



## N-Channel 200-V (D-S) 175°C MOSFET

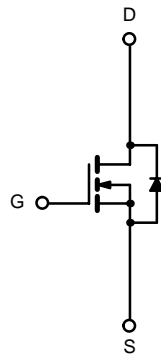
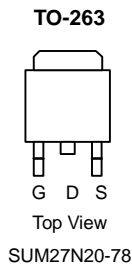
| PRODUCT SUMMARY   |                           |           |
|-------------------|---------------------------|-----------|
| $V_{(BR)DSS}$ (V) | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
| 200               | 0.078 @ $V_{GS} = 10$ V   | 27        |
|                   | 0.083 @ $V_{GS} = 6$ V    | 26        |

### FEATURES

- TrenchFET® Power MOSFETS
- 175°C Junction Temperature
- New Low Thermal Resistance Package
- PWM Optimized for Fast Switching

### APPLICATIONS

- Isolated DC/DC converters
  - Primary-Side Switch



N-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) |                |                                       |                  |    |
|---|----------------|---------------------------------------|------------------|----|
| Parameter   | Symbol         | Limit                                 | Unit             |    |
| Drain-Source Voltage  | $V_{DS}$       | 200                                   | V                |    |
| Gate-Source Voltage   | $V_{GS}$       | $\pm 20$                              |                  |    |
| Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )                      | $I_D$          | $T_C = 25^\circ\text{C}$              | 27               | A  |
|   |                | $T_C = 125^\circ\text{C}$             | 15.5             |    |
| Pulsed Drain Current  | $I_{DM}$       | 60                                    |                  |    |
| Avalanche Current   | $I_{AR}$       | 18                                    |                  |    |
| Repetitive Avalanche Energy <sup>a</sup>                                    | $E_{AR}$       | L = 0.1 mH                            | 16.2             | mJ |
| Maximum Power Dissipation <sup>a</sup>                                      | $P_D$          | $T_C = 25^\circ\text{C}$              | 150 <sup>b</sup> | W  |
|   |                | $T_A = 25^\circ\text{C}$ <sup>c</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        | $R_{thJA}$ | 40    | $^\circ\text{C}/\text{W}$ |
| Junction-to-Case (Drain)   | $R_{thJC}$ | 1.0   |                           |

Notes

- 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 |
| <b>Static</b>   |                      |   |     |       |       |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>DS</sub> = 0 V, I <sub>D</sub> = 250 μA  | 200 |       |       | V    |
| Gate-Threshold Voltage  | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA   | 2   |       | 4     |      |
| 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> = 160 V, V <sub>GS</sub> = 0 V  |     |       | 1     | μA   |
|   |                      | V <sub>DS</sub> = 160 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C   |     |       | 50    |      |
|   |                      | V <sub>DS</sub> = 160 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   | 60  |       |       | A    |
| Drain-Source On-State Resistance <sup>a</sup>   | r <sub>DS(on)</sub>  | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A   |     | 0.064 | 0.078 | Ω    |
|   |                      | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C  |     |       | 0.160 |      |
|   |                      | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C  |     |       | 0.205 |      |
| Drain-Source on State Resistance  |                      | V <sub>GS</sub> = 6 V, I <sub>D</sub> = 15 A  |     | 0.068 | 0.083 | Ω    |
| Forward Transconductance <sup>a</sup>   | g <sub>fs</sub>      | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 30 A   | 15  |       |       | S    |
| <b>Dynamic<sup>b</sup></b>  |                      |   |     |       |       |      |
| Input Capacitance   | C <sub>iSS</sub>     | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz  |     | 2150  |       | pF   |
| Output Capacitance  | C <sub>oss</sub>     |   |     | 215   |       |      |
| Reverse Transfer Capacitance  | C <sub>rSS</sub>     |   |     | 90    |       |      |
| Total Gate Charge <sup>c</sup>  | Q <sub>g</sub>       | V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A  |     | 40    | 60    | nC   |
| Gate-Source Charge <sup>c</sup>   | Q <sub>gs</sub>      |   |     | 11    |       |      |
| Gate-Drain Charge <sup>c</sup>  | Q <sub>gd</sub>      |   |     | 14    |       |      |
| Gate Resistance   | R <sub>G</sub>       |   |     | 2     |       | Ω    |
| Turn-On Delay Time <sup>c</sup>   | t <sub>d(on)</sub>   | V <sub>DD</sub> = 100 V, R <sub>L</sub> = 5 Ω<br>I <sub>D</sub> ≅ 20 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω |     | 15    | 25    | ns   |
| Rise Time <sup>c</sup>  | t <sub>r</sub>       |   |     | 35    | 55    |      |
| Turn-Off Delay Time <sup>c</sup>  | t <sub>d(off)</sub>  |   |     | 40    | 60    |      |
| Fall Time <sup>c</sup>  | t <sub>f</sub>       |   |     | 30    | 45    |      |
| <b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)<sup>b</sup></b> |                      |   |     |       |       |      |
| Continuous Current  | I <sub>S</sub>       |   |     |       | 27    | A    |
| Pulsed Current  | I <sub>SM</sub>      |   |     |       | 60    |      |
| Forward Voltage <sup>a</sup>  | V <sub>SD</sub>      | I <sub>F</sub> = 20 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   |     | 115   | 170   | ns   |
| Peak Reverse Recovery Current   | I <sub>RM(REC)</sub> |   |     | 7.5   | 12    | A    |
| Reverse Recovery Charge   | Q <sub>rr</sub>      |   |     | 0.43  | 1.02  | μC   |

