# HWD70H2DC130B

RoHS COMPLIANT  Pb Pb-Free  HSF HALOGEN FREE

## Description

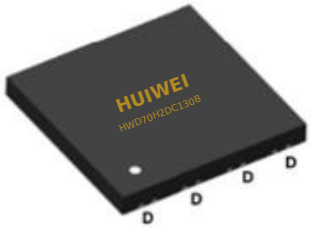
This is a 700V GaN-on-Si enhancement-mode power transistor in DFN8x8 package. The properties of GaN allow for high current, high breakdown voltage and high switching frequency. The DFN8x8 package offers low parasitic inductance, strong heat dissipation capability and high solderability, which make GaN better apply to consumer and industrial applications.

## Features

- Ultra-low FOM
- Ultra-high switching frequency
- Reverse current capability
- Zero reverse recovery loss
- Monolithic integrated ESD protection
- RoHS, Pb-free, REACH-compliant

## Applications

- AC/DC converters
- DC/DC converters
- Bridgeless totem pole PFC
- Fast chargers
- Power adapters
- LED lighting drivers
- Wireless power transfer
- Laser drivers
- TV display



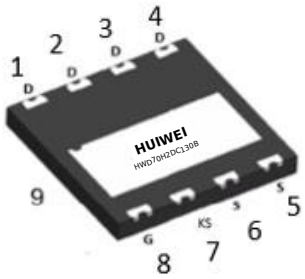




**Table 1 Key Performance Parameters at $T_j$ = 25 °C**

| Parameters | Values | Units |
|---|---|---|
| $V_{DS, max}$ | 700 | V |
| $R_{DS(on), max}$ | 130 | mΩ |
| $Q_G$ | 2.65 | nC |
| $I_{D, Pulse}$ | 32 | A |
| $Q_{OSS}$ @ 400 V | 26.3 | nC |
| $Q_{rr}$ | 0 | nC |

**Table 2 Pin Information**

| Gate | Drain | Kelvin Source | Source |
|---|---|---|---|
| 8 | 1,2,3,4 | 7 | 5,6,9 |

**Table3 Ordering Information**

| Ordering Code | Package | Product code |
|---|---|---|
| HWD70H2DC130B | DFN8*8 | HWD70H2DC130B |

# Table of contents

**Description.....1**

**Features.....1**

**Applications.....1**

**Table of contents.....2**

**1 Maximum ratings.....3**

**2 Thermal characteristics.....3**

**3 Electrical characteristics.....4**

**4 Electrical characteristics diagrams.....6**

**5 Package outlines.....12**

**6 Revision history.....13**

# 1 Maximum ratings

at $T_j$ = 25 °C unless otherwise specified. Continuous application of maximum ratings can deteriorate transistor lifetime.

**Table 3 Maximum rating**

| Parameters | Symbols | Values | Units | Notes/Test Conditions |
|---|---|---|---|---|
| Drain-source voltage | $V_{DS, max}$ | 700 | V | $V_{GS}$ = 0 V<br>Tj = -55℃ to 150℃ |
| Drain-source voltage transient [1] | $V_{DS, transient}$ | 800 | V | $V_{GS}$ = 0 V |
| Continuous current, drain-source | $I_D$ | 16 | A | $T_c$ = 25 °C |
| Pulsed current, drain-source [2] | $I_{D, pulse}$ | 32 | A | $T_c$ = 25 °C; $V_G$ = 6 V |
| Pulsed current, drain-source [2] | $I_{D, pulse}$ | 18 | A | $T_c$ = 125 °C; $V_G$ = 6 V |
| Gate-source voltage, continuous | $V_{GS}$ | -6 to +7 | V | $T_j$ = -55 °C to 150 °C |
| Gate-source voltage, pulsed | $V_{GS, pulse}$ | -20 to +10 | V | $T_j$ = -55 °C to 150 °C;<br>$t_{Pulse}$ = 50 ns, f = 100 kHz;<br>open drain |
| Power dissipation | $P_{tot}$ | 85 | W | $T_c$ = 25 °C |
| Operating temperature | $T_j$ | -55 to +150 | °C | |
| Storage temperature | $T_{stg}$ | -55 to +150 | °C | |

1. $V_{DS, transient}$ is intended for surge rating during non-repetitive events, $t_{Pulse}$ < 1 µs.
2. Pulse width = 10 µs.

# 2 Thermal characteristics

**Table 4 Thermal characteristics**

| Parameters | Symbols | Values | | | Units | Notes/Test Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Thermal resistance, junction-ambient | $R_{thJA}$ | | 80 | | °C/W | |
| Thermal resistance, junction-case | $R_{thJC}$ | - | 1.46 | - | °C/W | |
| Reflow soldering temperature | $T_{sold}$ | - | - | 260 | °C | MSL3 |

# 3 Electrical characteristics

at $T_j$ = 25 °C, unless specified otherwise.

**Table 5 Static characteristics**

| Parameters | Symbols | Values | | | Units | Notes/Test Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Gate threshold voltage | $V_{GS(TH)}$ | 1.1 | 1.4 | 2.5 | V | $I_D$ = 13.6 mA; $V_{DS}$ = $V_{GS}$; $T_j$ = 25 °C |
| | | - | 1.45 | - | | $I_D$ = 13.6 mA; $V_{DS}$ = $V_{GS}$; $T_j$ = 125 °C |
| Drain-source leakage current | $I_{DSS}$ | - | 0.2 | 37.5 | μA | $V_{DS}$ = 700 V; $V_{GS}$ = 0 V; $T_j$ = 25 °C |
| | | - | 3 | - | | $V_{DS}$ = 700 V; $V_{GS}$ = 0 V; $T_j$ = 125 °C |
| Gate-source leakage current | $I_{GSS}$ | - | 40 | | μA | $V_{GS}$ = 6 V; $V_{DS}$ = 0 V |
| Drain-source on-state resistance | $R_{DS(on)}$ | - | 100 | 130 | mΩ | $V_{GS}$ = 6 V; $I_D$ = 5 A; $T_j$ = 25 °C |
| | | - | 230 | - | mΩ | $V_{GS}$ = 6 V; $I_D$ = 5 A; $T_j$ = 150 °C |
| Gate resistance | $R_G$ | - | 11 | - | Ω | f = 5 MHz; open drain |

**Table 6 Dynamic characteristics**

| Parameters | Symbols | Values | | | Units | Notes/Test Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Input capacitance | $C_{iss}$ | - | 103.9 | - | pF | $V_{GS}$ = 0 V; $V_{DS}$ = 400 V; f = 100KHZ |
| Output capacitance | $C_{oss}$ | - | 33.8 | - | pF | $V_{GS}$ = 0 V; $V_{DS}$ = 400 V; f = 100KHZ |
| Reverse transfer capacitance | $C_{rss}$ | - | 0.36 | - | pF | $V_{GS}$ = 0 V; $V_{DS}$ = 400 V; f = 100KHZ |
| Effective output capacitance, energy related [1] | $C_{o(er)}$ | - | 49 | - | pF | $V_{GS}$ = 0 V; $V_{DS}$ = 0 to 400 V |
| Effective output capacitance, time related [2] | $C_{o(tr)}$ | - | 65 | - | pF | $V_{GS}$ = 0 V; $V_{DS}$ = 0 to 400 V |
| Output charge | $Q_{OSS}$ | - | 26.3 | - | nC | $V_{GS}$ = 0 V; $V_{DS}$ = 0 to 400 V |

1. $C_{o(er)}$ is the fixed capacitance that gives the same stored energy as $C_{OSS}$ while $V_{DS}$ is rising from 0 to 400 V.
2. $C_{o(tr)}$ is the fixed capacitance that gives the same charging time as $C_{OSS}$ while $V_{DS}$ is rising from 0 to 400 V.

**Table 7 Gate charge characteristics**

| Parameters | Symbols | Values | | | Units | Notes/Test Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Gate charge | $Q_G$ | - | 2.65 | - | nC | $V_{GS}$ = 0 to 6 V; $V_{DS}$ = 400 V; $I_D$ = 5 A |
| Gate-source charge | $Q_{GS}$ | - | 0.25 | - | nC | |
| Gate-drain charge | $Q_{GD}$ | - | 1 | - | nC | |
| Gate plateau voltage | $V_{plat}$ | - | 2.1 | - | V | $V_{DS}$ = 400 V; $I_D$ = 5 A |

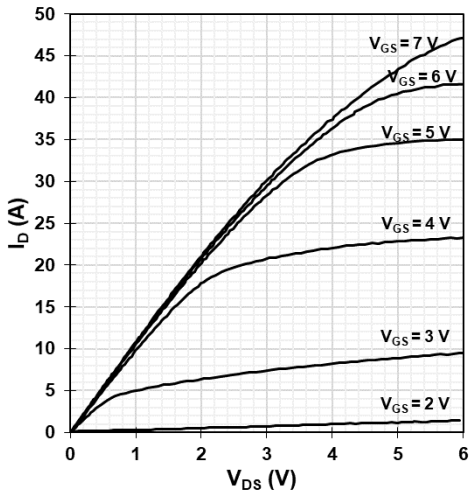
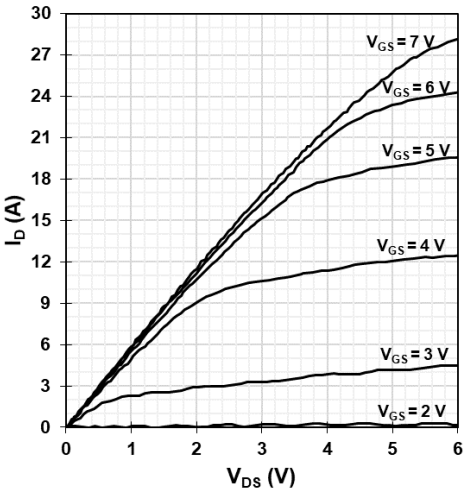
**Table 8 Reverse conduction characteristics**

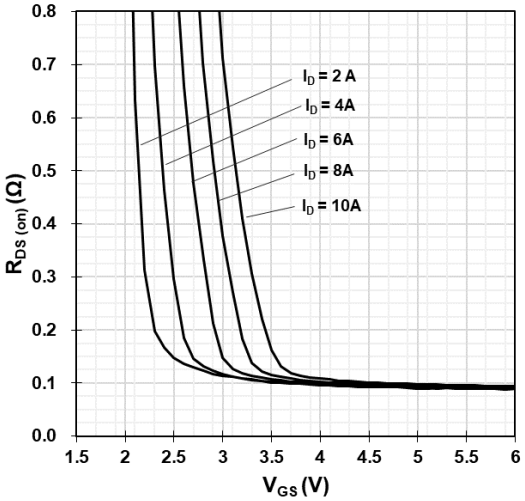
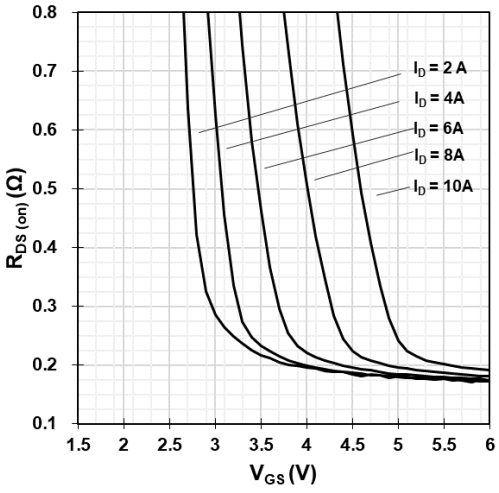
| Parameters | Symbols | Values | | | Units | Notes/Test Conditions |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Source-drain reverse voltage | $V_{SD}$ | - | 3 | - | V | $V_{GS}$ = 0 V; $I_{SD}$ = 5 A |
| Pulsed current, reverse | $I_{S,\ pulse}$ | - | - | 32 | A | $V_{GS}$ = 6 V |
| Reverse recovery charge [1] | $Q_{rr}$ | - | 0 | - | nC | $I_{SD}$ = 5A; $V_{DS}$ = 400 V |
| Reverse recovery time | $t_{rr}$ | - | 0 | - | ns | |
| Peak reverse recovery current | $I_{rrm}$ | - | 0 | - | A | |

