



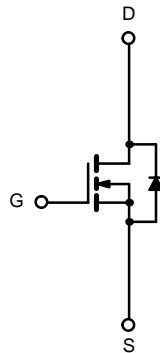
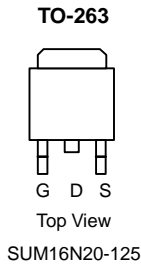
New Product

SUM16N20-125

Vishay Siliconix

N-Channel 200-V (D-S) 175 °C MOSFET

| PRODUCT SUMMARY | | |
|-------------------|---------------------------|-----------|
| $V_{(BR)DSS}$ (V) | $r_{DS(on)}$ (Ω) | I_D (A) |
| 200 | 0.125 @ $V_{GS} = 10$ V | 16 |
| | 0.150 @ $V_{GS} = 6$ V | 14.6 |



N-Channel MOSFET

FEATURES

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

APPLICATIONS

- Automotive
 - 42-V EPS and ABS
 - DC/DC Conversion
 - Motor Drives
- Isolated DC/DC converters
 - Primary-Side Switch
 - High Voltage Synchronous Rectifier

| 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} | ± 20 | | |
| Continuous Drain Current ($T_J = 175^\circ\text{C}$) | I_D | $T_C = 25^\circ\text{C}$ | 16 | A |
| | | $T_C = 125^\circ\text{C}$ | 9.2 | |
| Pulsed Drain Current | I_{DM} | 25 | | |
| Avalanche Current | I_{AR} | 10 | | |
| Repetitive Avalanche Energy ^a | E_{AR} | 5 | mJ | |
| Maximum Power Dissipation ^a | P_D | $T_C = 25^\circ\text{C}$ | 100 ^b | W |
| | | $T_A = 25^\circ\text{C}$ ^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 (PCB Mount) ^c | R_{thJA} | 40 | $^\circ\text{C/W}$ |
| Junction-to-Case (Drain) | R_{thJC} | 1.5 | |

Notes

- 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 | Max | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{DS} = 0 V, I _D = 250 μA | 200 | | | V |
| Gate-Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250 μA | 2 | | 4 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ± 20 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 160 V, V _{GS} = 0 V | | | 1 | μA |
| | | V _{DS} = 160 V, V _{GS} = 0 V, T _J = 125 °C | | | 50 | |
| | | V _{DS} = 160 V, V _{GS} = 0 V, T _J = 175 °C | | | 250 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} ≥ 5 V, V _{GS} = 10 V | 25 | | | A |
| Drain-Source On-State Resistance ^a | r _{DS(on)} | V _{GS} = 10 V, I _D = 15 A | | 0.100 | 0.125 | Ω |
| | | V _{GS} = 10 V, I _D = 15 A, T _J = 125 °C | | | 0.268 | |
| | | V _{GS} = 10 V, I _D = 15 A, T _J = 175 °C | | | 0.388 | |
| | | V _{GS} = 6 V, I _D = 10 A | | 0.100 | 0.150 | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = 15 V, I _D = 25 A | 10 | | | S |
| Dynamic^b | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz | | 1330 | | pF |
| Output Capacitance | C _{oss} | | | 140 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 58 | | |
| Total Gate Charge ^c | Q _g | V _{DS} = 100 V, V _{GS} = 10 V, I _D = 25 A | | 24 | 36 | nC |
| Gate-Source Charge ^c | Q _{gs} | | | 9 | | |
| Gate-Drain Charge ^c | Q _{gd} | | | 9 | | |
| Gate Resistance | R _G | | | 4.0 | | Ω |
| Turn-On Delay Time ^c | t _{d(on)} | V _{DD} = 100 V, R _L = 4 Ω I _D ≅ 25 A, V _{GEN} = 10 V, R _G = 2.5 Ω | | 10 | 15 | ns |
| Rise Time ^c | t _r | | | 175 | 260 | |
| Turn-Off Delay Time ^c | t _{d(off)} | | | 25 | 40 | |
| Fall Time ^c | t _f | | | 110 | 165 | |
| Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)^b | | | | | | |
| Continuous Current | I _S | | | | 16 | A |
| Pulsed Current | I _{SM} | | | | 25 | |
| Forward Voltage ^a | V _{SD} | I _F = 25 A, V _{GS} = 0 V | | 1.0 | 1.5 | V |
| Reverse Recovery Time | t _{rr} | I _F = 25 A, di/dt = 100 A/μs | | 105 | 160 | ns |
| Peak Reverse Recovery Current | I _{RM(REC)} | | | 7 | 11 | A |
| Reverse Recovery Charge | Q _{rr} | | | 0.37 | 0.88 | μC |

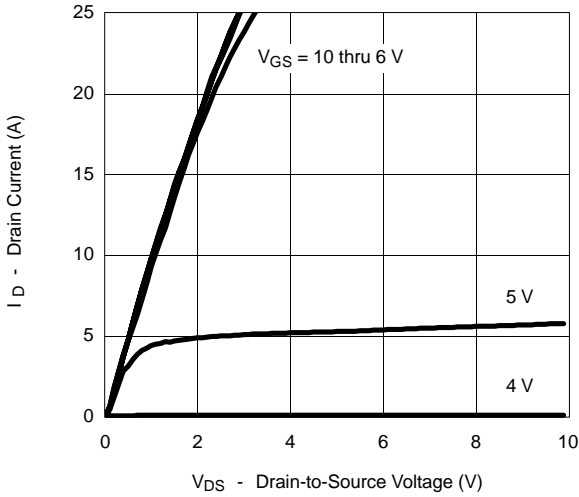
Notes

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

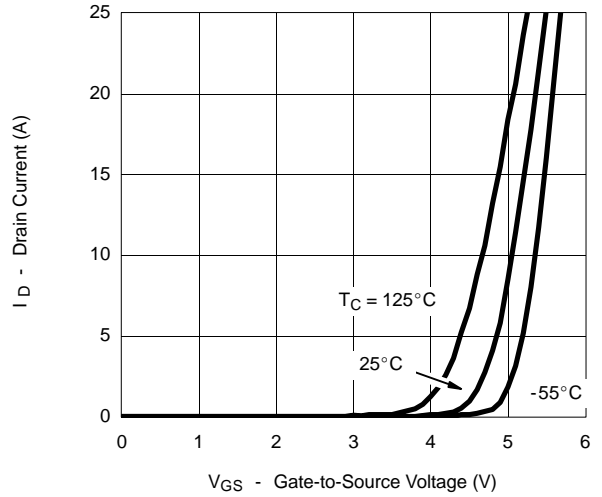


TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

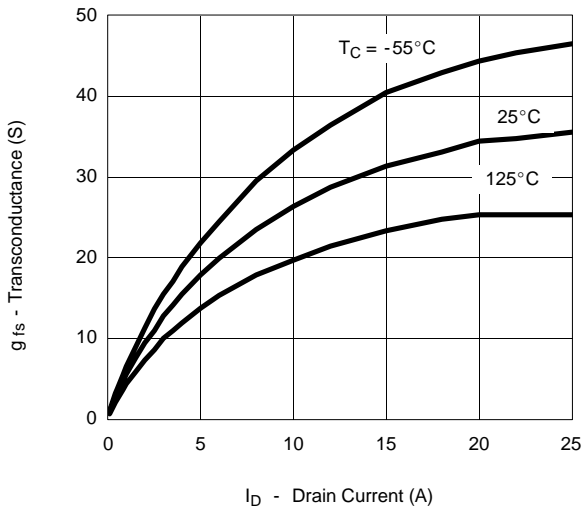
Output Characteristics



