



New Product

SUR70N02-04P

Vishay Siliconix

N-Channel 20-V (D-S) 175°C MOSFET

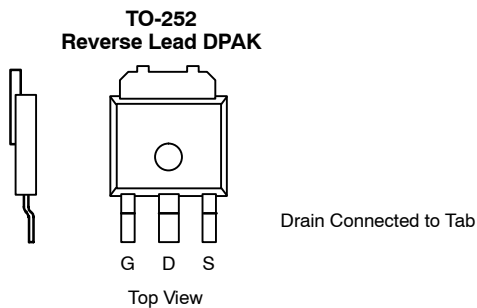
| PRODUCT SUMMARY | | |
|---------------------|----------------------------------|---------------------------------|
| V _{DS} (V) | r _{DS(on)} (Ω) | I _D (A) ^a |
| 20 | 0.0037 @ V _{GS} = 10 V | 37 |
| | 0.0061 @ V _{GS} = 4.5 V | 29 |

FEATURES

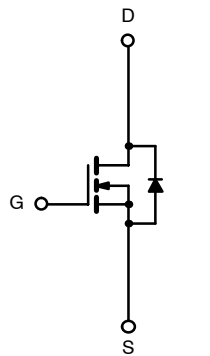
- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- PWM Optimized for High Efficiency
- 100% R_g Tested

APPLICATIONS

- Synchronous Buck Converter
 - Low Side
- Synchronous Rectifier
 - Secondary Rectifier



Ordering Information:
 SUR70N02-04P—E3
 SUR70N02-04P-T4—E3 (alternate tape orientation)



| ABSOLUTE MAXIMUM RATINGS (T _A = 25°C UNLESS OTHERWISE NOTED) | | | | |
|---|-----------------------|-----------------------------------|------------------|------|
| Parameter | | Symbol | Limit | Unit |
| Drain-Source Voltage | | V _{DS} | 20 | V |
| Gate-Source Voltage | | V _{GS} | ±20 | |
| Continuous Drain Current ^a | T _A = 25°C | I _D | 37 ^a | A |
| | T _C = 25°C | | 70 ^b | |
| Pulsed Drain Current | | I _{DM} | 100 | |
| Continuous Source Current (Diode Conduction) ^a | | I _S | 37 | |
| Single Pulse Avalanche Current | L = 0.1 mH | I _{AS} | 30 | mJ |
| Single Pulse Avalanche Energy | | E _{AS} | 45 | |
| Maximum Power Dissipation | T _A = 25°C | P _D | 8.3 ^a | W |
| | T _C = 25°C | | 93 | |
| Operating Junction and Storage Temperature Range | | T _J , T _{stg} | -55 to 175 | °C |

| THERMAL RESISTANCE RATINGS | | | | | |
|--|--------------|-------------------|---------|---------|------|
| Parameter | | Symbol | Typical | Maximum | Unit |
| Maximum Junction-to-Ambient ^a | t ≤ 10 sec | R _{thJA} | 15 | 18 | °C/W |
| | Steady State | | 40 | 50 | |
| Maximum Junction-to-Case | | R _{thJC} | 1.3 | 1.6 | |

Notes

- a. Surface Mounted on FR4 Board, t ≤ 10 sec.
 b. Limited by package

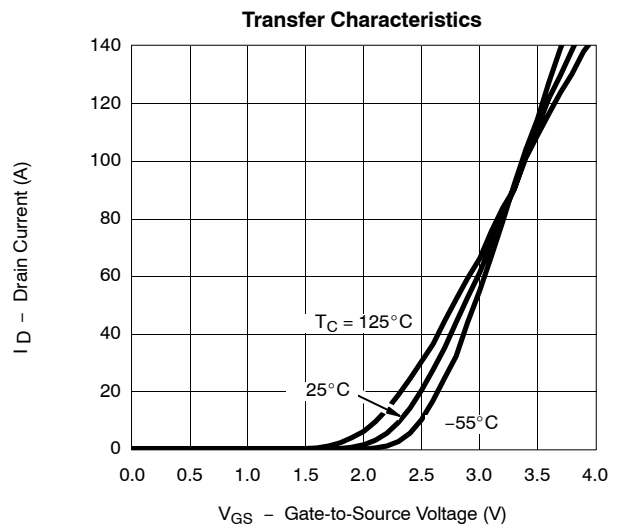
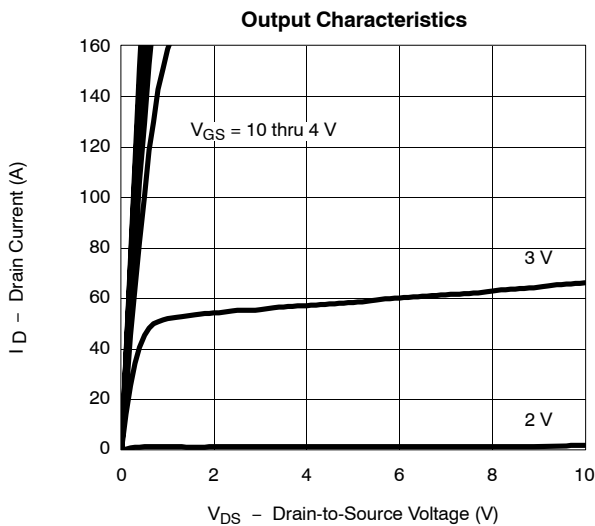


| SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED) | | | | | | |
|--|----------------------|--|-----|------------------|--------|------|
| Parameter | Symbol | Test Condition | Min | Typ ^a | Max | Unit |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0 V, I _D = 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} = 20 V, V _{GS} = 0 V | | | 1 | μA |
| | | V _{DS} = 20 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 | | 0.0028 | 0.0037 | Ω |
| | | V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C | | | 0.0052 | |
| | | V _{GS} = 4.5 V, I _D = 20 A | | 0.0047 | 0.0061 | |
| 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 | | 4500 | | pF |
| Output Capacitance | C _{oss} | | | 1520 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 800 | | |
| Gate Resistance | R _g | | 0.5 | 1.1 | 1.8 | Ω |
| Total Gate Charge ^c | Q _g | V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 50 A | | 34 | 153 | nC |
| Gate-Source Charge ^c | Q _{gs} | | | 11 | | |
| Gate-Drain Charge ^c | Q _{gd} | | | 10 | | |
| 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 | | 15 | 25 | ns |
| Rise Time ^c | t _r | | | 11 | 20 | |
| Turn-Off Delay Time ^c | t _{d(off)} | | | 35 | 55 | |
| Fall Time ^c | t _f | | | 15 | 25 | |
| | | | | | | |
| 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 | | 45 | 90 | ns |

Notes

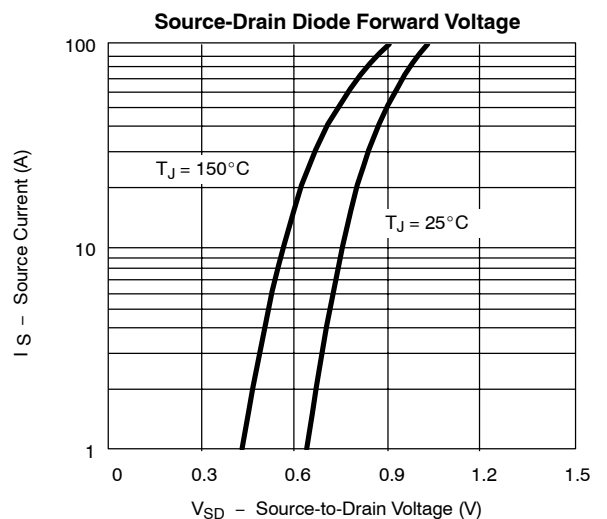
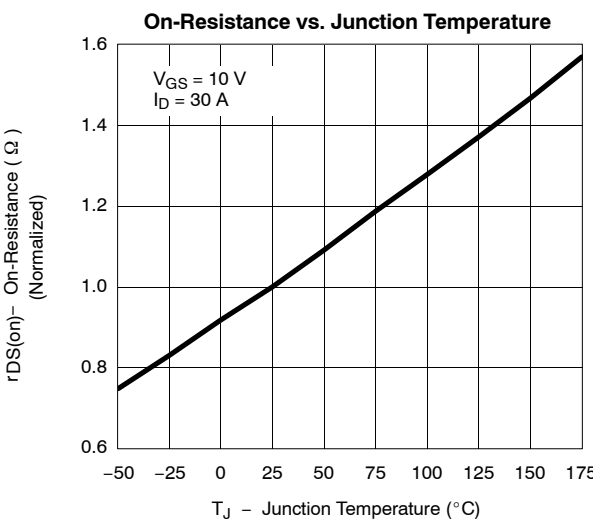
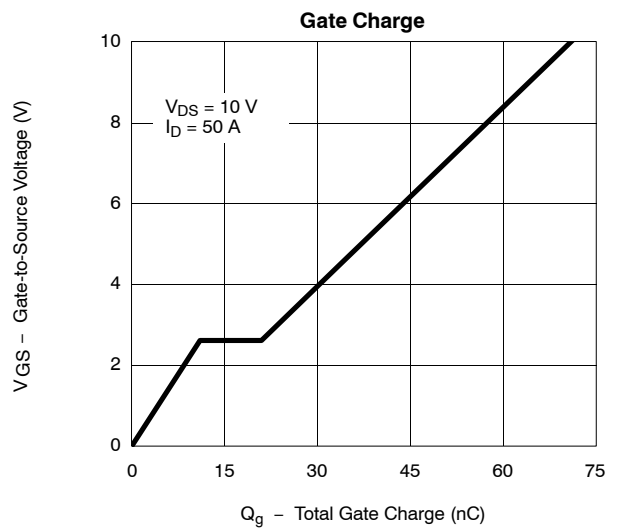
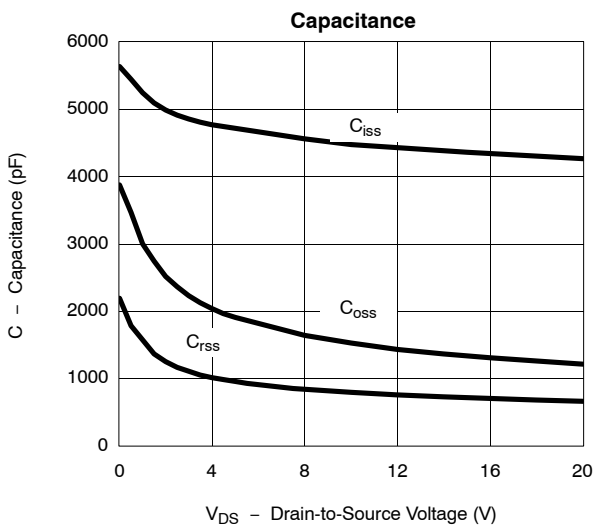
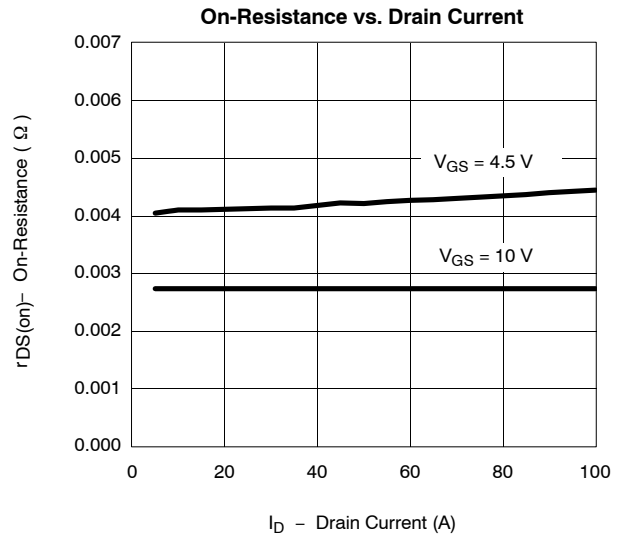
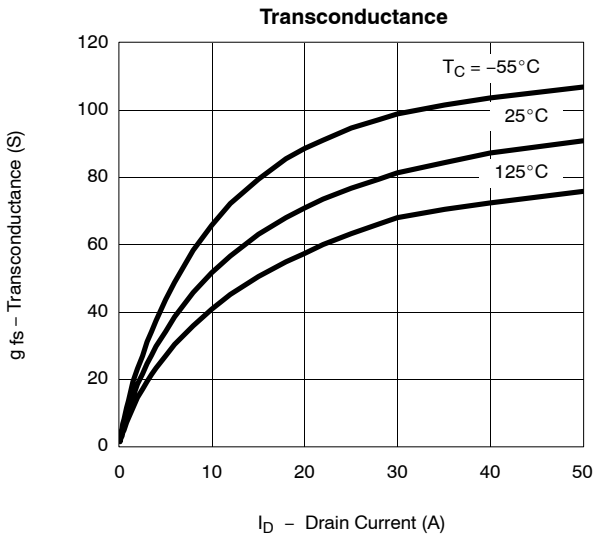
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)





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THERMAL RATINGS

