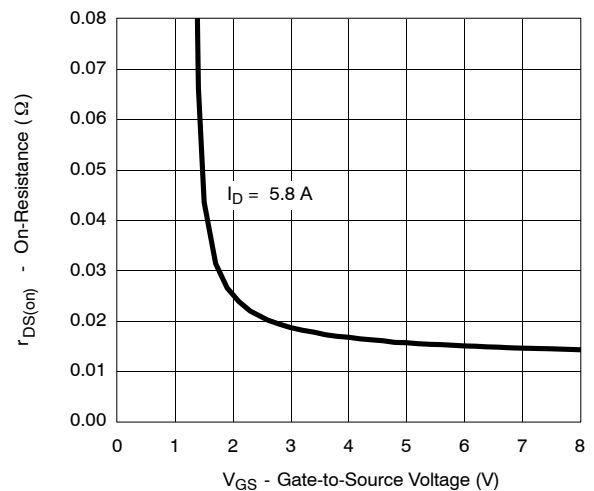
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

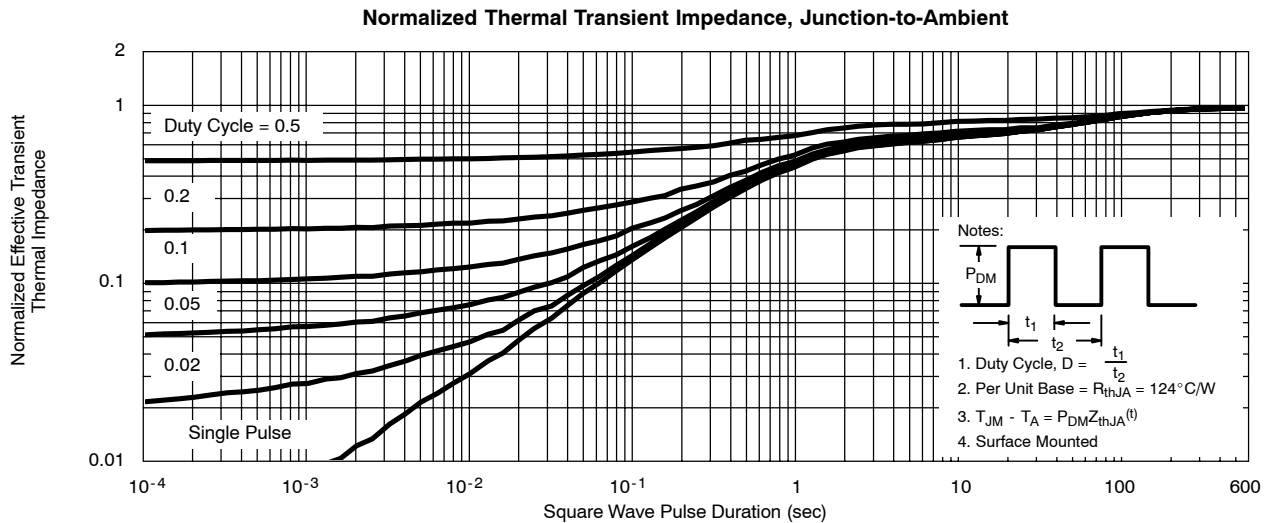
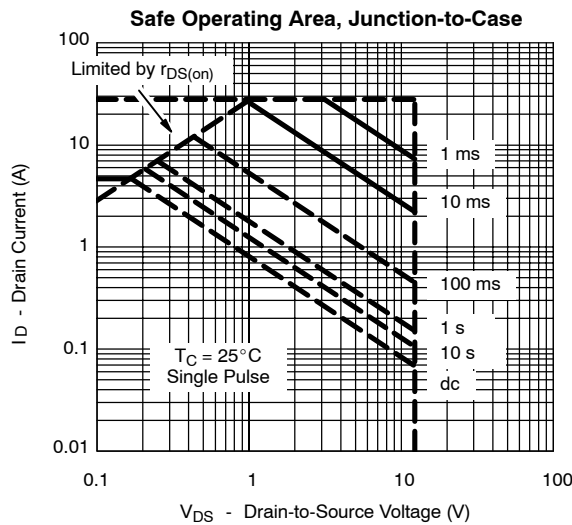
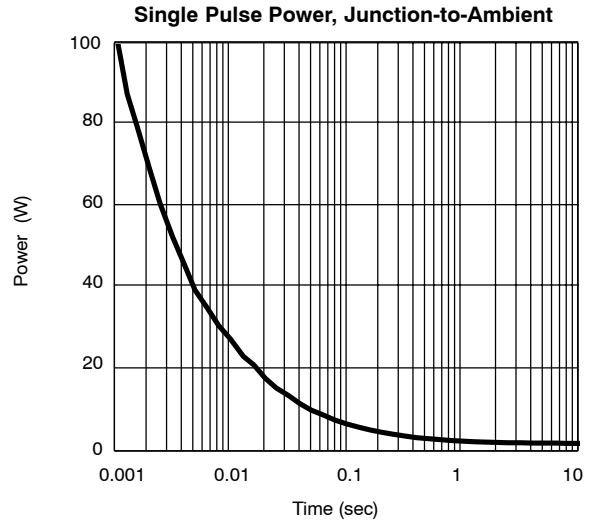
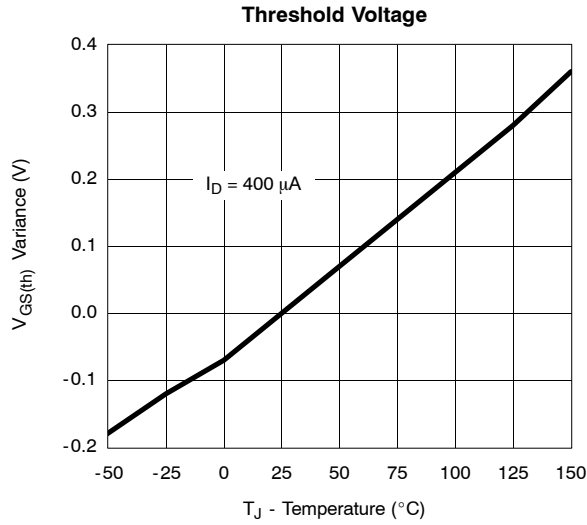


On-Resistance vs. Gate-to-Source Voltage





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