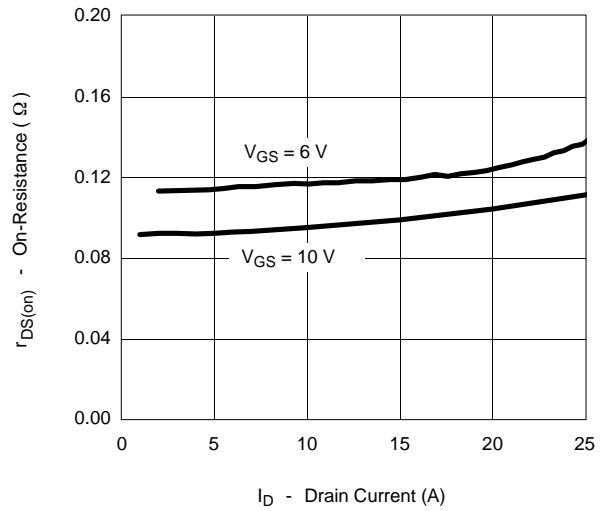
Transfer Characteristics



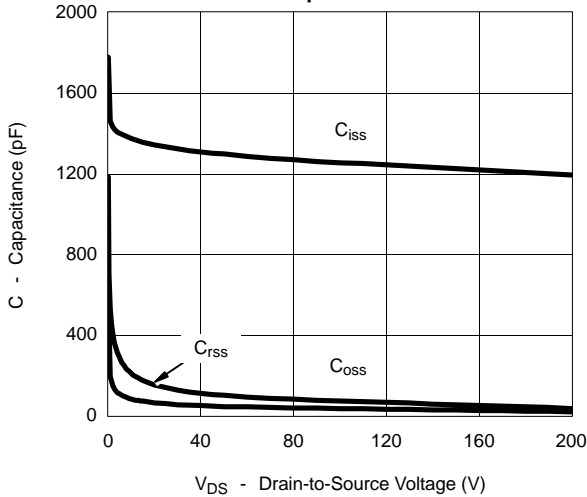
Transconductance



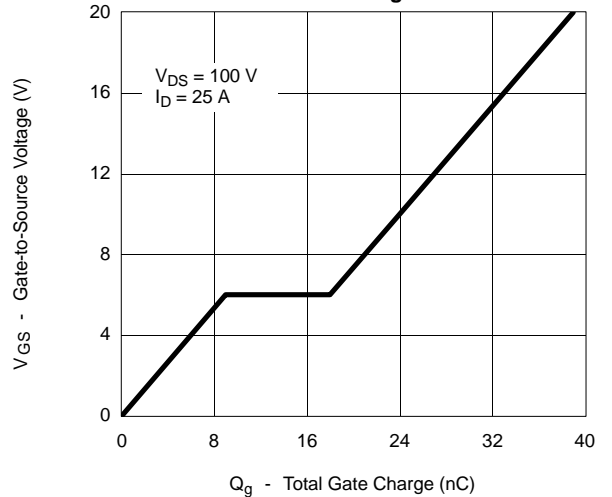
On-Resistance vs. Drain Current



Capacitance

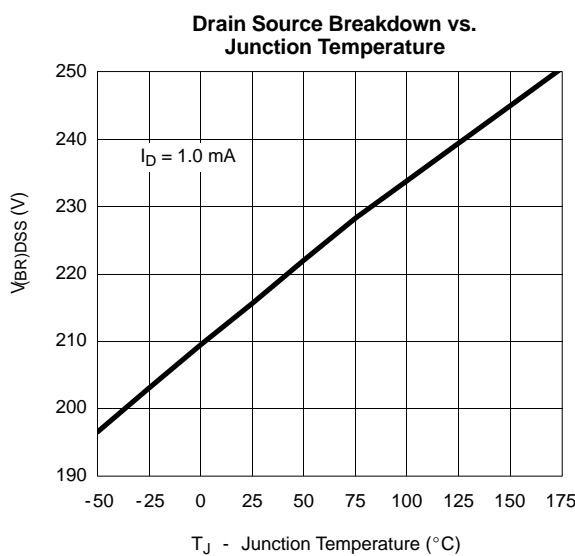
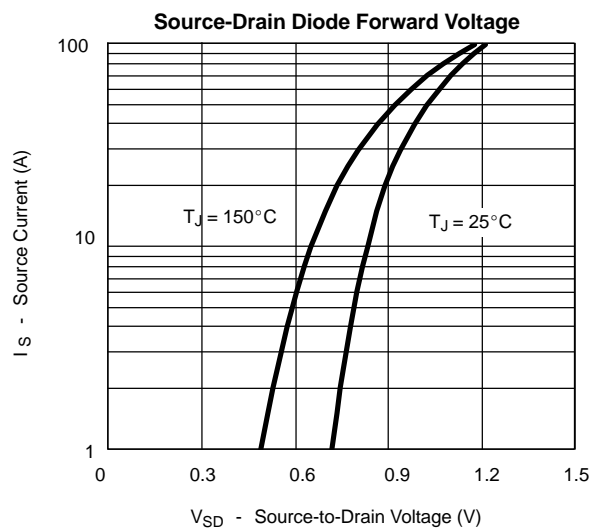
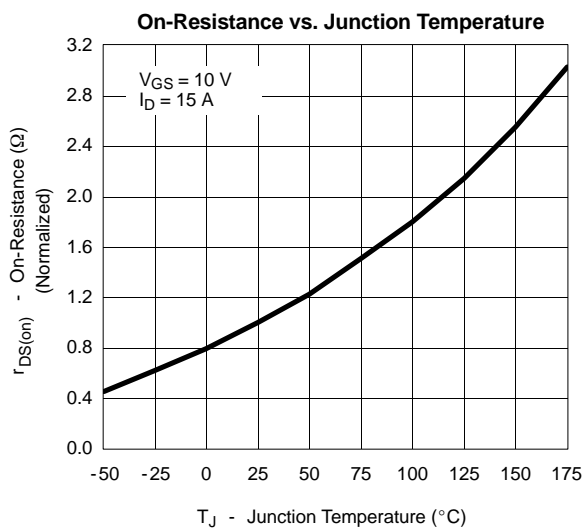


Gate Charge





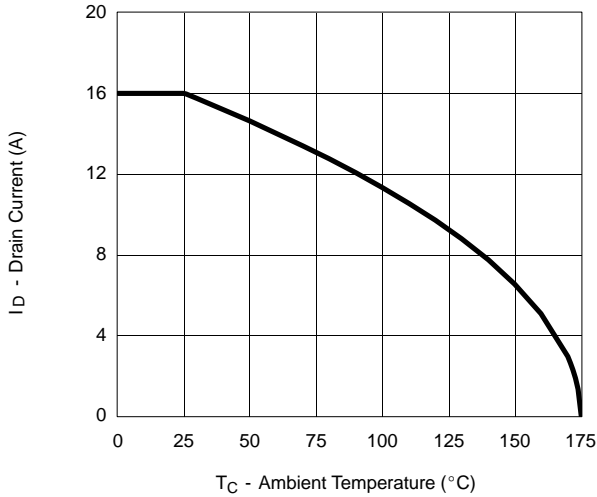
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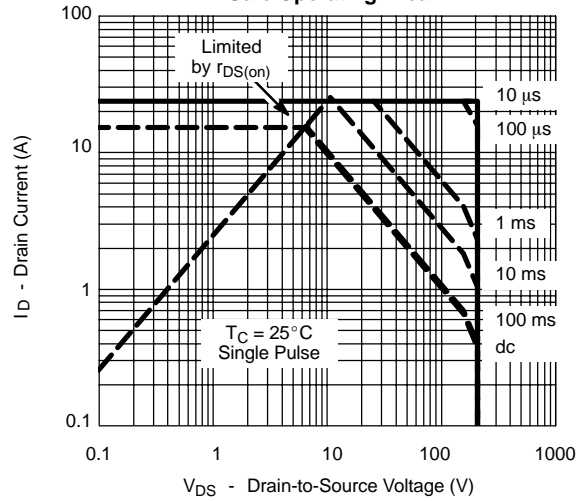


THERMAL RATINGS

Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

