

HUF75332P3-VB Datasheet N-Channel 60-V (D-S) MOSFET

| PRODUCT | ODUCT SUMMARY | | | |
|---------------------|----------------------------------|---------------------------------|--|--|
| V _{DS} (V) | $R_{DS(on)}(\Omega)$ | I _D (A) ^a | | |
| 60 | 0.011 at V _{GS} = 10 V | 60 | | |
| 00 | 0.013 at V _{GS} = 4.5 V | 50 | | |

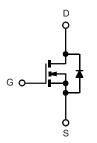
FEATURES

- 175 °C Junction Temperature
- · Trench Power MOSFET
- Material categorization:









N-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS (T _C = 2 | 25 °C, unless other | wise noted) | | | |
|---|-------------------------|-----------------------------------|--------------------------------------|------|--|
| Parameter | | Symbol | Limit | Unit | |
| Gate-Source Voltage | | V _{GS} | ± 20 | V | |
| Continuous Dusin Coment /T = 475 °C\h | T _C = 25 °C | | 60 | | |
| Continuous Drain Current (T _J = 175 °C) ^b | T _C = 100 °C | l _D | 50 ^a | | |
| Pulsed Drain Current | | I _{DM} | 200 | A | |
| Continuous Source Current (Diode Conduction) | | I _S | 50ª | | |
| Avalanche Current | | I _{AS} | 50 | | |
| Single Avalanche Energy (Duty Cycle ≤ 1 %) | L = 0.1 mH | E _{AS} | 125 | mJ | |
| Mayimum Dayar Dissinction | T _C = 25 °C | Pn | 136 | W | |
| Maximum Power Dissipation | T _A = 25 °C | | 3 ^b , 8.3 ^{b, c} |] vv | |
| Operating Junction and Storage Temperature Range | | T _J , T _{stg} | - 55 to 175 | °C | |

| THERMAL RESISTANCE RATINGS | | | | | |
|--|--------------|-------------------|---------|---------|--------|
| Parameter | | Symbol | Typical | Maximum | Unit |
| Marrian una lun atian ta Analianta | t ≤ 10 sec | P | 15 | 18 | |
| Maximum Junction-to-Ambient ^a | Steady State | R_{thJA} | 40 | 50 | 0 °C/W |
| Maximum Junction-to-Case | | R _{thJC} | 0.85 | 1.1 | |

Notes:

- a. Package limited.
- b. Surface mounted on 1" x 1" FR4 board.
- $c.\ t \leq 10\ s.$



| Parameter | Symbol | Test Conditions | Min. | Typ.a | Max. | Unit |
|---|---------------------|--|------|-------|-------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{DS} | $V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$ | 60 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | $V_{DS} = V_{GS}, I_{D} = 250 \mu A$ | 1 | | 3 | V |
| Gate-Body Leakage | I _{GSS} | $V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$ | | | ± 100 | nA |
| | | V _{DS} = 60 V, V _{GS} = 0 V | | | 1 | μA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 60 V, V _{GS} = 0 V, T _J = 125 °C | | | 50 | |
| | | V _{DS} = 60 V, V _{GS} = 0 V, T _J = 175 °C | | | 250 | |
| On-State Drain Current ^b | I _{D(on)} | V _{DS} = 5 V, V _{GS} = 10 V | 60 | | | Α |
| | | V _{GS} = 10 V, I _D = 20 A | | 0.011 | | |
| | D | V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C | | 0.014 | | Ω |
| Drain-Source On-State Resistance ^b | R _{DS(on)} | V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C | | 0.018 | | |
| | | V _{GS} = 4.5 V, I _D = 15 A | | 0.013 | | |
| Forward Transconductance ^b | 9 _{fs} | V _{DS} = 15 V, I _D = 20 A | | 60 | | S |
| Dynamic | | | | | | |
| Input Capacitance | C _{iss} | | | 4200 | | |
| Output Capacitance | C _{oss} | $V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$ | | 570 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 325 | | |
| Total Gate Charge ^c | Qg | | | 47 | | |
| Gate-Source Charge ^c | Q _{gs} | $V_{DS} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 50 \text{ A}$ | | 10 | | nC |
| Gate-Drain Charge ^c | Q_{gd} | | | 12 | | |
| Turn-On Delay Time ^c | t _{d(on)} | | | 10 | 20 | |
| Rise Time ^c | t _r | $V_{DD} = 30 \text{ V}, R_{L} = 0.6 \Omega$ | | 15 | 25 | no |
| Turn-Off Delay Time ^c | t _{d(off)} | $I_D \cong 50 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 2.5 \Omega$ | | 35 | 50 | - ns |
| Fall Time ^c | t _f | | | 20 | 30 | |
| Source-Drain Diode Ratings and Cha | aracteristics (| T _C = 25 °C) | | | | |
| Pulsed Current | I _{SM} | | | | 60 | Α |
| Diode Forward Voltage | V _{SD} | I _F = 20 A, V _{GS} = 0 V | | 1 | 1.5 | V |
| Reverse Recovery Time | t _{rr} | I _F = 20 A, di/dt = 100 A/μs | | 45 | 100 | ns |

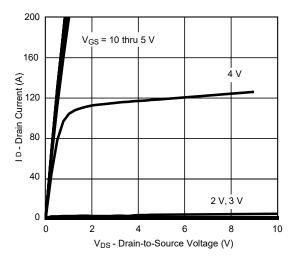
Notes:

- a. For design aid only; not subject to production testing.
- b. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.
- c. Independent of operating temperature.

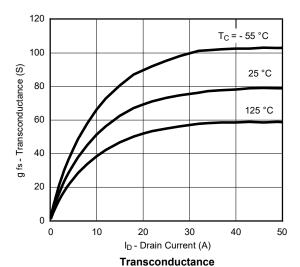
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



TYPICAL CHARACTERISTICS (25 °C unless noted)



Output Characteristics



2- Capacitance (pF) 3000 2400 1800 1300 1200 $\mathsf{C}_{\mathsf{oss}}$ 600 $\mathsf{C}_{\mathsf{rss}}$

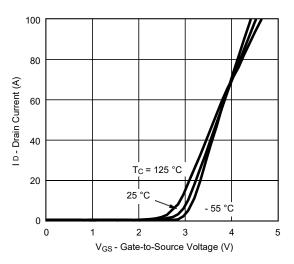
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C_{iss}

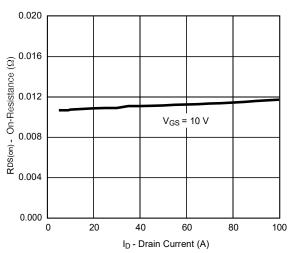
V_{DS} - Drain-to-Source Voltage (V) Capacitance

30

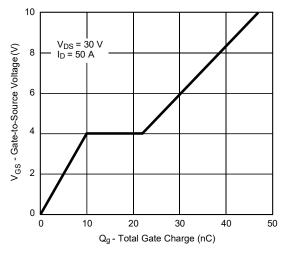
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Transfer Characteristics



On-Resistance vs. Drain Current



Gate Charge

4800 4200

3600

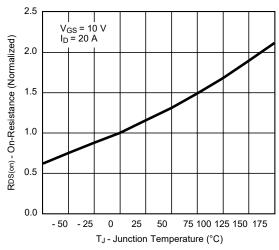
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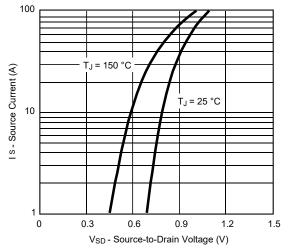
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TYPICAL CHARACTERISTICS (25 °C unless noted)



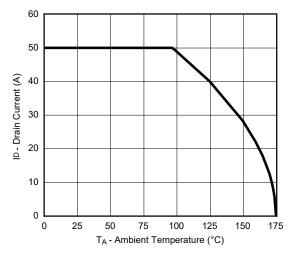
On-Resistance vs. Junction Temperature

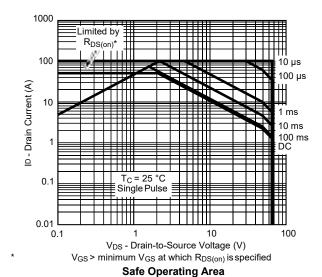


Source-Drain Diode Forward Voltage

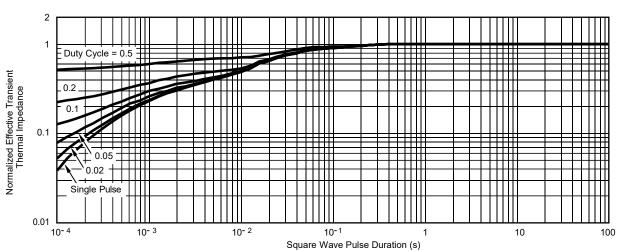


THERMAL RATINGS





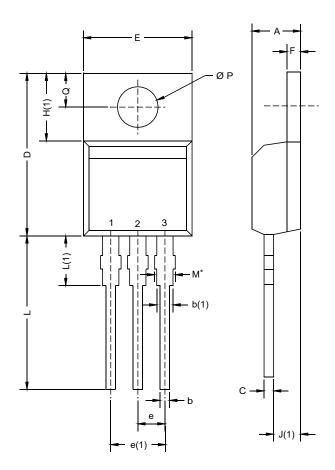
Maximum Drain Current vs. Ambient Temperature



Normalized Thermal Transient Impedance, Junction-to-Case



TO-220AB



| DIM. | MILLIN | IETERS | INCHES | | |
|------|--------|--------|--------|-------|--|
| | MIN. | MAX. | MIN. | MAX. | |
| Α | 4.24 | 4.65 | 0.167 | 0.183 | |
| b | 0.69 | 1.02 | 0.027 | 0.040 | |
| b(1) | 1.14 | 1.78 | 0.045 | 0.070 | |
| С | 0.36 | 0.61 | 0.014 | 0.024 | |
| D | 14.33 | 15.85 | 0.564 | 0.624 | |
| E | 9.96 | 10.52 | 0.392 | 0.414 | |
| е | 2.41 | 2.67 | 0.095 | 0.105 | |
| e(1) | 4.88 | 5.28 | 0.192 | 0.208 | |
| F | 1.14 | 1.40 | 0.045 | 0.055 | |
| H(1) | 6.10 | 6.71 | 0.240 | 0.264 | |
| J(1) | 2.41 | 2.92 | 0.095 | 0.115 | |
| L | 13.36 | 14.40 | 0.526 | 0.567 | |
| L(1) | 3.33 | 4.04 | 0.131 | 0.159 | |
| ØР | 3.53 | 3.94 | 0.139 | 0.155 | |
| Q | 2.54 | 3.00 | 0.100 | 0.118 | |

Note

• M* = 0.052 inches to 0.064 inches (dimension including protrusion), heatsink hole for HVM



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