



## Description

The AM7452NA uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

## General Features

$V_{DS} = 60V$   $I_D = 100A$

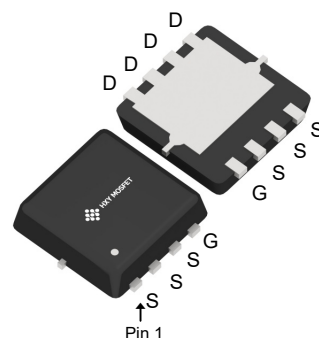
$R_{DS(ON)} < 4 m\Omega$  @  $V_{GS}=20V$

## Application

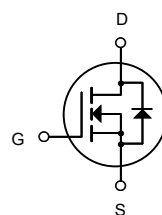
Battery protection

Load switch

Uninterruptible power supply



DFN3X3-8L



N-Channel MOSFET

## Ordering Information

| Product ID | Pack      | Brand      | Qty(PCS) |
|------------|-----------|------------|----------|
| AM7452NA   | DFN3X3-8L | HXY MOSFET | 5000     |

## Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

| Symbol                | Parameter                                | Rating     | Units        |
|-----------------------|------------------------------------------|------------|--------------|
| $V_{DS}$              | Drain-Source Voltage                     | 60         | V            |
| $V_{GS}$              | Gate-Source Voltage                      | $\pm 20$   | V            |
| $I_D@T_C=25^\circ C$  | Continuous Drain Current, $V_{GS}$ @ 10V | 100        | A            |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS}$ @ 10V | 64         | A            |
| $I_{DM}$              | Pulsed Drain Current                     | 385        | A            |
| EAS                   | Single Pulse Avalanche Energy            | 80         | mJ           |
| $I_{AS}$              | Avalanche Current                        | 22         | A            |
| $P_D@T_C=25^\circ C$  | Total Power Dissipation                  | 73.5       | W            |
| $T_{STG}$             | Storage Temperature Range                | -55 to 150 | $^\circ C$   |
| $T_J$                 | Operating Junction Temperature Range     | -55 to 150 | $^\circ C$   |
| $R_{\theta JA}$       | Thermal Resistance Junction-Ambient      | 51         | $^\circ C/W$ |
| $R_{\theta JC}$       | Thermal Resistance Junction-Case         | 1.7        | $^\circ C/W$ |



### Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ , unless otherwise noted)

| Parameter                               |                           | Symbol        | Test Conditions                                        | Min. | Typ. | Max.      | Unit       |
|-----------------------------------------|---------------------------|---------------|--------------------------------------------------------|------|------|-----------|------------|
| Drain-Source Breakdown Voltage          |                           | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                          | 60   | -    | -         | V          |
| Gate-body Leakage Current               |                           | $I_{GSS}$     | $V_{DS} = 0V, V_{GS} = \pm 20V$                        | -    | -    | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current         | $T_J=25^{\circ}\text{C}$  | $I_{DSS}$     | $V_{DS} = 60V, V_{GS} = 0V$                            | -    | -    | 1         | $\mu A$    |
|                                         | $T_J=100^{\circ}\text{C}$ |               |                                                        | -    | -    |           |            |
| Gate-Threshold Voltage                  |                           | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                      | 1.2  | 1.7  | 2.5       | V          |
| Drain-Source On-Resistance <sup>4</sup> |                           | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 21A$                              | -    | 4.0  | 4.8       | m $\Omega$ |
|                                         |                           |               | $V_{GS} = 4.5V, I_D = 10A$                             | -    | 5.2  | 6.6       |            |
| Forward Transconductance <sup>4</sup>   |                           | $g_{fs}$      | $V_{DS} = 10V, I_D = 21A$                              | -    | 89   | -         | S          |
| Input Capacitance                       |                           | $C_{iss}$     | $V_{DS} = 30V, V_{GS} = 0V, f = 1MHz$                  | -    | 2180 | -         | pF         |
| Output Capacitance                      |                           | $C_{oss}$     |                                                        | -    | 735  | -         |            |
| Reverse Transfer Capacitance            |                           | $C_{rss}$     |                                                        | -    | 42   | -         |            |
| Gate Resistance                         |                           | $R_g$         | $f = 1MHz$                                             | -    | 1.8  | -         | $\Omega$   |
| Total Gate Charge                       |                           | $Q_g$         | $V_{GS} = 10V, V_{DS} = 30V, I_D = 21A$                | -    | 35   | -         | nC         |
| Gate-Source Charge                      |                           | $Q_{gs}$      |                                                        | -    | 6.6  | -         |            |
| Gate-Drain Charge                       |                           | $Q_{gd}$      |                                                        | -    | 8.4  | -         |            |
| Turn-On Delay Time                      |                           | $t_{d(on)}$   | $V_{GS} = 10V, V_{DD} = 30V, R_G = 3\Omega, I_D = 21A$ | -    | 9.4  | -         | ns         |
| Rise Time                               |                           | $t_r$         |                                                        | -    | 8.4  | -         |            |
| Turn-Off Delay Time                     |                           | $t_{d(off)}$  |                                                        | -    | 32.5 | -         |            |
| Fall Time                               |                           | $t_f$         |                                                        | -    | 12.5 | -         |            |
| Body Diode Reverse Recovery Time        |                           | $t_{rr}$      | $I_F = 20A, dI/dt = 100A/\mu s$                        | -    | 50   | -         | ns         |
| Body Diode Reverse Recovery Charge      |                           | $Q_{rr}$      |                                                        | -    | 20   | -         | nC         |
| Diode Forward Voltage <sup>4</sup>      |                           | $V_{SD}$      | $I_S = 21A, V_{GS} = 0V$                               | -    | -    | 1.2       | V          |
| Continuous Source Current               | $T_C=25^{\circ}\text{C}$  | $I_S$         | -                                                      | -    | -    | 100       | A          |

#### Notes:

1. Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=150^{\circ}\text{C}$
2. The EAS data shows Max. rating . The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=40A$ .
3. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
5. This value is guaranteed by design hence it is not included in the production test.



## Typical Characteristics

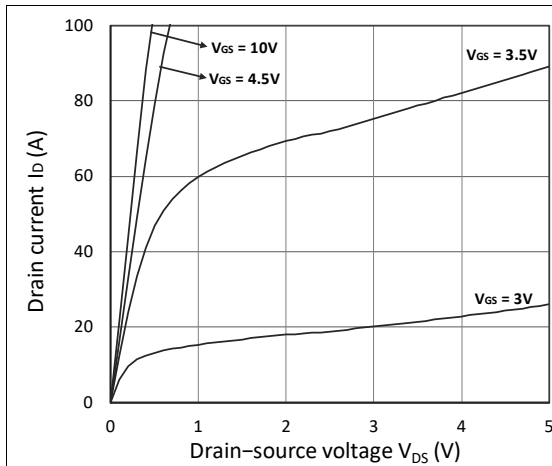


Figure 1. Output Characteristics

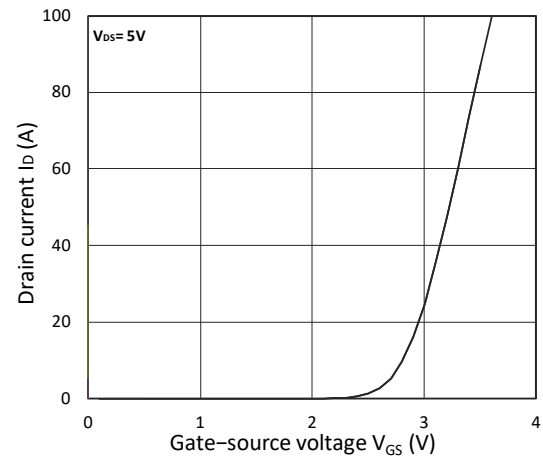


Figure 2. Transfer Characteristics

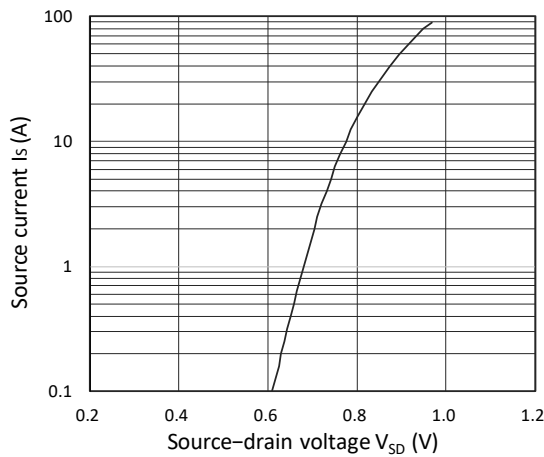


Figure 3. Forward Characteristics of Reverse

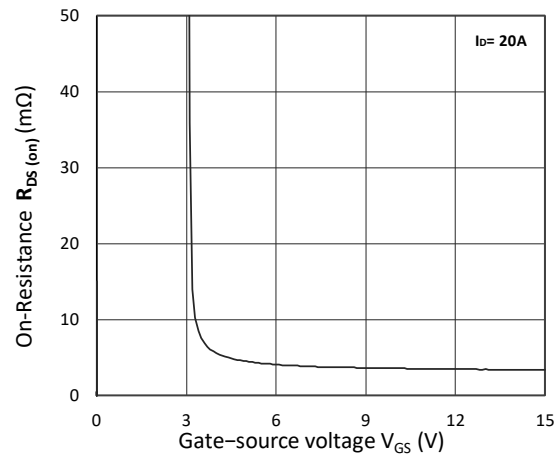


Figure 4.  $R_{DS(ON)}$  vs.  $V_{GS}$

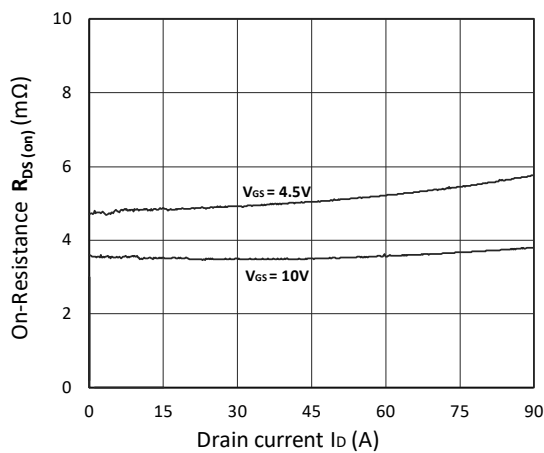


Figure 5.  $R_{DS(ON)}$  vs.  $I_D$

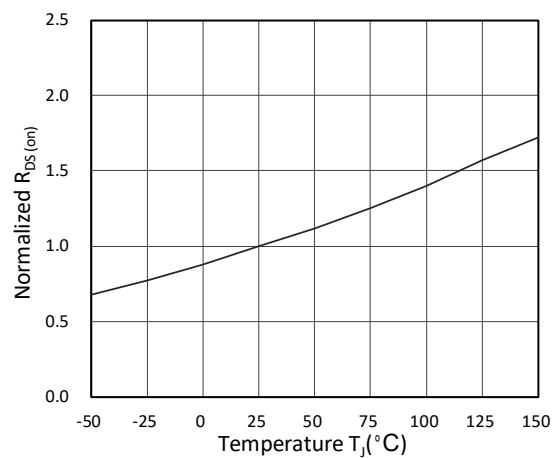


Figure 6. Normalized  $R_{DS(ON)}$  vs. Temperature

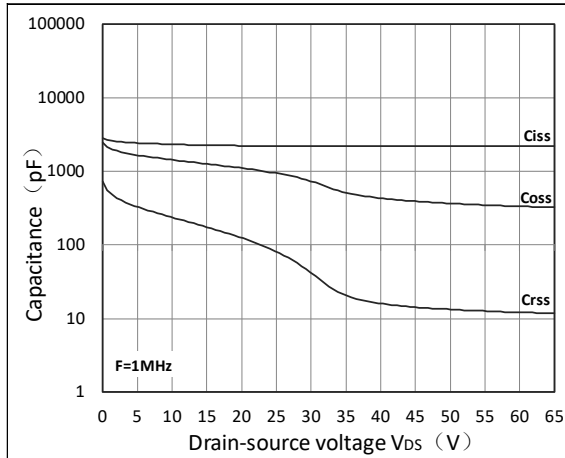


Figure 7. Capacitance Characteristics

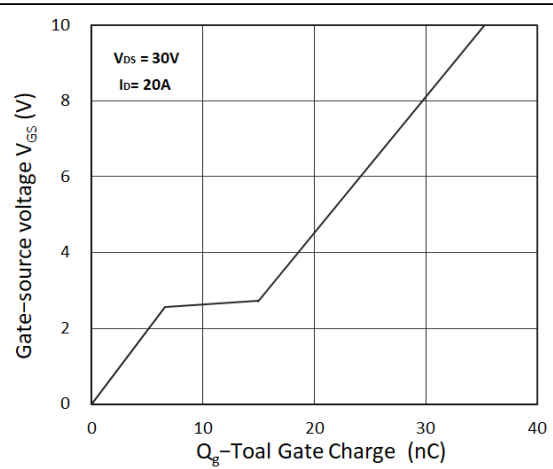


Figure 8. Gate Charge Characteristics

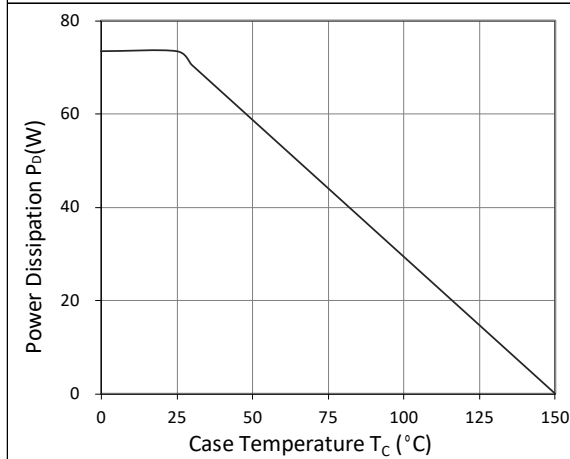


Figure 9. Power Dissipation

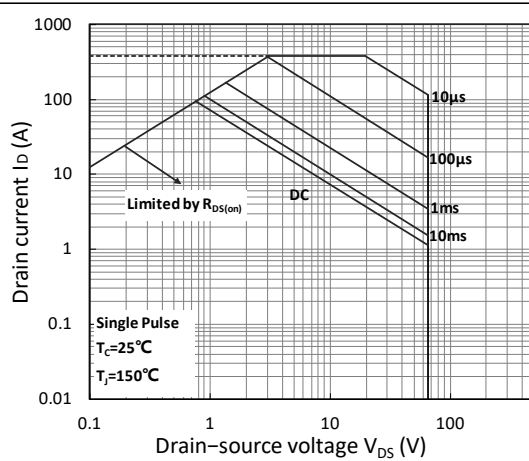


Figure 10. Safe Operating Area

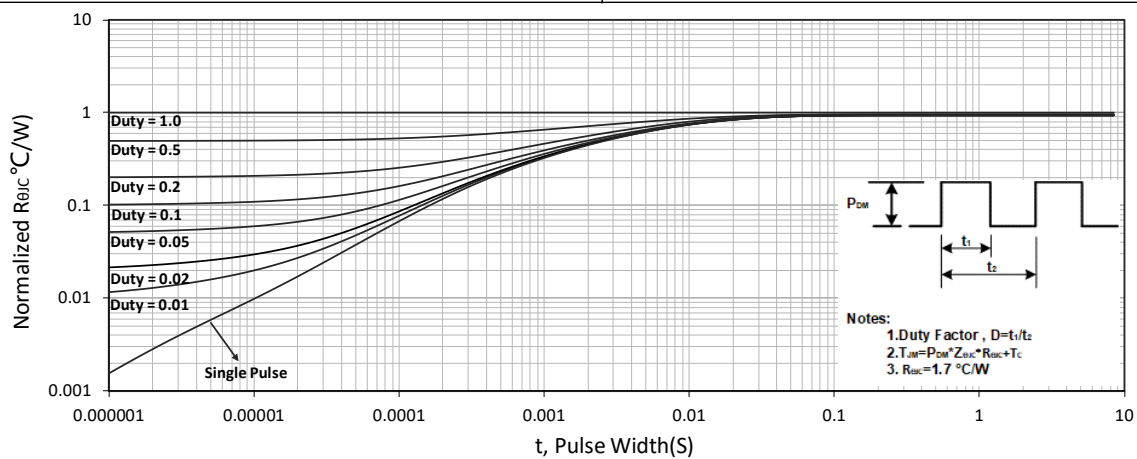


Figure 11. Normalized Maximum Transient Thermal Impedance



## Test Circuit

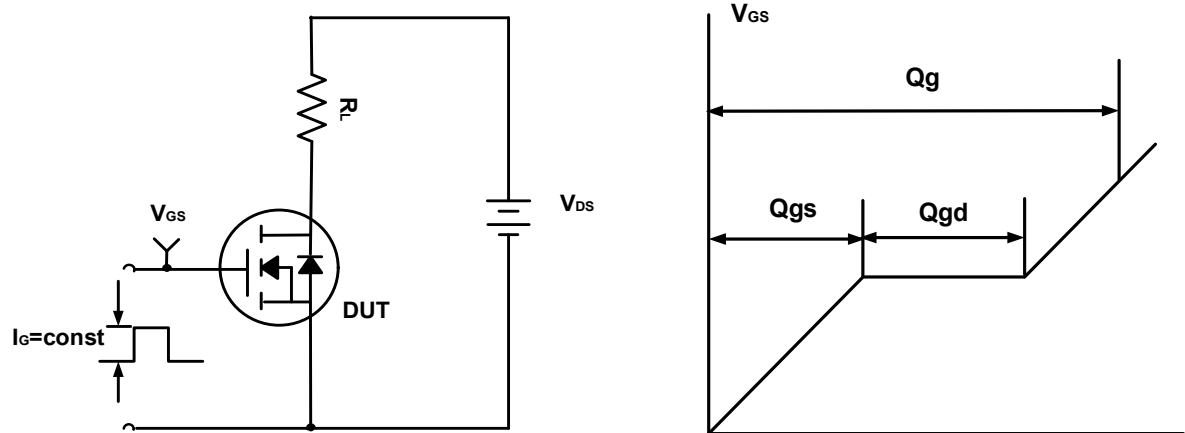


Figure A. Gate Charge Test Circuit & Waveforms

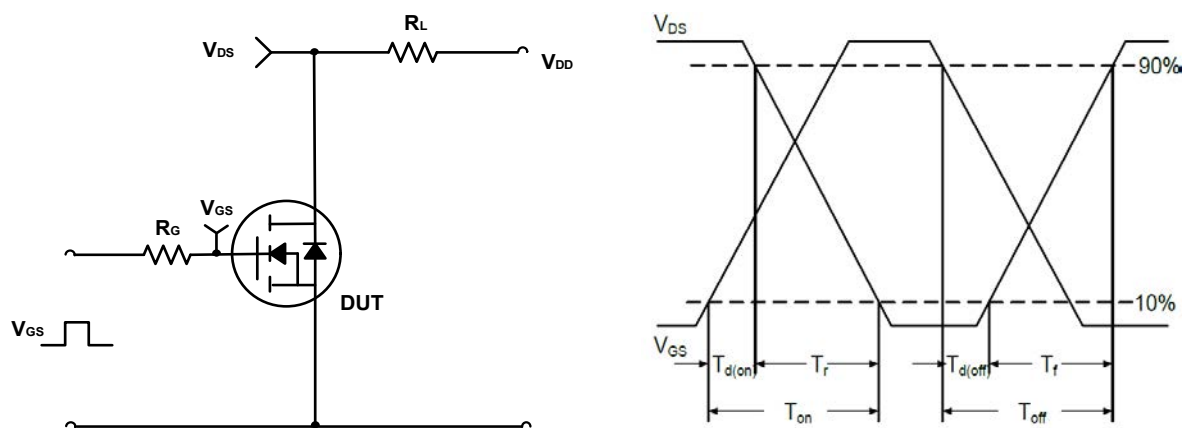


Figure B. Switching Test Circuit & Waveforms

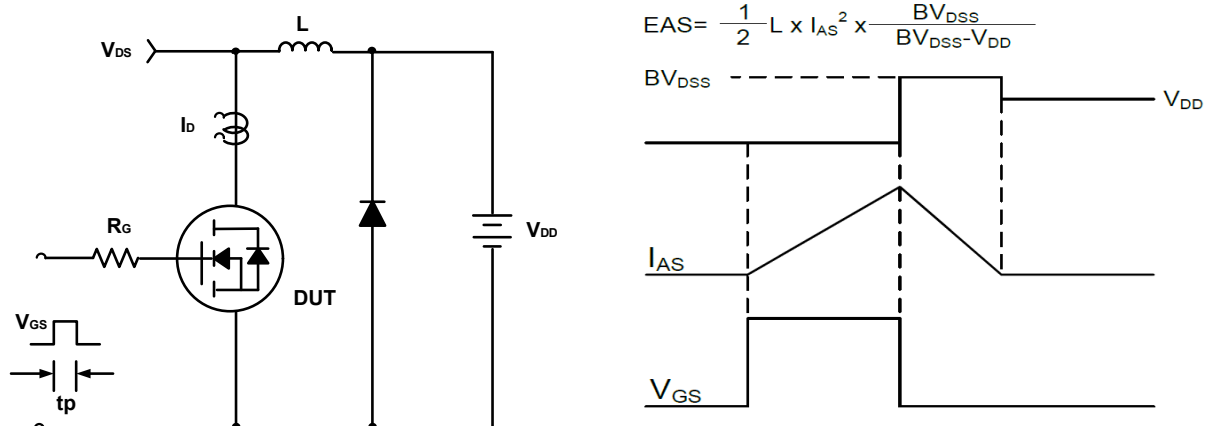


Figure C. Unclamped Inductive Switching Circuit & Waveforms



## DFN3X3-8L Package Information



| Symbol | Dimensions In Millimeters |      |      |
|--------|---------------------------|------|------|
|        | Min.                      | Nom. | Max. |
| A      | 0.70                      | 0.75 | 0.80 |
| b      | 0.25                      | 0.30 | 0.35 |
| c      | 0.10                      | 0.15 | 0.25 |
| D      | 3.25                      | 3.35 | 3.45 |
| D1     | 3.00                      | 3.10 | 3.20 |
| D2     | 1.48                      | 1.58 | 1.68 |
| D3     | -                         | 0.13 | -    |
| E      | 3.20                      | 3.30 | 3.40 |
| E1     | 3.00                      | 3.15 | 3.20 |
| E2     | 2.39                      | 2.49 | 2.59 |
| e      | 0.65BSC                   |      |      |
| H      | 0.30                      | 0.39 | 0.50 |
| L      | 0.30                      | 0.40 | 0.50 |
| L1     | -                         | 0.13 | -    |
| M      | *                         | *    | 0.15 |
| θ      |                           | 10°  | 12°  |



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