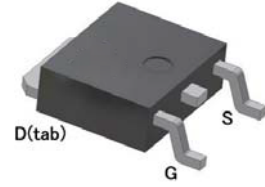
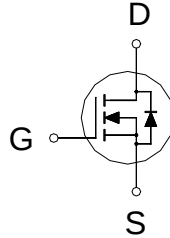


**N-Channel Logic Level Enhancement Mode Field Effect Transistor**

**Product Summary:**

|                            |      |
|----------------------------|------|
| BV <sub>DSS</sub>          | 30V  |
| R <sub>DS(on)</sub> (MAX.) | 20mΩ |
| I <sub>D</sub>             | 15A  |



UIS, R<sub>g</sub> 100% Tested

Pb-Free Lead Plating & Halogen Free



**ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> = 25 °C Unless Otherwise Noted)**

| PARAMETERS/TEST CONDITIONS                     |                                                     | SYMBOL                            | LIMITS     | UNIT |
|------------------------------------------------|-----------------------------------------------------|-----------------------------------|------------|------|
| Gate-Source Voltage                            |                                                     | V <sub>GS</sub>                   | ±20        | V    |
| Continuous Drain Current                       | T <sub>C</sub> = 25 °C                              | I <sub>D</sub>                    | 15         | A    |
|                                                | T <sub>C</sub> = 100 °C                             |                                   | 10         |      |
| Pulsed Drain Current <sup>1</sup>              |                                                     | I <sub>DM</sub>                   | 60         |      |
| Avalanche Current                              |                                                     | I <sub>AS</sub>                   | 15         | mJ   |
| Avalanche Energy                               | L = 0.1mH, I <sub>D</sub> =15A, R <sub>G</sub> =25Ω | E <sub>AS</sub>                   | 11.25      |      |
| Repetitive Avalanche Energy <sup>2</sup>       | L = 0.05mH                                          | E <sub>AR</sub>                   | 5.5        |      |
| Power Dissipation                              | T <sub>C</sub> = 25 °C                              | P <sub>D</sub>                    | 41         | W    |
|                                                | T <sub>C</sub> = 100 °C                             |                                   | 16         |      |
| Operating Junction & Storage Temperature Range |                                                     | T <sub>j</sub> , T <sub>stg</sub> | -55 to 150 | °C   |

**THERMAL RESISTANCE RATINGS**

| THERMAL RESISTANCE  | SYMBOL           | TYPICAL | MAXIMUM | UNIT   |
|---------------------|------------------|---------|---------|--------|
| Junction-to-Case    | R <sub>θJC</sub> |         | 3       | °C / W |
| Junction-to-Ambient | R <sub>θJA</sub> |         | 75      |        |

<sup>1</sup>Pulse width limited by maximum junction temperature.

<sup>2</sup>Duty cycle ≤ 1%

**ELECTRICAL CHARACTERISTICS ( $T_c = 25\text{ }^{\circ}\text{C}$ , Unless Otherwise Noted)**

| PARAMETER                                                                      | SYMBOL             | TEST CONDITIONS                                               | LIMITS |      |           | UNIT       |
|--------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------|--------|------|-----------|------------|
|                                                                                |                    |                                                               | MIN    | TYP  | MAX       |            |
| STATIC                                                                         |                    |                                                               |        |      |           |            |
| Drain-Source Breakdown Voltage                                                 | $V_{(BR)DSS}$      | $V_{GS} = 0V, I_D = 250\mu A$                                 | 30     |      |           | V          |
| Gate Threshold Voltage                                                         | $V_{GS(th)}$       | $V_{DS} = V_{GS}, I_D = 250\mu A$                             | 1      | 1.5  | 3         |            |
| Gate-Body Leakage                                                              | $I_{GSS}$          | $V_{DS} = 0V, V_{GS} = \pm 20V$                               |        |      | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current                                                | $I_{DSS}$          | $V_{DS} = 24V, V_{GS} = 0V$                                   |        |      | 1         | $\mu A$    |
|                                                                                |                    | $V_{DS} = 20V, V_{GS} = 0V, T_J = 125\text{ }^{\circ}C$       |        |      | 25        |            |
| On-State Drain Current <sup>1</sup>                                            | $I_{D(ON)}$        | $V_{DS} = 10V, V_{GS} = 10V$                                  | 15     |      |           | A          |
| Drain-Source On-State Resistance <sup>1</sup>                                  | $R_{DS(ON)}$       | $V_{GS} = 10V, I_D = 15A$                                     |        | 15.5 | 20        | m $\Omega$ |
|                                                                                |                    | $V_{GS} = 4.5V, I_D = 10A$                                    |        | 25   | 30        |            |
| Forward Transconductance <sup>1</sup>                                          | $g_{fs}$           | $V_{DS} = 5V, I_D = 15A$                                      |        | 16   |           | S          |
| DYNAMIC                                                                        |                    |                                                               |        |      |           |            |
| Input Capacitance                                                              | $C_{iss}$          | $V_{GS} = 0V, V_{DS} = 15V, f = 1MHz$                         |        | 520  |           | pF         |
| Output Capacitance                                                             | $C_{oss}$          |                                                               |        | 88   |           |            |
| Reverse Transfer Capacitance                                                   | $C_{rss}$          |                                                               |        | 62   |           |            |
| Gate Resistance                                                                | $R_g$              | $V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz$                        |        | 2.0  |           | $\Omega$   |
| Total Gate Charge <sup>1,2</sup>                                               | $Q_g(V_{GS}=10V)$  | $V_{DS} = 15V, V_{GS} = 10V,$<br>$I_D = 15A$                  |        | 11.5 |           | nC         |
|                                                                                | $Q_g(V_{GS}=4.5V)$ |                                                               |        | 5    |           |            |
| Gate-Source Charge <sup>1,2</sup>                                              | $Q_{gs}$           |                                                               |        | 1.6  |           |            |
| Gate-Drain Charge <sup>1,2</sup>                                               | $Q_{gd}$           |                                                               |        | 2.8  |           |            |
| Turn-On Delay Time <sup>1,2</sup>                                              | $t_{d(on)}$        | $V_{DS} = 15V,$<br>$I_D = 1A, V_{GS} = 10V, R_{GS} = 6\Omega$ |        | 9    |           | nS         |
| Rise Time <sup>1,2</sup>                                                       | $t_r$              |                                                               |        | 12   |           |            |
| Turn-Off Delay Time <sup>1,2</sup>                                             | $t_{d(off)}$       |                                                               |        | 30   |           |            |
| Fall Time <sup>1,2</sup>                                                       | $t_f$              |                                                               |        | 15   |           |            |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ( $T_c = 25\text{ }^{\circ}C$ ) |                    |                                                               |        |      |           |            |
| Continuous Current                                                             | $I_S$              |                                                               |        |      | 15        | A          |
| Pulsed Current <sup>3</sup>                                                    | $I_{SM}$           |                                                               |        |      | 60        |            |
| Forward Voltage <sup>1</sup>                                                   | $V_{SD}$           | $I_F = I_S, V_{GS} = 0V$                                      |        |      | 1.3       | V          |
| Reverse Recovery Time                                                          | $t_{rr}$           | $I_F = I_S, dI_F/dt = 100A / \mu S$                           |        | 50   |           | nS         |
| Peak Reverse Recovery Current                                                  | $I_{RM(REC)}$      |                                                               |        | 30   |           | A          |
| Reverse Recovery Charge                                                        | $Q_{rr}$           |                                                               |        | 2    |           | nC         |

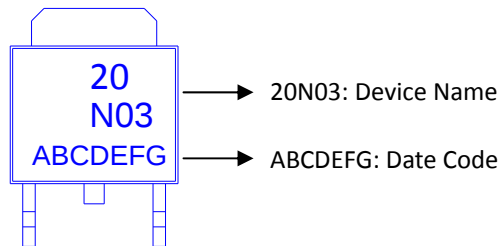
<sup>1</sup>Pulse test : Pulse Width  $\leq 300\mu$  sec, Duty Cycle  $\leq 2\%$ .

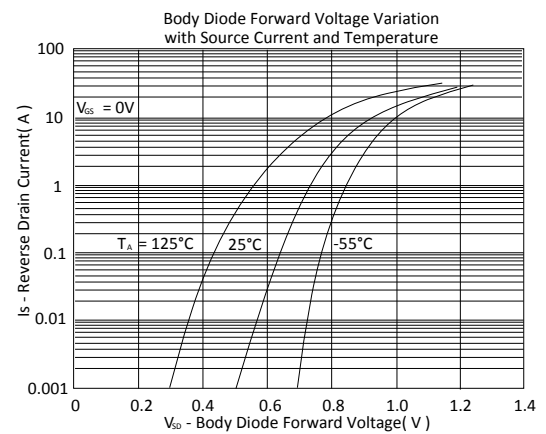
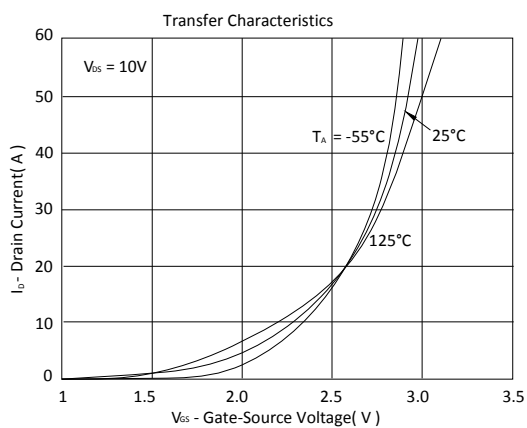
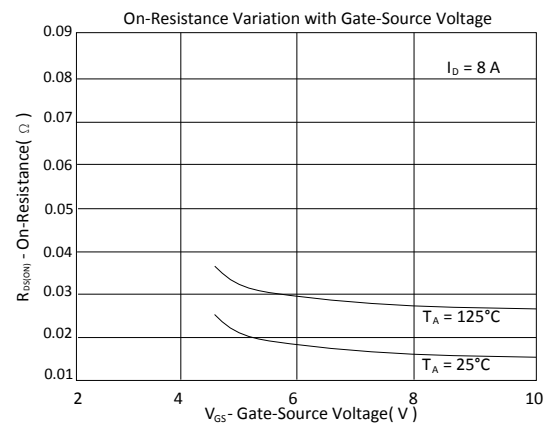
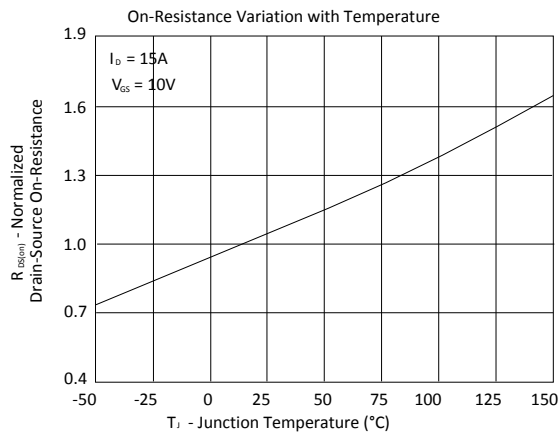
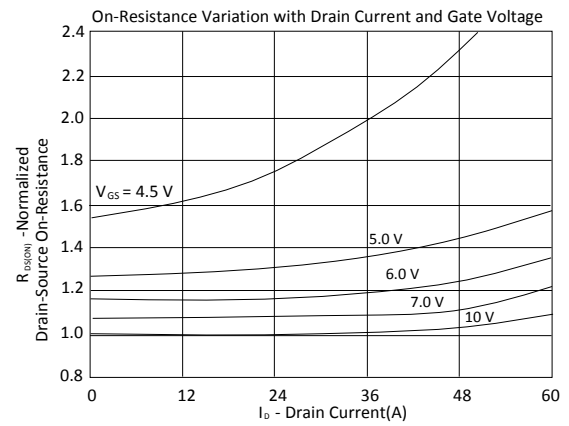
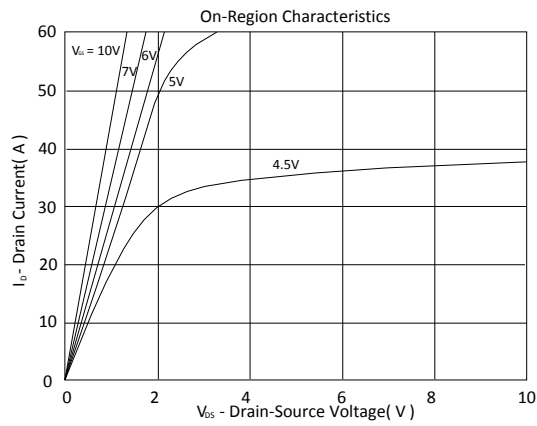
<sup>2</sup>Independent of operating temperature.

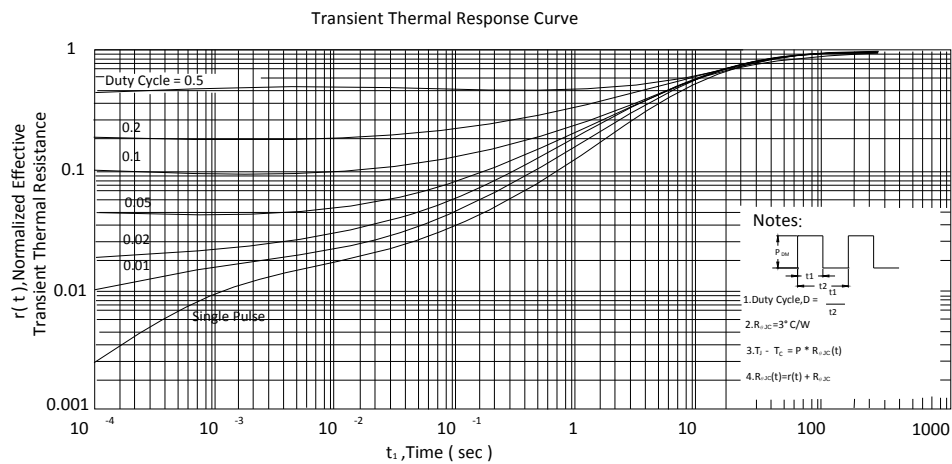
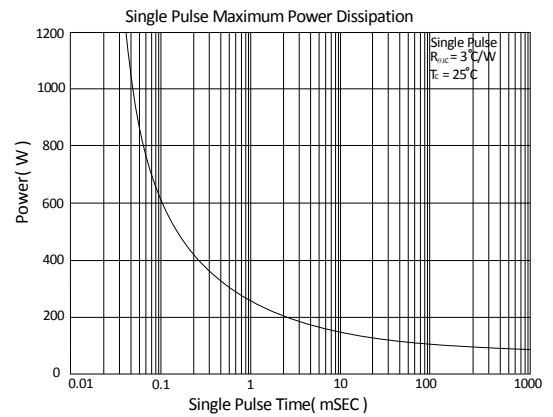
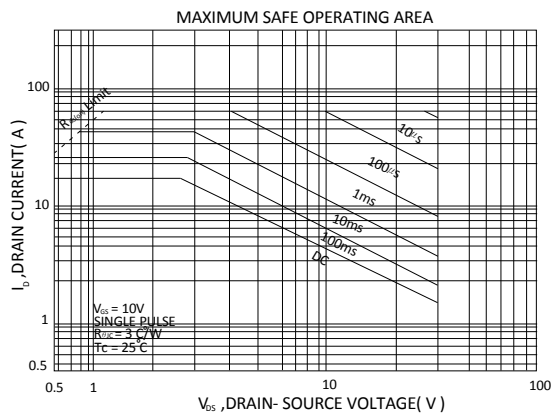
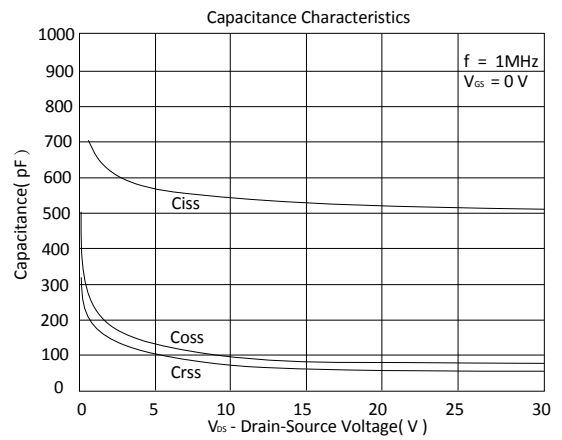
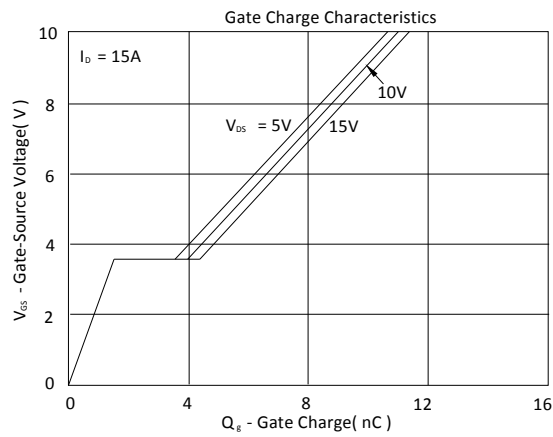
<sup>3</sup>Pulse width limited by maximum junction

temperature. **Ordering & Marking Information:**

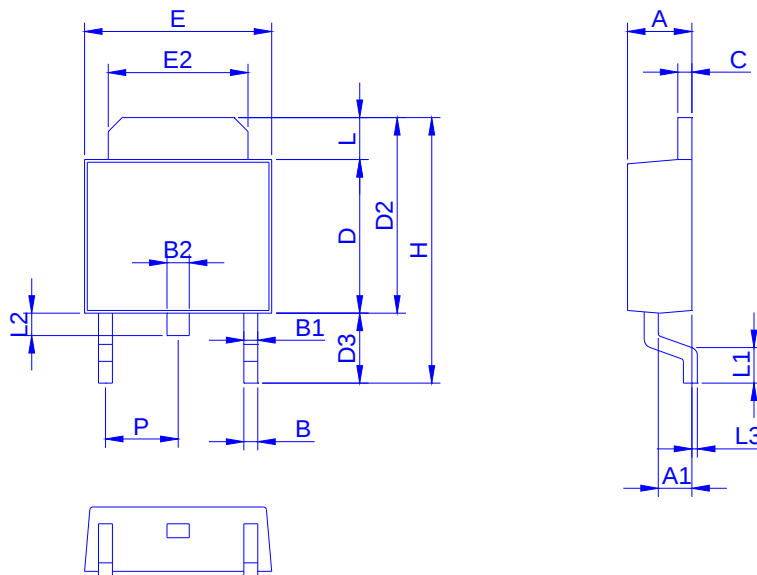
Device Name: LB20N03D for DPAK (TO-252)







## Outline Drawing



| Dimension | A    | A1   | B    | B1   | B2   | C    | D    | D2   | D3   | E    | E2   | H     | L    | L1   | L2   | L3   | P    |
|-----------|------|------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|
| Min.      | 2.10 | 0.95 | 0.30 | 0.40 | 0.60 | 0.40 | 5.30 | 6.70 | 2.20 | 6.40 | 4.80 | 9.20  | 0.89 | 0.90 | 0.50 | 0.00 | 2.10 |
| Max.      | 2.50 | 1.30 | 0.85 | 0.94 | 1.00 | 0.60 | 6.20 | 7.30 | 3.00 | 6.70 | 5.45 | 10.15 | 1.70 | 1.65 | 1.10 | 0.30 | 2.50 |

## Footprint

