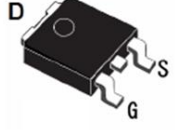
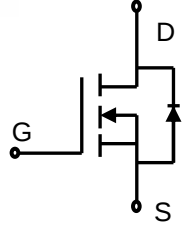


## Lonten N-channel 60V, 100A, 6.2mΩ Power MOSFET

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |     |                             |       |       |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----|-----------------------------|-------|-------|------|
| <p><b>Description</b></p> <p>These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.</p> <p><b>Features</b></p> <ul style="list-style-type: none"> <li>◆ 60V,100A,<math>R_{DS(on).max}=6.2m\Omega@V_{GS}=10V</math></li> <li>◆ Improved dv/dt capability</li> <li>◆ Fast switching</li> <li>◆ 100% EAS Guaranteed</li> <li>◆ Green device available</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>◆ Motor Drives</li> <li>◆ UPS</li> <li>◆ DC-DC Converter</li> </ul> | <p><b>Product Summary</b></p> <table> <tr> <td><math>V_{DSS}</math></td><td>60V</td></tr> <tr> <td><math>R_{DS(on).max}@V_{GS}=10V</math></td><td>6.2mΩ</td></tr> <tr> <td><math>I_D</math></td><td>100A</td></tr> </table> <p><b>Pin Configuration</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p><b>TO-251</b></p> </div> <div style="text-align: center;">  <p><b>TO-252</b></p> </div> </div> <div style="text-align: right;">  <p><b>N-Channel MOSFET</b></p> <p style="text-align: right;">(Pb)</p> </div> | $V_{DSS}$ | 60V | $R_{DS(on).max}@V_{GS}=10V$ | 6.2mΩ | $I_D$ | 100A |
| $V_{DSS}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 60V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |     |                             |       |       |      |
| $R_{DS(on).max}@V_{GS}=10V$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 6.2mΩ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |     |                             |       |       |      |
| $I_D$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 100A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |     |                             |       |       |      |

### Absolute Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

| Parameter                                                      | Symbol    | Value       | Unit       |
|----------------------------------------------------------------|-----------|-------------|------------|
| Drain-Source Voltage                                           | $V_{DSS}$ | 60          | V          |
| Continuous drain current ( $T_C = 25^\circ C$ ) <sup>1)</sup>  | $I_D$     | 100         | A          |
| Continuous drain current ( $T_C = 100^\circ C$ ) <sup>1)</sup> |           | 76          | A          |
| Pulsed drain current <sup>2)</sup>                             | $I_{DM}$  | 400         | A          |
| Gate-Source voltage                                            | $V_{GSS}$ | $\pm 20$    | V          |
| Avalanche energy <sup>3)</sup>                                 | $E_{AS}$  | 259         | mJ         |
| Power Dissipation ( $T_C = 25^\circ C$ )                       | $P_D$     | 110         | W          |
| Storage Temperature Range                                      | $T_{STG}$ | -55 to +150 | $^\circ C$ |
| Operating Junction Temperature Range                           | $T_J$     | -55 to +150 | $^\circ C$ |

### Thermal Characteristics

| Parameter                               | Symbol          | Value | Unit         |
|-----------------------------------------|-----------------|-------|--------------|
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | 1.13  | $^\circ C/W$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 65    | $^\circ C/W$ |

**Package Marking and Ordering Information**

| Device    | Device Package | Marking   |
|-----------|----------------|-----------|
| LNH06R062 | TO-251         | LNH06R062 |
| LNG06R062 | TO-252         | LNG06R062 |