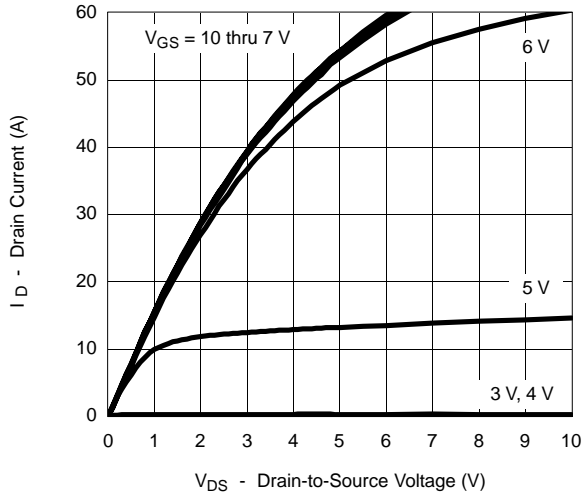
## Notes

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

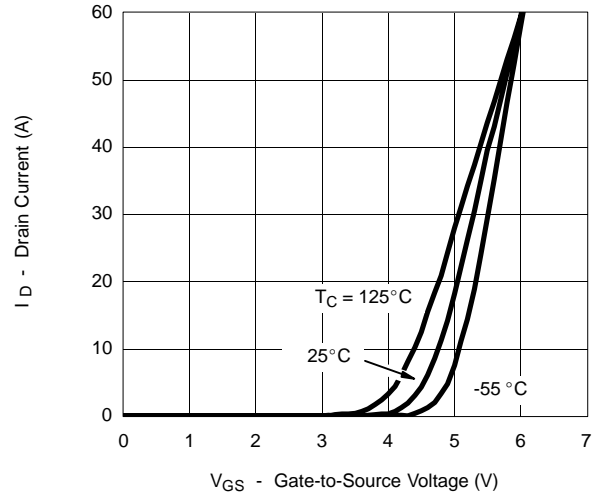


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

