



**Applications**

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

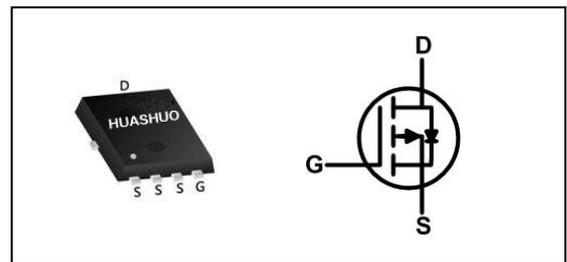
**Product Summary**

|                  |      |    |
|------------------|------|----|
| $V_{DS}$         | -100 | V  |
| $R_{DS(ON),typ}$ | 23   | mΩ |
| $I_D$            | -33  | A  |

**Features**

- 100% EAS Guaranteed
- Low Gate Charge
- Fast Switching Speed
- Advanced high cell density Trench Technology

**PRPAK5\*6 Pin Configuration**



**Absolute Maximum Ratings**

| Symbol                 | Parameter                                  | Rating     | Units |
|------------------------|--|------------|-------|
| $V_{DS}$               | Drain-Source Voltage                       | -100       | V     |
| $V_{GS}$               | Gate-Source Voltage                        | ±20        | V     |
| $I_D@T_C=25^{\circ}C$  | Continuous Drain Current                   | -33        | A     |
| $I_D@T_C=100^{\circ}C$ | Continuous Drain Current                   | -22        | A     |
| $I_{DM}$               | Pulsed Drain Current <sup>1</sup>          | -135       | A     |
| EAS                    | Single Pulse Avalanche Energy <sup>2</sup> | 678        | mJ    |
| $P_D@T_C=25^{\circ}C$  | Total Power Dissipation                    | 68         | W     |
| $T_{STG}$              | Storage Temperature Range                  | -55 to 150 | °C    |
| $T_J$                  | Operating Junction Temperature Range       | -55 to 150 | °C    |

**Thermal Data**

| Symbol          | Parameter                        | Typ. | Max. | Unit |
|-----------------|----------------------------------|------|------|------|
| $R_{\theta JC}$ | Thermal Resistance Junction-Case | ---  | 1.8  | °C/W |



**P-Ch 100V Fast Switching MOSFETs**

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

| Symbol              | Parameter                         | Conditions  | Min. | Typ.  | Max.  | Unit |
|---------------------|-----------------------------------|---|------|-------|-------|------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage    | V <sub>GS</sub> =0V , I <sub>D</sub> =-250uA  | -100 | ---   | ---   | V    |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance | V <sub>GS</sub> =-10V , I <sub>D</sub> =-20A  | ---  | 23    | 28    | mΩ   |
|                     |                                   | V <sub>GS</sub> =-4.5V , I <sub>D</sub> =-20A   |      | 25    | 32    | mΩ   |
| V <sub>GS(th)</sub> | Gate Threshold Voltage            | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA                                   | -1.0 | -1.7  | -2.5  | V    |
| I <sub>DSS</sub>    | Drain-Source Leakage Current      | V <sub>DS</sub> =-100V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C                         | ---  | ---   | -1    | uA   |
|                     |                                   | V <sub>DS</sub> =-100V , V <sub>GS</sub> =0V , T <sub>J</sub> =125°C                        | ---  | ---   | -100  | uA   |
| I <sub>GSS</sub>    | Gate-Source Leakage Current       | V <sub>GS</sub> =± 20V , V <sub>DS</sub> =0V  | ---  | ---   | ± 100 | nA   |
| g <sub>fs</sub>     | Forward Transconductance          | V <sub>DS</sub> =-5V , I <sub>D</sub> =-15A   | ---  | 38    | ---   | S    |
| R <sub>g</sub>      | Gate Resistance                   | V <sub>DS</sub> =-0V , V <sub>GS</sub> =0V , f=1MHz   | ---  | 1.9   | ---   | Ω    |
| Q <sub>g</sub>      | Total Gate Charge                 | V <sub>DS</sub> =-50V , V <sub>GS</sub> =-10V , I <sub>D</sub> =-20A                        | ---  | 38    | ---   | nC   |
| Q <sub>gs</sub>     | Gate-Source Charge                |   | ---  | 10    | ---   |      |
| Q <sub>gd</sub>     | Gate-Drain Charge                 |   | ---  | 8     | ---   |      |
| T <sub>d(on)</sub>  | Turn-On Delay Time                | V <sub>DD</sub> =-50V , V <sub>GS</sub> =-10V , R <sub>G</sub> =3Ω,<br>R <sub>L</sub> =2.5Ω | ---  | 17    | ---   | ns   |
| T <sub>r</sub>      | Rise Time                         |   | ---  | 48    | ---   |      |
| T <sub>d(off)</sub> | Turn-Off Delay Time               |   | ---  | 270   | ---   |      |
| T <sub>f</sub>      | Fall Time                         |   | ---  | 232   | ---   |      |
| C <sub>iss</sub>    | Input Capacitance                 | V <sub>DS</sub> =-50V , V <sub>GS</sub> =0V , f=1MHz  | ---  | 13250 | ---   | pF   |
| C <sub>oss</sub>    | Output Capacitance                |   | ---  | 265   | ---   |      |
| C <sub>rss</sub>    | Reverse Transfer Capacitance      |   | ---  | 240   | ---   |      |

**Diode Characteristics**

| Symbol          | Parameter                                | Conditions  | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I <sub>S</sub>  | Continuous Source Current <sup>1,5</sup> | V <sub>G</sub> =V <sub>D</sub> =0V , Force Current                | ---  | ---  | -33  | A    |
| V <sub>SD</sub> | Diode Forward Voltage <sup>2</sup>       | V <sub>GS</sub> =0V , I <sub>S</sub> =-20A , T <sub>J</sub> =25°C | ---  | ---  | 1.2  | V    |
| t <sub>rr</sub> | Reverse Recovery Time                    | I <sub>F</sub> =-20A , di/dt=-100A/μs ,                           | ---  | 68   | ---  | nS   |
| Q <sub>rr</sub> | Reverse Recovery Charge                  | T <sub>J</sub> =25°C  | ---  | 136  | ---  | nC   |

Note :

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2.EAS condition: T<sub>J</sub>=25°C,V<sub>DD</sub>=-60V,V<sub>G</sub>=10V, R<sub>G</sub>=25Ω, L=0.5mH.

3.Repetitive Rating: Pulse width limited by maximum junction temperature.



Typical Characteristics

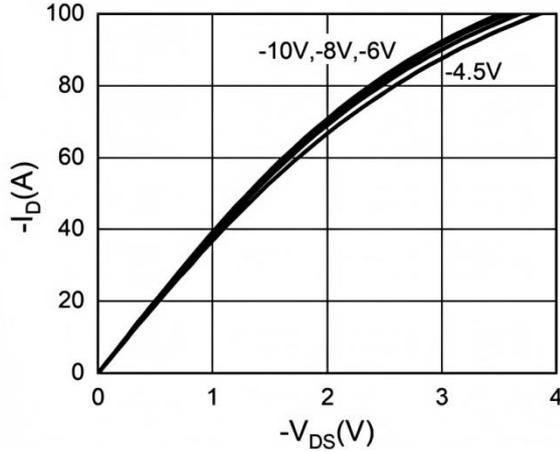


Figure 1. Output Characteristics

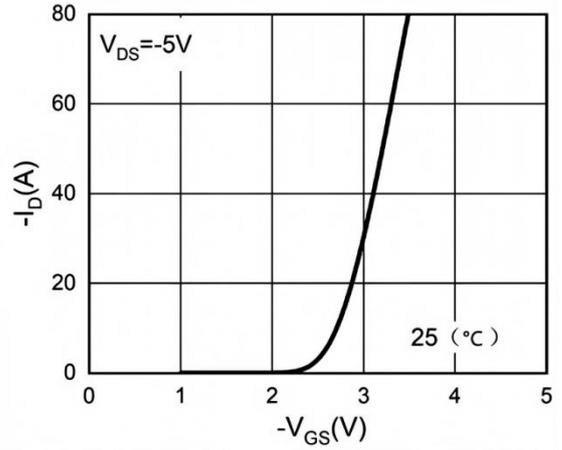


Figure 2. Transfer Characteristics

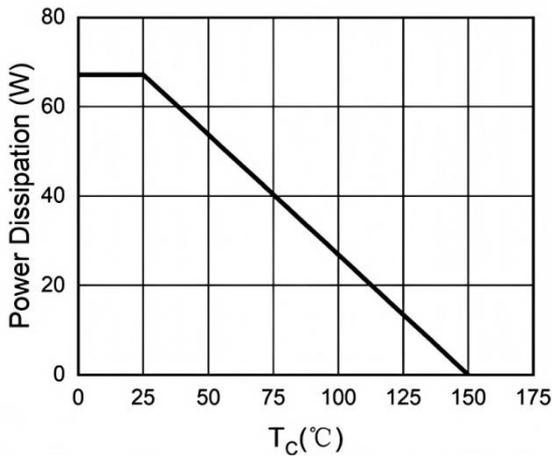


Figure 3. Power Dissipation

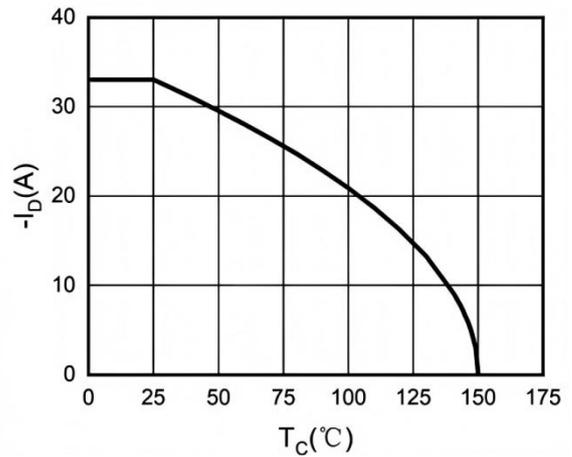


Figure 4. Drain Current

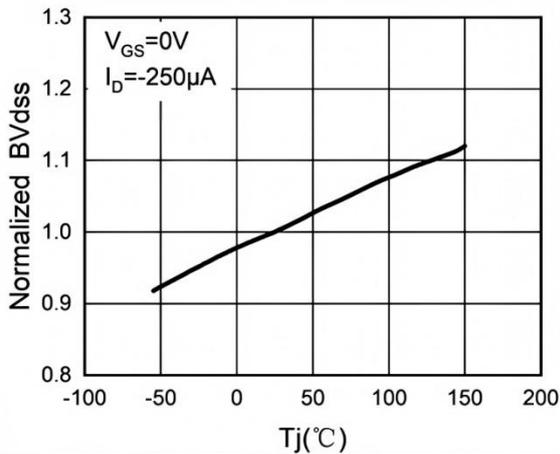


Figure 5.  $BV_{DSS}$  vs Junction Temperature

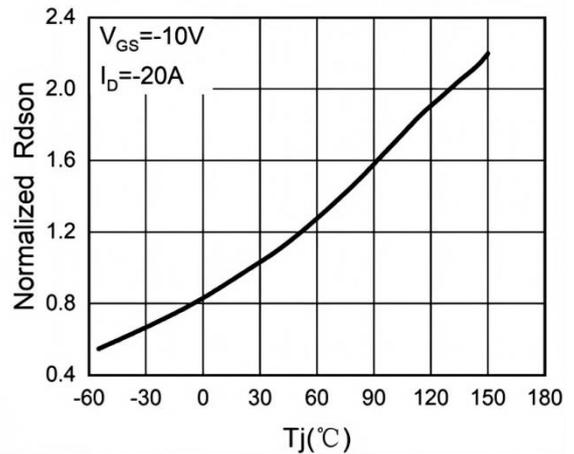
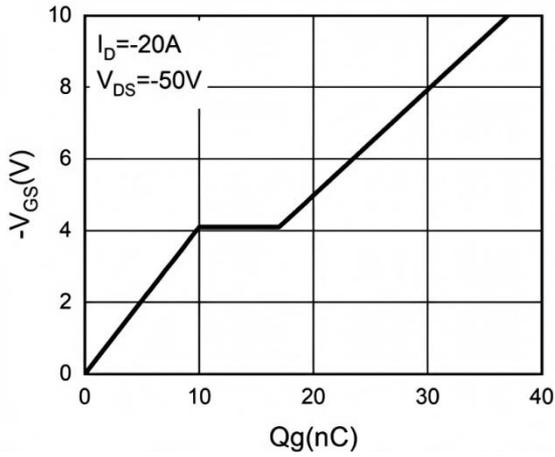


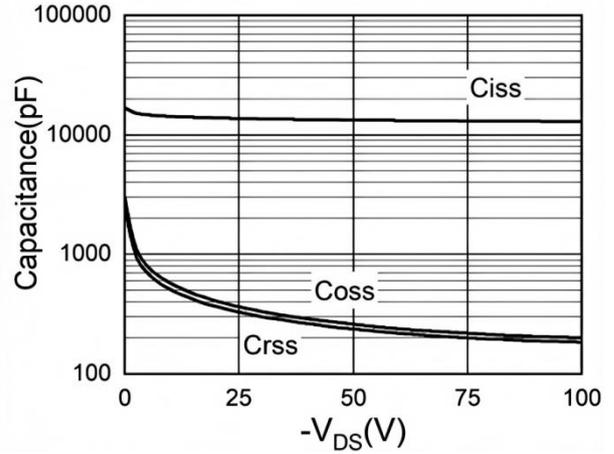
Figure 6.  $R_{DS(ON)}$  vs Junction Temperature



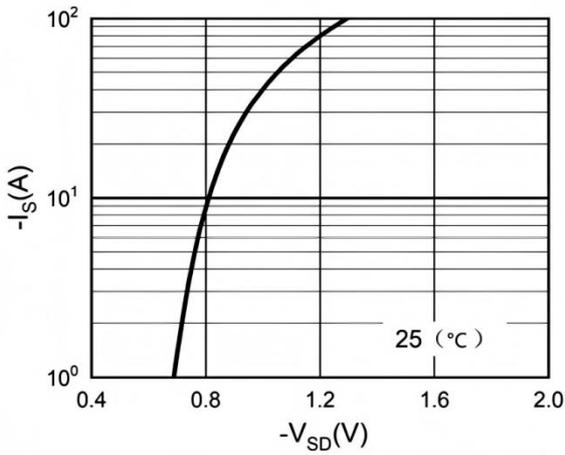
**P-Ch 100V Fast Switching MOSFETs**



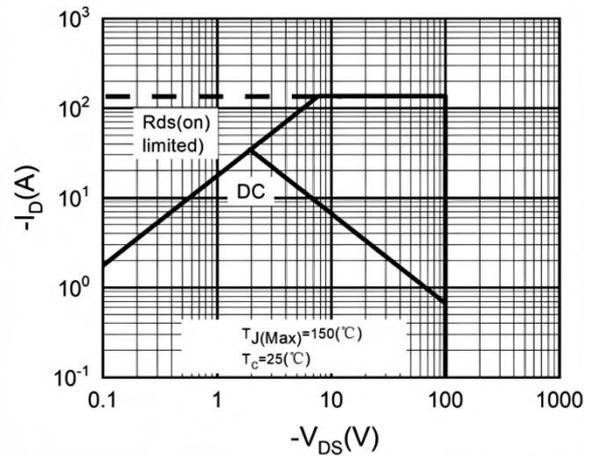
**Figure 7. Gate Charge Waveforms**



**Figure 8. Capacitance**



**Figure 9. Body-Diode Characteristics**



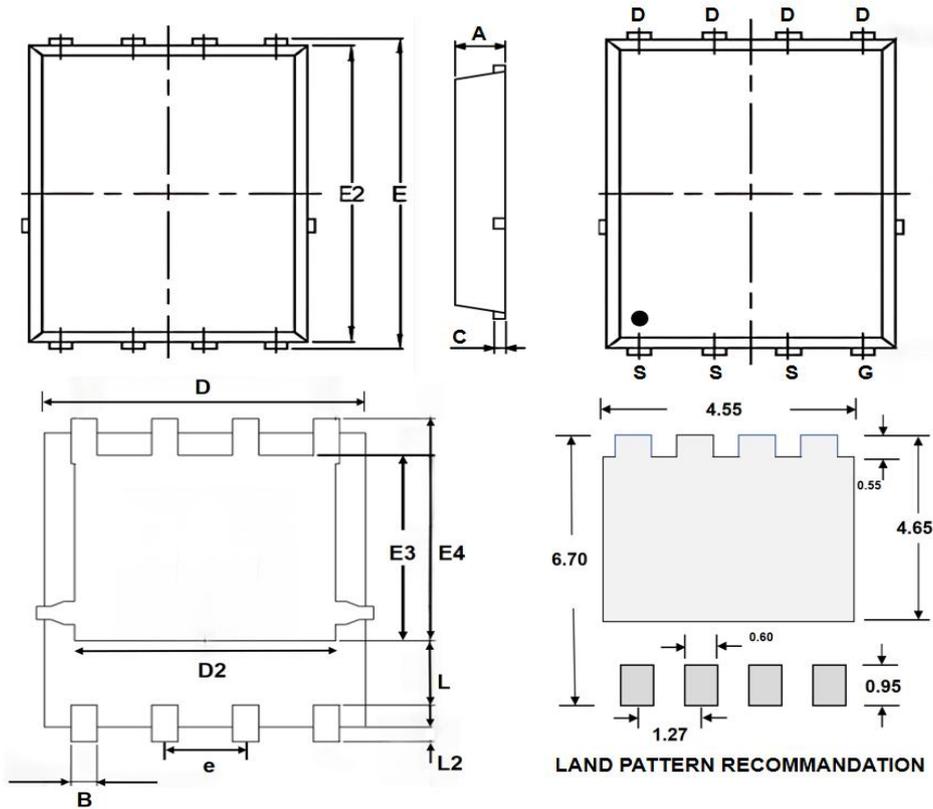
**Figure 10. Maximum Safe Operating Area**



## Ordering Information

|             |              |                |
|-------------|--------------|----------------|
| Part Number | Package code | Packaging      |
| HSBA0119    | PRPAK5*6     | 3000/Tape&Reel |

### PRPAK5\*6 Package Outline



| SYMBOLS | MILLIMETERS |      |      | INCHES |       |       |
|---------|-------------|------|------|--------|-------|-------|
|         | MIN         | NOM  | MAX  | MIN    | NOM   | MAX   |
| A       | 0.80        | --   | 1.20 | 0.031  | --    | 0.047 |
| B       | 0.25        | --   | 0.51 | 0.012  | --    | 0.020 |
| C       | 0.15        | --   | 0.35 | 0.006  | --    | 0.014 |
| D       | 4.80        | --   | 5.45 | 0.189  | --    | 0.209 |
| D2      | 3.61        | --   | 4.35 | 0.142  | --    | 0.171 |
| E       | 5.90        | --   | 6.35 | 0.232  | --    | 0.250 |
| E2      | 5.42        | --   | 6.06 | 0.213  | --    | 0.232 |
| E3      | 3.23        | --   | 3.90 | 0.127  | --    | 0.154 |
| E4      | 3.69        | --   | 4.55 | 0.145  | --    | 0.179 |
| L       | 0.61        | --   | 1.80 | 0.024  | --    | 0.071 |
| L2      | 0.05        | --   | 0.36 | 0.002  | --    | 0.014 |
| e       | --          | 1.27 | --   | --     | 0.050 | --    |



## HSBA0119 Marking:

