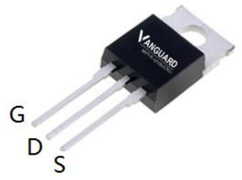
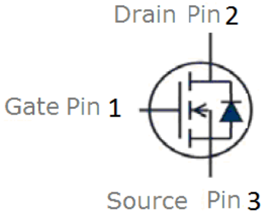
## Features

- N-Channel，10V Logic Level Control
- Enhancement mode
- Very low on-resistance $R_{DS(on)}$ @ $V_{GS}$=10 V
- 100% Avalanche test
- Pb-free lead plating; RoHS compliant

| | | |
|---|---|---|
| $V_{DS}$ | 80 | V |
| $R_{DS(on),TYP}$@ $V_{GS}$=10 V | 6.8 | mΩ |
| $I_D$ | 83 | A |

**TO-220AB**





| Part ID | Package Type | Marking | Tape and reel information |
|---|---|---|---|
| VS80N08AT | TO-220AB | 80N08AT | 50PCS/Tube |

## Maximum ratings, at $T_A$=25°C, unless otherwise specified

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-Source breakdown voltage | | 80 | V |
| $I_S$ | Diode continuous forward current | $T_C$ =25°C | 83 | A |
| $I_D$ | Continuous drain current@VGS=10V | $T_C$ =25°C | 83 | A |
| | | $T_C$ =100°C | 52 | A |
| $I_{DM}$ | Pulse drain current tested ① | $T_C$ =25°C | 332 | A |
| $P_D$ | Maximum power dissipation | $T_C$ =25°C | 150 | W |
| $V_{GS}$ | Gate-Source voltage | | ±20 | V |
| $T_{STG}$ , $T_J$ | Storage and junction temperature range | | -55 to 175 | °C |

## Thermal Characteristics

| Symbol | Parameter | Typical | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | 1.0 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 40 | °C/W |
| **Drain-Source Avalanche Ratings** | | | |
| EAS | Avalanche Energy, Single Pulsed ② | 576 | mJ |

| **Symbol** | **Parameter** | **Condition** | **Min.** | **Typ.** | **Max.** | **Unit** |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics @$T_j$= 25°C (unless otherwise stated)** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V $I_D$=250μA | 80 | -- | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=80V,$V_{GS}$=0V | -- | -- | 1 | μA |
| | Zero Gate Voltage Drain Current($T_j$=125℃) | $V_{DS}$=80V,$V_{GS}$=0V | -- | -- | 100 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=±20V,$V_{DS}$=0V | -- | -- | ±100 | nA |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 2.0 | 3.0 | 4.0 | V |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance③ | $V_{GS}$=10V, $I_D$=40A | -- | 6.8 | 8.0 | mΩ |
| **Dynamic Electrical Characteristics @ $T_j$ = 25°C (unless otherwise stated)** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=30V,$V_{GS}$=0V,<br>f=1MHz | -- | 2920 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 390 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 255 | -- | pF |
| $R_g$ | Gate Resistance | f=1MHz | -- | 0.95 | -- | Ω |
| $Q_g$ | Total Gate Charge | $V_{DS}$=40V,$I_D$=30A,<br>$V_{GS}$=10V | -- | 88 | -- | nC |
| $Q_{gs}$ | Gate-Source Charge | | -- | 18 | -- | nC |
| $Q_{gd}$ | Gate-Drain Charge | | -- | 29 | -- | nC |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}$=40V,<br>$I_D$=20A,<br>$R_G$=6.8Ω,<br>$V_{GS}$=10V | -- | 17 | -- | nS |
| $t_r$ | Turn-on Rise Time | | -- | 69 | -- | nS |
| $t_{d(off)}$ | Turn-Off Delay Time | | -- | 50 | -- | nS |
| $t_f$ | Turn-Off Fall Time | | -- | 73 | -- | nS |
| **Source- Drain Diode Characteristics@ $T_j$ = 25°C (unless otherwise stated)** | | | | | | |
| $V_{SD}$ | Forward on voltage | $I_{SD}$=40A,$V_{GS}$=0V | -- | 0.87 | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $T_j$=25℃,$I_{sd}$=20A,<br>$V_{GS}$=0V<br>di/dt=500A/μs | -- | 75 | -- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | | 180 | | nC |

NOTE:

① Repetitive rating; pulse width limited by max. junction temperature.

② Limited by $T_{Jmax}$, starting $T_J$ = 25°C, L = 0.5mH,$R_G$ = 25Ω, $I_{AS}$ = 48A, $V_{GS}$ =10V. Part not recommended for use above this value

③ Pulse width ≤ 300μs; duty cycle≤ 2%.

## Typical Characteristics

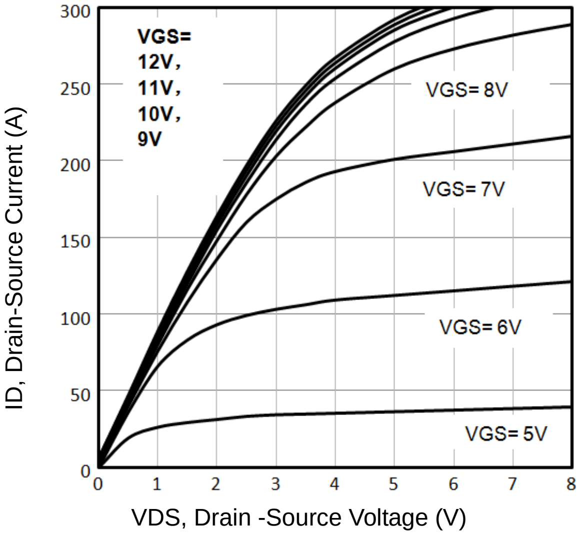


**Fig1.** Typical Output Characteristics

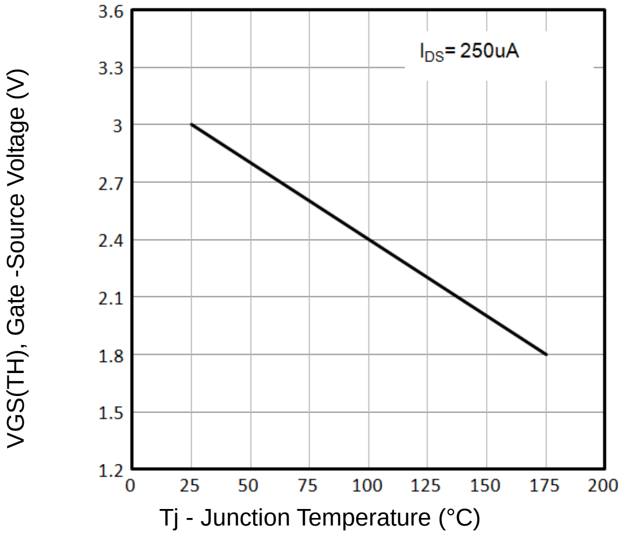


**Fig2.** $V_{GS(TH)}$ Gate -Source Voltage Vs.Tj

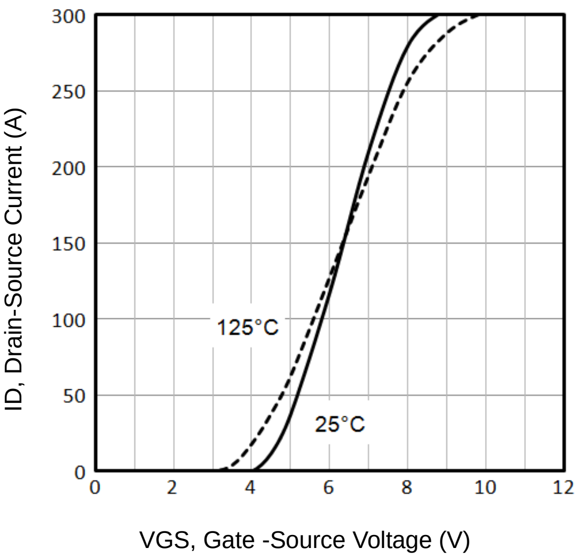


**Fig3.** Typical Transfer Characteristics

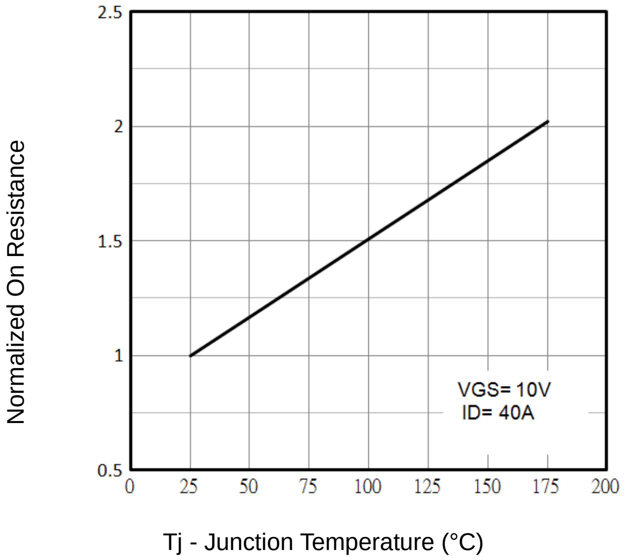


**Fig4.** Normalized On-Resistance Vs. Tj

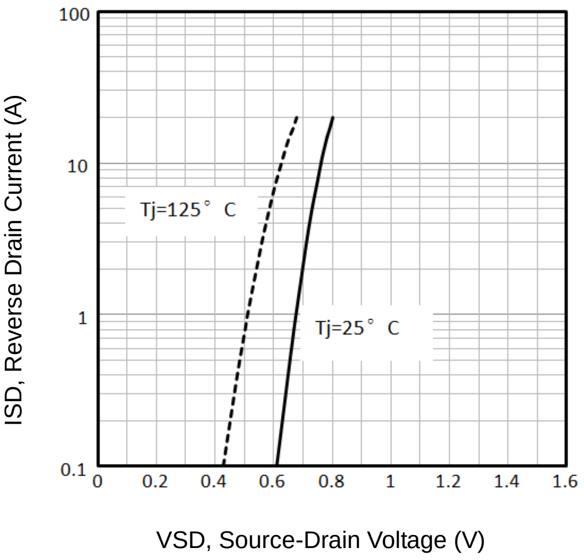


**Fig5.** Typical Source-Drain Diode Forward Voltage

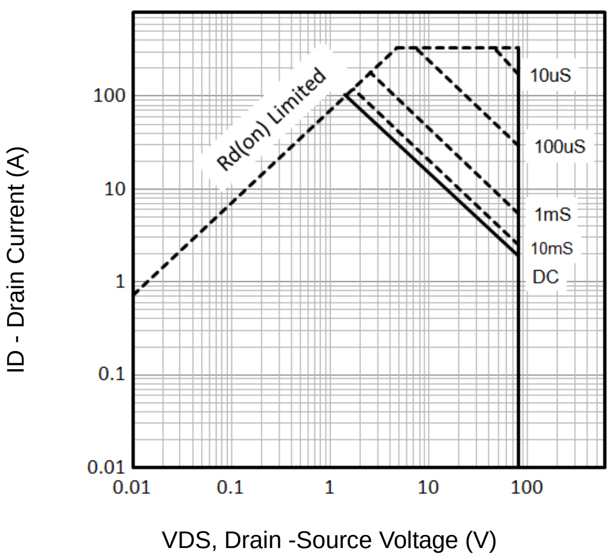


**Fig6.** Maximum Safe Operating Area

## Typical Characteristics

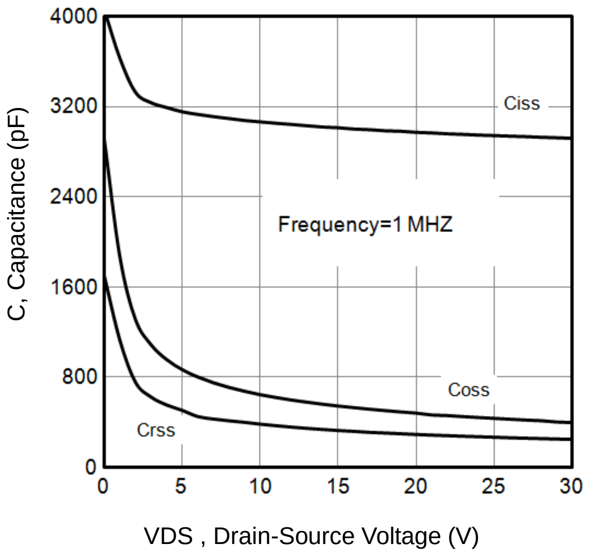


**Fig7.** Typical Capacitance Vs.Drain-Source Voltage

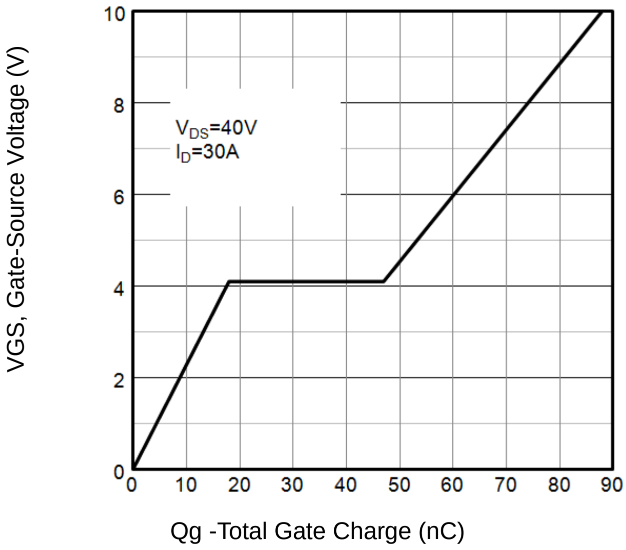


**Fig8.** Typical Gate Charge Vs.Gate-Source Voltage

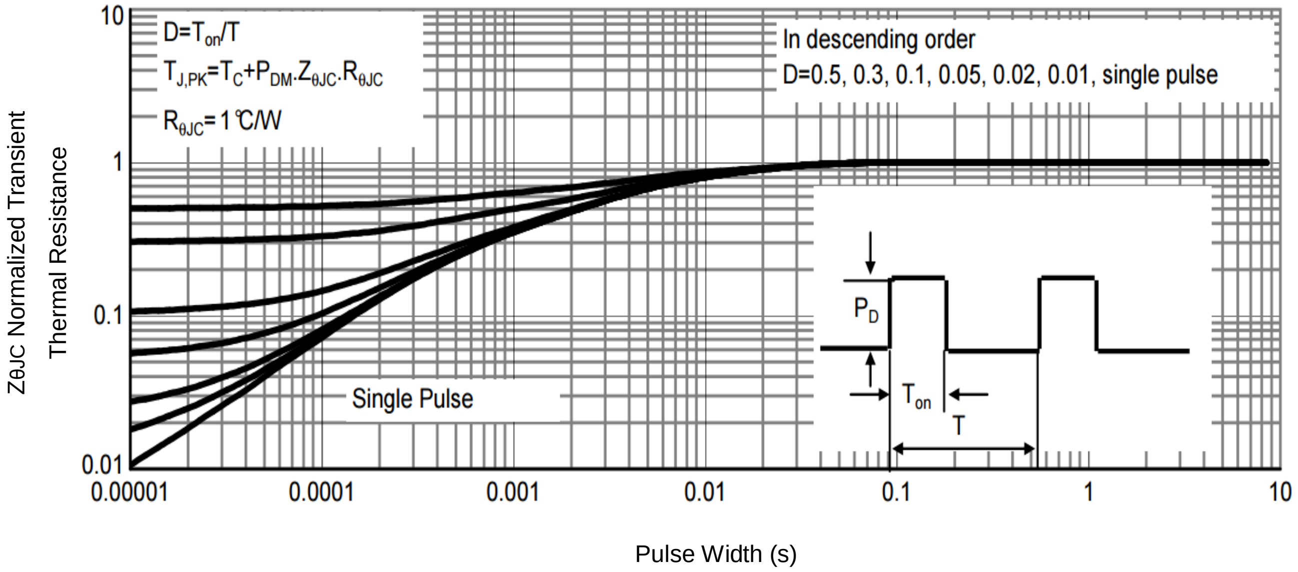


**Fig9.** Normalized Maximum Transient Thermal Impedance

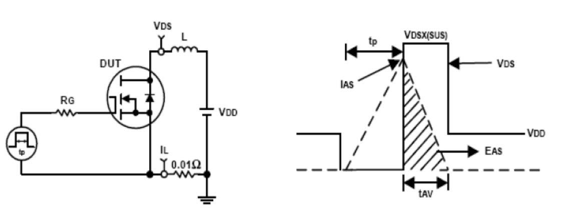


**Fig10.** Unclamped Inductive Test Circuit and waveforms

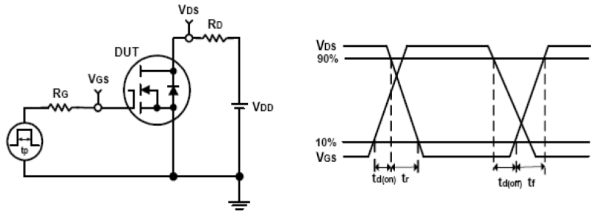
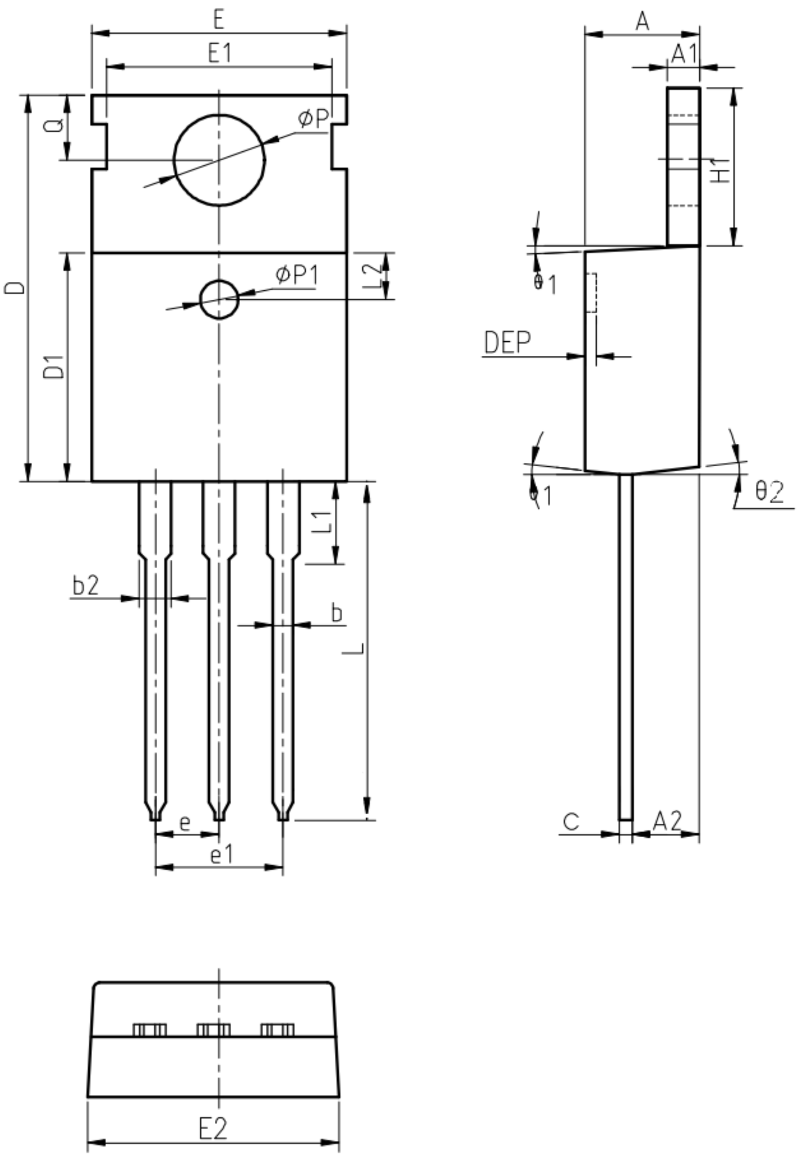


**Fig11.** Switching Time Test Circuit and waveforms

# TO-220AB Package Outline Data



| Symbol | Dimensions (unit: mm) | | |
|---|---|---|---|
| | Min | Typ | Max |
| **A** | 4.30 | 4.52 | 4.70 |
| **A1** | 1.15 | 1.30 | 1.40 |
| **A2** | 2.20 | 2.40 | 2.60 |
| **b** | 0.70 | 0.80 | 1.00 |
| **b2** | 1.17 | 1.32 | 1.50 |
| **c** | 0.45 | 0.50 | 0.61 |
| **D** | 15.30 | 15.65 | 15.90 |
| **D1** | 9.00 | 9.20 | 9.40 |
| **DEP** | 0.05 | 0.10 | 0.25 |
| **E** | 9.66 | 9.90 | 10.28 |
| **E1** | - | 8.70 | - |
| **E2** | 9.80 | 10.00 | 10.20 |
| **ΦP1** | 1.40 | 1.50 | 1.60 |
| **e** | 2.54 BSC | | |
| **e1** | 5.08 BSC | | |
| **H1** | 6.40 | 6.50 | 6.80 |
| **L** | 12.70 | - | 14.27 |
| **L1** | - | - | 3.95 |
| **L2** | 2.40 | 2.50 | 2.60 |
| **ΦP** | 3.53 | 3.60 | 3.70 |
| **Q** | 2.70 | 2.80 | 2.90 |
| **θ1** | 5 ° | 7 ° | 9 ° |
| **θ2** | 1 ° | 3 ° | 5 ° |

Notes:

1. Refer to JEDEC TO-220 variation AB
2. Dimension "D" and "E" do NOT include mold flash. Mold flash shall not exceed 0.127mm per side.

## Customer Service

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