

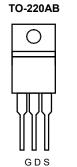
## UTT120N06-VB Datasheet N-Channel 60 V (D-S) MOSFET

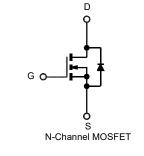
| PRODUCT SUMMARY                            |     |     |
|--|-----|-----|
| V <sub>DS</sub>                            | 60  | V   |
| R <sub>DS(on)</sub> V <sub>GS</sub> = 10 V | 5   | mΩ  |
| ID   | 120 | А   |
| Configuration                              | Sin | gle |

#### FEATURES

- 175 °C Junction Temperature
- TrenchFET<sup>®</sup> Power MOSFET
- Material categorization:







| ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 2                    | 5 °C, unless other      | vise noted)                       |                                      |      |  |
|---|-------------------------|-----------------------------------|--------------------------------------|------|--|
| Parameter   |                         | Symbol                            | Limit                                | Unit |  |
| Gate-Source Voltage   |                         | V <sub>GS</sub>                   | ± 20                                 | V    |  |
| Continuous Drain Current /T - 175 °Ch                           | T <sub>C</sub> = 25 °C  | I <sub>D</sub>                    | 120                                  |      |  |
| Continuous Drain Current (T <sub>J</sub> = 175 °C) <sup>b</sup> | T <sub>C</sub> = 100 °C |                                   | 90                                   |      |  |
| Pulsed Drain Current  |                         | I <sub>DM</sub>                   | 350                                  | A    |  |
| Continuous Source Current (Diode Conduction)                    |                         | I <sub>S</sub>                    | 70 <sup>a</sup>                      | 1    |  |
| Avalanche Current   |                         | I <sub>AS</sub>                   | 50                                   |      |  |
| Single Avalanche Energy (Duty Cycle $\leq$ 1 %) L = 0.1 mH      |                         | E <sub>AS</sub>                   | 125                                  | mJ   |  |
| Maximum Davier Diagin ation                                     | T <sub>C</sub> = 25 °C  | Pn -                              | 136                                  | - w  |  |
| Maximum Power Dissipation                                       | T <sub>A</sub> = 25 °C  |                                   | 3 <sup>b</sup> , 8.3 <sup>b, c</sup> |      |  |
| Operating Junction and Storage Temperature Range                |                         | T <sub>J</sub> , T <sub>stg</sub> | - 55 to 175                          | °C   |  |

| THERMAL RESISTANCE RATINGS               |              |                   |         |         |      |
|--|--------------|-------------------|---------|---------|------|
| Parameter                                |              | Symbol            | Typical | Maximum | Unit |
| Manimum lum attack to Analytica 12       | t ≤ 10 sec   | R <sub>thJA</sub> | 15      | 18      | °C/W |
| Maximum Junction-to-Ambient <sup>a</sup> | Steady State |                   | 40      | 50      |      |
| Maximum Junction-to-Case                 |              | R <sub>thJC</sub> | 0.85    | 1.1     |      |

Notes:

a. Package limited.b. Surface mounted on 1" x 1" FR4 board.

c. t ≤ 10 s.

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|---|------|-------------|
| W | ww.\ | /Bsemi.com  |

| Parameter                                     | Symbol              | Test Conditions  | Min.     | Typ.ª | Max.  | Unit |  |
|---|---------------------|--|----------|-------|-------|------|--|
| Static  |                     |  |          | 1     |       |      |  |
| Drain-Source Breakdown Voltage                | V <sub>DS</sub>     | V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA                         | 60       |       |       | V    |  |
| Gate Threshold Voltage                        | V <sub>GS(th)</sub> | $V_{DS} = V_{GS}, I_{D} = 250 \ \mu A$                                 | 2        |       | 4     | v    |  |
| Gate-Body Leakage                             | I <sub>GSS</sub>    | $V_{DS} = 0 V, V_{GS} = \pm 20 V$                                      |          |       | ± 100 | nA   |  |
|   |                     | V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V                          |          |       | 1     |      |  |
| Zero Gate Voltage Drain Current               | I <sub>DSS</sub>    | $V_{DS}$ = 60 V, $V_{GS}$ = 0 V, $T_{J}$ = 125 °C                      |          |       | 50    | μA   |  |
|   |                     | $V_{DS}$ = 60 V, $V_{GS}$ = 0 V, $T_{J}$ = 175 °C                      |          |       | 250   |      |  |
| On-State Drain Current <sup>b</sup>           | I <sub>D(on)</sub>  | V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V                          | 60       |       |       | А    |  |
|   |                     | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A                          |          | 5     |       |      |  |
|   |                     | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C |          | 10    |       | 0    |  |
| Drain-Source On-State Resistance <sup>b</sup> | R <sub>DS(on)</sub> | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C |          | 15    | m     |      |  |
|   |                     | V <sub>GS</sub> = 7.5 V, I <sub>D</sub> = 15 A                         |          | 8     |       |      |  |
| Forward Transconductance <sup>b</sup>         | 9 <sub>fs</sub>     | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 20 A                          |          | 60    |       | S    |  |
| Dynamic                                       |                     |  | <u> </u> | 1     |       |      |  |
| Input Capacitance                             | C <sub>iss</sub>    |  |          | 6800  |       |      |  |
| Output Capacitance                            | C <sub>oss</sub>    | $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz                             |          | 570   |       | pF   |  |
| Reverse Transfer Capacitance                  | C <sub>rss</sub>    |  |          | 325   |       | 1    |  |
| Total Gate Charge <sup>c</sup>                | Qg                  |  |          | 47    | 70    |      |  |
| Gate-Source Charge <sup>c</sup>               | Q <sub>gs</sub>     | $V_{DS}$ = 30 V, $V_{GS}$ = 10 V, $I_{D}$ = 50 A                       |          | 10    |       | nC   |  |
| Gate-Drain Charge <sup>c</sup>                | Q <sub>gd</sub>     |  |          | 12    |       | 1    |  |
| Turn-On Delay Time <sup>c</sup>               | t <sub>d(on)</sub>  |  |          | 10    | 20    |      |  |
| Rise Time <sup>c</sup>                        | t <sub>r</sub>      | V <sub>DD</sub> = 30 V, R <sub>I</sub> = 0.6 Ω                         |          | 15    | 25    |      |  |
| Turn-Off Delay Time <sup>c</sup>              | t <sub>d(off)</sub> | $I_D{\cong}50$ A, $V_{GEN}$ = 10 V, $R_g$ = 2.5 $\Omega$               |          | 35    | 50    | ns   |  |
| Fall Time <sup>c</sup>                        | t <sub>f</sub>      |  |          | 20    | 30    |      |  |
| Source-Drain Diode Ratings and Cha            | aracteristics (     | T <sub>C</sub> = 25 °C)  |          |       |       |      |  |
| Pulsed Current                                | I <sub>SM</sub>     |  |          | 350   |       | А    |  |
| Diode Forward Voltage                         | V <sub>SD</sub>     | I <sub>F</sub> = 20 A, V <sub>GS</sub> = 0 V                           |          | 1     | 1.5   | V    |  |
| Reverse Recovery Time                         | t <sub>rr</sub>     | I <sub>F</sub> = 20 A, di/dt = 100 A/μs                                |          | 45    | 100   | ns   |  |

Notes:

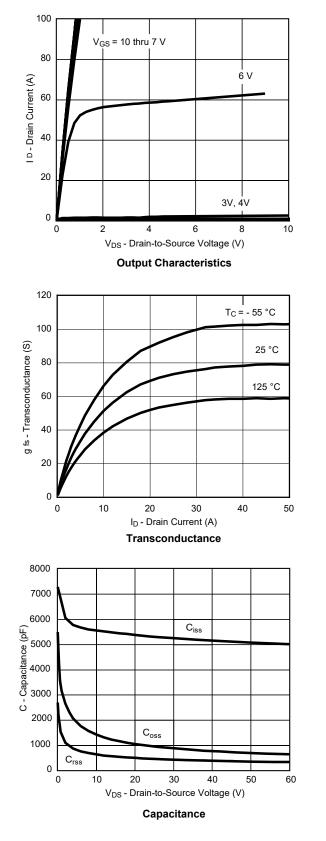
a. For design aid only; not subject to production testing. b. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %.

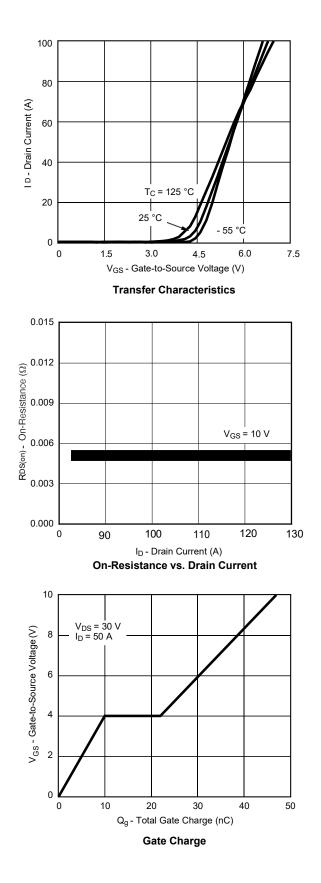
c. Independent of operating temperature.

