## DESCRIPTION

The AM03N100D-Q is available in TO-252 Packages.

| VDS | RDSON | ID |
|---|---|---|
| 1000V | 6.2Ω | 2.5A |

## FEATURE

- AEC-Q101 Certificated
- VDS = 1000V, ID = 2.5A
- $R_{DS(ON)}$ = 6.2Ω @ $V_{GS}$=10V
- Fast Switching
- Low Crss
- 100% avalanche tested
- Improved dv/dt capability
- Zener - Protected

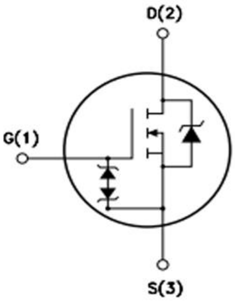
## APPLICATIONS

- High frequency switching mode power supply

## ORDERING INFORMATION

| Package Type | Part Number | |
|---|---|---|
| TO-252<br>AEC-Q101<br>SPQ: 2,500pcs/Reel | D | AM03N100D-Q |
| Note | Q: AEC-Q101 Qualified | |
| AiT provides all RoHS products | | |

## PIN DESCRIPTION



| Pin # | Symbol | Function |
|---|---|---|
| 1 | G | Gate |
| 2 | D | Drain |
| 3 | S | Source |

## ABSOLUTE MAXIMUM RATINGS

$T_C$ = 25°C, unless otherwise specified.

| | | |
|---|---|---|
| $V_{GS}$, Gate-to-Source Voltage | | ±30V |
| $V_{DSS}$, Drain-to-Source Voltage | | 1000V |
| $I_D$, Drain Continuous-Continuous | $T_C$=25℃ | 2.50A |
| | $T_C$=100℃ | 1.58A |
| $I_{DM}$ (1), Pulsed Drain Current | | 10A |
| $P_D$, Power Dissipation | TO-252 | 62.50W |
| | Derating Factor above 25℃ | 0.50W/℃ |
| $E_{AS}$ (2), Single Pulse Avalanche Energy | | 200mJ |
| $V_{ESD(G-S)}$, Gate source ESD (HBM, C=100pF, R=1.5kΩ) | | 3kV |
| dv/dt (3), Peak Diode Recovery dv/dt | | 5V/ns |
| $T_{STG}$, Storage Temperature Range | | -55℃~+150℃ |
| $T_J$, Operating Junction Temperature Range | | 150℃ |
| $T_L$, Maximum Temperature for Soldering | | 300℃ |
| $R_{\theta JC}$, Junction-to-Case | TO-252 | 2℃/W |

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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

(2) L=120mH, VDS=50V, Start TJ=25℃.

(3) ISD =3A, di/dt ≤100A/us, VDD≤BVDSS, Start TJ=25℃

## ELECTRICAL CHARACTERISTICS

$T_C$ = 25℃, unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF Characteristics** | | | | | | |
| Drain to Source Breakdown Voltage | $V_{DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 1000 | - | - | V |
| $BV_{DSS}$ Temperature Coefficient | $\Delta BV_{DSS}/\Delta TJ$ | $I_D$=250μA, Reference25℃ | - | 0.75 | - | V/℃ |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=1000V, $V_{GS}$=0V, $T_J$ = 5℃ | - | - | 10 | μA |
| | | $V_{DS}$=800V, $V_{GS}$=0V, $T_J$ = 125℃ | - | - | 100 | |
| Gate to Source Forward Leakage | $I_{GSS(F)}$ | $V_{GS}$ = 25V | - | - | 10 | μA |
| Gate to Source Reverse Leakage | $I_{GSS(R)}$ | $V_{GS}$ = -25V | - | - | 10 | |
| **ON Characteristics** | | | | | | |
| Gate Threshold Voltage* | $V_{GS(TH)}$ | $V_{GS}$=$V_{DS}$, $I_D$=250μA | 3 | - | 5 | V |
| Drain-to-Source On-Resistance* | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=1.25A | - | 6.20 | 7.50 | Ω |
| Forward Transconductance* | gfs | $V_{GS}$=15V, $I_D$=1.25A | 2 | - | - | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=25V, $V_{GS}$=0V, f=1MHz | - | 530 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 45 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 2.5 | - | |
| Total Gate Charge | $Q_g$ | $V_{DD}$=450V, $I_D$=2.5A, $V_{GS}$=10V | - | 13.80 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 4.60 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 4.80 | - | |
| Gate resistance | $R_G$ | f =1.0MHz | - | 4.50 | - | Ω |
| **Switching Characteristics** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=500V, $I_D$=2.5A, $R_{GEN}$=5Ω, $V_{GS}$=10V, $T_J$ = 25℃ | - | 23 | - | ns |
| Turn-on Rise Time | $t_r$ | | - | 63 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 33 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 61 | - | |
| **Drain-Source Diode Characteristics** | | | | | | |
| Drain Forward Voltage* | $V_{SD}$ | $I_S$=2.5A, $V_{GS}$=0V | - | - | 1.20 | V |
| Continuous Source Current (Body Diode) | $I_S$ | $T_C$ = 25℃ | - | - | 2.5 | A |
| Maximum Pulsed Current (Body Diode) | $I_{SM}$ | | - | - | 10 | |
| Reverse Recovery Time | Trr | $I_S$=2.5A, $T_J$ = 25°C $V_{GS}$=0V, $di_F/dt$=100A/us | - | 2103 | - | ns |
| Reverse Recovery Charge | Qrr | | - | 1979 | - | nC |
| **Gate-source Zener diode** | | | | | | |
| Gate-Source Breakdown Voltage | $V_{GSO}$ | $I_{GS}$= ±1mA (Open Drain) | 30 | - | - | V |

* Pulse width tp≤300μs, δ≤2%

## TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Safe Operating Area

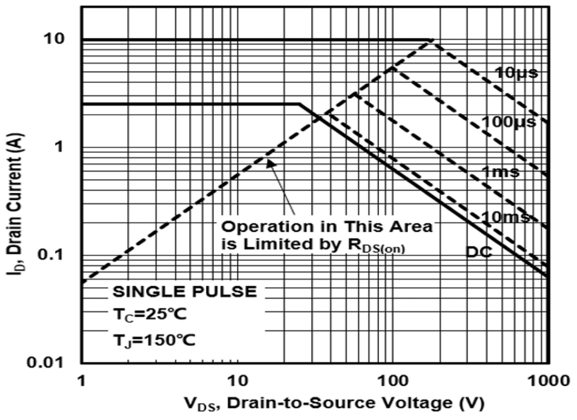


Fig 2. Power Dissipation

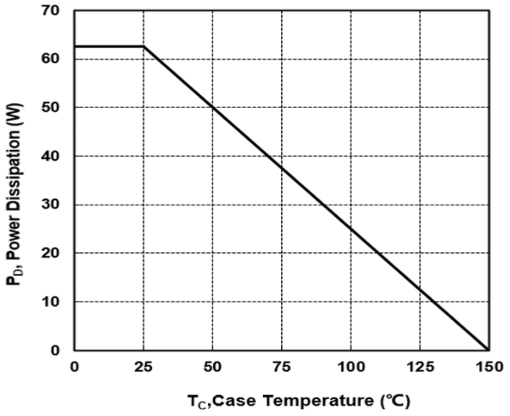
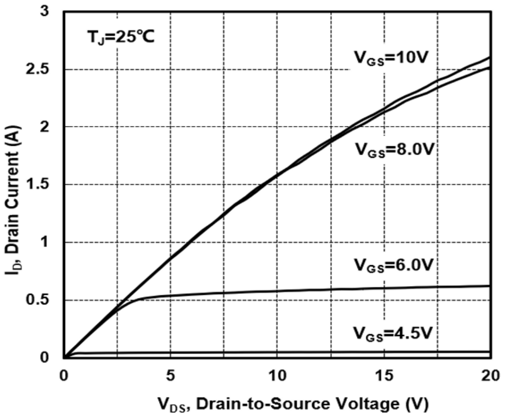


Fig 3. Typical Output Characteristics



a

Fig 4. Typical Transfer Characteristics

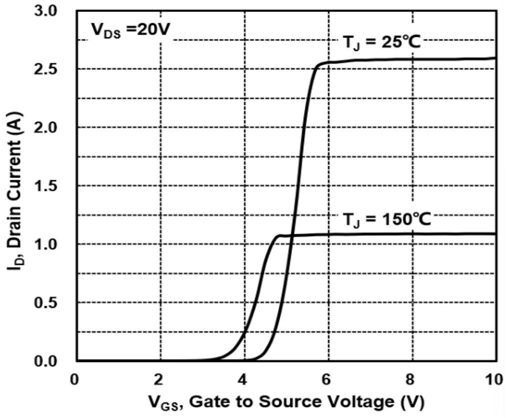


Fig 5. Typical Drain to Source ON Resistance vs. Drain Current

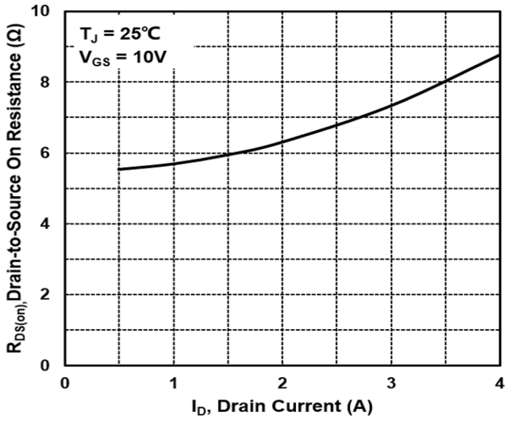


Fig 6. Typical Drian to Source on Resistance vs. Junction Temperature

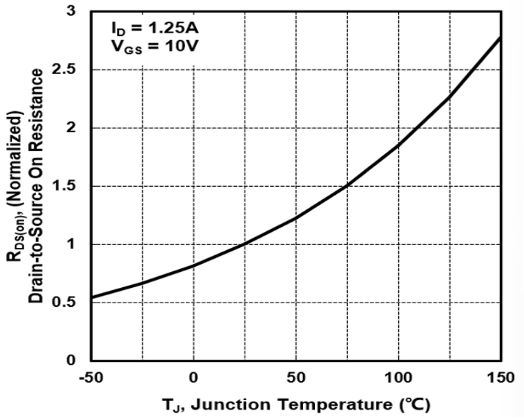


Fig 7. Typical Threshold Voltage vs. Junction Temperature

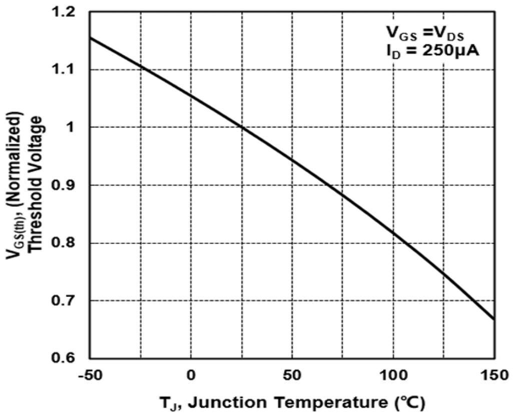


Fig 8. Typical Breakdown Voltage vs. Junction Temperature

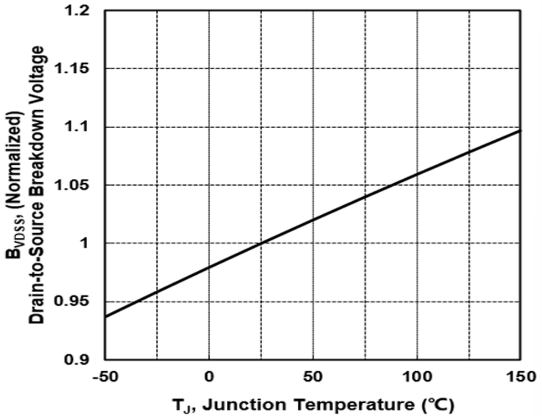


Fig 9. Typical Capacitance vs Drain to Source Voltage

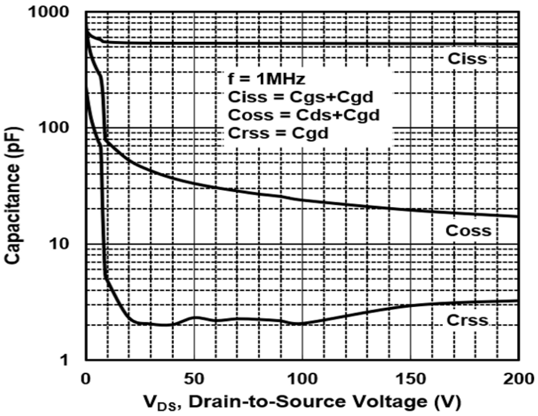


Fig 10. Typical Gate Charge vs Gate to Source Voltage

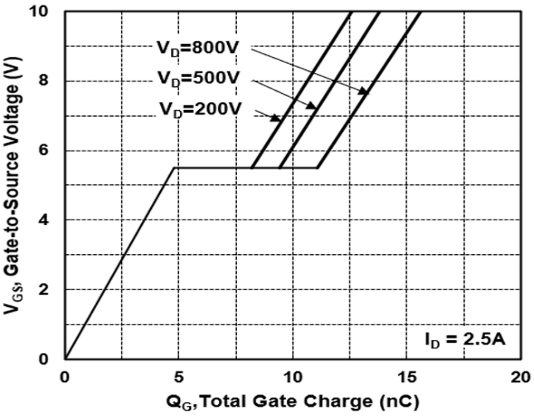


Fig 11. Transient Thermal Impedance, Junction to Case

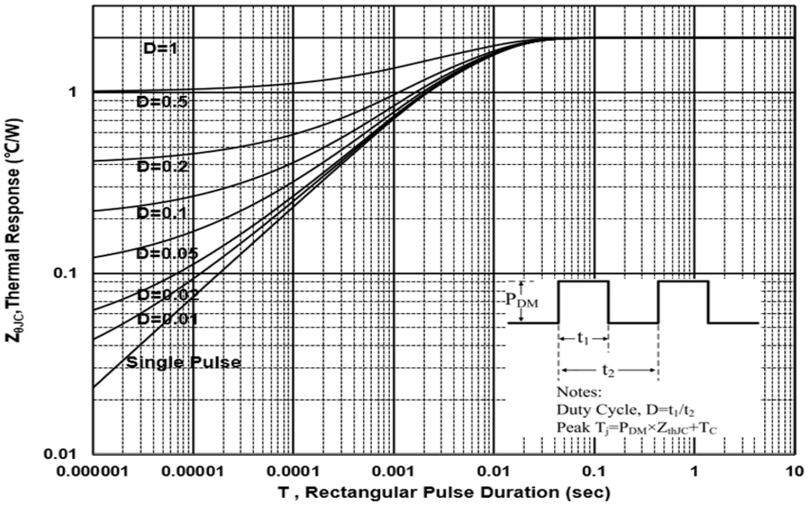


Fig 12. Gate Charge Test Circuit

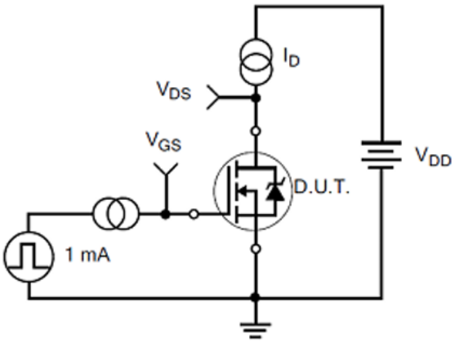


Fig 13. Gate Charge Waveforms

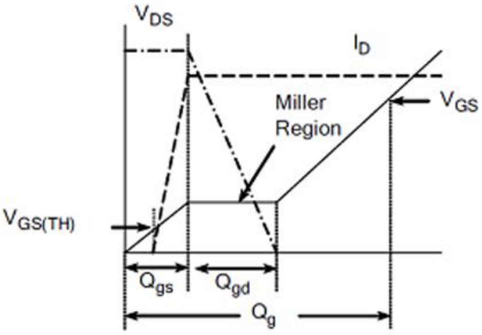


Fig 14. Resistive Switching Test Circuit

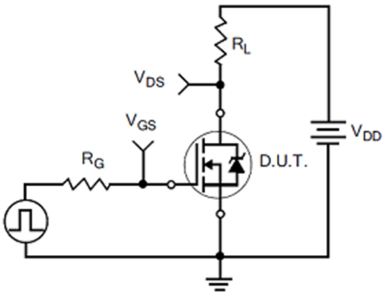


Fig 15. Resistive Switching Waveforms

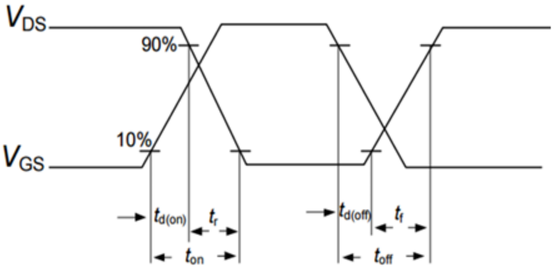


Fig 16. Diode Reverse Recovery Test Circuit

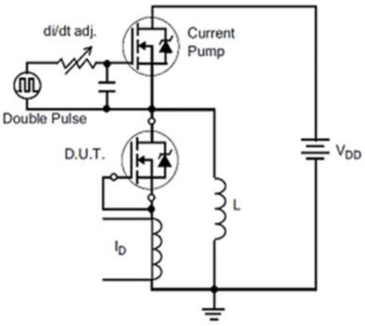


Fig 17. Diode Reverse Recovery Waveform

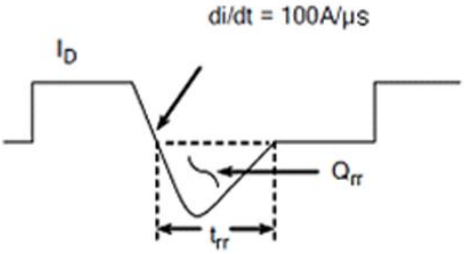


Fig 18. Unclamped Inductive Switching Test Circuit

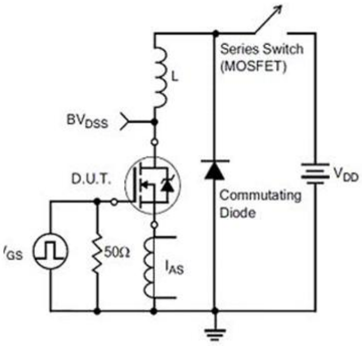
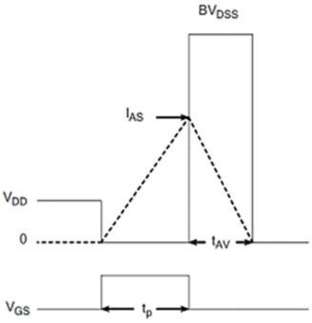
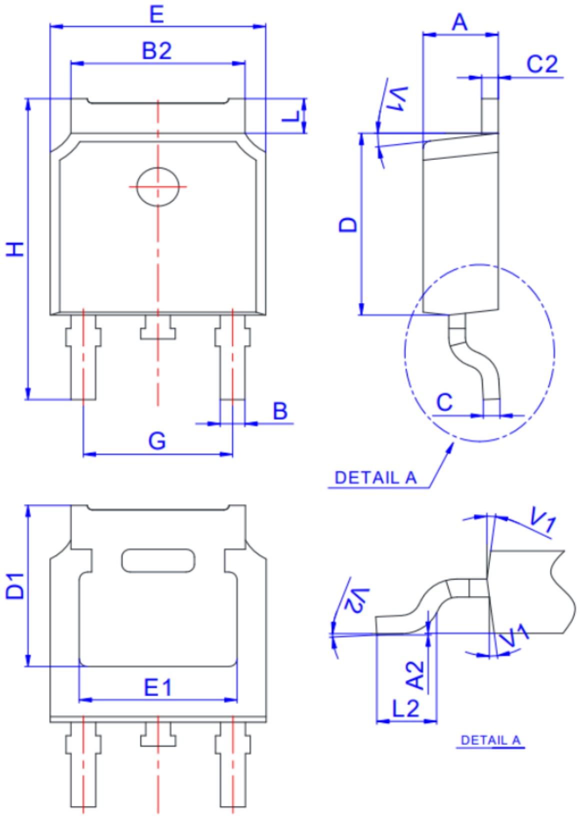


Fig 19. Unclamped Inductive Switching Waveform



## PACKAGE INFORMATION

Dimension in TO-252 (Unit: mm)



| Symbol | Min. | Max. |
|---|---|---|
| A | 2.100 | 2.500 |
| A2 | 0.000 | 0.100 |
| B | 0.660 | 0.860 |
| B2 | 5.180 | 5.480 |
| C | 0.400 | 0.600 |
| C2 | 0.440 | 0.580 |
| D | 5.900 | 6.300 |
| D1 | 5.300REF | |
| E | 6.400 | 6.800 |
| E1 | 4.630 | - |
| G | 4.470 | 4.670 |
| H | 9.500 | 10.70 |
| L | 1.090 | 1.210 |
| L2 | 1.350 | 1.650 |
| V1 | 7” | |
| V2 | 0° | 6° |

## IMPORTANT NOTICE

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