**Electrical Characteristics**
 $T_J = 25^{\circ}\text{C}$  unless otherwise noted

| Parameter                                              | Symbol              | Test Condition                                                        | Min. | Typ. | Max. | Unit |
|--------------------------------------------------------|---------------------|-----------------------------------------------------------------------|------|------|------|------|
| Static characteristics                                 |                     |                                                                       |      |      |      |      |
| Drain-source breakdown voltage                         | BV <sub>DSS</sub>   | V <sub>GS</sub> =0 V, I <sub>D</sub> =250uA                           | 60   | ---  | ---  | V    |
| Gate threshold voltage                                 | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA              | 1.0  | ---  | 3.0  | V    |
| Drain-source leakage current                           | I <sub>DSS</sub>    | V <sub>DS</sub> =60 V, V <sub>GS</sub> =0 V, T <sub>J</sub> = 25°C    | ---  | ---  | 1    | μA   |
|                                                        |                     | V <sub>DS</sub> =60 V, V <sub>GS</sub> =0 V, T <sub>J</sub> = 125°C   | ---  | ---  | 5    | μA   |
| Gate leakage current, Forward                          | I <sub>GSSF</sub>   | V <sub>GS</sub> =20 V, V <sub>DS</sub> =0 V                           | ---  | ---  | 100  | nA   |
| Gate leakage current, Reverse                          | I <sub>GSSR</sub>   | V <sub>GS</sub> =-20 V, V <sub>DS</sub> =0 V                          | ---  | ---  | -100 | nA   |
| Drain-source on-state resistance                       | R <sub>DS(on)</sub> | V <sub>GS</sub> =10 V, I <sub>D</sub> =20 A                           | ---  | 4.5  | 6.2  | mΩ   |
|                                                        |                     | V <sub>GS</sub> =4.5 V, I <sub>D</sub> =10 A                          | ---  | 6.7  | 10   | mΩ   |
| Forward transconductance                               | g <sub>fs</sub>     | V <sub>DS</sub> =5 V , I <sub>D</sub> =50A                            | ---  | 56   | ---  | S    |
| Dynamic characteristics                                |                     |                                                                       |      |      |      |      |
| Input capacitance                                      | C <sub>iss</sub>    | V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V,<br>F = 1MHz            | ---  | 6080 | ---  | pF   |
| Output capacitance                                     | C <sub>oss</sub>    |                                                                       | ---  | 393  | ---  |      |
| Reverse transfer capacitance                           | C <sub>rss</sub>    |                                                                       | ---  | 192  | ---  |      |
| Turn-on delay time                                     | t <sub>d(on)</sub>  | V <sub>DD</sub> = 30V,V <sub>GS</sub> =10V, I <sub>D</sub> = 10A      | ---  | 15   | ---  | ns   |
| Rise time                                              | t <sub>r</sub>      |                                                                       | ---  | 13   | ---  |      |
| Turn-off delay time                                    | t <sub>d(off)</sub> |                                                                       | ---  | 50   | ---  |      |
| Fall time                                              | t <sub>f</sub>      |                                                                       | ---  | 36   | ---  |      |
| Gate resistance                                        | R <sub>g</sub>      | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz                      | ---  | 2.44 | ---  | Ω    |
| Gate charge characteristics                            |                     |                                                                       |      |      |      |      |
| Gate to source charge                                  | Q <sub>gs</sub>     | V <sub>DS</sub> =30 V, I <sub>D</sub> =40A,<br>V <sub>GS</sub> = 10 V | ---  | 26.6 | ---  | nC   |
| Gate to drain charge                                   | Q <sub>gd</sub>     |                                                                       | ---  | 37.9 | ---  |      |
| Gate charge total                                      | Q <sub>g</sub>      |                                                                       | ---  | 130  | ---  |      |
| Drain-Source diode characteristics and Maximum Ratings |                     |                                                                       |      |      |      |      |
| Continuous Source Current                              | I <sub>S</sub>      |                                                                       | ---  | ---  | 100  | A    |
| Pulsed Source Current <sup>4)</sup>                    | I <sub>SM</sub>     |                                                                       | ---  | ---  | 400  | A    |
| Diode Forward Voltage                                  | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =40A, T <sub>J</sub> =25°C        | ---  | 0.95 | 1.4  | V    |
| Reverse Recovery Time                                  | t <sub>rr</sub>     | I <sub>S</sub> =40A, di/dt=100A/us,                                   | ---  | 50   | ---  | ns   |
| Reverse Recovery Charge                                | Q <sub>rr</sub>     | T <sub>J</sub> =25°C                                                  | ---  | 80   | ---  | nC   |