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)

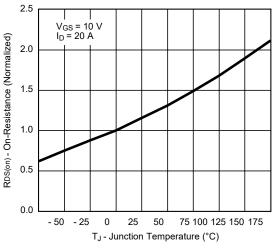




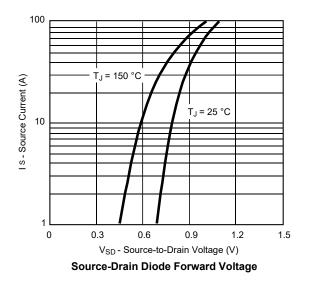
服务热线:400-655-8788



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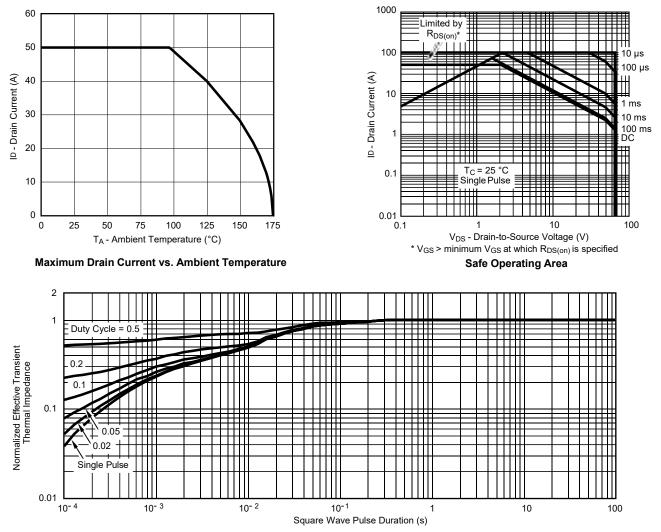


**On-Resistance vs. Junction Temperature** 



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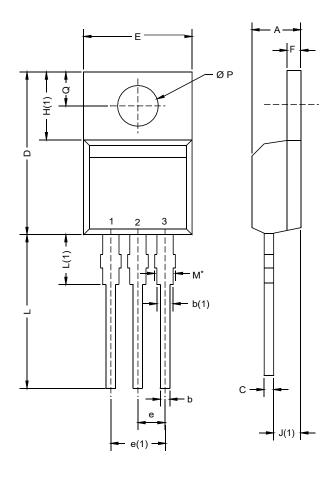
#### THERMAL RATINGS



Normalized Thermal Transient Impedance, Junction-to-Case



## **TO-220AB**



|                       | MILLIM            | IETERS    | INCHES |       |  |
|-----------------------|-------------------|-----------|--------|-------|--|
| DIM.                  | MIN.              | MAX.      | MIN.   | MAX.  |  |
| А                     | 4.25              | 4.65      | 0.167  | 0.183 |  |
| b                     | 0.69              | 1.01      | 0.027  | 0.040 |  |
| b(1)                  | 1.20              | 1.73      | 0.047  | 0.068 |  |
| с                     | 0.36              | 0.61      | 0.014  | 0.024 |  |
| D                     | 14.85             | 15.49     | 0.585  | 0.610 |  |
| Е                     | 10.04             | 10.51     | 0.395  | 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)                  | 6.09              | 6.48      | 0.240  | 0.255 |  |
| J(1)                  | 2.41              | 2.92      | 0.095  | 0.115 |  |
| L                     | 13.35             | 14.02     | 0.526  | 0.552 |  |
| L(1)                  | 3.32              | 3.82      | 0.131  | 0.150 |  |
| ØР                    | 3.54              | 3.94      | 0.139  | 0.155 |  |
| Q                     | 2.60              | 3.00      | 0.102  | 0.118 |  |
| ECN: X12-<br>DWG: 547 | 0208-Rev. N,<br>1 | 08-Oct-12 |        |       |  |

#### Notes

\* M = 1.32 mm to 1.62 mm (dimension including protrusion) Heatsink hole for HVM



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