# Lonten N-channel 80V, 60A, 16mΩ Power MOSFET

## Description

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.

## Features

- 80V,60A,$R_{DS(on).max}$=16mΩ@$V_{GS}$=10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

## Applications

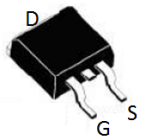
- Motor Drives
- UPS
- DC-DC Converter

## Product Summary

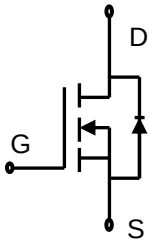
| | |
|---|---|
| $V_{DSS}$ | 80V |
| $R_{DS(on).max}$@ $V_{GS}$=10V | 16mΩ |
| $I_D$ | 60A |

## Pin Configuration


TO-220




TO-263




N-Channel MOSFET

## Absolute Maximum Ratings

$T_C$ = 25°C unless otherwise noted

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 80 | V |
| Continuous drain current ( $T_C$ = 25°C ) | $I_D$ | 60 | A |
| Continuous drain current ( $T_C$ = 100°C ) | | 39 | A |
| Pulsed drain current[1)] | $I_{DM}$ | 240 | A |
| Gate-Source voltage | $V_{GSS}$ | ±20 | V |
| Avalanche energy[2)] | $E_{AS}$ | 132 | mJ |
| Power Dissipation ( $T_C$ = 25°C ) | $P_D$ | 110 | W |
| Storage Temperature Range | $T_{STG}$ | -55 to +150 | °C |
| Operating Junction Temperature Range | $T_J$ | -55 to +150 | °C |

## Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 0.88 | °C/W |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 62 | °C/W |

## Package Marking and Ordering Information

| Device | Device Package | Marking |
|---|---|---|
| LNC08R160 | TO-220 | LNC08R160 |
| LNE08R160 | TO-263 | LNE08R160 |

## Electrical Characteristics

$T_J$ = 25°C unless otherwise noted

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static characteristics** | | | | | | |
| Drain-source breakdown voltage | $BV_{DSS}$ | $V_{GS}$=0 V, $I_D$=250uA | 80 | --- | --- | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 1.0 | 1.6 | 2.5 | V |
| Drain-source leakage current | $I_{DSS}$ | $V_{DS}$=80V, $V_{GS}$=0V, $T_J$ = 25°C | --- | --- | 1 | μA |
| | | $V_{DS}$=64V, $V_{GS}$=0V, $T_J$ = 125°C | --- | --- | 30 | μA |
| Gate leakage current, Forward | $I_{GSSF}$ | $V_{GS}$=20 V, $V_{DS}$=0 V | --- | --- | 100 | nA |
| Gate leakage current, Reverse | $I_{GSSR}$ | $V_{GS}$=-20 V, $V_{DS}$=0 V | --- | --- | -100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}$=10 V, $I_D$= 30 A | --- | 12.5 | 16 | mΩ |
| | | $V_{GS}$=4.5 V, $I_D$=20 A | --- | 16.5 | 21 | mΩ |
| Forward transconductance | $g_{fs}$ | $V_{DS}$ =10V , $I_D$=30A | --- | 52 | --- | S |
| **Dynamic characteristics** | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{DS}$ = 25 V, $V_{GS}$ = 0 V, F = 1MHz | --- | 3116 | --- | pF |
| Output capacitance | $C_{oss}$ | | --- | 196 | --- | |
| Reverse transfer capacitance | $C_{rss}$ | | --- | 140 | --- | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$ =40V,$V_{GS}$=10V, $I_D$ = 30A | --- | 10.7 | --- | ns |
| Rise time | $t_r$ | | --- | 17.7 | --- | |
| Turn-off delay time | $t_{d(off)}$ | | --- | 139.7 | --- | |
| Fall time | $t_f$ | | --- | 28.3 | --- | |
| Gate resistance | $R_g$ | $V_{GS}$=0V, $V_{DS}$=0V, F=1MHz | --- | 1.5 | --- | Ω |
| **Gate charge characteristics** | | | | | | |
| Gate to source charge | $Q_{gs}$ | $V_{DS}$=40 V, $I_D$=30A, $V_{GS}$= 10 V | --- | 13.6 | --- | nC |
| Gate to drain charge | $Q_{gd}$ | | --- | 11.7 | --- | |
| Gate charge tota | $Q_g$ | | --- | 58 | --- | |
| **Drain-Source diode characteristics and Maximum Ratings** | | | | | | |
| Diode Forward Voltage[3)] | $V_{SD}$ | $V_{GS}$=0V, $I_S$=30A, $T_J$=25℃ | --- | 0.85 | 1.3 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_S$=30A, di/dt=100A/us, $T_J$=25℃ | --- | 27.7 | --- | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | --- | 41 | --- | nC |

Notes:

1: Repetitive Rating: Pulse width limited by maximum junction temperature.

2: $V_{DD}$=50V, $V_{GS}$=10V, L=0.5mH, $I_{AS}$=23A, $R_G$=25Ω, Starting $T_J$=25℃.

3: Pulse Test：Pulse Width ≤300μs, Duty Cycle≤2%.

## Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

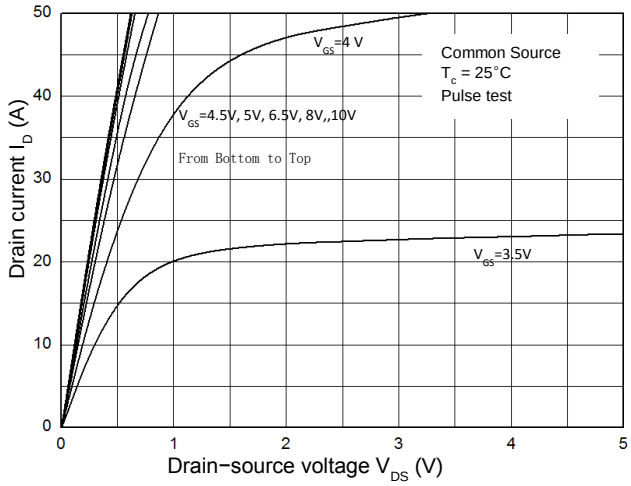



Figure 2. Transfer Characteristics

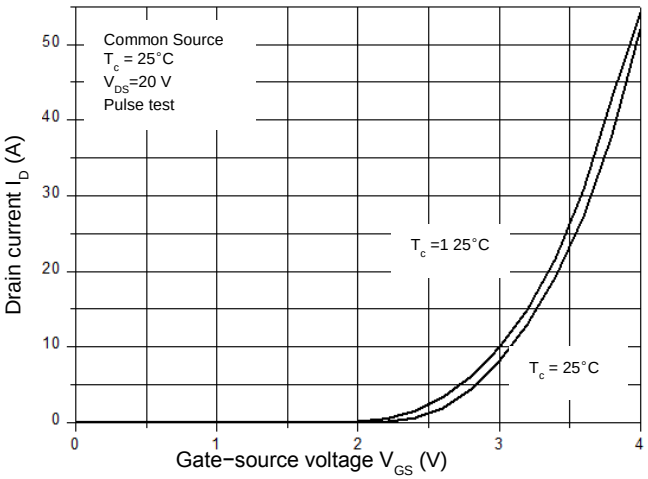



