

N-Channel 30-V (D-S) 175°C MOSFET

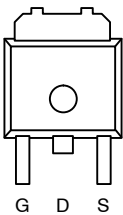
PRODUCT SUMMARY

| V_{DS} (V) | $r_{DS(on)}$ (Ω) | I_D (A) |
|--------------|---------------------------|-----------|
| 30 | 0.007 @ $V_{GS} = 10$ V | 20 |
| | 0.010 @ $V_{GS} = 4.5$ V | 16 |

FEATURES

- TrenchFET® Power MOSFET
- 175°C Maximum Junction Temperature
- 100% R_g Tested

TO-252

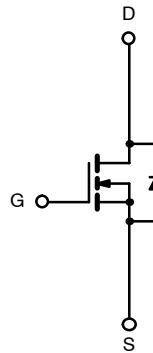


Top View

Ordering Information:

SUD50N03-07
SUD50N03-07—E3 (Lead Free)

Drain Connected to Tab



N-Channel MOSFET

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 | I_D | $T_A = 25^\circ\text{C}$ | 20 |
| | | $T_A = 100^\circ\text{C}$ | 14 |
| Pulsed Drain Current | I_{DM} | 100 | A |
| Continuous Source Current (Diode Conduction) ^a | I_S | 20 | |
| Maximum Power Dissipation | P_D | $T_C = 25^\circ\text{C}$ | 136 |
| | | $T_A = 25^\circ\text{C}$ | 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 | R_{thJA} | | 30 | $^\circ\text{C}/\text{W}$ |
| Maximum Junction-to-Case | R_{thJC} | 0.85 | 1.1 | |

Notes

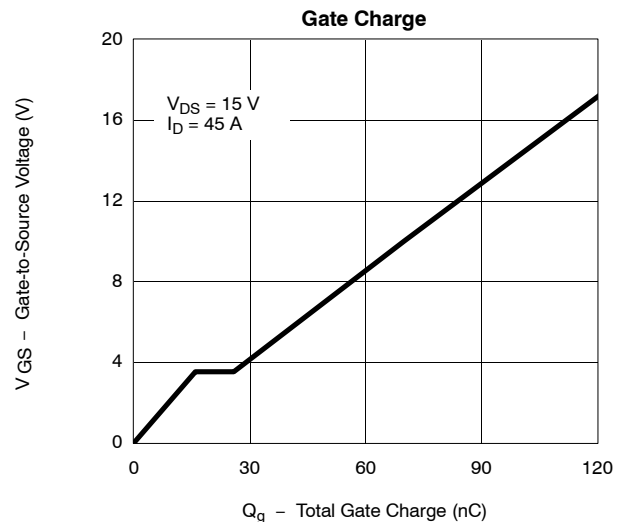
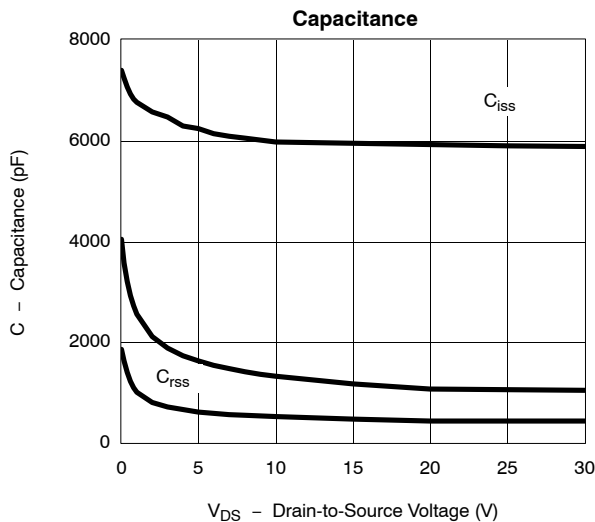
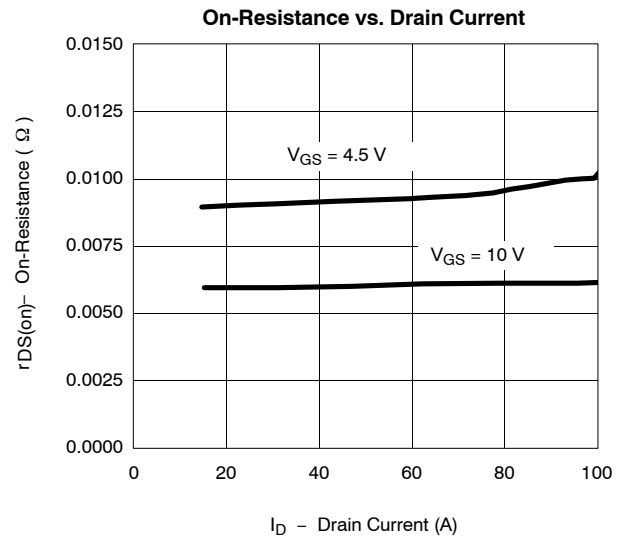
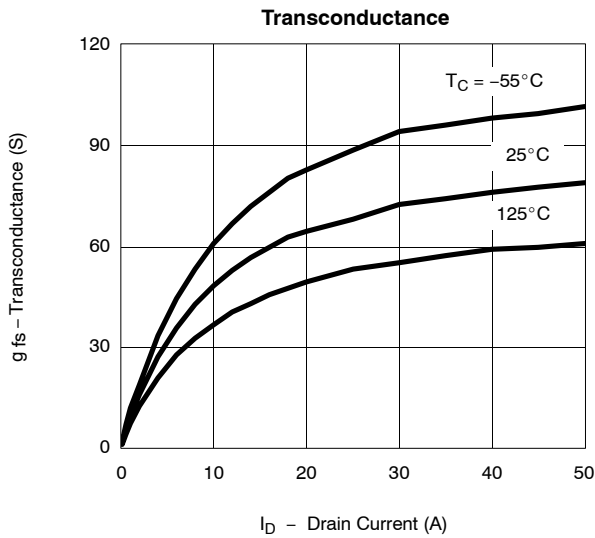
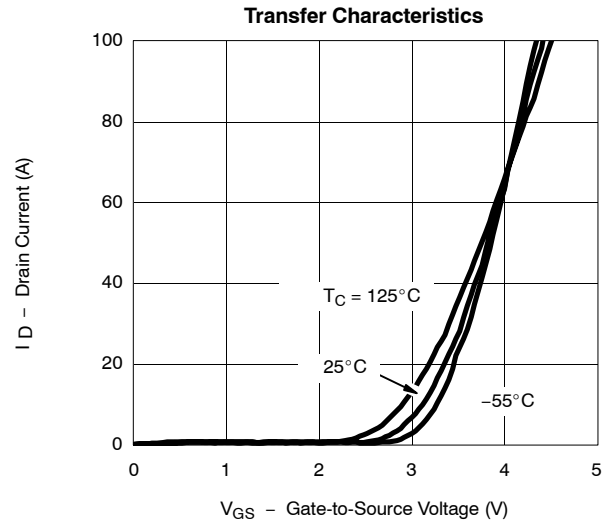
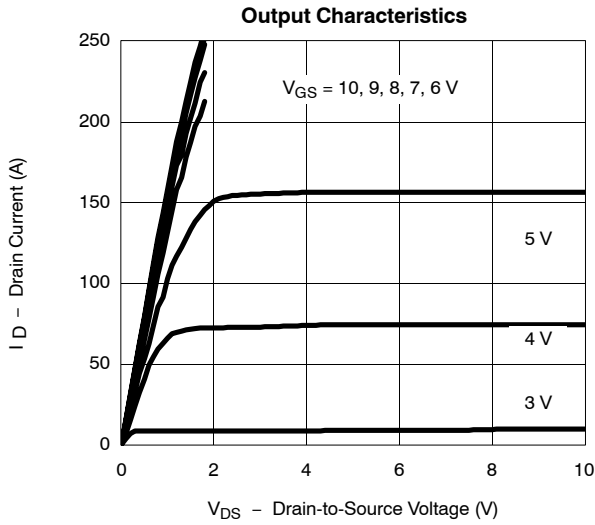
a. Surface Mounted on FR4 Board, $t \leq 10$ sec.

| SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | | | |
|--|---------------|--|-----|------------------|-----------|---------------|
| Parameter | Symbol | Test Condition | Min | Typ ^a | Max | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$ | 30 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$ | 1.0 | 2.0 | 3.0 | |
| 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} | $V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$ | | | 1 | μA |
| | | $V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$ | | | 50 | |
| On-State Drain Current ^b | $I_{D(on)}$ | $V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$ | 50 | | | A |
| Drain-Source On-State Resistance ^b | $r_{DS(on)}$ | $V_{GS} = 10\text{ V}, I_D = 20\text{ A}$ | | | 0.007 | Ω |
| | | $V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 125^\circ\text{C}$ | | | 0.011 | |
| | | $V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$ | | | 0.010 | |
| Forward Transconductance ^b | g_{fs} | $V_{DS} = 15\text{ V}, I_D = 20\text{ A}$ | 20 | | | S |
| Dynamic^a | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 5600 | | pF |
| Output Capacitance | C_{oss} | | | 1100 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 450 | | |
| Total Gate Charge ^c | Q_g | $V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 50\text{ A}$ | | 70 | 130 | nC |
| Gate-Source Charge ^c | Q_{gs} | | | 16 | | |
| Gate-Drain Charge ^c | Q_{gd} | | | 10 | | |
| Gate Resistance | R_g | | 0.5 | | 3.1 | Ω |
| Turn-On Delay Time ^c | $t_{d(on)}$ | $V_{DD} = 15\text{ V}, R_L = 0.3\ \Omega$ $I_D \cong 50\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\ \Omega$ | | 14 | 30 | ns |
| Rise Time ^c | t_r | | | 11 | 20 | |
| Turn-Off Delay Time ^c | $t_{d(off)}$ | | | 60 | 120 | |
| Fall Time ^c | t_f | | | 15 | 40 | |
| Source-Drain Diode Ratings and Characteristic ($T_C = 25^\circ\text{C}$) | | | | | | |
| Pulsed Current | I_{SM} | | | | 100 | A |
| Diode Forward Voltage ^b | V_{SD} | $I_F = 100\text{ A}, V_{GS} = 0\text{ V}$ | | 1.2 | 1.5 | V |
| Source-Drain Reverse Recovery Time | t_{rr} | $I_F = 50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$ | | 55 | 100 | ns |

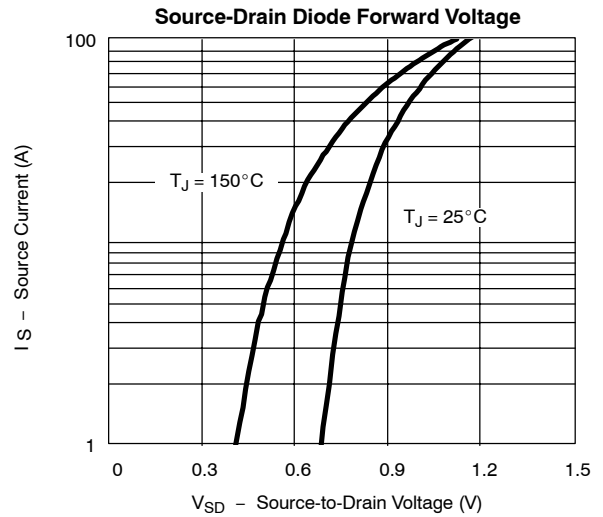
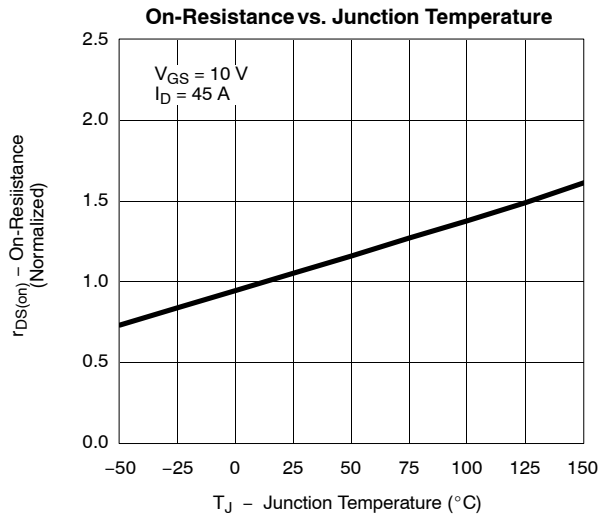
Notes

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

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



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THERMAL RATINGS

