# DH025N08

85V/2.9mΩ/215A N-MOSFET

## Features

- Fast switching
- Low on resistance
- Low gate charge
- High avalanche current
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% ΔVDS test

## Key Parameters

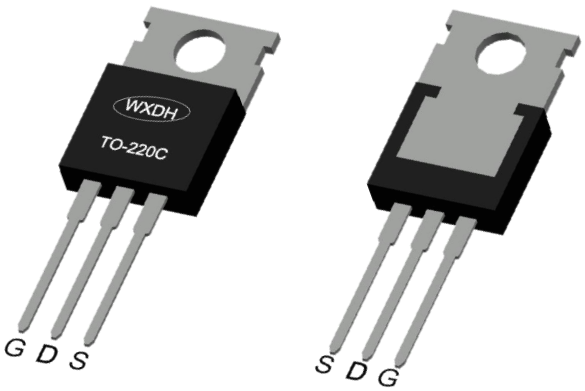
| | |
|---|---|
| $V_{DS}$ | 85V |
| $R_{DS(on)typ.}$ | 2.9mΩ |
| $I_D$ | 215A |
| Vth | 2.9V |
| $Ciss_{@10V}$ | 17292pF |
| Qgd | 94nC |

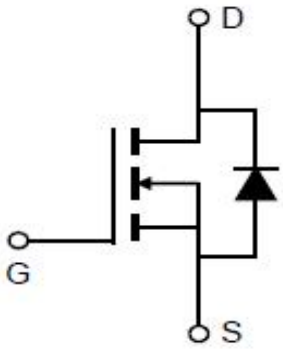
## Applications

- Motor Control and Drive
- Charge/Discharge for Battery Management System
- Synchronous Rectifier for SMPS

Pb LEAD FREE  Hal Halogen FREE  RoHS COMPLIANT

## TO-220




## Marking & Packing Information

| Part # | Package | Marking | Tube/Reel | Qty(pcs) |
|---|---|---|---|---|
| DH025N08 | TO-220 | DH025N08 | Tube | 1000/box |

## Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 85 | V |
| Gate-Source voltage | $V_{GS}$ | ±20 | V |
| Continuous drain current<br>$T_C$ = 25°C<br>$T_C$ = 100°C | $I_D$ | <br>215<br>136 | A |
| Pulsed drain current ($T_C$ = 25°C, $t_p$ limited by $T_{jmax}$) | $I_{D\ pulse}$ | 860 | A |
| Avalanche energy, single pulse (L=0.5mH, Rg=25Ω) | $E_{AS}$ | 2162 | mJ |
| Power dissipation $T_C$ = 25°C | $P_{tot}$ | 278 | W |
| Power dissipation $T_A$ = 25°C | $P_{tot}$ | 1.92 | W |
| Operating junction and storage temperature | $T_j$ , $T_{stg}$ | -55...+150 | °C |

## Thermal Resistance

| Parameter | Symbol | Max | Unit |
|---|---|---|---|
| Thermal resistance, junction – case. | $R_{thJC}$ | 0.45 | °C/W |
| Thermal resistance, junction – ambient(min. footprint) | $R_{thJA}$ | 65 | °C/W |

## Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

### Static Characteristic

| Parameter | Symbol | Value | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| Drain-source breakdown voltage | $BV_{DSS}$ | 85 | - | - | V | $V_{GS}$=0V, $I_D$=250uA |
| Gate threshold voltage | $V_{GS(th)}$ | 2.3 | 2.9 | 3.5 | V | $V_{DS}$=$V_{GS}$,$I_D$=250uA |
| Zero gate voltage drain current | $I_{DSS}$ | - | - | 1 | μA | $V_{DS}$=80V,$V_{GS}$=0V<br>$T_j$=25°C |
| | | - | - | 100 | | $T_j$=125°C |
| Gate-source leakage current | $I_{GSS}$ | - | - | 100 | nA | $V_{GS}$=20V,$V_{DS}$=0V |
| Drain-source on-state resistance | $R_{DS(on)}$ | - | 2.9 | 3.4 | mΩ | $V_{GS}$=10V, $I_D$=90A,<br>Tj=25°C |

## Dynamic Characteristic

| Parameter | Symbol | Value | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| Input Capacitance | $C_{iss}$ | - | 17292 | - | pF | $V_{GS}$=0V, $V_{DS}$=40V, f=1MHz |
| Output Capacitance | $C_{oss}$ | - | 848 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 688 | - | | |
| Gate Total Charge | $Q_G$ | - | 326 | - | nC | $V_{GS}$=10V, $V_{DS}$=40V, $I_D$=90A, f=1MHz |
| Gate-Source charge | $Q_{gs}$ | - | 87 | - | | |
| Gate-Drain charge | $Q_{gd}$ | - | 94 | - | | |
| Turn-on delay time | $t_{d(on)}$ | - | 40 | - | ns | $V_{GS}$=10V, $V_{DD}$=40V, $R_{G\_ext}$=3Ω, $I_D$=90A |
| Rise time | $t_r$ | - | 96 | - | | |
| Turn-off delay time | $t_{d(off)}$ | - | 153 | - | | |
| Fall time | $t_f$ | - | 94 | - | | |

## Body Diode Characteristic

| Parameter | Symbol | Value | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| Diode Max Current | $I_S$ | | - | 215 | A | - |
| Diode Forward Voltage | $V_{SD}$ | - | - | 1.2 | V | $V_{GS}$=0V,$I_{SD}$=60A |
| Diode Reverse Recovery Time | $t_{rr}$ | - | 65 | - | ns | $I_F$=40A, dI/dt=100A/μs |
| Diode Reverse Recovery Charge | $Q_{rr}$ | - | 198 | - | nC | |

## Typical Characteristics Diagram

Fig1. Output Characteristics

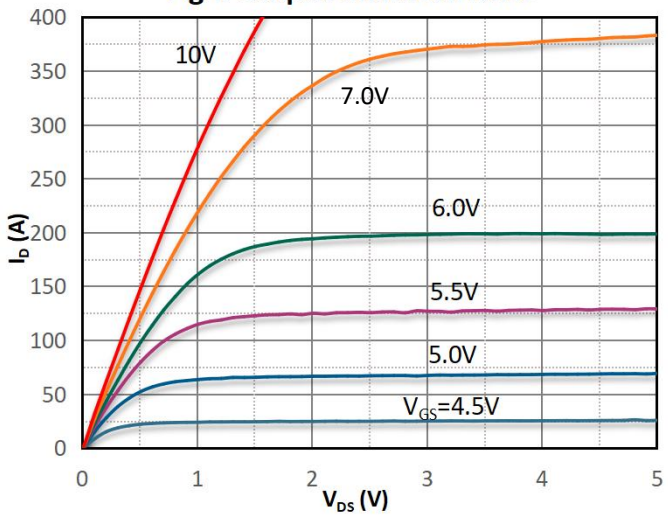



Fig2. Transfer Characteristics

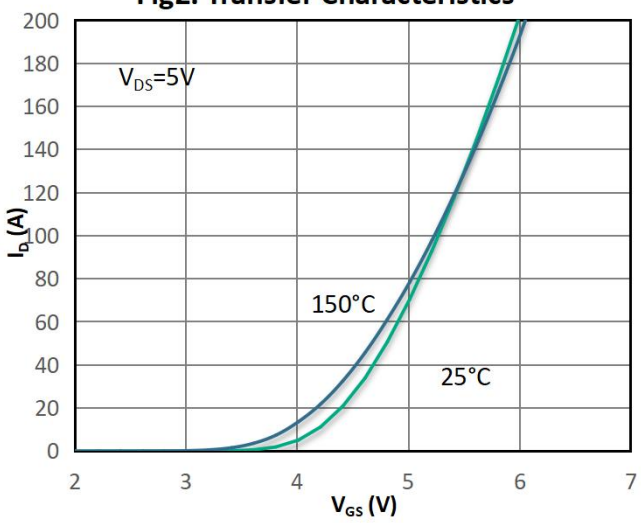



Fig3. Rds(on) vs Drain Current

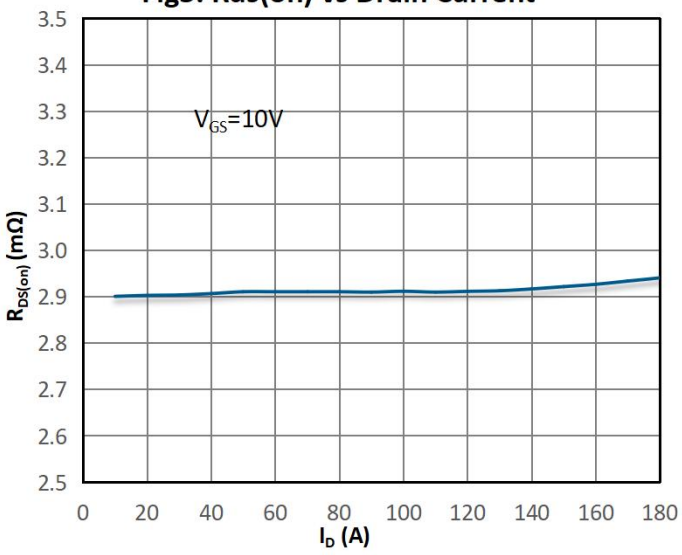



Fig 4. Rds(on) vs Gate Voltage

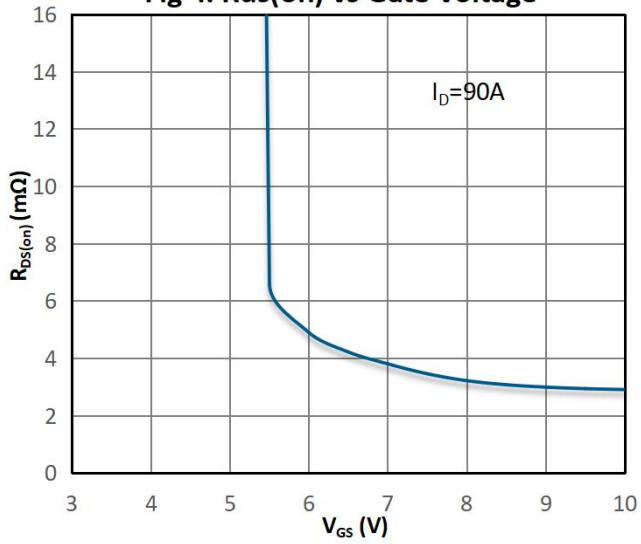



Fig5. Rds(on) vs. Temperature

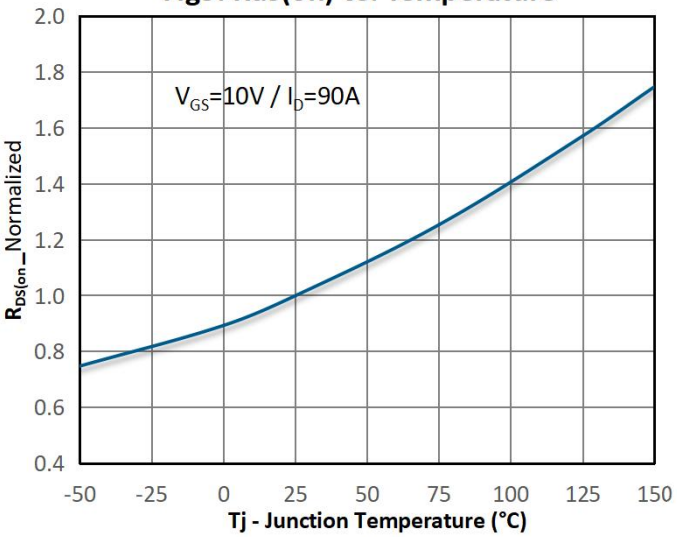
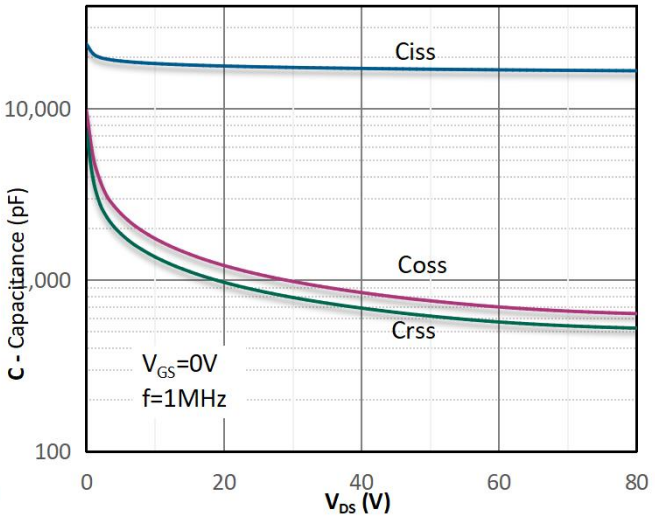



Fig6. Capacitance Characteristics



## Typical Characteristics Diagram

Fig7. Gate Charge Characteristics

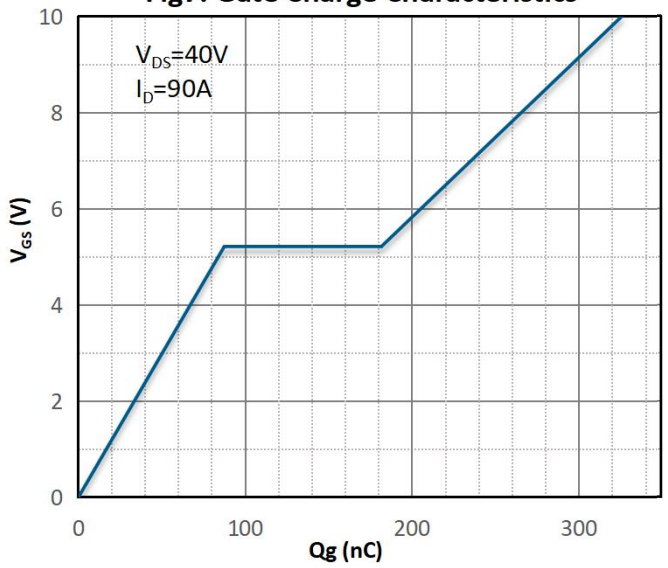



Fig8. Body-diode Forward Characteristics

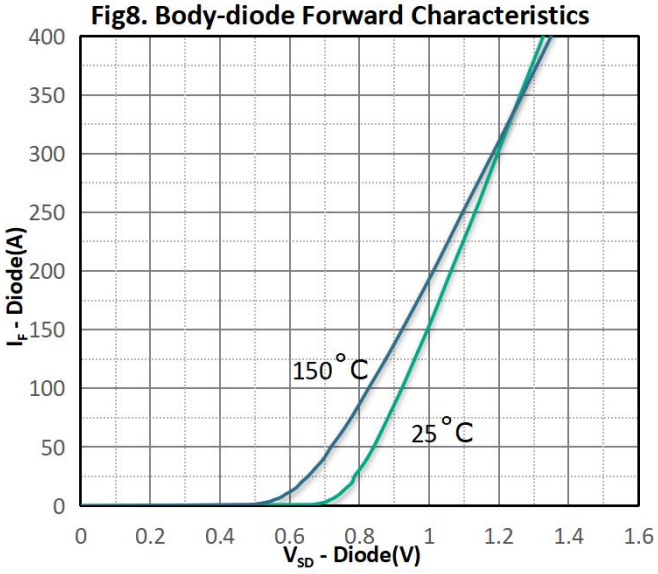



Fig9. Power De-rating

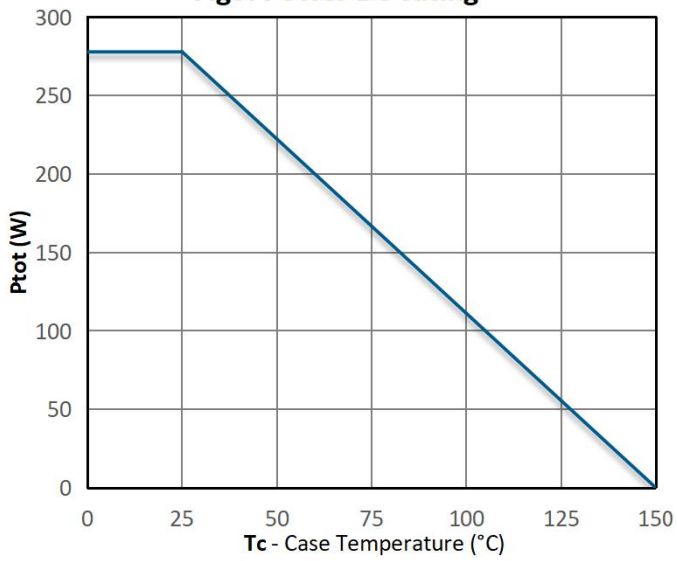



Fig10. Current De-rating

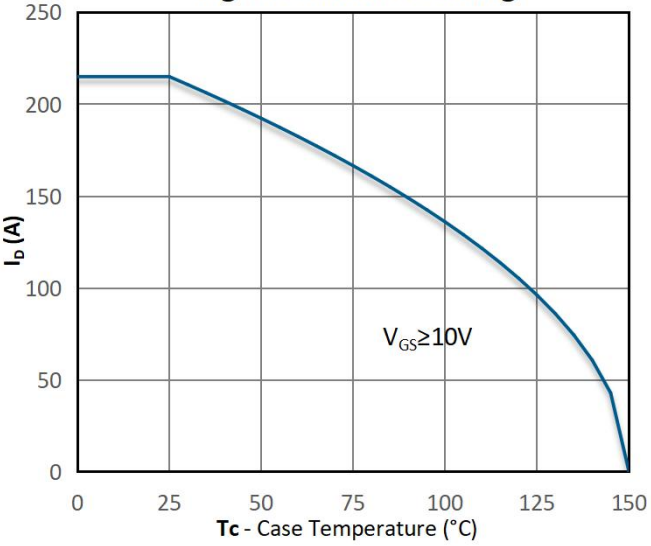



Fig11. Safe Operating Area

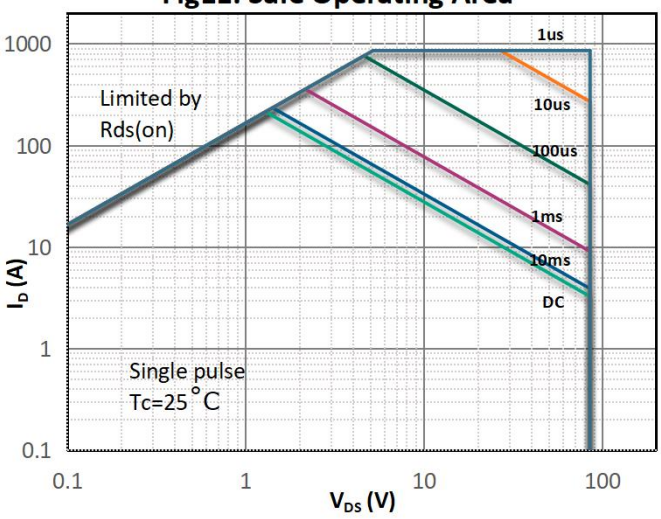
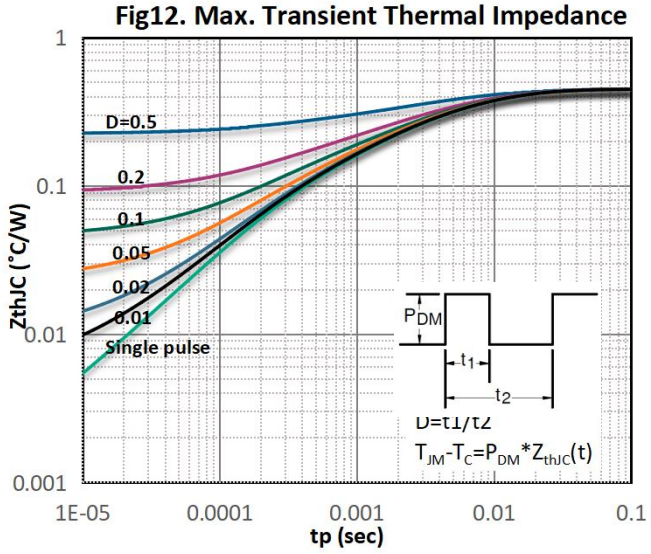
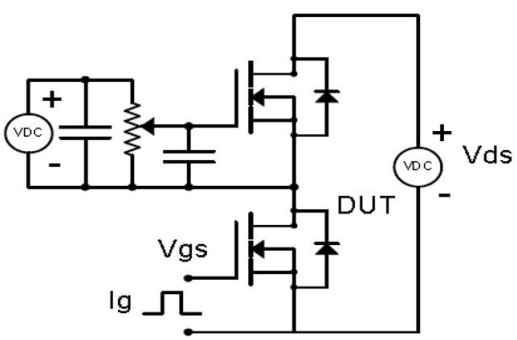


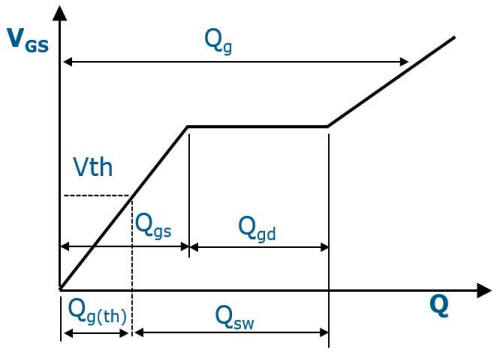

Fig12. Max. Transient Thermal Impedance



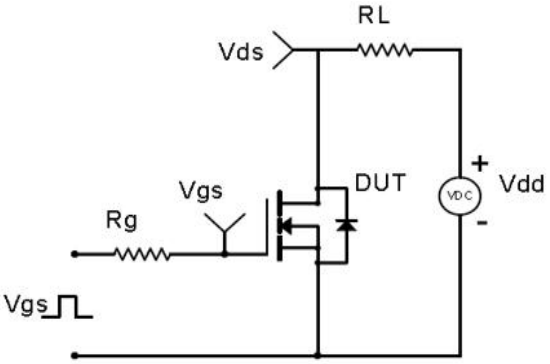
## Test Circuit & Waveform

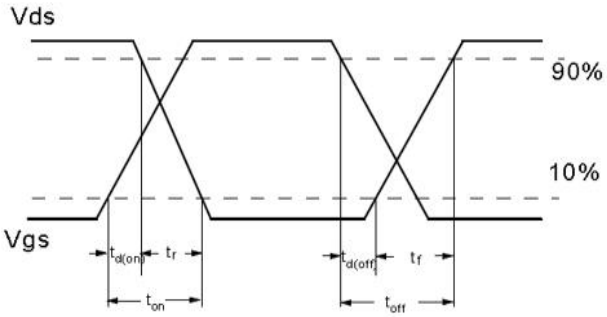
### Gate Charge Test Circuit & Waveform



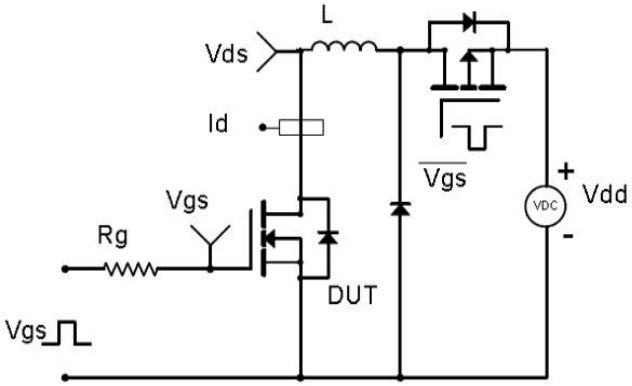



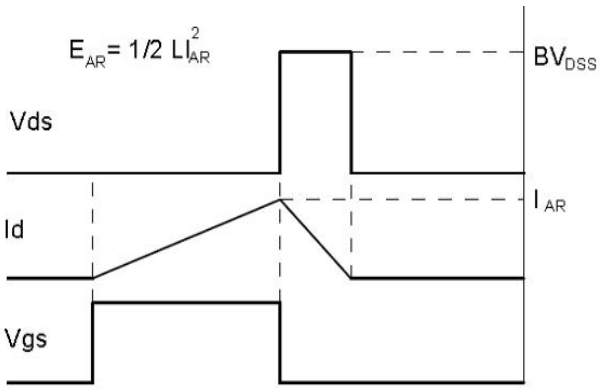

### MOSFET Switching Test Circuit & Waveform



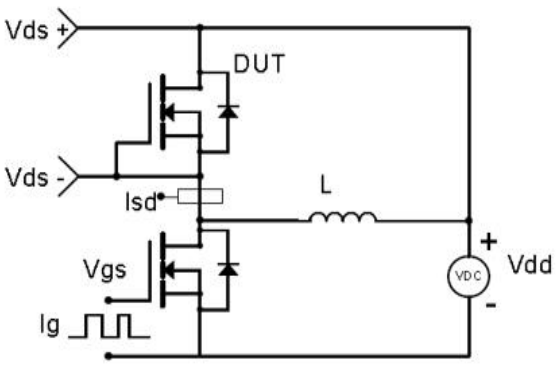



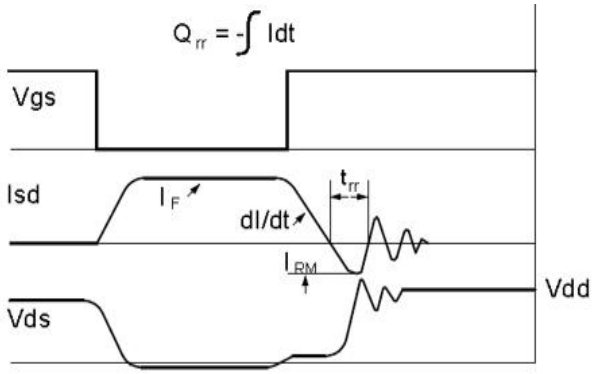

### $E_{AS}$ Test Circuit & Waveform



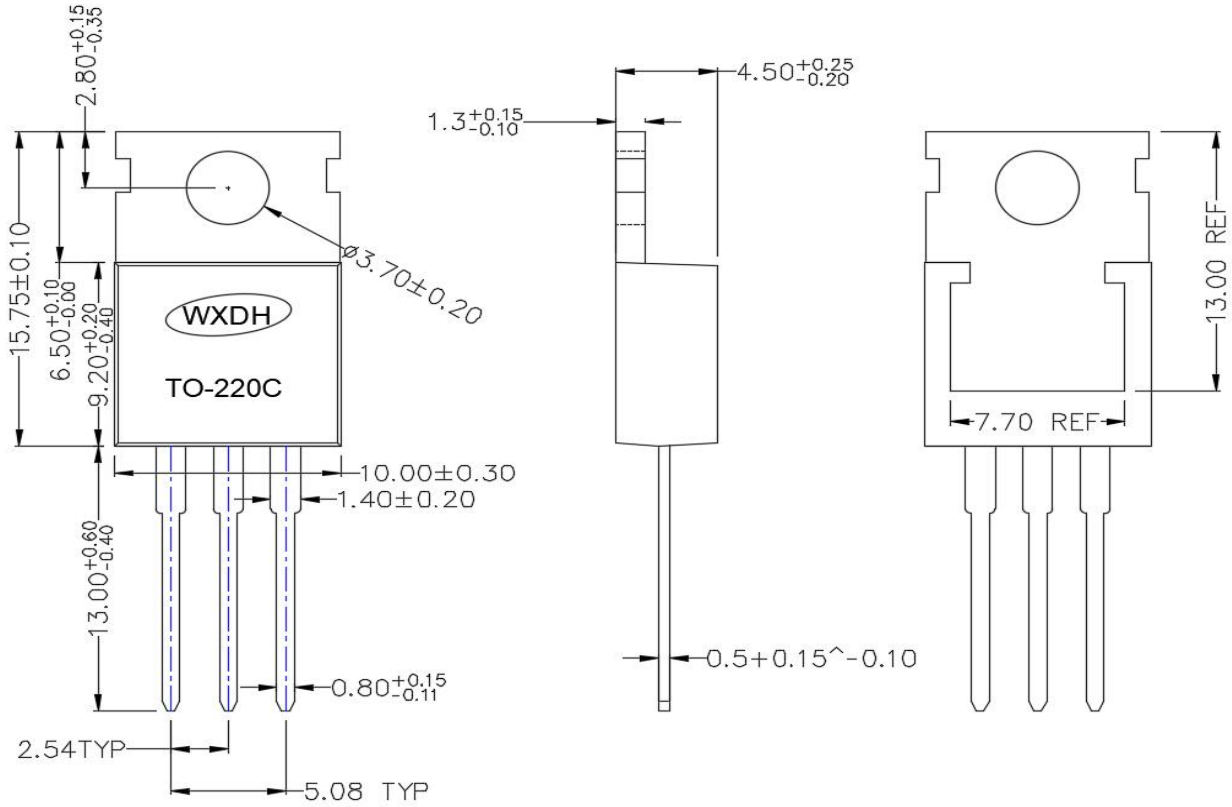

### Diode Recovery Test Circuit & Waveform



## Package Outline : TO-220

*Dimensions in mm




## Revision History

| Revison | Date | Major changes |
|---|---|---|
| 1.0 | 2023/10/10 | Release of formal version |

## Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qulified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as aviation, aerospace, life-support devices or systems.

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