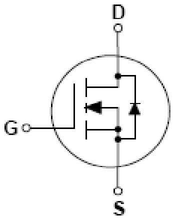
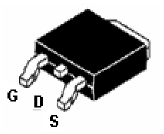
# N-Channel Enhancement Mode MOSFET **BL6N40D**

## FEATURES

- $R_{DS(ON)} = 1.0\Omega$ @ $V_{GS} = 10V$
- Fast switching speed
- Improved dv/dt capability

**HF**





**TO-252**

## Ordering Information

| Part Number | Package | Shipping | Marking Code |
|---|---|---|---|
| BL6N40D | TO-252 | 80pcs / Tube or 2500pcs / Tape & Reel | 6N40D |

## MAXIMUM RATING operating temperature range applies unless otherwise specified

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source voltage | 400 | V |
| $V_{GS}$ | Gate -Source voltage | ±30 | V |
| $I_D$ | Continuous Drain current(Note5) | 6 | A |
| $I_{DM}$ | Pulsed Drain current(Note5) | 24 | A |
| $E_{AS}$ | Single Pulse Avalanche Energy(Note3) | 330 | mJ |
| $E_{AR}$ | Avalanche Energy,Repetitive(Note2) | 8.5 | mJ |
| $I_{AR}$ | Avalanche Current(Note2) | 6 | A |
| dv/dt | Peak Diode Recovery dv/dt(Note4) | 4.5 | V/ns |
| $P_D$ | Power Dissipation | 62.5 | W |
| $R_{\theta JC}$ | Junction-to-Case | 2 | ℃/W |
| $R_{\theta JA}$ | Junction-to-Ambient | 110 | ℃/W |
| $T_J$, $T_{stg}$ | Junction and Storage Temperature | -55 to +150 | ℃ |

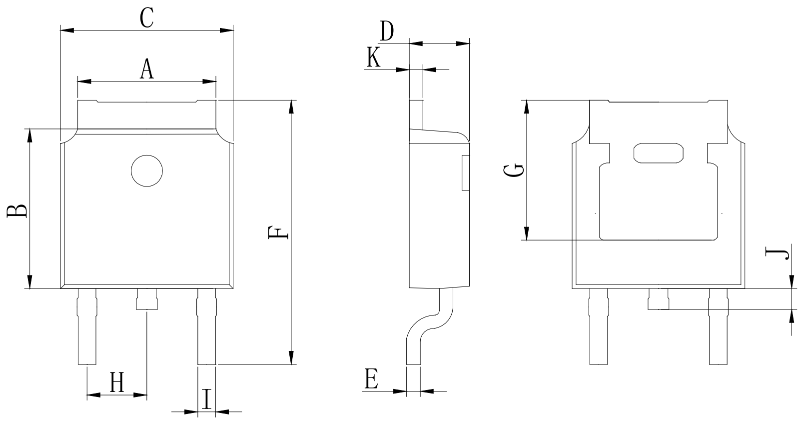
Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
3. L=19mH, $I_{AS}$=5.5A, $V_{DD}$=50V, $R_G$=25Ω, Starting TJ =25°C.
4. $I_{SD}$≤6A, di/dt ≤ 200A/μs, $V_{DD}$ ≤ $BV_{DSS}$, Starting TJ =25°C.
5. Drain current limited by maximum junction temperature.

## ELECTRICAL CHARACTERISTICS

| **Parameter** | **Symbol** | **Test conditions** | **MIN** | **TYP** | **MAX** | **UNIT** |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V,$I_D$=250μA | 400 | - | - | V |
| Bvdss Temperature Coefficient | $\triangle BV_{DSS}/$<br>$\triangle T_J$ | $I_D$=250uA | - | 0.54 | - | V/℃ |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$= $V_{GS}$, $I_D$ =250uA | 2 | | 4 | V |
| Drain to Source Leakage Current | $I_{DSS}$ | $V_{DS}$=400V, $V_{GS}$=0V | - | - | 1 | uA |
| Static drain-Source on-resistance | $R_{DS(ON)}$ | $V_{GS}$=10V,$I_D$=3A | - | 0.78 | 1 | Ω |
| Gate-body Leakage Forward<br>Reverse | $I_{GSS}$ | $V_{GS}$=±30V | - | - | ±100 | nA |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V $V_{DS}$ = 25V<br>f = 1.0MHz | - | 480 | 625- | pF |
| Output Capacitance | $C_{oss}$ | | - | 80 | 105 | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 15 | 20 | |
| Turn-on Delay Time | $t_{d(ON)}$ | $I_D$ =6A,$V_{DD}$ = 200V<br>$R_G$ = 25Ω $^{(Note1,2)}$ | - | 13 | 35 | ns |
| Rise Time | tr | | - | 65 | 140 | |
| Turn-Off Delay Time | $t_{d(OFF)}$ | | - | 21 | 55 | |
| Fall Time | tf | | - | 38 | 85 | |
| Total Gate Charge | $Q_g$ | $I_D$ =6A,$V_{DS}$=320V<br>$V_{GS}$ = 10V$^{(Note1,2)}$ | - | 16 | 20 | nC |
| Gate to Source Charge | $Q_{gs}$ | | - | 2.3 | - | |
| Gate to Drain (“Miller”)Charge | $Q_{gd}$ | | - | 8.2 | - | |
| Reverse Recovery Time | trr | $I_S$=6A,Tj = 25℃<br>dIF/dt=100A/us$^{(Note1)}$,<br>$V_{GS}$=0V | - | 230 | - | ns |
| Reverse Recovery Charge | Qrr | | - | 1.7 | - | nC |

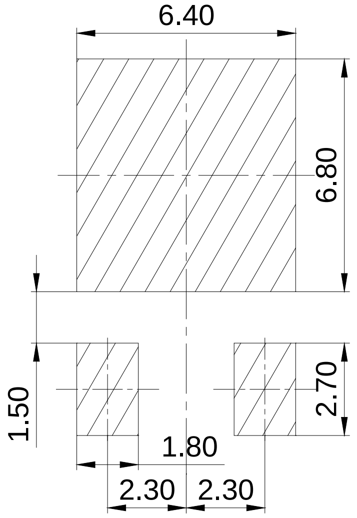
## PACKAGE OUTLINE

Plastic surface mounted package TO-252



| TO-252 | | |
|---|---|---|
| A | 5.05 | 5.65 |
| B | 5.80 | 6.40 |
| C | 6.25 | 6.85 |
| D | 2.20 | 2.40 |
| E | 0.40 | 0.60 |
| F | 9.71 | 10.31 |
| G | 5.05 | 5.65 |
| H | 2.10 | 2.50 |
| I | 0.70 | 0.90 |
| J | 0.50 | 0.7 |
| K | 0.40 | 0.60 |
| All Dimensions in mm | | |

## SOLDERING FOOTPRINT



Unit: mm