## DESCRIPTION

The AM05N06 is available in SOT-223 Package

| BVDSS | RDSON | ID |
|---|---|---|
| 60V | 66mΩ | 5A |

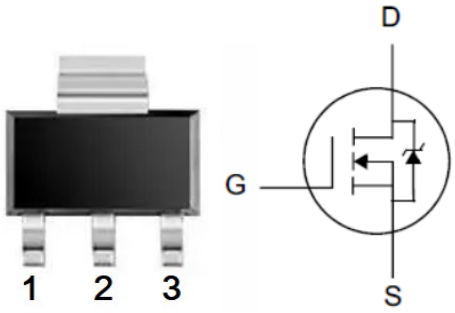
## FEATURE

- Advanced high cell density Trench Technology
- $R_{DS(ON)typ.}$=66mΩ @ $V_{GS}$=10V
- Excellent dv/dt effect decline
- Super Low Gate Charge

## ORDERING INFORMATION

| Package Type | Part Number | |
|---|---|---|
| SOT-223<br>SPQ: 1,000pcs/Reel | N3 | AM05N06N3R |
| | | AM05N06N3VR |
| Note | V: Halogen free Package<br>R: Tape & Reel | |
| AiT provides all RoHS products | | |

## PIN DESCRIPTION




SOT-223

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

## ABSOLUTE MAXIMUM RATINGS

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

| | | |
|---|---|---|
| $V_{DS}$, Drain-Source Voltage | | 60V |
| $V_{GS}$, Gate-Source Voltage | | ±20V |
| $I_D$, Continuous Drain Current, $V_{GS}$@10V (1) | $T_A$ = 25℃ | 5.0A |
| | $T_A$ = 70℃ | 1.8A |
| $I_{DM}$, Pulsed Drain Current (2) | | 9.2A |
| $P_D$, Total Power Dissipation (3) | $T_A$ = 25℃ | 1W |
| $T_J$, Operating Junction Temperature Range | | -55℃~+150℃ |
| $T_{STG}$, Storage Temperature Range | | -55℃~+150℃ |
| $R_{\theta JA}$, Thermal Resistance Junction-Ambient (1) | | 125℃/W |
| $R_{\theta JC}$, Thermal Resistance Junction-Case (1) | | 80℃/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) The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper.

(2) The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

(3) The power dissipation is limited by 150℃ junction temperature.

## ELECTRICAL CHARACTERISTICS

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

| Parameter | Symbol | Conditions | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 60 | - | - | V |
| $BV_{DSS}$ Temperature Coefficient | $\Delta BV_{DSS}$ / $\Delta T_J$ | $I_D$=1mA Reference 25℃ | - | 0.054 | - | V/℃ |
| Static Drain-Source On-Resistance (2) | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=2A | - | 66 | 105 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=1A | - | 85 | 110 | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$= $V_{GS}$, $I_D$=250μA | 1.2 | - | 2.5 | V |
| $V_{GS(TH)}$ Temperature Coefficient | $\Delta V_{GS(TH)}$ | | - | -4.96 | - | mV/℃ |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=48V, $V_{GS}$=0V, $T_J$=25℃ | - | - | 1 | μA |
| | | $V_{DS}$=48V, $V_{GS}$=0V, $T_J$=55℃ | - | - | 5 | |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V, | - | - | ±100 | nA |
| Forward Transconductance | gfs | $V_{DS}$=5V, $I_D$=2A | - | 13 | - | S |
| Total Gate Charge (4.5V) | $Q_g$ | $V_{DS}$=48V, $V_{GS}$=4.5V, $I_D$=2A | - | 5.0 | 7.0 | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 1.68 | 2.4 | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 1.9 | 2.7 | |
| Turn-on Delay Time | $t_{d(ON)}$ | $I_D$=2A, $V_{DD}$=30V, $V_{GS}$=10V, $R_G$=3.3Ω | - | 1.6 | 3.2 | ns |
| Rise Time | $t_r$ | | - | 7.2 | 13 | |
| Turn-Off Delay Time | $t_{d(OFF)}$ | | - | 25 | 50 | |
| Fall Time | $t_f$ | | - | 14.4 | 28.8 | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=15V, f=1.0MHz | - | 511 | 715 | pF |
| Output Capacitance | $C_{oss}$ | | - | 38 | 53 | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 25 | 35 | |
| **Diode Characteristics** | | | | | | |
| Continuous Source Current (1)(3) | $I_S$ | $V_G$=$V_D$=0V, Force Current | - | - | 2.3 | A |
| Maximum Pulsed Current (2)(3) | $I_{SM}$ | | - | - | 9.2 | A |
| Diode Forward Voltage (2) | $V_{SD}$ | $V_{GS}$=0V , $I_S$=1A , $T_J$=25 °C | - | - | 1.2 | V |
| Reverse Recovery Time | $T_{rr}$ | $I_F$=2A , dI/dt=100A/μs , $T_J$=25℃ | - | 9.7 | - | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | - | 5.8 | - | nC |

(1) The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

(2) The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

(3) The data is theoretically the same as $I_D$ and $I_{DM}$, in real applications, should be limited by total power dissipation

## TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Typical Output Characteristics

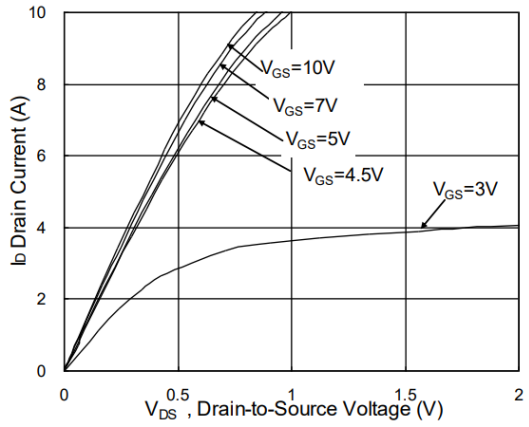



Fig 2. On-Resistance vs. Gate-Source

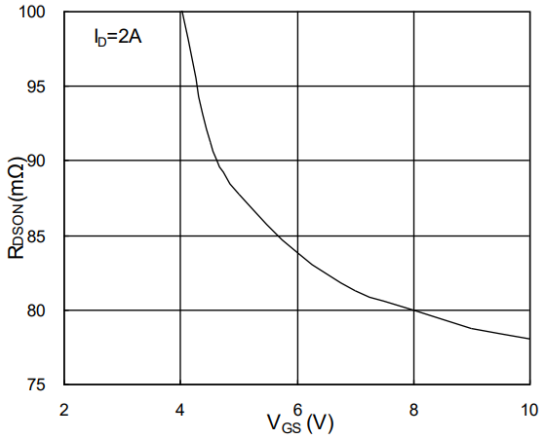



Fig 3. Forward Characteristics of Reverse

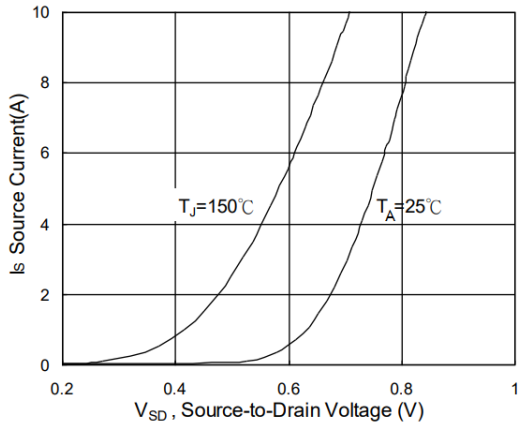



Fig 4. Gate-Charge Characteristics

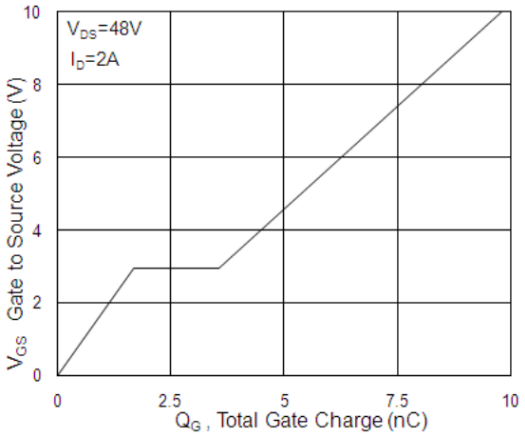



