# Lonten N-channel 60V, 90A, 7.9mΩ 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

- 60V,90A,$R_{DS(ON).max}$=7.9mΩ@$V_{GS}$=10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

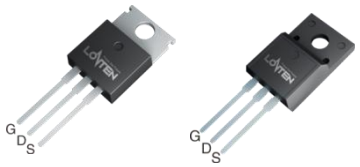
## Applications

- Motor Drives
- UPS
- DC-DC Converter

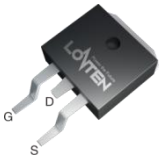
## Product Summary

| | |
|---|---|
| $V_{DSS}$ | 60V |
| $R_{DS(on).max}$@ $V_{GS}$=10V | 7.9mΩ |
| $I_D$ | 90A |

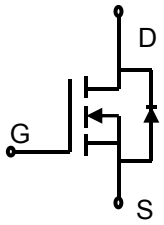
## Pin Configuration




TO-220 TO-220MF




TO-263




N-Channel MOSFET

Pb

S

## Absolute Maximum Ratings

$T_C$ = 25°C unless otherwise noted

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 60 | V |
| Continuous drain current ( $T_C$ = 25°C ) TO-220/TO-263 | $I_D$ | 90 | A |
| Continuous drain current ( $T_C$ = 100°C ) TO-220/TO-263 | | 57 | A |
| Continuous drain current ( $T_C$ = 25°C ) TO-220MF | $I_D$ | 50 | A |
| Continuous drain current ( $T_C$ = 100°C ) TO-220MF | | 31 | A |
| Pulsed drain current[1)] | $I_{DM}$ | 360 | A |
| Gate-Source voltage | $V_{GSS}$ | ±20 | V |
| Avalanche energy[2)] | $E_{AS}$ | 144 | mJ |
| Power Dissipation ( $T_C$ = 25°C ) TO-220/TO-263 | $P_D$ | 125 | W |
| Power Dissipation ( $T_C$ = 25°C ) TO-220MF | $P_D$ | 38 | 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 TO-220/TO-263 | $R_{\theta JC}$ | 1.0 | °C/W |
| Thermal Resistance, Junction-to-Case TO-220MF | $R_{\theta JC}$ | 3.3 | °C/W |

## Package Marking and Ordering Information

| Device | Device Package | Marking |
|---|---|---|
| LNC06R079 | TO-220 | LNC06R079 |
| LND06R079 | TO-220MF | LND06R079 |
| LNE06R079 | TO-263 | LNE06R079 |

## 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 | 60 | --- | --- | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 0.8 | 1.3 | 1.8 | V |
| Drain-source leakage current | $I_{DSS}$ | $V_{DS}$=60V, $V_{GS}$=0V, $T_J$ = 25°C | --- | --- | 1 | μA |
| | | $V_{DS}$=48V, $V_{GS}$=0V, $T_J$ = 125°C | --- | --- | 30 | μA |
| Gate leakage current, Forward | $I_{GSSF}$ | $V_{GS}$=20V, $V_{DS}$=0 V | --- | --- | 100 | nA |
| Gate leakage current, Reverse | $I_{GSSR}$ | $V_{GS}$=-20V, $V_{DS}$=0 V | --- | --- | -100 | nA |
| Drain-source on-state resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=30A | --- | 6.5 | 7.9 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=20A | --- | 7.6 | 9.5 | mΩ |
| Forward transconductance | $g_{fs}$ | $V_{DS}$ =5V , $I_D$=30A | --- | 92 | --- | S |
| **Dynamic characteristics** | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{DS}$ = 25V, $V_{GS}$ = 0V, F = 1MHz | --- | 3752 | --- | pF |
| Output capacitance | $C_{oss}$ | | --- | 269 | --- | |
| Reverse transfer capacitance | $C_{rss}$ | | --- | 206 | --- | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$ = 30V,$V_{GS}$=10V, $I_D$ =25A | --- | 16.5 | --- | ns |
| Rise time | $t_r$ | | --- | 170 | --- | |
| Turn-off delay time | $t_{d(off)}$ | | --- | 464 | --- | |
| Fall time | $t_f$ | | --- | 140 | --- | |
| Gate resistance | $R_g$ | $V_{GS}$=0V, $V_{DS}$=0V, F=1MHz | --- | 2.95 | --- | Ω |
| **Gate charge characteristics** | | | | | | |
| Gate to source charge | $Q_{gs}$ | $V_{DS}$=48V, $I_D$=25A, $V_{GS}$= 10V | --- | 11.7 | --- | nC |
| Gate to drain charge | $Q_{gd}$ | | --- | 13.1 | --- | |
| Gate charge total | $Q_g$ | | --- | 69 | --- | |
| **Drain-Source diode characteristics and Maximum Ratings** | | | | | | |
| Continuous Source Current | $I_S$ | | --- | --- | 90 | A |
| Pulsed Source Current[3)] | $I_{SM}$ | | --- | --- | 360 | A |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_S$=20A, $T_J$=25℃ | --- | --- | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_S$=25A,di/dt=100A/us, $T_J$=25℃ | --- | 26.8 | --- | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | --- | 29 | --- | nC |

Notes:

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

2: $V_{DD}$=25V, $V_{GS}$=10V, L=0.5mH, $I_{AS}$=24A, $R_G$=25Ω, Starting $T_J$=25℃.

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

## Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

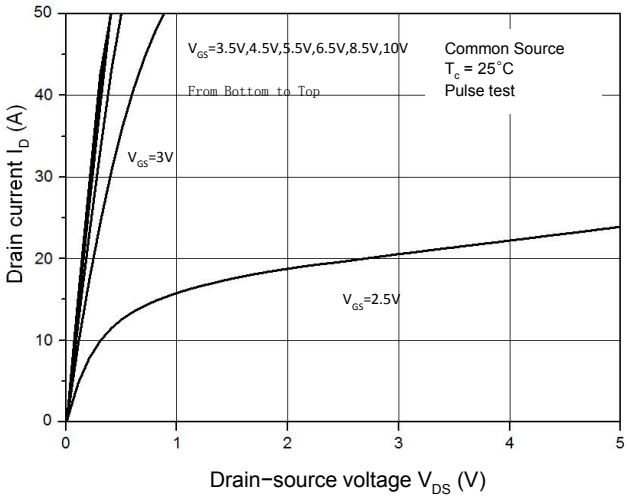



Figure 2. Transfer Characteristics

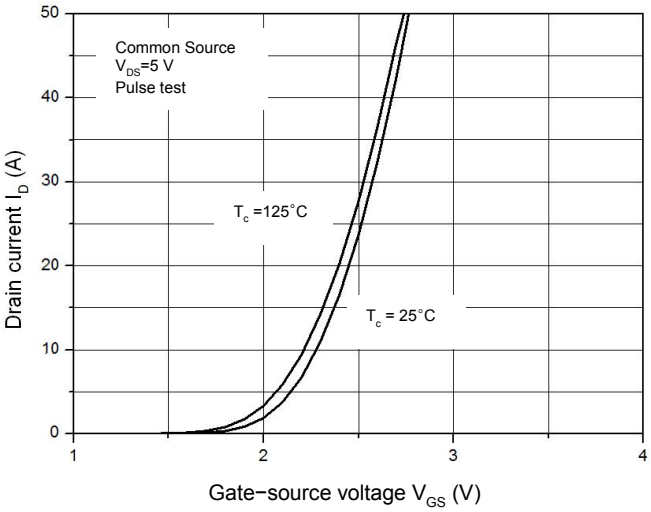



Figure 3. Capacitance Characteristics

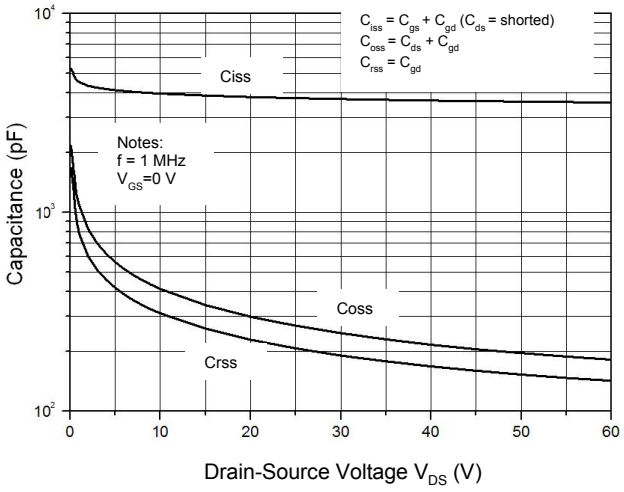



Figure 4. Gate Charge Waveform

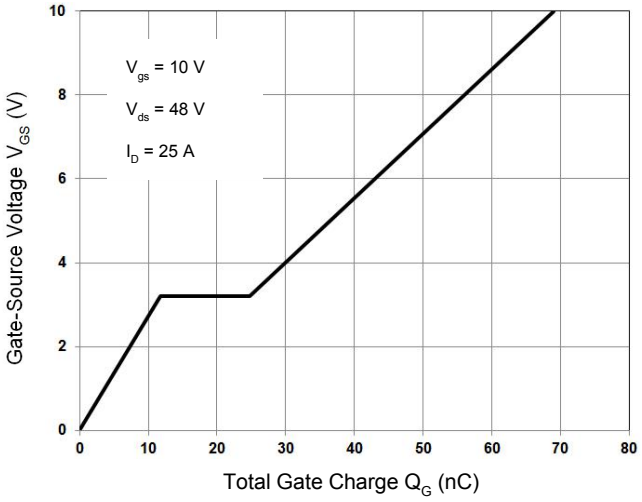



Figure 5. Body-Diode Characteristics

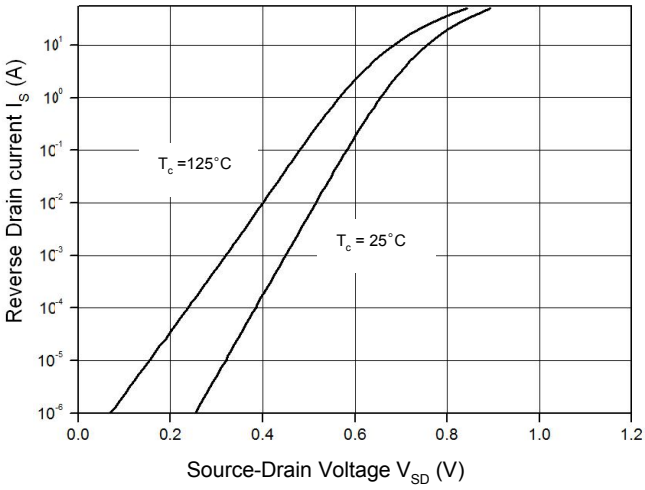



Figure 6. Rdson-Drain Current

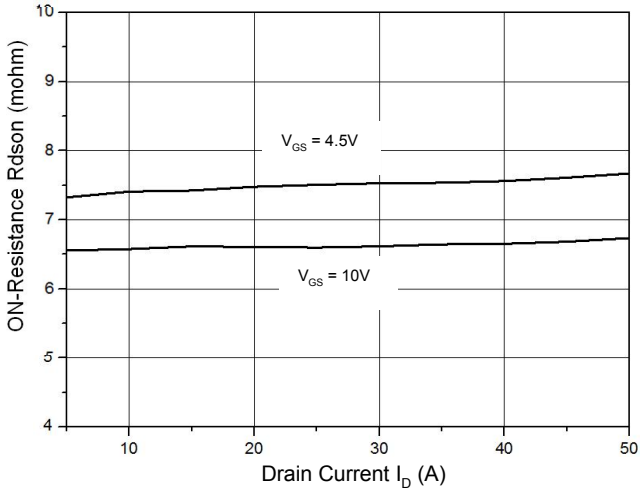


Figure 7. Rdson-Junction Temperature(℃)

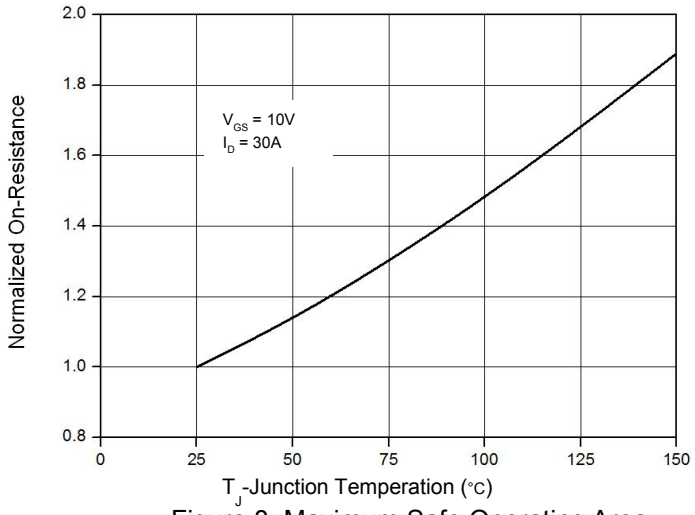



Figure 8. Maximum Safe Operating Area

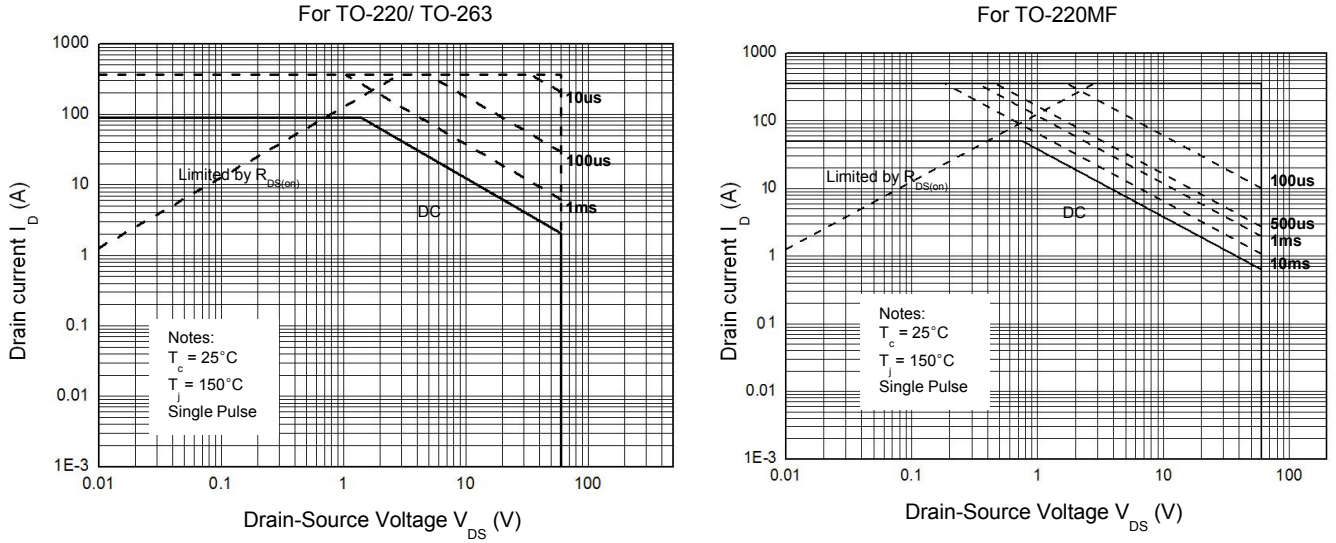
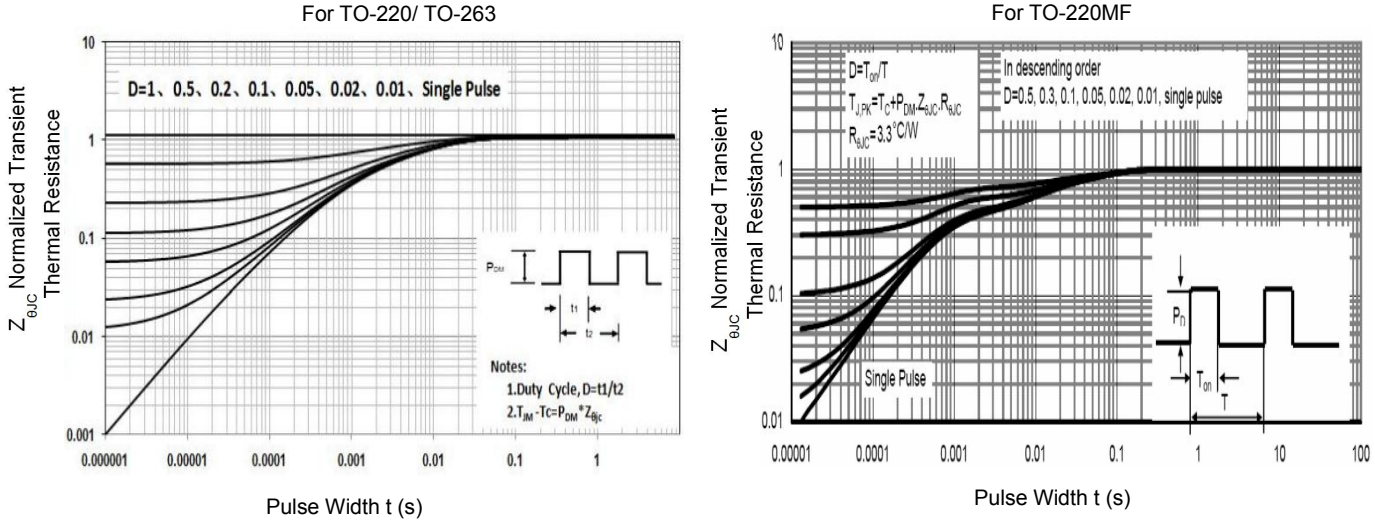



Figure 9. Normalized Maximum Transient Thermal Impedance (RthJC)



## Test Circuit & Waveform

Figure 8. Gate Charge Test Circuit & Waveform

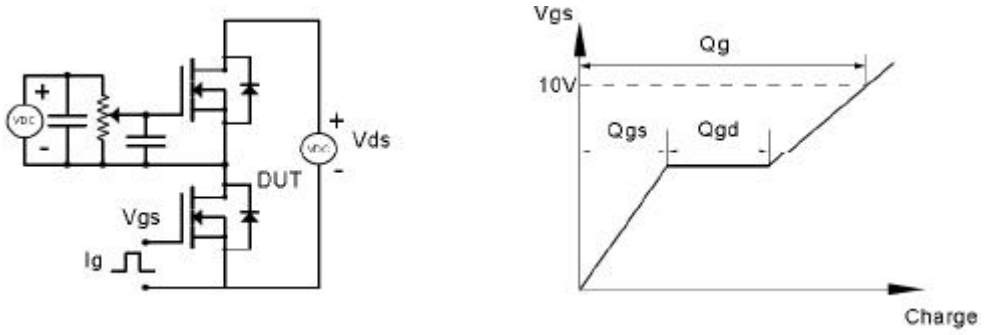



Figure 9. Resistive Switching Test Circuit & Waveforms

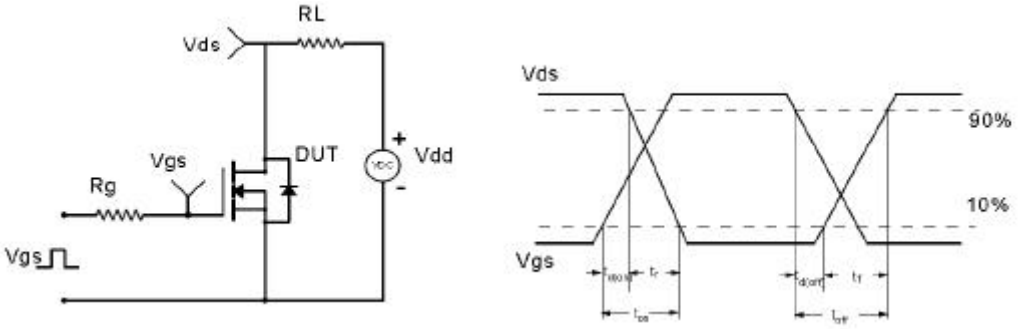



Figure 10. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

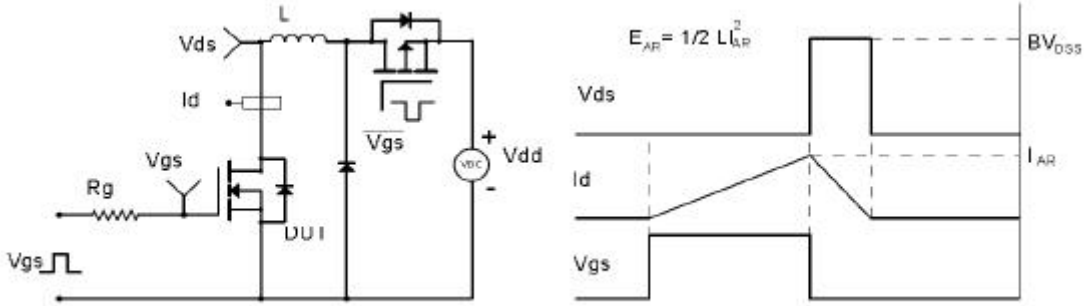
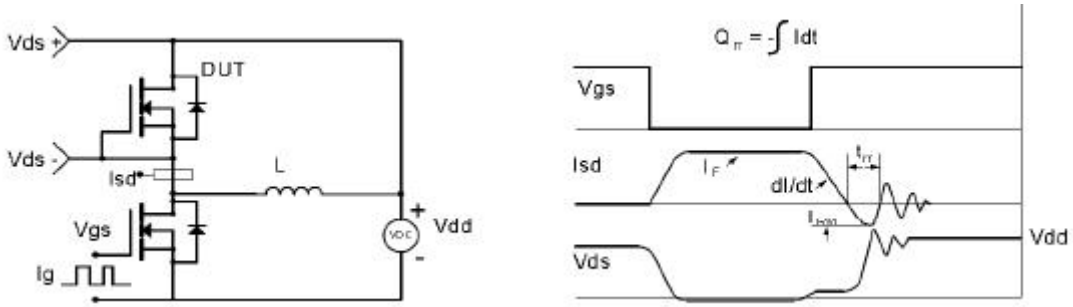
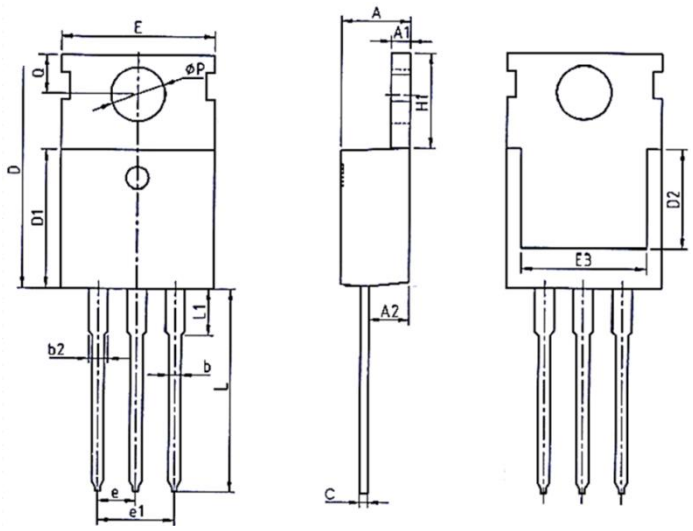



Figure 11. Diode Recovery Circuit & Waveform

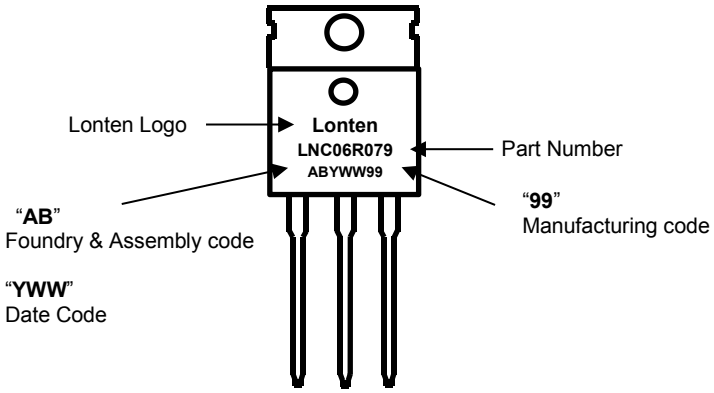


# TO-220 PACKAGE INFORMATION

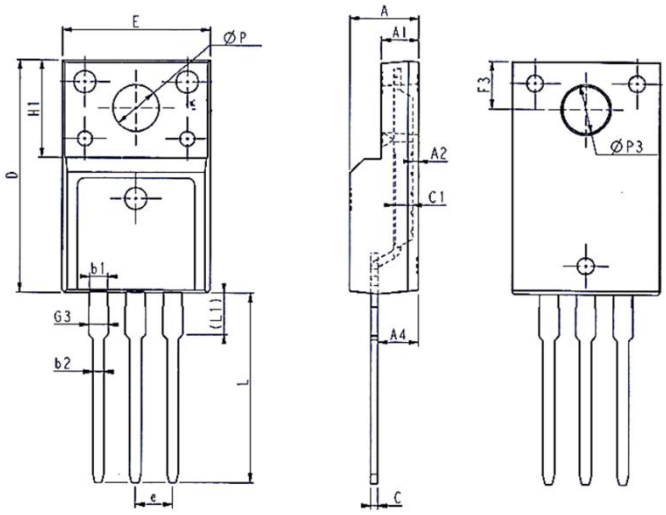



| COMMON DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|
| SYMBOL | MM | | | INCH | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 4.37 | 4.57 | 4.70 | 0.172 | 0.180 | 0.185 |
| A1 | 1.25 | 1.30 | 1.40 | 0.049 | 0.051 | 0.055 |
| A2 | 2.20 | 2.40 | 2.60 | 0.087 | 0.094 | 0.102 |
| b | 0.70 | 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

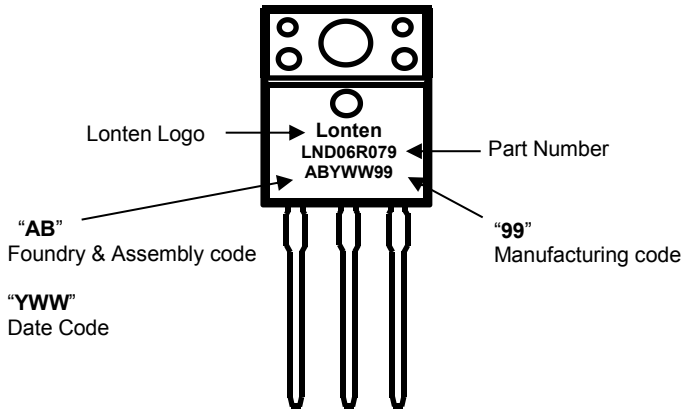


## Mechanical Dimensions for TO-220MF

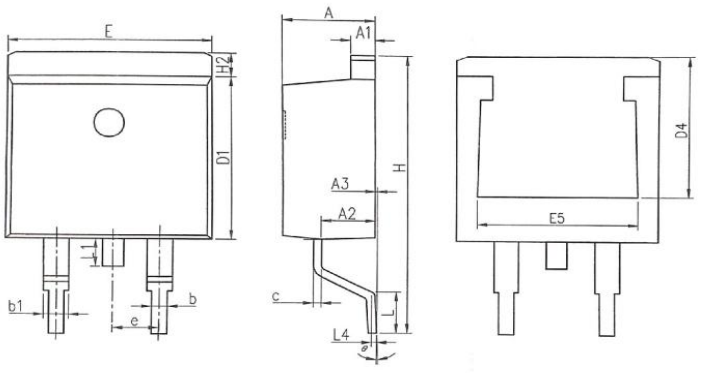



| COMMON DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|
| SYMBOL | MM | | | INCH | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| E | 9.96 | 10.16 | 10.36 | 0.392 | 0.400 | 0.408 |
| A | 4.50 | 4.70 | 4.90 | 0.177 | 0.185 | 0.193 |
| A1 | 2.34 | 2.54 | 2.74 | 0.092 | 0.100 | 0.108 |
| A2 | 0.30 | 0.45 | 0.60 | 0.012 | 0.018 | 0.024 |
| A4 | 2.56 | 2.76 | 2.96 | 0.101 | 0.109 | 0.117 |
| c | 0.40 | 0.50 | 0.65 | 0.016 | 0.020 | 0.026 |
| c1 | 1.20 | 1.30 | 1.35 | 0.047 | 0.051 | 0.053 |
| D | 15.57 | 15.87 | 16.17 | 0.613 | 0.625 | 0.637 |
| H1 | 6.70REF | | | 0.264REF | | |
| e | 2.54BSC | | | 0.1BSC | | |
| L | 12.68 | 12.98 | 13.28 | 0.499 | 0.511 | 0.523 |
| L1 | 2.88 | 3.03 | 3.18 | 0.113 | 0.119 | 0.125 |
| ØP | 3.03 | 3.18 | 3.38 | 0.119 | 0.125 | 0.133 |
| ØP3 | 3.15 | 3.45 | 3.65 | 0.124 | 0.136 | 0.144 |
| F3 | 3.15 | 3.30 | 3.45 | 0.124 | 0.130 | 0.136 |
| G3 | 1.25 | 1.35 | 1.55 | 0.049 | 0.053 | 0.061 |
| b1 | 1.18 | 1.28 | 1.43 | 0.046 | 0.050 | 0.056 |
| b2 | 0.70 | 0.80 | 0.95 | 0.028 | 0.031 | 0.037 |

## TO-220MF Part Marking Information

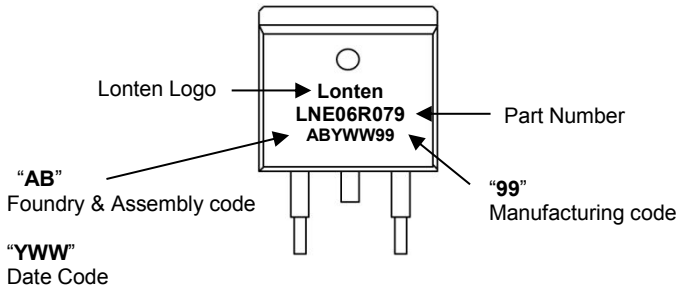


# TO-263 PACKAGE INFORMATION




| 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



**Disclaimer**

The content specified herein is for the purpose of introducing LONTEN's products (hereinafter "Products"). The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

LONTEN does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of the Products or technical information described in this document.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). LONTEN shall bear no responsibility in any way for use of any of the Products for the above special purposes.

Although LONTEN endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a LONTEN product.

The content specified herein is subject to change for improvement without notice. When using a LONTEN product, be sure to obtain the latest specifications.

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

***Click to view similar products for*** MOSFET ***category:***

***Click to view products by*** LONTEN ***manufacturer:***

Other Similar products are found below :

614233C 648584F MCH3443-TL-E MCH6422-TL-E FDPF9N50NZ FW216A-TL-2W FW231A-TL-E APT5010JVR NTNS3A92PZT5G IRF100S201 JANTX2N5237 2SK2464-TL-E 2SK3818-DL-E FCA20N60_F109 FDZ595PZ STD6600NT4G FSS804-TL-E 2SJ277-DL-E 2SK1691-DL-E 2SK2545(Q,T) D2294UK 405094E 423220D MCH6646-TL-E TPCC8103,L1Q(CM 367-8430-0972-503 VN1206L 424134F 026935X 051075F SBVS138LT1G 614234A 715780A NTNS3166NZT5G 751625C 873612G IRF7380TRHR IPS70R2K0CEAKMA1 RJK60S3DPP-E0#T2 RJK60S5DPK-M0#T0 APT5010JVFR APT12031JFLL APT12040JVR DMN3404LQ-7 NTE6400 JANTX2N6796U JANTX2N6784U JANTXV2N5416U4 SQM110N05-06L-GE3 SIHF35N60E-GE3