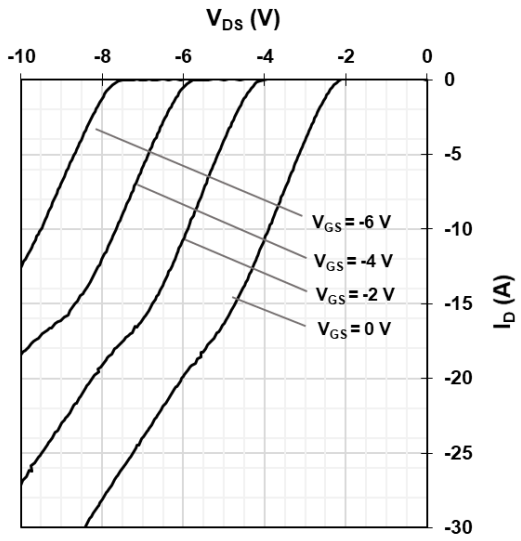
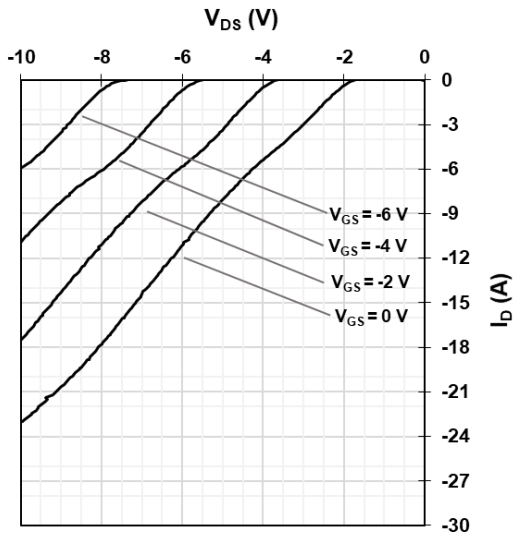
1. Excluding $Q_{OSS}$

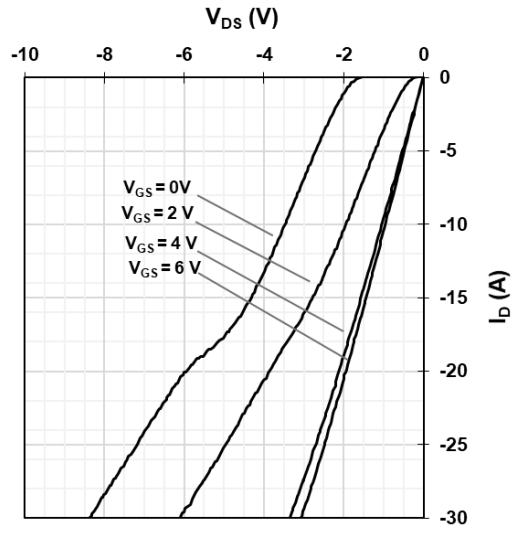
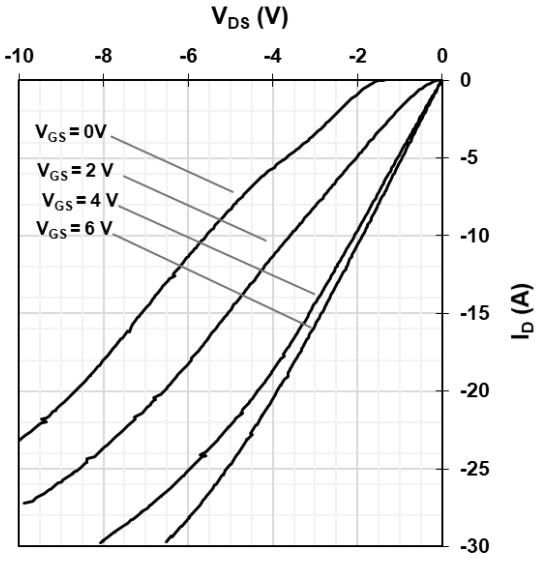
# 4 Electrical characteristics diagrams

