Datasheet

# FS8820S

Dual N-Channel Enhancement Mode Power MOSFET

FORTUNE' Properties For Reference Only

Fortune SEMICONDUCTOR CORPORATION

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## 1. Features

1.1 Low on-resistance

1.1.1 $R_{DS(ON)}$ = 24 mΩ MAX. ($V_{GS}$ = 4.5V, $I_D$ = 6A)

1.1.2 $R_{DS(ON)}$ = 32 mΩ MAX. ($V_{GS}$ = 2.5V, $I_D$ = 5A)

1.1.3 ESD Rating: ≧2000V HBM

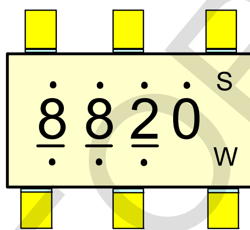
## 2. Applications

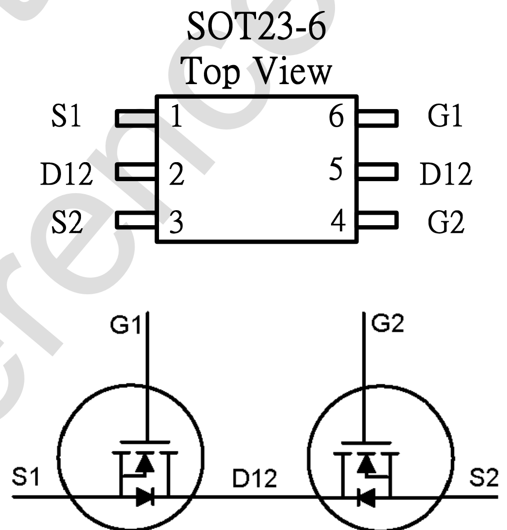
- Li-ion battery management applications

## 3. Ordering Information

| Product Number | Description | Package Type | Quantity/Reel |
|---|---|---|---|
| FS8820S | SOT-23-6 version | SOT-23-6 | 3,000 |

## 4. Pin Assignment




For FS8820S
w : A~Z or A ~ Z
Top points, bottom points & w: Lot No Information

## 5. Limiting Values

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| VDS | Drain-Source Voltage | 20 | V |
| VGS | Gate-Source Voltage | ±12 | V |
| ID @TA = 25℃ | Continuous Drain Current3 | 6.5 | A |
| ID @TA = 100℃ | Continuous Drain Current3 | 4 | A |
| IDM | Pulsed Drain Current1 | 20 | A |
| PD @TA = 25℃ | Total Power Dissipation | 1.25 | W |
| TSTG | Storage Temperature Range | -55 to 150 | ℃ |
| TJ | Operating Junction Temperature Range | -55 to 150 | ℃ |
| Is | Diode Forward Current | 1.7 | A |

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## 6. Thermal Data

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| Rthj-a | Thermal Resistance Junction-ambient3 | Max. 125 | ℃/W |

## 7. Electrical Characteristics

Electrical Characteristics @$T_A$ = 25℃ ( unless otherwise specified )

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Static Characteristics | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$ = 0V, $I_D$ = 250uA | 20 | - | - | V |
| $\Delta BV_{DSS}/\Delta T_j$ | Breakdown Voltage Temperature Coefficient | Reference to 25℃, $I_D$=1mA | - | 0.1 | - | V/℃ |
| $R_{DS(ON)}$ [1] | Static Drain-Source On-Resistance[2] | $V_{GS}$ = 4.5V, $I_D$ = 6A | - | 19 | 24 | mΩ |
| | | $V_{GS}$ = 2.5V, $I_D$ = 5A | - | 25 | 32 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_D$ = 250uA | 0.5 | 0.7 | 1.0 | V |
| $I_{DSS}$ | Drain-Source Leakage Current ($T_j$ = 25℃) | $V_{DS}$ =16 $V_{GS}$ = 0V | - | - | 1 | uA |
| | Drain-Source Leakage Current ($T_j$ = 85℃) | $V_{DS}$ =16 $V_{GS}$ = 0V | - | - | 30 | uA |
| $I_{GSS}$ | Gate-Source Leakage | $V_{GS}$ = ±10V | - | - | ±10 | uA |
| Diode Characteristics | | | | | | |
| $V_{SD}$ [1] | Diode Forward Voltage | $I_{SD}$=1.7A,$V_{GS}$=0V | | 0.7 | 1.0 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_{SD}$=6A,d$I_{SD}$/dt=100A/μs | | 27 | | Ns |
| $Q_{rr}$ | Reverse Recovery Charge | | | 15 | | nC |
| Dynamic Characteristics [2] | | | | | | |
| $R_G$ | Gate Resistance | VGS=VDS=0V,F=1MHz | | 4 | | Ω |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V,$V_{DS}$=10V Frequency=1MHz | | 1110 | | pF |
| $C_{oss}$ | Output Capacitance | | | 240 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 200 | | |
| $t_d$(on) | Turn-on Delay Time | $V_{DS}$=10V,$V_{GEN}$=4.5V, $R_G$=6Ω,$R_L$=10Ω, $I_{DS}$=1A | | 6 | 12 | ns |
| $t_r$ | Turn-on Rise Time | | | 13 | 24 | |
| $t_d$(off) | Turn-off Delay Time | | | 67 | 122 | |
| $t_f$ | Turn-off Rise Time | | | 37 | 68 | |
| Gate Charge Characteristics[2] | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{GS}$=4.5V,$V_{DS}$=10V, $I_{DS}$=6A | | 15 | 21 | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 1.5 | | |
| $Q_{gd}$ | Gate-Drain Charge | | | 4.7 | | |

**Notes：**

1. Pulse width ≦ 300us, duty cycle ≦ 2%.
2. Guaranteed by design, not subject to production testing

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## 8. Typical Characteristics

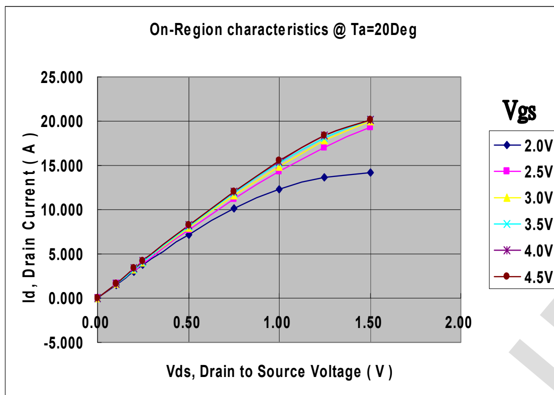


Fig 1. Typical Output Characteristics

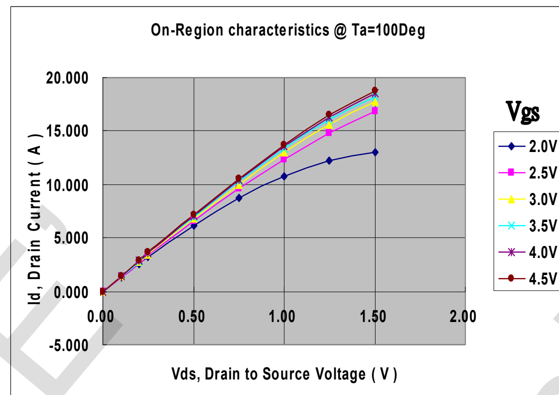


Fig 2. Typical Output Characteristics

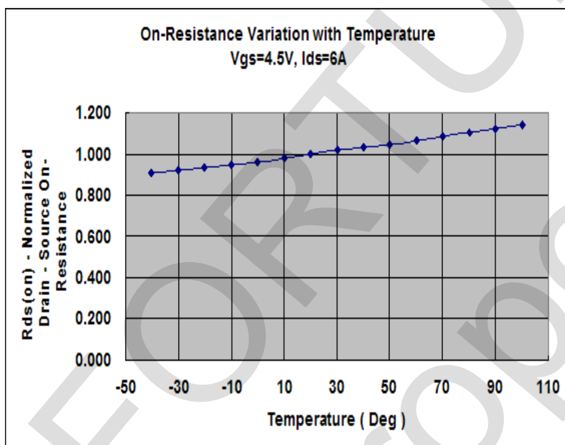


Fig 3. Normalized On-Resistance

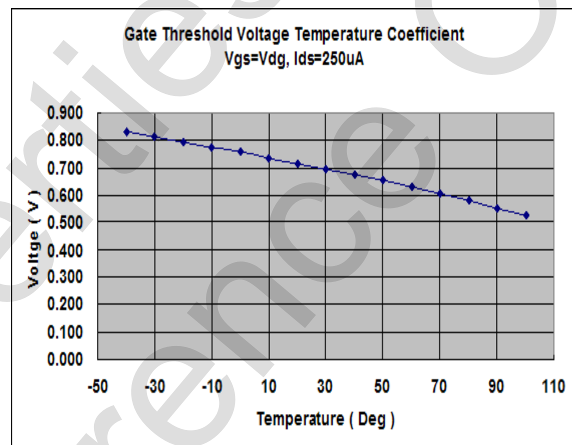


Fig 4. Gate Threshold Variation with Temperature

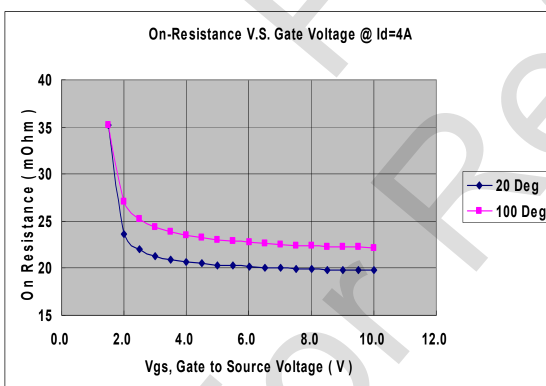


Fig 5. Forward Characteristic of Reverse Diode

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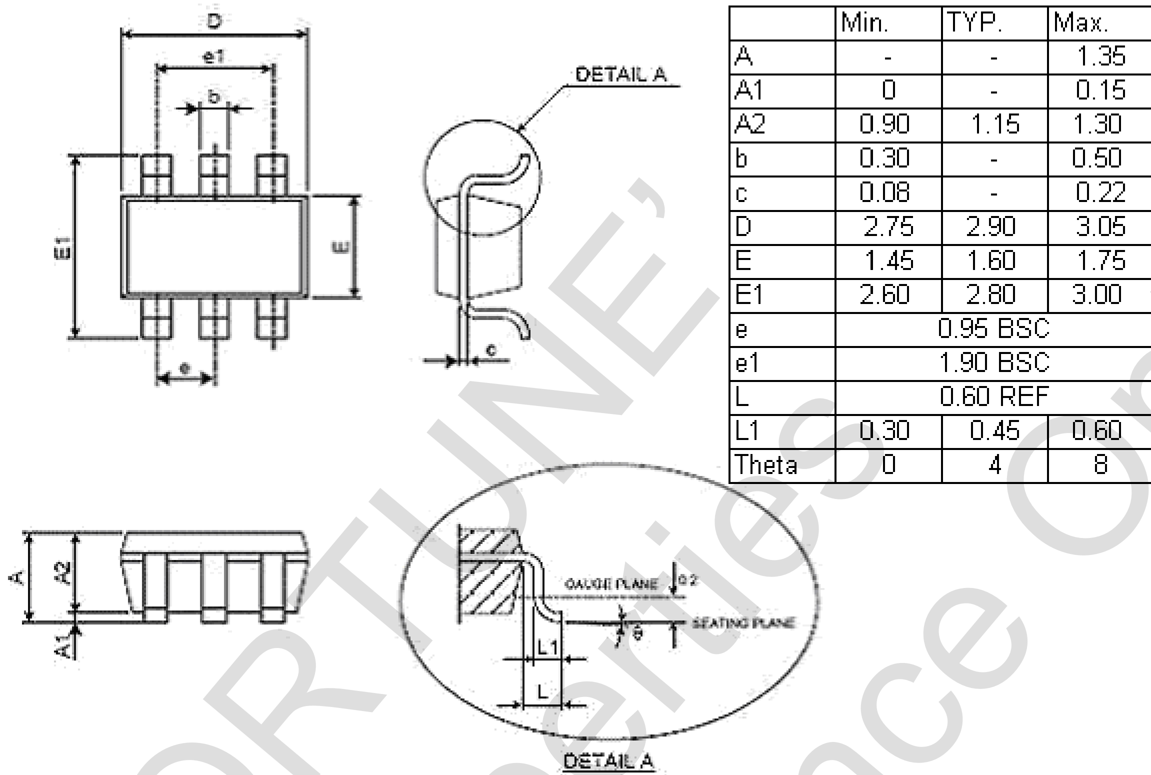
## 9. Package Information




| | Min. | TYP. | Max. |
|---|---|---|---|
| A | - | - | 1.35 |
| A1 | 0 | - | 0.15 |
| A2 | 0.90 | 1.15 | 1.30 |
| b | 0.30 | - | 0.50 |
| c | 0.08 | - | 0.22 |
| D | 2.75 | 2.90 | 3.05 |
| E | 1.45 | 1.60 | 1.75 |
| E1 | 2.60 | 2.80 | 3.00 |
| e | 0.95 BSC | | |
| e1 | 1.90 BSC | | |
| L | 0.60 REF | | |
| L1 | 0.30 | 0.45 | 0.60 |
| Theta | 0 | 4 | 8 |

## 10. Revision History

| Version | Date | Page | Description |
|---|---|---|---|
| 1.0 | 2011/12/26 | ALL | New release |
| 1.1 | 2012/12/10 | 6 | Revise Package Information A |
| 1.2 | 2014/05/22 | 2 | Revised company address |
| 1.3 | 2016/08/29 | 3 | Revise Package Marking Information |

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