# Lonten N-channel 100V, 75A, 8mΩ Power MOSFET

## Description

These N-Channel enhancement mode power field effect transistors are using **shielded 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,75A,$R_{DS(on).max}$=8mΩ@$V_{GS}$ = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

## Applications

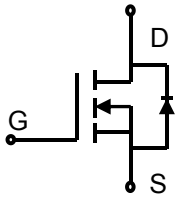
- Motor Drives
- UPS
- DC-DC Converter

## Product Summary

| | |
|---|---|
| $V_{DSS}$ | 100V |
| $R_{DS(on).max}$@ $V_{GS}$=10V | 8mΩ |
| $I_D$ | 75A |

## Pin Configuration


**TO-220**




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 ) | $I_D$ | 75 | A |
| ( $T_C$ = 100°C ) | | 48 | A |
| Pulsed drain current[1)] | $I_{DM}$ | 300 | A |
| Gate-Source voltage | $V_{GSS}$ | ±20 | V |
| Avalanche energy[2)] | $E_{AS}$ | 26.5 | mJ |
| Power Dissipation | $P_D$ | 89 | 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 | $R_{\theta JC}$ | 1.4 | °C/W |
| Thermal Resistance, Junction-to-Ambient[3)] | $R_{\theta JA}$ | 70 | °C/W |

## Package Marking and Ordering Information

| Device | Device Package | Marking | Units/Tube |
|---|---|---|---|
| LSGC10R080WB | TO-220 | C10R080WB | 50 |

## 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 | 2.0 | --- | 4.0 | V |
| Drain-source leakage current | $I_{DSS}$ | $V_{DS}$=100 V, $V_{GS}$=0 V, $T_J$ = 25°C | --- | --- | 1 | μA |
| | | $V_{DS}$=100V,$V_{GS}$=0V, $T_J$ = 150°C | --- | --- | 10 | mA |
| 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, $I_D$=40 A,$T_J$ = 25°C<br>$T_J$ = 150°C | --- | 6.7<br>13.2 | 8<br>--- | mΩ |
| Forward transconductance | $g_{fs}$ | $V_{DS}$ =40 V , $I_D$=40A | --- | 92 | --- | S |
| **Dynamic characteristics** | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{DS}$ = 100 V, $V_{GS}$ = 0 V,<br>f = 250kHz | --- | 2890 | --- | pF |
| Output capacitance | $C_{oss}$ | | --- | 253 | --- | |
| Reverse transfer capacitance | $C_{rss}$ | | --- | 4.7 | --- | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$ = 50V,$V_{GS}$=10V, $I_D$ =40 A | --- | 28.5 | --- | ns |
| Rise time | $t_r$ | | --- | 93.4 | --- | |
| Turn-off delay time | $t_{d(off)}$ | | --- | 60.8 | --- | |
| Fall time | $t_f$ | | --- | 28 | --- | |
| Gate resistance | $R_g$ | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz | --- | 1 | --- | Ω |
| **Gate charge characteristics** | | | | | | |
| Gate to source charge | $Q_{gs}$ | $V_{DS}$=80V, $I_D$=40A,<br>$V_{GS}$= 10 V | --- | 13.3 | --- | nC |
| Gate to drain charge | $Q_{gd}$ | | --- | 17 | --- | |
| Gate charge total | $Q_g$ | | --- | 56.5 | --- | |
| Gate plateau voltage | $V_{plateau}$ | | --- | 4.5 | --- | V |
| Output Charge | $Q_{oss}$ | $V_{DS}$=80 V,$V_{GS}$= 0V | --- | 69 | --- | nC |
| **Drain-Source diode characteristics and Maximum Ratings** | | | | | | |
| Continuous Source Current | $I_S$ | | --- | --- | 75 | A |
| Pulsed Source Current | $I_{SM}$ | | --- | --- | 300 | A |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_S$=40A, $T_J$=25℃ | --- | --- | 1.1 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_S$=40A, di/dt=100A/us,<br>$T_J$=25℃ | --- | 41.3 | --- | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | --- | 47 | --- | nC |

Notes:

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

2: $V_{DD}$=25V, $V_{GS}$=10V, L=0.1mH, $I_{AS}$=23A, Starting $T_J$=25℃.

3: The value of $R_{thJA}$ is measured by placing the device in a still air box which is one cubic foot.

## Electrical Characteristics Diagrams

Figure 1. Typ. Output Characteristics

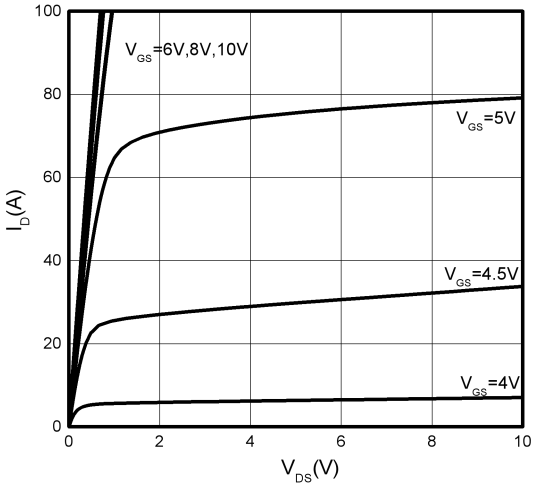



Figure 2. Transfer Characteristics

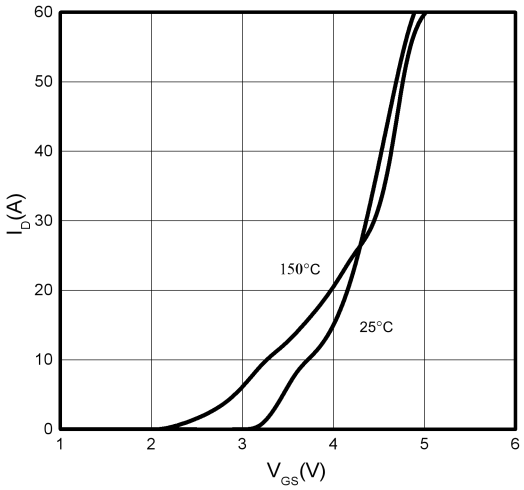



Figure 3. On-Resistance vs. Drain Current