Figure 3. Capacitance Characteristics

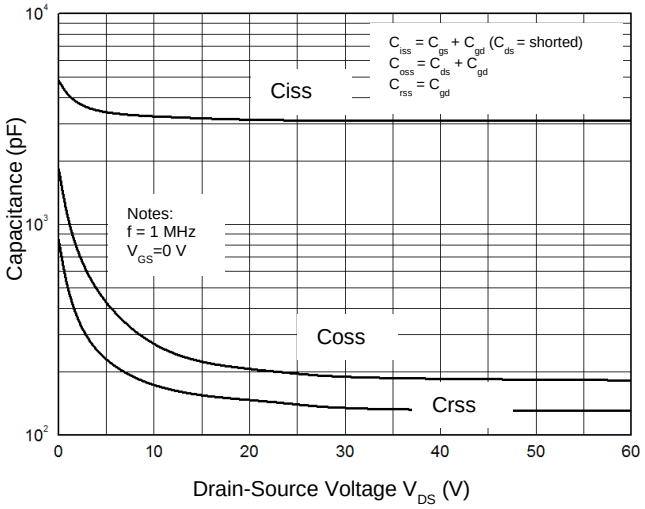



Figure 4. Gate Charge Waveform

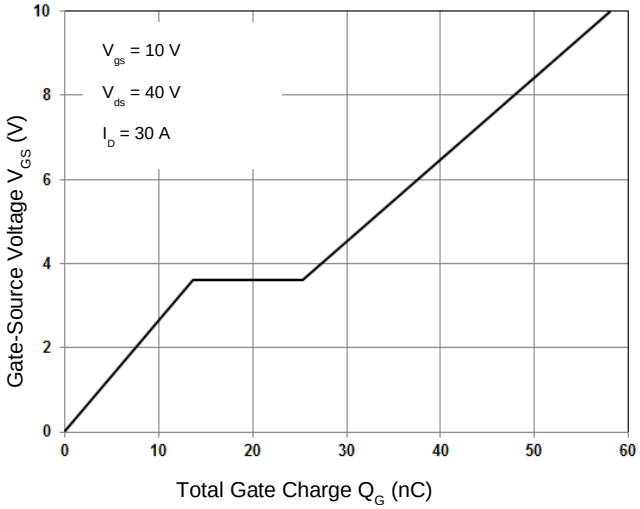



Figure 5. Body-Diode Characteristics

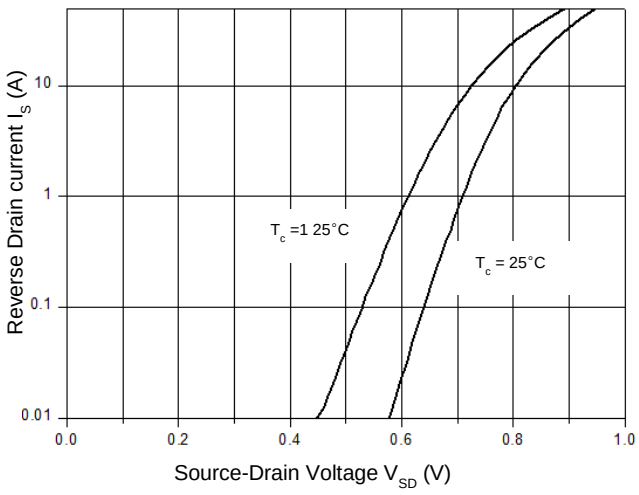



Figure 6. Rdson-Drain Current

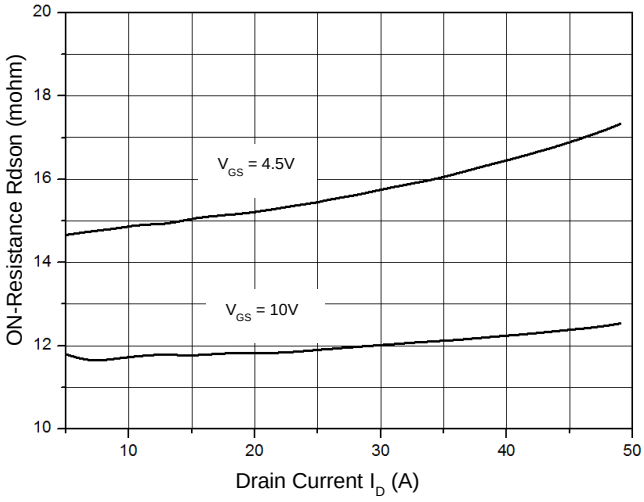


Figure 7. Rdson-Junction Temperature(℃)

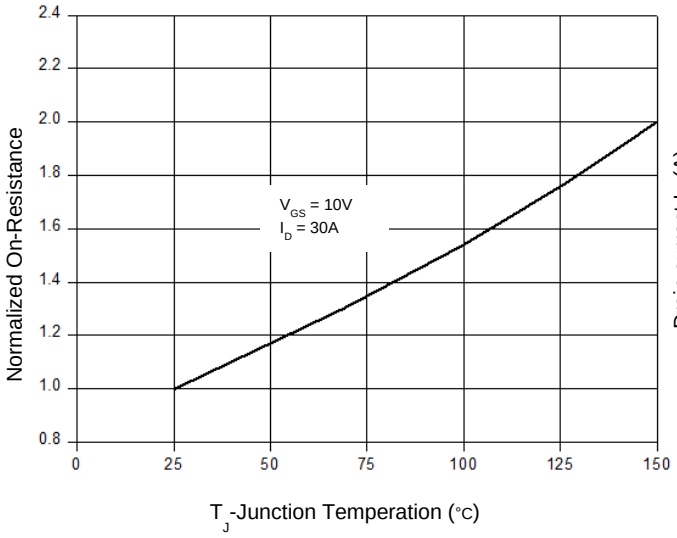



Figure 8. Maximum Safe Operating Area

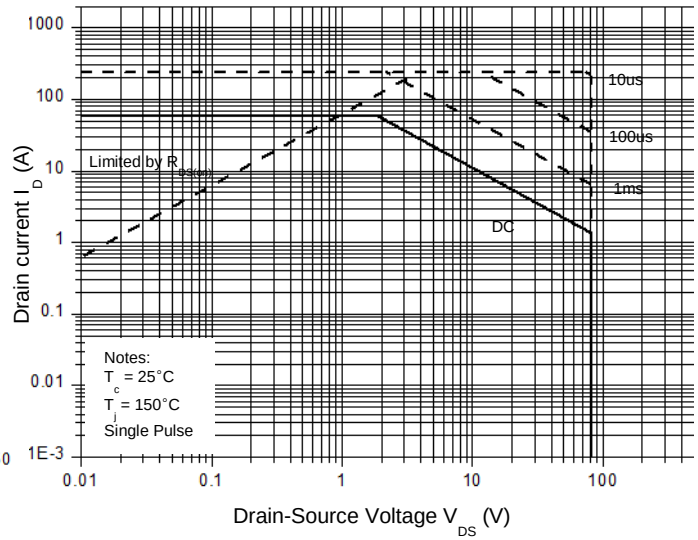



Figure 6. Normalized Maximum Transient Thermal Impedance (RthJC)

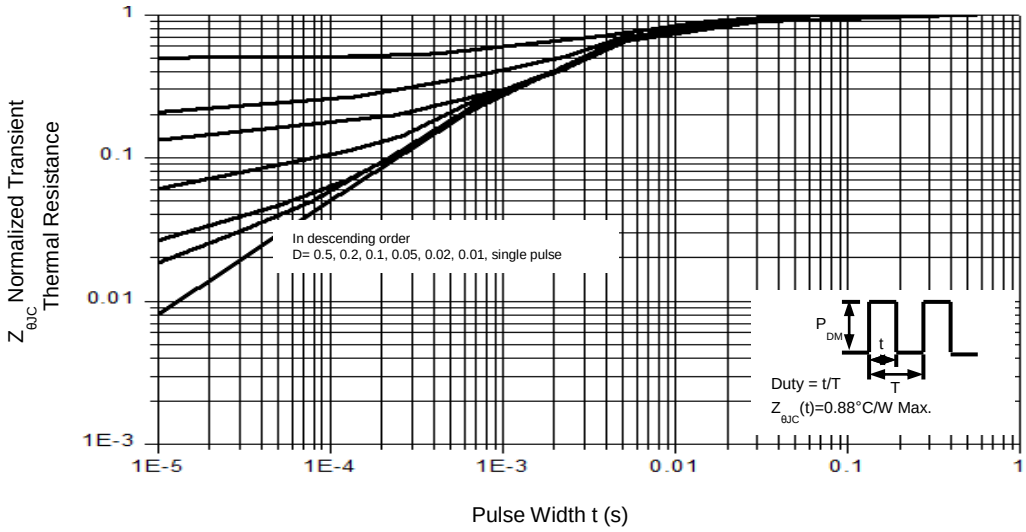
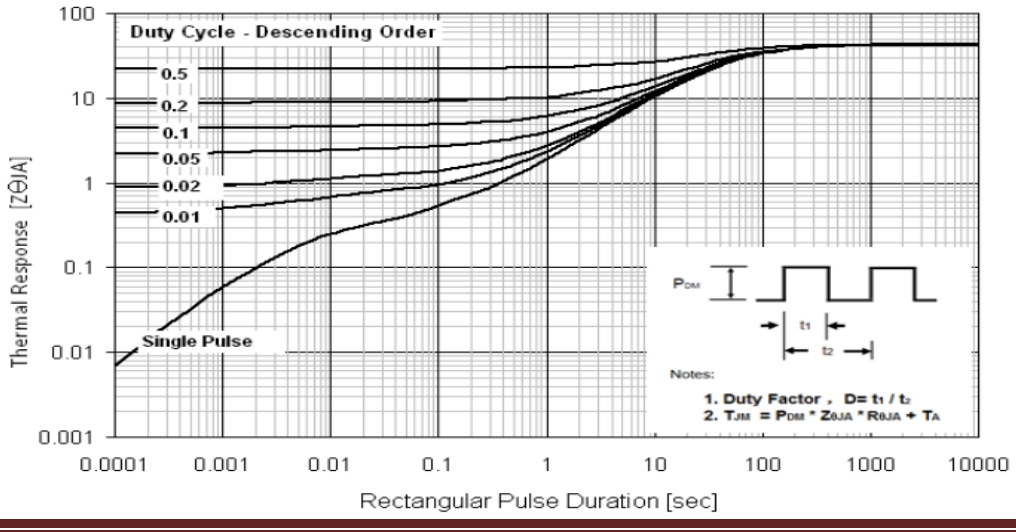



Figure 7. Normalized Maximum Transient Thermal Impedance (RthJA)



## Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

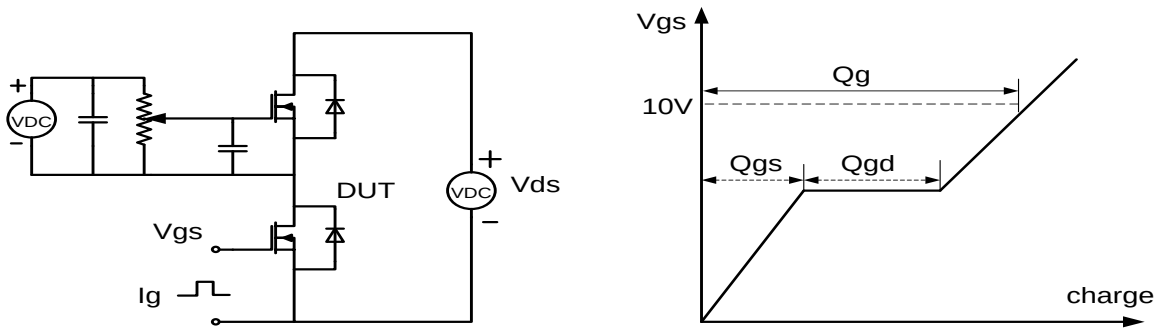



Figure 9. Resistive Switching Test Circuit & Waveforms

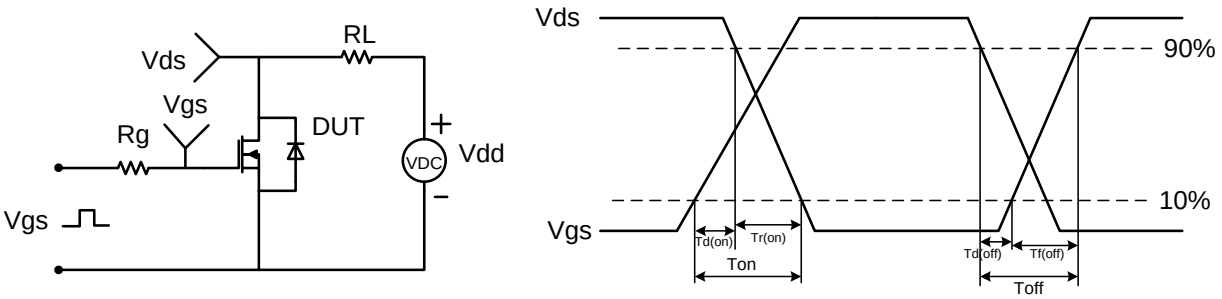



Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

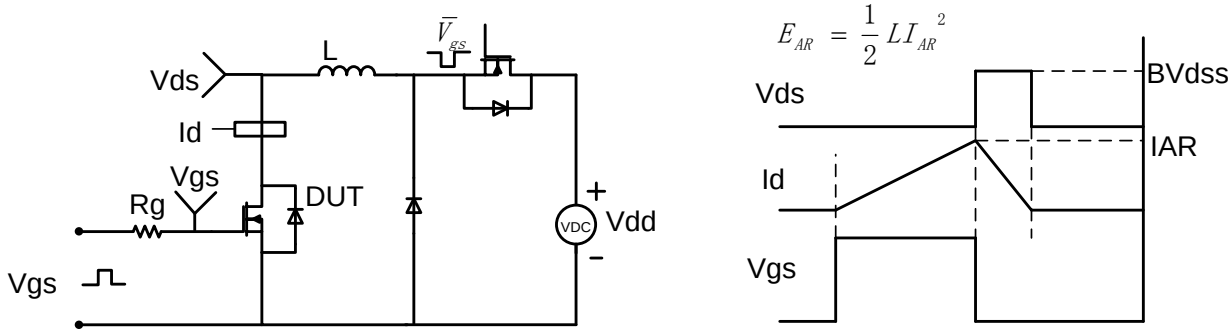
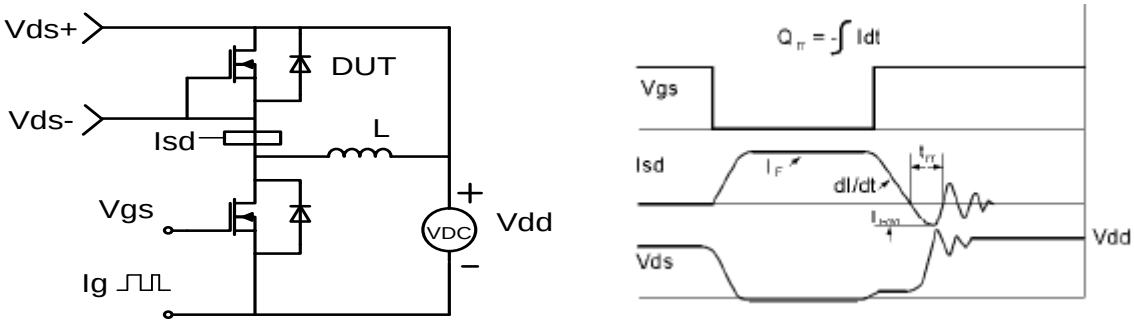
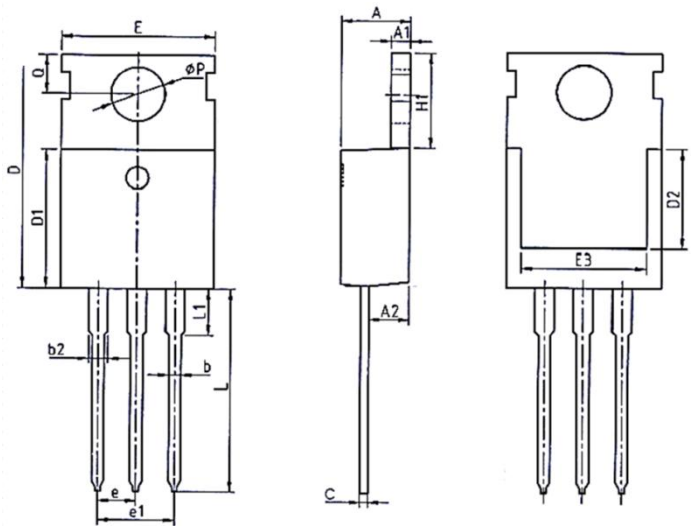



Figure 11. Diode Recovery Circuit & Waveform

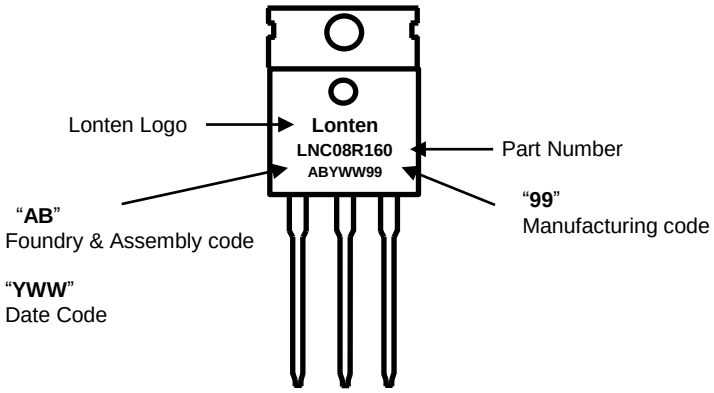


# TO-220 PACKAGE INFORMATION




| COMMON DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|
| SYMBOL | MM | | | INCH | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 4.37 | 4.57 | 4.70 | 0.172 | 0.180 | 0.185 |
| A1 | 1.25 | 1.30 | 1.40 | 0.049 | 0.051 | 0.055 |
| A2 | 2.20 | 2.40 | 2.60 | 0.087 | 0.094 | 0.102 |
| b | 0.70 | 0.80 | 0.95 | 0.028 | 0.031 | 0.037 |
| b2 | 1.17 | 1.27 | 1.47 | 0.046 | 0.050 | 0.058 |
| c | 0.45 | 0.50 | 0.60 | 0.018 | 0.020 | 0.024 |
| D | 15.10 | 15.60 | 16.10 | 0.594 | 0.614 | 0.634 |
| D1 | 8.80 | 9.10 | 9.40 | 0.346 | 0.358 | 0.370 |
| D2 | 5.50 | - | - | 0.217 | - | - |
| E | 9.70 | 10.00 | 10.30 | 0.382 | 0.394 | 0.406 |
| E3 | 7.00 | - | - | 0.276 | - | - |
| e | 2.54BCS | | | 0.1BSC | | |
| e1 | 5.08BCS | | | 0.2REF | | |
| H1 | 6.25 | 6.50 | 6.85 | 0.246 | 0.256 | 0.270 |
| L | 12.75 | 13.50 | 13.80 | 0.502 | 0.531 | 0.543 |
| L1 | - | 3.10 | 3.40 | - | 0.122 | 0.134 |
| ØP | 3.40 | 3.60 | 3.80 | 0.134 | 0.142 | 0.150 |
| Q | 2.60 | 2.80 | 3.00 | 0.102 | 0.110 | 0.118 |

### TO-220 Part Marking Information



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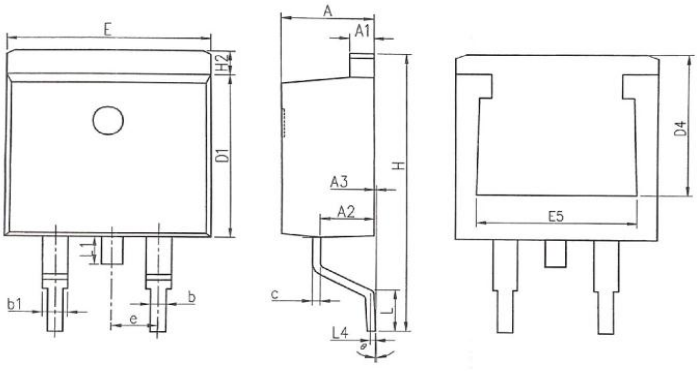
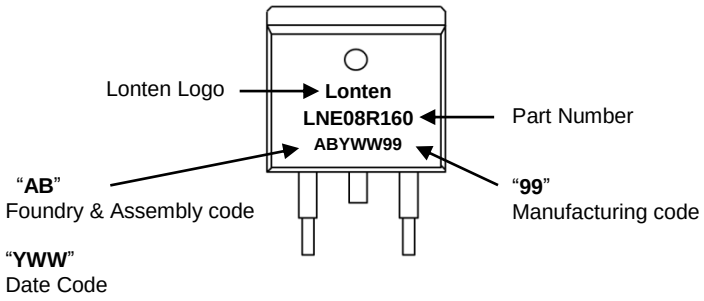



| COMMON DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|
| SYMBOL | MM | | | INCH | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 4.37 | 4.57 | 4.77 | 0.172 | 0.180 | 0.188 |
| A1 | 1.22 | 1.27 | 1.42 | 0.048 | 0.050 | 0.056 |
| A2 | 2.49 | 2.69 | 2.89 | 0.098 | 0.106 | 0.114 |
| A3 | 0.00 | 0.13 | 0.25 | 0.000 | 0.005 | 0.010 |
| b | 0.70 | 0.81 | 0.96 | 0.028 | 0.032 | 0.038 |
| b1 | 1.17 | 1.27 | 1.47 | 0.046 | 0.050 | 0.058 |
| c | 0.30 | 0.38 | 0.53 | 0.012 | 0.015 | 0.021 |
| D1 | 8.50 | 8.70 | 8.90 | 0.335 | 0.343 | 0.350 |
| D4 | 6.60 | — | — | 0.260 | — | — |
| E | 9.86 | 10.16 | 10.36 | 0.388 | 0.400 | 0.408 |
| E5 | 7.06 | — | — | 0.278 | — | — |
| e | 2.54 BSC | | | 0.100 BSC | | |
| H | 14.70 | 15.10 | 15.50 | 0.579 | 0.594 | 0.610 |
| H2 | 1.07 | 1.27 | 1.47 | 0.042 | 0.050 | 0.058 |
| L | 2.00 | 2.30 | 2.60 | 0.079 | 0.091 | 0.102 |
| L1 | 1.40 | 1.55 | 1.70 | 0.055 | 0.061 | 0.067 |
| L4 | 0.25 BSC | | | 0.010 BSC | | |
| θ | 0° | 5° | 9° | 0° | 5° | 9° |

### TO-263 Part Marking Information



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