# Lonten N-channel 100V, 78A, 8mΩ Power MOSFET

## Description

These N-Channel enhancement mode power field effect transistors are using split gate 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

- 100V,78A, $R_{DS(on),max}$ =8mΩ@$V_{GS}$ = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

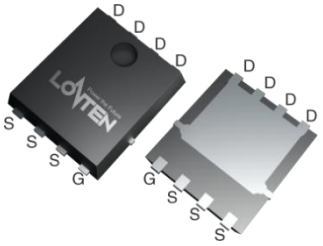
## Applications

- Motor Drives
- UPS
- DC-DC Converter

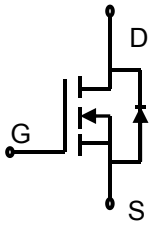
## Product Summary

| | |
|---|---|
| $V_{DSS}$ | 100V |
| $R_{DS(on),max}$@ $V_{GS}$=10V | 8mΩ |
| $I_D$ | 78A |

## Pin Configuration




**DFN5×6**




N-Channel MOSFET

## Absolute Maximum Ratings

$T_C$ = 25°C unless otherwise noted

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 100 | V |
| Continuous drain current ( $T_C$ = 25°C )[1] | $I_D$ | 78 | A |
| Continuous drain current ( $T_C$ = 100°C )[1] | | 49 | A |
| Pulsed drain current[2] | $I_{DM}$ | 280 | A |
| Gate-Source voltage | $V_{GSS}$ | ±20 | V |
| Avalanche energy[3] | $E_{AS}$ | 61 | mJ |
| Power Dissipation ( $T_C$ = 25°C ) | $P_D$ | 108 | 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 | $R_{\theta JC}$ | 1.15 | °C/W |
| Thermal Resistance Junction-to-Ambient | $R_{\theta JA}$ | 55 | °C/W |

## Package Marking and Ordering Information

| Device | Device Package | Marking |
|---|---|---|
| LSGN10R08WB | DFN5X6 | 10R08WB |

## 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 | 100 | --- | --- | V |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 2 | 3 | 4 | V |
| Drain-source leakage current | $I_{DSS}$ | $V_{DS}$=100 V, $V_{GS}$=0V, $T_J$ = 25°C | --- | --- | 1 | 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, $I_D$=13.5 A | --- | 6.6 | 8 | mΩ |
| Forward transconductance | $g_{fs}$ | $V_{DS}$ =10V , $I_D$=20A | --- | 81 | --- | S |
| **Dynamic characteristics** | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{DS}$ = 50 V, $V_{GS}$ = 0 V, F = 1MHz | --- | 3150 | --- | pF |
| Output capacitance | $C_{oss}$ | | --- | 695 | --- | |
| Reverse transfer capacitance | $C_{rss}$ | | --- | 27 | --- | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$ = 50V,$V_{GS}$=10V, $I_D$ = 13.5A $R_G$=3Ω | --- | 10.3 | --- | ns |
| Rise time | $t_r$ | | --- | 6.6 | --- | |
| Turn-off delay time | $t_{d(off)}$ | | --- | 45.2 | --- | |
| Fall time | $t_f$ | | --- | 7.8 | --- | |
| **Gate charge characteristics** | | | | | | |
| Gate to source charge | $Q_{gs}$ | $V_{DS}$=50V, $I_D$=13.5A, $V_{GS}$= 10 V | --- | 9.6 | --- | nC |
| Gate to drain charge | $Q_{gd}$ | | --- | 4.5 | --- | |
| Gate charge total | $Q_g$ | | --- | 45 | --- | |
| **Drain-Source diode characteristics and Maximum Ratings** | | | | | | |
| Continuous Source Current | $I_S$ | | --- | --- | 78 | A |
| Pulsed Source Current[4)] | $I_{SM}$ | | --- | --- | 280 | A |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_S$=13.5A, $T_J$=25℃ | --- | --- | 1.2 | V |
| Reverse recovery time | $t_{rr}$ | $I_F$=13.5A,d$I_F$/dt=100 A/μs | --- | 33 | --- | ns |
| Reverse recovery charge | $Q_{rr}$ | | --- | 150 | --- | nC |

Notes:

1: The maximum junction current rating is package limited.

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

3: $V_{DD}$=50V, $V_{GS}$=10V, L=0.1mH, $I_{AS}$=28A, Starting $T_J$=25℃.

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

5: Guaranteed by design, not subject to production.

## Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

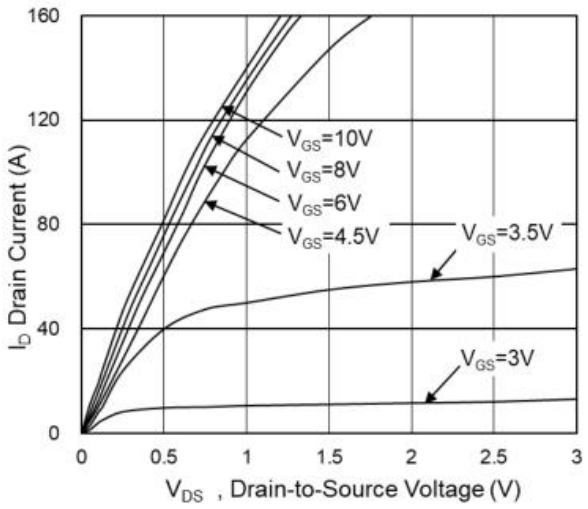



Figure 2. Transfer Characteristics

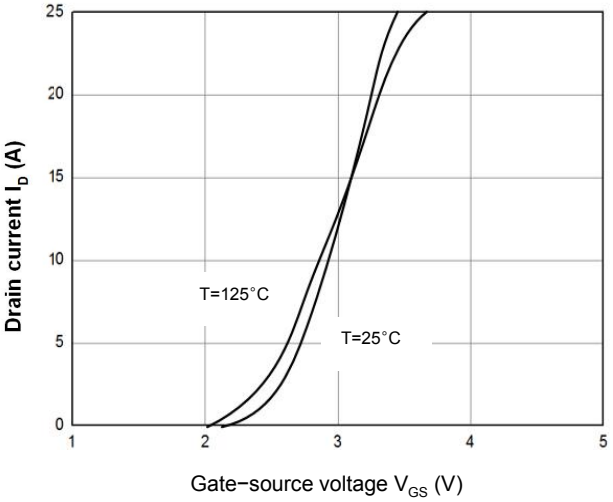



Figure 3. Capacitance Characteristics

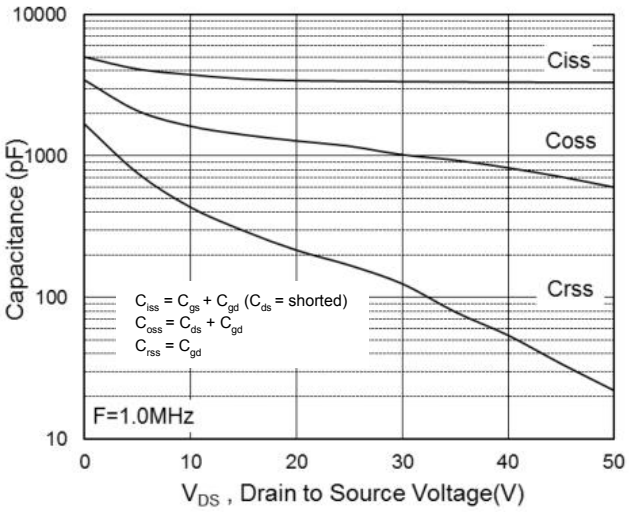



Figure 4. Gate Charge Waveform

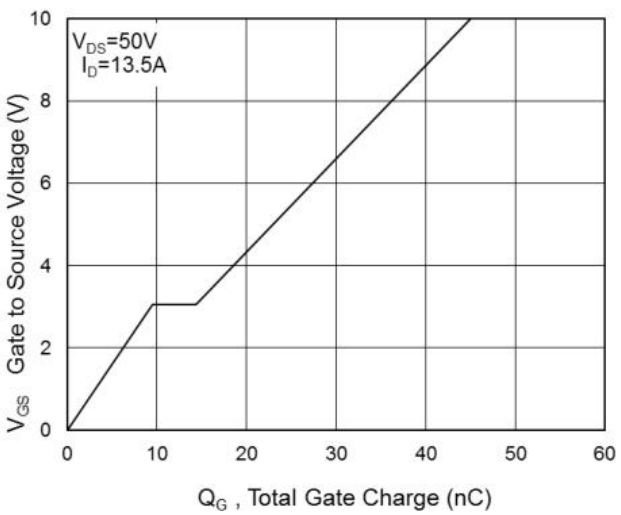



Figure 5. Body-Diode Characteristics

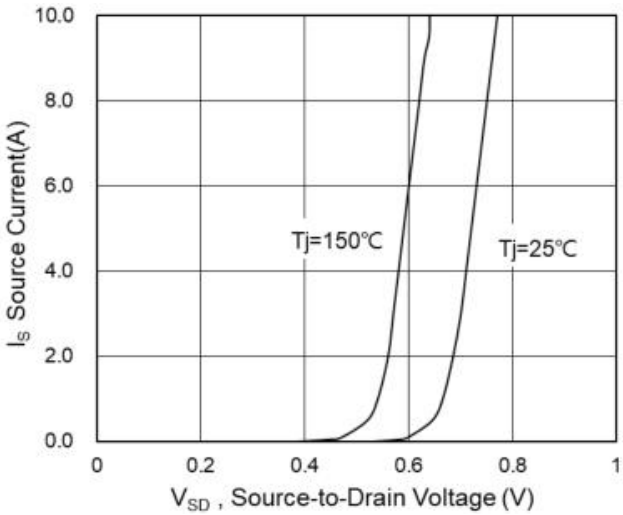



Figure 6. Rdson-Drain Current

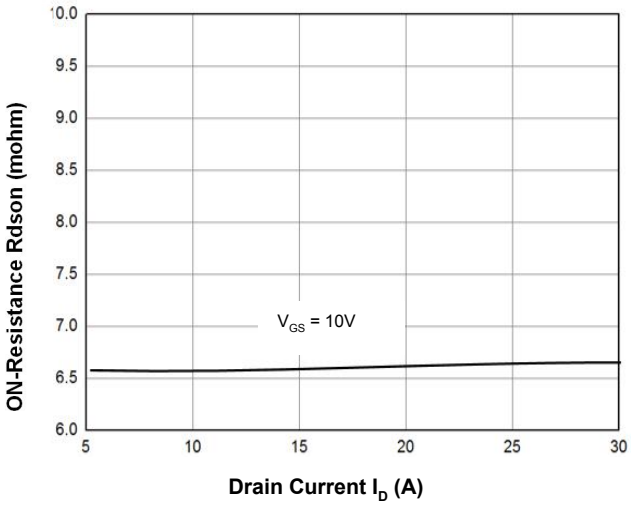


Figure 7. Rdson-Junction Temperature(℃)

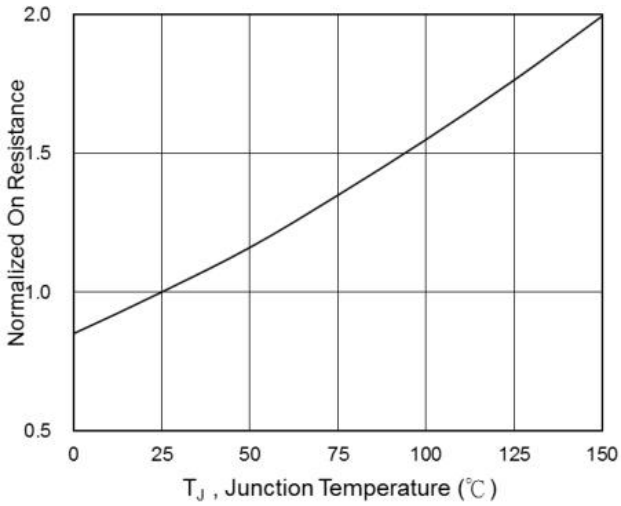



Figure 8. $V_{GS(th)}$-Junction Temperature(℃)

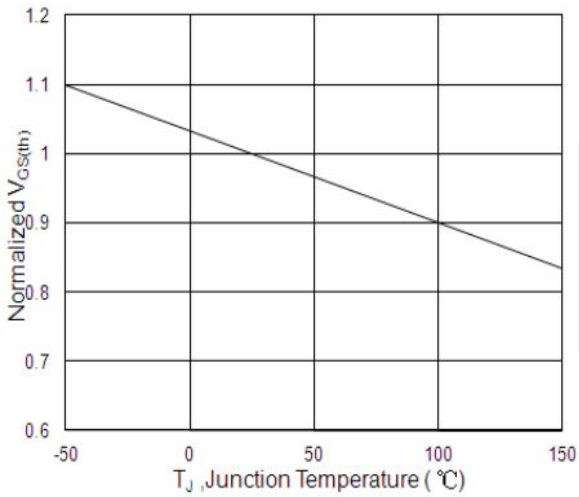



Figure 9. On-Resistance vs. Gate-to-Source voltage

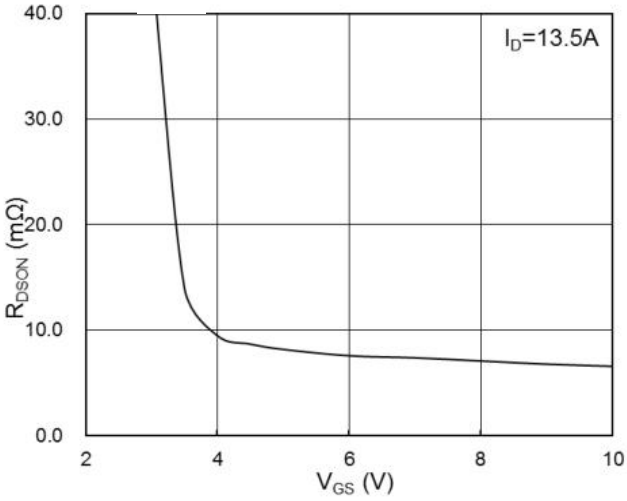



Figure 10. Maximum Safe Operating Area

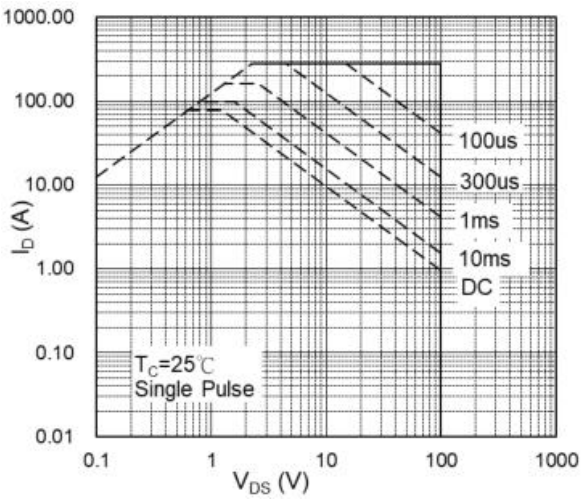
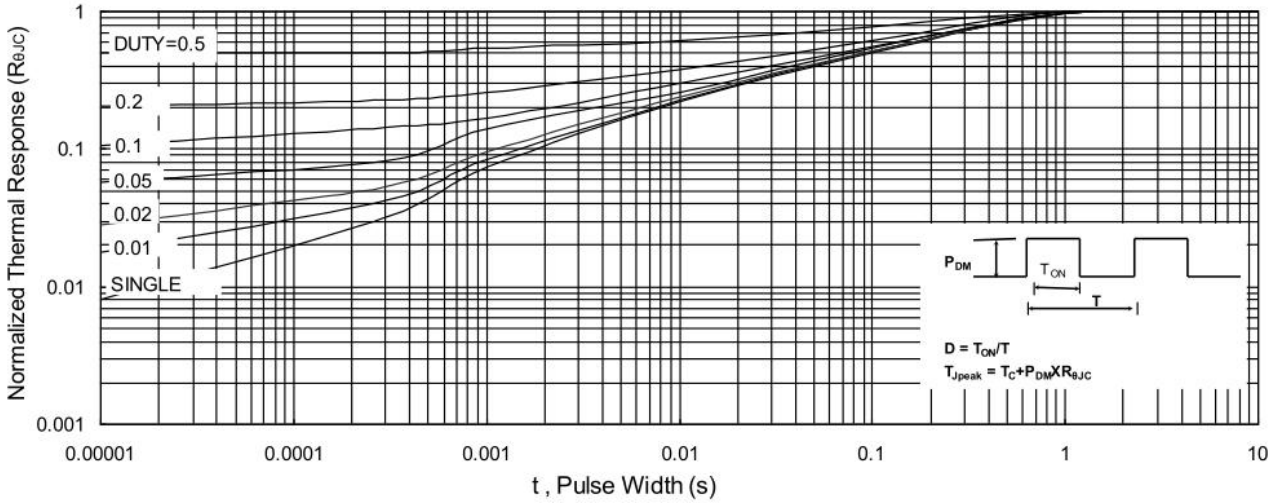



Figure 11. Normalized Maximum Transient Thermal Impedance (RthJC)



## Test Circuit & Waveform

Figure 12. Gate Charge Test Circuit & Waveform

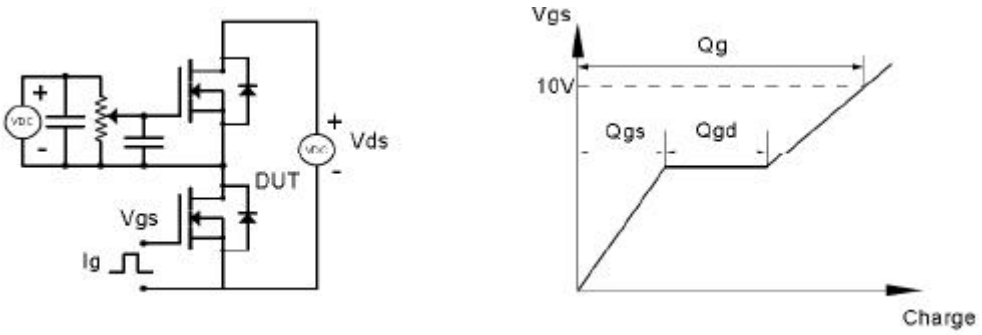



Figure 13. Resistive Switching Test Circuit & Waveforms

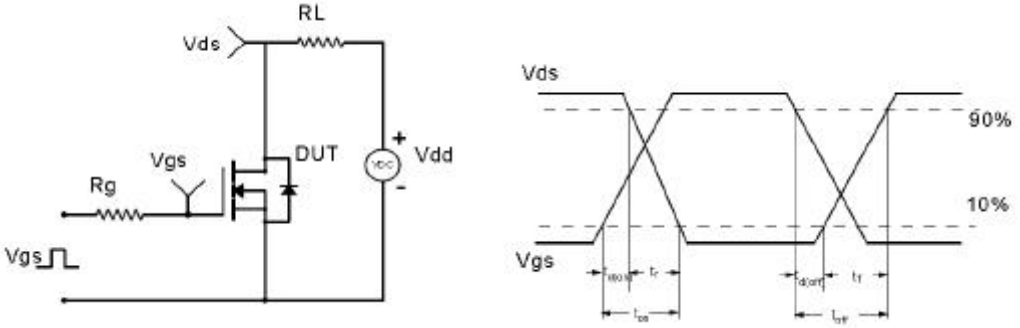



Figure 14. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

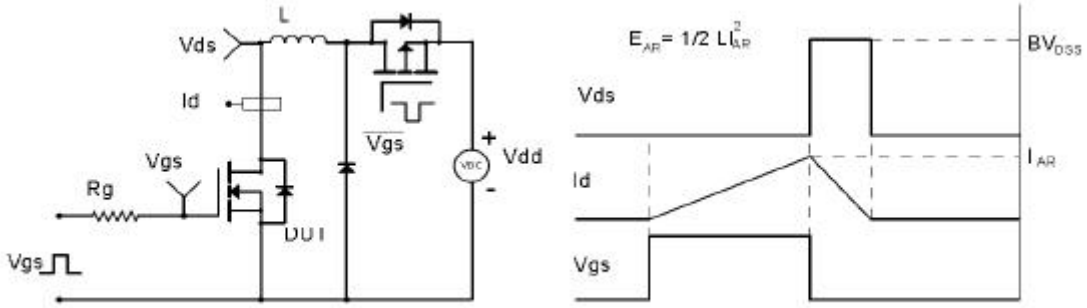
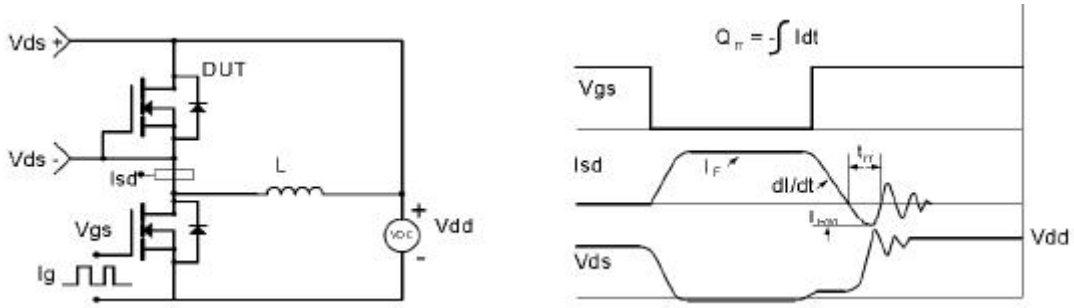
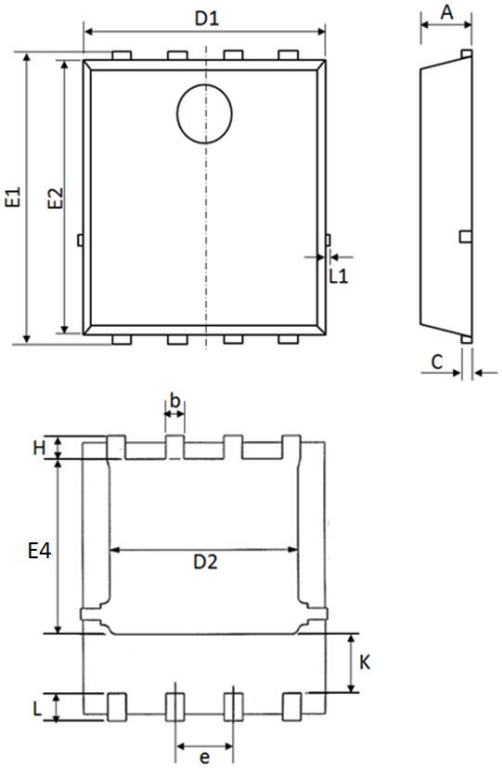



Figure 15. Diode Recovery Circuit & Waveform

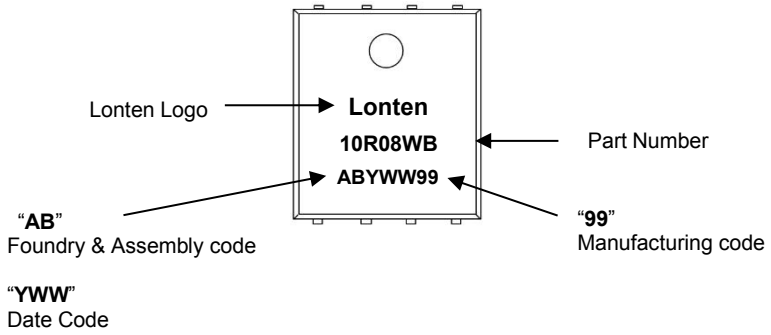


# Mechanical Dimensions for DFN5×6




| COMMON DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|
| SYMBOL | MILLIMETERS | | | INCHS | | |
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1 | 1.1 | 1.2 | 0.039 | 0.043 | 0.047 |
| b | 0.3 | 0.4 | 0.5 | 0.012 | 0.016 | 0.020 |
| C | 0.154 | 0.254 | 0.354 | 0.006 | 0.010 | 0.014 |
| D1 | 5 | 5.2 | 5.4 | 0.197 | 0.205 | 0.213 |
| D2 | 3.8 | 4.1 | 4.25 | 0.150 | 0.161 | 0.167 |
| E1 | 5.95 | 6.15 | 6.35 | 0.234 | 0.242 | 0.250 |
| E2 | 5.66 | 5.86 | 6.06 | 0.223 | 0.231 | 0.239 |
| E4 | 3.52 | 3.72 | 3.92 | 0.139 | 0.146 | 0.154 |
| e | 1.27 BSC | | | 0.050 BSC | | |
| H | 0.4 | 0.5 | 0.6 | 0.016 | 0.020 | 0.024 |
| L | 0.5 | 0.6 | 0.7 | 0.020 | 0.024 | 0.028 |
| L1 | - | - | 0.12 | - | - | 0.005 |
| K | 1.14 | 1.29 | 1.44 | 0.045 | 0.051 | 0.057 |

## DFN5×6 Part Marking Information



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