

## General Description

The HSS3400E is the high cell density trenched N-ch MOSFETs, which provides excellent  $R_{DS(on)}$  and efficiency for most of the small power switching and load switch applications.

The HSS3400E meet the RoHS and Green Product requirement with full function reliability approved.

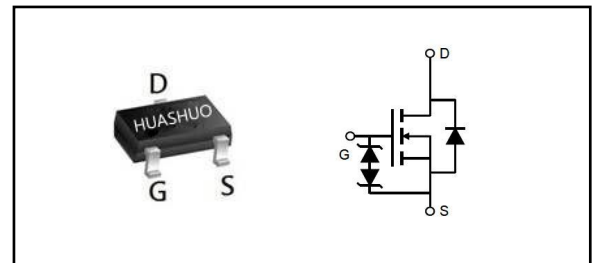
## Product Summary

|                  |     |            |
|------------------|-----|------------|
| $V_{DS}$         | 30  | V          |
| $R_{DS(ON),Typ}$ | 23  | m $\Omega$ |
| $I_D$            | 5.0 | A          |

## Features

- Green Device Available
- Super Low Gate Charge
- ESD Rating: >2KV HBM
- Advanced high cell density Trench Technology

## SOT-23S Pin Configuration



## Absolute Maximum Ratings

| Symbol                     | Parameter                             | Rating     | Units            |
|----------------------------|---------------------------------------|------------|------------------|
| $V_{DS}$                   | Drain-Source Voltage                  | 30         | V                |
| $V_{GS}$                   | Gate-Source Voltage                   | $\pm 10$   | V                |
| $I_D@T_A=25^\circ\text{C}$ | Continuous Drain Current <sup>1</sup> | 5.0        | A                |
| $I_D@T_A=70^\circ\text{C}$ | Continuous Drain Current <sup>1</sup> | 4.0        | A                |
| $I_{DM}$                   | Pulsed Drain Current <sup>2</sup>     | 20         | A                |
| $P_D@T_C=25^\circ\text{C}$ | Total Power Dissipation <sup>1</sup>  | 0.72       | 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> | ---  | 175  | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>    | ---  | 80   | $^\circ\text{C/W}$ |

Note :

1.Surface mounted on 1" x 1" FR4 board,  $t \leq 10\text{sec}$

2.Pulse width limited by maximum junction temperature



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

| Symbol       | Parameter                                      | Conditions                                         | Min. | Typ. | Max.     | Unit      |
|--------------|------------------------------------------------|----------------------------------------------------|------|------|----------|-----------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage                 | $V_{GS}=0V, I_D=250\mu A$                          | 30   | ---  | ---      | V         |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance <sup>1</sup> | $V_{GS}=10V, I_D=5A$                               | ---  | 23   | 30       | $m\Omega$ |
|              |                                                | $V_{GS}=4.5V, I_D=4A$                              | ---  | 27   | 35       |           |
|              |                                                | $V_{GS}=2.5V, I_D=3A$                              | ---  | 39   | 50       |           |
| $V_{GS(th)}$ | Gate Threshold Voltage                         | $V_{GS}=V_{DS}, I_D=250\mu A$                      | 0.5  | 1.0  | 1.5      | V         |
| $I_{DSS}$    | Drain-Source Leakage Current                   | $V_{DS}=30V, V_{GS}=0V, T_J=25^{\circ}\text{C}$    | ---  | ---  | 1        | $\mu A$   |
| $I_{GSS}$    | Gate-Source Leakage Current                    | $V_{GS}=\pm 10V, V_{DS}=0V$                        | ---  | ---  | $\pm 10$ | $\mu A$   |
| $Q_g$        | Total Gate Charge                              | $V_{DS}=15V, V_{GS}=4.5V, I_D=4A$                  | ---  | 15   | ---      | nC        |
| $Q_{gs}$     | Gate-Source Charge                             |                                                    | ---  | 1.6  | ---      |           |
| $Q_{gd}$     | Gate-Drain Charge                              |                                                    | ---  | 2.5  | ---      |           |
| $T_{d(on)}$  | Turn-On Delay Time                             | $V_{DD}=15V, V_{GS}=4.5V, R_G=1\Omega$<br>$I_D=4A$ | ---  | 8    | ---      | ns        |
| $T_r$        | Rise Time                                      |                                                    | ---  | 20   | ---      |           |
| $T_{d(off)}$ | Turn-Off Delay Time                            |                                                    | ---  | 35   | ---      |           |
| $T_f$        | Fall Time                                      |                                                    | ---  | 6    | ---      |           |
| $C_{iss}$    | Input Capacitance                              | $V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$             | ---  | 726  | ---      | pF        |
| $C_{oss}$    | Output Capacitance                             |                                                    | ---  | 58   | ---      |           |
| $C_{rss}$    | Reverse Transfer Capacitance                   |                                                    | ---  | 50   | ---      |           |

**Diode Characteristics**

| Symbol   | Parameter             | Conditions                                  | Min. | Typ. | Max. | Unit |
|----------|-----------------------|---------------------------------------------|------|------|------|------|
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}=0V, I_S=2A, T_J=25^{\circ}\text{C}$ | ---  | ---  | 1.2  | V    |

Note :

1.Pulse test: pulse width $\leq 300\mu s$ , duty $\leq 2\%$

Guaranteed by design, not subject to production testing



Typical Characteristics

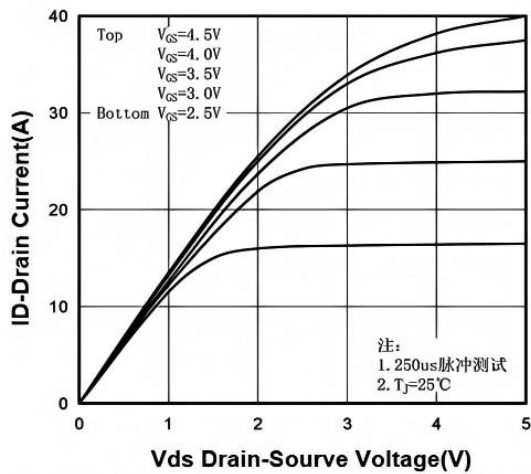


Fig.1 Output Characteristic

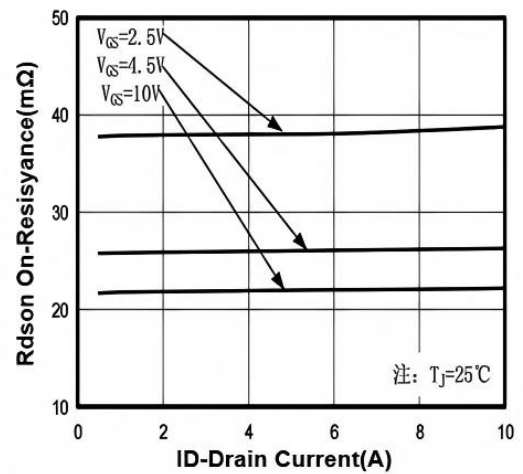


Fig.2 On-Resistance vs. Drain Current

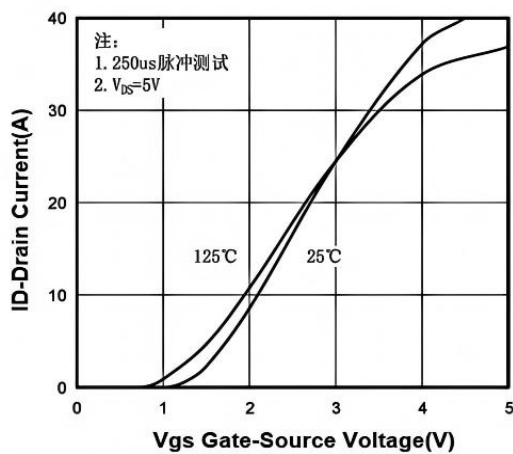


Fig.3 Transfer Characteristic

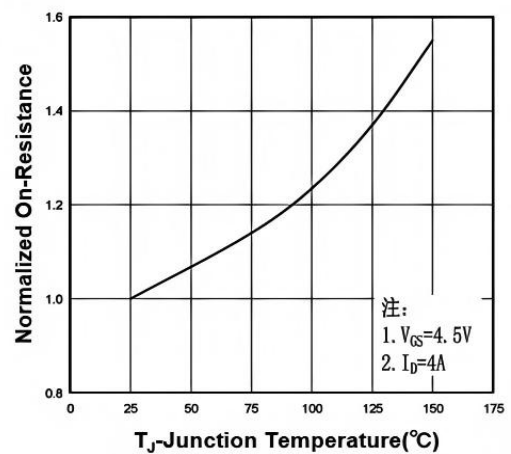


Fig.4 On-Resistance vs. Junction Temperature

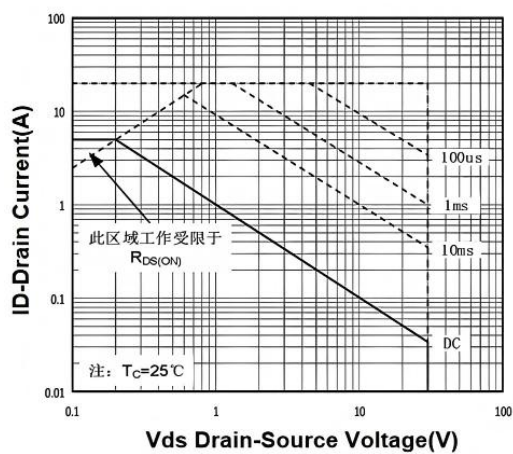


Fig.5 Safe Operation Area

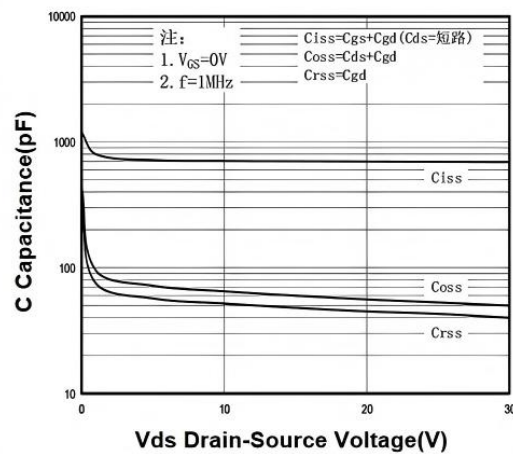
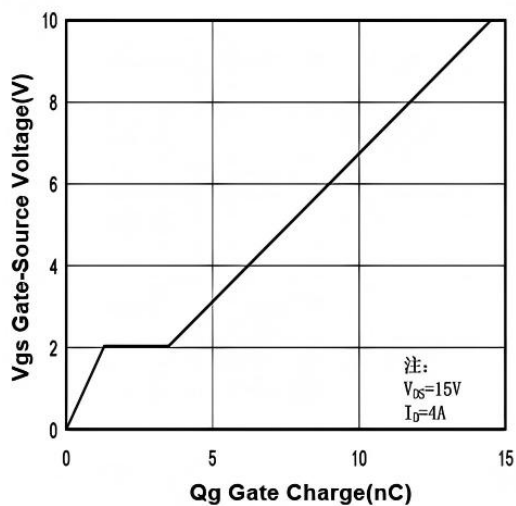
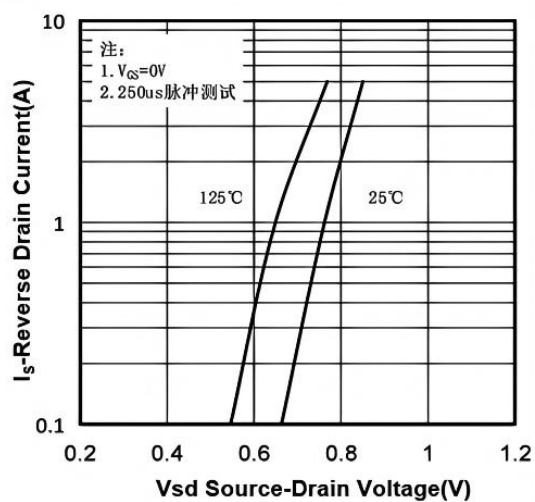


Fig.6 Capacitance Characteristic



**Fig.7 Gate-Charge Characteristic**



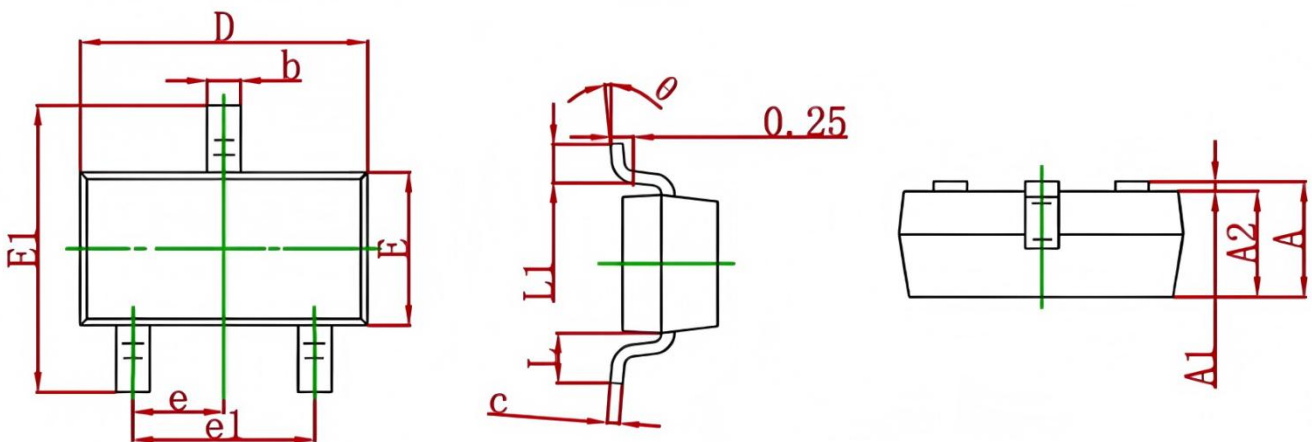
**Fig.8 Body Diode Characteristic**



## Ordering Information

| Part Number | Package code | Packaging      |
|-------------|--------------|----------------|
| HSS3400E    | SOT-23S      | 3000/Tape&Reel |

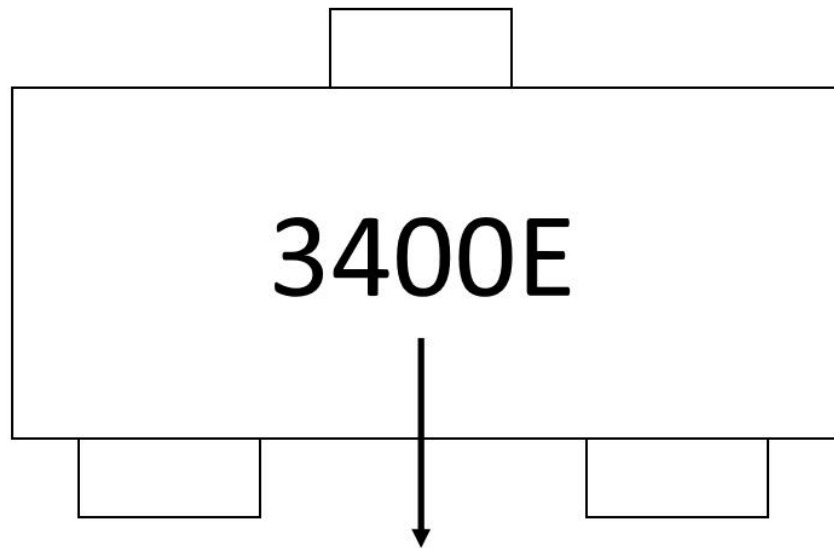
### SOT-23S Package Outline



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 0.900                     | 1.050 | 0.035                | 0.041 |
| b        | 0.300                     | 0.500 | 0.012                | 0.020 |
| C        | 0.080                     | 0.150 | 0.003                | 0.006 |
| D        | 2.800                     | 3.000 | 0.110                | 0.118 |
| E        | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1       | 2.250                     | 2.550 | 0.089                | 0.100 |
| e        | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1       | 1.800                     | 2.000 | 0.071                | 0.079 |
| L        | 0.550 REF                 |       | 0.022 REF            |       |
| L1       | 0.300                     | 0.500 | 0.012                | 0.020 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |



## HSS3400E TOP Marking



Part Number