

## BUZ102-VB Datasheet N-Channel 60-V (D-S) MOSFET

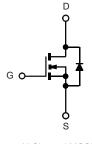
| PRODUCT             | SUMMARY                                |                                 |
|---------------------|--|---------------------------------|
| V <sub>DS</sub> (V) | <b>R<sub>DS(on)</sub> (</b> Ω <b>)</b> | I <sub>D</sub> (A) <sup>a</sup> |
| 60                  | 0.011 at V <sub>GS</sub> = 10 V        | 60                              |
| 00                  | 0.013 at V <sub>GS</sub> = 4.5 V       | 50                              |

#### FEATURES

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







N-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25 $^{\circ}$        | C, unless otherv        | vise noted)                       |                                      |      |  |
|---|-------------------------|-----------------------------------|--------------------------------------|------|--|
| Parameter   |                         | Symbol                            | Limit                                | Unit |  |
| Gate-Source Voltage   |                         | V <sub>GS</sub>                   | ± 20                                 | V    |  |
| Continuous Drain Current (T = 175 °C)b                          | T <sub>C</sub> = 25 °C  | - I <sub>D</sub> -                | 60                                   |      |  |
| Continuous Drain Current (T <sub>J</sub> = 175 °C) <sup>b</sup> | T <sub>C</sub> = 100 °C | D                                 | 50ª                                  |      |  |
| Pulsed Drain Current  |                         | I <sub>DM</sub>                   | 200                                  | A    |  |
| Continuous Source Current (Diode Conduction)                    |                         | ۱ <sub>S</sub>                    | 50ª                                  |      |  |
| 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 Power Dissipation                                       | T <sub>C</sub> = 25 °C  | PD                                | 136                                  | w    |  |
|   | T <sub>A</sub> = 25 °C  | ' D                               | 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 |  |  |
| Maximum lumation to Amelianta            | t ≤ 10 sec   | R <sub>thJA</sub> | 15      | 18      |      |  |  |
| Maximum Junction-to-Ambient <sup>a</sup> | Steady State | • • • thJA        | 40      | 50      | °C/W |  |  |
| 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.  $t \leq$  10 s.

| Parameter Sym   Static Vir   Drain-Source Breakdown Voltage Vir   Gate Threshold Voltage Vir   Gate-Body Leakage Iir   Zero Gate Voltage Drain Current Iir   On-State Drain Currentb Iir   Drain-Source On-State Resistanceb RDS | DS<br>S(th)<br>SS | V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 $\mu$ A       V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 $\mu$ A       V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V | Min.<br>60<br>1 | Typ.ª       | Max.  | Unit         |  |
|--|-------------------|--|-----------------|-------------|-------|--------------|--|
| Drain-Source Breakdown Voltage Vreshold   Gate Threshold Voltage VGS   Gate-Body Leakage IGS   Zero Gate Voltage Drain Current IDS   On-State Drain Current <sup>b</sup> IDGS  | S(th)<br>SS       | $V_{DS} = V_{GS}, I_D = 250 \ \mu A$ $V_{DS} = 0 \ V, V_{GS} = \pm 20 \ V$   |                 |             |       |              |  |
| Gate Threshold Voltage   VGS     Gate-Body Leakage   IGS     Zero Gate Voltage Drain Current   IDS     On-State Drain Current <sup>b</sup> ID(6)   | S(th)<br>SS       | $V_{DS} = V_{GS}, I_D = 250 \ \mu A$ $V_{DS} = 0 \ V, V_{GS} = \pm 20 \ V$   |                 |             |       |              |  |
| Gate-Body Leakage IGS   Zero Gate Voltage Drain Current IDS   On-State Drain Current <sup>b</sup> IDS  | SS                | $V_{DS} = 0 V, V_{GS} = \pm 20 V$  | 1               |             | 1 1   | V            |  |
| Zero Gate Voltage Drain Current I <sub>D</sub>   |                   | 50 00  |                 |             | 3     |              |  |
| On-State Drain Current <sup>b</sup>  |                   |  |                 |             | ± 100 | nA           |  |
| On-State Drain Current <sup>b</sup>  | [                 | $V_{DS} = 60 V, V_{GS} = 0 V$  |                 |             | 1     |              |  |
|  | 50                | V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C   |                 |             | 50    | μA           |  |
|  | Γ                 | $V_{DS} = 60 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 175 ^{\circ}\text{C}$  |                 |             | 250   |              |  |
|  | on)               | V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V  | 60              |             |       | А            |  |
| Drain-Source On-State Resistance <sup>b</sup>  |                   | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A  |                 | 0.011 0.014 |       |              |  |
| Drain-Source On-State Resistance TDS   | Γ                 | $V_{GS}$ = 10 V, $I_{D}$ = 20 A, $T_{J}$ = 125 °C  |                 |             |       |              |  |
|  | S(on)             | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C   |                 | 0.018       |       |              |  |
|  | F                 | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 15 A   |                 | 0.013       |       | Ω<br>S<br>pF |  |
| Forward Transconductance <sup>b</sup> 9  | fs                | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 20 A  |                 | 60          |       | S            |  |
| Dynamic  |                   |  |                 |             |       |              |  |
| Input Capacitance C <sub>i</sub>   | ss                |  |                 | 4200        |       |              |  |
| Output Capacitance C <sub>o</sub>  | oss               | $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz   |                 | 570         |       | pF           |  |
| Reverse Transfer Capacitance C <sub>r</sub>  | ss                |  |                 | 325         |       |              |  |
| Total Gate Charge <sup>c</sup> Q   | g                 |  |                 | 47          |       |              |  |
| Gate-Source Charge <sup>c</sup> Q  | gs                | V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 50 A  |                 | 10          |       | nC           |  |
| Gate-Drain Charge <sup>c</sup> Q   | gd                |  |                 | 12          |       |              |  |
| Turn-On Delay Time <sup>c</sup> t <sub>d(c</sub>   | on)               |  |                 | 10          | 20    |              |  |
| Rise Time <sup>c</sup> t   |                   | $V_{DD}$ = 30 V, R <sub>L</sub> = 0.6 $\Omega$   |                 | 15          | 25    | ns           |  |
| Turn-Off Delay Time <sup>c</sup> t <sub>d(c</sub>  | off)              | $I_D {\cong} 50$ A, $V_{GEN}$ = 10 V, $R_g$ = 2.5 $\Omega$   |                 | 35          | 50    |              |  |
| Fall Time <sup>c</sup> t   | f                 |  |                 | 20          | 30    |              |  |
| Source-Drain Diode Ratings and Characteri  | stics (1          | Γ <sub>C</sub> = 25 °C)  |                 |             |       |              |  |
| Pulsed Current I <sub>S</sub>  |                   |  |                 |             | 60    | А            |  |
| Diode Forward Voltage V <sub>s</sub>   |                   |  |                 |             |       |              |  |
| Reverse Recovery Time t <sub>r</sub>   | SD                | I <sub>F</sub> = 20 A, V <sub>GS</sub> = 0 V   |                 | 1           | 1.5   | V            |  |

Notes:

a. For design aid only; not subject to production testing.

b. Pulse test; pulse width  $\leq$  300 µs, duty cycle  $\leq$  2 %.

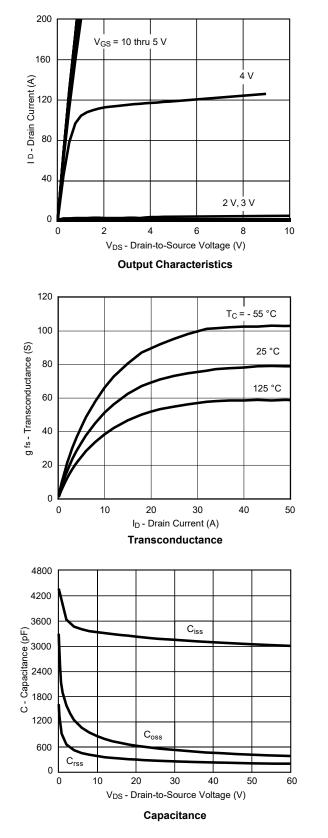
c. Independent of operating temperature.

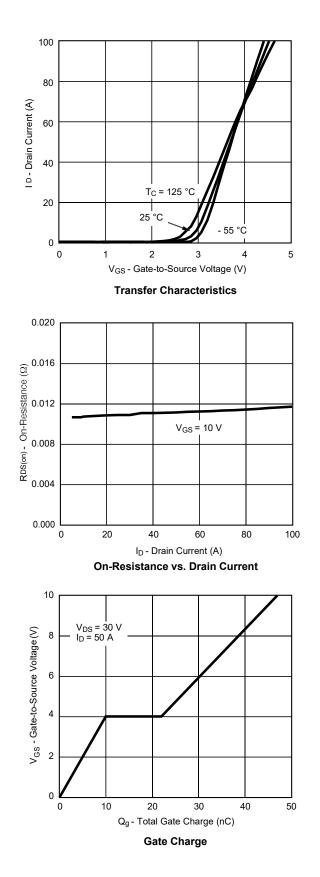
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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### TYPICAL CHARACTERISTICS (25 °C unless noted)

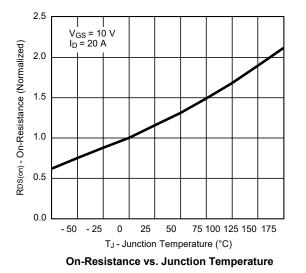


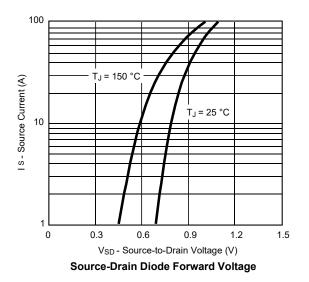


服务热线:400-655-8788



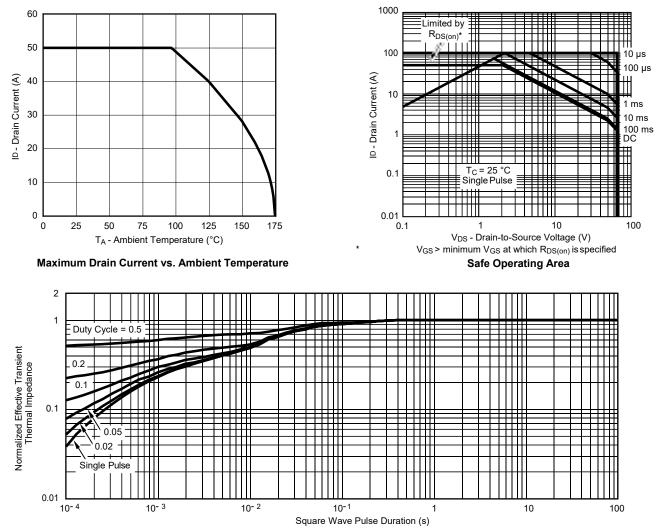
## TYPICAL CHARACTERISTICS (25 °C unless noted)





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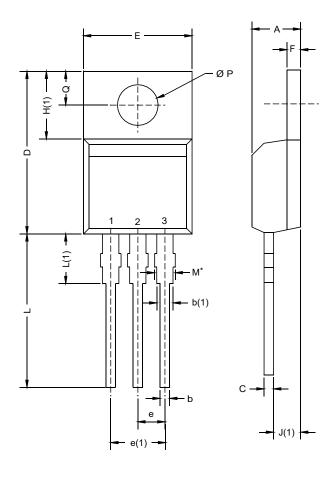
#### THERMAL RATINGS



Normalized Thermal Transient Impedance, Junction-to-Case



## **TO-220AB**



| DIM.                  | MILLIM            | ETERS     | INCHES |       |  |
|-----------------------|-------------------|-----------|--------|-------|--|
|                       | MIN.              | MAX.      | MIN.   | MAX.  |  |
| А                     | 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 |  |
| ECN: X15-<br>DWG: 603 | 0364-Rev. C,<br>1 | 14-Dec-15 |        |       |  |

#### Note

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



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