

### Description

The HSS1N25 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent  $R_{DS(on)}$  and gate charge for most of the synchronous buck converter applications.

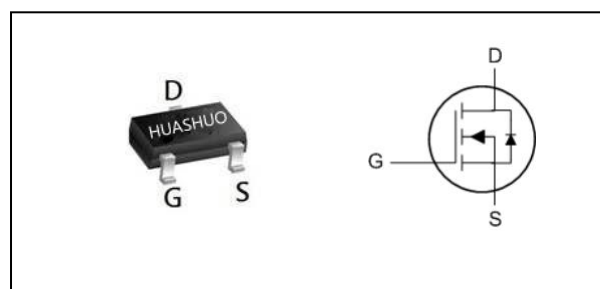
The HSS1N25 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- Super Low Gate Charge
- Green Device Available
- Excellent  $C_{dv}/dt$  effect decline
- Advanced high cell density Trench technology

### Product Summary

|                  |     |          |
|------------------|-----|----------|
| $V_{DS}$         | 250 | V        |
| $R_{DS(ON),max}$ | 1.2 | $\Omega$ |
| $I_D$            | 1   | A        |

### SOT-23L Pin Configuration



### Absolute Maximum Ratings

| Symbol                     | Parameter                                  | Rating     | Units            |
|----------------------------|--------------------------------------------|------------|------------------|
| $V_{DS}$                   | Drain-Source Voltage                       | 200        | V                |
| $V_{GS}$                   | Gate-Source Voltage                        | $\pm 20$   | V                |
| $I_D@T_A=25^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 1          | A                |
| $I_D@T_A=70^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 0.7        | A                |
| $I_{DM}$                   | Pulsed Drain Current <sup>2</sup>          | 4          | A                |
| $P_D@T_A=25^\circ\text{C}$ | Total Power Dissipation <sup>3</sup>       | 1.2        | W                |
| $T_{STG}$                  | Storage Temperature Range                  | -55 to 150 | $^\circ\text{C}$ |
| $T_J$                      | Operating Junction Temperature Range       | -55 to 150 | $^\circ\text{C}$ |

### Thermal Data

| Symbol          | Parameter                                        | Typ. | Max. | Unit                      |
|-----------------|--------------------------------------------------|------|------|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient <sup>1</sup> | ---  | 100  | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>    | ---  | 64   | $^\circ\text{C}/\text{W}$ |

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

| Symbol       | Parameter                                      | Conditions                                               | Min. | Typ. | Max.      | Unit      |
|--------------|------------------------------------------------|----------------------------------------------------------|------|------|-----------|-----------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage                 | $V_{GS}=0V$ , $I_D=250\mu A$                             | 250  | ---  | ---       | V         |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=10V$ , $I_D=1A$                                  | ---  | 1000 | 1200      | $m\Omega$ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=4.5V$ , $I_D=0.5A$                               | ---  | 1100 | 1300      | $m\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage                         | $V_{GS}=V_{DS}$ , $I_D=250\mu A$                         | 1    | 1.8  | 3         | V         |
| $I_{DSS}$    | Drain-Source Leakage Current                   | $V_{DS}=250V$ , $V_{GS}=0V$ , $T_J=25^\circ\text{C}$     | ---  | ---  | 1         | $\mu A$   |
|              |                                                | $V_{DS}=250V$ , $V_{GS}=0V$ , $T_J=125^\circ\text{C}$    | ---  | ---  | 100       |           |
| $I_{GSS}$    | Gate-Source Leakage Current                    | $V_{GS}=\pm 20V$ , $V_{DS}=0V$                           | ---  | ---  | $\pm 100$ | nA        |
| $g_{fs}$     | Forward Transconductance                       | $V_{DS}=10V$ , $I_D=1A$                                  | ---  | 7.9  | ---       | S         |
| $R_g$        | Gate Resistance                                | $V_{DS}=0V$ , $V_{GS}=0V$ , $f=1\text{MHz}$              | ---  | 1.8  | ---       | $\Omega$  |
| $Q_g$        | Total Gate Charge (10V)                        | $V_{DS}=100V$ , $V_{GS}=10V$ , $I_D=1A$                  | ---  | 12.5 | ---       | nC        |
| $Q_{gs}$     | Gate-Source Charge                             |                                                          | ---  | 2    | ---       |           |
| $Q_{gd}$     | Gate-Drain Charge                              |                                                          | ---  | 2.5  | ---       |           |
| $T_{d(on)}$  | Turn-On Delay Time                             | $V_{DD}=100V$ , $V_{GS}=10V$ , $R_G=6\Omega$<br>$I_D=1A$ | ---  | 13   | ---       | ns        |
| $T_r$        | Rise Time                                      |                                                          | ---  | 9    | ---       |           |
| $T_{d(off)}$ | Turn-Off Delay Time                            |                                                          | ---  | 38   | ---       |           |
| $T_f$        | Fall Time                                      |                                                          | ---  | 8    | ---       |           |
| $C_{iss}$    | Input Capacitance                              | $V_{DS}=100V$ , $V_{GS}=0V$ , $f=1\text{MHz}$            | ---  | 670  | ---       | pF        |
| $C_{oss}$    | Output Capacitance                             |                                                          | ---  | 14   | ---       |           |
| $C_{rss}$    | Reverse Transfer Capacitance                   |                                                          | ---  | 8    | ---       |           |

**Diode Characteristics**

| Symbol   | Parameter                                | Conditions                                      | Min. | Typ. | Max. | Unit |
|----------|------------------------------------------|-------------------------------------------------|------|------|------|------|
| $I_S$    | Continuous Source Current <sup>1,5</sup> | $V_G=V_D=0V$ , Force Current                    | ---  | ---  | 1    | A    |
| $I_{SM}$ | Pulsed Source Current <sup>2,5</sup>     |                                                 | ---  | ---  | 4    | A    |
| $V_{SD}$ | Diode Forward Voltage <sup>2</sup>       | $V_{GS}=0V$ , $I_S=1A$ , $T_J=25^\circ\text{C}$ | ---  | ---  | 1.2  | V    |
| $t_{rr}$ | Reverse Recovery Time                    | $I_F=1A$ , $dI/dt=100A/\mu s$ ,                 | ---  | 75   | ---  | nS   |
| $Q_{rr}$ | Reverse Recovery Charge                  | $T_J=25^\circ\text{C}$                          | ---  | 270  | ---  | nC   |

Note :

1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.

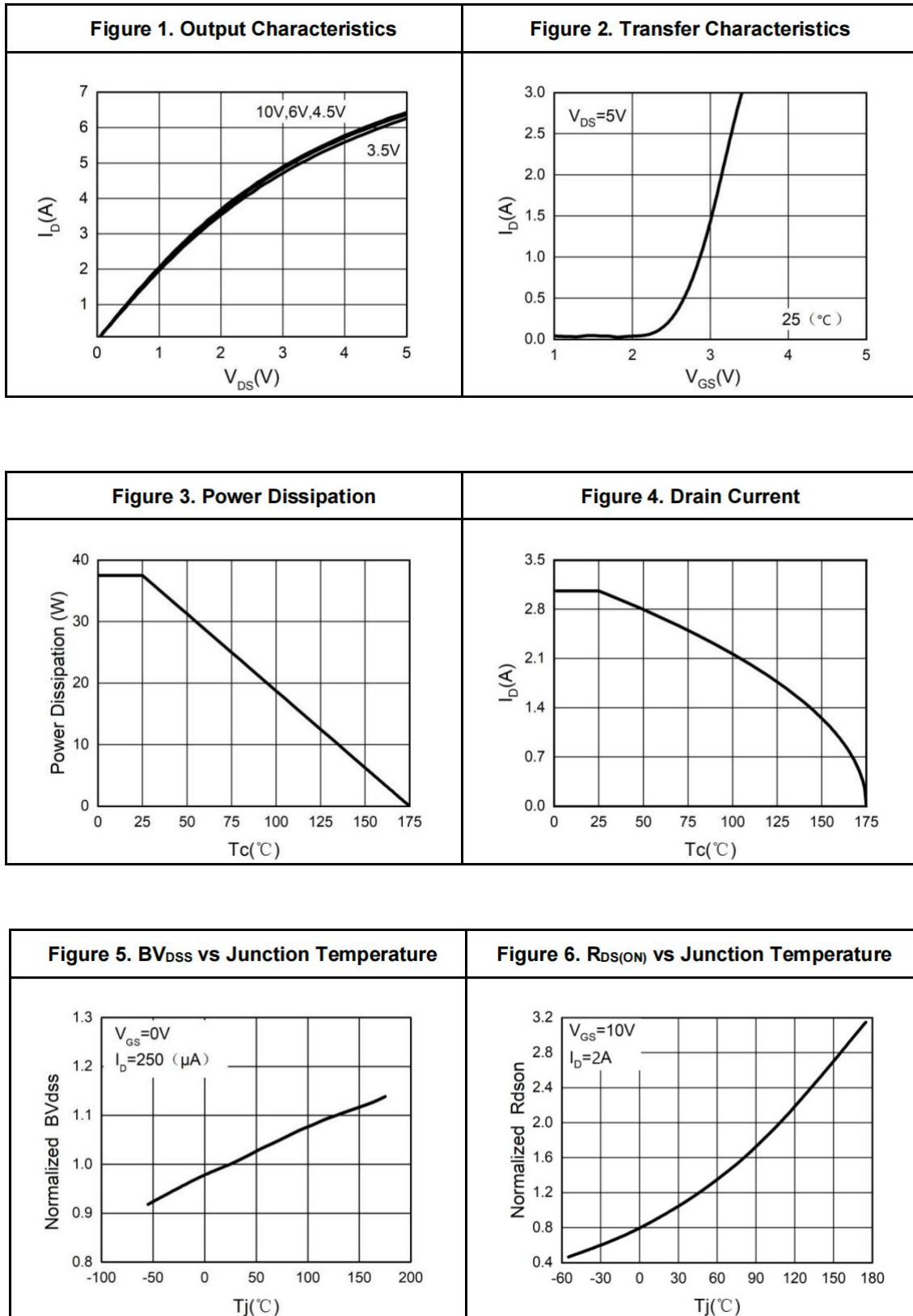
2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$

3.The power dissipation is limited by  $150^\circ\text{C}$  junction temperature

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

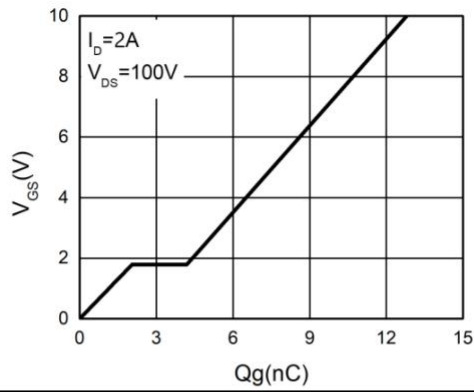


### Typical Characteristics

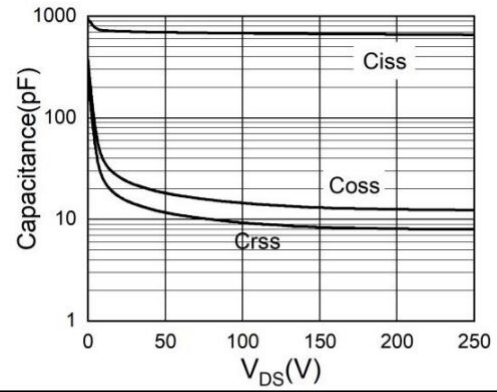




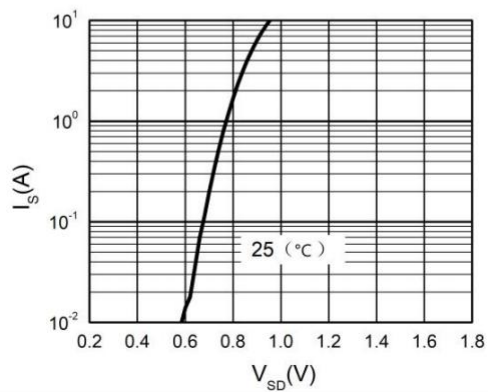
**Figure 7. Gate Charge Waveforms**



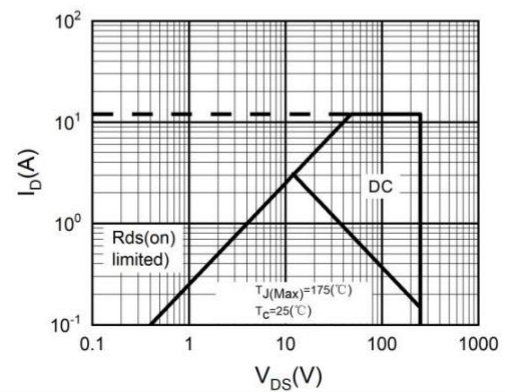
**Figure 8. Capacitance**



**Figure 9. Body-Diode Characteristics**

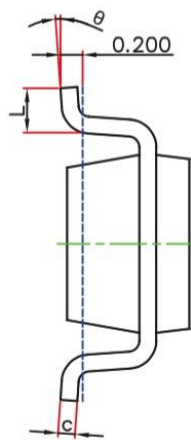
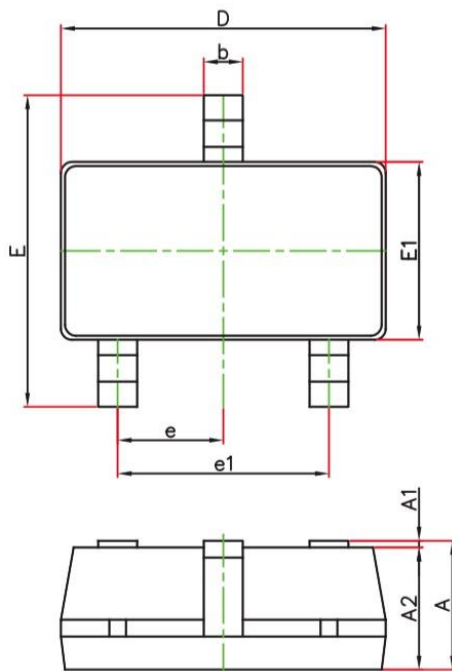


**Figure 10. Maximum Safe Operating Area**



## Ordering Information

| Part Number | Package code | Packaging      |
|-------------|--------------|----------------|
| HSS1N25     | SOT-23L      | 3000/Tape&Reel |



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.050                     | 1.150 | 0.041                | 0.045 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.820                     | 3.020 | 0.111                | 0.119 |
| E1     | 1.500                     | 1.700 | 0.059                | 0.067 |
| E      | 2.650                     | 2.950 | 0.104                | 0.116 |
| e      | 0.950(BSC)                |       | 0.037(BSC)           |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.300                     | 0.600 | 0.012                | 0.024 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |