## DESCRIPTION

The AM04NN10 is available in SOP8 Package.

| BVDSS | RDSON | ID |
|---|---|---|
| 100V | 95mΩ | 3.5A |

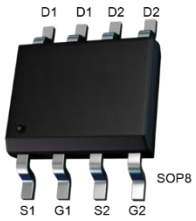
## FEATURES

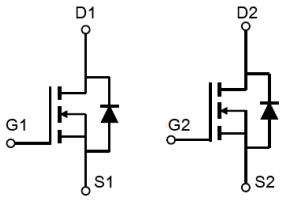
- 100V, 3.5A
  $R_{DS(ON)}$ Typ = 95mΩ @ $V_{GS}$ = 10V
  $R_{DS(ON)}$ Typ = 135mΩ @ $V_{GS}$ = 4.5V
- Advanced Trench MOS with Split-Gate Structure
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free

## APPLICATION

- DC/DC Converter
- LED Backlighting
- Motor Control

## PIN DESCRIPTION




| Pin# | Symbol | Function |
|---|---|---|
| 1,3 | S | Source |
| 2,4 | G | Gate |
| 5,6,7,8 | D | Drain |

## ORDERING INFORMATION

| Package Type | Part Number | |
|---|---|---|
| SOP8<br>SPQ: 4,000pcs/Reel | M8 | AM04NN10M8VR |
| Note | V: Halogen free Package<br>R: Tape & Reel | |
| AiT provides all RoHS products | | |

## ABSOLUTE MAXIMUM RATINGS

$T_J$=25℃, unless otherwise specified.

| | | |
|---|---|---|
| $V_{DS}$, Drain-to-Source Voltage | | 100V |
| $V_{GS}$, Gate-to-Source Voltage | | ±20V |
| $I_D$, Continuous Drain Current | $T_A$ = 25℃ | 3.5A |
| | $T_A$ = 100℃ | 2.2A |
| $I_{DM}$, Pulsed Drain Current (1) | | 14A |
| $E_{AS}$, Single Pulsed Avalanche Energy (2) | | 7.2mJ |
| $P_D$, Power Dissipation | $T_A$ = 25℃ | 3.1W |
| $R_{\theta JA}$, Thermal Resistance, Junction to Ambient (3) | | 40.3℃/W |
| $T_J$, $T_{STG}$, Junction & Storage Temperature Range | | -55℃ ~ +150℃ |

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 junction temperature $T_J$(MAX)=150°C.

(2) The EAS data shows Max. rating. The test condition is $T_J$=25℃, $V_{DD}$=25V, $V_G$=10V, $R_G$=25Ω, L=0.4mH, $I_{AS}$=6A

(3) $R_{\theta JA}$ is measured with the device mounted on 1inch² pad of 2oz copper FR4 PCB.

## ELECTRICAL CHARACTERISTICS

$T_J$=25℃, unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 100 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=100V, $V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$ =±20V, $V_{DS}$= 0V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| Gate Threshold Voltage | $V_{GS\ (th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1 | 1.65 | 2.5 | V |
| Static Drain Source ON-Resistance (4) | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=3A | - | 95 | 130 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=1A | - | 135 | 190 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=50V, $V_{GS}$=0V, f=1MHz | - | 200 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 300 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 3 | - | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=0 to 10V, $V_{DS}$=50V, $I_D$=3A | - | 4 | - | nC |
| Gate Source Charge | $Q_{gs}$ | | - | 0.9 | - | |
| Gate-Drain (“Miller”) Charge | $Q_{gd}$ | | - | 1.1 | - | |
| **Switching Characteristics** | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}$=10V, $V_{DD}$=50V $R_{GEN}$=3Ω, $I_D$=3A | - | 13 | - | ns |
| Turn-On Rese Time | $t_r$ | | - | 19 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 20 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 28 | - | |
| **Drain-Source Diode Characteristics and Max Ratings** | | | | | | |
| Maximum Continuous Drain to Source Diode Forward Current | $I_S$ | - | - | - | 3.5 | A |
| Maximum Pulsed Drain to Source Diode Forward Current | $I_{SM}$ | - | - | - | 14 | A |
| Drain to Source Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_S$=3A | - | - | 1.2 | V |

(4) Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

## TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Output Characteristics

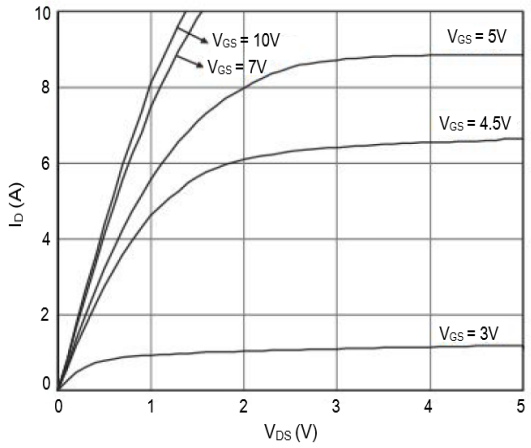



Fig 2. Typical Transfer Characteristics

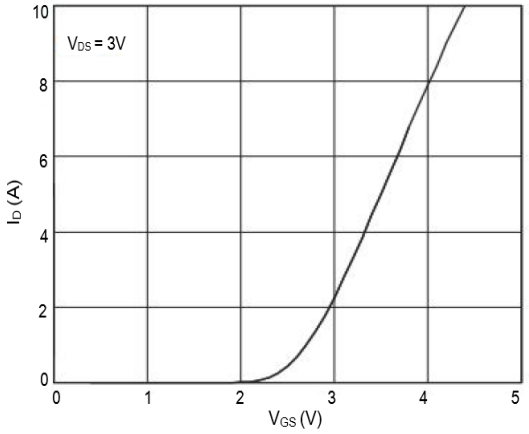



Fig 3. On-resistance vs. Drain Current

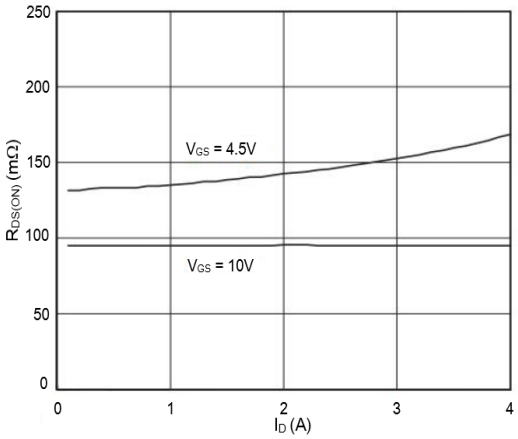



Fig 4. Body Diode Characteristics

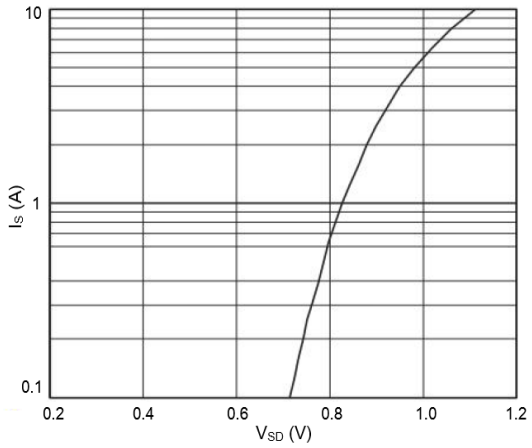



Fig 5. Gate Charge Characteristics

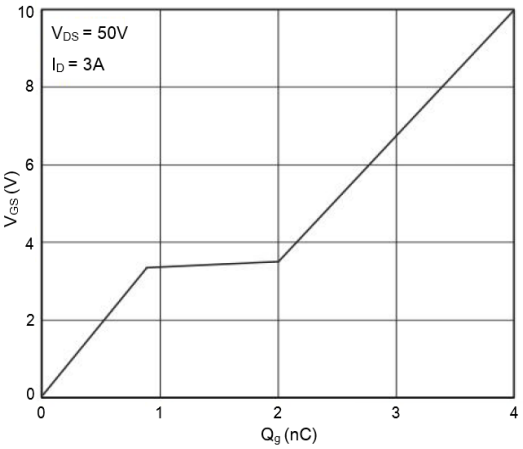



Fig 6. Capacitance Characteristics

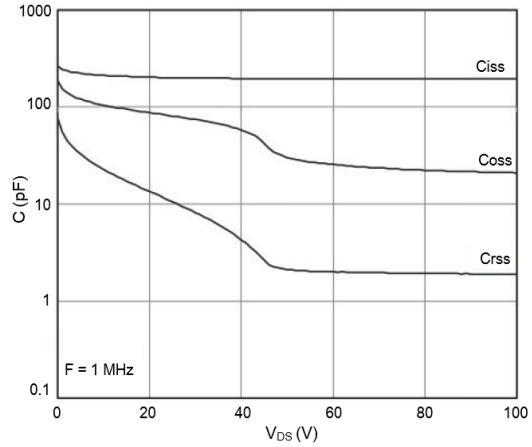


Fig 7. Normalized Breakdown voltage vs. Junction Temperature

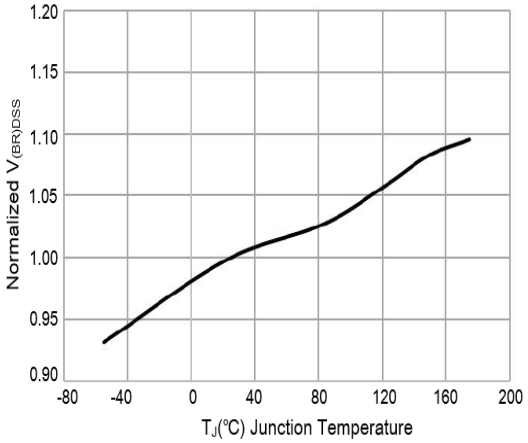



Fig 8. Normalized on Resistance vs. Junction Temperature

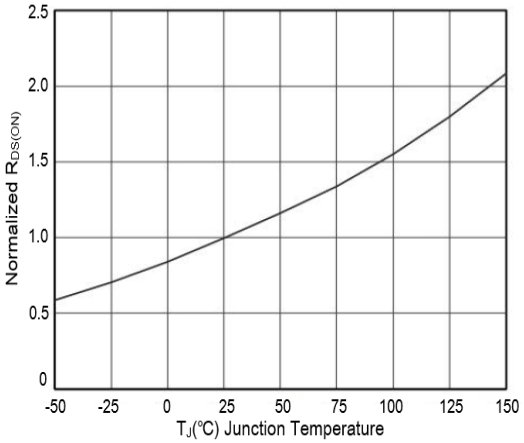



Fig 9. Maximum Safe Operating Area

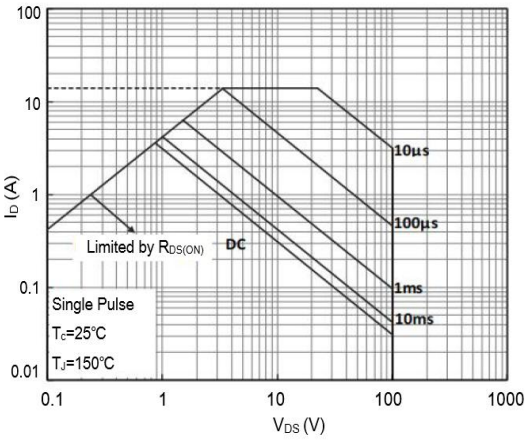



Fig 10. Maximum Continuous Drain Current vs. Case Temperature

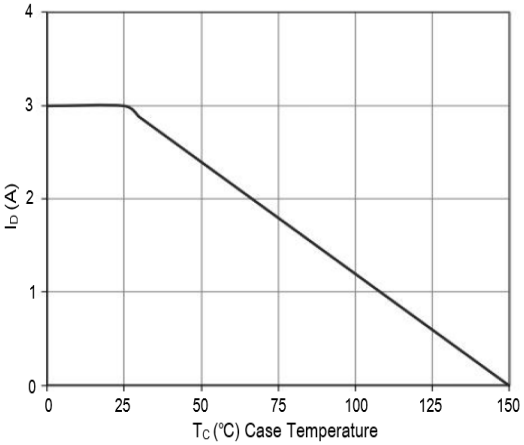



Fig 11. Normalized Maximum Transient Thermal Impedance

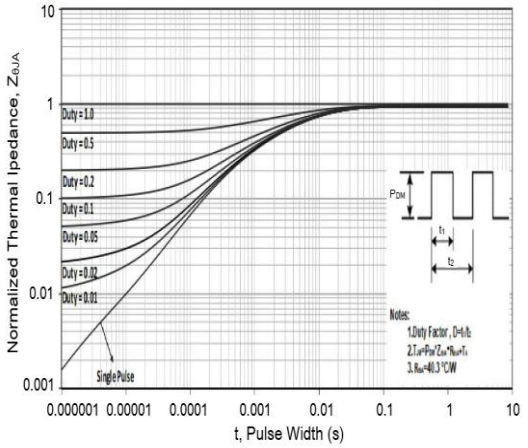
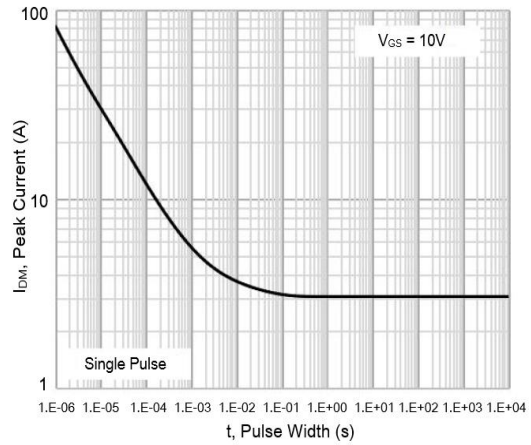



Fig 12. Peak Current Capacity



## TEST CIRCUIT

Fig 1. Gate Charge Test Circuit & Waveform

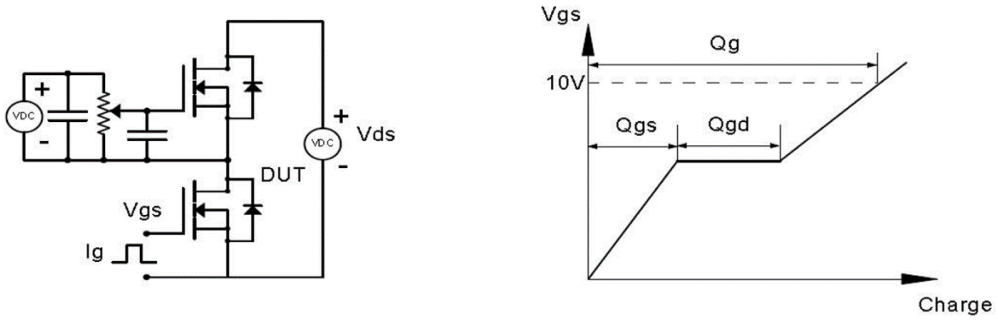



Fig 2. Resistive Switching Test Circuit & Waveforms

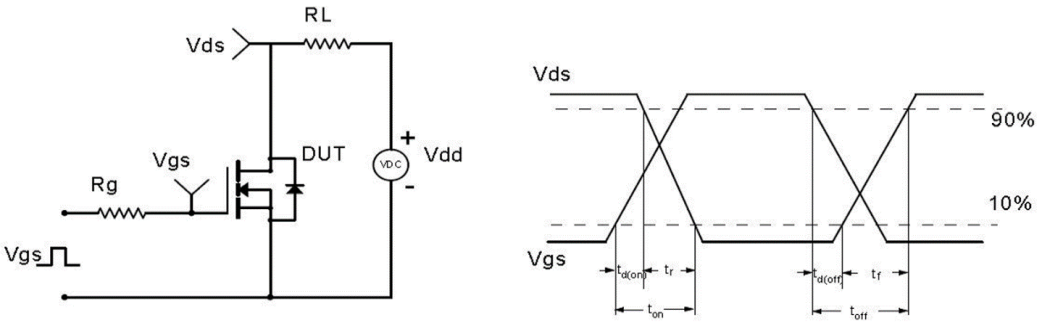



Fig 3. Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

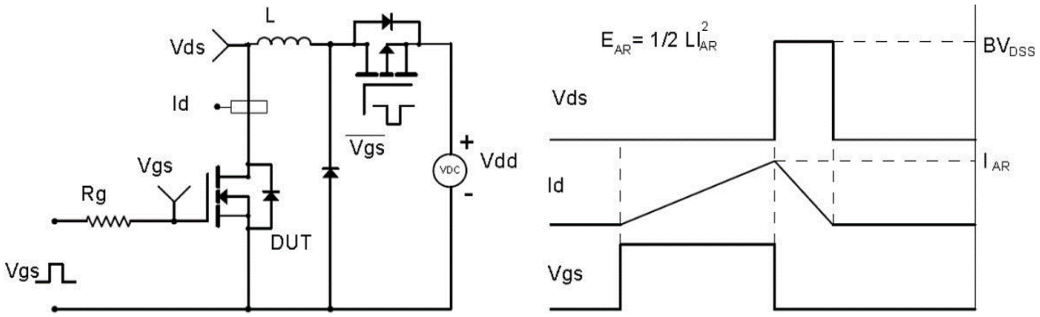
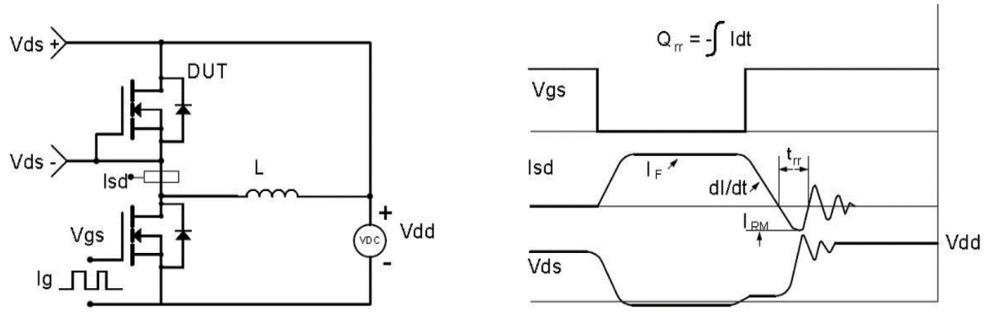
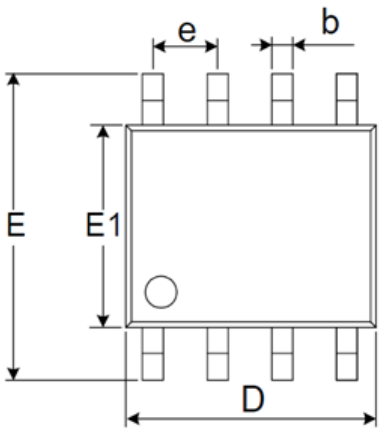


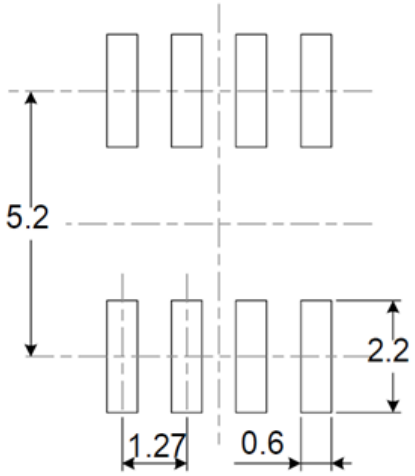

Fig 4. Diode Recovery Test Circuit & Waveforms



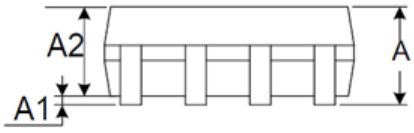
## PACKAGE INFORMATION

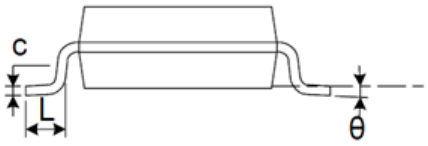
Dimension in SOP8 (Unit: mm)




RECOMMENDED LAND PATTERN (Unit: mm)




| Symbol | MILLIMETER | |
|---|---|---|
| | Min. | Max. |
| A | 1.350 | 1.750 |
| A1 | 0.100 | 0.250 |
| A2 | 1.350 | 1.550 |
| b | 0.330 | 0.510 |
| c | 0.170 | 0.250 |
| D | 4.800 | 5.000 |
| e | 1.270 BSC | |
| E | 5.800 | 6.200 |
| E1 | 3.800 | 4.000 |
| L | 0.400 | 1.270 |
| θ | 0° | 8° |

## IMPORTANT NOTICE

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