



Dual P-Channel 20-V (D-S) MOSFET

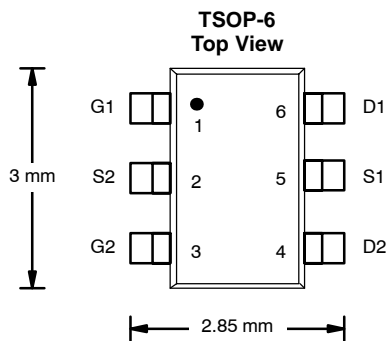
| PRODUCT SUMMARY | | |
|-----------------|---------------------------|-----------|
| V_{DS} (V) | $r_{DS(on)}$ (Ω) | I_D (A) |
| -20 | 0.185 @ $V_{GS} = -4.5$ V | -1.9 |
| | 0.260 @ $V_{GS} = -2.5$ V | -1.6 |
| | 0.385 @ $V_{GS} = -1.8$ V | -0.7 |

FEATURES

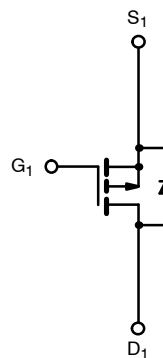
- TrenchFET® Power MOSFET

APPLICATIONS

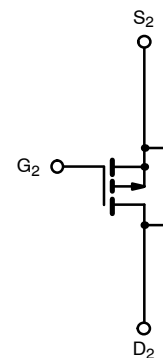
- Battery Switch for Portable Devices
- Computers
 - Bus Switch
 - Load Switch



Ordering Information: Si3981DV-T1—E3
Marking Code: MCxxx



P-Channel MOSFET



P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | | |
|---|----------------|--------------------------|--------------|------------------|---|
| Parameter | Symbol | 5 secs | Steady State | Unit | |
| Drain-Source Voltage | V_{DS} | -20 | | V | |
| Gate-Source Voltage | V_{GS} | ± 8 | | | |
| Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a | I_D | $T_A = 25^\circ\text{C}$ | -1.9 | -1.6 | A |
| | | $T_A = 70^\circ\text{C}$ | -1.5 | -1.3 | |
| Pulsed Drain Current | I_{DM} | -8 | | | |
| Continuous Diode Current (Diode Conduction) ^a | I_S | -1.0 | -0.72 | | |
| Maximum Power Dissipation ^a | P_D | $T_A = 25^\circ\text{C}$ | 1.08 | 0.80 | W |
| | | $T_A = 70^\circ\text{C}$ | 0.69 | 0.51 | |
| 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} | $t \leq 5$ sec | 97 | 115 | $^\circ\text{C/W}$ |
| | | Steady State | 132 | 155 | |
| Maximum Junction-to-Foot (Drain) | R_{thJF} | 78 | 95 | | |

Notes

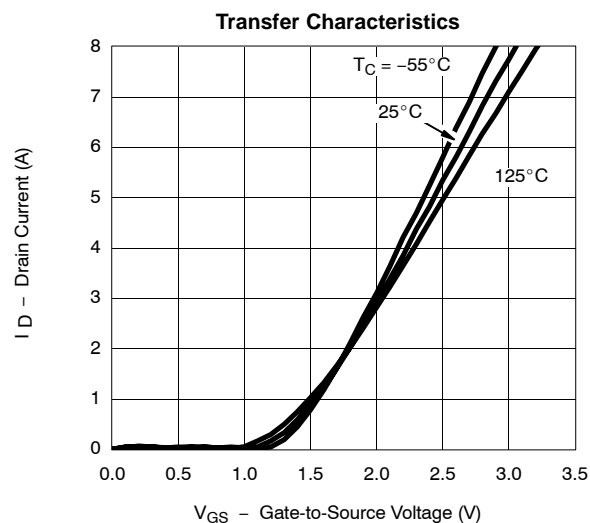
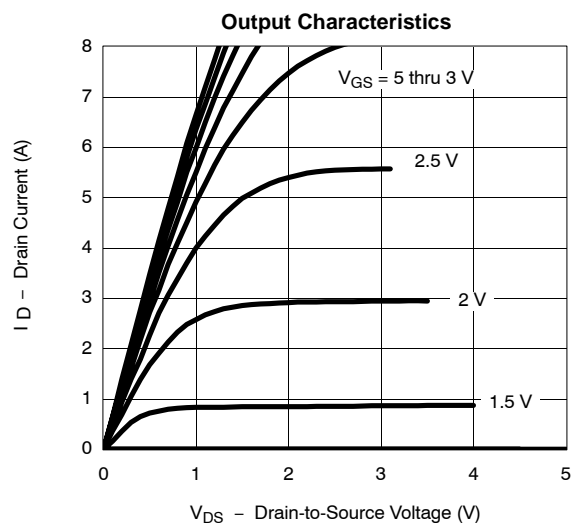
a. Surface Mounted on 1" x 1" FR4 Board.

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 = -250 μA | -0.40 | | -1.1 | 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} = -20 V, V _{GS} = 0 V | | | -1 | μA |
| | | V _{DS} = -20 V, V _{GS} = 0 V, T _J = 85 °C | | | -10 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} = -5 V, V _{GS} = -4.5 V | -5 | | | A |
| Drain-Source On-State Resistance ^a | r _{DS(on)} | V _{GS} = -4.5 V, I _D = -1.9 A | | 0.146 | 0.185 | Ω |
| | | V _{GS} = -2.5 V, I _D = -1.6 A | | 0.210 | 0.260 | |
| | | V _{GS} = -1.8 V, I _D = -0.7 A | | 0.306 | 0.385 | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = -5 V, I _D = -1.9 A | | 4 | | S |
| Diode Forward Voltage ^a | V _{SD} | I _S = -1.0 A, V _{GS} = 0 V | | -0.84 | -1.1 | V |
| Dynamic^b | | | | | | |
| Total Gate Charge | Q _g | V _{DS} = -10 V, V _{GS} = -4.5 V, I _D = -1.9 A | | 3.2 | 5 | nC |
| Gate-Source Charge | Q _{gs} | | | 0.42 | | |
| Gate-Drain Charge | Q _{gd} | | | 0.84 | | |
| Gate Resistance | R _g | f = 1 MHz | | 6 | | Ω |
| Turn-On Delay Time | t _{d(on)} | V _{DD} = -10 V, R _L = 10 Ω I _D ≅ -1 A, V _{GEN} = -4.5 V, R _g = 6 Ω | | 30 | 45 | ns |
| Rise Time | t _r | | | 50 | 85 | |
| Turn-Off Delay Time | t _{d(off)} | | | 45 | 85 | |
| Fall Time | t _f | | | 21 | 50 | |
| Source-Drain Reverse Recovery Time | t _{rr} | | I _F = -1.00 A, di/dt = 100 A/μs | | 20 | |

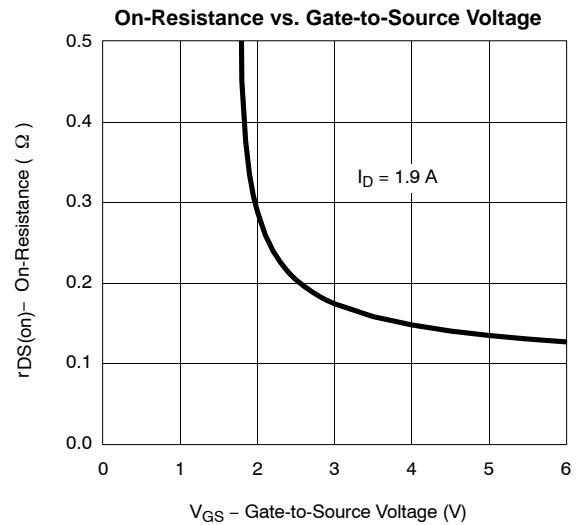
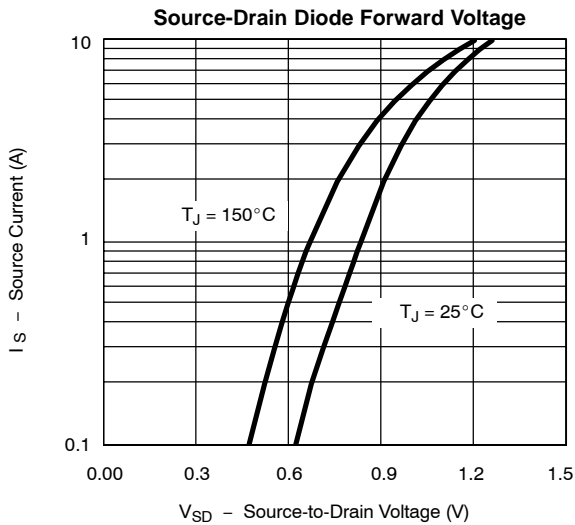
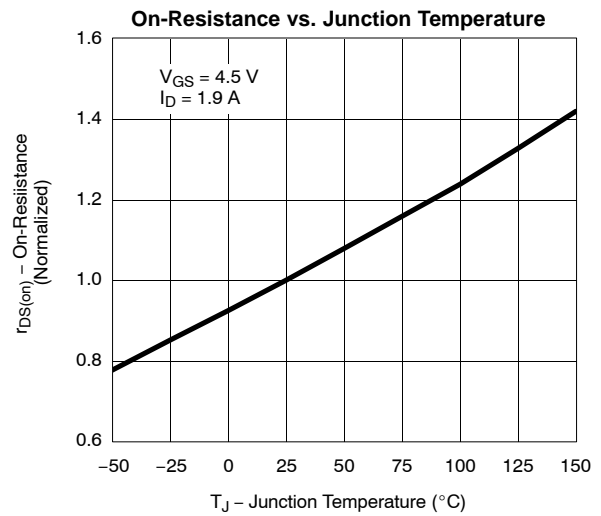
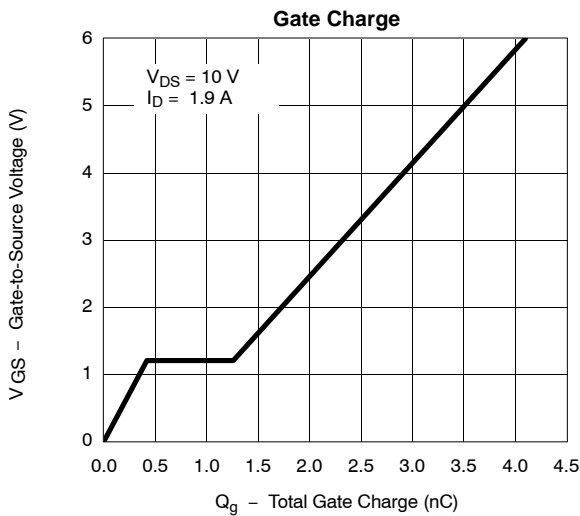
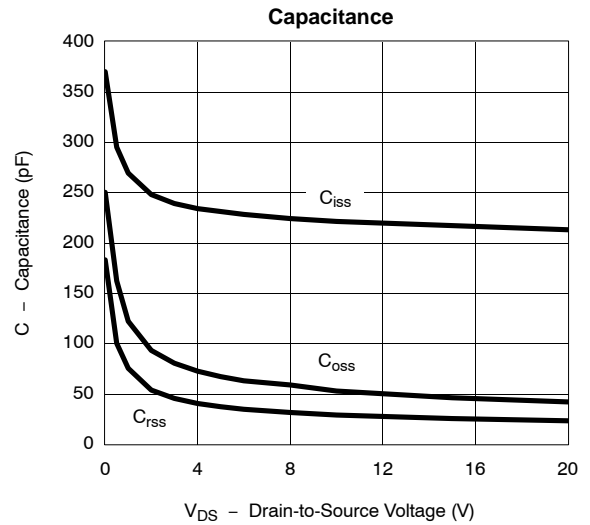
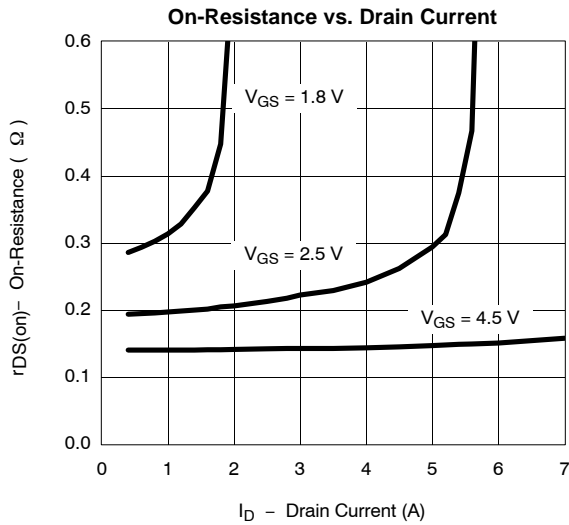
Notes

- 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)

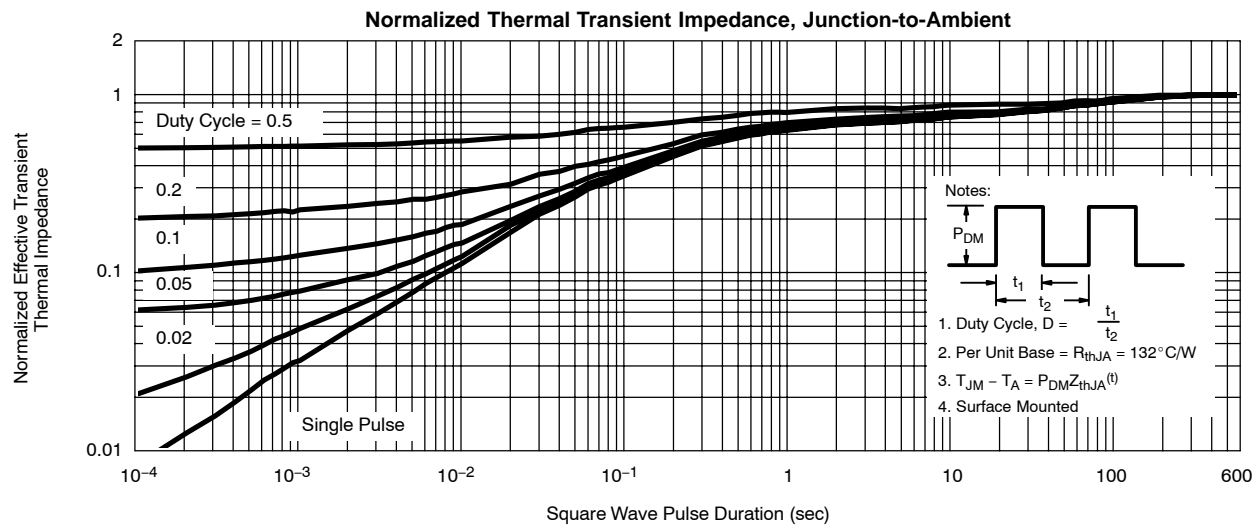
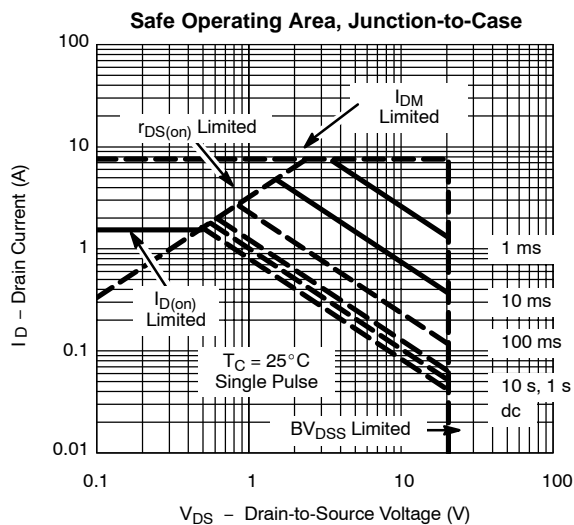
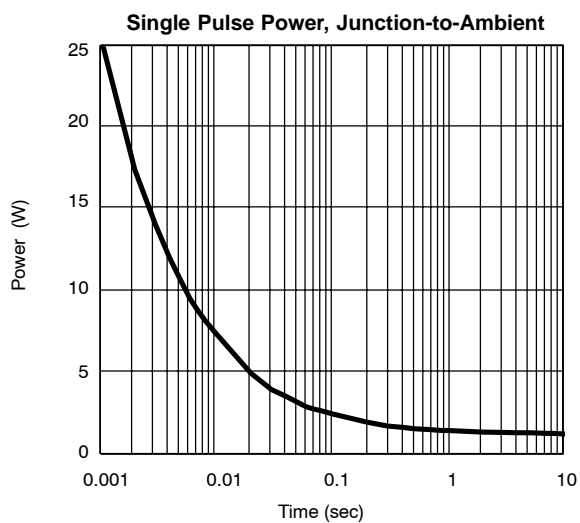
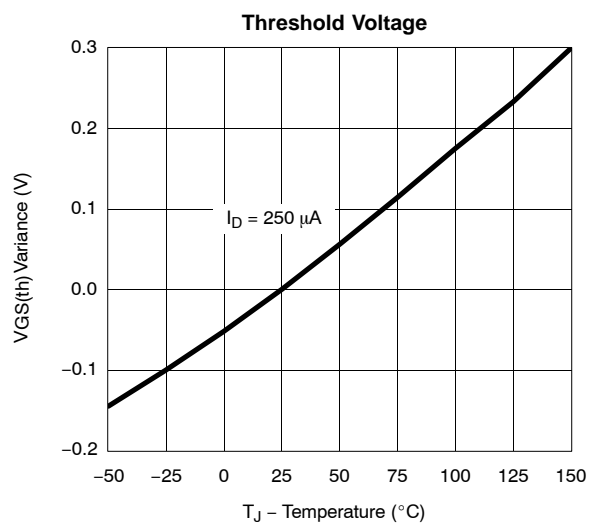


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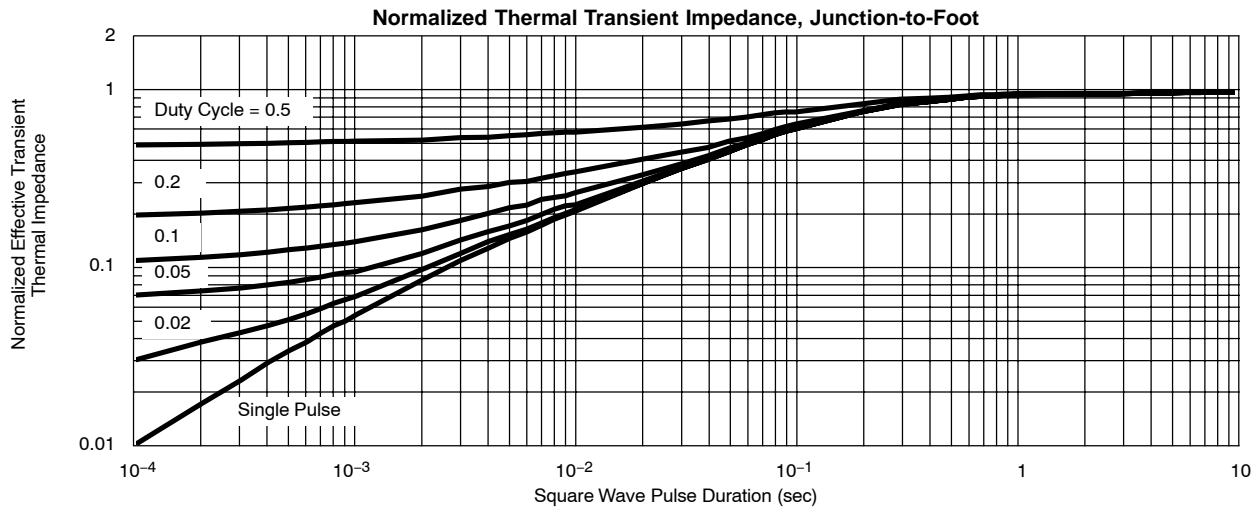


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TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)





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