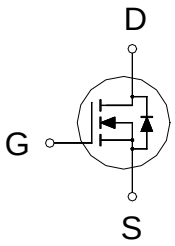
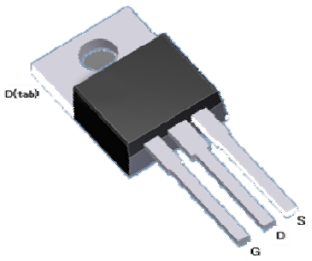
**N-Channel Logic Level Enhancement Mode Field Effect Transistor**

Product Summary:

| | |
|---|---|
| $BV_{DSS}$ | 100V |
| $R_{DSON\ (MAX.)}$ | 8.5mΩ |
| $I_D$ | 96A |




UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free

**ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25 °C Unless Otherwise Noted)**

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNIT |
|---|---|---|---|---|
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$ = 25 °C | $I_D$ | 96 | A |
| | $T_C$ = 100 °C | | 61 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | 380 | |
| Avalanche Current | | $I_{AS}$ | 15 | |
| Avalanche Energy | L = 0.1mH, $I_{AS}$ =15A, RG=25Ω | $E_{AS}$ | 11.2 | mJ |
| Repetitive Avalanche Energy[2] | L = 0.05mH | $E_{AR}$ | 5.6 | |
| Power Dissipation | $T_C$ = 25 °C | $P_D$ | 138 | W |
| | $T_C$ = 100 °C | | 55 | |
| Operating Junction & Storage Temperature Range | | $T_j$, $T_{stg}$ | -55 to 150 | °C |

**THERMAL RESISTANCE RATINGS**

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNIT |
|---|---|---|---|---|
| Junction-to-Case | $R_{\theta JC}$ | | 0.9 | °C / W |
| Junction-to-Ambient | $R_{\theta JA}$ | | 62.5 | |

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

**ELECTRICAL CHARACTERISTICS ($T_J$ = 25 °C, Unless Otherwise Noted)**

| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS | | | UNIT |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 100 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1.0 | 2.0 | 3.0 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±12V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 80V, $V_{GS}$ = 0V | | | 1 | μA |
| | | $V_{DS}$ = 70V, $V_{GS}$ = 0V, $T_J$ = 125 °C | | | 25 | |
| On-State Drain Current[1] | $I_{D(ON)}$ | $V_{DS}$ = 5V, $V_{GS}$ = 10V | 96 | | | A |
| Drain-Source On-State Resistance[1] | $R_{DS(ON)}$ | $V_{GS}$ = 10V, $I_D$ = 20A | | 7.1 | 8.5 | mΩ |
| | | $V_{GS}$ = 4.5V, $I_D$ = 20A | | 8.4 | 10.5 | |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$ = 5V, $I_D$ = 20A | | 70 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 50V, f = 1MHz | | 4430 | | pF |
| Output Capacitance | $C_{oss}$ | | | 744 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 108 | | |
| Gate Resistance | $R_g$ | $V_{GS}$ = 15mV, $V_{DS}$ = 0V, f = 1MHz | | 1.0 | | Ω |
| Total Gate Charge[1,2] | $Q_g$($V_{GS}$=10V) | $V_{DS}$ = 50V, $V_{GS}$ = 10V, $I_D$ = 20A | | 78 | | nC |
| | $Q_g$($V_{GS}$=4.5V) | | | 44 | | |
| Gate-Source Charge[1,2] | $Q_{gs}$ | | | 13 | | |
| Gate-Drain Charge[1,2] | $Q_{gd}$ | | | 23 | | |
| Turn-On Delay Time[1,2] | $t_{d(on)}$ | $V_{DS}$ = 50V, $I_D$ = 20A, $V_{GS}$ = 10V, $R_{GS}$ = 6Ω | | 10 | | nS |
| Rise Time[1,2] | $t_r$ | | | 15 | | |
| Turn-Off Delay Time[1,2] | $t_{d(off)}$ | | | 32 | | |
| Fall Time[1,2] | $t_f$ | | | 20 | | |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_C$ = 25 °C)** | | | | | | |
| Continuous Current | $I_S$ | | | | 96 | A |
| Pulsed Current[3] | $I_{SM}$ | | | | 380 | |
| Forward Voltage[1] | $V_{SD}$ | $I_F$ = 20A, $V_{GS}$ = 0V | | | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 20A, $dI_F/dt$ = 100A / μS | | 46 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 225 | | nC |

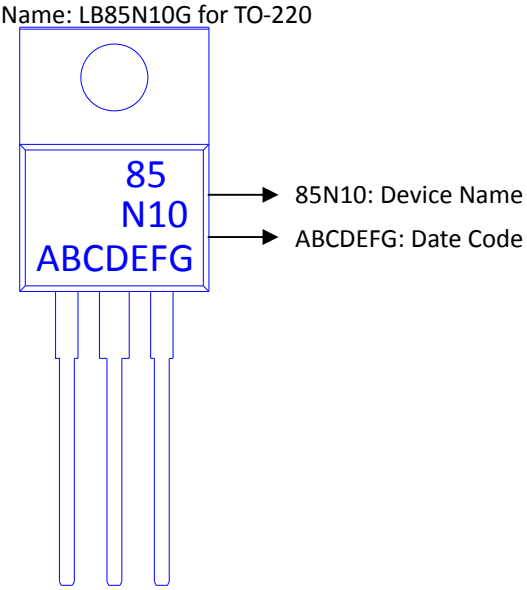
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

[3]Pulse width limited by maximum junction temperature.

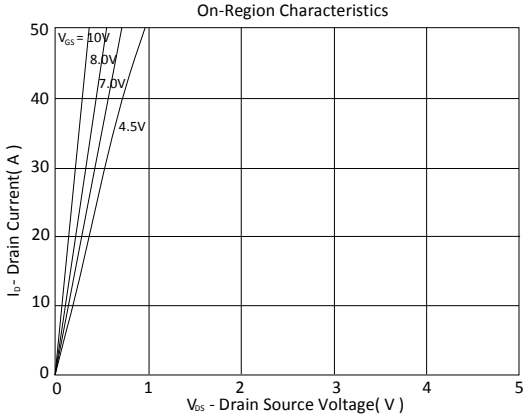
## Ordering & Marking Information:

Device Name: LB85N10G for TO-220

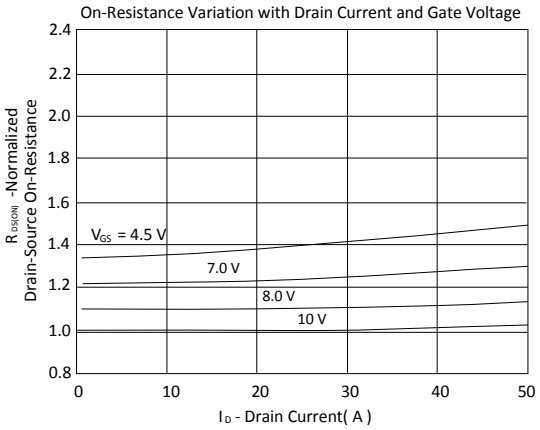


## TYPICAL CHARACTERISTICS

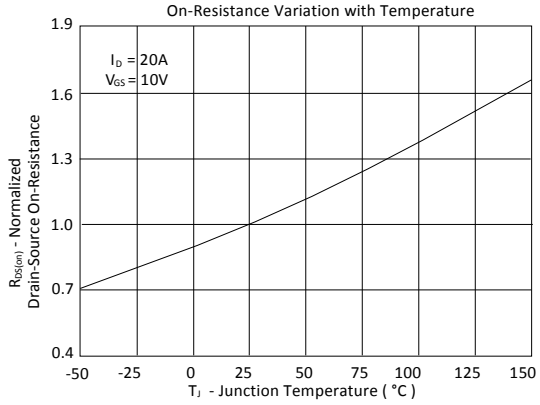
On-Region Characteristics



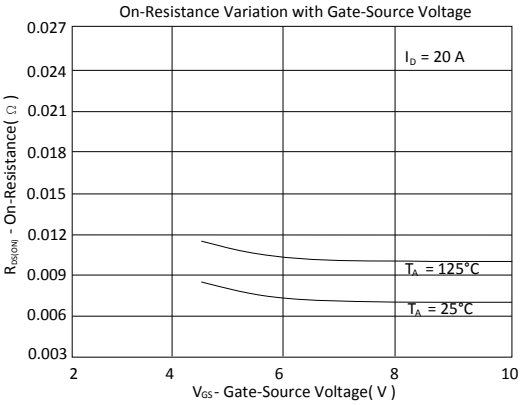

On-Resistance Variation with Drain Current and Gate Voltage



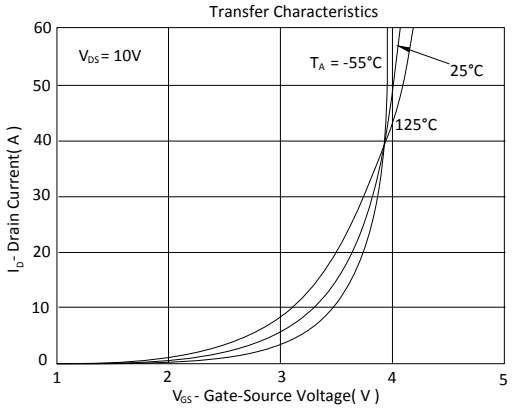

On-Resistance Variation with Temperature



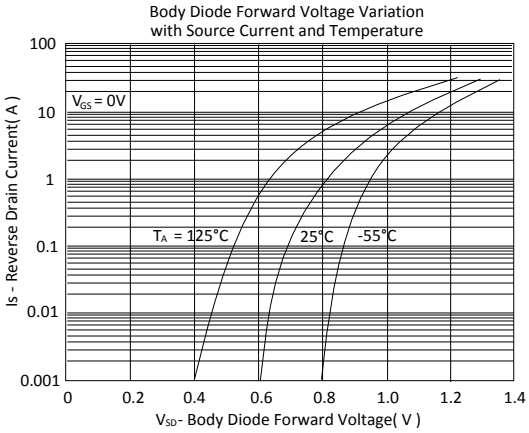

On-Resistance Variation with Gate-Source Voltage



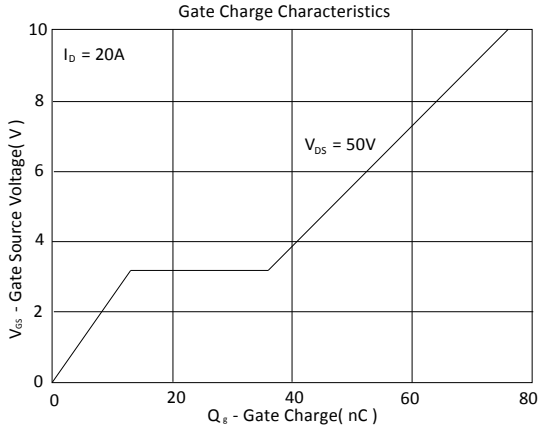

Transfer Characteristics



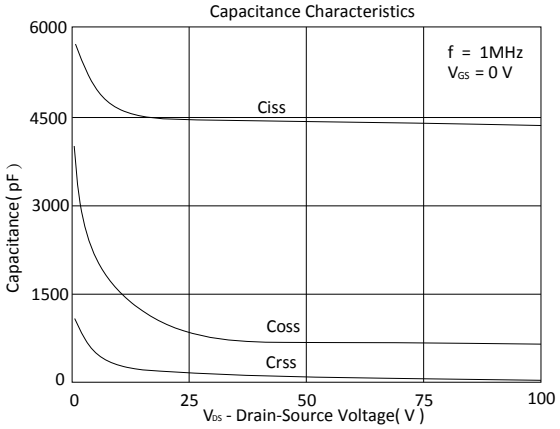

Body Diode Forward Voltage Variation
with Source Current and Temperature



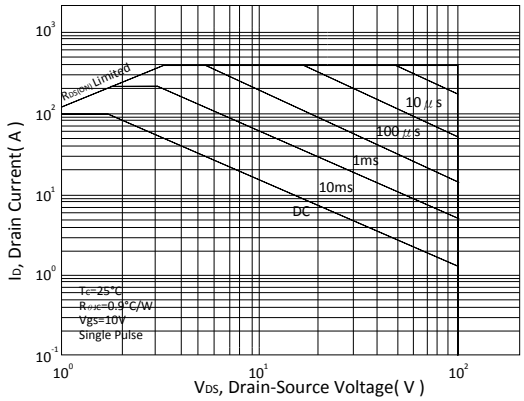
Gate Charge Characteristics



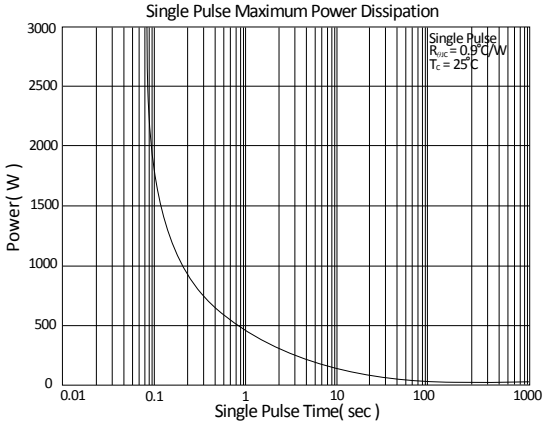

Capacitance Characteristics



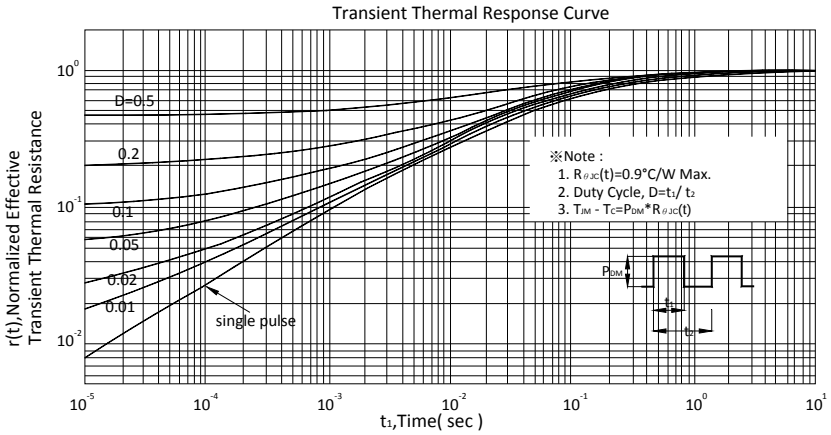

Maximum Safe Operating Area



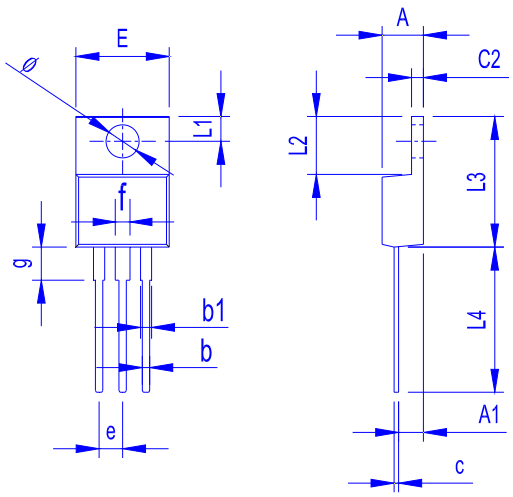

Single Pulse Maximum Power Dissipation




Transient Thermal Response Curve



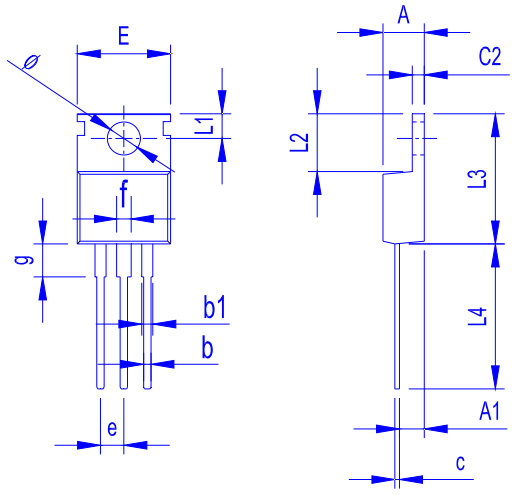
Outline Drawing A




Dimension in mm

| Dimension | A | A1 | b | b1 | c | c2 | E | L1 | L2 | L3 | L4 | ø | e | f | g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. | 4.20 | 2.40 | 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 |
| Max. | 4.80 | 3.00 | 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 |

Outline Drawing B




Dimension in mm

| Dimension | A | A1 | b | b1 | c | c2 | E | L1 | L2 | L3 | L4 | ø | e | f | g |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. | 4.20 | 2.20 | 0.70 | 1.17 | 0.30 | 1.10 | 9.66 | 2.55 | 6.10 | 14.80 | 12.70 | 3.40 | 2.35 | 1.17 | 2.60 |
| Max. | 4.80 | 2.60 | 1.10 | 1.72 | 0.70 | 1.50 | 10.50 | 2.95 | 6.80 | 15.90 | 14.50 | 3.80 | 2.75 | 1.90 | 3.80 |