**Notes:**

- 1: The maximum junction current rating is package limited.
- 2: Repetitive Rating: Pulse width limited by maximum junction temperature.
- 3:  $V_{DD}=50\text{ V}, V_{GS}=10\text{ V}, L=0.1\text{ mH}, I_{AS}=72\text{ A}, R_G=25\Omega$ , Starting  $T_J=25^{\circ}\text{C}$ .
- 4: Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

## Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

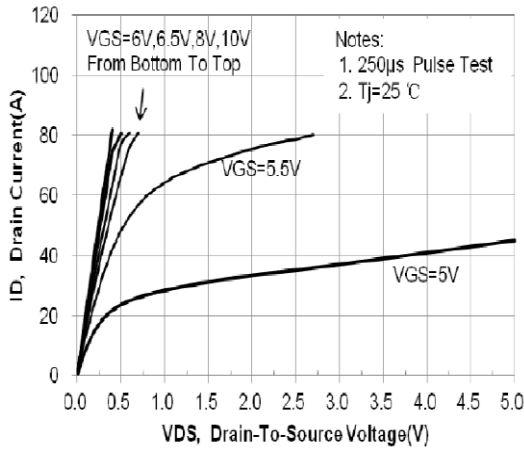


Figure 2. Transfer Characteristics

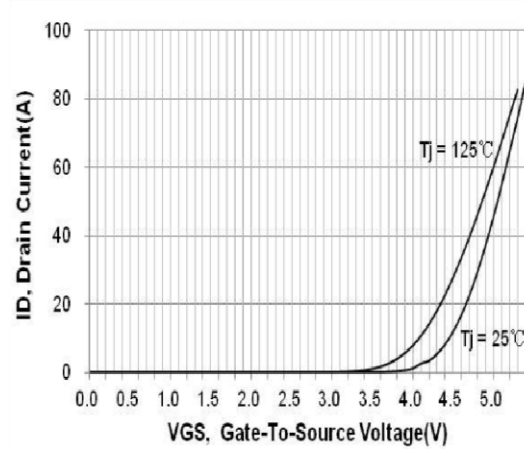


Figure 3. Capacitance Characteristics

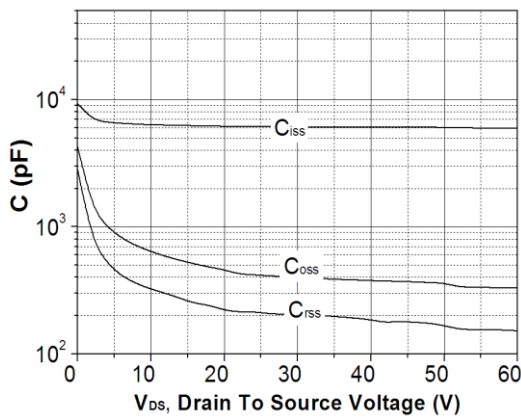


Figure 4. Gate Charge Waveform

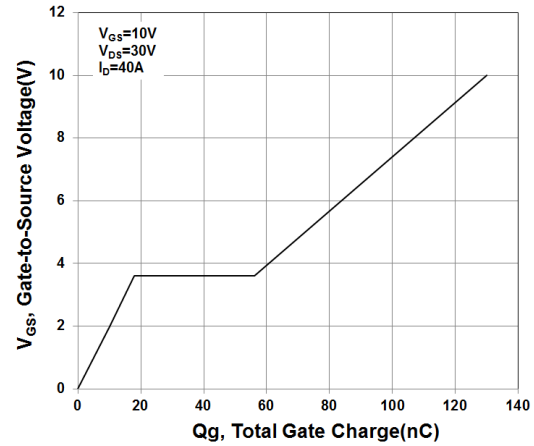


Figure 5. Body-Diode Characteristics

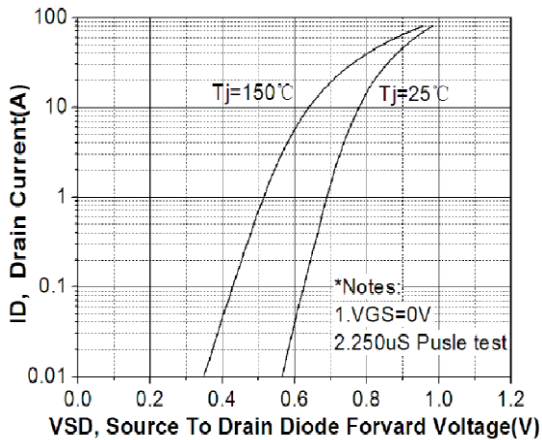


Figure 6. Normalized Maximum Transient Thermal Impedance (RthJC)

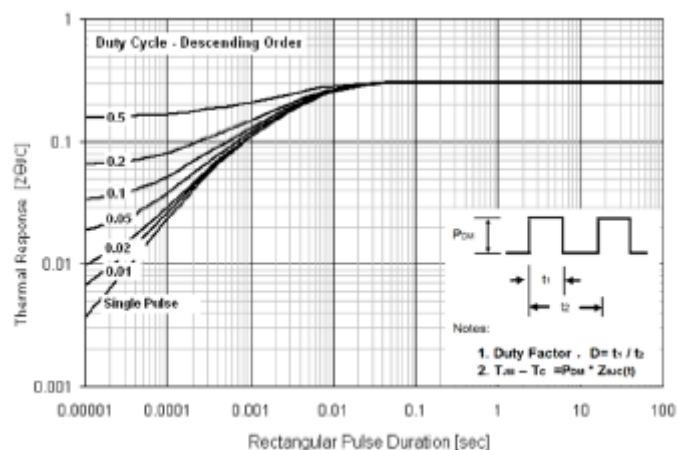
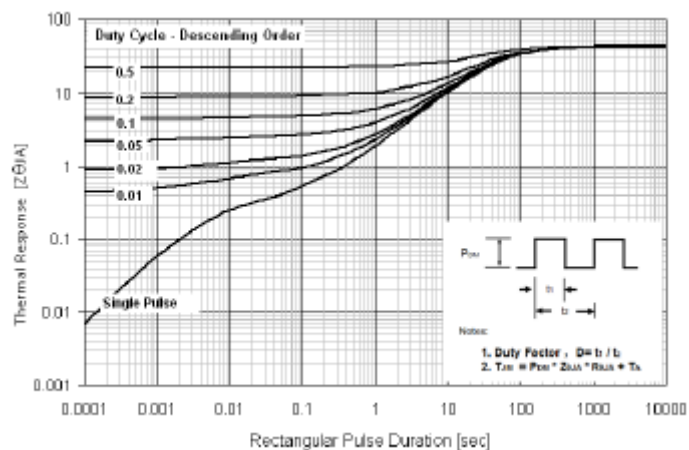


Figure 7. Normalized Maximum Transient Thermal Impedance (RthJA)



## Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

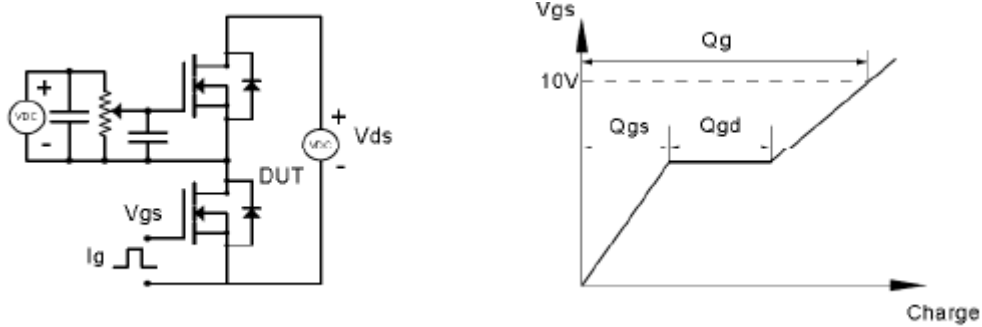


Figure 9. Resistive Switching Test Circuit & Waveforms

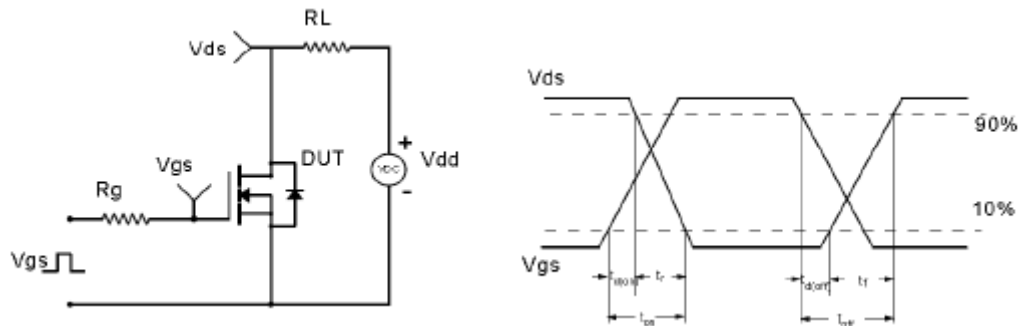


Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

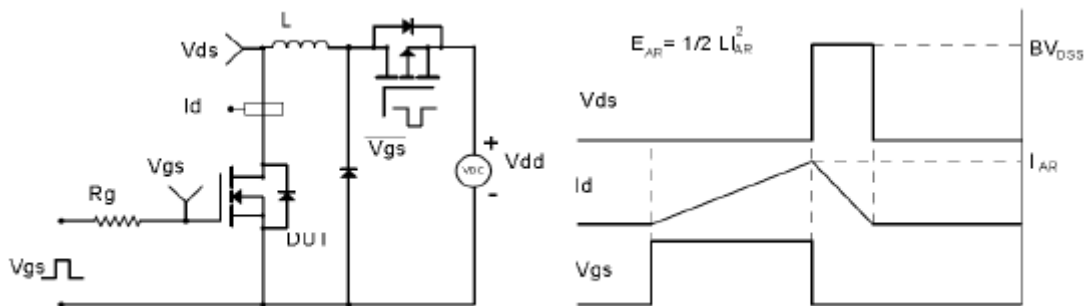
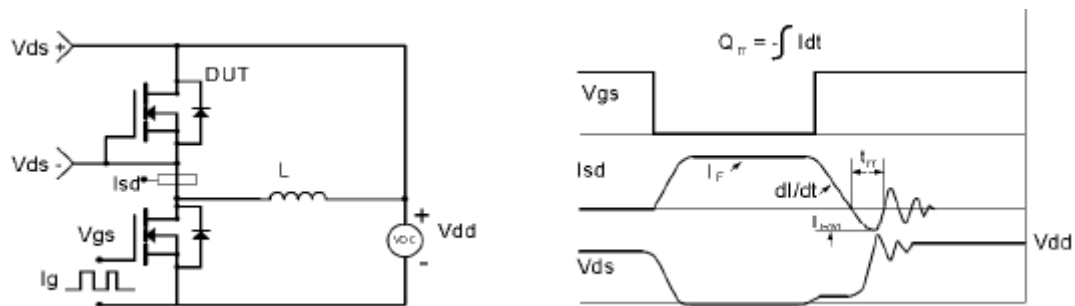
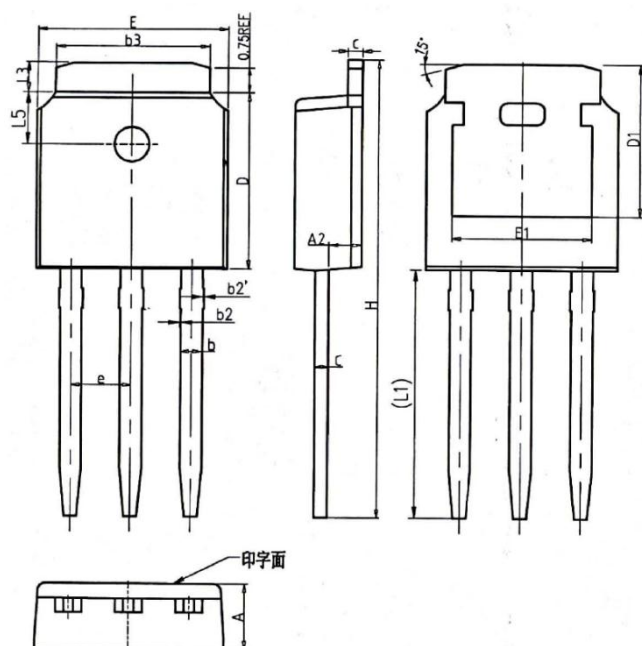


Figure 11. Diode Recovery Circuit & Waveform

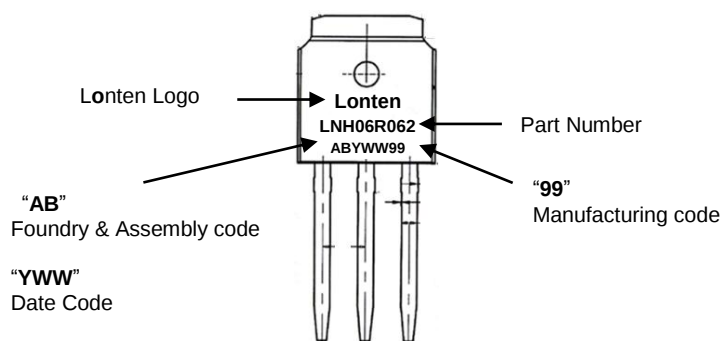


## Mechanical Dimensions for TO-251

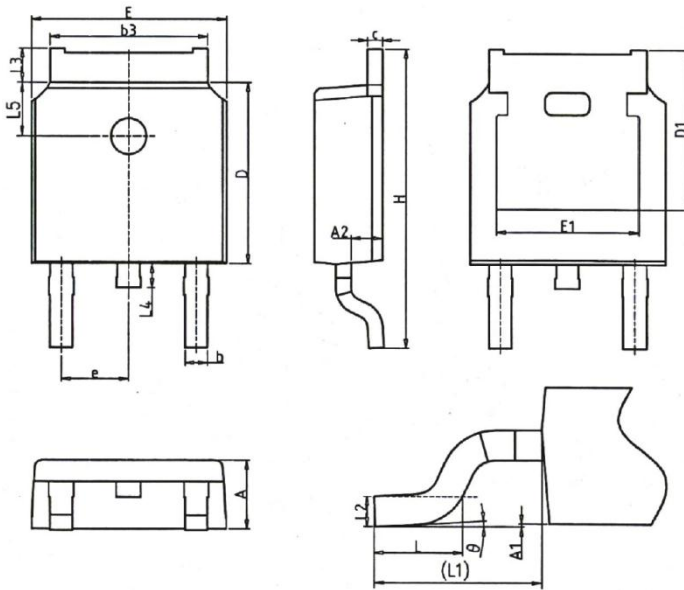


| COMMON DIMENSIONS |          |       |       |          |       |       |
|-------------------|----------|-------|-------|----------|-------|-------|
| SYMBOL            | MM       |       |       | INCH     |       |       |
|                   | MIN      | NOM   | MAX   | MIN      | NOM   | MAX   |
| A                 | 2.20     | 2.30  | 2.38  | 0.087    | 0.091 | 0.094 |
| A2                | 0.97     | 1.07  | 1.17  | 0.038    | 0.042 | 0.046 |
| b                 | 0.68     | 0.78  | 0.90  | 0.027    | 0.031 | 0.035 |
| b2                | 0.00     | 0.04  | 0.10  | 0.000    | 0.002 | 0.004 |
| b2'               | 0.00     | 0.04  | 0.10  | 0.000    | 0.002 | 0.004 |
| b3                | 5.20     | 5.33  | 5.46  | 0.205    | 0.210 | 0.215 |
| c                 | 0.43     | 0.53  | 0.61  | 0.017    | 0.021 | 0.024 |
| D                 | 5.98     | 6.10  | 6.22  | 0.235    | 0.240 | 0.245 |
| D1                | 5.30REF  |       |       | 0.209REF |       |       |
| E                 | 6.40     | 6.60  | 6.73  | 0.252    | 0.260 | 0.265 |
| E1                | 4.63     | -     | -     | 0.182    | -     | -     |
| e                 | 2.286BSC |       |       | 0.090BSC |       |       |
| H                 | 16.22    | 16.52 | 16.82 | 0.639    | 0.650 | 0.662 |
| L1                | 9.15     | 9.40  | 9.65  | 0.360    | 0.370 | 0.380 |
| L3                | 0.88     | 1.02  | 1.28  | 0.035    | 0.040 | 0.050 |
| L5                | 1.65     | 1.80  | 1.95  | 0.065    | 0.071 | 0.077 |

## TO-251 Part Marking Information

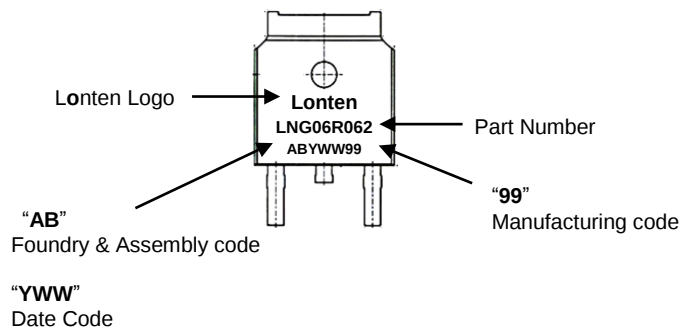


## Mechanical Dimensions for TO-252



| COMMON DIMENSIONS |          |       |       |          |       |       |
|-------------------|----------|-------|-------|----------|-------|-------|
| SYMBOL            | MM       |       |       | INCH     |       |       |
|                   | MIN      | NOM   | MAX   | MIN      | NOM   | MAX   |
| A                 | 2.20     | 2.30  | 2.38  | 0.087    | 0.091 | 0.094 |
| A1                | 0.00     | -     | 0.20  | 0.000    | -     | 0.008 |
| A2                | 0.97     | 1.07  | 1.17  | 0.038    | 0.042 | 0.046 |
| b                 | 0.68     | 0.78  | 0.90  | 0.027    | 0.031 | 0.035 |
| b3                | 5.20     | 5.33  | 5.46  | 0.205    | 0.210 | 0.215 |
| c                 | 0.43     | 0.53  | 0.61  | 0.017    | 0.021 | 0.024 |
| D                 | 5.98     | 6.10  | 6.22  | 0.235    | 0.240 | 0.245 |
| D1                | 5.30REF  |       |       | 0.209REF |       |       |
| E                 | 6.40     | 6.60  | 6.73  | 0.252    | 0.260 | 0.265 |
| E1                | 4.63     | -     | -     | 0.182    | -     | -     |
| e                 | 2.286BSC |       |       | 0.090BSC |       |       |
| H                 | 9.40     | 10.10 | 10.50 | 0.370    | 0.398 | 0.413 |
| L                 | 1.38     | 1.50  | 1.75  | 0.054    | 0.059 | 0.069 |
| L1                | 2.90REF  |       |       | 0.114REF |       |       |
| L2                | 0.51BSC  |       |       | 0.020BSC |       |       |
| L3                | 0.88     | -     | 1.28  | 0.035    | -     | 0.050 |
| L4                | 0.50     | -     | 1.00  | 0.020    | -     | 0.039 |
| L5                | 1.65     | 1.80  | 1.95  | 0.065    | 0.071 | 0.077 |
| θ                 | 0°       | -     | 8°    | 0°       | -     | 8°    |

## TO-252 Part Marking Information



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