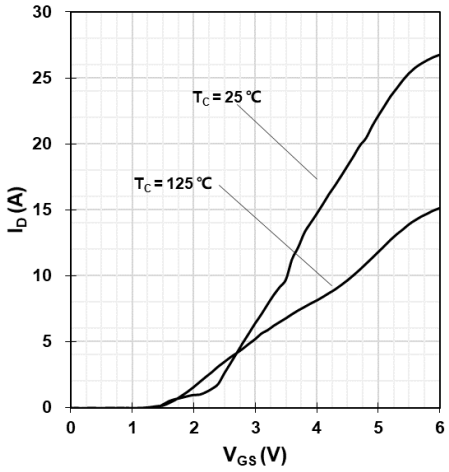
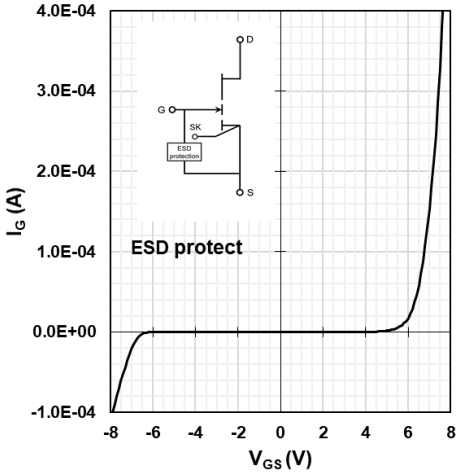
at $T_j$ = 25 °C, unless specified otherwise.

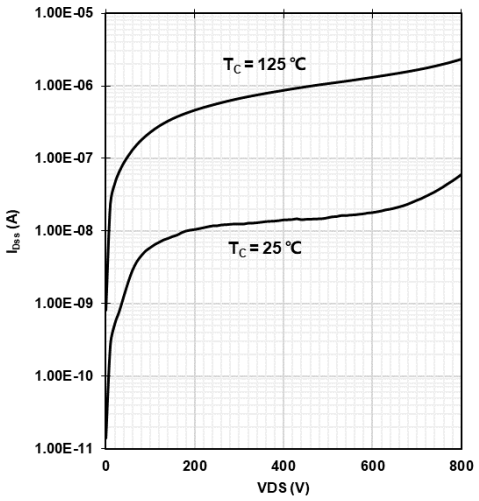
| **Figure 1 Typ. output characteristics** | **Figure 2 Typ. output characteristics** |
|---|---|
|  |  |
| $I_D = f(V_{DS}, V_{GS})$; $T_j$ = 25 °C | $I_D = f(V_{DS}, V_{GS})$; $T_j$ = 125 °C |

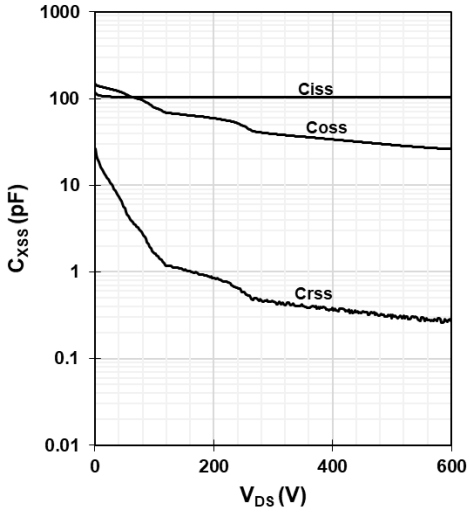
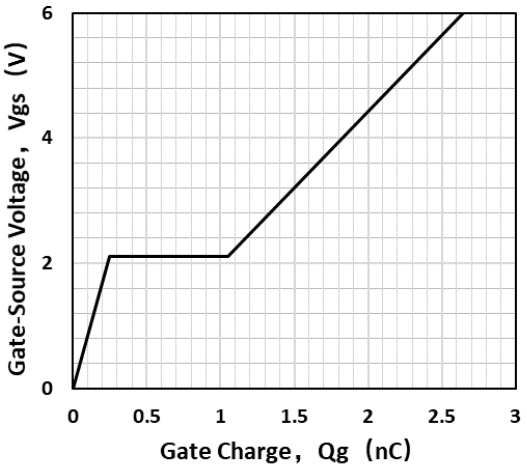
| **Figure 3 Typ. drain-source on-state resistance** | **Figure 4 Typ. drain-source on-state resistance** |
|---|---|
|  |  |
| $R_{DS(on)} = f(I_D, V_{GS})$; $T_j$ = 25 °C | $R_{DS(on)} = f(I_D, V_{GS})$; $T_j$ = 125 °C |

