



## N-Channel 100-V (D-S) 175°C MOSFET

## PRODUCT SUMMARY

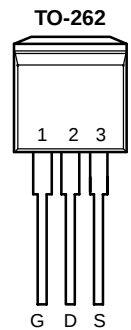
| $V_{(BR)DSS}$ (V) | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A)       |
|-------------------|---------------------------|-----------------|
| 100               | 0.0105 @ $V_{GS} = 10$ V  | 85 <sup>a</sup> |
|                   | 0.012 @ $V_{GS} = 4.5$ V  |                 |

## FEATURES

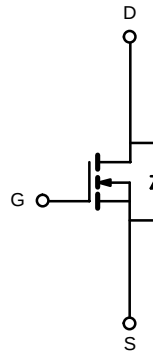
- TrenchFET® Power MOSFET
- 175°C Junction Temperature

## APPLICATIONS

- DC/DC Primary Side Switch



Top View  
SUV85N10-10



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)

| Parameter                                              |                                       | Symbol         | Limit            | Unit             |
|--------------------------------------------------------|---------------------------------------|----------------|------------------|------------------|
| Drain-Source Voltage                                   |                                       | $V_{DS}$       | 100              | V                |
| Gate-Source Voltage                                    |                                       | $V_{GS}$       | $\pm 20$         |                  |
| Continuous Drain Current ( $T_J = 175^\circ\text{C}$ ) | $T_C = 25^\circ\text{C}$              | $I_D$          | 85 <sup>a</sup>  | A                |
|                                                        | $T_C = 125^\circ\text{C}$             |                | 60 <sup>a</sup>  |                  |
| Pulsed Drain Current                                   |                                       | $I_{DM}$       | 240              |                  |
| Avalanche Current                                      |                                       | $I_{AR}$       | 75               |                  |
| Repetitive Avalanche Energy <sup>b</sup>               | $L = 0.1$ mH                          | $E_{AR}$       | 280              | mJ               |
| Maximum Power Dissipation <sup>b</sup>                 | $T_C = 25^\circ\text{C}$              | $P_D$          | 250 <sup>c</sup> | W                |
|                                                        | $T_A = 25^\circ\text{C}$ <sup>d</sup> |                | 3.75             |                  |
| Operating Junction and Storage Temperature Range       |                                       | $T_J, T_{stg}$ | -55 to 175       | $^\circ\text{C}$ |

## THERMAL RESISTANCE RATINGS

| Parameter           |                        | Symbol     | Limit | Unit               |
|---------------------|------------------------|------------|-------|--------------------|
| Junction-to-Ambient | PCB Mount <sup>d</sup> | $R_{thJA}$ | 40    | $^\circ\text{C/W}$ |
|                     | Free Air               |            | 62.5  |                    |
| Junction-to-Case    |                        | $R_{thJC}$ | 0.6   |                    |

## Notes

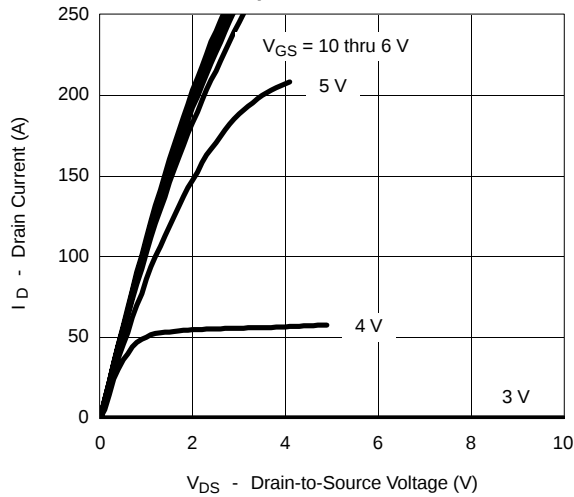
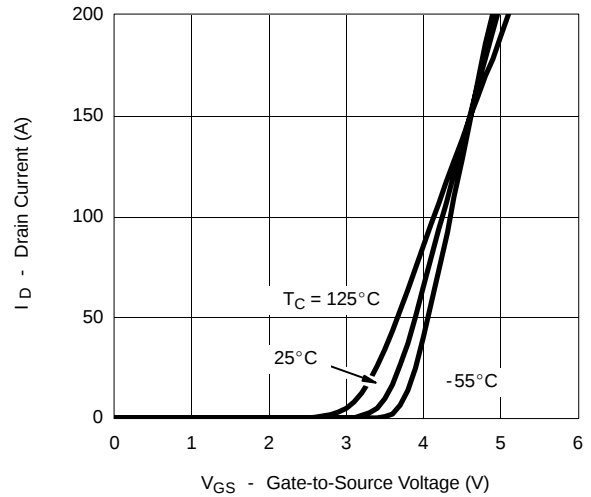
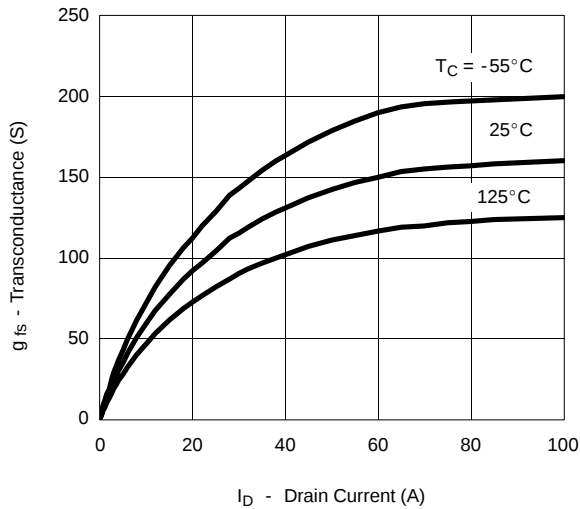
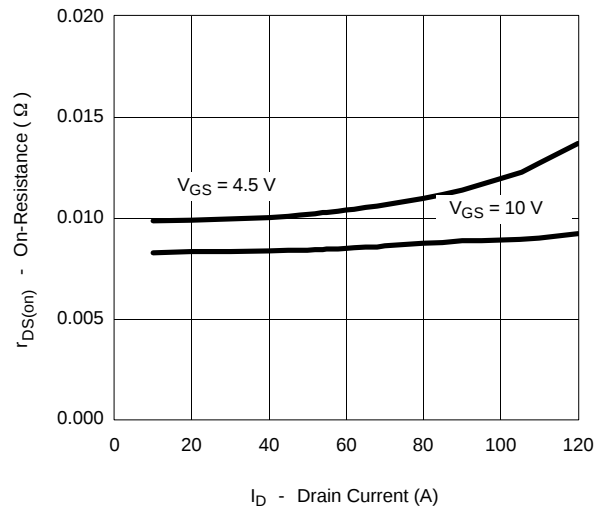
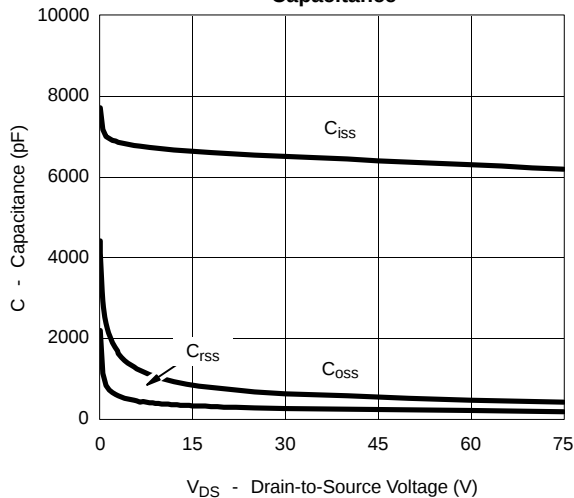
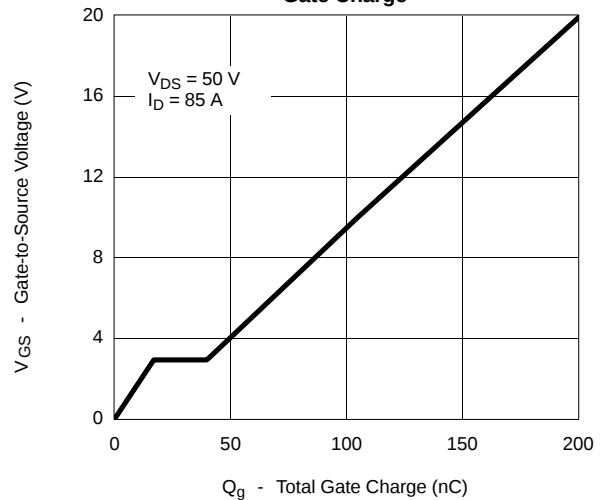
- Package limited.
- Duty cycle  $\leq 1\%$ .
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

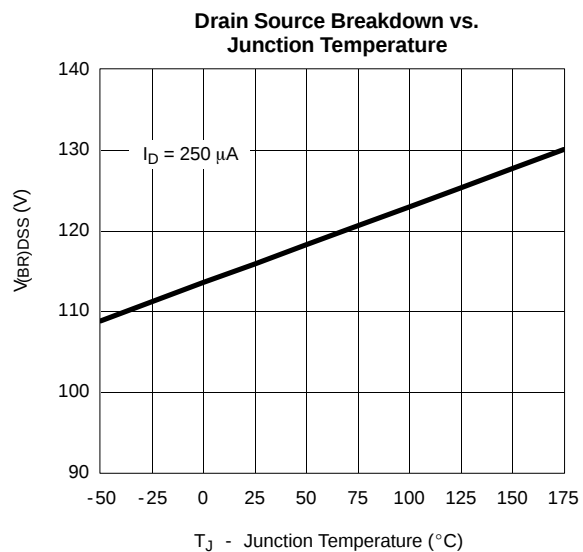
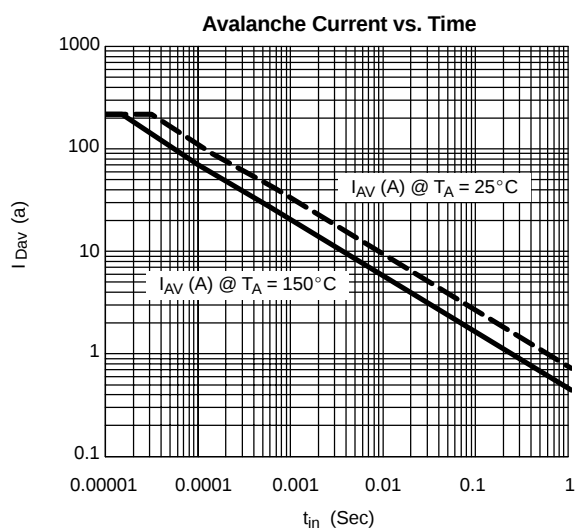
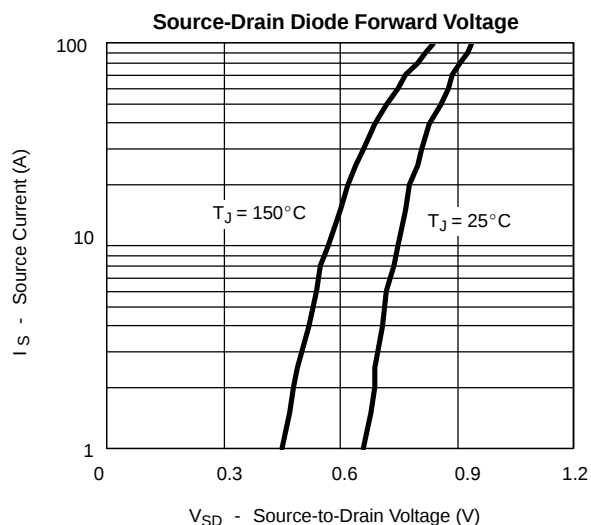
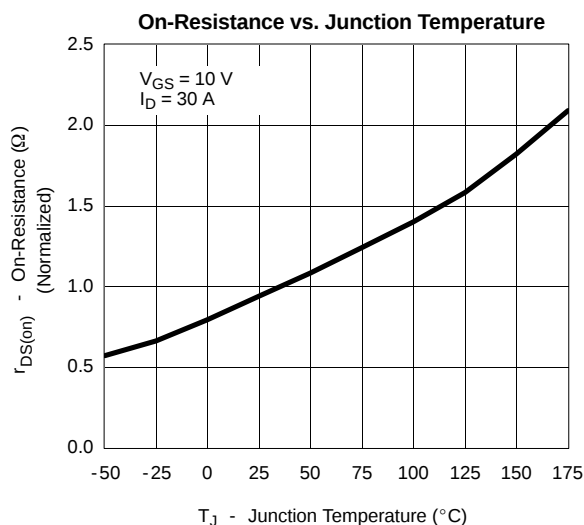
**SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)**

| 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                                                                           | 100 |        |        | V    |
| Gate-Threshold Voltage                                                              | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA                                                              | 1   |        | 3      |      |
| 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> = 80 V, V <sub>GS</sub> = 0 V                                                                            |     |        | 1      | μA   |
|                                                                                     |                      | V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125°C                                                    |     |        | 50     |      |
|                                                                                     |                      | V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175°C                                                    |     |        | 250    |      |
| On-State Drain Current <sup>a</sup>                                                 | I <sub>D(on)</sub>   | V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 10 V                                                                            | 120 |        |        | A    |
| Drain-Source On-State Resistance <sup>a</sup>                                       | r <sub>DS(on)</sub>  | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A                                                                            |     | 0.0085 | 0.0105 | Ω    |
|                                                                                     |                      | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A                                                                           |     | 0.0010 | 0.012  |      |
|                                                                                     |                      | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 125°C                                                    |     |        | 0.017  |      |
|                                                                                     |                      | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 175°C                                                    |     |        | 0.022  |      |
| Forward Transconductance <sup>a</sup>                                               | g <sub>fs</sub>      | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 30 A                                                                            | 25  |        |        | S    |
| Dynamic <sup>b</sup>                                                                |                      |                                                                                                                          |     |        |        |      |
| Input Capacitance                                                                   | C <sub>iss</sub>     | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz                                                                 |     | 6550   |        | pF   |
| Output Capacitance                                                                  | C <sub>oss</sub>     |                                                                                                                          |     | 665    |        |      |
| Reverse Transfer Capacitance                                                        | C <sub>rss</sub>     |                                                                                                                          |     | 265    |        |      |
| Total Gate Charge <sup>c</sup>                                                      | Q <sub>g</sub>       | V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 85 A                                                    |     | 105    | 160    | nC   |
| Gate-Source Charge <sup>c</sup>                                                     | Q <sub>gs</sub>      |                                                                                                                          |     | 17     |        |      |
| Gate-Drain Charge <sup>c</sup>                                                      | Q <sub>gd</sub>      |                                                                                                                          |     | 23     |        |      |
| Turn-On Delay Time <sup>c</sup>                                                     | t <sub>d(on)</sub>   | V <sub>DD</sub> = 50 V, R <sub>L</sub> = 0.6 Ω<br>I <sub>D</sub> ≅ 85 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω |     | 12     | 25     | ns   |
| Rise Time <sup>c</sup>                                                              | t <sub>r</sub>       |                                                                                                                          |     | 90     | 135    |      |
| Turn-Off Delay Time <sup>c</sup>                                                    | t <sub>d(off)</sub>  |                                                                                                                          |     | 55     | 85     |      |
| Fall Time <sup>c</sup>                                                              | t <sub>f</sub>       |                                                                                                                          |     | 130    | 195    |      |
| Source-Drain Diode Ratings and Characteristics (T <sub>C</sub> = 25°C) <sup>b</sup> |                      |                                                                                                                          |     |        |        |      |
| Continuous Current                                                                  | I <sub>S</sub>       |                                                                                                                          |     |        | 85     | A    |
| Pulsed Current                                                                      | I <sub>SM</sub>      |                                                                                                                          |     |        | 240    |      |
| Forward Voltage <sup>a</sup>                                                        | V <sub>SD</sub>      | I <sub>F</sub> = 85 A, V <sub>GS</sub> = 0 V                                                                             |     | 1.0    | 1.5    | V    |
| Reverse Recovery Time                                                               | t <sub>rr</sub>      | I <sub>F</sub> = 50 A, di/dt = 100 A/μs                                                                                  |     | 85     | 140    | ns   |
| Peak Reverse Recovery Current                                                       | I <sub>RM(REC)</sub> |                                                                                                                          |     | 4.5    | 7      | A    |
| Reverse Recovery Charge                                                             | Q <sub>rr</sub>      |                                                                                                                          |     | 0.17   | 0.35   | μC   |

