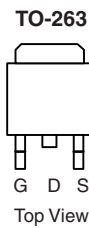
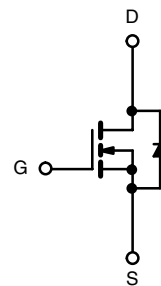


N-Channel 100-V (D-S) 175 °C MOSFET

| PRODUCT SUMMARY | | |
|---------------------|----------------------------------|--------------------|
| V _{DS} (V) | r _{DS(on)} (Ω) | I _D (A) |
| 100 | 0.024 at V _{GS} = 10 V | 47 |
| | 0.027 at V _{GS} = 4.5 V | 44 |

FEATURES

- TrenchFET[®] Power MOSFET
- 175 °C Maximum Junction Temperature
- 100 % R_g Tested


RoHS
COMPLIANT

Ordering Information: SUM47N10-24L-E3 (Lead (Pb)-free)


N-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted | | | |
|---|-----------------------------------|-------------------------|-------------------|
| Parameter | Symbol | Limit | Unit |
| Drain-Source Voltage | V _{DS} | 100 | V |
| Gate-Source Voltage | V _{GS} | ± 20 | |
| Continuous Drain Current (T _J = 175 °C) ^b | I _D | T _C = 25 °C | 47 |
| | | T _C = 125 °C | 27 |
| Pulsed Drain Current | I _{DM} | 70 | A |
| Continuous Source Current (Diode Conduction) | I _S | 47 | |
| Single Pulse Avalanche Current | I _{AS} | 40 | |
| Single Pulse Avalanche Energy (Duty Cycle ≤ 1 %) | E _{AS} | 80 | mJ |
| Maximum Power Dissipation | P _D | T _C = 25 °C | 136 ^b |
| | | T _A = 25 °C | 3.75 ^a |
| Operating Junction and Storage Temperature Range | T _J , T _{stg} | - 55 to 175 | °C |

| THERMAL RESISTANCE RATINGS | | | |
|----------------------------|-------------------|-----------|------|
| Parameter | Symbol | Maximum | Unit |
| Junction-to-Ambient | R _{thJA} | PCB Mount | 40 |
| | | Free Air | 62.5 |
| Junction-to-Case | R _{thJC} | 1.1 | °C/W |

Notes:

a. Surface Mounted on 1" x 1" FR4 Board.

b. See SOA curve for voltage derating.



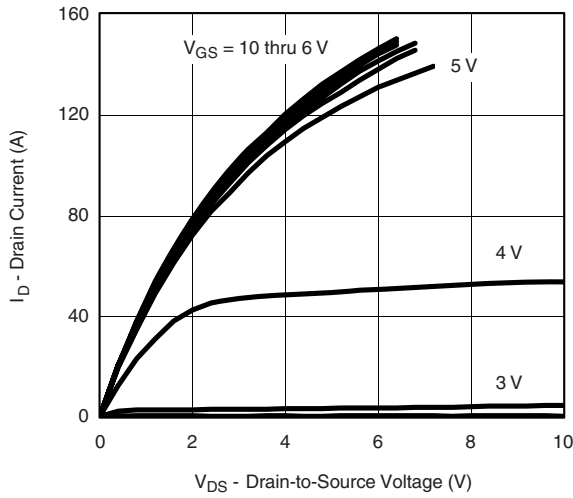
| SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted | | | | | | |
|--|---------------|---|------|-------------------|-----------|---------------|
| Parameter | Symbol | Test Conditions | Min. | Typ. ^a | Max. | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$ | 100 | | | V |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$ | 1.0 | | 3.0 | |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$ | | | 1 | μA |
| | | $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$ | | | 50 | |
| | | $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$ | | | 250 | |
| On-State Drain Current ^b | $I_{D(on)}$ | $V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$ | 70 | | | A |
| Drain-Source On-State Resistance ^b | $r_{DS(on)}$ | $V_{GS} = 10\text{ V}, I_D = 40\text{ A}$ | | 0.019 | 0.024 | Ω |
| | | $V_{GS} = 10\text{ V}, I_D = 40\text{ A}, T_J = 125\text{ }^\circ\text{C}$ | | | 0.048 | |
| | | $V_{GS} = 10\text{ V}, I_D = 40\text{ A}, T_J = 175\text{ }^\circ\text{C}$ | | | 0.060 | |
| | | $V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$ | | 0.021 | 0.027 | |
| Forward Transconductance ^b | g_{fs} | $V_{DS} = 15\text{ V}, I_D = 40\text{ A}$ | | 70 | | S |
| Dynamic^a | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, F = 1\text{ MHz}$ | | 2400 | | μF |
| Output Capacitance | C_{oss} | | | 290 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 120 | | |
| Total Gate Charge ^c | Q_g | $V_{DS} = 50\text{ V}, V_{GS} = 10\text{ V}, I_D = 40\text{ A}$ | | 40 | 60 | nC |
| Gate-Source Charge ^c | Q_{gs} | | | 11 | | |
| Gate-Drain Charge ^c | Q_{gd} | | | 9 | | |
| Gate Resistance | R_g | $f = 1\text{ MHz}$ | 1 | 2.2 | 3.5 | Ω |
| Turn-On Delay Time ^c | $t_{d(on)}$ | $V_{DD} = 50\text{ V}, R_L = 1.25\text{ }\Omega$ $I_D \cong 47\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$ | | 8 | 13 | ns |
| Rise Time ^c | t_r | | | 40 | 60 | |
| Turn-Off Delay Time ^c | $t_{d(off)}$ | | | 15 | 25 | |
| Fall Time ^c | t_f | | | 80 | 120 | |
| Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}$ | | | | | | |
| Pulsed Current | I_{SM} | | | | 70 | A |
| Diode Forward Voltage ^b | V_{SD} | $I_F = 40\text{ A}, V_{GS} = 0\text{ V}$ | | 1.0 | 1.5 | V |
| Source-Drain Reverse Recovery Time | t_{rr} | $I_F = 47\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$ | | 75 | 120 | ns |

Notes:

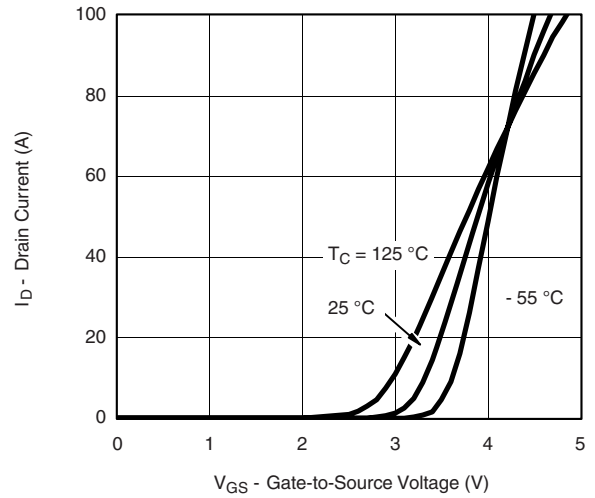
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

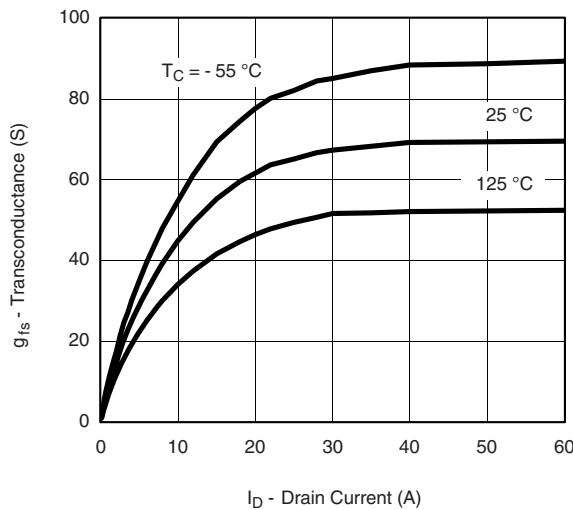
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



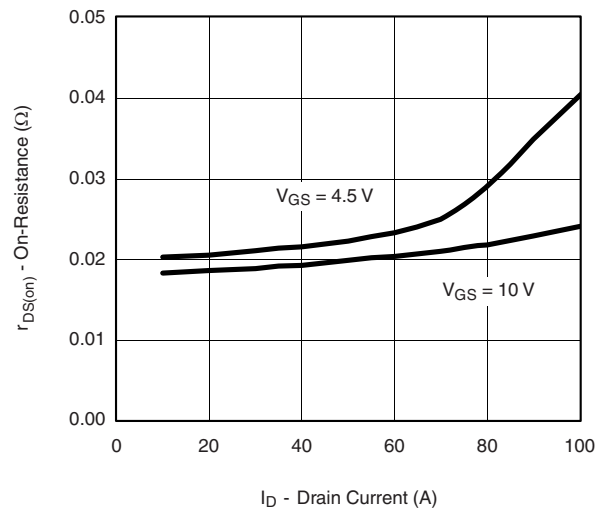
Output Characteristics



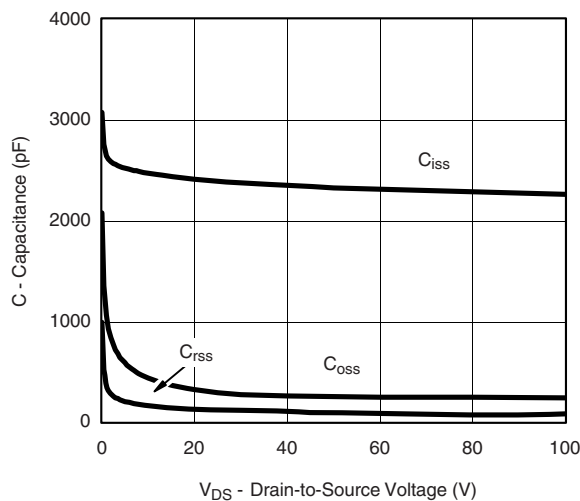
Transfer Characteristics



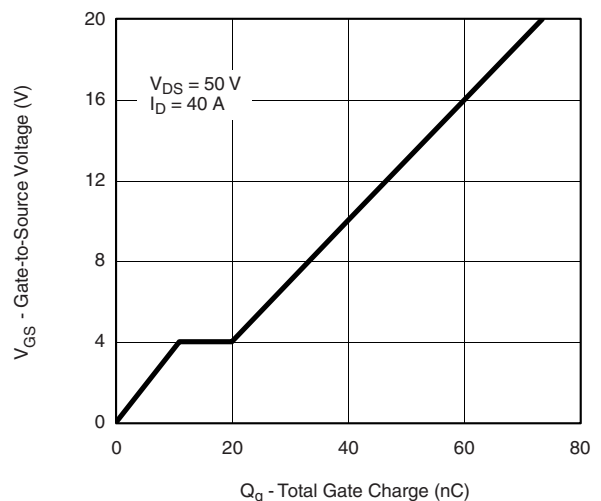
Transconductance



On-Resistance vs. Drain Current

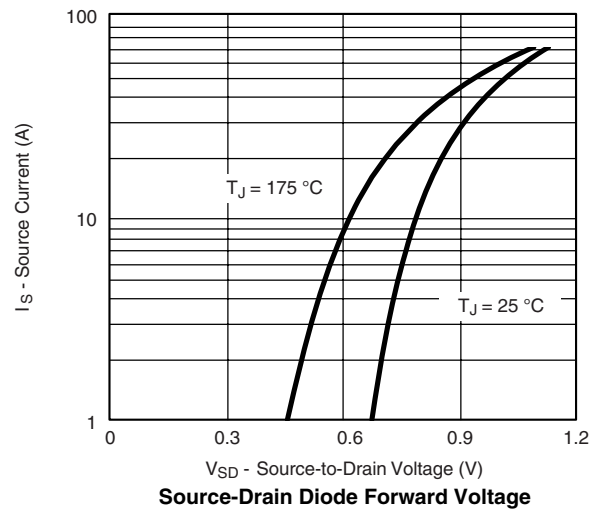
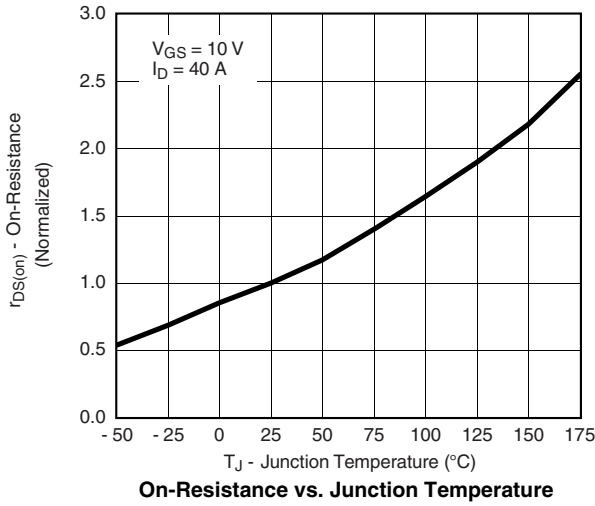


Capacitance

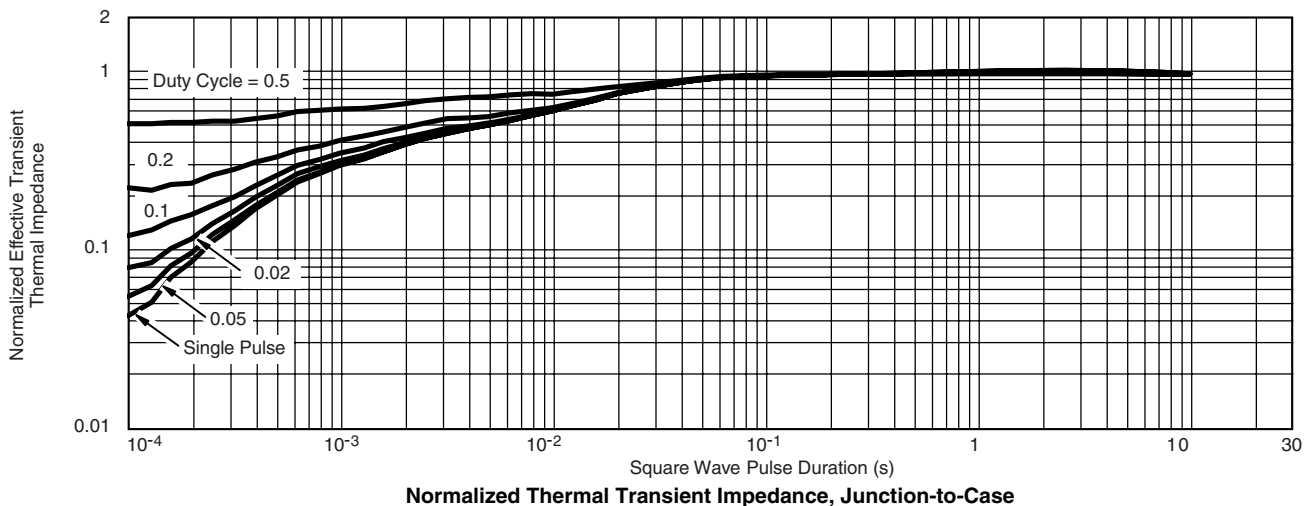
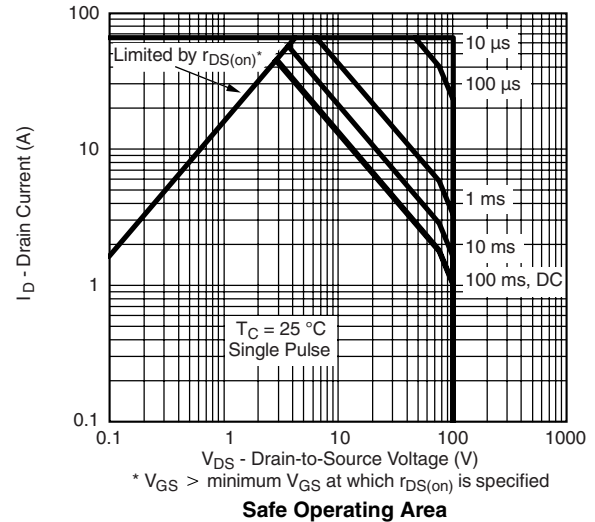
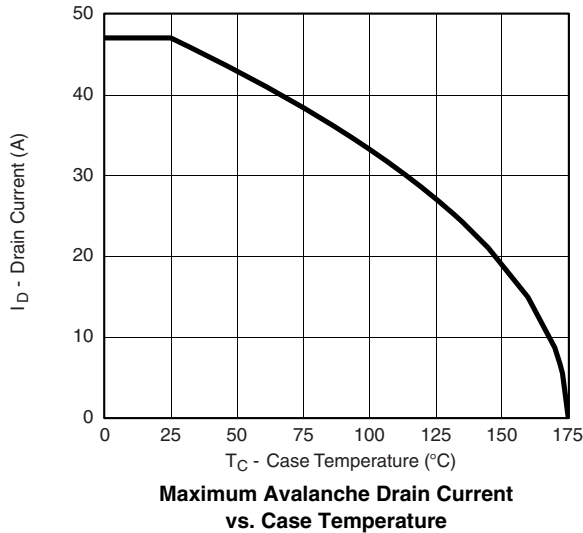


Gate Charge

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



THERMAL RATINGS



Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?72827>.



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