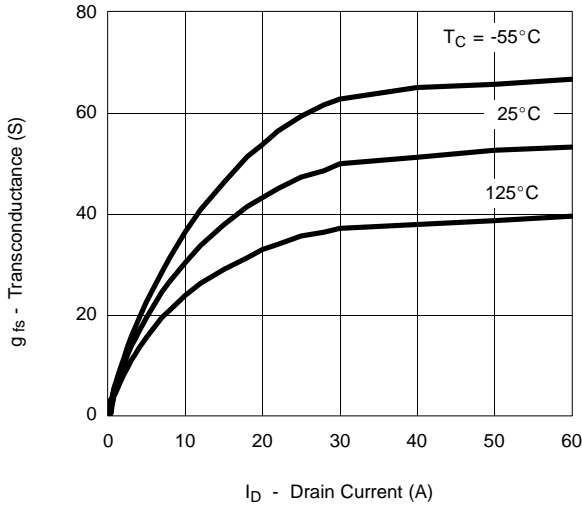
Output Characteristics



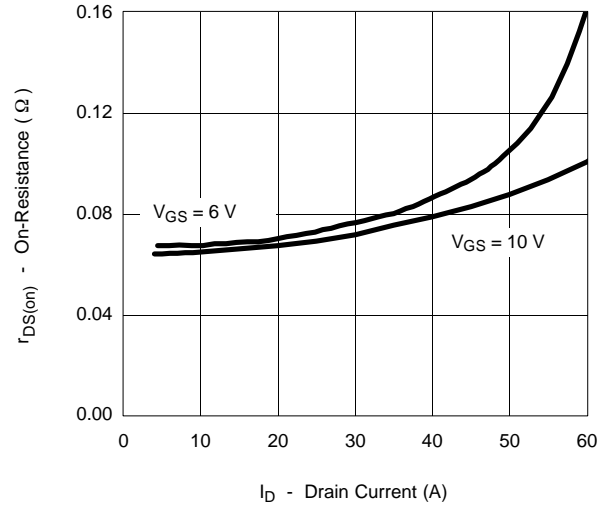
Transfer Characteristics



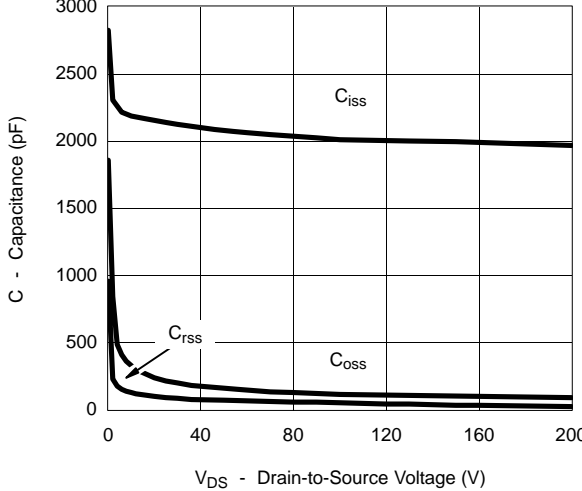
Transconductance



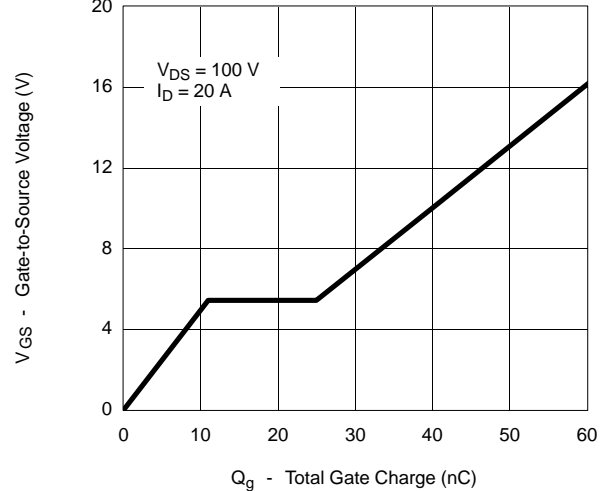
On-Resistance vs. Drain Current



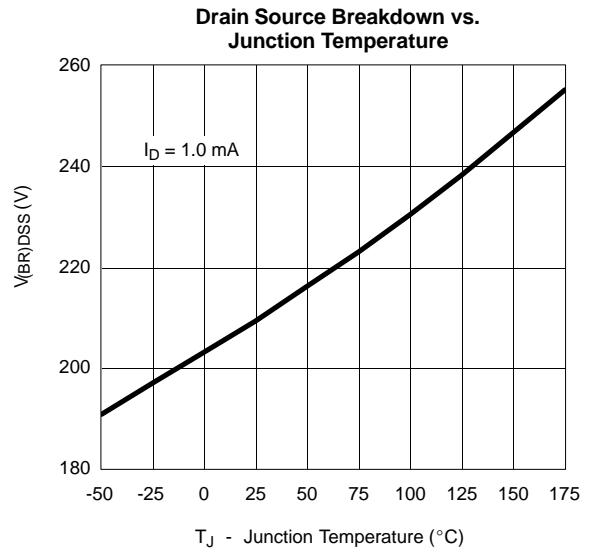
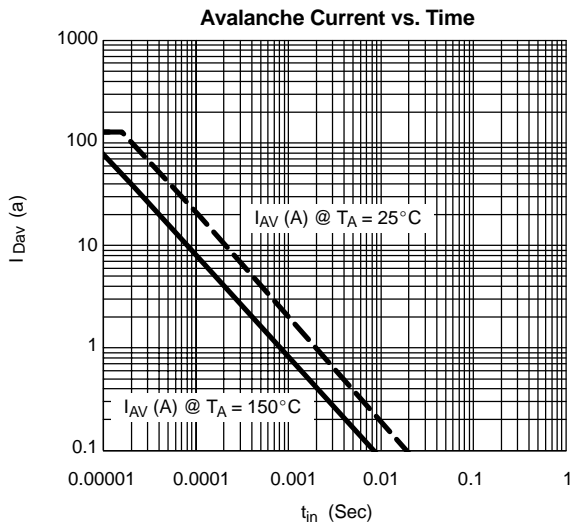
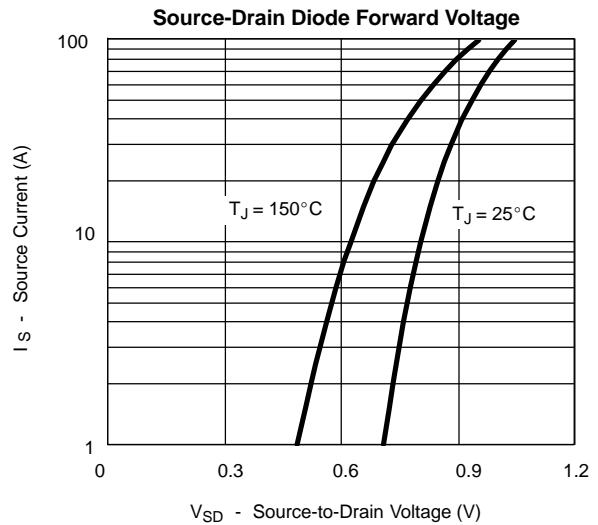
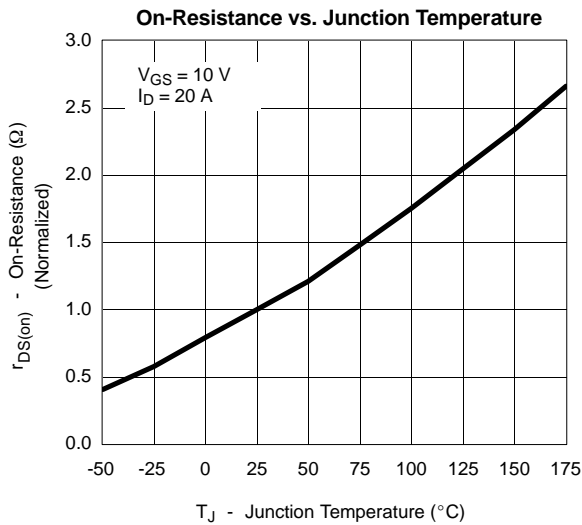
Capacitance



