



N-Channel 20-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

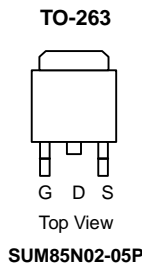
| $V_{(BR)DSS}$ (V) | $r_{DS(on)}$ (Ω) | I_D (A) ^a |
|-------------------|---------------------------|------------------------|
| 20 | 0.005 @ $V_{GS} = 10$ V | 85 |
| | 0.0083 @ $V_{GS} = 4.5$ V | 85 |

FEATURES

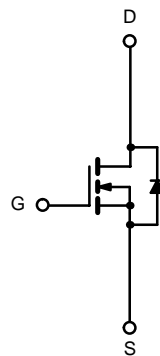
- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- Optimized for Low-Side Synchronous Rectifier

APPLICATIONS

- Synchronous Buck DC/DC Conversion
 - Desktop
 - Server



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} | 20 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | |
| Continuous Drain Current ($T_J = 175^\circ\text{C}$) | I_D | $T_C = 25^\circ\text{C}$ | 85 ^a |
| | | $T_C = 100^\circ\text{C}$ | 77 |
| Pulsed Drain Current | I_{DM} | 160 | A |
| Maximum Power Dissipation ^b | P_D | $T_C = 25^\circ\text{C}$ | 107 ^c |
| | | $T_A = 25^\circ\text{C}$ | 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 | $^\circ\text{C/W}$ |
| Junction-to-Case | R_{thJC} | 1.4 | |

Notes

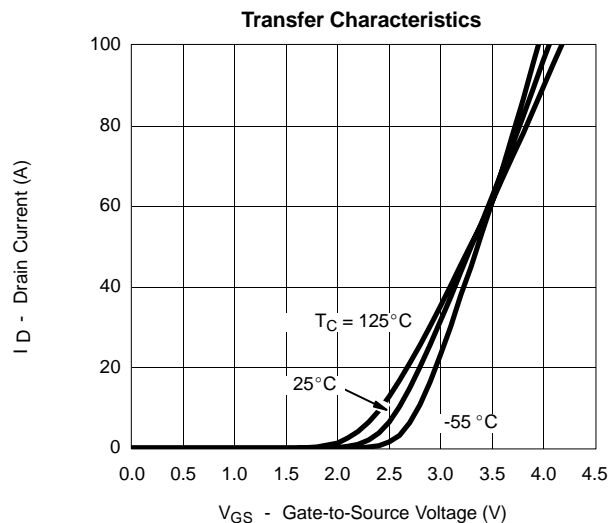
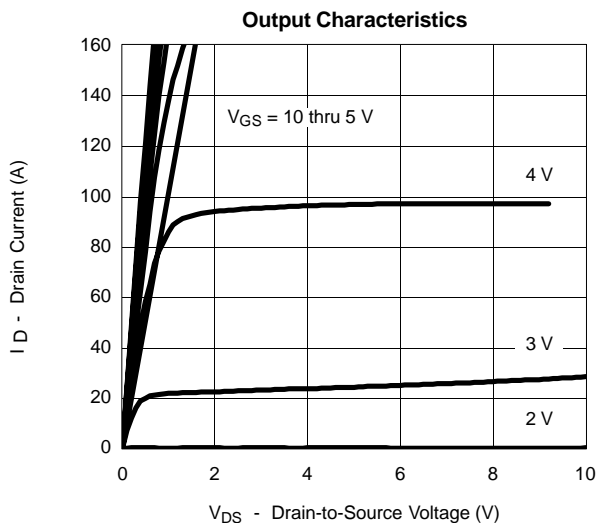
- Package limited.
- Duty cycle $\leq 1\%$.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

| SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED) | | | | | | |
|--|----------------------|--|-----|------------------|--------|------|
| Parameter | Symbol | Test Condition | Min | Typ ^a | Max | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0 V, I _D = 250 μA | 20 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250 μA | 0.8 | | 3.0 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±20 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 16 V, V _{GS} = 0 V | | | 1 | μA |
| | | V _{DS} = 16 V, V _{GS} = 0 V, T _J = 125 °C | | | 50 | |
| On-State Drain Current ^b | I _{D(on)} | V _{DS} = 5 V, V _{GS} = 10 V | 50 | | | A |
| Drain-Source On-State Resistance ^b | r _{DS(on)} | V _{GS} = 10 V, I _D = 20 A | | 0.0041 | 0.005 | Ω |
| | | V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C | | | 0.007 | |
| | | V _{GS} = 4.5 V, I _D = 20 A | | 0.0064 | 0.0083 | |
| Forward Transconductance ^b | g _{fs} | V _{DS} = 15 V, I _D = 20 A | 15 | | | S |
| Dynamic^a | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} = 0 V, V _{DS} = 10 V, f = 1 MHz | | 2550 | | pF |
| Output Capacitance | C _{oss} | | | 900 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 415 | | |
| Gate Resistance | R _G | | | 1.5 | | Ω |
| Total Gate Charge ^c | Q _g | V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 50 A | | 19 | 30 | nC |
| Gate-Source Charge ^c | Q _{gs} | | | 7.5 | | |
| Gate-Drain Charge ^c | Q _{gd} | | | 6.0 | | |
| Turn-On Delay Time ^c | t _{d(on)} | V _{DD} = 10 V, R _L = 0.2 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _G = 2.5 Ω | | 11 | 20 | ns |
| Rise Time ^c | t _r | | | 10 | 15 | |
| Turn-Off Delay Time ^c | t _{d(off)} | | | 24 | 35 | |
| Fall Time ^c | t _f | | | 9 | 15 | |
| | | | | | | |
| Source-Drain Diode Ratings and Characteristic (T_C = 25 °C) | | | | | | |
| Pulsed Current | I _{SM} | | | | 100 | A |
| Diode Forward Voltage ^b | V _{SD} | I _F = 50 A, V _{GS} = 0 V | | 1.2 | 1.5 | V |
| Source-Drain Reverse Recovery Time | t _{rr} | I _F = 50 A, di/dt = 100 A/μs | | 35 | 70 | ns |

Notes

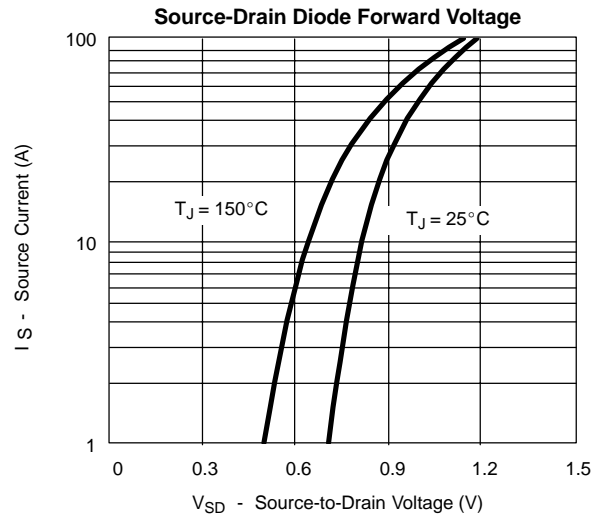
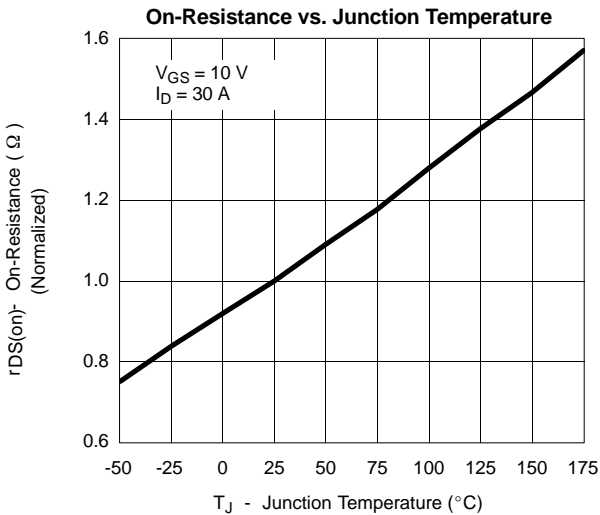
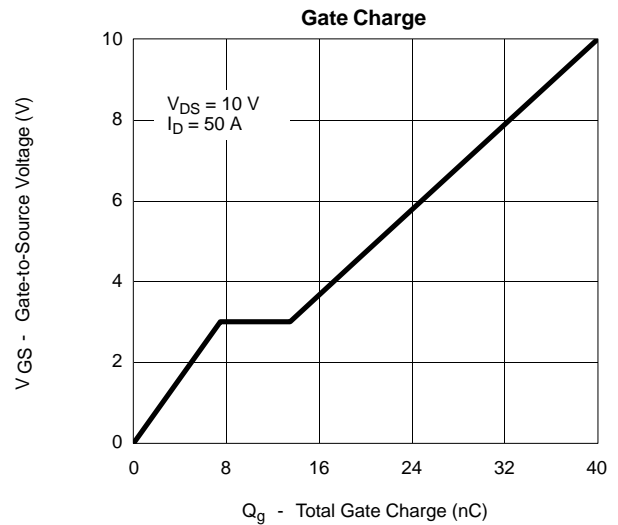
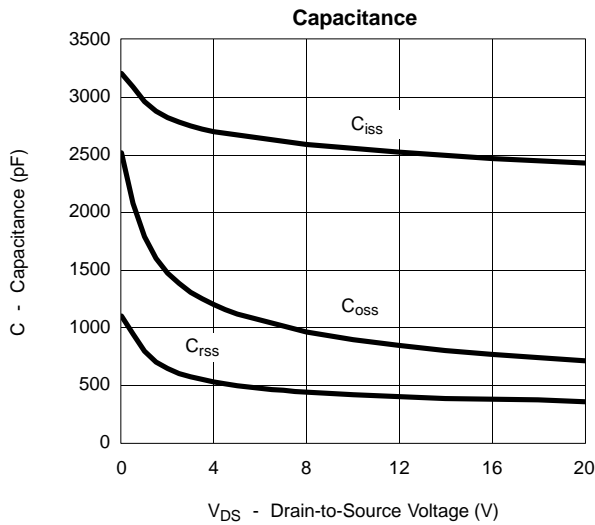
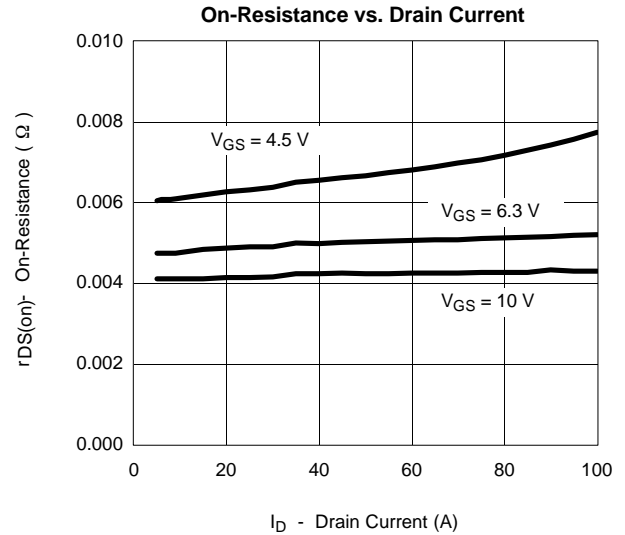
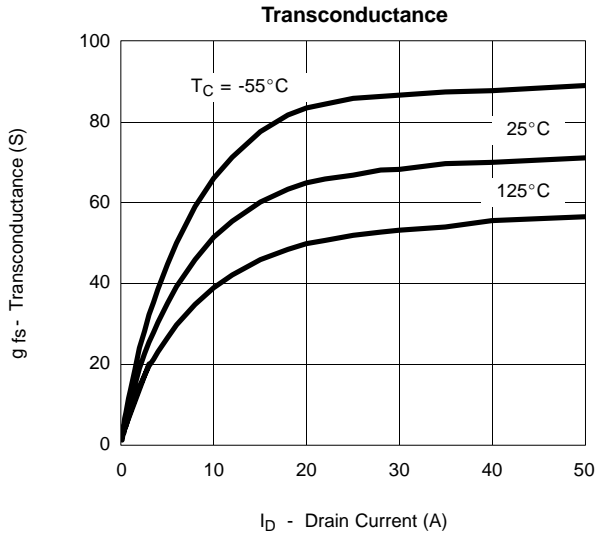
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



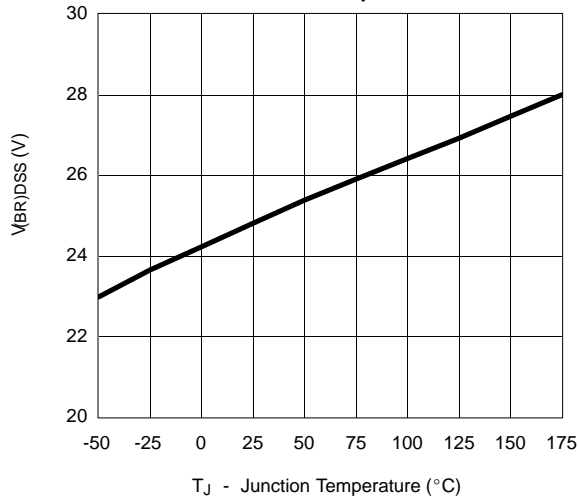


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

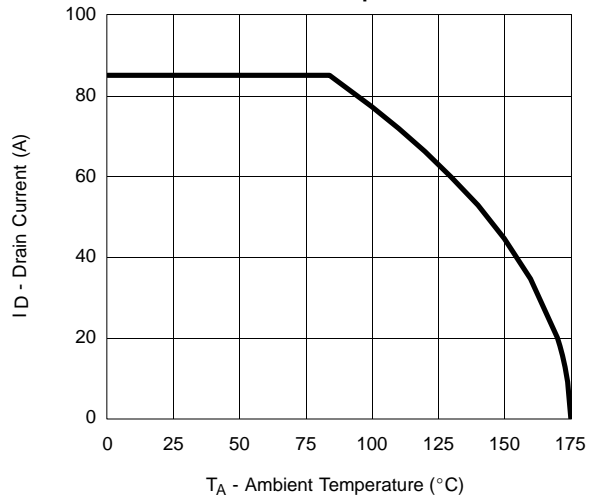


THERMAL RATINGS

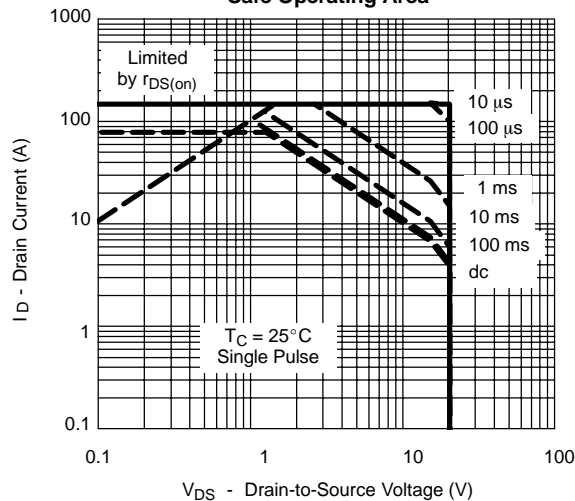
Drain Source Breakdown vs. Junction Temperature



Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

