

## Applications

- High Frequency Switching and Synchronous Rectification.
- DC/DC Converters.
- Power Tool Application.

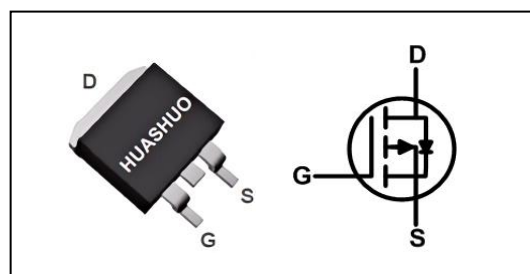
## Product Summary

|                  |      |            |
|------------------|------|------------|
| $V_{DS}$         | -100 | V          |
| $R_{DS(ON),typ}$ | 12   | m $\Omega$ |
| $I_D$            | -130 | A          |

## Features

- 100% EAS Guaranteed
- Green Device Available
- Fast Switching Speed
- Advanced high cell density Trench Technology

## TO-263 Pin Configuration



## Absolute Maximum Ratings

| Symbol                      | Parameter                                   | Rating     | Units            |
|-----------------------------|---------------------------------------------|------------|------------------|
| $V_{DS}$                    | Drain-Source Voltage                        | -100       | V                |
| $V_{GS}$                    | Gate-Source Voltage                         | $\pm 20$   | V                |
| $I_D@T_C=25^\circ\text{C}$  | Continuous Drain Current, $V_{GS} @ -10V^1$ | -130       | A                |
| $I_D@T_C=100^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ -10V^1$ | -78        | A                |
| $I_{DM}$                    | Pulsed Drain Current <sup>2</sup>           | -400       | A                |
| EAS                         | Single Pulse Avalanche Energy <sup>3</sup>  | 1510       | mJ               |
| $I_{AS}$                    | Avalanche Current                           | -140       | A                |
| $P_D@T_C=25^\circ\text{C}$  | Total Power Dissipation <sup>4</sup>        | 250        | 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>    | ---  | 0.6  | $^\circ\text{C/W}$ |

**P-Ch 100V Fast Switching MOSFETs**
**Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)**

| Symbol       | Parameter                                      | Conditions                                                      | Min. | Typ.  | Max.      | Unit      |
|--------------|------------------------------------------------|-----------------------------------------------------------------|------|-------|-----------|-----------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage                 | $V_{GS}=0V$ , $I_D=-250\mu A$                                   | -100 | ---   | ---       | V         |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=-10V$ , $I_D=-20A$                                      | ---  | 12    | 15        | $m\Omega$ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=-4.5V$ , $I_D=-20A$                                     | ---  | 13    | 16        | $m\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage                         | $V_{GS}=V_{DS}$ , $I_D=-250\mu A$                               | -1   | -1.9  | -2.5      | V         |
| $I_{DSS}$    | Drain-Source Leakage Current                   | $V_{DS}=-100V$ , $V_{GS}=0V$ , $T_J=25^\circ\text{C}$           | ---  | ---   | -1        | $\mu A$   |
| $I_{GSS}$    | Gate-Source Leakage Current                    | $V_{GS}=\pm 20V$ , $V_{DS}=0V$                                  | ---  | ---   | $\pm 100$ | nA        |
| $R_g$        | Gate Resistance                                | $V_{DS}=0V$ , $V_{GS}=0V$ , $f=1\text{MHz}$                     | ---  | 1     | ---       | $\Omega$  |
| $Q_g$        | Total Gate Charge                              | $V_{DS}=-50V$ , $V_{GS}=-10V$ , $I_D=-20A$                      | ---  | 230   | ---       | nC        |
| $Q_{gs}$     | Gate-Source Charge                             |                                                                 | ---  | 18    | ---       |           |
| $Q_{gd}$     | Gate-Drain Charge                              |                                                                 | ---  | 13    | ---       |           |
| $T_{d(on)}$  | Turn-On Delay Time                             | $V_{DD}=-50V$ , $V_{GS}=-10V$ , $R_G=3.3\Omega$ ,<br>$I_D=-20A$ | ---  | 29    | ---       | ns        |
| $T_r$        | Rise Time                                      |                                                                 | ---  | 82    | ---       |           |
| $T_{d(off)}$ | Turn-Off Delay Time                            |                                                                 | ---  | 76    | ---       |           |
| $T_f$        | Fall Time                                      |                                                                 | ---  | 92    | ---       |           |
| $C_{iss}$    | Input Capacitance                              | $V_{DS}=-50V$ , $V_{GS}=0V$ , $f=1\text{MHz}$                   | ---  | 23250 | ---       | pF        |
| $C_{oss}$    | Output Capacitance                             |                                                                 | ---  | 523   | ---       |           |
| $C_{rss}$    | Reverse Transfer Capacitance                   |                                                                 | ---  | 475   | ---       |           |

