

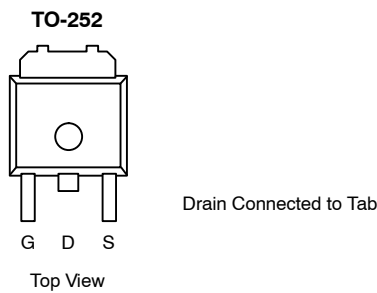


N-Channel 30-V (D-S), 175°C, MOSFET PWM Optimized

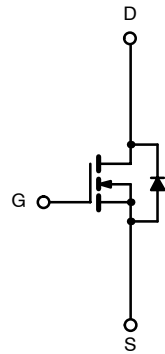
| PRODUCT SUMMARY | | |
|-------------------|---------------------------|------------------------|
| $V_{(BR)DSS}$ (V) | $r_{DS(on)}$ (Ω) | I_D (A) ^a |
| 30 | 0.010 @ $V_{GS} = 10$ V | 20 |
| | 0.014 @ $V_{GS} = 4.5$ V | 18 |

FEATURES

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



Ordering Information: SUD50N03-10BP



| 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 ($T_J = 175^\circ\text{C}$) ^a | $T_A = 25^\circ\text{C}$ | I_D | 20 | A |
| | $T_A = 100^\circ\text{C}$ | | 14 | |
| Pulsed Drain Current | | I_{DM} | 100 | |
| Continuous Source Current (Diode Conduction) ^a | | I_S | 20 | |
| Maximum Power Dissipation | $T_C = 25^\circ\text{C}$ | P_D | 71 ^b | W |
| | $T_A = 25^\circ\text{C}$ | | 8.3 ^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} | 15 | 18 | $^\circ\text{C}/\text{W}$ |
| | Steady State | | 40 | 50 | |
| Maximum Junction-to-Case | | R_{thJC} | 1.75 | 2.1 | |

Notes:

- a. Surface mounted on 1" x 1" FR4 Board, $t \leq 10$ sec.
- b. See SOA curve for voltage derating.

| MOSFET SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED) | | | | | | |
|---|----------------------|--|-----|--------|-------|------|
| Parameter | Symbol | Test Condition | Min | Typ | 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 _{DS} = 250 μA | 0.8 | 2 | | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ± 20 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 24 V, V _{GS} = 0 V | | | 1 | μA |
| | | V _{DS} = 24 V, V _{GS} = 0 V, T _J = 125 °C | | | 50 | |
| | | V _{DS} = 24 V, V _{GS} = 0 V, T _J = 175 °C | | | 150 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} = 5 V, V _{GS} = 10 V | 50 | | | A |
| Drain-Source On-State Resistance ^a | r _{DS(on)} | V _{GS} = 10 V, I _D = 15 A | | 0.0075 | 0.010 | Ω |
| | | V _{GS} = 10 V, I _D = 15 A, T _J = 125 °C | | | 0.016 | |
| | | V _{GS} = 10 V, I _D = 15 A, T _J = 175 °C | | | 0.019 | |
| | | V _{GS} = 4.5 V, I _D = 15 A | | 0.011 | 0.014 | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = 15 V, I _D = 15 A | 20 | | | S |
| Dynamic^b | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz | | 1500 | | pF |
| Output Capacitance | C _{oss} | | | 530 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 240 | | |
| Total Gate Charge ^c | Q _g | V _{DS} = 15 V, V _{GS} = 5 V, I _D = 20 A | | 15.5 | 19 | nC |
| Gate-Source Charge ^c | Q _{gs} | | | 5 | | |
| Gate-Drain Charge ^c | Q _{gd} | | | 6 | | |
| Gate Resistance | R _g | | 0.5 | | 4.1 | Ω |
| Turn-On Delay Time ^c | t _{d(on)} | V _{DD} = 15 V, R _L = 0.3 Ω I _D = 20 A, V _{GEN} = 10 V, R _G = 2.5 Ω | | 10 | 18 | ns |
| Rise Time ^c | t _r | | | 8 | 15 | |
| Turn-Off Delay Time ^c | t _{d(off)} | | | 25 | 45 | |
| Fall Time ^c | t _f | | | 9 | 16 | |
| Gate Resistance | R _g | | | | 2.3 | |
| Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)^b | | | | | | |
| Continuous Current | I _S | | | | 50 | A |
| Pulsed Current | I _{SM} | | | | 100 | |
| Forward Voltage ^a | V _{SD} | I _F = 100 A, V _{GS} = 0 V | | 1.2 | 1.5 | V |
| Reverse Recovery Time | t _{rr} | I _F = 20 A, di/dt = 100 A/μs | | 30 | 60 | ns |

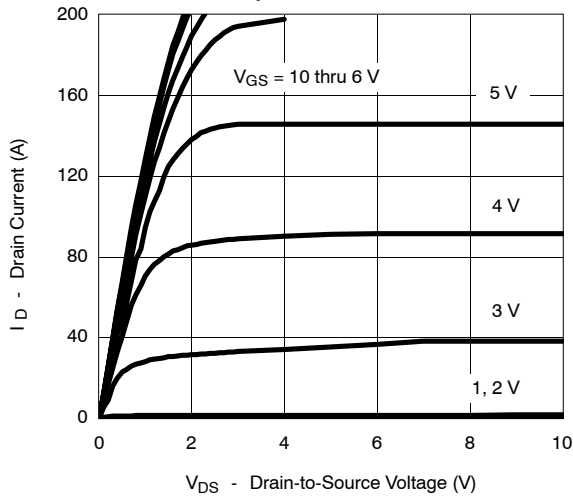
Notes:

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

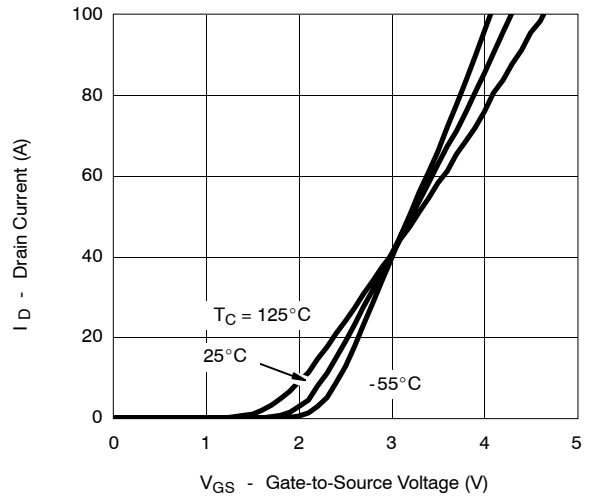


TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

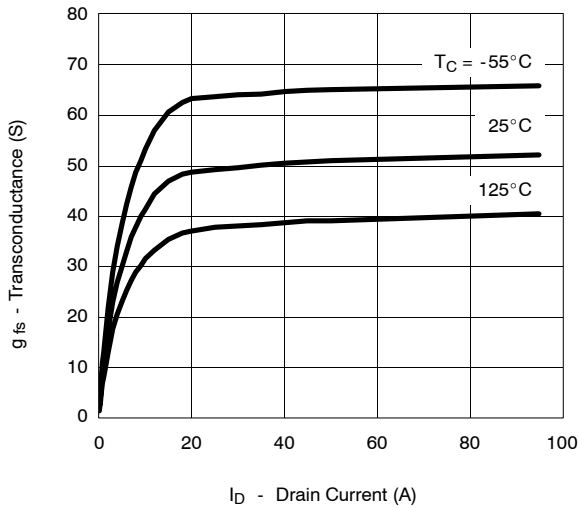
Output Characteristics



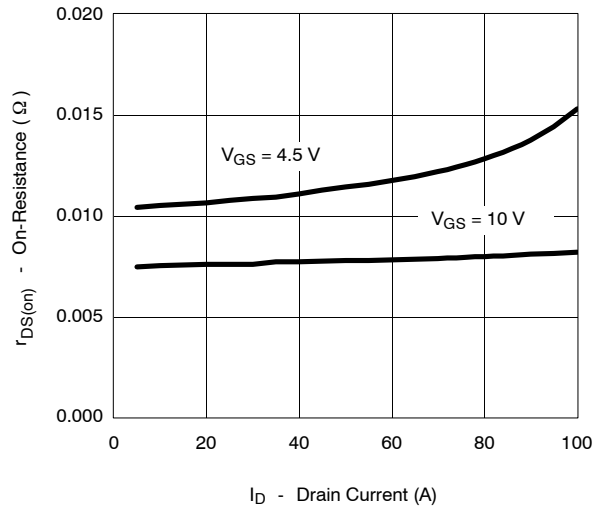
Transfer Characteristics



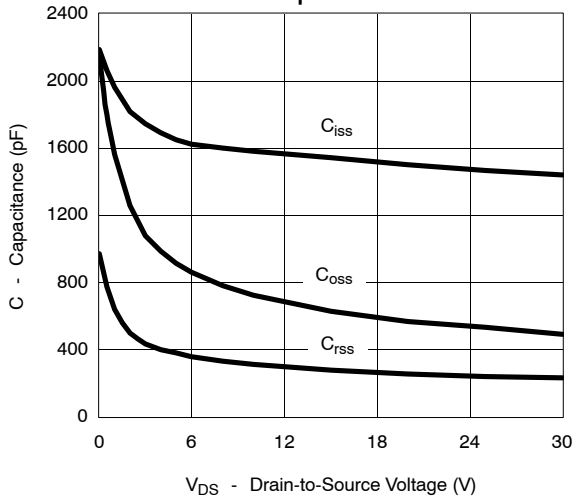
Transconductance



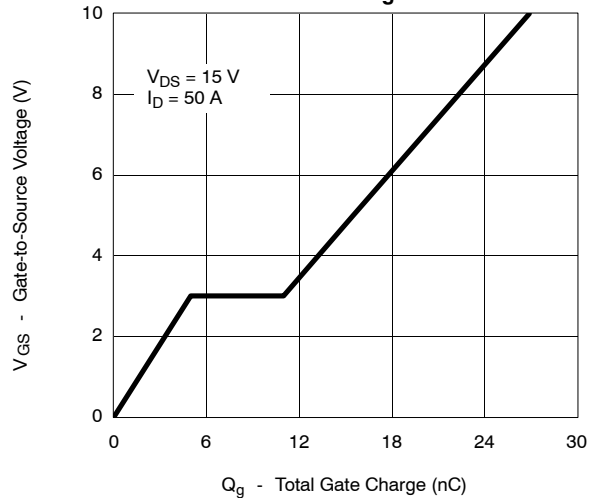
On-Resistance vs. Drain Current



Capacitance

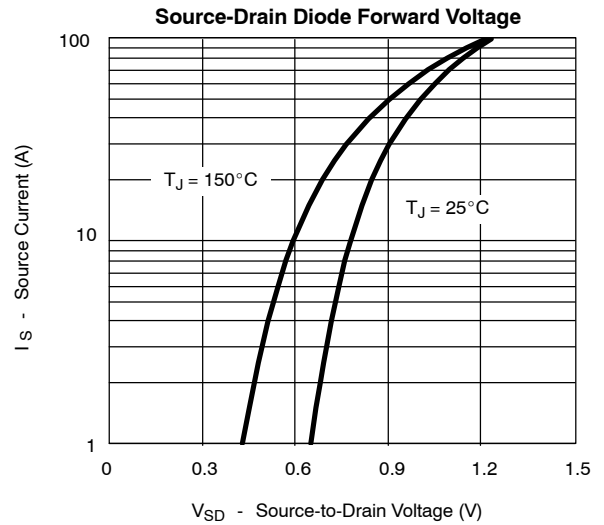
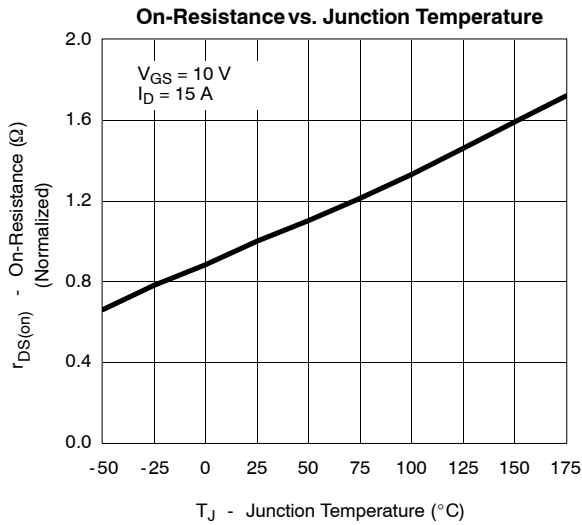


Gate Charge

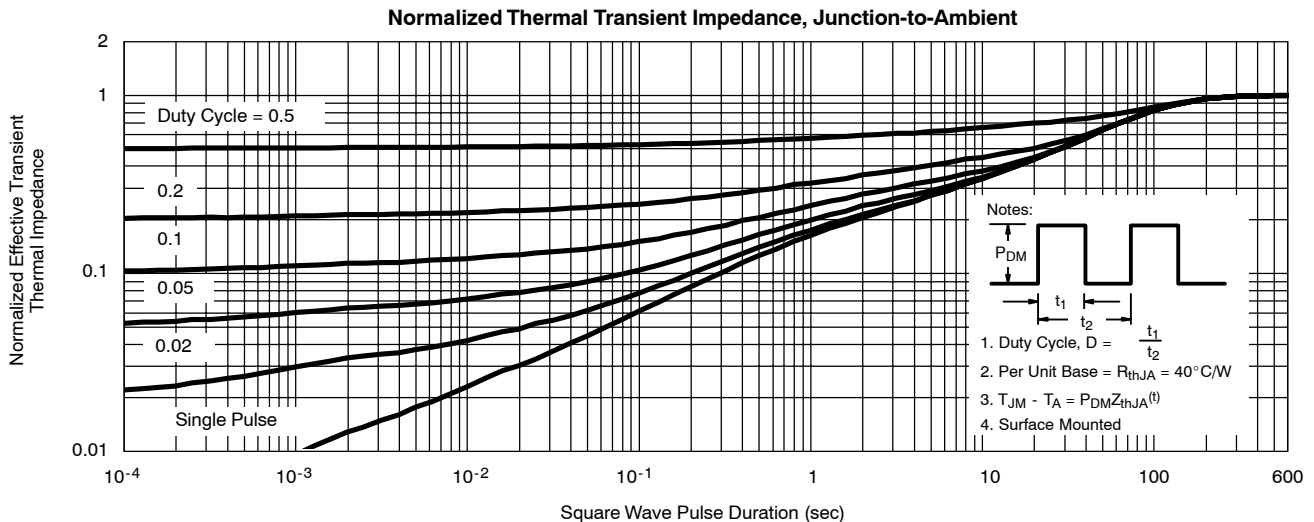
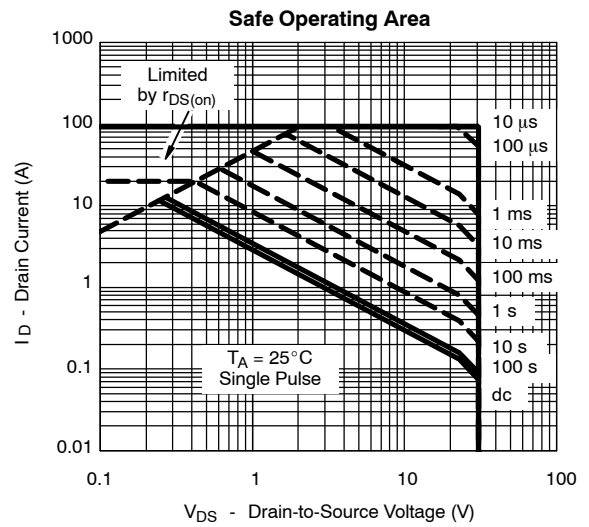
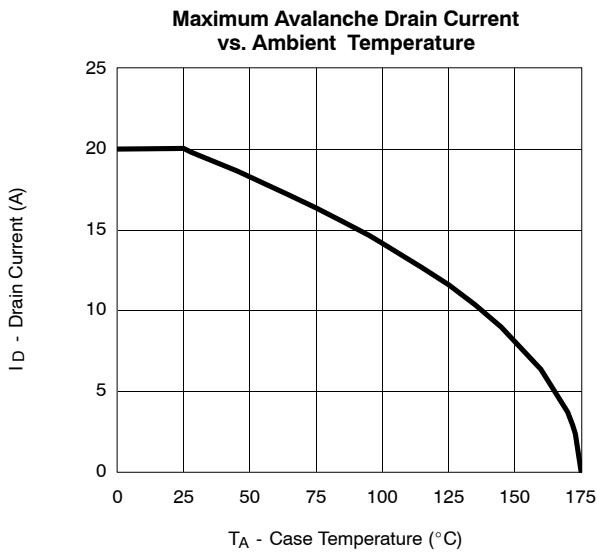




TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



THERMAL RATINGS





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