## Notes

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

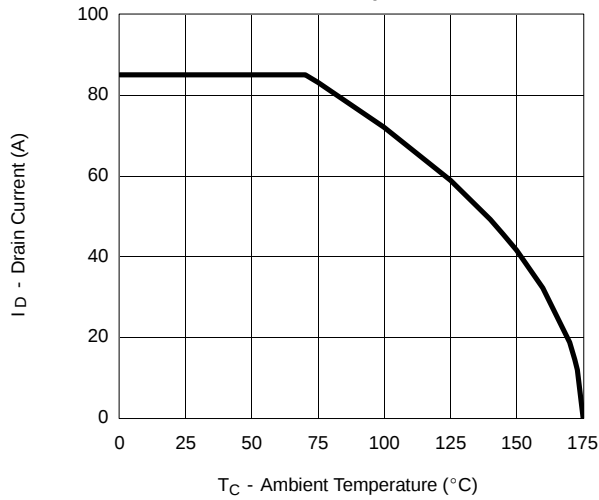
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)****Output Characteristics****Transfer Characteristics****Transconductance****On-Resistance vs. Drain Current****Capacitance****Gate Charge**

**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

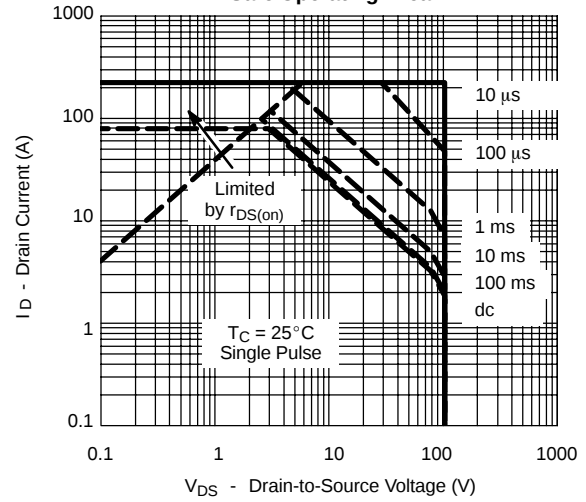


**THERMAL RATINGS**

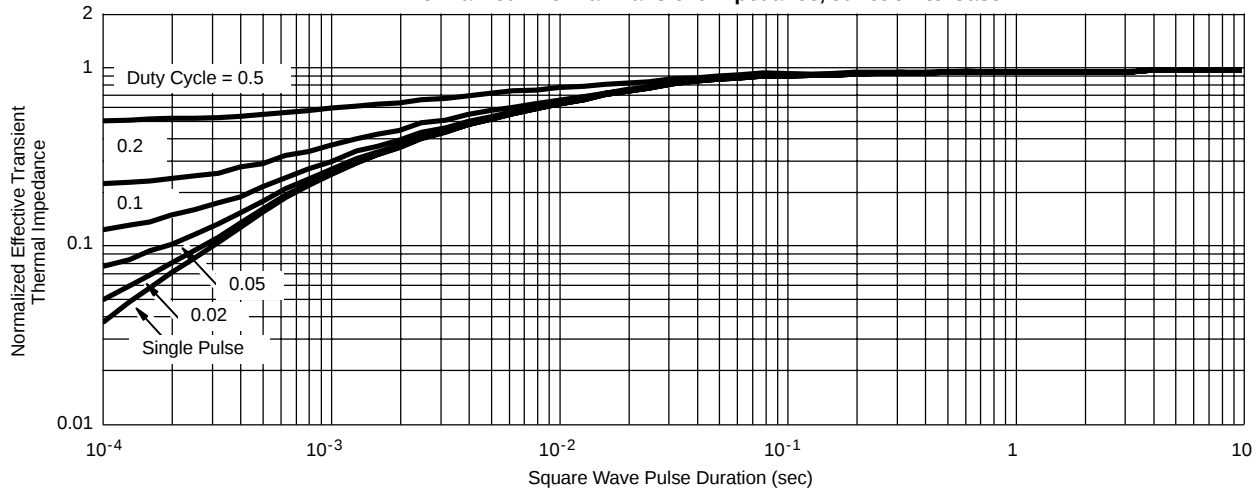
Maximum Avalanche and Drain Current  
vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case





### Disclaimer

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