**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                                 | ---  | ---  | -100 | 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                    | $I_F=-20A$ , $di/dt=-100A/\mu s$ ,<br>$T_J=25^\circ\text{C}$ | ---  | 70   | ---  | nS   |
| $Q_{rr}$ | Reverse Recovery Charge                  |                                                              | ---  | 140  | ---  | 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  $V_{DD}=-60V$ ,  $V_{GS}=-10V$ ,  $L=0.5mH$ ,  $I_{AS}=-140A$
- 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

## P-Ch 100V Fast Switching MOSFETs

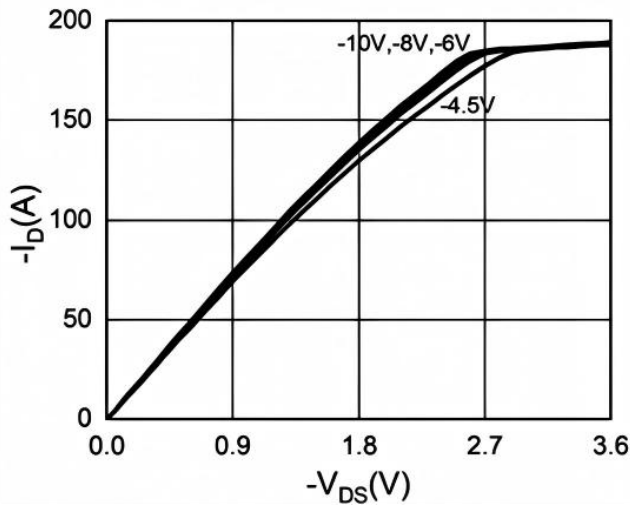


Fig.1 Typical Output Characteristics

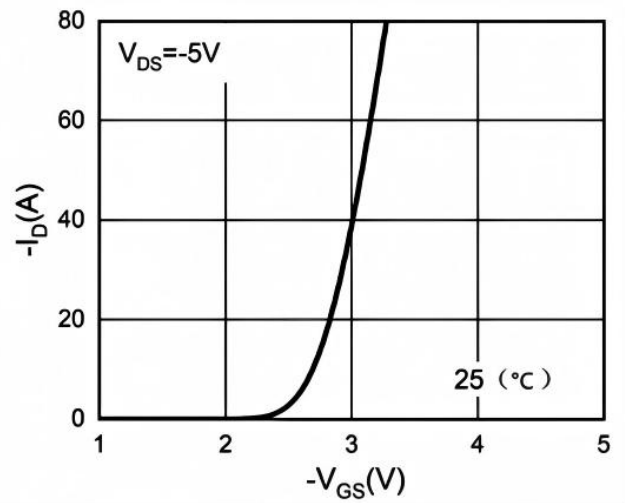


Fig.2 Transfer Characteristics

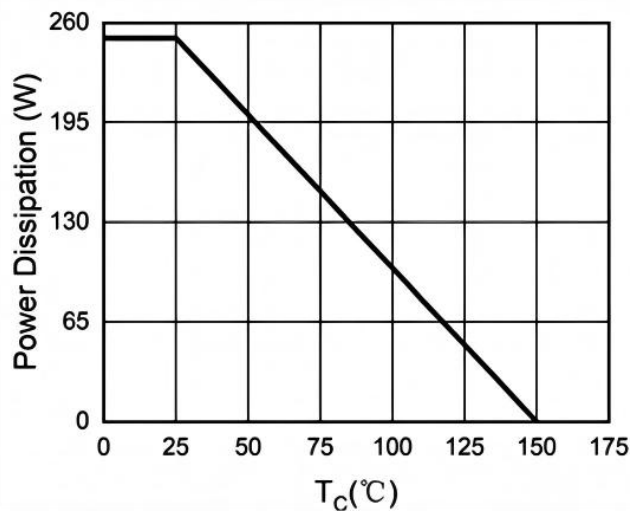


Fig.3 Power Dissipation

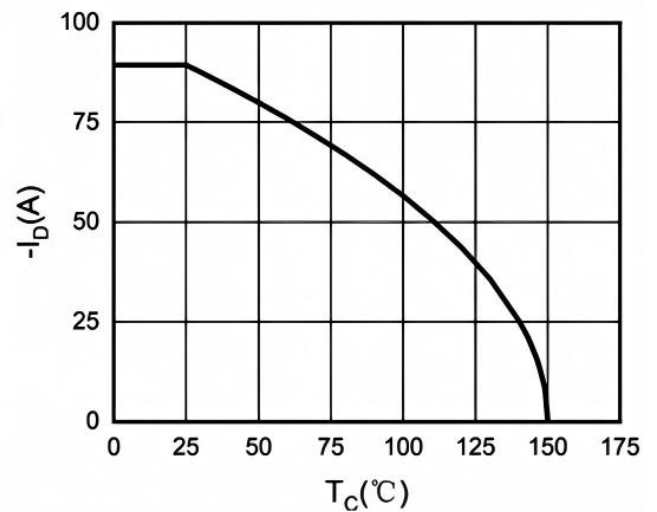


Fig.4 Drain Current

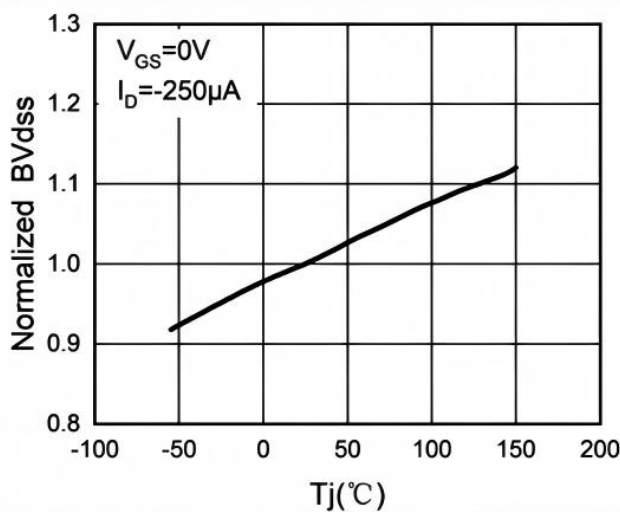


Fig.5  $BV_{DS}$  vs Junction Temperature

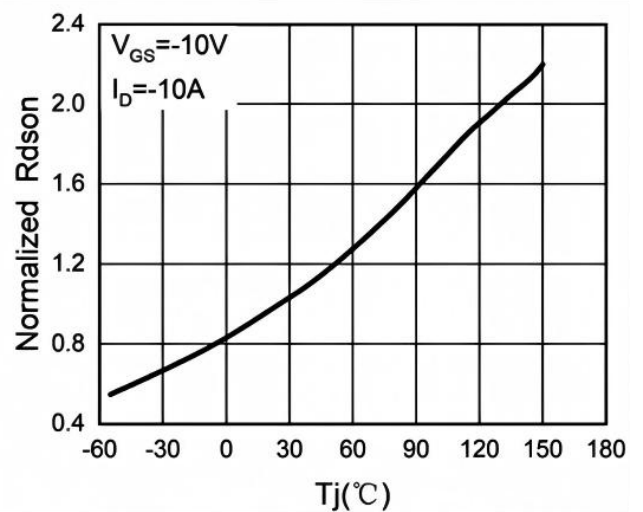


Fig.6  $R_{DS(ON)}$  vs Junction Temperature



P-Ch 100V Fast Switching MOSFETs

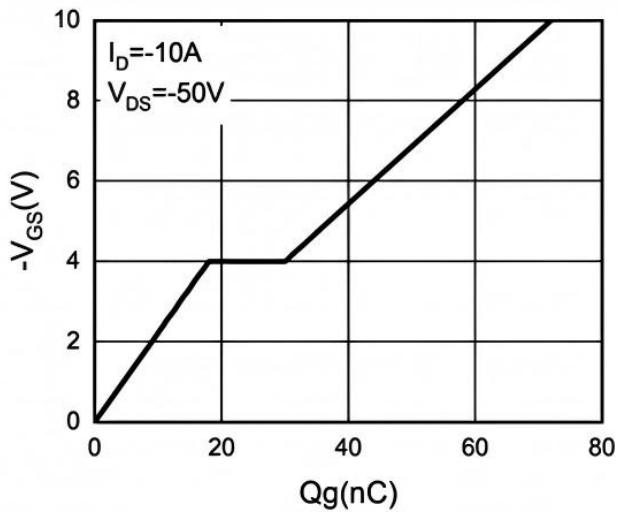


Fig.7 Gate Charge Waveforms

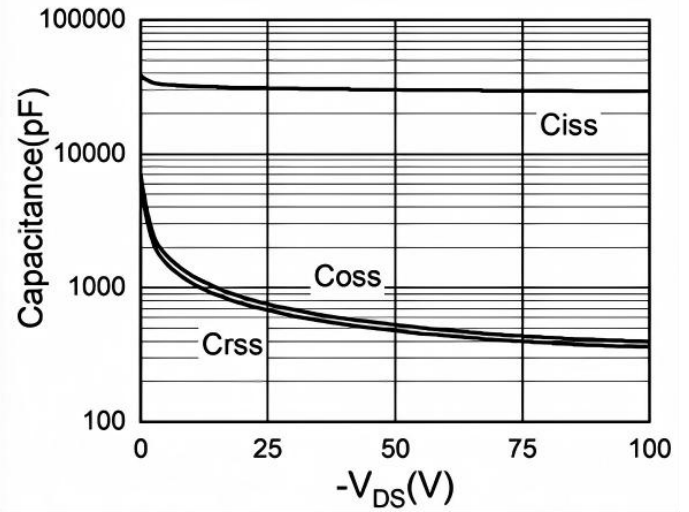


Fig.8 Capacitance

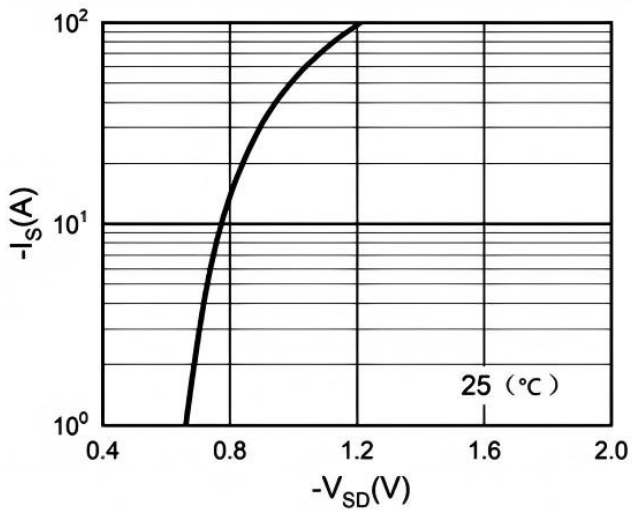


Fig.9 Body Diode Characteristics

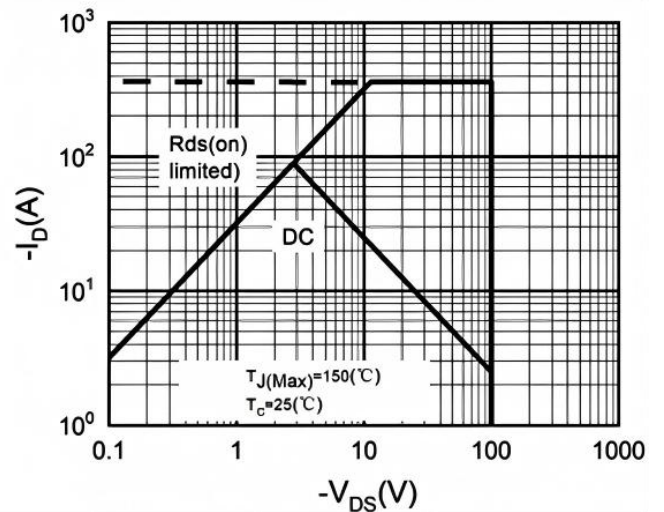
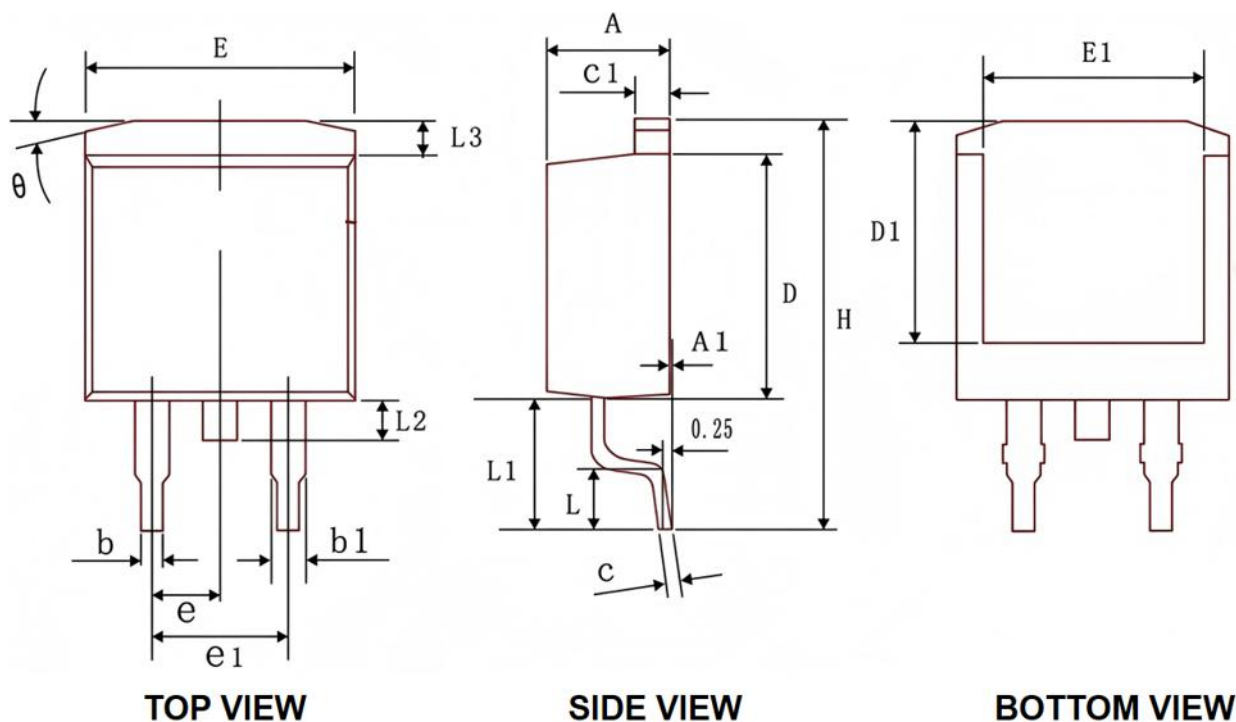


Fig.10 Maximum Safe Operating Area

## Ordering Information

| Part Number    | Package code  | Packaging                |
|----------------|---------------|--------------------------|
| <b>HSH0129</b> | <b>TO-263</b> | <b>800/Tape&amp;Reel</b> |

**TO-263 Package Outline**



**COMMON DIMENSIONS(UNIT OF MEASURE - MM)**

| SYMBOL   | MIN      | NOM   | MAX  |
|----------|----------|-------|------|
| A        | 4.37     | 4.57  | 4.77 |
| A1       | 0.00     | -     | 0.25 |
| b        | 0.70     | 0.83  | 0.96 |
| b1       | 1.00     | 1.24  | 1.47 |
| C        | 0.35     | 0.45  | 0.55 |
| C1       | 1.25     | 1.30  | 1.35 |
| D        | 8.50     | 8.90  | 9.30 |
| D1       | 7.50     | 8.00  | 8.50 |
| H        | 14.7     | 15.20 | 15.7 |
| E        | 9.80     | 10.08 | 10.4 |
| E1       | 7.35     | 7.80  | 8.25 |
| e1       | 4.93     | 5.08  | 5.23 |
| L        | 2.00     | 2.30  | 2.60 |
| L1       | 4.50     | 4.75  | 5.00 |
| L2       | 1.30     | 1.53  | 1.75 |
| L3       | 1.10     | 1.29  | 1.47 |
| e        | 2.54 BSC |       |      |
| $\theta$ | 13°TYP   |       |      |

## HSH0129 Marking:

