

## General Description

The HSBA8119 is the high cell density trench P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The HSBA8119 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

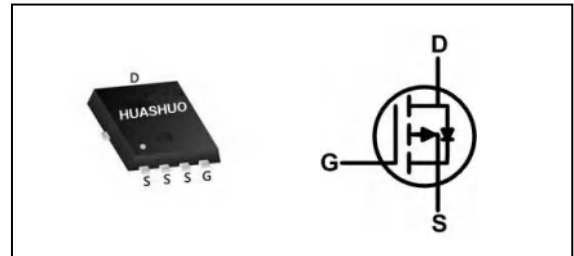
## Features

- Super Low Gate Charge
- 100% EAS Guaranteed
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench Technology

## Product Summary

|                  |      |    |
|------------------|------|----|
| $V_{DS}$         | -80  | V  |
| $R_{DS(ON),typ}$ | 12.5 | mΩ |
| $I_D$            | -70  | A  |

## PRPAK5\*6 Pin Configuration



## Absolute Maximum Ratings

| Symbol                      | Parameter                                    | Rating     | Units            |
|-----------------------------|----------------------------------------------|------------|------------------|
| $V_{DS}$                    | Drain-Source Voltage                         | -80        | V                |
| $V_{GS}$                    | Gate-Source Voltage                          | $\pm 20$   | V                |
| $I_D@T_C=25^\circ\text{C}$  | Continuous Drain Current, $-V_{GS} @ -10V^1$ | -70        | A                |
| $I_D@T_C=100^\circ\text{C}$ | Continuous Drain Current, $-V_{GS} @ -10V^1$ | -44        | A                |
| $I_{DM}$                    | Pulsed Drain Current <sup>2</sup>            | -270       | A                |
| EAS                         | Single Pulse Avalanche Energy <sup>3</sup>   | 710        | mJ               |
| $I_{AS}$                    | Avalanche Current                            | 63         | A                |
| $P_D@T_C=25^\circ\text{C}$  | Total Power Dissipation <sup>4</sup>         | 145        | 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> | ---  | 62   | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>    | ---  | 0.88 | $^\circ\text{C/W}$ |

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

| Symbol       | Parameter                                      | Conditions                                        | Min. | Typ.  | Max.      | Unit      |
|--------------|------------------------------------------------|---------------------------------------------------|------|-------|-----------|-----------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage                 | $V_{GS}=0V, I_D=-250\mu A$                        | -80  | ---   | ---       | V         |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=-10V, I_D=-20A$                           | ---  | 12.5  | 15        | $m\Omega$ |
|              |                                                | $V_{GS}=-4.5V, I_D=-10A$                          | ---  | 14    | 17        |           |
| $V_{GS(th)}$ | Gate Threshold Voltage                         | $V_{GS}=V_{DS}, I_D=-250\mu A$                    | -1.0 | -1.8  | -2.5      | V         |
| $I_{DSS}$    | Drain-Source Leakage Current                   | $V_{DS}=-80V, V_{GS}=0V, T_J=25^\circ\text{C}$    | ---  | ---   | 1         | $\mu A$   |
|              |                                                | $V_{DS}=-80V, V_{GS}=0V, T_J=55^\circ\text{C}$    | ---  | ---   | 10        |           |
| $I_{GSS}$    | Gate-Source Leakage Current                    | $V_{GS}=\pm 20V, V_{DS}=0V$                       | ---  | ---   | $\pm 100$ | nA        |
| $R_g$        | Gate Resistance                                | $V_{GS}=0V, V_{DS}=0V, f=1.0\text{MHz}$           | ---  | 1.7   | ---       | $\Omega$  |
| $g_{fs}$     | Forward Transconductance                       | $V_{DS}=-10V, I_D=-3A$                            | ---  | 30    | ---       | S         |
| $Q_g$        | Total Gate Charge                              | $V_{DS}=-40V, V_{GS}=-10V, I_D=-10A$              | ---  | 190   | ---       | nC        |
| $Q_{gs}$     | Gate-Source Charge                             |                                                   | ---  | 29    | ---       |           |
| $Q_{gd}$     | Gate-Drain Charge                              |                                                   | ---  | 55    | ---       |           |
| $T_{d(on)}$  | Turn-On Delay Time                             | $V_{DD}=-40V, V_{GS}=-10V, R_G=6\Omega, I_D=-10A$ | ---  | 25    | ---       | ns        |
| $T_r$        | Rise Time                                      |                                                   | ---  | 20    | ---       |           |
| $T_{d(off)}$ | Turn-Off Delay Time                            |                                                   | ---  | 180   | ---       |           |
| $T_f$        | Fall Time                                      |                                                   | ---  | 88    | ---       |           |
| $C_{iss}$    | Input Capacitance                              | $V_{DS}=-40V, V_{GS}=0V, f=1\text{MHz}$           | ---  | 13300 | ---       | pF        |
| $C_{oss}$    | Output Capacitance                             |                                                   | ---  | 390   | ---       |           |
| $C_{rss}$    | Reverse Transfer Capacitance                   |                                                   | ---  | 50    | ---       |           |

**Diode Characteristics**

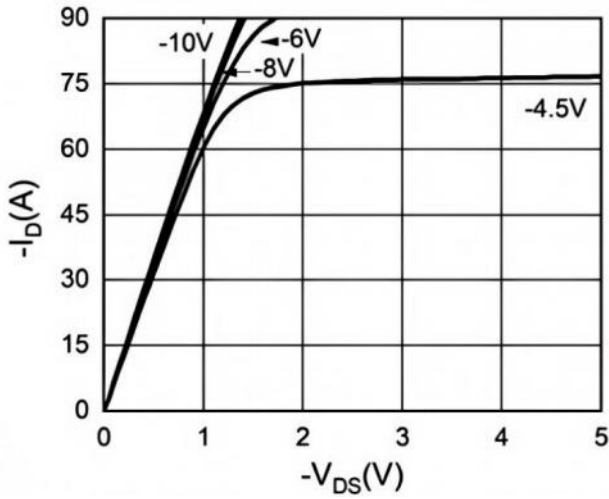
| Symbol   | Parameter                                | Conditions                                 | Min. | Typ. | Max. | Unit |
|----------|------------------------------------------|--------------------------------------------|------|------|------|------|
| $I_S$    | Continuous Source Current <sup>1,5</sup> | $V_G=V_D=0V$ , Force Current               | ---  | ---  | -70  | A    |
| $I_{SM}$ | Pulsed Source Current <sup>2,5</sup>     |                                            | ---  | ---  | -270 | 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                    | $I_F=-20A, di/dt=100A/\mu s$               | ---  | 35   | ---  | ns   |
| $Q_{rr}$ | Reverse Recovery Charge                  | $I_F=-20A, di/dt=100A/\mu s$               | ---  | 45   | ---  | nC   |

Note :

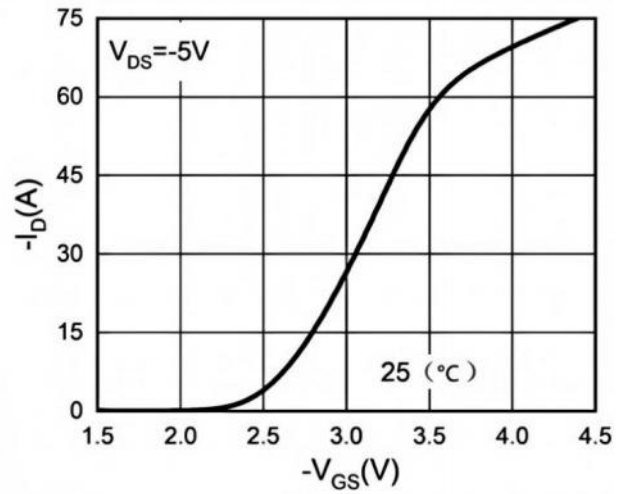
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=-50V, V_{GS}=-10V, L=0.1mH, R_g=25\Omega, I_{AS}=-63A$
- 4.The power dissipation is limited by  $150^\circ\text{C}$  junction temperature
- 5.The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.



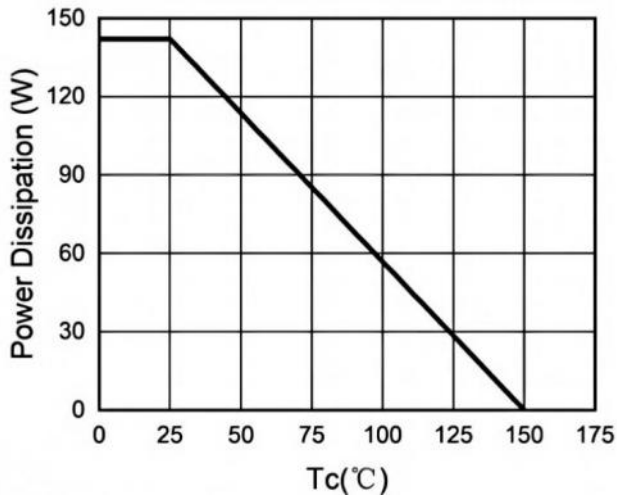
**Typical Characteristics**



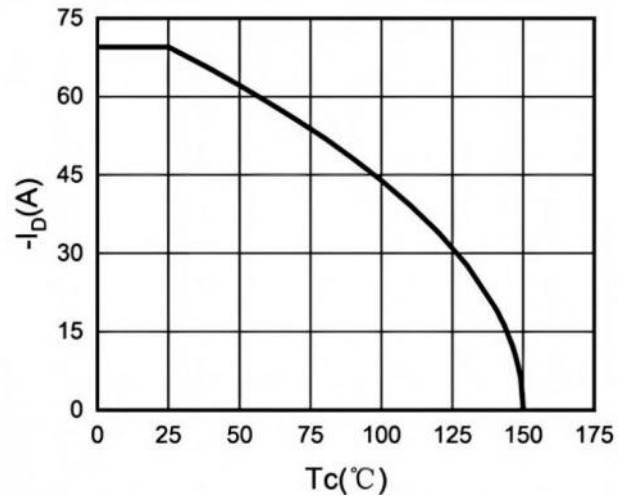
**Fig.1 Typical Output Characteristics**



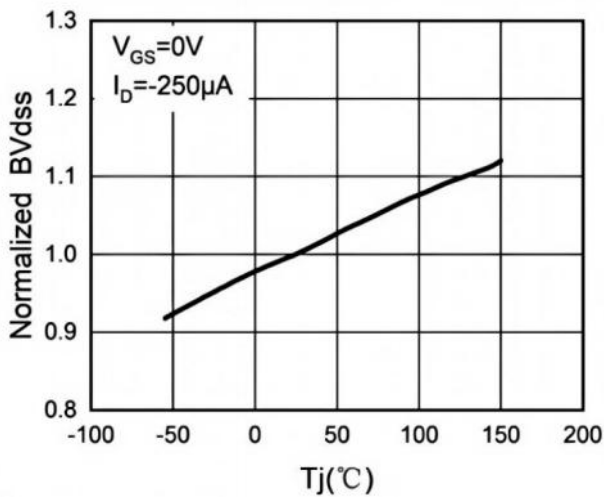
**Fig.2 Transfer Characteristics**



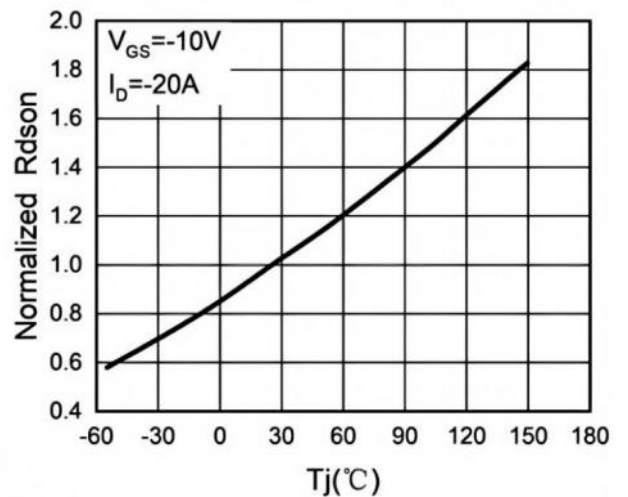
**Fig.3 Power Dissipation**



**Fig.4 Drain Current**



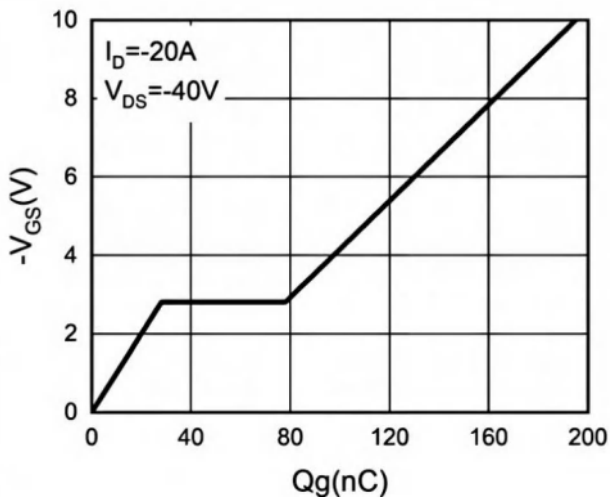
**Fig.5  $BV_{DS}$  vs Junction Temperature**



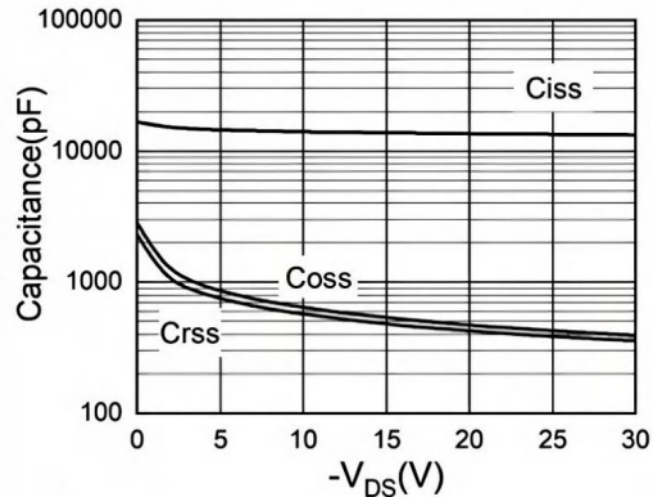
**Fig.6  $R_{DS(ON)}$  vs Junction Temperature**



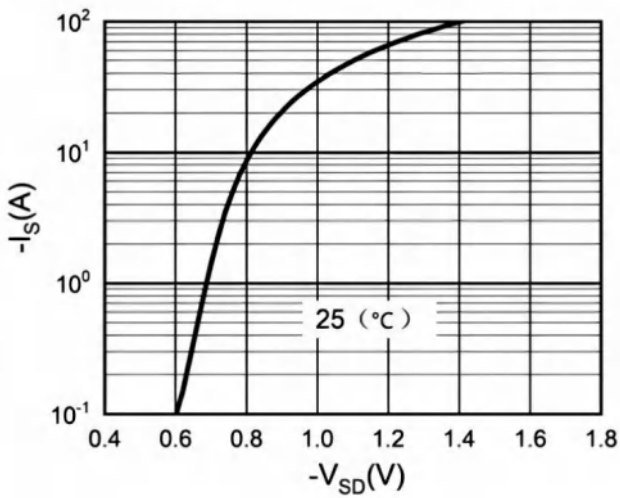
**P-Ch 80V Fast Switching MOSFETs**



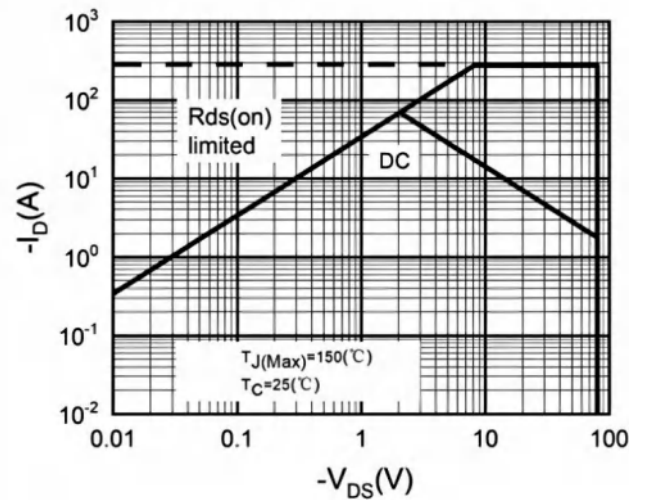
**Fig.7 Gate Charge Waveforms**



**Fig.8 Capacitance**



**Fig.9 Body Diode Characteristics**

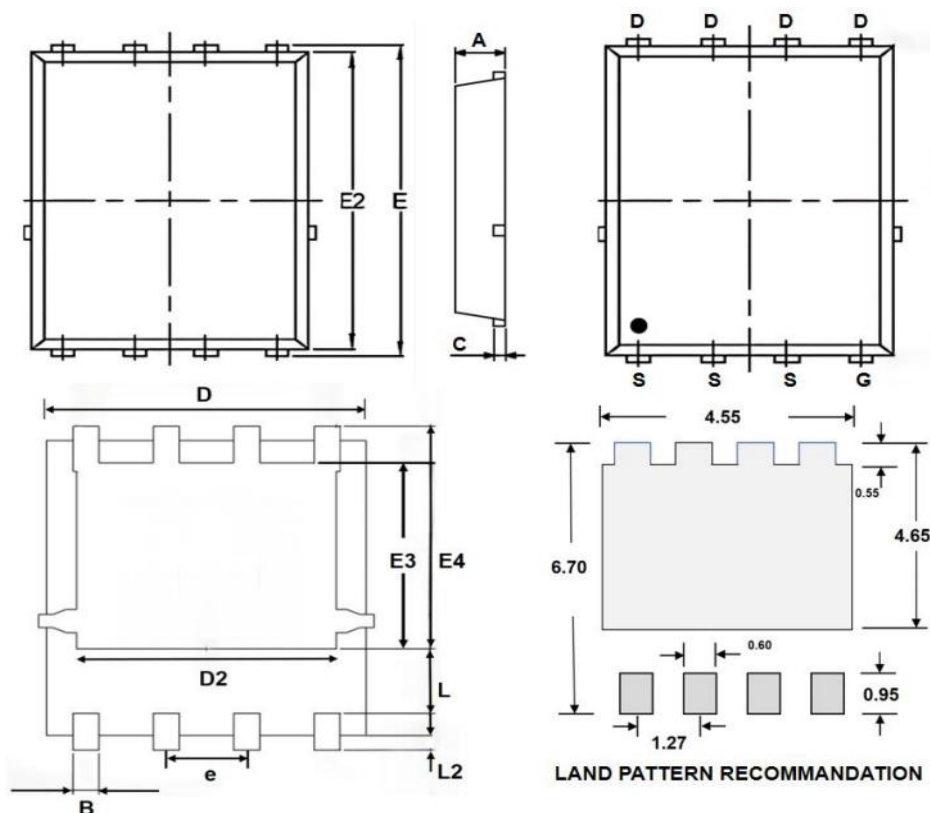


**Fig.10 Maximum Safe Operating Area**

## Ordering Information

| Part Number     | Package code    | Packaging                 |
|-----------------|-----------------|---------------------------|
| <b>HSBA8119</b> | <b>PRPAK5*6</b> | <b>3000/Tape&amp;Reel</b> |

### 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 | --    |

## HSBA8119 Marking:

