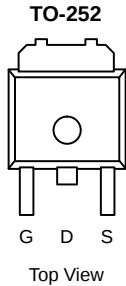
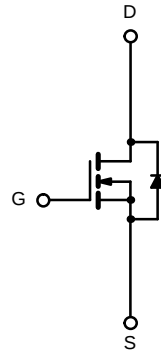


**N-Ch 30-V (D-S), 175 °C, MOSFET PWM Optimized**  
*New Product***175 °C Rated**  
Maximum Junction Temperature  
**TrenchFET®**  
Power MOSFETs**PRODUCT SUMMARY**

| <b>V<sub>(BR)DSS</sub> (V)</b> | <b>R<sub>DS(ON)</sub> (Ω)</b>   | <b>I<sub>D</sub> (A)</b> |
|--------------------------------|---------------------------------|--------------------------|
| 30                             | 0.010 @ V <sub>GS</sub> = 10 V  | ± 50 <sup>A</sup>        |
|                                | 0.015 @ V <sub>GS</sub> = 4.5 V | ± 45                     |

Order Number:  
SUD50N03-10P

Drain Connected to Tab



N-Channel MOSFET

**ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> = 25 °C UNLESS OTHERWISE NOTED)**

| <b>PARAMETER</b>                                          |                         | <b>SYMBOL</b>                     | <b>LIMIT</b>      | <b>UNIT</b> |
|-----------------------------------------------------------|-------------------------|-----------------------------------|-------------------|-------------|
| Drain-Source Voltage                                      |                         | V <sub>DS</sub>                   | ± 30              | V           |
| Gate-Source Voltage                                       |                         | V <sub>GS</sub>                   | ± 20              |             |
| Continuous Drain Current (T <sub>J</sub> = 175 °C)        | T <sub>C</sub> = 25 °C  | I <sub>D</sub>                    | ± 50 <sup>A</sup> | A           |
|                                                           | T <sub>C</sub> = 100 °C |                                   | ± 40              |             |
| Pulsed Drain Current                                      |                         | I <sub>DM</sub>                   | ± 180             |             |
| Continuous Source Current (Diode Conduction) <sup>A</sup> |                         | I <sub>S</sub>                    | ± 50              | W           |
| Maximum Power Dissipation                                 | T <sub>C</sub> = 25 °C  | P <sub>D</sub>                    | 65 <sup>C</sup>   |             |
|                                                           | T <sub>A</sub> = 25 °C  |                                   | 5 <sup>B</sup>    |             |
| Operating Junction and Storage Temperature Range          |                         | T <sub>J</sub> , T <sub>stg</sub> | -55 to 175        | °C          |

**THERMAL RESISTANCE RATINGS**

| <b>PARAMETER</b>                         | <b>SYMBOL</b>     | <b>LIMIT</b> | <b>UNIT</b> |
|------------------------------------------|-------------------|--------------|-------------|
| Maximum Junction-to-Ambient <sup>B</sup> | R <sub>thJA</sub> | 30           | °C/W        |
| Maximum Junction-to-Case                 | R <sub>thJC</sub> | 2.3          |             |

## Notes:

- A. Package limited.  
B. Surface mounted on FR4 Board, t ≤ 10 sec.  
C. See SOA curve for voltage derating.

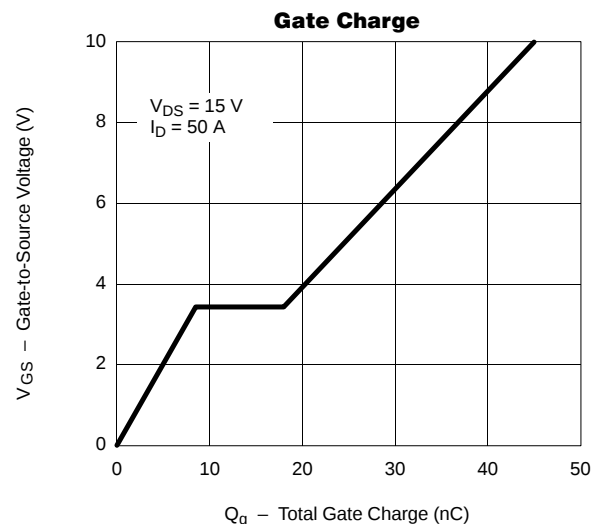
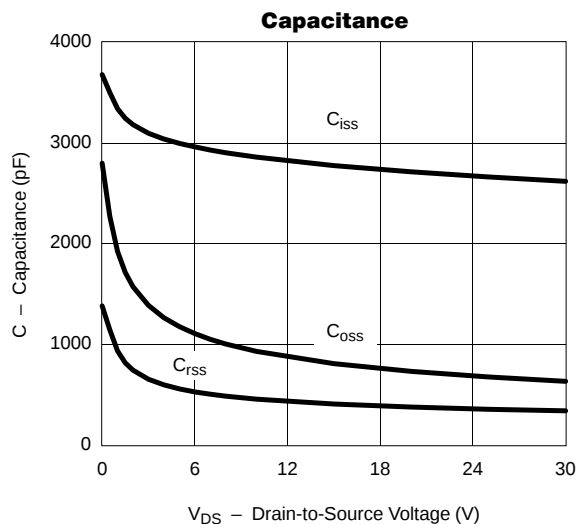
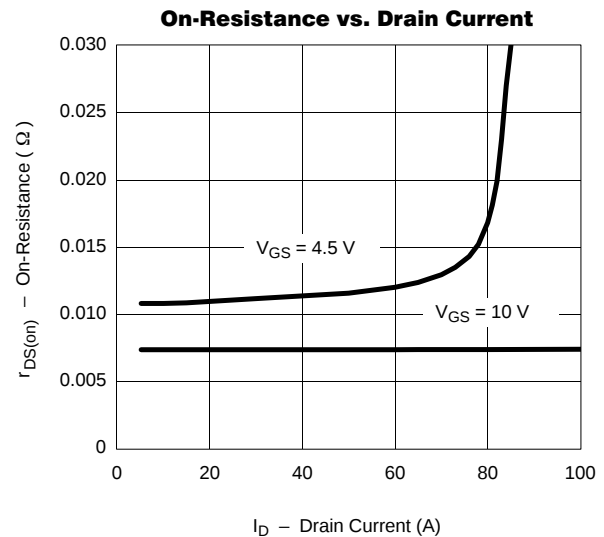
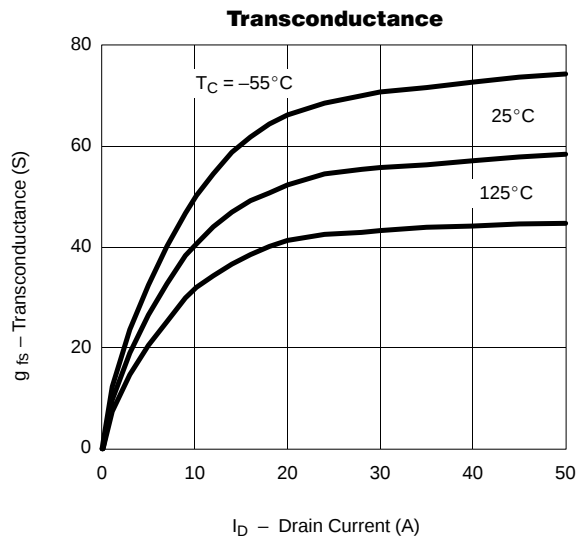
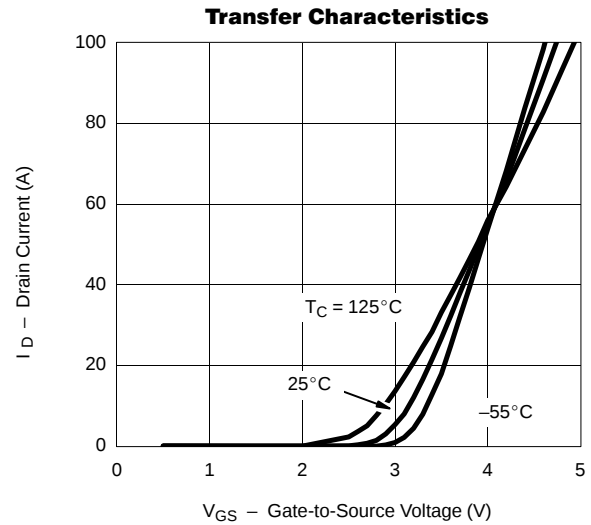
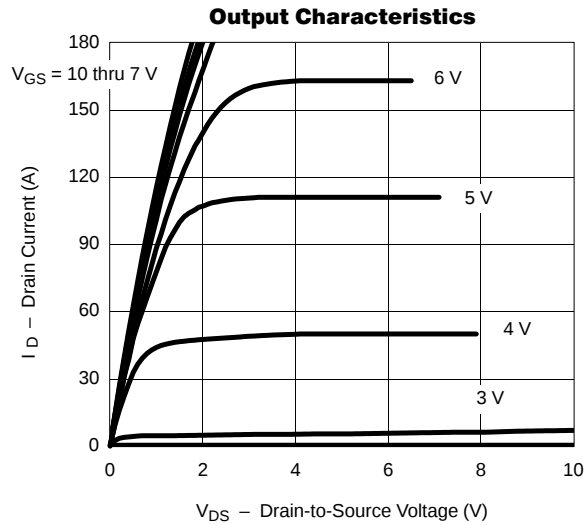
Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70822.

**MOSFET SPECIFICATIONS (T<sub>J</sub> = 25°C UNLESS OTHERWISE NOTED)**

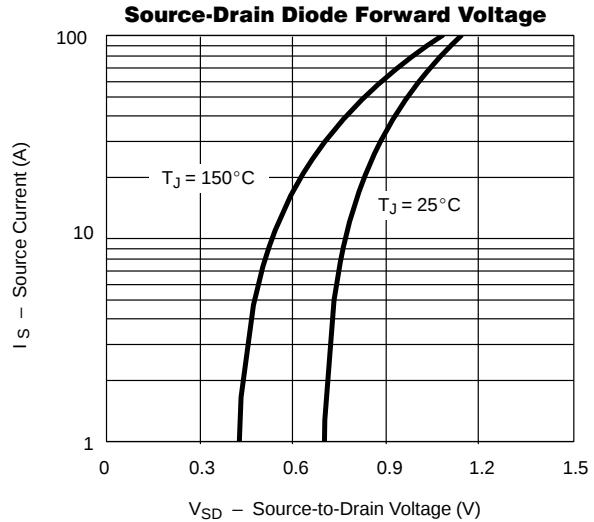
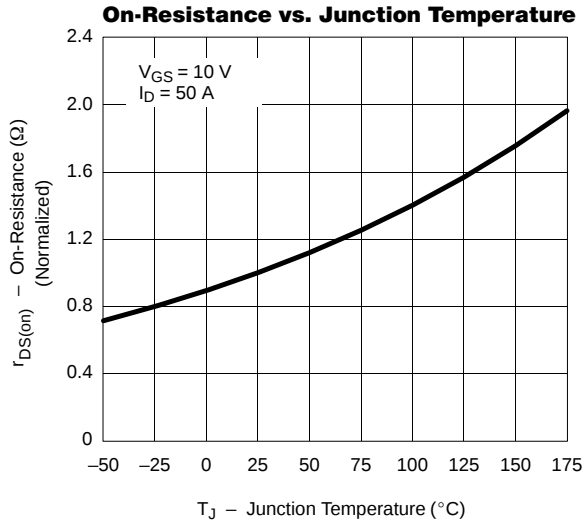
| PARAMETER                                                                           | SYMBOL               | TEST CONDITION                                                                                                           | MIN | TYP    | MAX   | UNIT |
|-------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------|-----|--------|-------|------|
| STATIC                                                                              |                      |                                                                                                                          |     |        |       |      |
| Drain-Source Breakdown Voltage                                                      | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA                                                                           | 30  |        |       | V    |
| Gate Threshold Voltage                                                              | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA                                                             | 1   | 2      |       |      |
| Gate-Body Leakage                                                                   | I <sub>GSS</sub>     | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V                                                                           |     |        | ±100  | nA   |
| Zero Gate Voltage Drain Current                                                     | I <sub>DSS</sub>     | V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V                                                                            |     |        | 1     | μA   |
|                                                                                     |                      | V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125°C                                                    |     |        | 50    |      |
|                                                                                     |                      | V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175°C                                                    |     |        | 150   |      |
| On-State Drain Current <sup>B</sup>                                                 | I <sub>D(on)</sub>   | V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V                                                                            | 50  |        |       | A    |
| Drain-Source On-State Resistance <sup>B</sup>                                       | r <sub>DS(on)</sub>  | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 25 A                                                                            |     | 0.0075 | 0.010 | Ω    |
|                                                                                     |                      | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A, T <sub>J</sub> = 125°C                                                    |     |        | 0.016 |      |
|                                                                                     |                      | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A, T <sub>J</sub> = 175°C                                                    |     |        | 0.019 |      |
|                                                                                     |                      | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 15 A                                                                           |     | 0.011  | 0.015 |      |
| Forward Transconductance <sup>B</sup>                                               | g <sub>fs</sub>      | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 15 A                                                                            | 20  | 40     |       | S    |
| DYNAMIC <sup>A</sup>                                                                |                      |                                                                                                                          |     |        |       |      |
| Input Capacitance                                                                   | C <sub>iss</sub>     | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz                                                                 |     | 2700   |       | pF   |
| Output Capacitance                                                                  | C <sub>oss</sub>     |                                                                                                                          |     | 680    |       |      |
| Reversen Transfer Capacitance                                                       | C <sub>rSS</sub>     |                                                                                                                          |     | 360    |       |      |
| Total Gate Charge <sup>C</sup>                                                      | Q <sub>g</sub>       | V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 50 A                                                    |     | 45     | 70    | nC   |
| Gate-Source Charge <sup>C</sup>                                                     | Q <sub>gs</sub>      |                                                                                                                          |     | 8.5    |       |      |
| Gate-Drain Charge <sup>C</sup>                                                      | Q <sub>gd</sub>      |                                                                                                                          |     | 9.5    |       |      |
| Turn-On Delay Time <sup>C</sup>                                                     | t <sub>d(on)</sub>   | V <sub>DD</sub> = 15 V, R <sub>L</sub> = 0.3 Ω<br>I <sub>D</sub> = 50 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω |     | 12     | 20    | ns   |
| Rise Time <sup>C</sup>                                                              | t <sub>r</sub>       |                                                                                                                          |     | 7      | 15    |      |
| Turn-Off Delay Time <sup>C</sup>                                                    | t <sub>d(off)</sub>  |                                                                                                                          |     | 35     | 60    |      |
| Fall Time <sup>C</sup>                                                              | t <sub>f</sub>       |                                                                                                                          |     | 12     | 20    |      |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T <sub>C</sub> = 25°C) <sup>A</sup> |                      |                                                                                                                          |     |        |       |      |
| Continuous Current                                                                  | I <sub>S</sub>       |                                                                                                                          |     |        | 50    | A    |
| Pulsed Current                                                                      | I <sub>SM</sub>      |                                                                                                                          |     |        | 180   |      |
| Forward Voltage <sup>B</sup>                                                        | V <sub>SD</sub>      | I <sub>F</sub> = 50 A, V <sub>GS</sub> = 0 V                                                                             |     | 1.2    | 1.5   | V    |
| Reverse Recovery Time                                                               | t <sub>rr</sub>      | I <sub>F</sub> = 50 A, di/dt = 100 A/μs                                                                                  |     | 40     | 80    | ns   |

## Notes:

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

**Typical Characteristics (25°C Unless Otherwise Noted)**

### Typical Characteristics (25°C Unless Otherwise Noted)



### Thermal Ratings

