## DESCRIPTION

The AM20N06-Q is available in PDFN8(3.3x3.3) Package.

| BVDSS | RDSON | ID |
|---|---|---|
| 60V | 30mΩ | 20A |

## APPLICATION

- Valves control
- Solenoids control
- Lighting

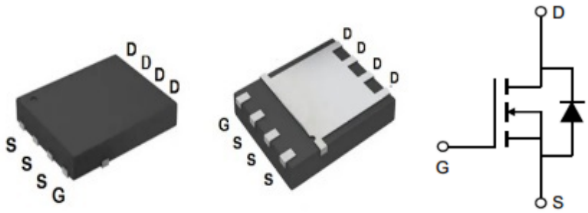
## ORDERING INFORMATION

| Package Type | Part Number | |
|---|---|---|
| PDFN8(3.3x3.3)<br>SPQ: 5,000pcs/Reel | PJ8S | AM20N06PJ8SR-Q |
| | | AM20N06PJ8SVR-Q |
| Note | R: Tape & Reel<br>Q: AEC-Q101 Certificated<br>V: Halogen free Package | |
| AiT provides all RoHS products | | |

## FEATURE

- $V_{DS}$ = 60V, $I_D$ = 20A
  $R_{DS(ON)}$ < 30mΩ @ $V_{GS}$=10V
  $R_{DS(ON)}$ < 40mΩ @ $V_{GS}$=4.5V
- High ESD Capability
- High Density Cell Design for Lower $R_{DSON}$
- 175°C Operating Temperature
- Good Stability and Uniformity with High EAS
- AEC-Q101 certificated

## PIN DESCRIPTION




PDFN8 (3.3 x 3.3)

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

## ABSOLUTE MAXIMUM RATINGS

$T_A$=25℃,unless otherwise noted.

| | | |
|---|---|---|
| $V_{DS}$, Drain-Source Voltage | | 60V |
| $V_{GS}$, Gate-Source Voltage | | ±20V |
| $I_D$, Continuous Drain Continuous (1) | | 20A |
| $I_{DM}$ (1), Drain Current- Pulsed | | 80A |
| $P_D$, Total Power Dissipation | $T_C$=25℃ | 44W |
| $E_{AS}$ (2), Single Pulse Avalanche Energy | | 56mJ |
| $T_{STG}$, Storage Temperature Range | | -55℃~+175℃ |
| $T_J$, Operating Junction Temperature Range | | -55℃~+175℃ |
| $R_{\theta JC}$, Thermal Resistance Junction-Case | | 3.4℃/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) $E_{AS}$ condition :$T_j$=25℃,$V_{DD}$=30V,$V_{GS}$=10V,L=0.5mH,Rg=25Ω

## ELECTRICAL CHARACTERISTICS

$T_A$=25℃,unless otherwise noted.

| Parameter | Symbol | Conditions | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 60 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=60V, $V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$ =±20V, $V_{DS}$= 0V | - | - | ±100 | nA |
| **ON Characteristics** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}$=$V_{DS}$, $I_D$=250uA | 1.3 | 1.8 | 2.3 | V |
| Drain-Source On-State Resistance (1) | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=25A | - | 25 | 30 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=25A | - | 30 | 40 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=5V, $I_D$=10A | - | 11 | - | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=25V, $V_{GS}$=0V, f=1MHz | - | 670 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 76 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 66 | - | |
| **Switching Characteristics (2)** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=30V, $I_D$=10A, $R_{GEM}$=10Ω, $V_{GS}$=10V | - | 19.20 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 6.40 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 29.20 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 8.20 | - | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=48V, $I_D$=10A, $V_{GS}$=10V | - | 21 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 5 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 6.50 | - | |
| **Drain-Source Diode Characteristics** | | | | | | |
| Drain Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_S$=20A, | - | - | 1.2 | V |
| Reverse Recovery Time | $T_{rr}$ | Tj=25℃ , IF=10A , di/dt=100A/uS | - | 33.6 | - | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | - | 32.1 | - | nC |

(1) Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

(2) Guaranteed by design, not subject to production.

## TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Output Characteristics

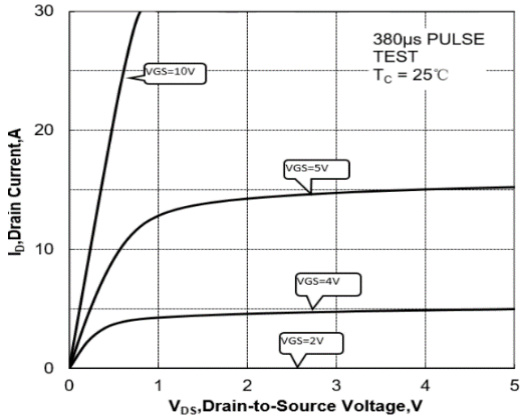



Fig 2. Transfer Characteristics

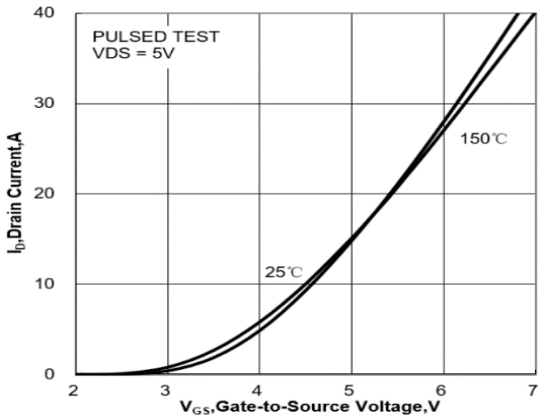



Fig 3. On-Resistance vs. $I_D$ and $V_{GS}$

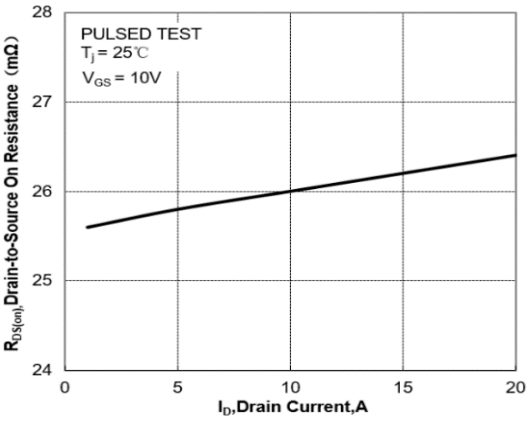



Fig 4. On-Resistance vs. Junction Temperature

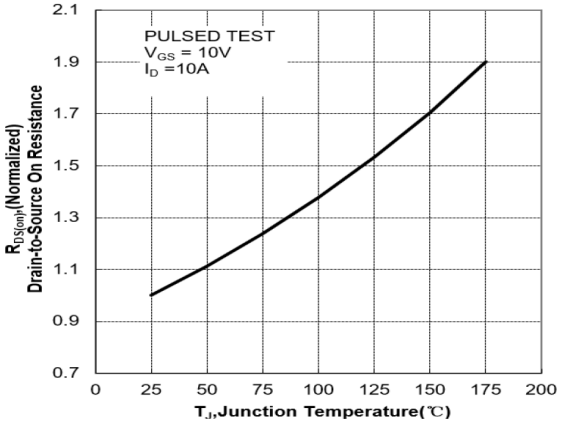



Fig 5. On-Resistance vs. $V_{GS}$

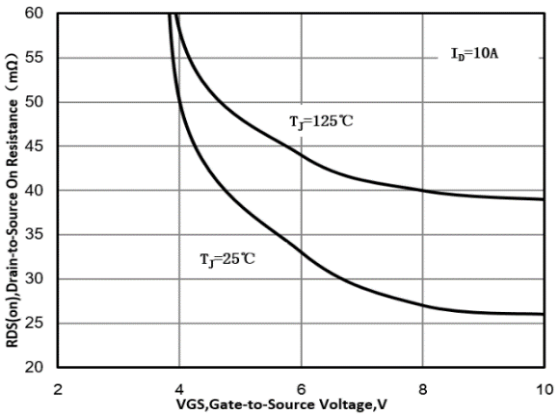



Fig 6. Body Diode Forward Voltage

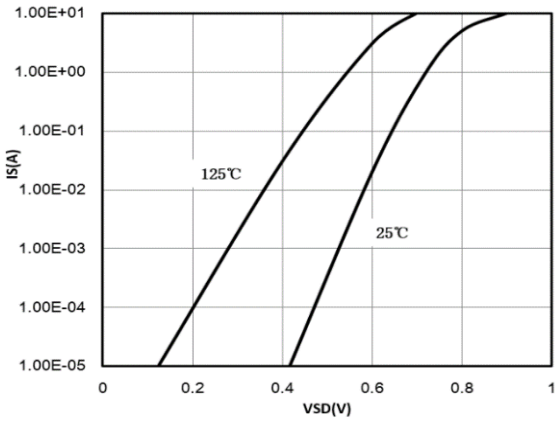


Fig 7. Gate-Charge Characteristics

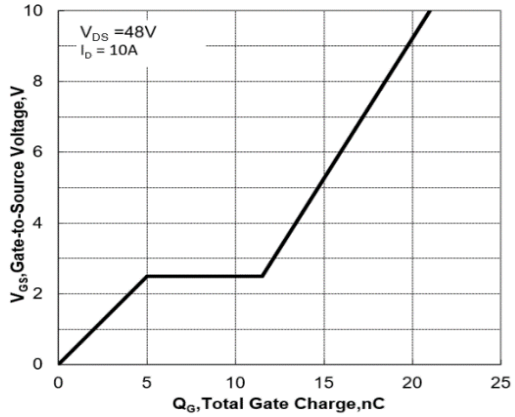



Fig 8. Capacitance Characteristics

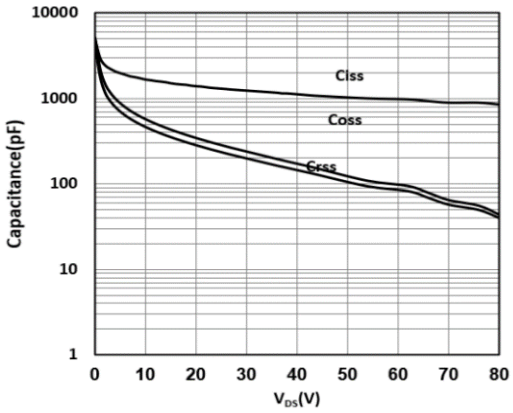



Fig 9. Maximum Forward Biased Safe Operation Area

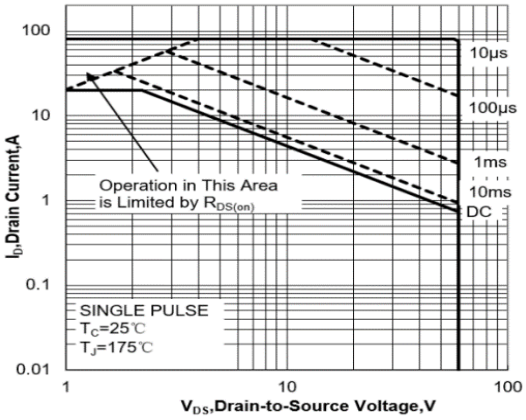



Fig 10. Single Pulse Power Rating Junction-to-Ambient

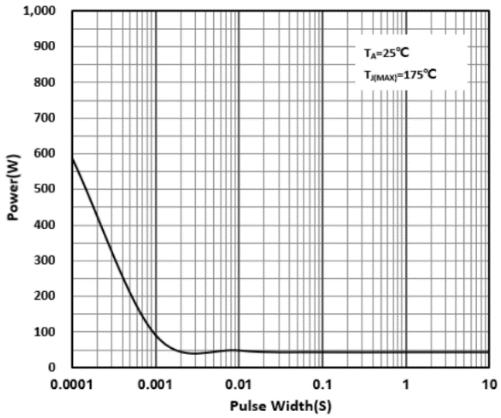



Fig 11. Normalized Maximum Transient Thermal Impedance

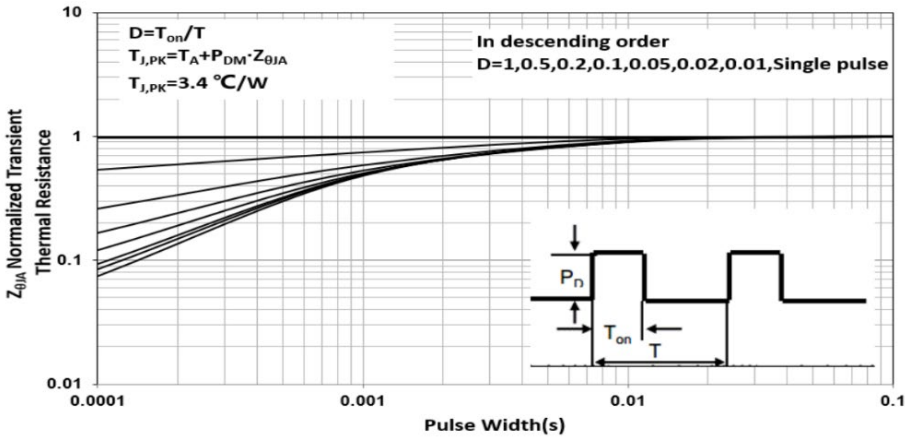


Fig 12. Gate Charge Test Circuit

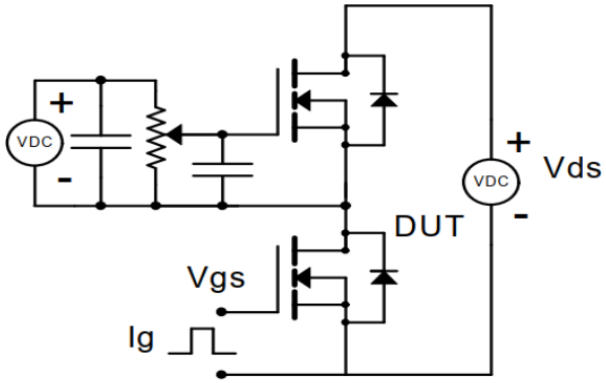



Fig 13. Gate Charge Test Waveform

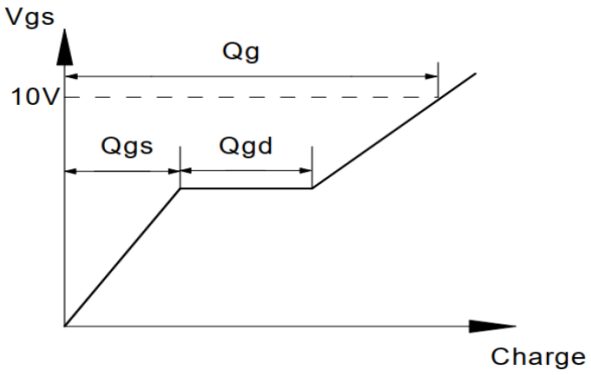



Fig 14. Resistive Switching Test Circuit

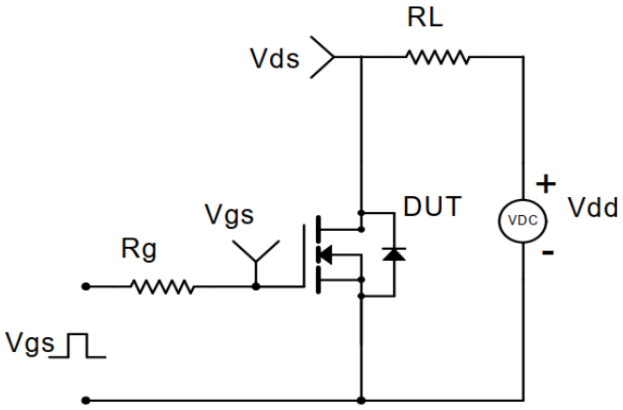



Fig 15. Resistive Switching Test Waveforms

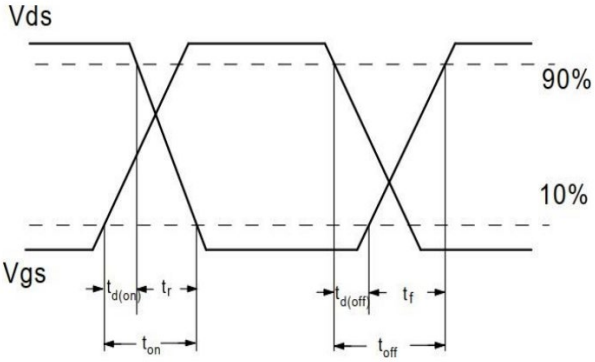



Fig 16. Unclamped Inductive Switching (UIS) Test Circuit

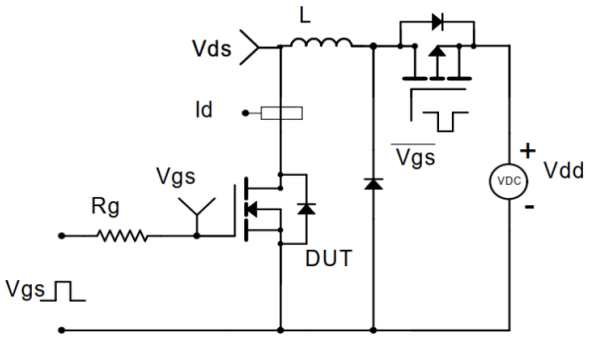



Fig 17. Unclamped Inductive Switching (UIS) Test Waveform

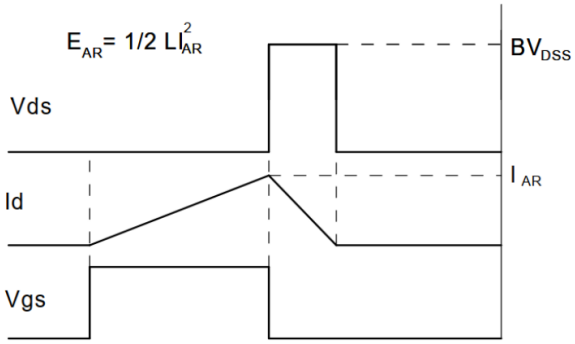


Fig 18. Diode Recovery Test Circuit

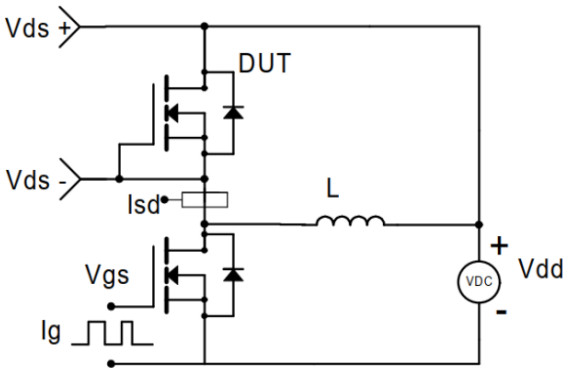
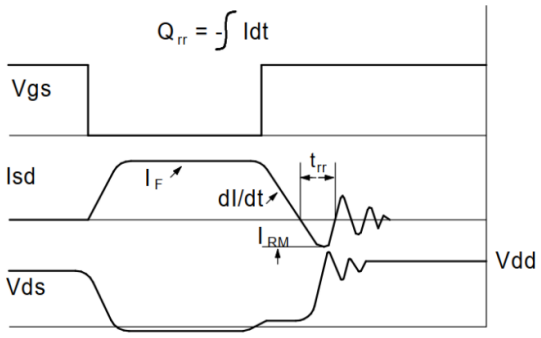
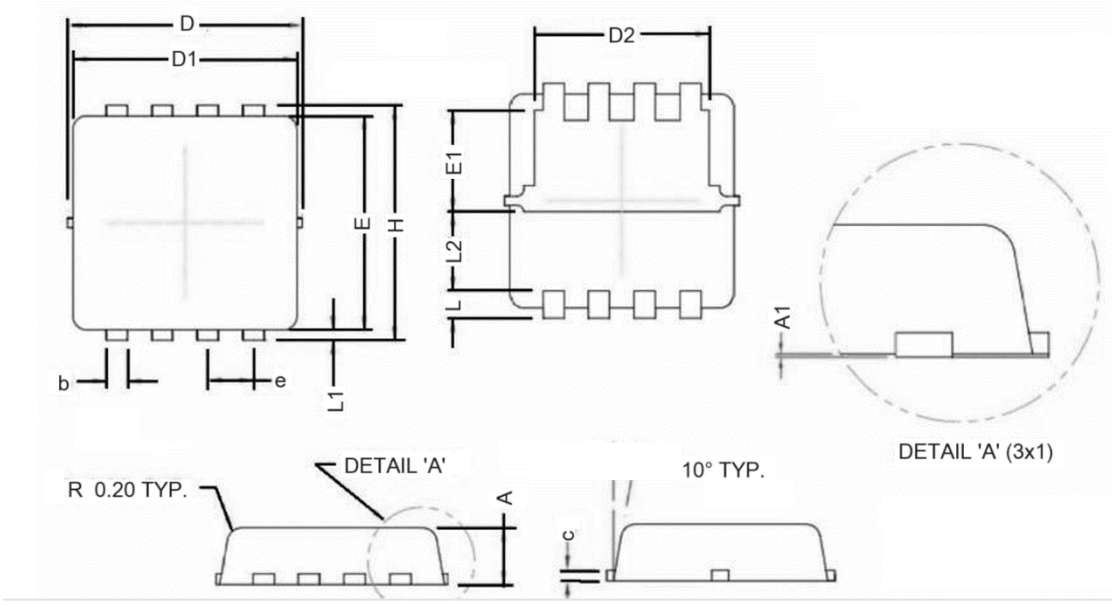



Fig 19. Diode Recovery Test Waveforms



## PACKAGE INFORMATION

Dimension in PDFN8(3.3x3.3) (Unit: mm)




| Symbol | Millimeters (mm) | |
|---|---|---|
| | Min. | Max. |
| A | 0.700 | 0.900 |
| A1 | 0.000 | 0.050 |
| b | 0.240 | 0.350 |
| c | 0.100 | 0.200 |
| D | 3.250 | 3.400 |
| D1 | 3.050 | 3.250 |
| D2 | 2.400 | 2.600 |
| E | 3.000 | 3.200 |
| E1 | 1.350 | 1.550- |
| e | 0.650 BSC | |
| H | 3.200 | 3.400 |
| L | 0.300 | 0.500 |
| L1 | 0.100 | 0.200 |
| L2 | 1.130 REF. | |

## IMPORTANT NOTICE

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