

RoHS Compliant Product  
A suffix of "-C" specifies halogen & lead-free

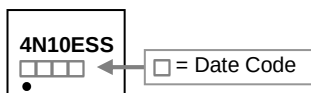
## DESCRIPTION

The SSG4N10E provide the designer with the best Combination of fast switching, ruggedized device design, Ultra low on-resistance and cost-effectiveness.

## FEATURES

- Low on-resistance
- Simple Drive Requirement
- Double-N MosFET Package

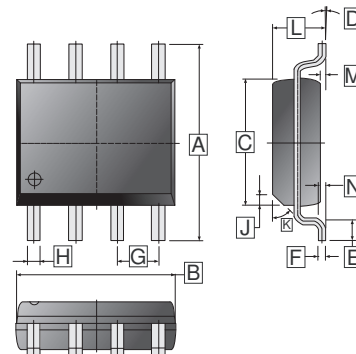
## MARKING CODE



## PACKAGE INFORMATION

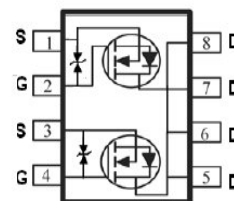
| Package | MPQ | Leader Size |
|---------|-----|-------------|
| SOP-8   | 3K  | 13' inch    |

### SOP-8



Dimensions in millimeters

| REF. | Millimeter |      | REF. | Millimeter |      |
|------|------------|------|------|------------|------|
|      | Min.       | Max. |      | Min.       | Max. |
| A    | 5.80       | 6.20 | H    | 0.35       | 0.49 |
| B    | 4.80       | 5.00 | J    | 0.375      | REF. |
| C    | 3.80       | 4.00 | K    | 45°        |      |
| D    | 0°         | 8°   | L    | 1.35       | 1.75 |
| E    | 0.40       | 0.90 | M    | 0.10       | 0.25 |
| F    | 0.19       | 0.25 | N    | 0.25       | REF. |
| G    | 1.27       | TYP. |      |            |      |



## ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                                                | Symbol          | Ratings  | Unit                        |
|----------------------------------------------------------|-----------------|----------|-----------------------------|
| Drain-Source Voltage                                     | $V_{DS}$        | 100      | V                           |
| Gate-Source Voltage                                      | $V_{GS}$        | $\pm 20$ | V                           |
| Continuous Drain Current@ $V_{GS} = 10V$ <sup>1</sup>    | $I_D$           | 4        | A                           |
|                                                          |                 | 3.1      |                             |
| Pulsed Drain Current <sup>2</sup>                        | $I_{DM}$        | 15       | A                           |
| Single Pulse Avalanche Energy <sup>3</sup>               | EAS             | 9        | mJ                          |
| Avalanche Current                                        | $I_{AS}$        | 6        | A                           |
| Power Dissipation@ $T_A = 25^\circ\text{C}$ <sup>4</sup> | $P_D$           | 1.5      | W                           |
| Operating Junction & Storage Temperature Range           | $T_J, T_{STG}$  | -55~150  | $^\circ\text{C}$            |
| <b>Thermal Resistance Ratings</b>                        |                 |          |                             |
| Thermal Resistance Junction-ambient (Max.) <sup>1</sup>  | $R_{\theta JA}$ | 85       | $^\circ\text{C} / \text{W}$ |
| Thermal Resistance Junction-Case (Max.) <sup>1</sup>     | $R_{\theta JC}$ | 50       | $^\circ\text{C} / \text{W}$ |

# **ELECTRICAL CHARACTERISTICS** ( $T_j = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                                  | Symbol              | Min. | Typ. | Max. | Unit | Test condition                                                                                                        |
|--------------------------------------------|---------------------|------|------|------|------|-----------------------------------------------------------------------------------------------------------------------|
| Static                                     |                     |      |      |      |      |                                                                                                                       |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>   | 100  | -    | -    | V    | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                                                            |
| Gate-Threshold Voltage                     | V <sub>GS(th)</sub> | 1    | -    | 3    | V    | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                                              |
| Gate-Body Leakage                          | I <sub>GSS</sub>    | -    | -    | ±10  | μA   | V <sub>GS</sub> =±20V                                                                                                 |
| Zero Gate Voltage Drain Current            | I <sub>DSS</sub>    | -    | -    | 1    | μA   | V <sub>DS</sub> =80V, V <sub>GS</sub> =0, T <sub>J</sub> =25℃                                                         |
|                                            |                     | -    | -    | 30   |      | V <sub>DS</sub> =80V V <sub>GS</sub> =0, T <sub>J</sub> =85℃                                                          |
| Drain-Source On-Resistance <sup>2</sup>    | R <sub>DS(ON)</sub> | -    | -    | 120  | mΩ   | V <sub>GS</sub> =10V, I <sub>D</sub> =4A                                                                              |
|                                            |                     | -    | -    | 135  |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.5A                                                                           |
| Gate Resistance                            | R <sub>g</sub>      | -    | 2.5  | -    | Ω    | f=1.0MHz                                                                                                              |
| Total Gate Charge (V <sub>GS</sub> = 4.5V) | Q <sub>g</sub>      | -    | 6.1  | -    | nC   | I <sub>D</sub> = 4A<br>V <sub>DS</sub> = 30V<br>V <sub>GS</sub> = 10V                                                 |
| Total Gate Charge                          | Q <sub>g</sub>      | -    | 13   | -    |      |                                                                                                                       |
| Gate-Source Charge                         | Q <sub>gs</sub>     | -    | 2.2  | -    |      |                                                                                                                       |
| Gate-Drain (“Miller”) Charge               | Q <sub>gd</sub>     | -    | 2.4  | -    |      |                                                                                                                       |
| Turn-On Delay Time                         | T <sub>d(on)</sub>  | -    | 10   | -    | nS   | V <sub>DD</sub> = 30V<br>I <sub>D</sub> = 1A<br>V <sub>GEN</sub> = 10V<br>R <sub>G</sub> = 6Ω<br>R <sub>L</sub> = 30Ω |
| Rise Time                                  | T <sub>r</sub>      | -    | 7    | -    |      |                                                                                                                       |
| Turn-Off Delay Time                        | T <sub>d(off)</sub> | -    | 22   | -    |      |                                                                                                                       |
| Fall Time                                  | T <sub>f</sub>      | -    | 4    | -    |      |                                                                                                                       |
| Input Capacitance                          | C <sub>iss</sub>    | -    | 585  | -    | pF   | V <sub>GS</sub> =0V<br>V <sub>DS</sub> =30V<br>f=1.0MHz                                                               |
| Output Capacitance                         | C <sub>oss</sub>    | -    | 36   | -    |      |                                                                                                                       |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | -    | 20   | -    |      |                                                                                                                       |
| Guaranteed Avalanche Characteristics       |                     |      |      |      |      |                                                                                                                       |
| Single Pulse Avalanche Energy <sup>5</sup> | EAS                 | 4    | -    | -    | mJ   | V <sub>DD</sub> = 25V, L=0.5mH, I <sub>AS</sub> = 4A                                                                  |
| Source-Drain Diode                         |                     |      |      |      |      |                                                                                                                       |
| Continuous Source Current <sup>1,6</sup>   | I <sub>S</sub>      | -    | -    | 4    | A    | V <sub>G</sub> = V <sub>D</sub> =0V, Force Current                                                                    |
| Pulsed Source Current <sup>2,6</sup>       | I <sub>SM</sub>     | -    | -    | 15   | A    |                                                                                                                       |
| Forward On Voltage <sup>2</sup>            | V <sub>DS</sub>     | -    | -    | 1.3  | V    | I <sub>S</sub> =4A, V <sub>GS</sub> =0V, T <sub>J</sub> =25℃                                                          |
| Reverse Recovery Time                      | t <sub>rr</sub>     | -    | 25   | -    | nS   | IF=4A, dI/dt=100A/μs, T <sub>J</sub> =25℃                                                                             |
| Reverse Recovery Charge                    | Q <sub>rr</sub>     | -    | 34   | -    | nC   |                                                                                                                       |

## Notes:

1. Surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper. 135 $^\circ\text{C}/W$  when mounted on Min. copper pad.
2. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
3. The EAS data shows Max. rating. The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.5\text{mH}, I_{AS}=6A$ .
4. The power dissipation is limited by 150 $^\circ\text{C}$  junction temperature.
5. The Min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

## CHARACTERISTICS CURVE

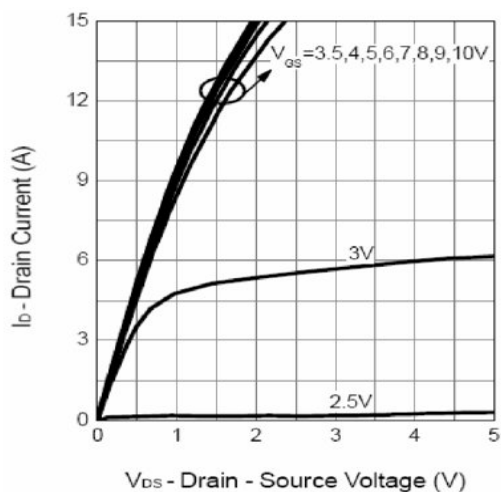


**Fig 1. Typical Output Characteristics**

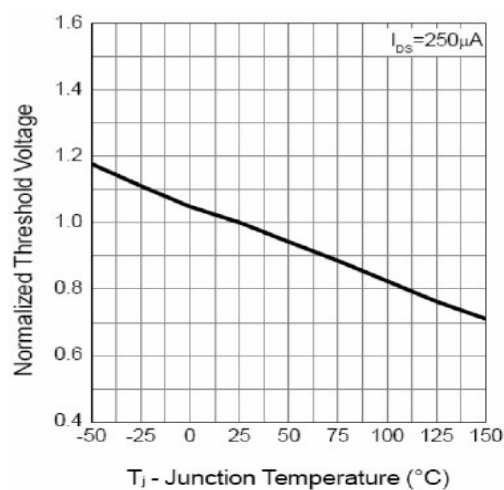


**Fig 2. Gate Threshold Voltage**

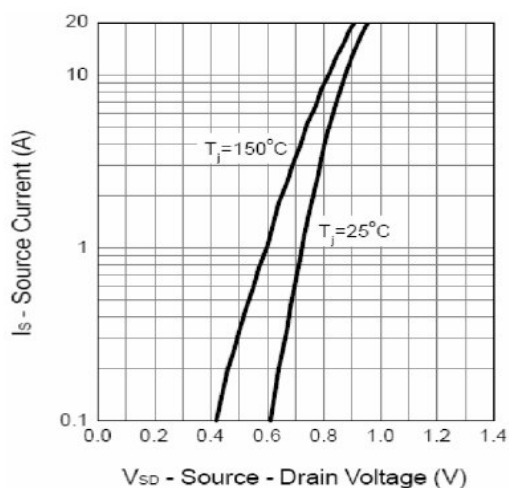


**Fig 3. Typical Source-Drain Diode Forward Voltage**

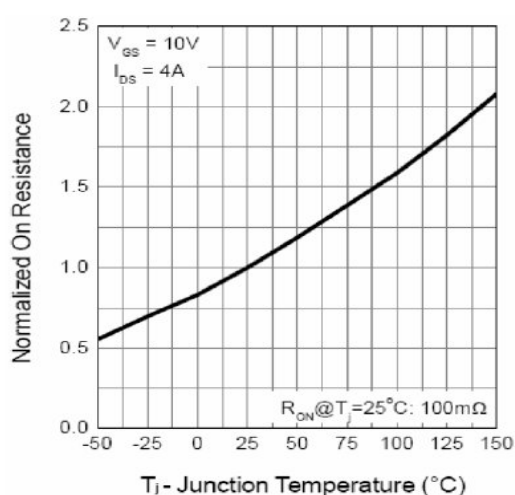


**Fig 4. Normalized On-Resistance vs. Junction Temperature**

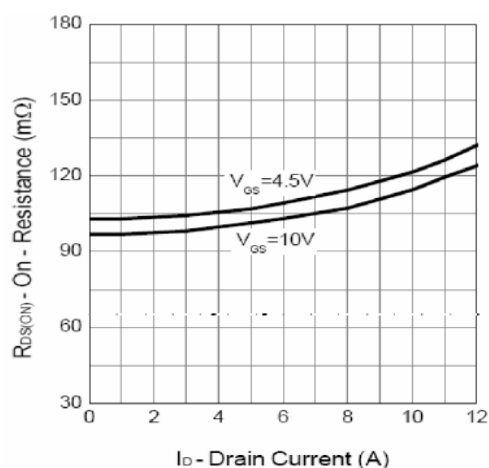


**Fig 5. Typical On-Resistance vs. Drain Current**

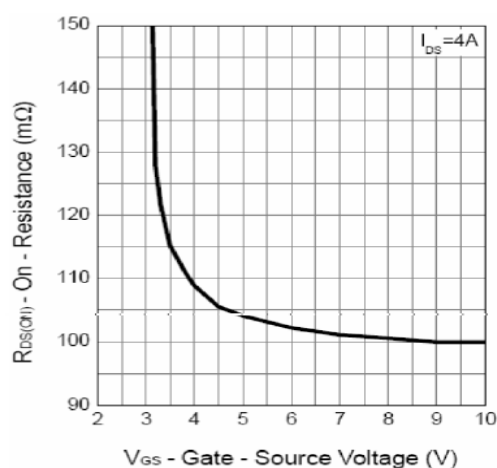


**Fig 6. Typical On-Resistance vs. Gate Voltage**

## CHARACTERISTICS CURVE

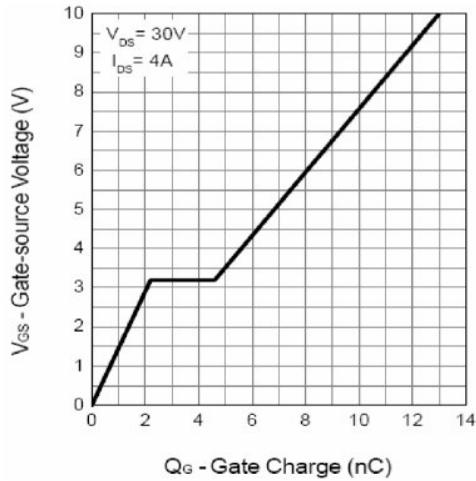


**Fig 7. Gate Charge Characteristics**

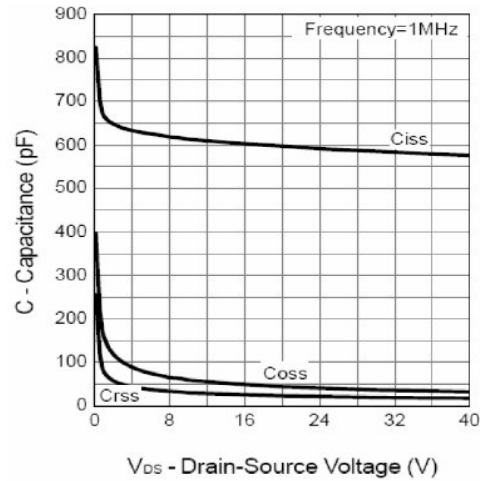


**Fig 8. Typical Capacitance Characteristics**

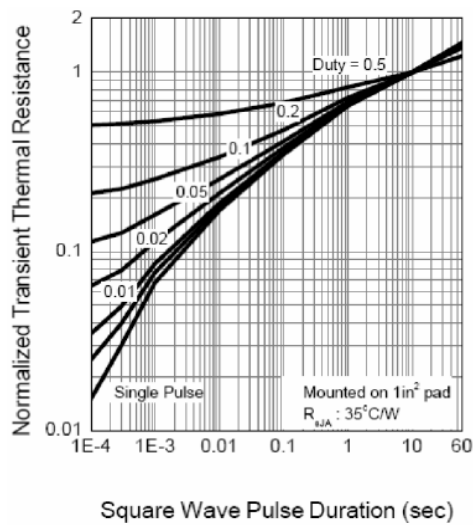


**Fig 9. Thermal Transient Impedance**

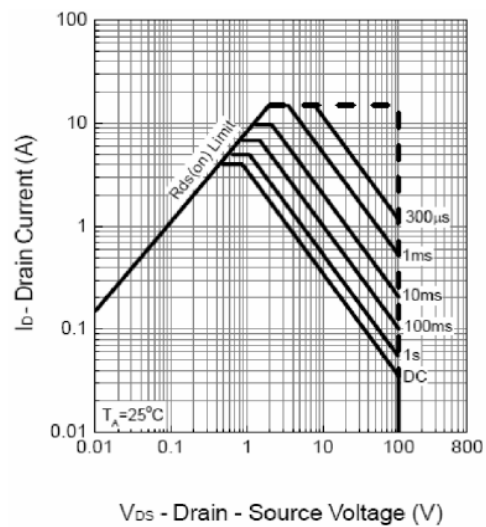


**Fig 10. Maximum Safe Operating Area**