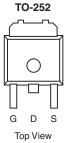


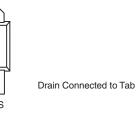
SUD50P04-13L

Vishay Siliconix

P-Channel 40-V (D-S) 175 °C MOSFET

| PRODUCT SUMMARY | | | | |
|---------------------|------------------------------------|--------------------|--|--|
| V _{DS} (V) | r _{DS(on)} (Ω) | I _D (A) | | |
| - 40 | 0.013 at V _{GS} = - 10 V | - 60 ^a | | |
| | 0.022 at V _{GS} = - 4.5 V | - 48 | | |

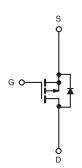




FEATURES

- TrenchFET[®] Power MOSFET
- 175 °C Junction Temperature





Ordering Information: SUD50P04-13L-E3 (Lead (Pb)-free)

P-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS $T_A = 2$ | 25 °C, unless othe | rwise noted | | | |
|--|-------------------------|-----------------------------------|-------------------|------|--|
| Parameter | | Symbol | Limit | Unit | |
| Drain-Source Voltage | | V _{DS} | - 40 | V | |
| Gate-Source Voltage | | V _{GS} | ± 20 | | |
| | T _C = 25 °C | 1 | - 60 ^c | | |
| Continuous Drain Current ^b | T _C = 100 °C | I _D | - 43 | | |
| Pulsed Drain Current | | I _{DM} | - 100 | | |
| Continuous Source Current (Diode Conduction) | | ۱ _S | - 60 ^c | | |
| Avalanche Current | | I _{AS} | - 40 | | |
| Avalanche Energy, | L = 0.1 mH | E _{AS} | 80 | mJ | |
| Maximum Power Dissipation ^b | T _C = 25 °C | Р | 93.7 ^b | w | |
| | T _A = 25 °C | P _D | 3 ^a | VV | |
| Operating Junction and Storage Temperature Range | - | T _J , T _{stg} | - 55 to 175 | °C | |

| THERMAL RESISTANCE RATINGS | | | | | |
|--|--------------|---------------------|---------|---------|------|
| Parameter | | Symbol | Typical | Maximum | Unit |
| Maximum lumation to Ambianta | t ≤ 10 sec | - R _{thJA} | 15 | 18 | °C/W |
| Maximum Junction-to-Ambient ^a | Steady State | | 40 | 50 | |
| Maximum Junction-to-Case (Drain) | | R _{thJC} | 1.3 | 1.8 | |

Notes:

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

b. See SOA curve for voltage derating.

b. Calculated based on maximum allowed Junction Temperature. Package limitation current is 50 A.

SUD50P04-13L

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| Parameter | Symbol | 1bol Test Conditions | | Тур | Max | Unit | |
|---|----------------------|---|-------|--------|-------|-------|--|
| Static | • | · · · · · · · · · · · · · · · · · · · | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | $V_{GS} = 0 V, I_{D} = -250 \mu A$ | - 40 | | | v | |
| Gate-Source Threshold Voltage | V _{GS(th)} | $V_{DS} = V_{GS}, I_{D} = -250 \ \mu A$ | - 1.0 | | - 3.0 | v | |
| Gate-Source Leakage | I _{GSS} | $V_{DS} = 0 V, V_{GS} = \pm 20 V$ | | | ± 100 | nA | |
| Zero Gate Voltage Drain Current | I _{DSS} | $V_{DS} = -40 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$ | - 1 | | - 1 | | |
| | | V_{DS} = - 40 V, V_{GS} = 0 V, T_{J} = 125 °C | | | - 50 | μΑ | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} = - 5 V, V _{GS} = - 10 V | - 50 | | | Α | |
| Drain-Source On-State Resistance ^a | | V _{GS} = - 10 V, I _D = - 30 A | | 0.0105 | 0.013 | 020 Ω | |
| | r _{DS(on)} | V_{GS} = - 10 V, I _D = - 30 A, T _J = 125 °C | | | 0.020 | | |
| | | V _{GS} = - 4.5 V, I _D = - 20 A | | 0.017 | 0.022 | | |
| Forward Transconductance ^a | 9 _{fs} | V _{DS} = - 15 V, I _D = - 30 A | 15 | | | S | |
| Dynamic ^b | | | | | | | |
| Input Capacitance | C _{iss} | | | 3120 | | pF | |
| Output Capacitance | C _{oss} | V_{DS} = - 25 V, V_{GS} = 0 V, f = 1 MHz | | 440 | | | |
| Reverse Transfer Capacitance | C _{rss} | | | 320 | | | |
| Gate Resistance | Rg | f = 1 MHz | | 4.3 | | Ω | |
| Total Gate Charge ^c | Qg | | | 63 | 95 | | |
| Gate-Source Charge ^c | Q _{gs} | $V_{DS} = -20$ V, $V_{GS} = -10$ V, $I_{D} = -50$ A | | 13 | | nC | |
| Gate-Drain Charge ^c | Q _{gd} | | | 16 | | | |
| Turn-On Delay Time ^c | t _{d(on)} | | | 15 | 25 | | |
| Rise Time ^c | t _r | V_{DD} = - 20 V, R _L = 0.4 Ω I _D \cong - 50 A, V _{GEN} = - 10 V, R _g = 2.5 Ω | | 18 | 30 | ns | |
| Turn-Off Delay Time ^c | t _{d(off)} | | | 60 | 90 | | |
| Fall Time ^c | t _f | | | 47 | 70 | | |
| Drain-Source Body Diode Characteristic | | 1 | | 1 | I I | | |
| Pulse Current | I _{SM} | | | | - 100 | | |
| Forward Voltage ^a | V _{SD} | I _F = - 50 A, V _{GS} = 0 V | | - 1.0 | - 1.5 | V | |
| Source-Drain Reverse Recovery Time | t _{rr} | I _F = - 50 A, di/dT = 100 A/μs | | 36 | 55 | ns | |

Notes:

a. Pulse test; pulse width \leq 300 $\mu s,$ duty cycle \leq 2 %.

b. Guaranteed by design, not subject to production testing.

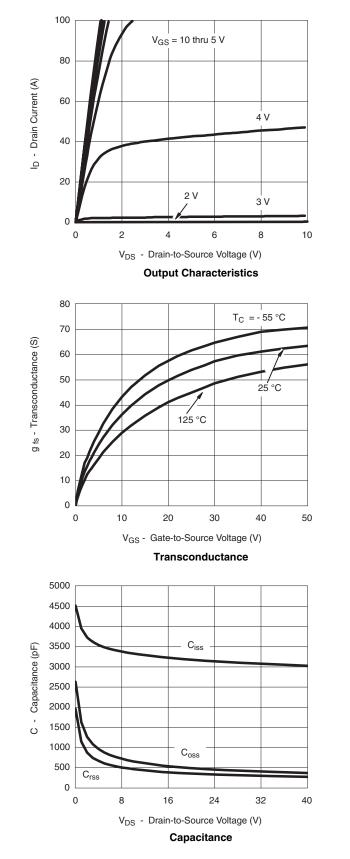
c. Independent of operating temperature.

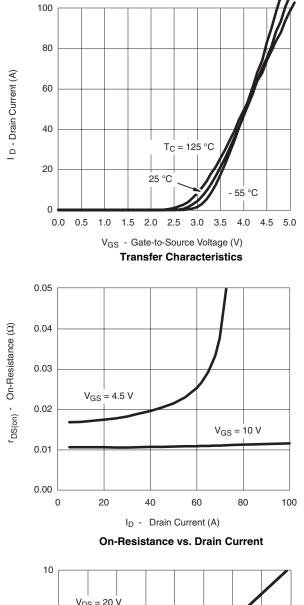
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

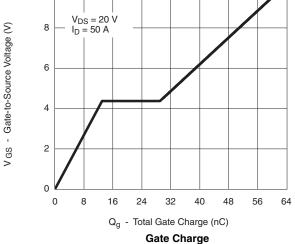


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TYPICAL CHARACTERISTICS 25 °C unless noted







Document Number: 73009 S-71660-Rev. B, 06-Aug-07

100

. Т_.ј = 150 °С

Is - Source Current (A)

10

1

0

0.3

0.6

V_{SD} - Source-to-Drain Voltage (V)

Source-Drain Diode Forward Voltage

0.9

SUD50P04-13L

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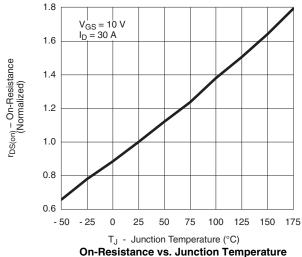
T_J = 25 ⁶C

1.2

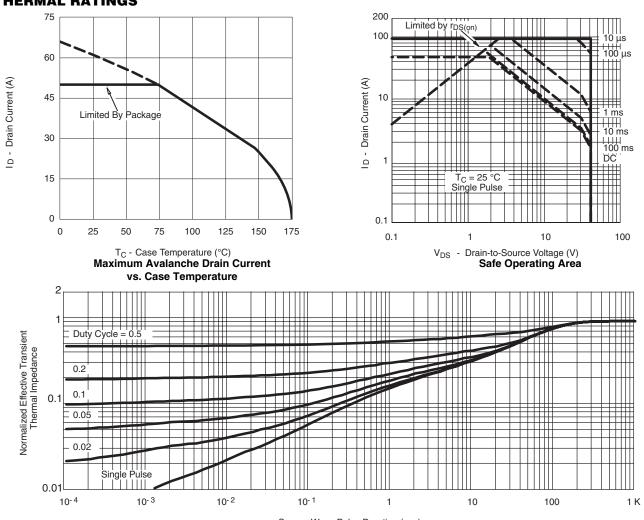
1.5

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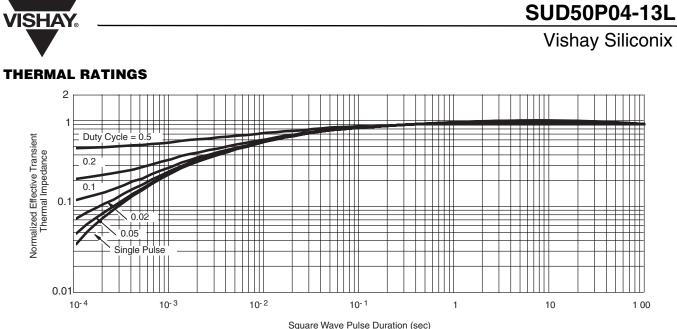
TYPICAL CHARACTERISTICS 25 °C unless noted



THERMAL RATINGS



Sauare Wave Pulse Duration (sec) Normalized Thermal Transient Impedance, Junction-to-Ambient



Square Wave Pulse Duration (sec) Normalized Thermal Transient Impedance, Junction-to-Case

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