



N-Channel 30-V (D-S), 175°C MOSFET

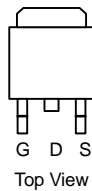
PRODUCT SUMMARY

| $V_{(BR)DSS}$ (V) | $r_{DS(on)}$ (Ω) | I_D (A) |
|-------------------|---------------------------|-----------------|
| 30 | 0.013 @ $V_{GS} = 10$ V | 45 ^a |
| | 0.02 @ $V_{GS} = 4.5$ V | 45 ^a |

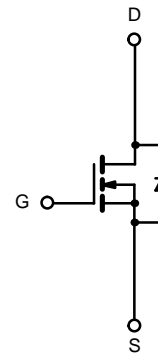
FEATURES

- TrenchFET® Power MOSFETS
- 175°C Junction Temperature

TO-263



SUB45N03-13L



N-Channel MOSFET

www.DataSheet4U.com

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

| Parameter | Symbol | Limit | Unit | |
|--|----------------------------|---------------------------|------------------|----|
| Drain-Source Voltage | V_{DS} | 30 | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | | |
| Continuous Drain Current ($T_J = 175^\circ\text{C}$) | I_D | $T_C = 25^\circ\text{C}$ | 45 ^a | A |
| | | $T_C = 125^\circ\text{C}$ | 34 ^a | |
| Pulsed Drain Current | I_{DM} | 100 | | |
| Avalanche Current | I_{AR} | 45 | | |
| Repetitive Avalanche Energy ^b | E_{AR} | L = 0.1 mH | 100 | mJ |
| Maximum Power Dissipation ^b | | $T_C = 25^\circ\text{C}$ | 88 ^c | W |
| | $T_A = 25^\circ\text{C}^d$ | 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 (Drain) | | | |

Notes

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

For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>

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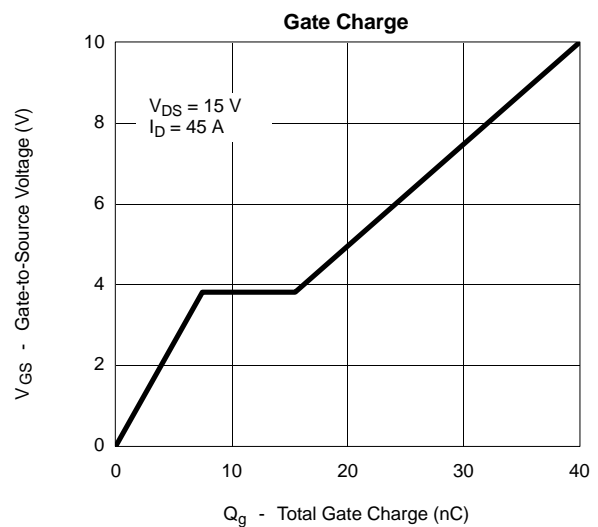
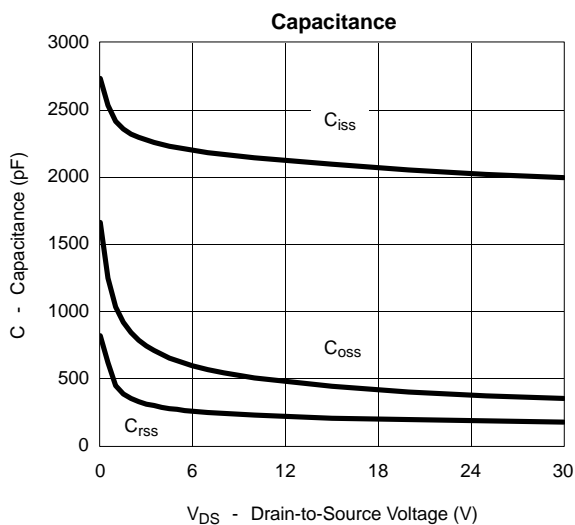
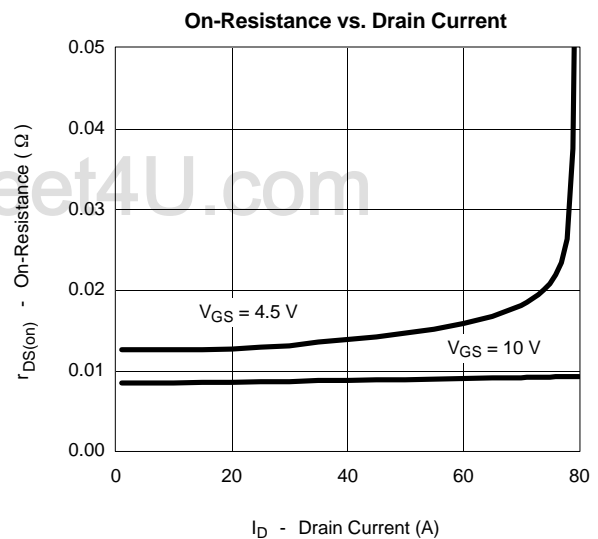
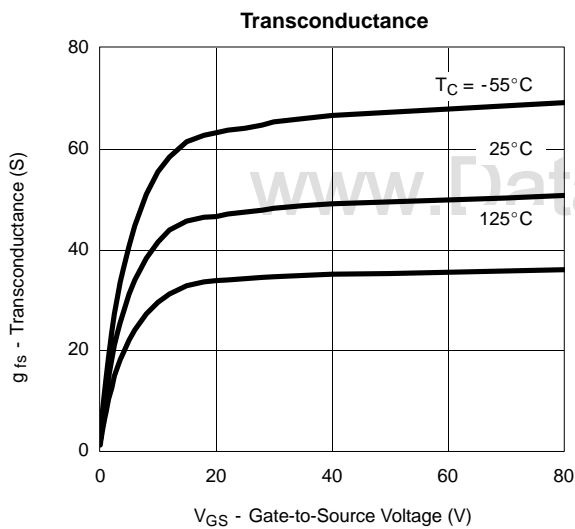
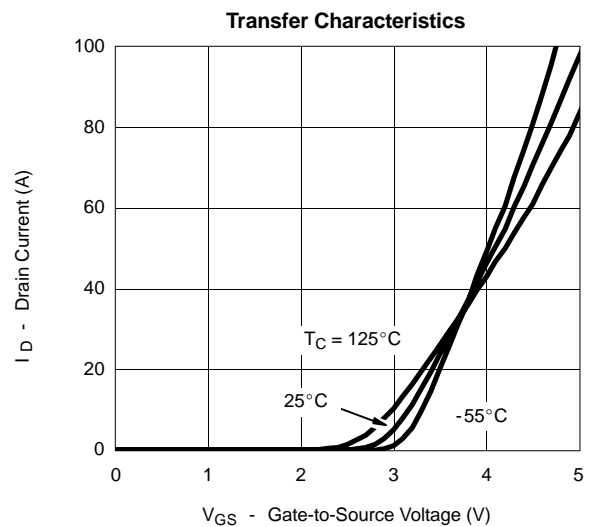
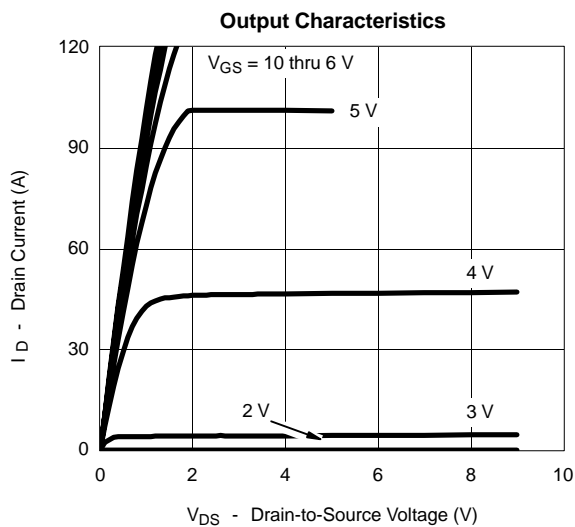


Vishay Siliconix

| MOSFET 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 _{GS} = 0 V, I _D = 250 μA | 30 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _{DS} = 250 μA | 1 | | 3 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ± 20 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 30 V, V _{GS} = 0 V | | | 1 | μA |
| | | V _{DS} = 30 V, V _{GS} = 0 V, T _J = 125 °C | | | 50 | |
| | | V _{DS} = 30 V, V _{GS} = 0 V, T _J = 175 °C | | | 150 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} = 5 V, V _{GS} = 10 V | 45 | | | A |
| Drain-Source On-State Resistance ^a | r _{DS(on)} | V _{GS} = 10 V, I _D = 45 A | | 0.009 | 0.013 | Ω |
| | | V _{GS} = 10 V, I _D = 45 A, T _J = 125 °C | | 0.013 | 0.02 | |
| | | V _{GS} = 10 V, I _D = 45 A, T _J = 175 °C | | 0.02 | 0.026 | |
| | | V _{GS} = 4.5 V, I _D = 20 A | | 0.0145 | 0.02 | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = 15 V, I _D = 45 A | 20 | | | S |
| Dynamic^b | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz | | 2000 | | pF |
| Output Capacitance | C _{oss} | | | 370 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 180 | | |
| Total Gate Charge ^c | Q _g | V _{DS} = 15 V, V _{GS} = 10 V, I _D = 45 A | | 40 | 70 | nC |
| Gate-Source Charge ^c | Q _{gs} | | | 7.5 | | |
| Gate-Drain Charge ^c | Q _{gd} | | | 8 | | |
| Turn-On Delay Time ^c | t _{d(on)} | V _{DD} = 15 V, R _L = 0.33 Ω I _D = 45 A, V _{GEN} = 10 V, R _G = 2.5 Ω | | 11 | 20 | ns |
| Rise Time ^c | t _r | | | 9 | 20 | |
| Turn-Off Delay Time ^c | t _{d(off)} | | | 38 | 70 | |
| Fall Time ^c | t _f | | | 11 | 20 | |
| Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)^b | | | | | | |
| Continuous Current | I _S | | | | 45 | A |
| Pulsed Current | I _{SM} | | | | 100 | |
| Forward Voltage ^a | V _{SD} | I _F = 45 A, V _{GS} = 0 V | | 1 | 1.3 | V |
| Reverse Recovery Time | t _{rr} | I _F = 45 A, di/dt = 100 A/μs | | 35 | 70 | ns |
| Peak Reverse Recovery Current | I _{RM(REC)} | | | 1.7 | | A |
| Reverse Recovery Charge | Q _{rr} | | | 0.03 | | 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)


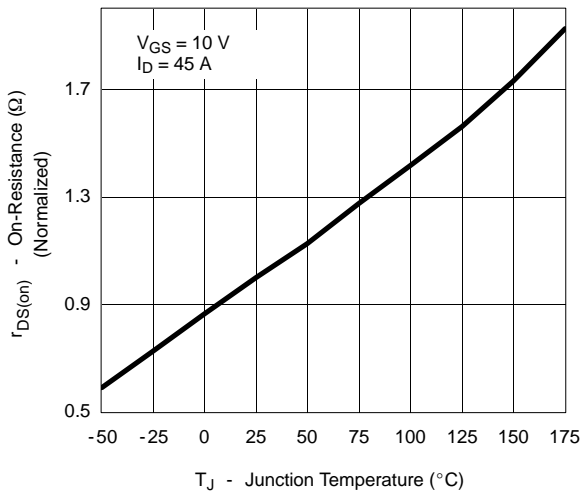
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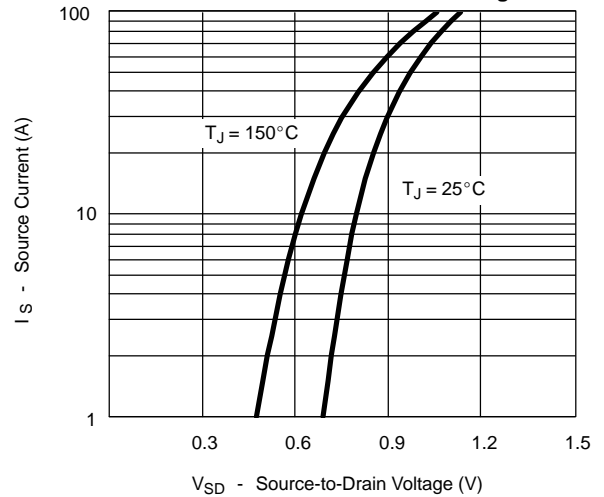
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TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

On-Resistance vs. Junction Temperature

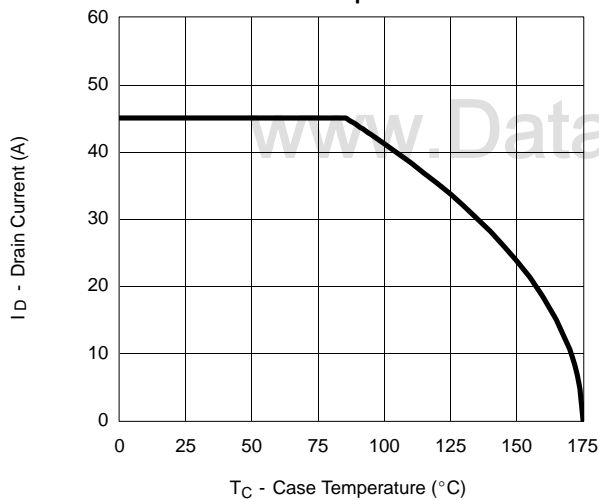


Source-Drain Diode Forward Voltage

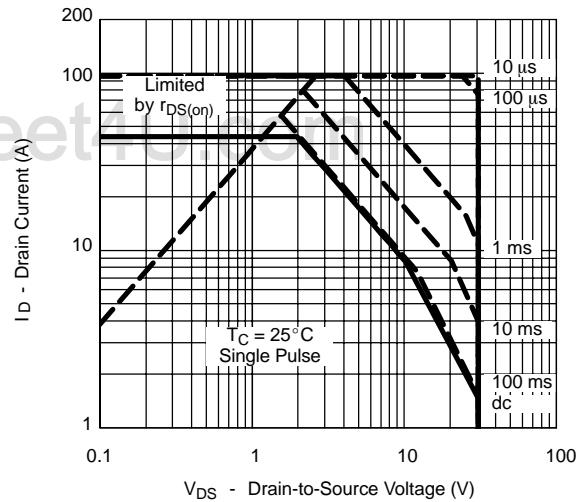


THERMAL RATINGS

Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