Gate Charge



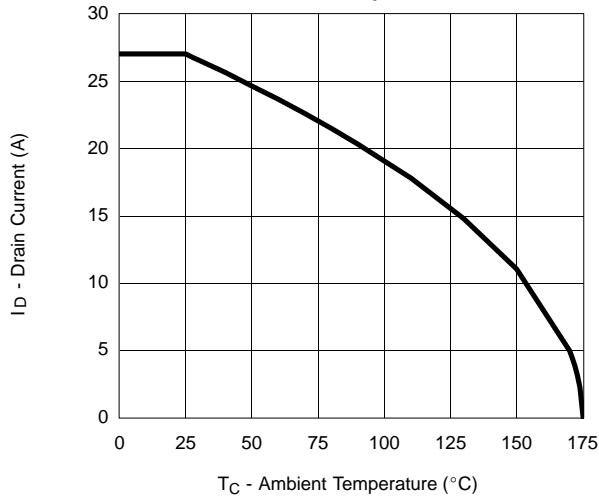
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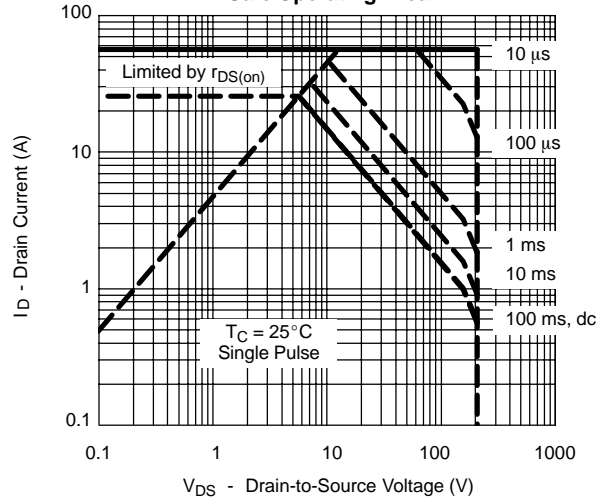


**THERMAL RATINGS**

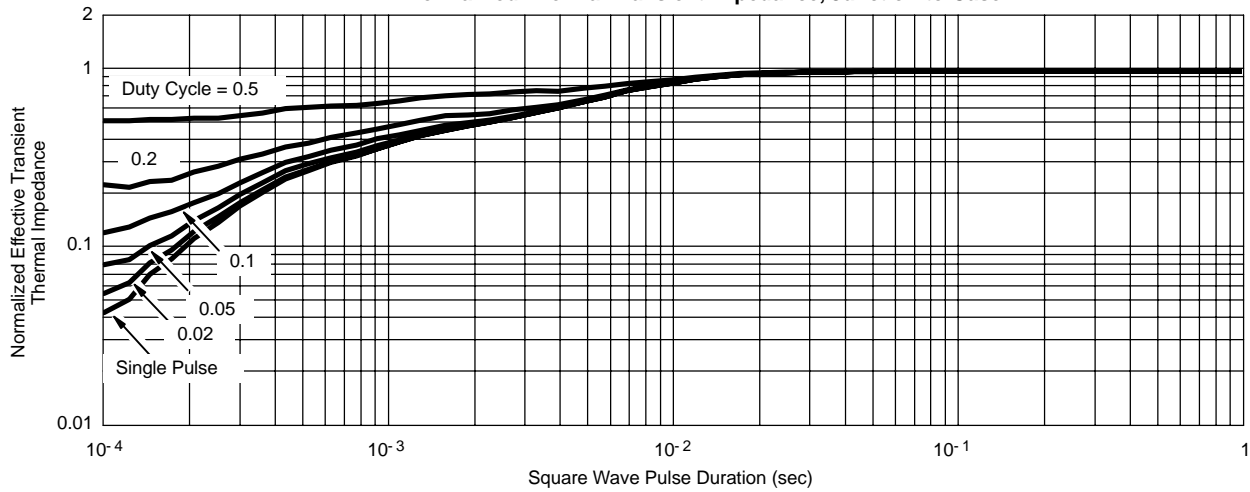
Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



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Datasheets for electronics components.