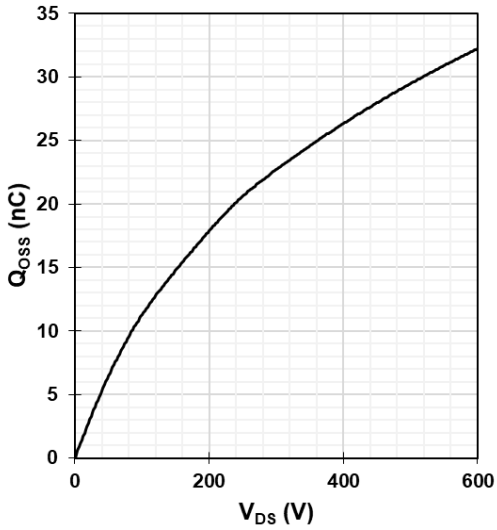
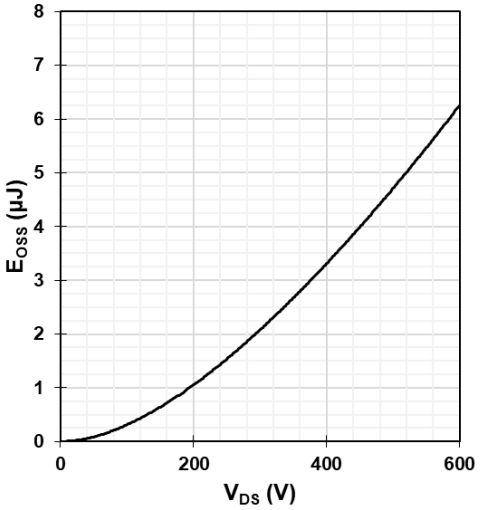
| Figure 5 Typ. channel reverse characteristics | Figure 6 Typ. channel reverse characteristics |
|---|---|
|  |  |
| $I_D = f(V_{DS}, V_{GS})$; $T_j$ = 25 °C | $I_D = f(V_{DS}, V_{GS})$; $T_j$ = 125 °C |

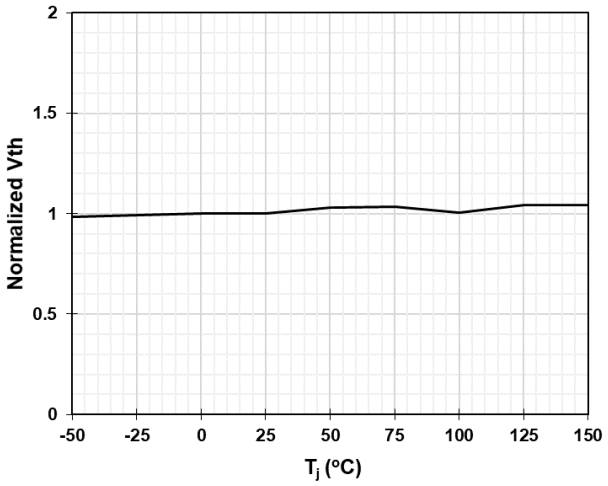
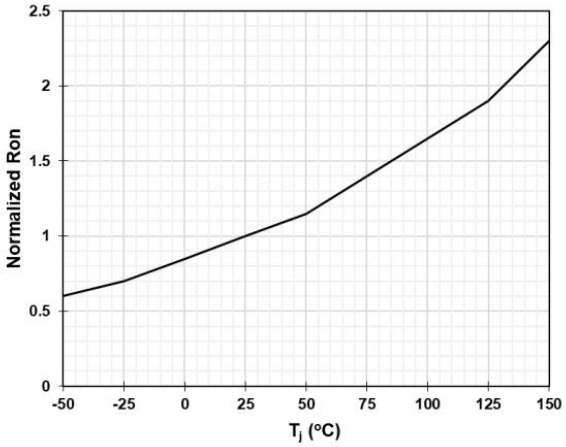
| Figure 7 Typ. channel reverse characteristics | Figure 8 Typ. channel reverse characteristics |
|---|---|
|  |  |
| $I_D = f(V_{DS}, V_{GS})$; $T_j$ = 25 °C | $I_D = f(V_{DS}, V_{GS})$; $T_j$ = 125 °C |

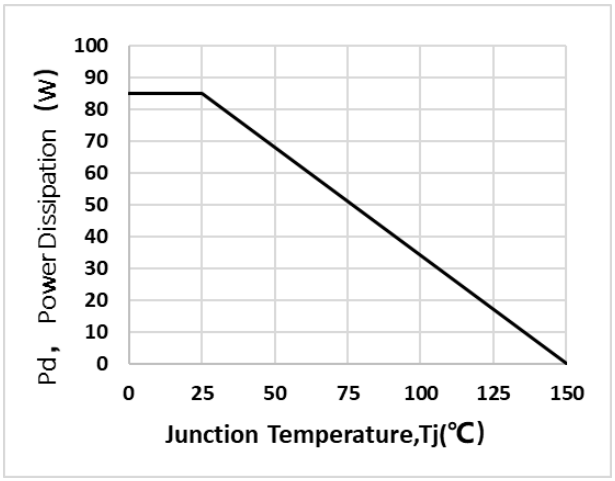
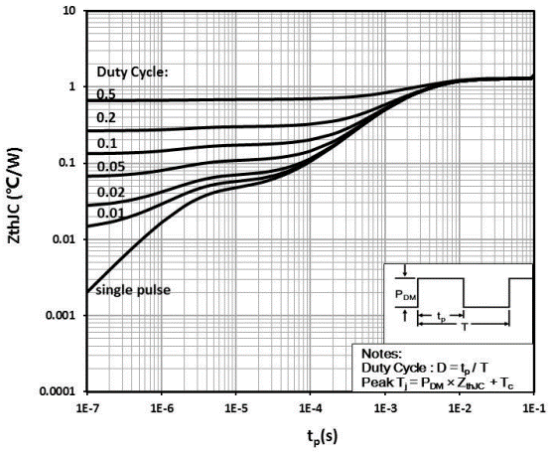
| Figure 9 Typ. transfer characteristics | Figure 10 Typ. gate-to-source leakage |
|---|---|
|  |  |
| $I_D = f(V_{GS})$; $V_{DS}$ = 3 V | $I_G = f(V_{GS})$; $V_D$ = open |

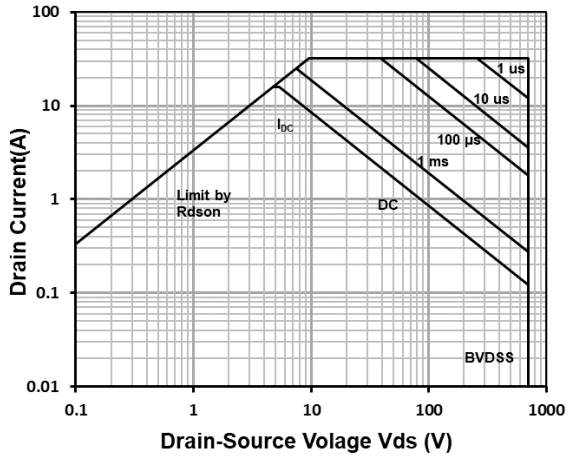
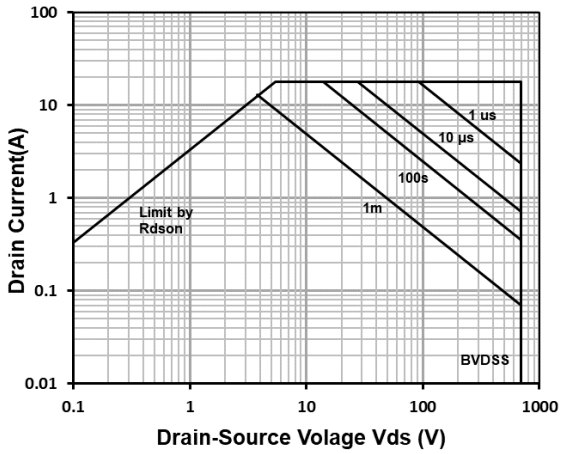
| Figure 11 Drain-source leakage characteristics |
|---|
|  |
| Idss = f(Vds); Vgs = 0V |

| Figure 12 Typ. capacitances | Figure 13 Typ. gate charge |
|---|---|
|  |  |
| $C_{XSS}$ = f($V_{DS}$); Freq. = 100kHz | $V_{GS}$ = f($Q_G$); $V_{DS}$ = 400 V; $I_D$ = 5 A |

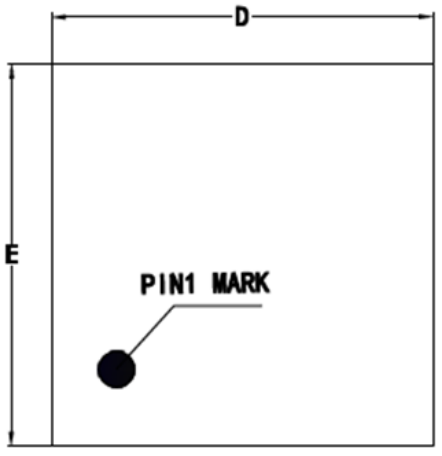
| Figure 14 Typ. output charge | Figure 15 Typ. $C_{oss}$ stored energy |
|---|---|
|  |  |
| $Q_{OSS}$ = f($V_{DS}$); Freq. = 100khz | $E_{OSS}$ = f($V_{DS}$); Freq. = 100khz |

| Figure 16 Gate threshold voltage | Figure 17 Drain-source on-state resistance |
|---|---|
|  |  |
| $V_{GS(TH)} = f(T_j)$; $V_{GS} = V_{DS}$; $I_D$ = 13.6 mA | $R_{DS(on)} = f(T_j)$; $I_D$ = 5A; $V_{GS}$ = 6 V |

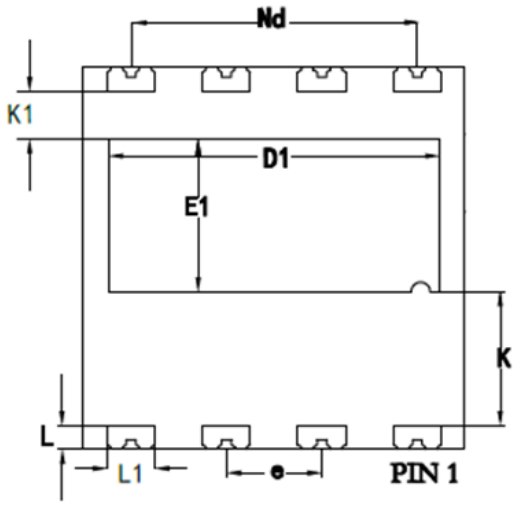
| Figure 18 Power dissipation | Figure 19 Max.transient thermal impedance |
|---|---|
|  |  |
| Ptot = f(Tc) | Zthjc = f(tp,D) |

| Figure 20 Safe Operation Area | Figure 21 Safe Operation Area |
|---|---|
|  |  |
| Id = f(Vds); Tc = 25℃ | Id = f(Vds); Tc = 125℃ |

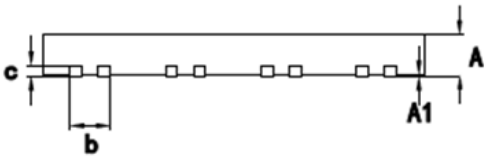
# 5 Package outlines




TOP VIEW




BOTGOM VIEW




| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 0.80 | 0.85 | 0.90 |
| A1 | 0.00 | 0.02 | 0.05 |
| C | — | 0.203 | — |
| b | 0.80 | 0.85 | 0.90 |
| D | 7.90 | 8.00 | 8.10 |
| D1 | 6.84 | 6.94 | 7.04 |
| E | 7.90 | 8.00 | 8.10 |
| E1 | 3.40 | 3.20 | 3.60 |
| e | 2.00 BSC | | |
| K | — | 2.80 | — |
| K1 | 0.90 | 1.00 | 1.10 |
| L | 0.490 | 0.50 | 0.51 |
| L1 | 0.90 | 1.00 | 1.10 |
| Nd | 5.90 | 6.00 | 6.10 |

# 6 Revision history

Major changes since the last revision

| Revision | Date | Description of changes |
|---|---|---|
| 0.1 | 2026-08-20 | 0.1 version release |
| Ver1-1 | 2026-11-14 | Centered HUIWEI / full part number marking;<br>page-one title changed to the full HWD part number. |