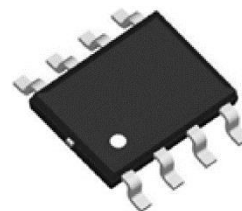


## N-Channel Enhancement Mode MOSFET

### Features

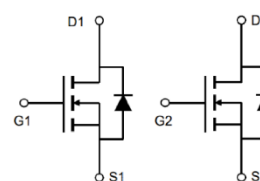
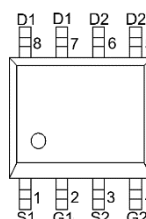
- $V_{DS}=20V, I_D=10A$
- $R_{DS(ON)}=20m\Omega$  (TYP.)  $V_{GS}=4.5V$
- Reliable and Rugged
- Avalanche Rated
- Low On-Resistance

### SOP8



### Applications

- Load Switch
- Power management in portable/desktop PCs
- DC/DC conversion



### Ordering Information

| Device    | Package |         | Marking | Package Qty. |
|-----------|---------|---------|---------|--------------|
| HMN9910AS | SOP8    | Pb-Free | 9910AS  | 3000pcs/Reel |

### Absolute Maximum Ratings ( $T_C=25^\circ C$ , unless otherwise noted)

| Parameter                                      | Symbol         | Value    | Unit       |
|------------------------------------------------|----------------|----------|------------|
| Drain-Source Voltage ( $V_{GS}=0V$ )           | $V_{DS}$       | 20       | V          |
| Gate-Source Voltage ( $V_{GS}=0V$ , static)    | $V_{GS}$       | $\pm 10$ | V          |
| Continuous Drain Current ( $T_C=25^\circ C$ )  | $I_D$          | 10       | A          |
| Continuous Drain Current ( $T_C=100^\circ C$ ) |                | 7        | A          |
| Pulsed Drain Current                           | $I_{DM}$       | 30       | A          |
| Single Pulsed Avalanche Energy                 | $E_{AS}$       | -        | mJ         |
| Maximum Power Dissipation ( $T_C=25^\circ C$ ) | $P_D$          | 1.25     | W          |
| Operating, Storage Temperature Range           | $T_J, T_{STG}$ | -55~150  | $^\circ C$ |

### Thermal Characteristics

| Parameter                               | Symbol          | Min. | Typ. | Max. | Unit         |
|-----------------------------------------|-----------------|------|------|------|--------------|
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | -    | 7.8  | -    | $^\circ C/W$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | -    | 100  | -    | $^\circ C/W$ |

## Electrical Characteristics

| Parameter                        | Symbol       | Test Conditions               | Min. | Typ. | Max.      | Unit       |
|----------------------------------|--------------|-------------------------------|------|------|-----------|------------|
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$     | 20   | -    | -         | V          |
| Zero Gate Voltage Drain Current  | $I_{DSS}$    | $V_{DS}=30V, V_{GS}=0V$       | -    | -    | 1         | $\mu A$    |
| Gate -Source Leakage Current     | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$   | -    | -    | $\pm 100$ | nA         |
| Gate Threshold Voltage           | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 0.5  | -    | 1.0       | V          |
| Drain-Source On-stage Resistance | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=1A$         | -    | 14   | 20        | m $\Omega$ |
|                                  |              | $V_{GS}=2.5V, I_D=1A$         | -    | 18   | 25        |            |

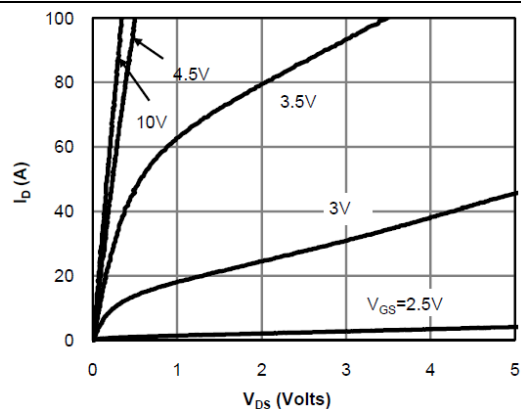
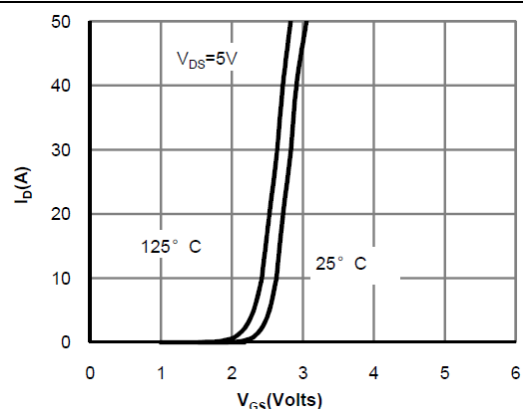
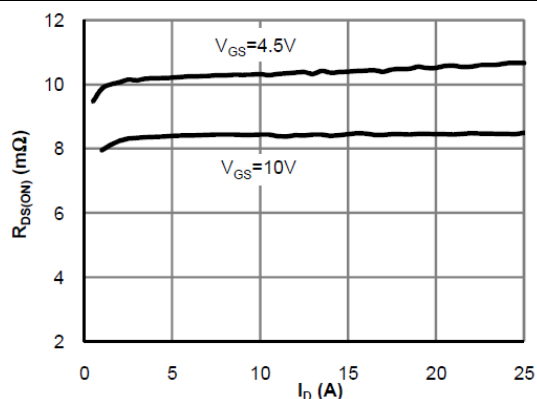
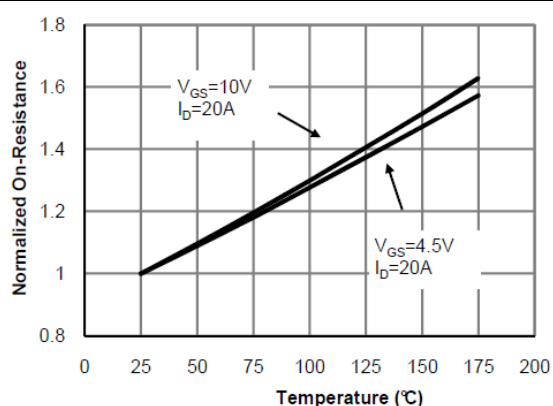
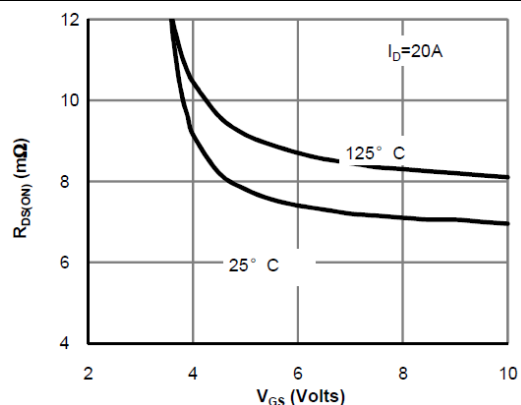
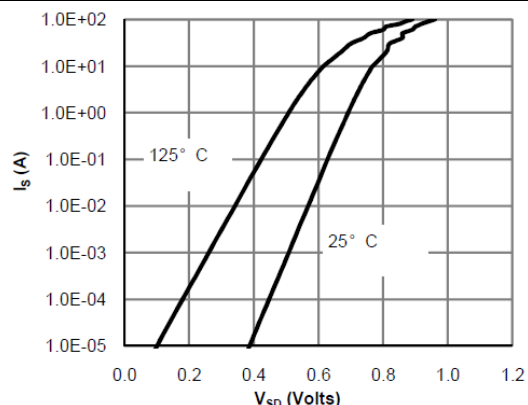
## Dynamic Characteristics

| Parameter                    | Symbol       | Test Conditions | Min. | Typ. | Max. | Unit     |
|------------------------------|--------------|-----------------|------|------|------|----------|
| Input capacitance            | $C_{iss}$    | $V_{DS}=15V$    | -    | 950  | -    | pF       |
| Output capacitance           | $C_{oss}$    | $V_{GS}=0V$     | -    | 130  | -    |          |
| Reverse transfer capacitance | $C_{rss}$    | $f=1MHz$        | -    | 50   | -    |          |
| Gate Resistance              | $R_g$        | $f=1MHz$        | -    | 1.9  | -    | $\Omega$ |
| Total Gate Charge            | $Q_g$        | $V_{DS}=15V$    | -    | 10   | -    | nC       |
| Gate Source Charge           | $Q_{gs}$     | $V_{GS}=10V$    | -    | 1.5  | -    |          |
| Gate Drain Charge            | $Q_{gd}$     | $I_D=20A$       | -    | 1.6  | -    |          |
| Turn-on delay Time           | $t_{d(on)}$  | $V_{GS}=10V$    | -    | 8    | -    | ns       |
| Rise time                    | $t_r$        | $V_{DS}=15V$    | -    | 9    | -    |          |
| Turn-off delay Time          | $t_{d(off)}$ | $R_L=3.5\Omega$ | -    | 15   | -    |          |
| Fall time                    | $t_f$        | $R_G=6.8\Omega$ | -    | 4    | -    |          |

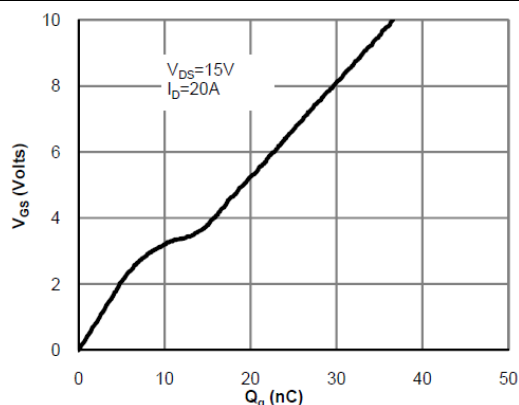
## Reverse Diode Characteristics

| Parameter                  | Symbol   | Test Conditions         | Min. | Typ. | Max. | Unit |
|----------------------------|----------|-------------------------|------|------|------|------|
| Body Diode Forward Voltage | $V_{SD}$ | $V_{GS}=0V, I_{SD}=1A$  | -    | -    | 1.2  | V    |
| Reverse Recovery Time      | $t_{rr}$ | $V_{GS}=0V, I_{SD}=20A$ | -    | 17   | -    | ns   |
| Reverse Recovery Charge    | $Q_{rr}$ | $d_i/d_t=100A/\mu s$    | -    | 25   | -    | nC   |

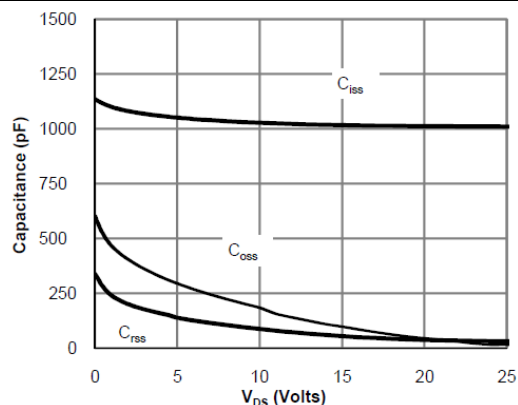
# Electrical Characteristics Diagrames

**Figure 1. On-Regin Characteristics**

**Figure 2. Transfer Characteristics**

**Figure 3. On-Resistance vs. Drain Current and Gate Voltage**

**Figure 4. On-Resistance vs. Junction Temperature**

**Figure 5. On-Resistance vs. Gate-Source Voltage**

**Figure 6. Body-Diode Characteristics**


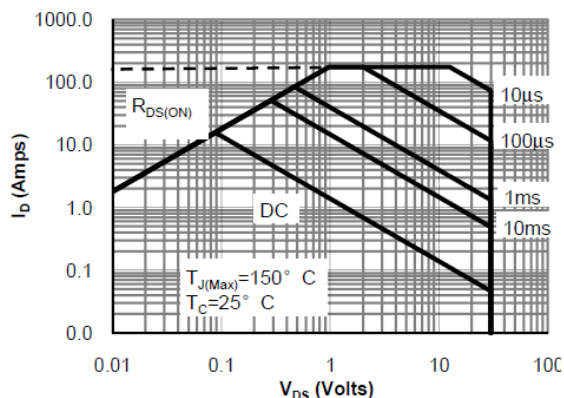
**Figure 7. Gate-Charge Characteristics**



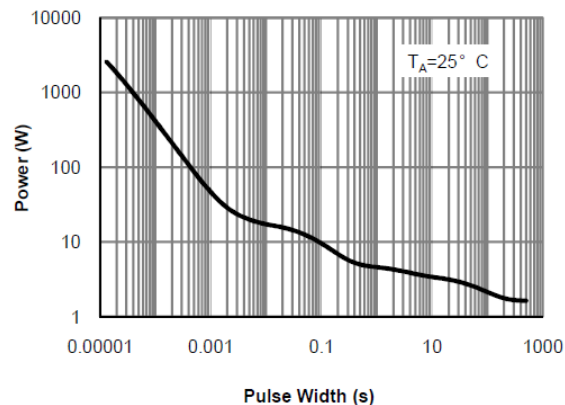
**Figure 8. Capacitance Characteristics**



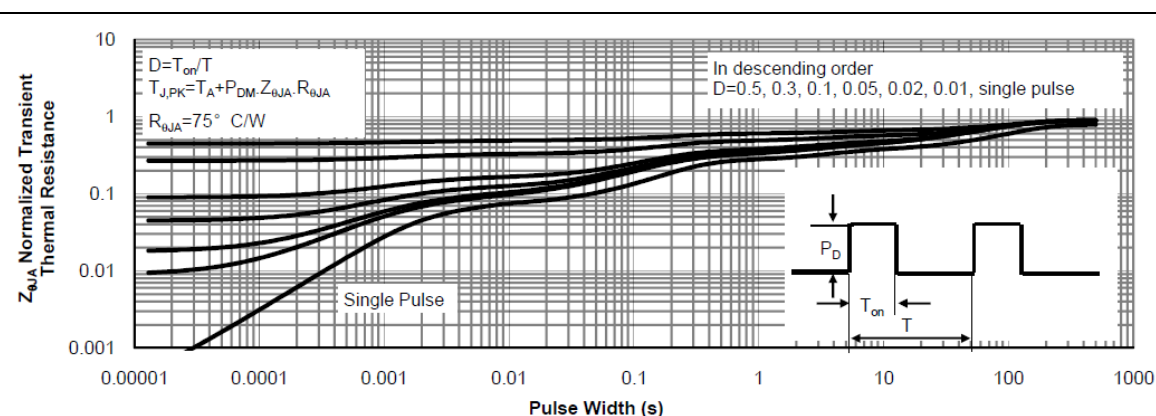
**Figure 9. Maximum Forward Biased Safe Operating Area**



**Figure 10. Single Pulse Power Rating Junction-to-Ambient**



**Figure 11. Normalized Maximum Transient Thermal Impedance**



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