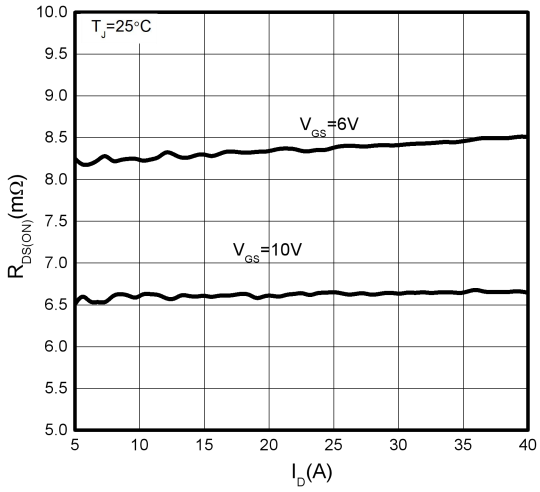



Figure 4.On-Resistance vs.Temperature

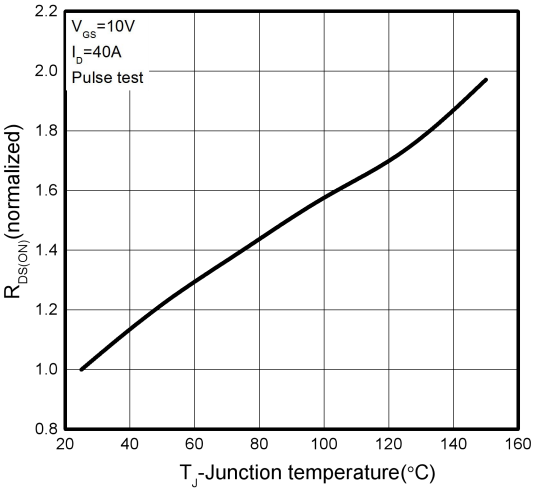



Figure 5.Breakdown Voltage vs.Temperature

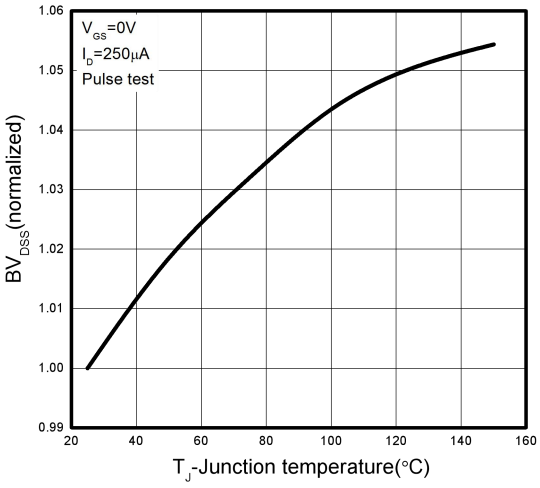



Figure 6.Threshold Voltage vs.Temperature

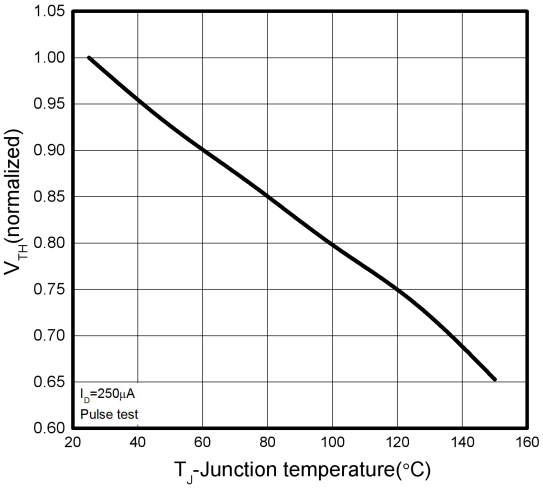


Figure 7.Rds(on) vs. Gate Voltage

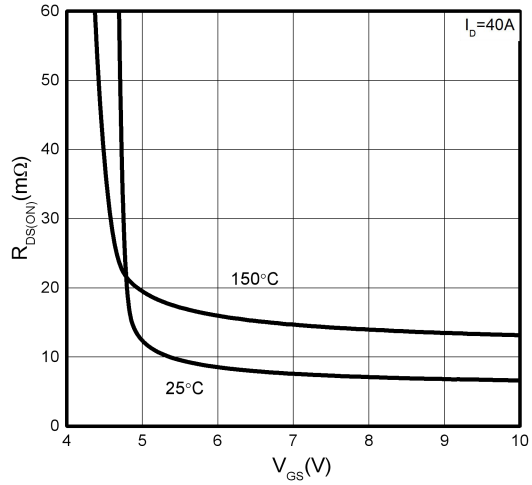



Figure 8.Body-Diode Characteristics

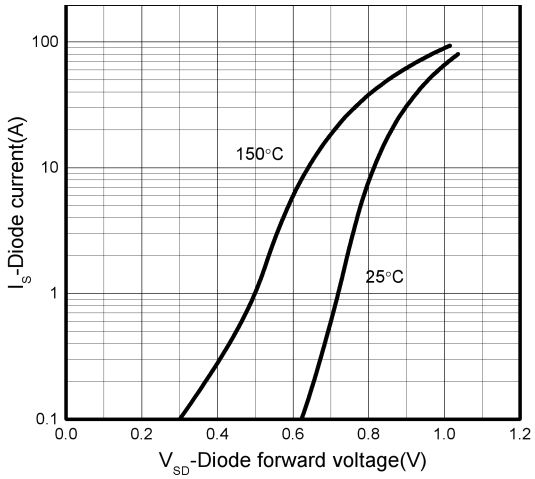



Figure 9.Capacitance Characteristics

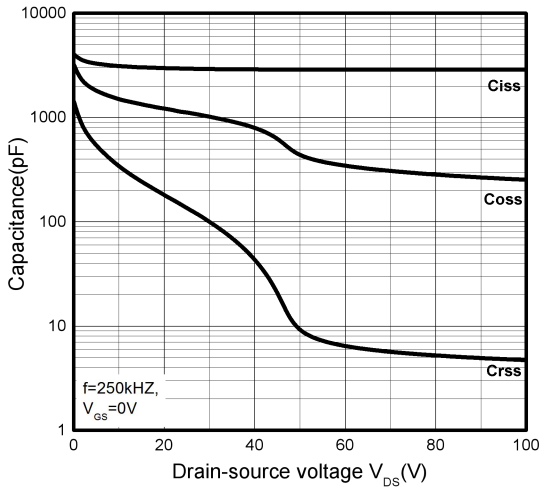



Figure 10.Gate Charge Characteristics

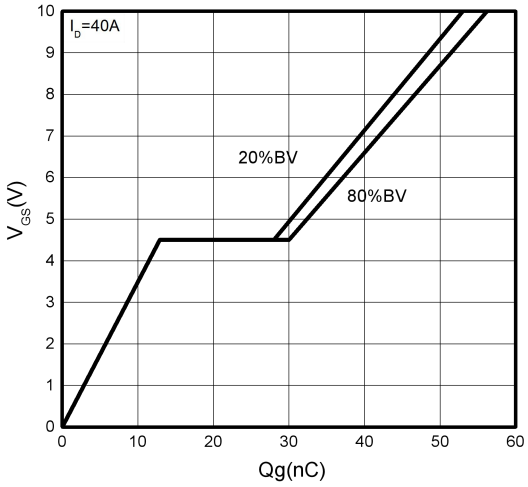



Figure 11.Drain Current Derating

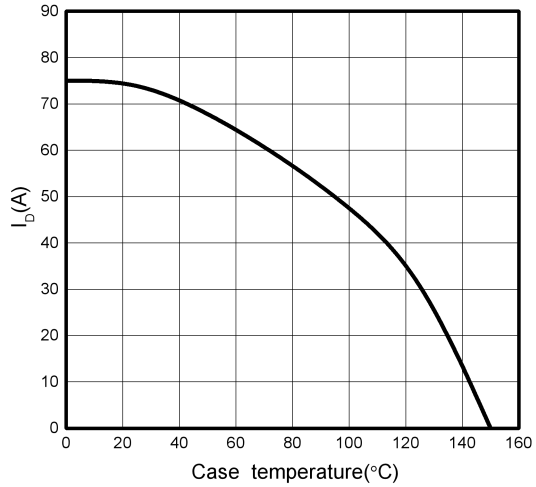



Figure 12.Power Dissipation vs.Temperature

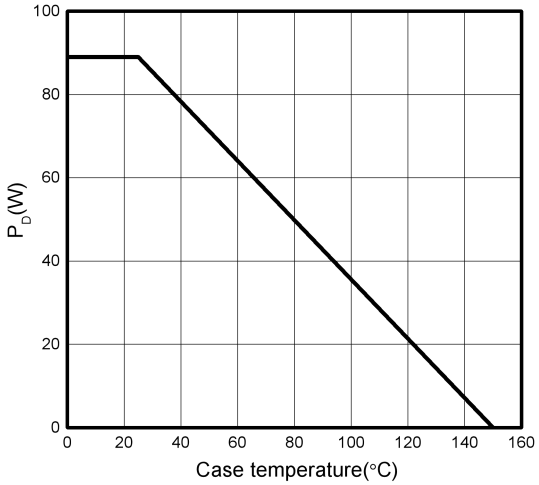


Figure 13: Safe Operating Area

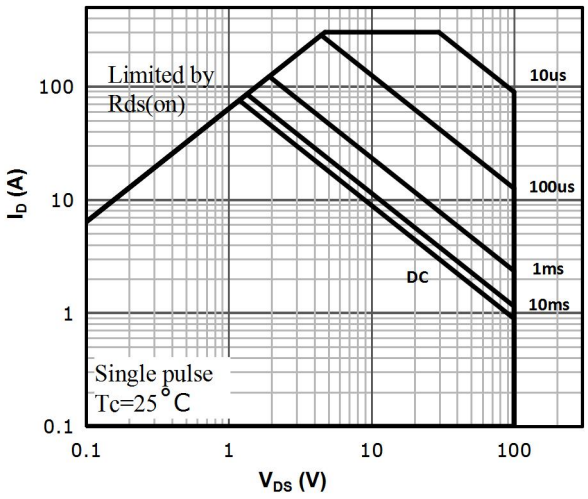
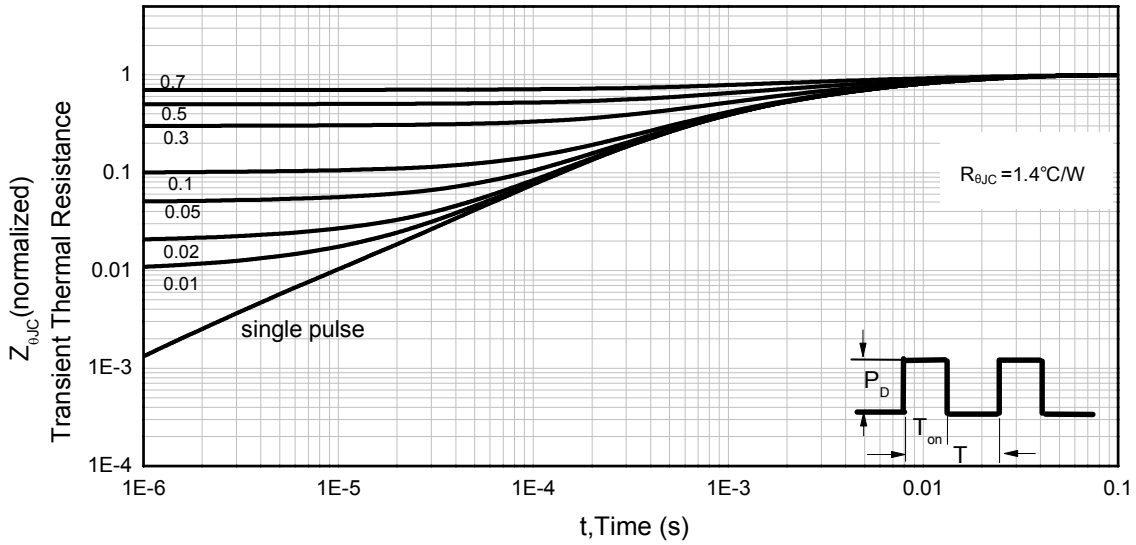
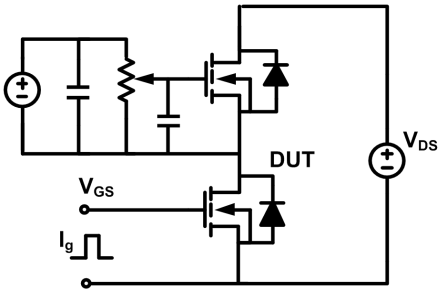


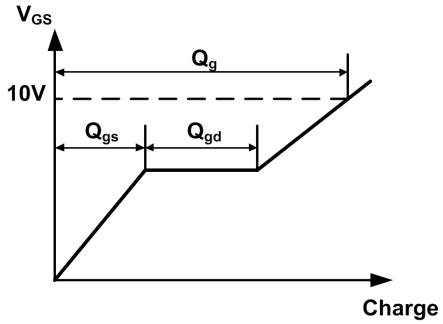

Figure 14. Normalized Maximum Transient Thermal Impedance (RthJC)



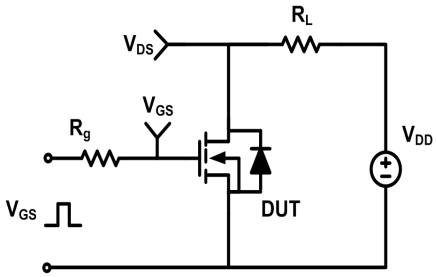
## Test Circuit & Waveforms

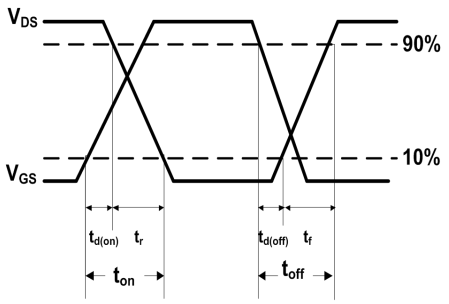
### Gate Charge Test Circuit & Waveform



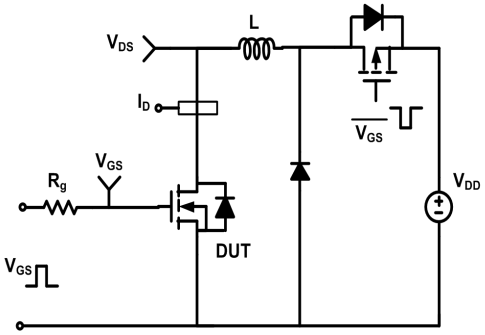



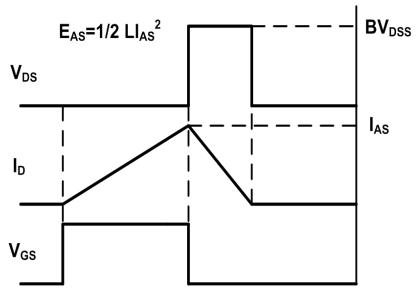

### Resistive Switching Test Circuit & Waveform



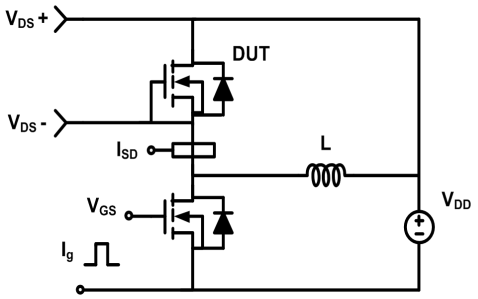



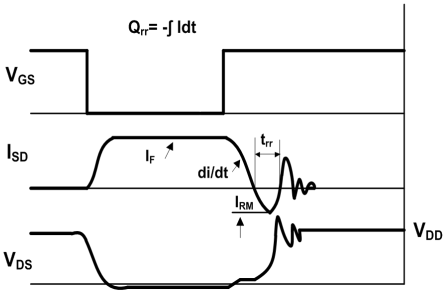

### Unclamped Inductive Switching (UIS) Test Circuit & Waveform



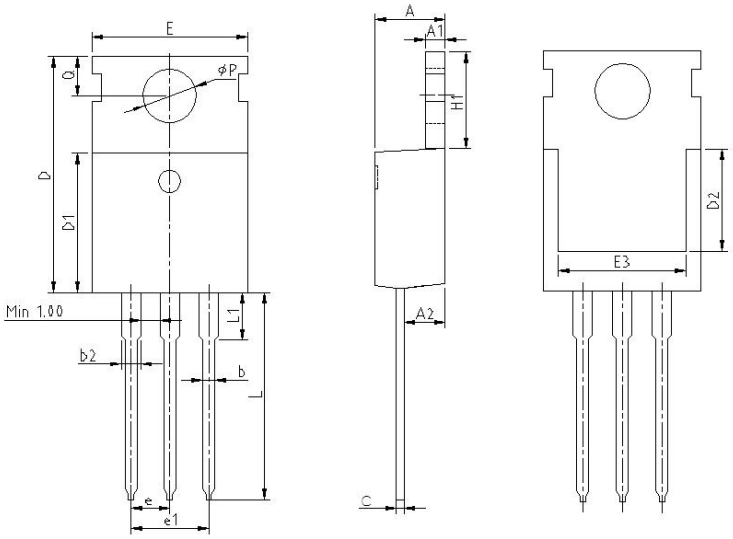




### Diode Recovery Test Circuit & Waveform



## Mechanical Dimensions for TO-220




| DIMENSIONS IN MILLITMETERS | | |
|---|---|---|
| SYMBOL | MIN | MAX |
| A | 4.25 | 4.7 |
| A1 | 1.2 | 1.4 |
| A2 | 2.2 | 2.92 |
| b | 0.7 | 0.97 |
| b2 | 1.14 | 1.78 |
| c | 0.4 | 0.61 |
| D | 14.32 | 16.1 |
| D1 | 8.39 | 9.4 |
| D2 | 5.5 | 7 |
| E | 9.7 | 10.36 |
| E3 | 7 | 8.78 |
| e | 2.54BSC | |
| e1 | 5.08BSC | |
| H1 | 6.25 | 6.85 |
| L | 12.75 | 14.4 |
| L1 | - | 4.05 |
| ΦP | 3.4 | 3.8 |
| Q | 2.54 | 3 |

## Version Information

LSGC10R080WB

**Revision:2021-08-11 ,Rev 1.0**

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