

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## 5N06S-MS

Product specification

## Description

The 5N06S-MS is the high cell density trench N-ch MOSFETs, which provides excellent R<sub>DS(on)</sub> and efficiency for most of the small power switching and load switch applications.

The 5N06S-MS meet the RoHS and Green Product requirement with full function reliability approved.

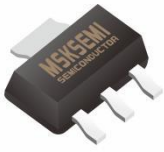
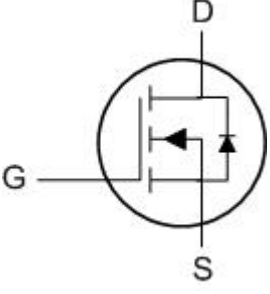

## Product Summary

|                           |      |
|---------------------------|------|
| <b>BVDSS</b>              | 60V  |
| <b>R<sub>DS(on)</sub></b> | 80mΩ |
| <b>ID</b>                 | 5A   |

## FEATURE

- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

## Reference News

| PACKAGE OUTLINE  | PIN CONFIGURATION   | Marking  |
|--|---|--|
|  <p>SOT-223</p> |  |  |

## Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise noted)

| Symbol                            | Parameter                               | Max.                   | Units |   |
|-----------------------------------|---|------------------------|-------|---|
| V <sub>DSS</sub>                  | Drain-Source Voltage                    | 60                     | V     |   |
| V <sub>GSS</sub>                  | Gate-Source Voltage                     | ±20                    | V     |   |
| I <sub>D</sub>                    | Continuous Drain Current                | T <sub>A</sub> = 25°C  | 5     | A |
|                                   |   | T <sub>A</sub> = 100°C | 2     | A |
| I <sub>DM</sub>                   | Pulsed Drain Current <sup>note1</sup>   | 12                     | A     |   |
| P <sub>D</sub>                    | Power Dissipation                       | T <sub>A</sub> = 25°C  | 1.5   | W |
| R <sub>θJA</sub>                  | Thermal Resistance, Junction to Ambient | 83                     | °C/W  |   |
| T <sub>J</sub> , T <sub>STG</sub> | Operating and Storage Temperature Range | -55 to +150            | °C    |   |

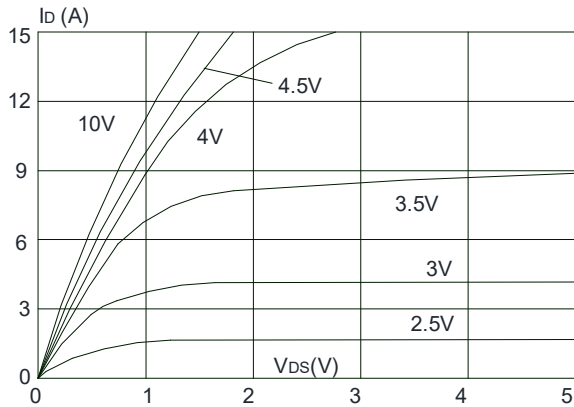
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

| Symbol  | Parameter   | Test Condition   | Min. | Typ. | Max.      | Units      |
|---|---|--|------|------|-----------|------------|
| <b>Off Characteristic</b>                                     |   |  |      |      |           |            |
| $V_{(BR)DSS}$   | Drain-Source Breakdown Voltage                            | $V_{GS}=0V, I_D=250\mu A$                              | 60   | -    | -         | V          |
| $I_{DSS}$   | Zero Gate Voltage Drain Current                           | $V_{DS}=60V, V_{GS}=0V,$                               | -    | -    | 1.0       | $\mu A$    |
| $I_{GSS}$   | Gate to Body Leakage Current                              | $V_{DS}=0V, V_{GS}=\pm 20V$                            | -    | -    | $\pm 100$ | nA         |
| <b>On Characteristics</b>                                     |   |  |      |      |           |            |
| $V_{GS(th)}$  | Gate Threshold Voltage                                    | $V_{DS}=V_{GS}, I_D=250\mu A$                          | 1.0  | 1.4  | 2.0       | V          |
| $R_{DS(on)}$  | Static Drain-Source on-Resistance<br><small>note2</small> | $V_{GS}=10V, I_D=3A$                                   | -    | 80   | 100       | m $\Omega$ |
|   |   | $V_{GS}=4.5V, I_D=2A$                                  | -    | 90   | 120       |            |
| <b>Dynamic Characteristics</b>                                |   |  |      |      |           |            |
| $C_{iss}$   | Input Capacitance   | $V_{DS}=25V, V_{GS}=0V,$<br>$f=1.0MHz$                 | -    | 350  | -         | pF         |
| $C_{oss}$   | Output Capacitance  |  | -    | 29   | -         | pF         |
| $C_{riss}$  | Reverse Transfer Capacitance                              |  | -    | 23   | -         | pF         |
| $Q_g$   | Total Gate Charge   | $V_{DS}=30V, I_D=3A,$<br>$V_{GS}=10V$                  | -    | 9    | -         | nC         |
| $Q_{gs}$  | Gate-Source Charge  |  | -    | 1.5  | -         | nC         |
| $Q_{gd}$  | Gate-Drain("Miller") Charge                               |  | -    | 2    | -         | nC         |
| <b>Switching Characteristics</b>                              |   |  |      |      |           |            |
| $t_{d(on)}$   | Turn-on Delay Time  | $V_{DD}=30V, I_D=2A,$<br>$R_{GEN}=3\Omega, V_{GS}=10V$ | -    | 5    | -         | ns         |
| $t_r$   | Turn-on Rise Time   |  | -    | 7    | -         | ns         |
| $t_{d(off)}$  | Turn-off Delay Time                                       |  | -    | 37   | -         | ns         |
| $t_f$   | Turn-off Fall Time  |  | -    | 22   | -         | ns         |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |   |  |      |      |           |            |
| $I_S$   | Maximum Continuous Drain to Source Diode Forward Current  |  | -    | -    | 5         | A          |
| $I_{SM}$  | Maximum Pulsed Drain to Source Diode Forward Current      |  | -    | -    | 12        | A          |
| $V_{SD}$  | Drain to Source Diode Forward Voltage                     | $V_{GS}=0V, I_S=3A$                                    | -    | -    | 1.2       | V          |

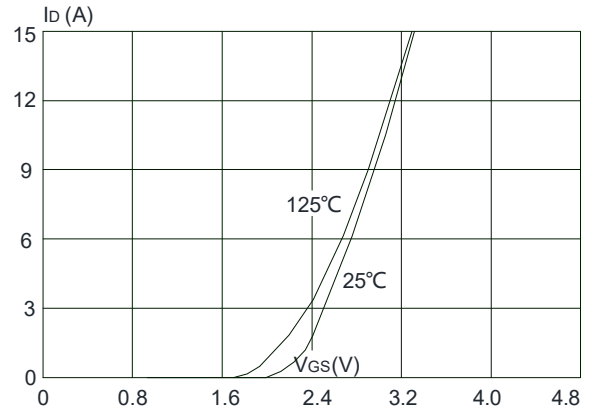
- Notes:** 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature  
 2. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 0.5\%$

**Typical Performance Characteristics**

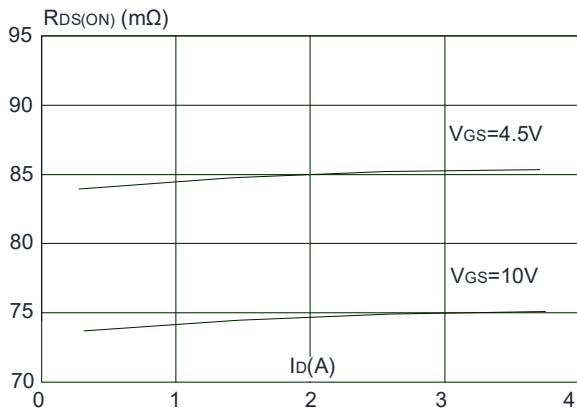
**Figure 1: Output Characteristics**



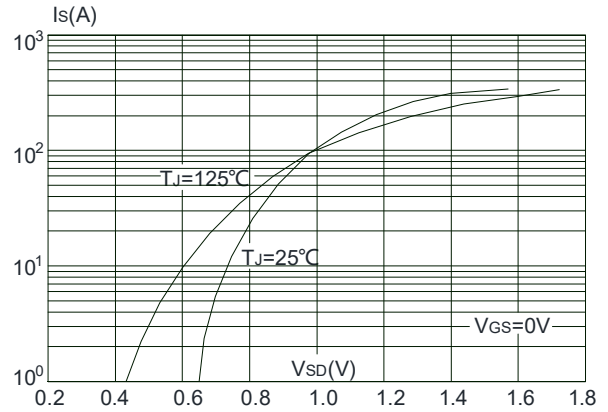
**Figure 2: Typical Transfer Characteristics**



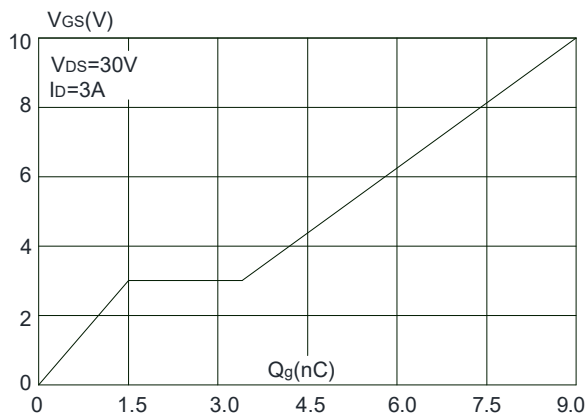
**Figure 3: On-resistance vs. Drain Current**



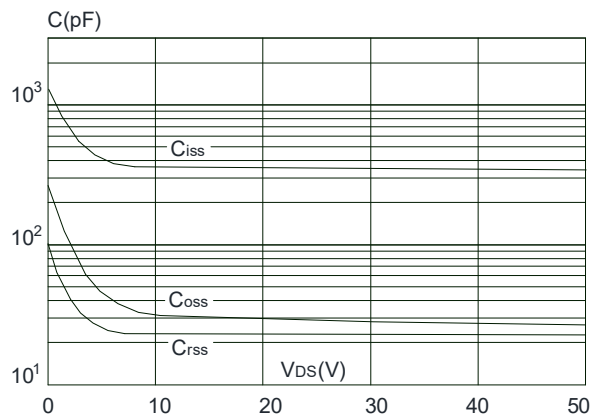
**Figure 4: Body Diode Characteristics**



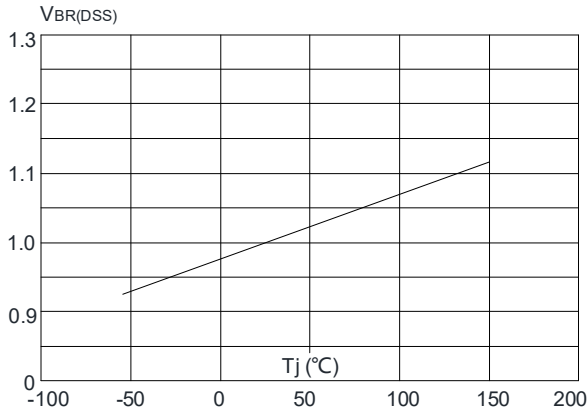
**Figure 5: Gate Charge Characteristics**



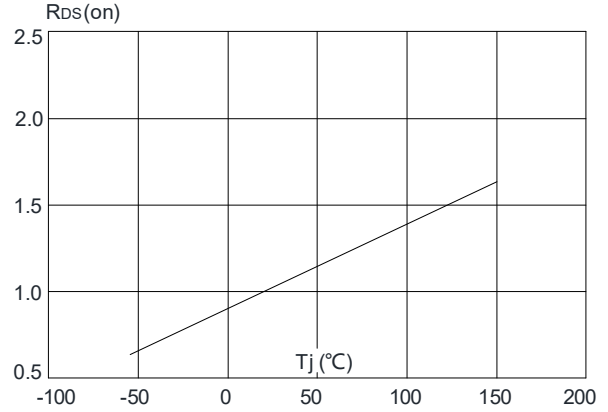
**Figure 6: Capacitance Characteristics**



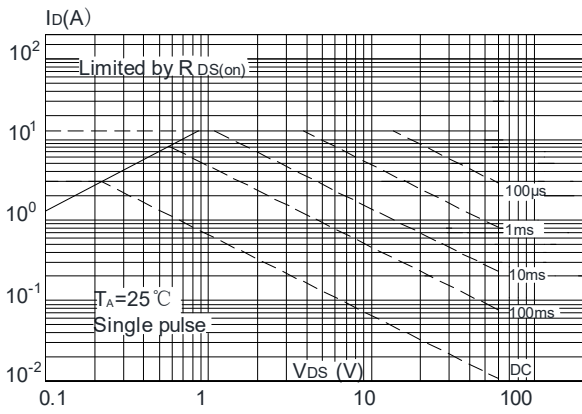
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



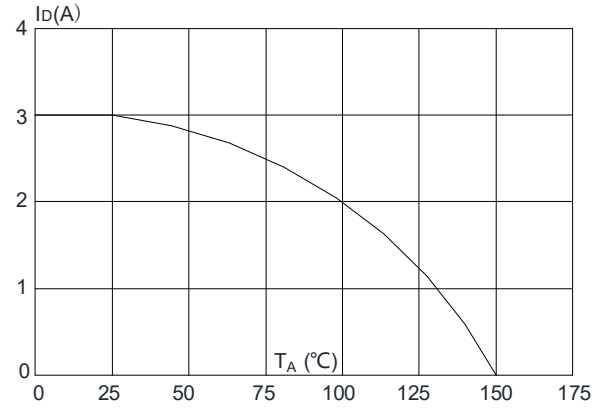
**Figure 8:** Normalized on Resistance vs. Junction Temperature



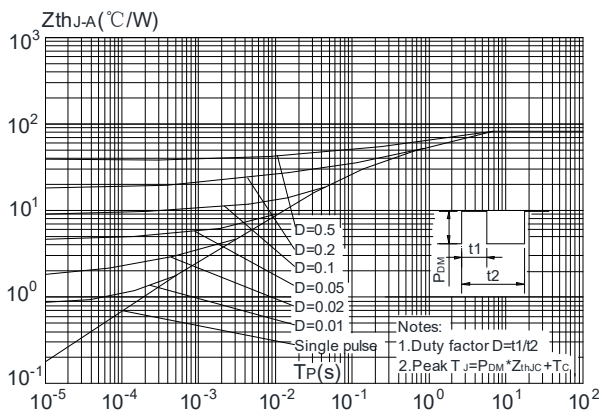
**Figure 9:** Maximum Safe Operating Area



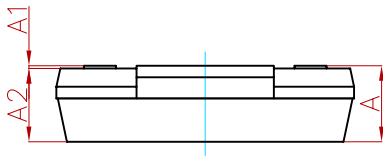
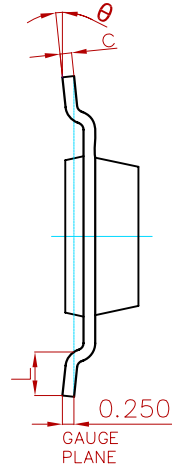
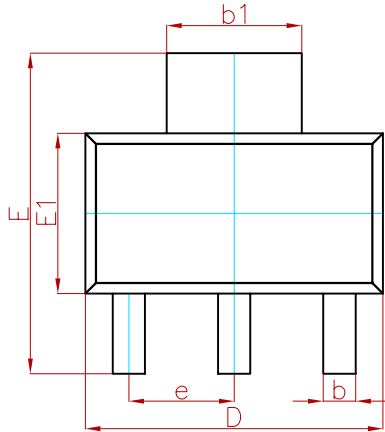
**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

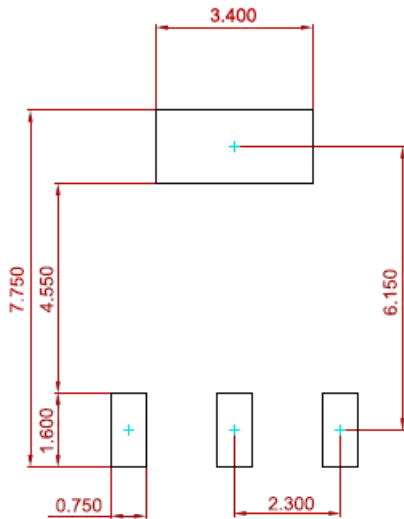


**PACKAGE MECHANICAL DATA**



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min.                      | Max.  | Min.                 | Max.  |
| A        | —                         | 1.800 | —                    | 0.071 |
| A1       | 0.020                     | 0.100 | 0.001                | 0.004 |
| A2       | 1.500                     | 1.700 | 0.059                | 0.067 |
| b        | 0.660                     | 0.840 | 0.026                | 0.033 |
| $b_1$    | 2.900                     | 3.100 | 0.114                | 0.122 |
| c        | 0.230                     | 0.350 | 0.009                | 0.014 |
| D        | 6.300                     | 6.700 | 0.248                | 0.264 |
| E        | 6.700                     | 7.300 | 0.264                | 0.287 |
| E1       | 3.300                     | 3.700 | 0.130                | 0.146 |
| e        | 2.300(BSC)                |       | 0.091(BSC)           |       |
| L        | 0.750                     | —     | 0.030                | —     |
| $\theta$ | 0°                        | 10°   | 0°                   | 10°   |

**Suggested Pad Layout**



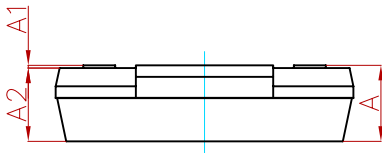
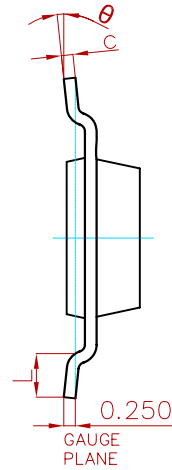
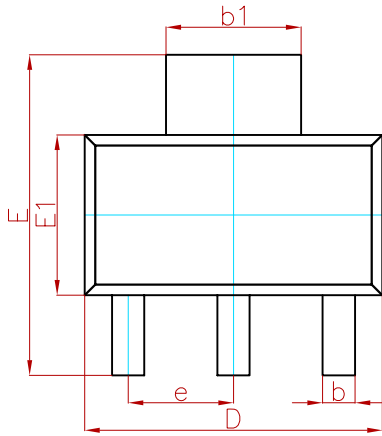
**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.050$ mm.
3. The pad layout is for reference purposes only.

**REEL SPECIFICATION**

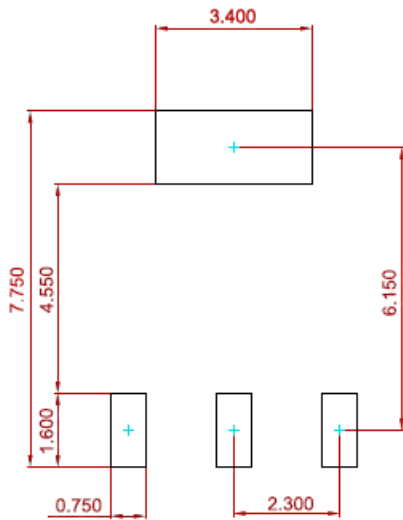
| P/N      | PKG     | QTY  |
|----------|---------|------|
| 5N06S-MS | SOT-223 | 2500 |

**PACKAGE MECHANICAL DATA**



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**REEL SPECIFICATION**

| P/N   | PKG     | QTY  |
|-------|---------|------|
| ***** | SOT-223 | 2500 |

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