



## DESCRIPTION

The AMA2N7002 is available in SC-89 package.

## ORDERING INFORMATION

| Package Type                                                              | Part Number                                                     |                |
|---------------------------------------------------------------------------|-----------------------------------------------------------------|----------------|
| SC-89                                                                     | CK3                                                             | AMA2N7002CK3R  |
|                                                                           |                                                                 | AMA2N7002CK3VR |
| Note                                                                      | V: Halogen free Package<br>R: Tape & Reel<br>SPQ: 3,000pcs/Reel |                |
| AiT provides all RoHS products<br>Suffix “ V ” means Halogen free Package |                                                                 |                |

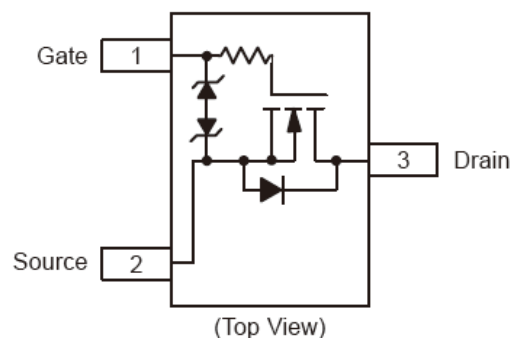
## FEATURES

- Low Gate Charge for Fast Switching
- Small 1.6 X 1.6 mm Footprint
- ESD Protected Gate
- ESD Protected: 2000V
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.
- Available in SC-89 Package

## APPLICATION

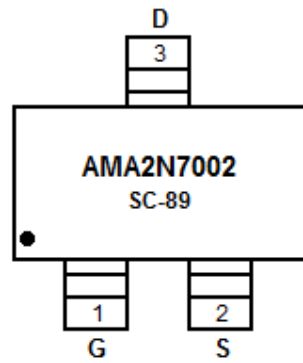
- Power Management Load Switch
- Level Shift
- Portable Applications such as Cell Phones, Media Players, Digital Cameras, PDA's, Video Games, Hand Held Computers, etc.

## TYPICAL APPLICATION





## PIN DESCRIPTION



Top View

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



## ABSOLUTE MAXIMUM RATINGS

|                                                                                   |                      |             |
|-----------------------------------------------------------------------------------|----------------------|-------------|
| V <sub>DSS</sub> , Drain-to-Source Voltage                                        |                      | 30V         |
| V <sub>GS</sub> , Gate-to-Source Voltage                                          |                      | ±10V        |
| I <sub>D</sub> , Continuous Drain Current <sup>NOTE1</sup>                        | Steady State=25°C    | 154mA       |
| P <sub>D</sub> , Power Dissipation <sup>NOTE1</sup>                               | Steady State=25°C    | 300mW       |
| I <sub>DM</sub> , Pulsed Drain Current                                            | t <sub>P</sub> ≤10μs | 618mA       |
| T <sub>J</sub> , T <sub>STG</sub> , Operating Junction and Storage Temperature    |                      | -55°C~150°C |
| I <sub>SD</sub> , Continuous Source Current (Body Diode)                          |                      | 154mA       |
| T <sub>L</sub> , Lead Temperature for Soldering Purposes (1/8" from case for 10s) |                      | 260°C       |
| <b>THERMAL RESISTANCE RATINGS</b>                                                 |                      |             |
| R <sub>θJA</sub> , Junction-to-Ambient – Steady State <sup>NOTE1</sup>            |                      | 416°C/W     |

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).



## ELECTRICAL CHARACTERISTICS

T<sub>J</sub> = 25°C, unless otherwise specified

| Parameter                          | Symbol               | Conditions                                                                                    | Min. | Typ. | Max. | Unit |
|------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|------|------|------|------|
| OFF CHARACTERISTICS                |                      |                                                                                               |      |      |      |      |
| Drain-to-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0, I <sub>D</sub> = 10μA                                                    | 30   |      |      | V    |
| Zero Gate Voltage Drain Current    | I <sub>DSS</sub>     | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 30V                                                   |      |      | 1.0  | μA   |
| Zero Gate Voltage Drain Current    | I <sub>DSS</sub>     | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 20V,<br>T = 85°C                                      |      |      | 1.0  | μA   |
| Gate-to-Source Leakage Current     | I <sub>GSS</sub>     | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±10V                                                  |      |      | ±25  | μA   |
| Gate-to-Source Leakage Current     | I <sub>GSS</sub>     | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±5V                                                   |      |      | ±1.0 | μA   |
| Gate-to-Source Leakage Current     | I <sub>GSS</sub>     | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±5V<br>T = 85°C                                       |      |      | ±1.0 | μA   |
| ON CHARACTERISTICS NOTE2           |                      |                                                                                               |      |      |      |      |
| Gate Threshold Voltage             | V <sub>GS(TH)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 100μA                                    | 0.5  | 1.0  | 1.5  | V    |
| Drain-to-Source On Resistance      | R <sub>DS(ON)</sub>  | V <sub>GS</sub> = 4.5V, I <sub>D</sub> =154mA                                                 |      | 1.4  | 7.0  | Ω    |
|                                    |                      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> =154mA                                                 |      | 2.3  | 7.5  |      |
| Forward Transconductance           | g <sub>FS</sub>      | V <sub>DS</sub> = 3V, I <sub>D</sub> = 154mA                                                  |      | 80   |      | mS   |
| CAPACITANCES                       |                      |                                                                                               |      |      |      |      |
| Input Capacitance                  | C <sub>ISS</sub>     | V <sub>DS</sub> = 50V, f = 1MHz,<br>V <sub>GS</sub> =0V                                       |      | 11.5 |      | pF   |
| Output Capacitance                 | C <sub>OSS</sub>     |                                                                                               |      | 10   |      |      |
| Reverse Transfer Capacitance       | C <sub>RSS</sub>     |                                                                                               |      | 3.5  |      |      |
| SWITCHING CHARACTERISTICS NOTE3    |                      |                                                                                               |      |      |      |      |
| Turn-On Delay Time                 | t <sub>d(ON)</sub>   | V <sub>GS</sub> = 4.5V, V <sub>DS</sub> =5.0V,<br>I <sub>D</sub> = 75mA, R <sub>G</sub> = 10Ω |      | 13   |      | ns   |
| Rise Time                          | t <sub>r</sub>       |                                                                                               |      | 15   |      |      |
| Turn-Off Delay Time                | t <sub>d(OFF)</sub>  |                                                                                               |      | 98   |      |      |
| Fall Time                          | t <sub>f</sub>       |                                                                                               |      | 60   |      |      |
| Drain-Source Diode Characteristics |                      |                                                                                               |      |      |      |      |
| Forward Diode Voltage              | V <sub>SD</sub>      | V <sub>GS</sub> = 0V, I <sub>S</sub> =0.154mA                                                 |      | 0.77 | 0.9  | V    |

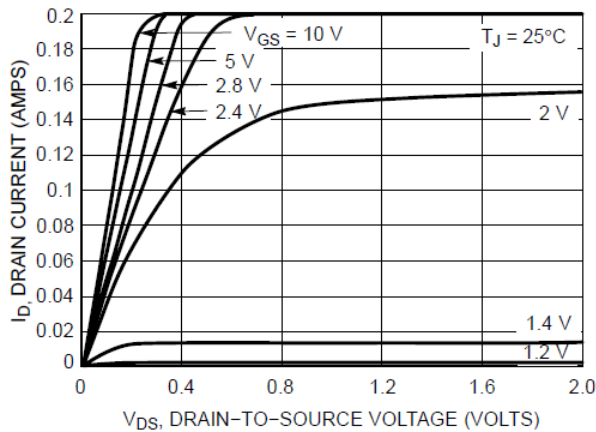
NOTE2: Pulse Test: pulse width ≤ 300μs, duty cycle ≤ 2%.

NOTE3: Switching characteristics are independent of operating junction temperatures.

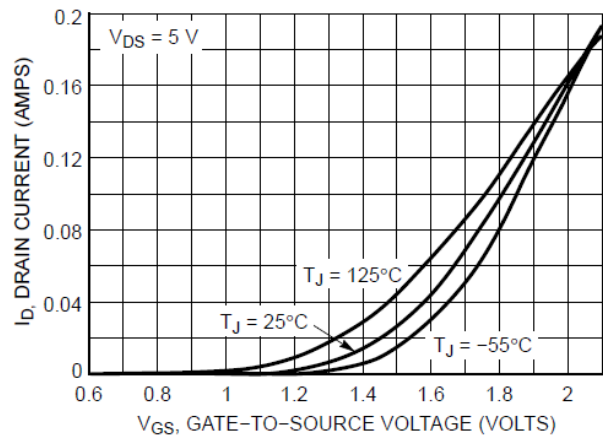


## TYPICAL PERFORMANCE CHARACTERISTICS

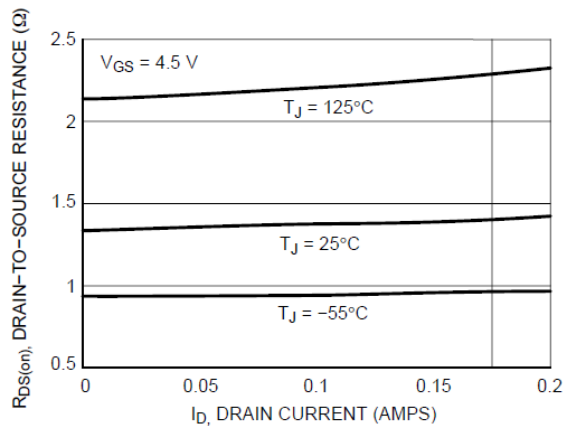
### 1. On-Region Characteristics



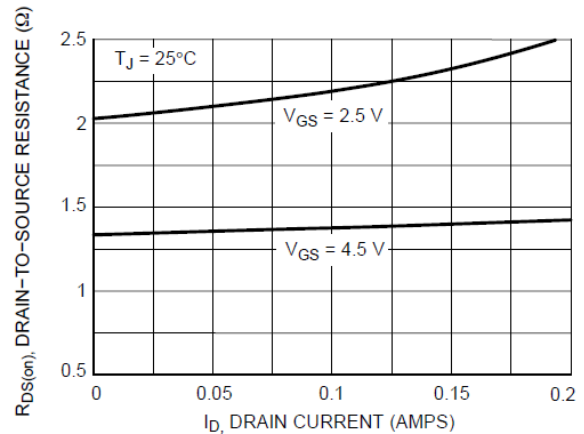
### 2. Transfer Characteristics



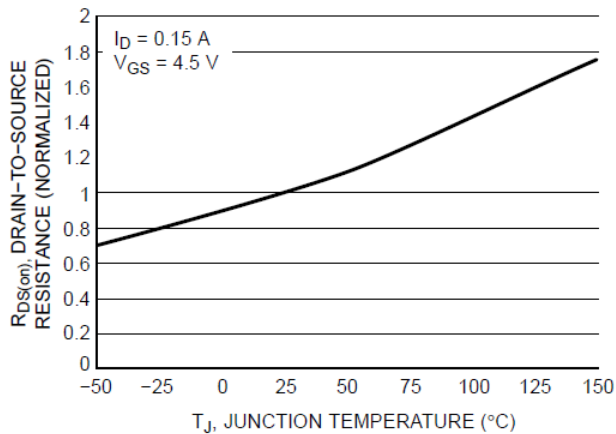
### 3. On-Resistance vs. Drain Current and Temperature



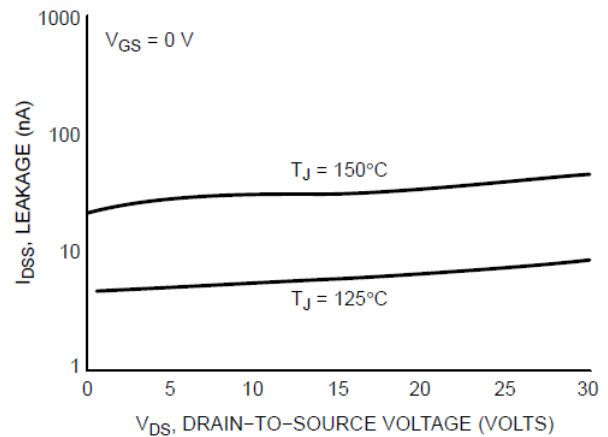
### 4. On-Resistance vs. Drain Current and Gate Voltage



### 5. On-Resistance Variation with Temperature

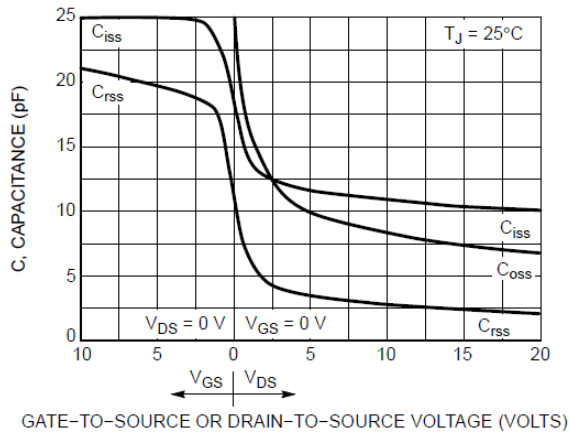


### 6. Drain-to-Source Leakage Current vs. Voltage

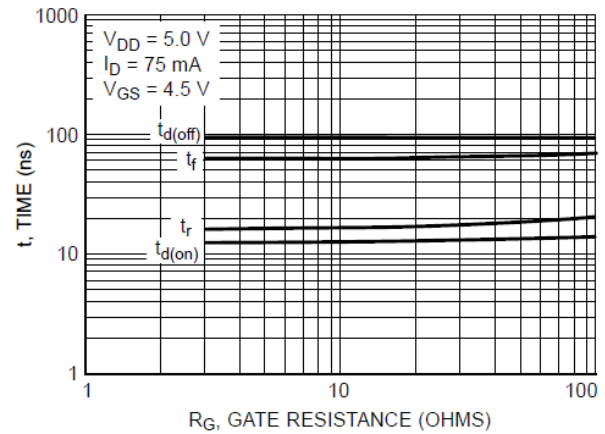




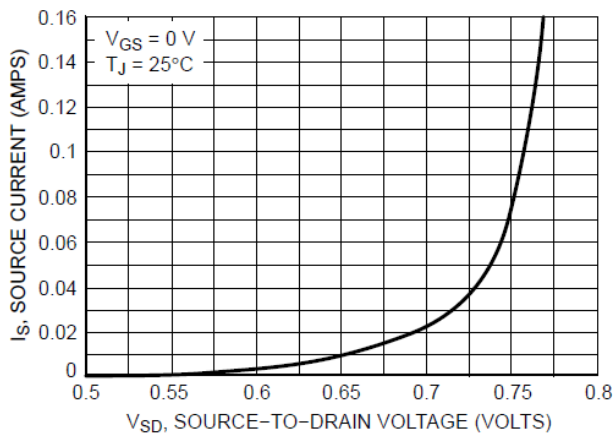
7. Capacitance Variation



8. Resistive Switching Time Variation vs. Gate Resistance



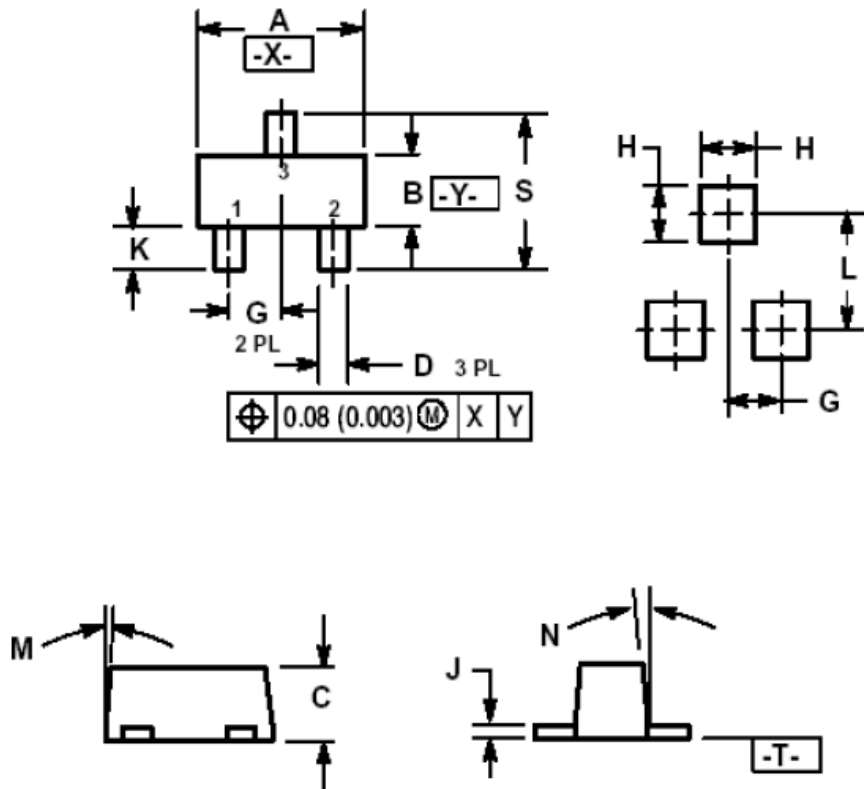
9. Diode Forward Voltage vs. Current





## PACKAGE INFORMATION

Dimension in SC-89 Package (Unit: mm)



| SYMBOL | MIN       | MAX   |
|--------|-----------|-------|
| A      | 1.500     | 1.700 |
| B      | 0.750     | 0.950 |
| C      | 0.600     | 0.800 |
| D      | 0.230     | 0.330 |
| G      | 0.500 BSC |       |
| H      | 0.530 REF |       |
| J      | 0.100     | 0.200 |
| K      | 0.300     | 0.500 |
| L      | 1.100 REF |       |
| M      | -         | 10°   |
| N      | -         | 10°   |
| S      | 1.500     | 1.700 |



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