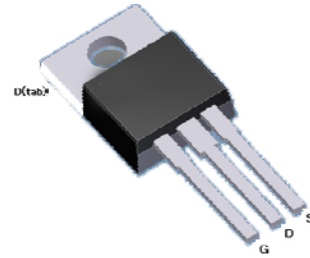
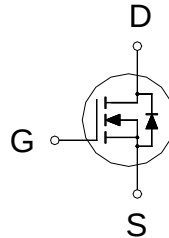


**N-Channel Logic Level Enhancement Mode Field Effect Transistor**

**Product Summary:**

|                     |              |
|---------------------|--------------|
| $BV_{DSS}$          | 200V         |
| $R_{DS(on)} (MAX.)$ | $0.5 \Omega$ |
| $I_D$               | 7A           |



UIS, Rg 100% Tested

Pb-Free Lead Plating



**ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$  Unless Otherwise Noted)**

| PARAMETERS/TEST CONDITIONS                     |                                                      | SYMBOL           | LIMITS     | UNIT             |
|------------------------------------------------|------------------------------------------------------|------------------|------------|------------------|
| Gate-Source Voltage                            |                                                      | $V_{GS}$         | $\pm 30$   | V                |
| Continuous Drain Current                       | $T_C = 25^\circ\text{C}$                             | $I_D$            | 7          | A                |
|                                                | $T_C = 100^\circ\text{C}$                            |                  | 5          |                  |
| Pulsed Drain Current <sup>1</sup>              |                                                      | $I_{DM}$         | 28         |                  |
| Avalanche Current                              |                                                      | $I_{AS}$         | 1.5        |                  |
| Avalanche Energy                               | $L = 1\text{mH}, I_D = 1.5\text{A}, R_G = 25 \Omega$ | $E_{AS}$         | 1.12       | mJ               |
| Repetitive Avalanche Energy <sup>2</sup>       | $L = 0.5\text{mH}$                                   | $E_{AR}$         | 0.56       |                  |
| Power Dissipation                              | $T_C = 25^\circ\text{C}$                             | $P_D$            | 50         | W                |
|                                                | $T_C = 100^\circ\text{C}$                            |                  | 20         |                  |
| Operating Junction & Storage Temperature Range |                                                      | $T_{j, T_{stg}}$ | -55 to 150 | $^\circ\text{C}$ |

**THERMAL RESISTANCE RATINGS**

| THERMAL RESISTANCE  | SYMBOL          | TYPICAL | MAXIMUM | UNIT                        |
|---------------------|-----------------|---------|---------|-----------------------------|
| Junction-to-Case    | $R_{\theta JC}$ |         | 2.5     | $^\circ\text{C} / \text{W}$ |
| Junction-to-Ambient | $R_{\theta JA}$ |         | 62.5    |                             |

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

<sup>2</sup>Duty cycle  $\leq 1\%$

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

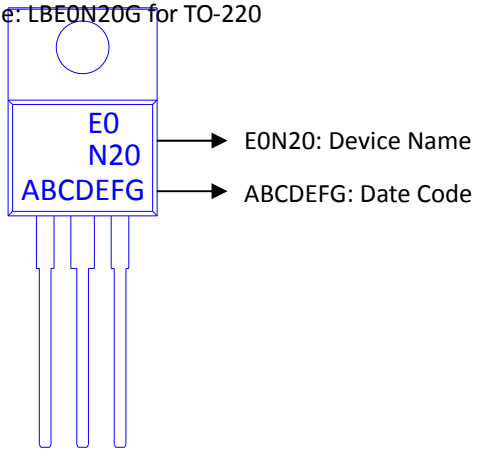
| PARAMETER                                                               | SYMBOL        | TEST CONDITIONS                                           | LIMITS |      |           | UNIT     |
|-------------------------------------------------------------------------|---------------|-----------------------------------------------------------|--------|------|-----------|----------|
|                                                                         |               |                                                           | MIN    | TYP  | MAX       |          |
| STATIC                                                                  |               |                                                           |        |      |           |          |
| Drain-Source Breakdown Voltage                                          | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                             | 200    |      |           | V        |
| Gate Threshold Voltage                                                  | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                         | 3.0    | 4.0  | 5.0       |          |
| Gate-Body Leakage                                                       | $I_{GSS}$     | $V_{DS} = 0V, V_{GS} = \pm 30V$                           |        |      | $\pm 100$ | nA       |
| Zero Gate Voltage Drain Current                                         | $I_{DSS}$     | $V_{DS} = 160V, V_{GS} = 0V$                              |        |      | 1         | $\mu A$  |
|                                                                         |               | $V_{DS} = 130V, V_{GS} = 0V, T_J = 125\text{ }^{\circ}C$  |        |      | 25        |          |
| On-State Drain Current <sup>1</sup>                                     | $I_{D(ON)}$   | $V_{DS} = 10V, V_{GS} = 10V$                              | 7      |      |           | A        |
| Drain-Source On-State Resistance <sup>1</sup>                           | $R_{DS(ON)}$  | $V_{GS} = 10V, I_D = 3.5A$                                |        | 0.4  | 0.5       | $\Omega$ |
| Forward Transconductance <sup>1</sup>                                   | $g_{fs}$      | $V_{DS} = 5V, I_D = 3.5A$                                 |        | 2    |           | S        |
| DYNAMIC                                                                 |               |                                                           |        |      |           |          |
| Input Capacitance                                                       | $C_{iss}$     | $V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$                     |        | 803  |           | pF       |
| Output Capacitance                                                      | $C_{oss}$     |                                                           |        | 19   |           |          |
| Reverse Transfer Capacitance                                            | $C_{rss}$     |                                                           |        | 16   |           |          |
| Gate Resistance                                                         | $R_g$         | $V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz$                    |        | 2.0  |           | $\Omega$ |
| Total Gate Charge <sup>1,2</sup>                                        | $Q_g$         | $V_{DS} = 100V, V_{GS} = 10V, I_D = 3.5A$                 |        | 21.3 |           | nC       |
| Gate-Source Charge <sup>1,2</sup>                                       | $Q_{gs}$      |                                                           |        | 2.9  |           |          |
| Gate-Drain Charge <sup>1,2</sup>                                        | $Q_{gd}$      |                                                           |        | 6    |           |          |
| Turn-On Delay Time <sup>1,2</sup>                                       | $t_{d(on)}$   | $V_{DS} = 100V, I_D = 1A, V_{GS} = 10V, R_{GS} = 6\Omega$ |        | 20   |           | nS       |
| Rise Time <sup>1,2</sup>                                                | $t_r$         |                                                           |        | 60   |           |          |
| Turn-Off Delay Time <sup>1,2</sup>                                      | $t_{d(off)}$  |                                                           |        | 20   |           |          |
| Fall Time <sup>1,2</sup>                                                | $t_f$         |                                                           |        | 50   |           |          |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T <sub>C</sub> = 25 °C) |               |                                                           |        |      |           |          |
| Continuous Current                                                      | $I_S$         |                                                           |        |      | 7         | A        |
| Pulsed Current <sup>3</sup>                                             | $I_{SM}$      |                                                           |        |      | 28        |          |
| Forward Voltage <sup>1</sup>                                            | $V_{SD}$      | $I_F = I_S, V_{GS} = 0V$                                  |        |      | 1.5       | V        |
| Reverse Recovery Time                                                   | $t_{rr}$      | $I_F = 7A, dI_F/dt = 100A / \mu S$                        |        | 1450 |           | nS       |
| Reverse Recovery Charge                                                 | $Q_{rr}$      |                                                           |        | 0.85 |           | $\mu C$  |

<sup>1</sup>Pulse test : Pulse Width  $\leq 300\text{ }\mu\text{sec}$ , Duty Cycle  $\leq 2\%$ 
<sup>2</sup>Independent of operating temperature.

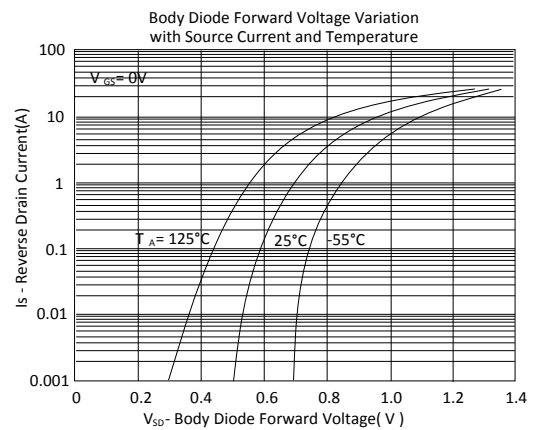
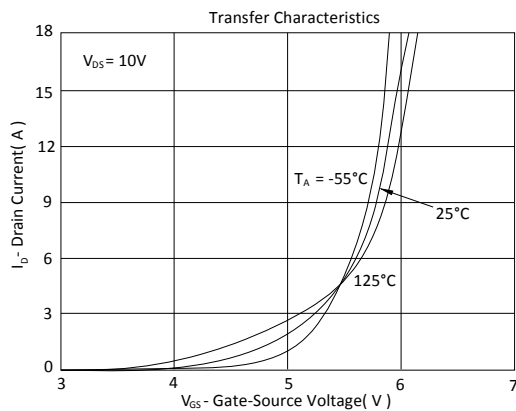
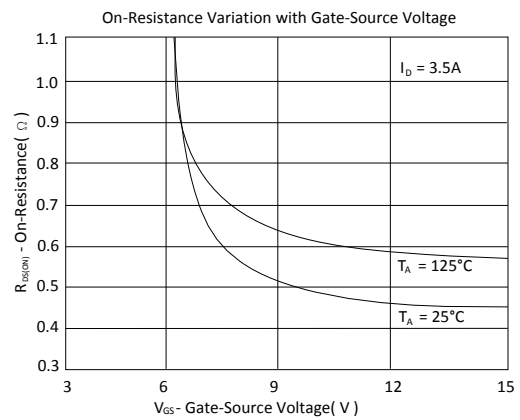
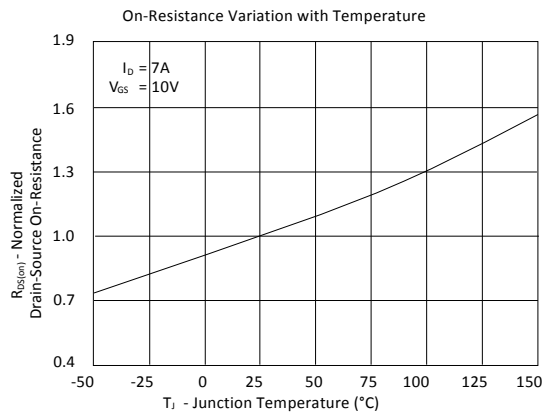
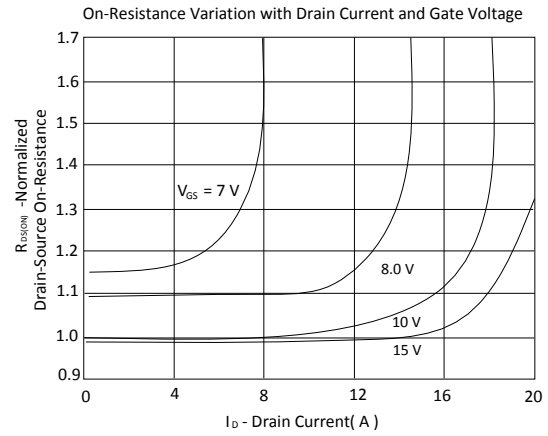
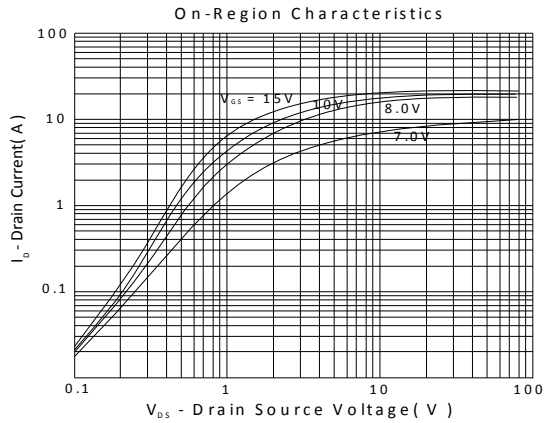
<sup>3</sup>Pulse width limited by maximum junction temperature.

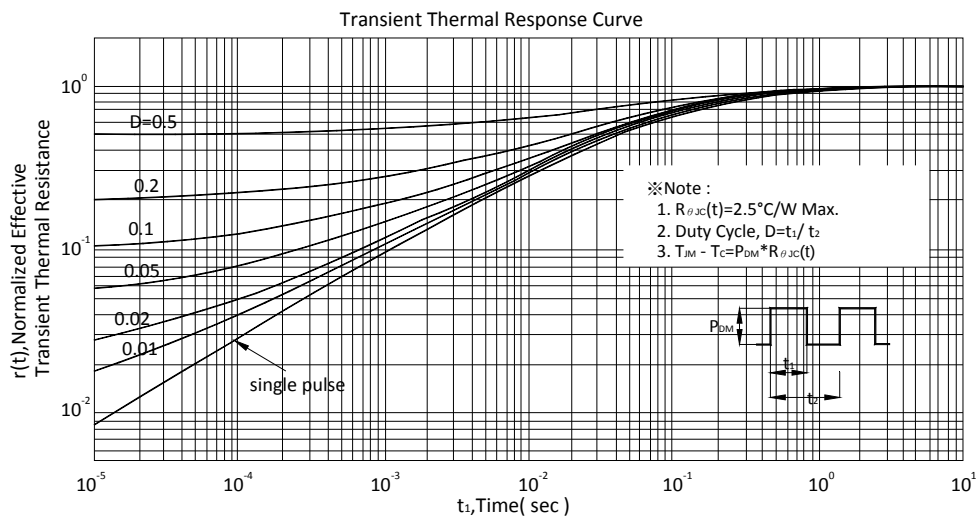
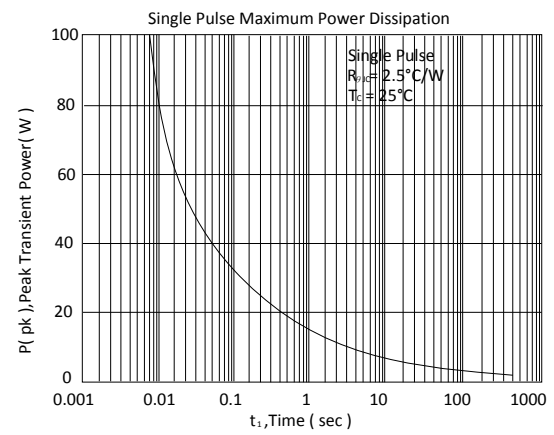
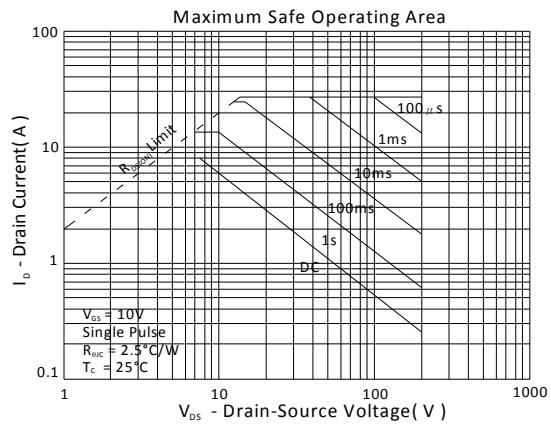
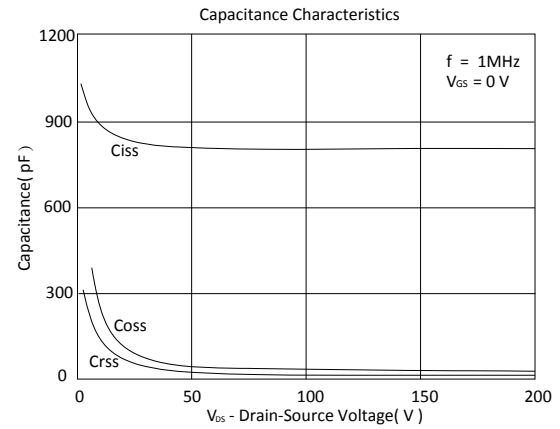
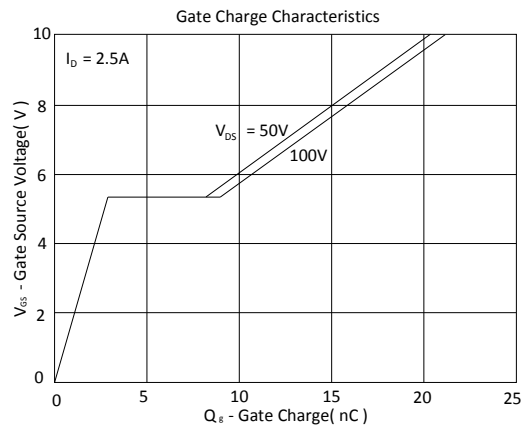
**Ordering & Marking  
Information:**

Device Name: LBE0N20G for TO-220

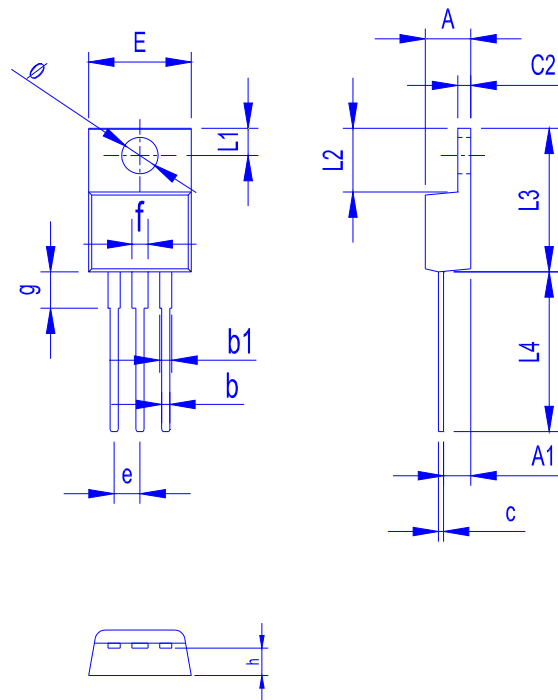


# TYPICAL CHARACTERISTICS





# Outline Drawing



Dimension in mm

| Dimension | A    | b    | b1   | c    | c2   | E     | L1   | L2   | L3    | L4    | $\phi$ | e    | f    | g    | h    |
|-----------|------|------|------|------|------|-------|------|------|-------|-------|--------|------|------|------|------|
| Min.      | 4.20 | 0.70 | 0.90 | 0.30 | 1.10 | 9.80  | 2.55 | 6.10 | 14.80 | 13.50 | 3.40   | 2.35 | 1.30 | 3.40 | 2.40 |
| Max.      | 4.80 | 1.10 | 1.50 | 0.70 | 1.50 | 10.50 | 2.85 | 6.50 | 15.40 | 14.50 | 3.80   | 2.75 | 1.90 | 3.80 | 3.00 |