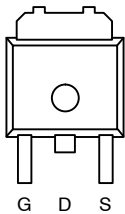


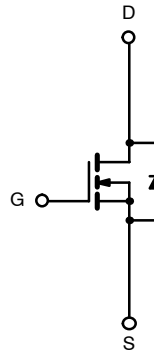
N-Channel 30-V (D-S) MOSFET

| PRODUCT SUMMARY | | |
|-----------------|---------------------------|------------------------|
| V_{DS} (V) | $r_{DS(on)}$ (Ω) | I_D (A) ^b |
| 30 | 0.0095 @ $V_{GS} = 10$ V | 63 ^b |
| | 0.014 @ $V_{GS} = 4.5$ V | 52 ^b |

TO-252


Top View

Drain Connected to Tab



N-Channel MOSFET

FEATURES

- TrenchFET[®] Power MOSFET
- Optimized for High- or Low-Side
- 100% R_g Tested

APPLICATIONS

- DC/DC Converters
- Synchronous Rectifiers

 Ordering Information: SUD50N03-09P
 SUD50N03-09P—E3 (Lead Free)

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | |
|---|---------------------------|----------------|-------------------|------------------|
| Parameter | | Symbol | Limit | Unit |
| Drain-Source Voltage | | V_{DS} | 30 | V |
| Gate-Source Voltage | | V_{GS} | ± 20 | |
| Continuous Drain Current ^a | $T_C = 25^\circ\text{C}$ | I_D | 63 ^b | A |
| | $T_C = 100^\circ\text{C}$ | | 44.5 ^b | |
| Pulsed Drain Current | | I_{DM} | 50 | |
| Continuous Source Current (Diode Conduction) ^a | | I_S | 10 | |
| Avalanche Current | | I_{AS} | 35 | |
| Single Pulse Avalanche Energy | | E_{AS} | 61 | mJ |
| Maximum Power Dissipation | $T_C = 25^\circ\text{C}$ | P_D | 65.2 | W |
| | $T_A = 25^\circ\text{C}$ | | 7.5 ^a | |
| Operating Junction and Storage Temperature Range | | T_J, T_{stg} | -55 to 175 | $^\circ\text{C}$ |

| THERMAL RESISTANCE RATINGS | | | | | |
|--|-----------------|------------|---------|---------|---------------------------|
| Parameter | | Symbol | Typical | Maximum | Unit |
| Maximum Junction-to-Ambient ^a | $t \leq 10$ sec | R_{thJA} | 16 | 20 | $^\circ\text{C}/\text{W}$ |
| | Steady State | | 40 | 50 | |
| Maximum Junction-to-Case | | R_{thJC} | 1.8 | 2.3 | |

Notes

- Surface Mounted on FR4 Board, $t \leq 10$ sec.
- Based on maximum allowable Junction Temperature, package limitation current is 50 A.

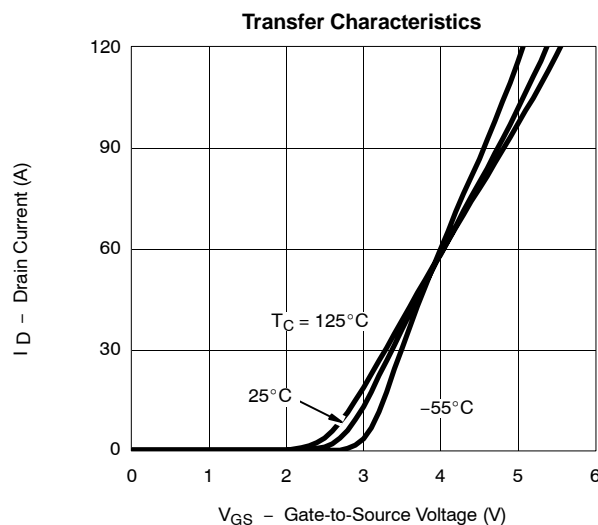
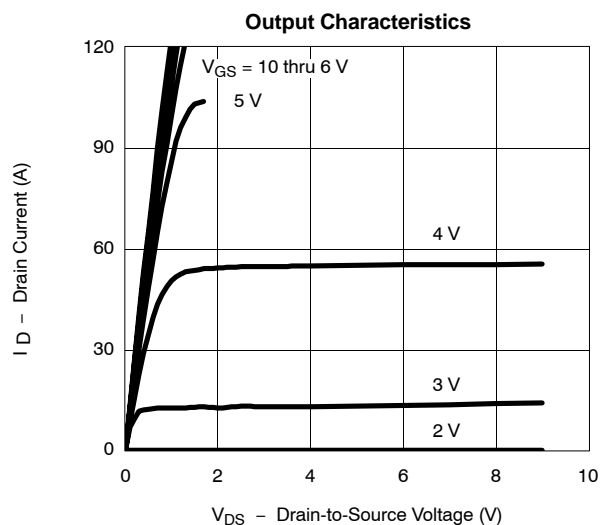
SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)

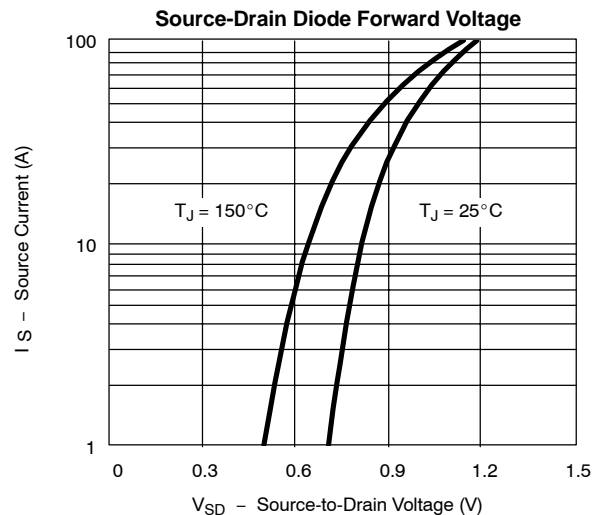
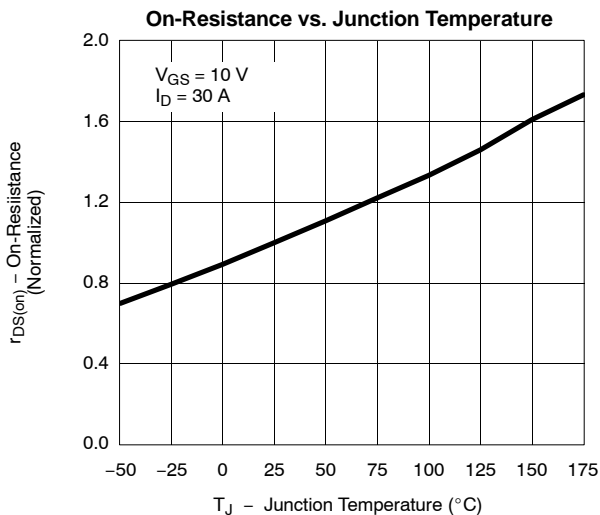
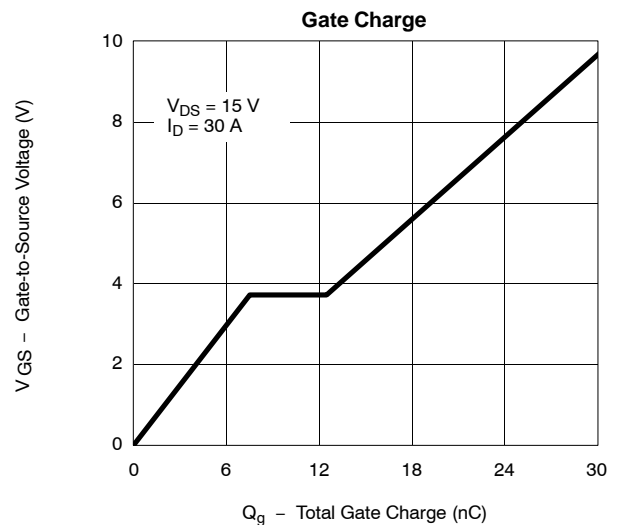
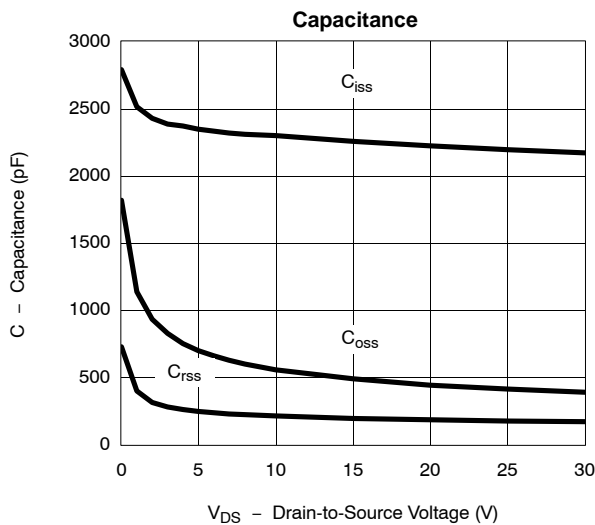
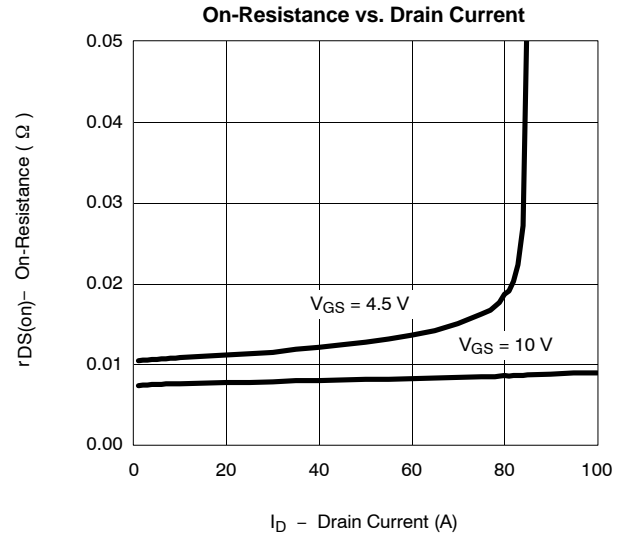
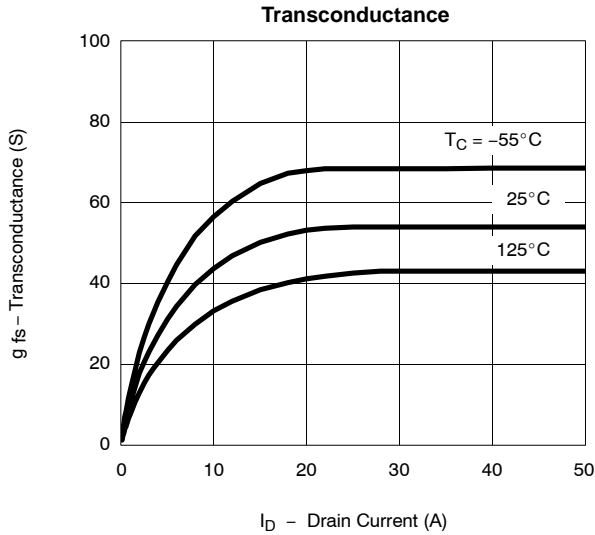
| Parameter | Symbol | Test Condition | Min | Typ ^a | Max | Unit |
|--|----------------------|--|-----|------------------|--------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0 V, I _D = 250 μA | 30 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250 μA | 1.0 | | 3.0 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±20 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 30 V, V _{GS} = 0 V | | | 1 | μA |
| | | V _{DS} = 30 V, V _{GS} = 0 V, T _J = 125 °C | | | 50 | |
| On-State Drain Current ^b | I _{D(on)} | V _{DS} = 5 V, V _{GS} = 10 V | 50 | | | A |
| Drain-Source On-State Resistance ^b | r _{DS(on)} | V _{GS} = 10 V, I _D = 20 A | | 0.0076 | 0.0095 | Ω |
| | | V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C | | | 0.015 | |
| | | V _{GS} = 4.5 V, I _D = 20 A | | 0.0115 | 0.014 | |
| Forward Transconductance ^b | g _{fs} | V _{DS} = 15 V, I _D = 20 A | 20 | | | S |
| Dynamic^a | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz | | 2200 | | pF |
| Output Capacitance | C _{oss} | | | 410 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 180 | | |
| Total Gate Charge ^c | Q _g | V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 50 A | | 11 | 16 | nC |
| Gate-Source Charge ^c | Q _{gs} | | | 7.5 | | |
| Gate-Drain Charge ^c | Q _{gd} | | | 5.0 | | |
| Gate Resistance | R _g | | 0.5 | 1.5 | 2.1 | |
| Turn-On Delay Time ^c | t _{d(on)} | V _{DD} = 15 V, R _L = 0.3 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _g = 2.5 Ω | | 9 | 15 | ns |
| Rise Time ^c | t _r | | | 80 | 120 | |
| Turn-Off Delay Time ^c | t _{d(off)} | | | 22 | 35 | |
| Fall Time ^c | t _f | | | 8 | 12 | |
| Source-Drain Diode Ratings and Characteristic (T_C = 25 °C) | | | | | | |
| Pulsed Current | I _{SM} | | | | 100 | A |
| Diode Forward Voltage ^b | V _{SD} | I _F = 50 A, V _{GS} = 0 V | | 1.2 | 1.5 | V |
| Source-Drain Reverse Recovery Time | t _{rr} | I _F = 50 A, di/dt = 100 A/μs | | 35 | 70 | ns |

Notes

- Guaranteed by design, not subject to production testing.
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Independent of operating temperature.

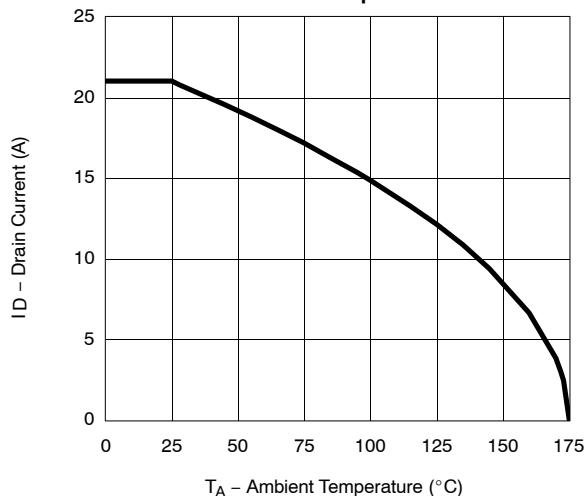
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



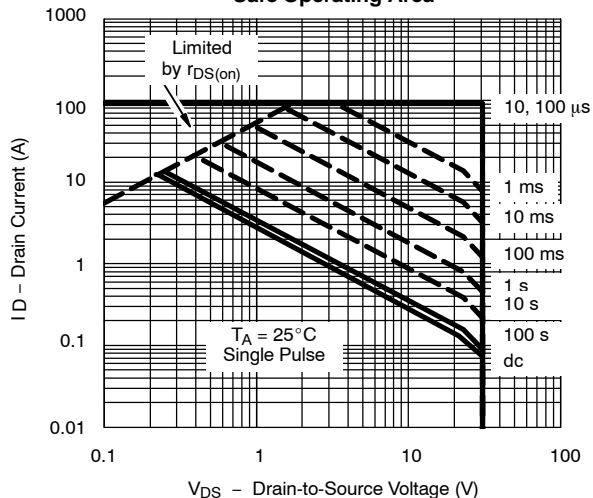
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)


THERMAL RATINGS

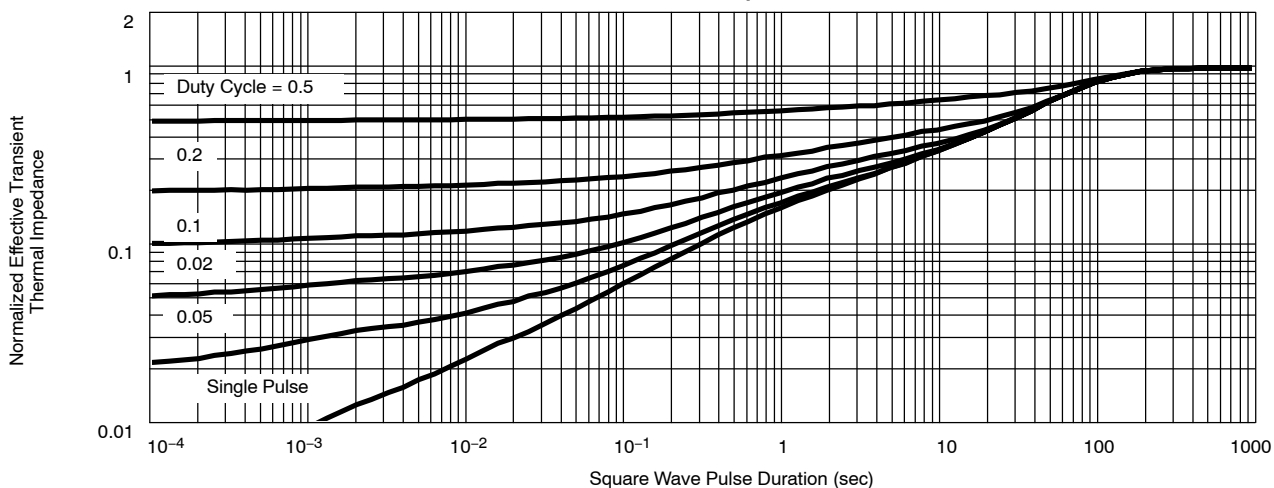
Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