Fig 5. Normalized $V_{GS\,(TH)}$ vs. $T_J$

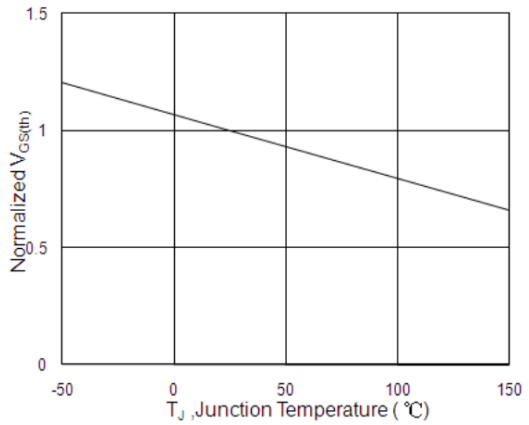



Fig 6. Normalized $R_{DSON}$ vs. $T_J$

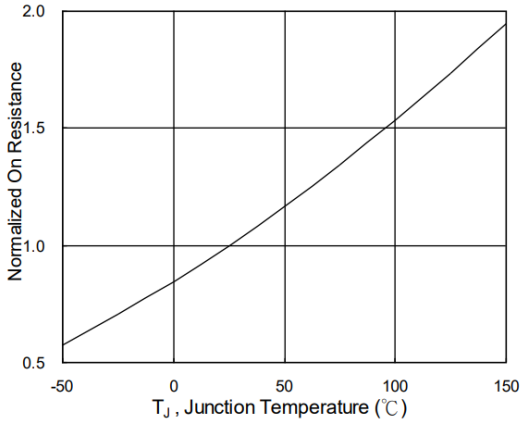


Fig 7. Capacitance

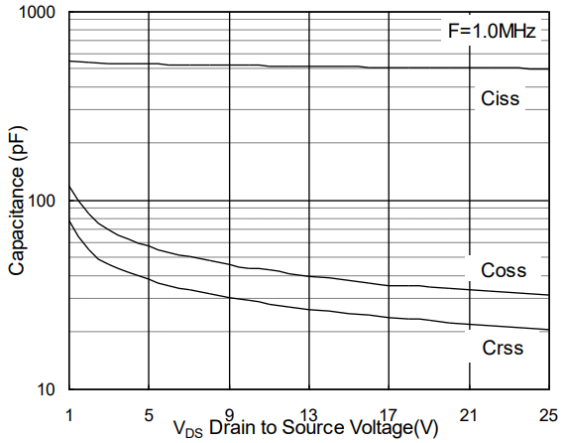



Fig 8. Safe Operating Area

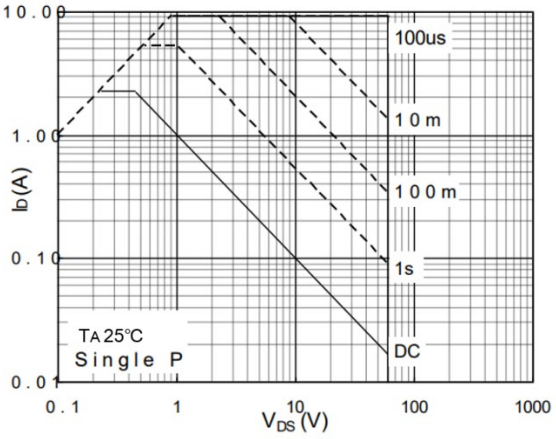



Fig 9. Normalized Maximum Transient Thermal Impedance

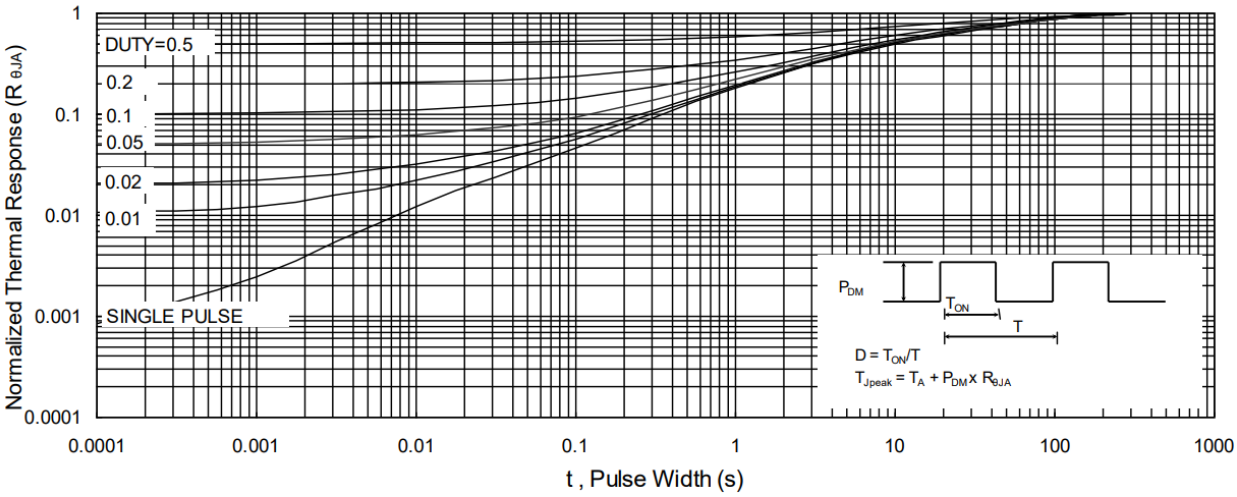



Fig 10. Switching Time Waveform

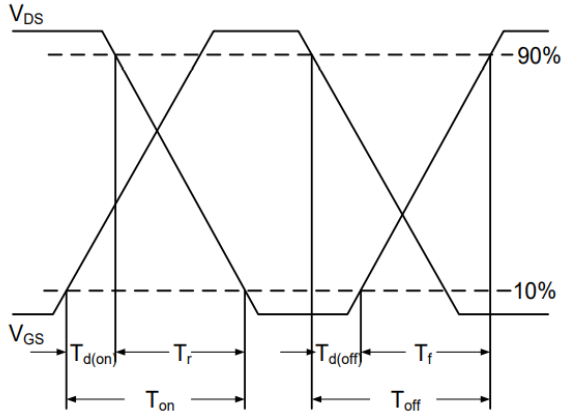
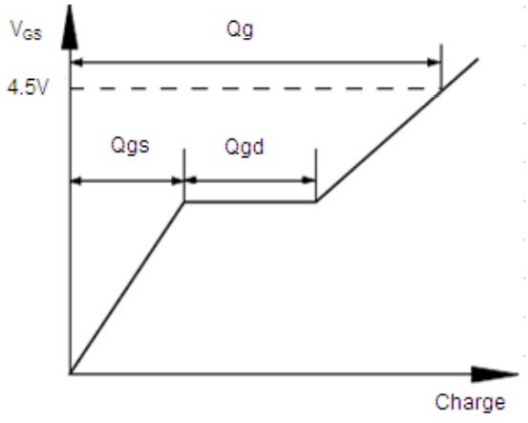
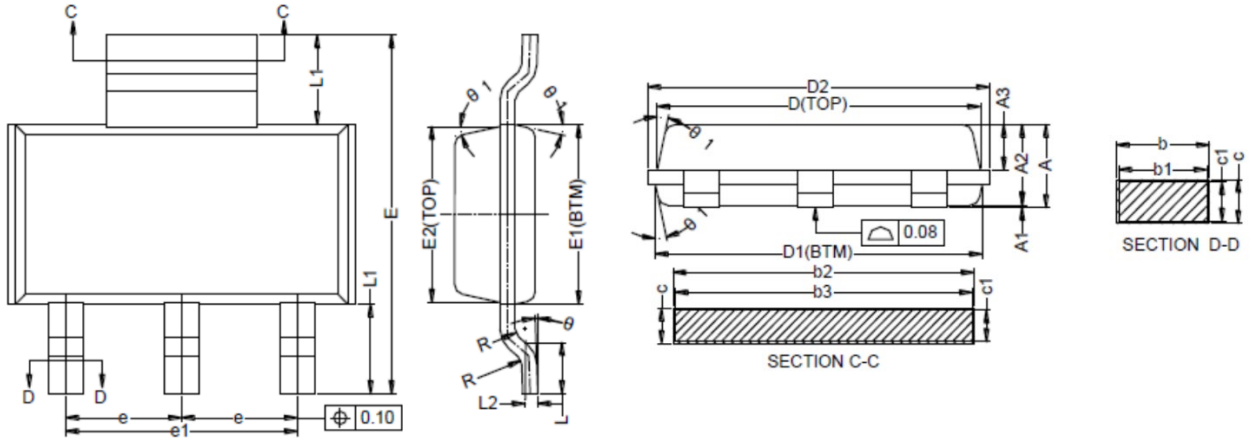



Fig 11. Gate Charge Waveform



## PACKAGE INFORMATION

Dimension in SOT-223 (Unit: mm)




| Symbol | Min. | Max. |
|---|---|---|
| A | - | 1.80 |
| A1 | 0.02 | 0.10 |
| A2 | 1.50 | 1.70 |
| A3 | 0.80 | 1.00 |
| b | 0.67 | 0.80 |
| b1 | 0.66 | 0.76 |
| b2 | 2.96 | 3.09 |
| b3 | 2.95 | 3.05 |
| c | 0.30 | 0.35 |
| c1 | 0.29 | 0.31 |
| D | 6.48 | 6.58 |
| D1 | 6.55 | 6.65 |
| D2 | - | 7.05 |
| E | 6.80 | 7.20 |
| E1 | 3.40 | 3.60 |
| E2 | 3.33 | 3.53 |
| e | 2.30(BSC) | |
| e1 | 4.60(BSC) | |
| L | 0.80 | 1.20 |
| L1 | 1.750(REF) | |
| L2 | 0.250(BSC) | |
| R | 0.10 | - |
| R1 | 0.10 | - |
| θ | 0° | 8° |
| θ1 | 10° | 14° |

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