

# PWDC018N08UES4Q

Perfect MOS N-MOSFET 80V, 1.6mΩ, 258A



重庆平伟半导体股份有限公司

## Features

- Uses PingWei advanced PerfectMOS4 technology
- Extremely low on-resistance  $R_{DS(on)}$
- Excellent  $Q_g \times R_{DS(on)}$  product(FOM)
- Qualified according to AEC-Q101 criteria

## Benefits

- High robustness and reliability
- Increases maximum current capability
- Low power loss, high power density
- Easy paralleling

## Applications

- General Automotive Applications
- Motor Drivers
- Switching Mode Power Supply

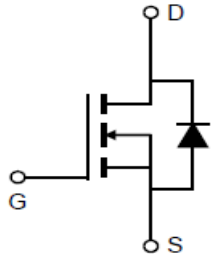
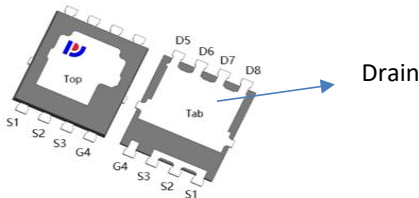


**100% DVDS Tested**  
**100% Avalanche Tested**

## Product Summary

|                       |       |
|-----------------------|-------|
| $V_{DS}$              | 80V   |
| $R_{DS(on)}$ @10V typ | 1.6mΩ |
| $I_D$ (Silicon)       | 258A  |

UDFN5x6 Double Cooling



## Package Marking and Ordering Information

| Part #          | Marking  | Package              | Packing   | Reel Size | Tape Width | Qty     |
|-----------------|----------|----------------------|-----------|-----------|------------|---------|
| PWDC018N08UES4Q | PW1808U4 | DFN5x6Double Cooling | Tape&Reel | 13 inches | 12mm       | 5000pcs |

## Absolute Maximum Ratings

| Parameter                                                                                                                                                     | Symbol                | Value             | Unit             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|------------------|
| Drain-source voltage                                                                                                                                          | $V_{DS}$              | 80                | V                |
| Continuous drain current<br>$T_C = 25^\circ\text{C}$ (Silicon limit)<br>$T_C = 100^\circ\text{C}$ (Silicon limit)<br>$T_C = 25^\circ\text{C}$ (Package limit) | $I_D$                 | 258<br>182<br>150 | A                |
| Pulsed drain current ( $T_C = 25^\circ\text{C}$ , $t_p = 100\mu\text{s}$ )                                                                                    | $I_{D \text{ pulse}}$ | 597               | A                |
| Avalanche energy, single pulse ( $L=0.1\text{mH}$ )                                                                                                           | $E_{AS}$              | 353               | mJ               |
| Gate-Source voltage                                                                                                                                           | $V_{GS}$              | $\pm 20$          | V                |
| Power dissipation<br>$T_C = 25^\circ\text{C}$                                                                                                                 | $P_{tot}$             | 238               | W                |
| Operating junction and storage temperature                                                                                                                    | $T_j, T_{stg}$        | $-55 \dots +175$  | $^\circ\text{C}$ |
| Reflow soldering temperature (10s)                                                                                                                            | $T_{sold}$            | 260               | $^\circ\text{C}$ |

**Thermal Resistance**

| Parameter                                 | Symbol     | Value |      |      | Unit | Test Condition                                   |
|-------------------------------------------|------------|-------|------|------|------|--------------------------------------------------|
|                                           |            | min.  | typ. | max. |      |                                                  |
| Thermal resistance, junction – case.      | RthJC      | -     | -    | 0.63 | °C/W | -                                                |
| Thermal resistance , Channel to Top Plate | Rth(ch-tp) | -     | -    | 0.60 | °C/W | -                                                |
| Thermal resistance, junction - ambient    | RthJA      | -     | -    | 56   | °C/W | 1 inch <sup>2</sup> , 2oz single copper FR-4 PCB |

**Electrical Characteristic (at T<sub>j</sub> = 25 °C, unless otherwise specified)**

| Parameter | Symbol | Value |      |      | Unit | Test Condition |
|-----------|--------|-------|------|------|------|----------------|
|           |        | min.  | typ. | max. |      |                |

**Static Characteristic**

|                                  |                     |    |     |          |    |                                                                                            |
|----------------------------------|---------------------|----|-----|----------|----|--------------------------------------------------------------------------------------------|
| Drain-source breakdown voltage   | BV <sub>DSS</sub>   | 80 | -   | -        | V  | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                                 |
| Gate threshold voltage           | V <sub>GS(th)</sub> | 2  | -   | 4        | V  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA                                   |
| Zero gate voltage drain current  | I <sub>DSS</sub>    | -  | -   | 1<br>100 | μA | V <sub>DS</sub> =80V, V <sub>GS</sub> =0V<br>T <sub>j</sub> =25°C<br>T <sub>j</sub> =125°C |
| Gate-source leakage current      | I <sub>GSS</sub>    | -  | -   | ±100     | nA | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                 |
| Drain-source on-state resistance | R <sub>DS(on)</sub> | -  | 1.6 | 1.85     | mΩ | V <sub>GS</sub> =10V, I <sub>D</sub> =50A                                                  |
| Transconductance                 | g <sub>fs</sub>     | -  | 135 | -        | S  | V <sub>DS</sub> =5V, I <sub>D</sub> =50A                                                   |

**Dynamic Characteristic**

|                              |                     |   |      |   |    |                                                                                              |
|------------------------------|---------------------|---|------|---|----|----------------------------------------------------------------------------------------------|
| Input Capacitance            | C <sub>iss</sub>    | - | 7445 | - | pF | V <sub>GS</sub> =0V, V <sub>DS</sub> =40V,<br>f=100KHz                                       |
| Output Capacitance           | C <sub>oss</sub>    | - | 1221 | - |    |                                                                                              |
| Reverse Transfer Capacitance | C <sub>rss</sub>    | - | 39   | - |    |                                                                                              |
| Gate Total Charge            | Q <sub>G</sub>      | - | 100  | - | nC | V <sub>DS</sub> =40V, I <sub>D</sub> =40A<br>, V <sub>GS</sub> =10V                          |
| Gate-Source charge           | Q <sub>gs</sub>     | - | 37   | - |    |                                                                                              |
| Gate-Drain charge            | Q <sub>gd</sub>     | - | 10   | - |    |                                                                                              |
| Turn-on delay time           | t <sub>d(on)</sub>  | - | 25   | - | ns | V <sub>GS</sub> =10V, V <sub>DD</sub> =40V,<br>R <sub>G_ext</sub> =3.5Ω, I <sub>D</sub> =40A |
| Rise time                    | t <sub>r</sub>      | - | 23   | - |    |                                                                                              |
| Turn-off delay time          | t <sub>d(off)</sub> | - | 74   | - |    |                                                                                              |
| Fall time                    | t <sub>f</sub>      | - | 33   | - |    |                                                                                              |
| Gate resistance              | R <sub>G</sub>      | - | 1.5  | - | Ω  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V,<br>f=1MHz                                          |

## Body Diode Characteristic

| Parameter                             | Symbol      | Value |      |      | Unit | Test Condition                            |
|---------------------------------------|-------------|-------|------|------|------|-------------------------------------------|
|                                       |             | min.  | typ. | max. |      |                                           |
| Body Diode Forward Voltage            | $V_{SD}$    | -     | -    | 1.2  | V    | $V_{GS}=0V, I_{SD}=50A$                   |
| Body Diode Continuous Forward Current | $I_S$       | -     | -    | 150  | A    | TC = 25°C                                 |
| Body Diode Pulsed Current             | $I_S$ pulse | -     | -    | 597  | A    | TC = 25°C, $t_p = 100\mu s$               |
| Body Diode Reverse Recovery Time      | $t_{rr}$    | -     | 46   | -    | ns   | $V_R=40V, I_F=50A,$<br>$dI/dt=100A/\mu s$ |
| Body Diode Reverse Recovery Charge    | $Q_{rr}$    | -     | 64   | -    | nC   |                                           |

## Typical Performance Characteristics

Fig 1: Output Characteristics

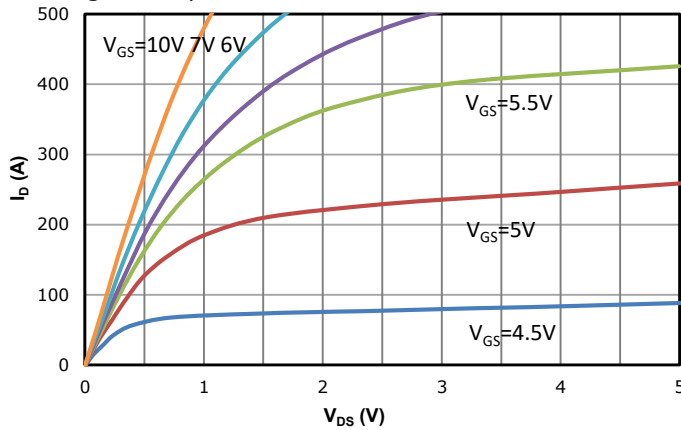


Fig 2: Transfer Characteristics

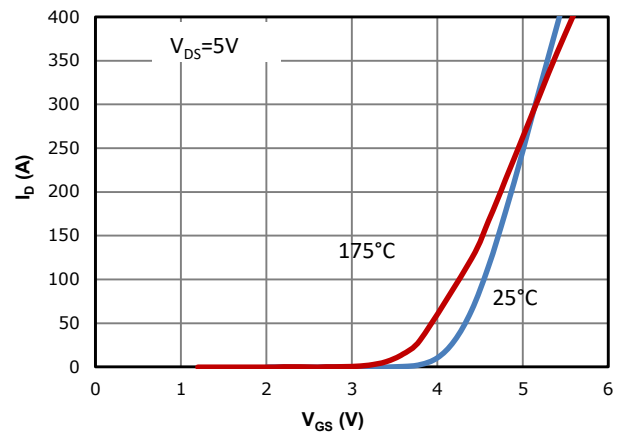


Fig 3: Rds(on) vs Drain Current and Gate Voltage

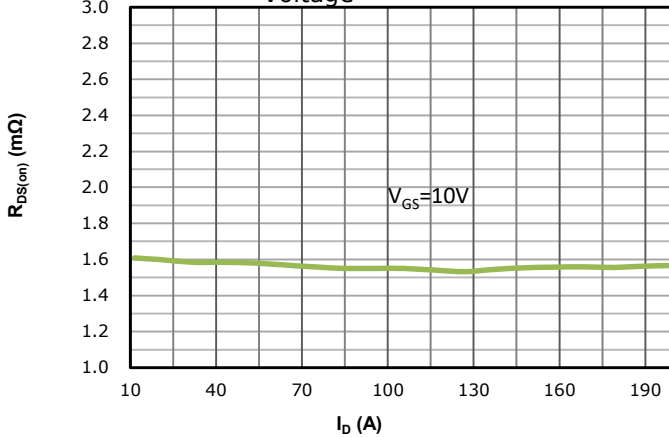


Fig 4: Rds(on) vs Gate Voltage

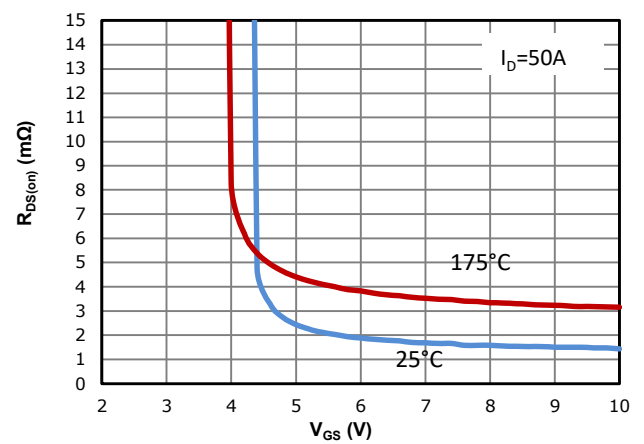


Fig 5: Rds(on) vs. Temperature

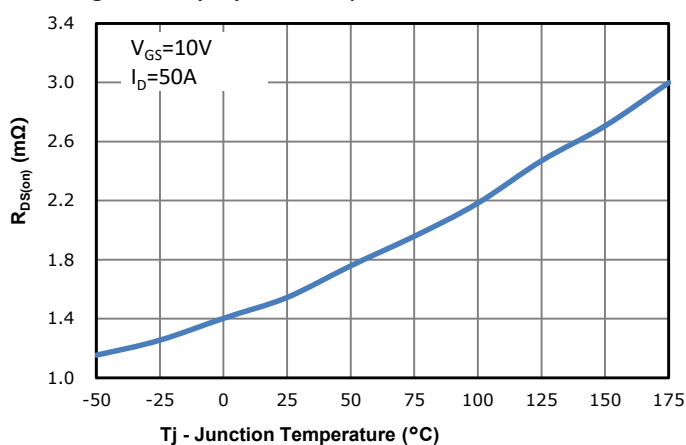


Fig 6: Vgs(th) vs. Temperature

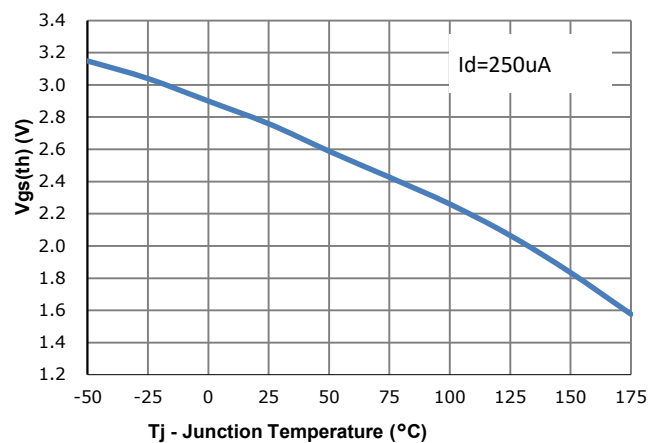


Fig 7: BVdss vs. Temperature

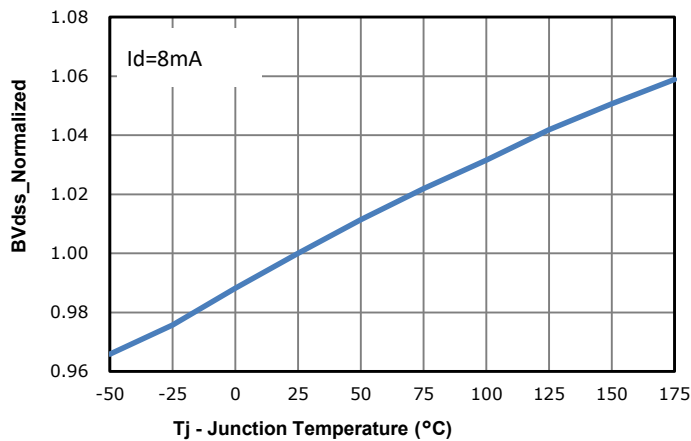


Fig 8: Capacitance Characteristics

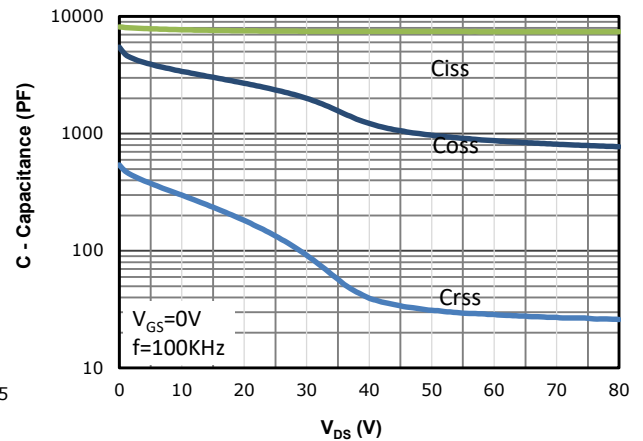


Fig 9: Gate Charge Characteristics

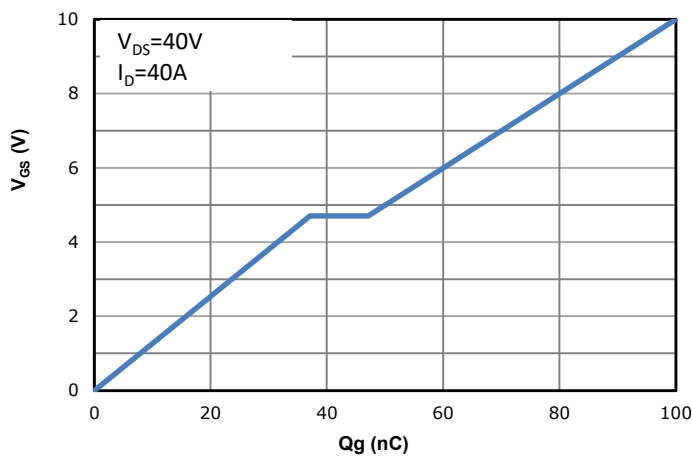


Fig 10: Body-diode Forward Characteristics

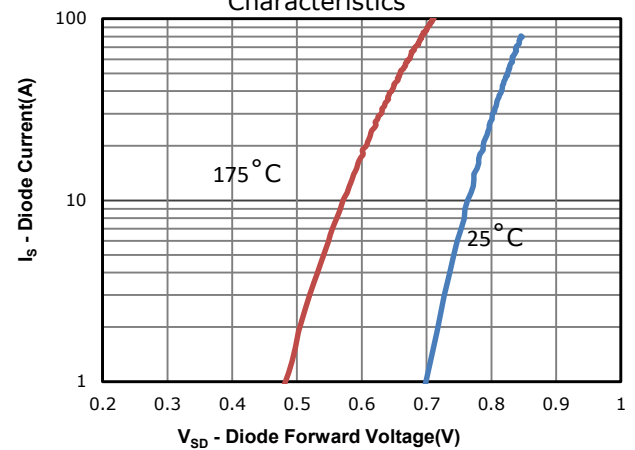


Fig 11: Power Dissipation

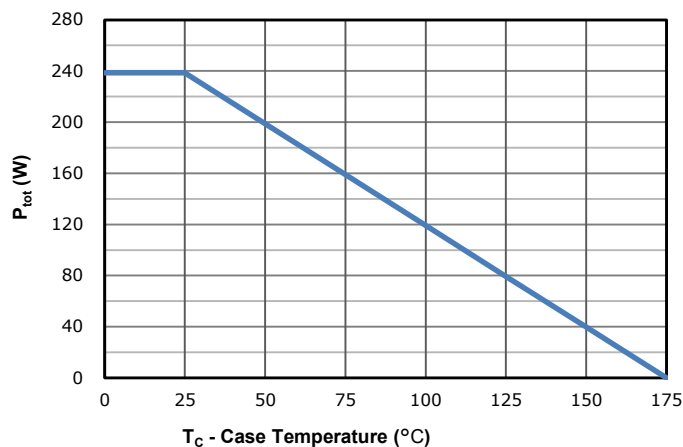


Fig 12: Drain Current Derating

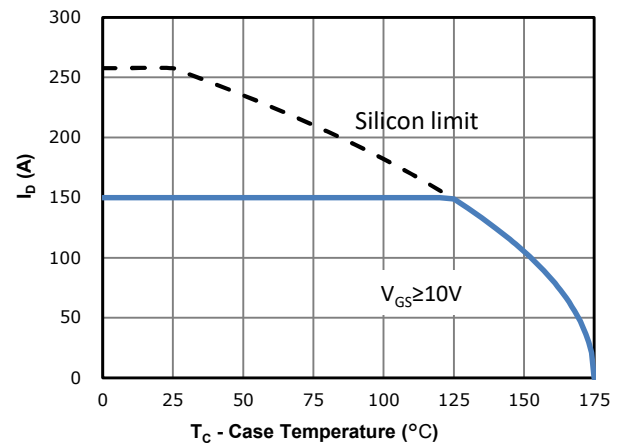


Fig 13: Safe Operating Area

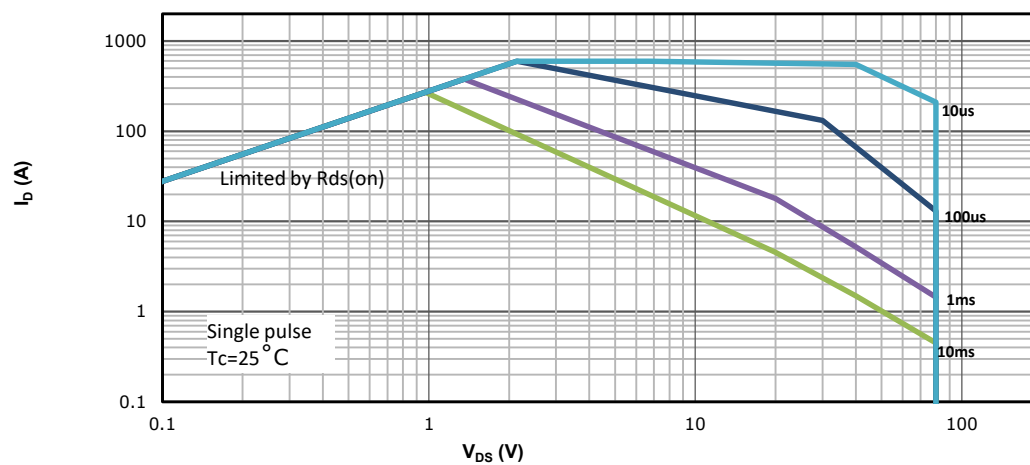
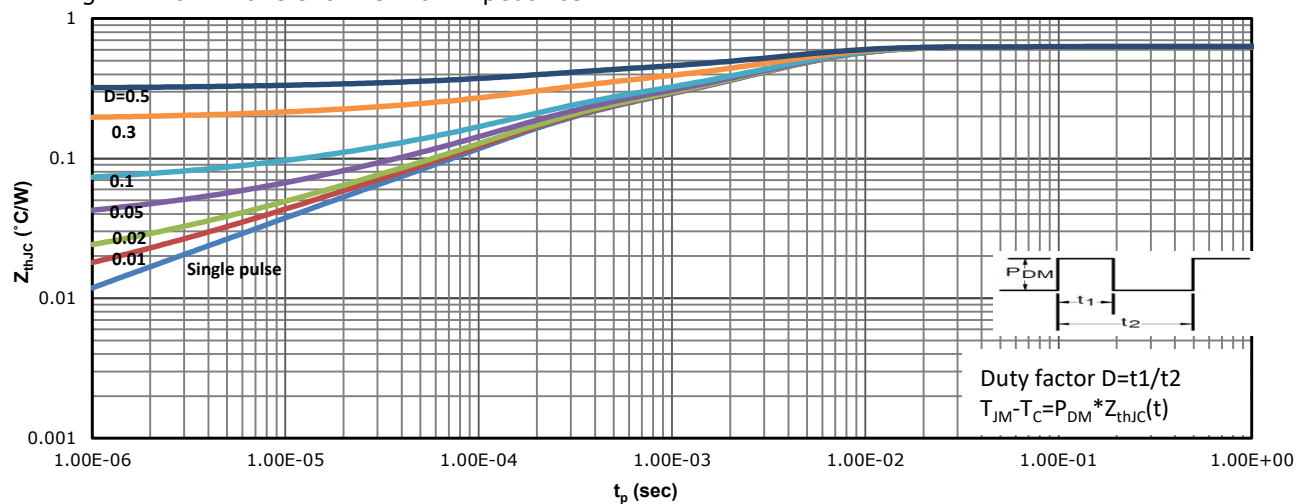
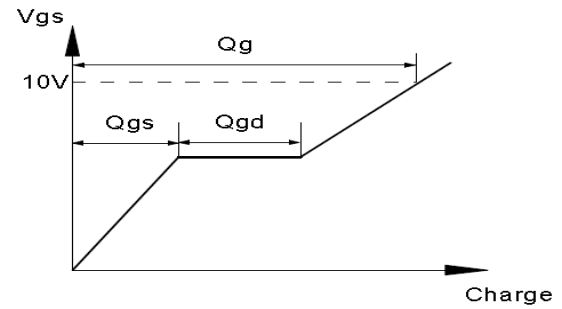
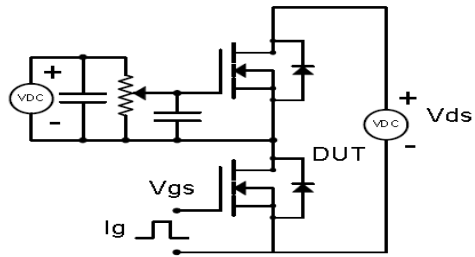


Fig 14: Max. Transient Thermal Impedance

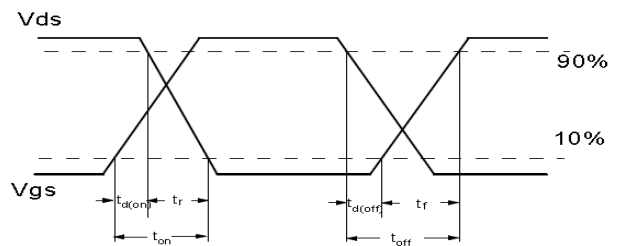
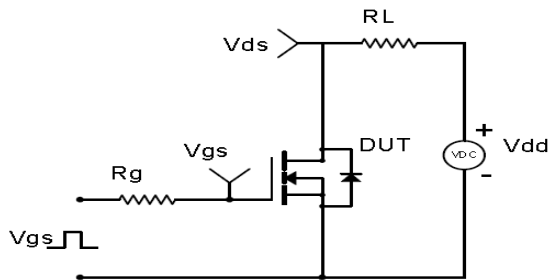


## Test Circuit & Waveform

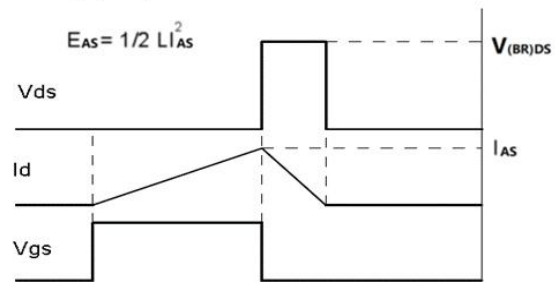
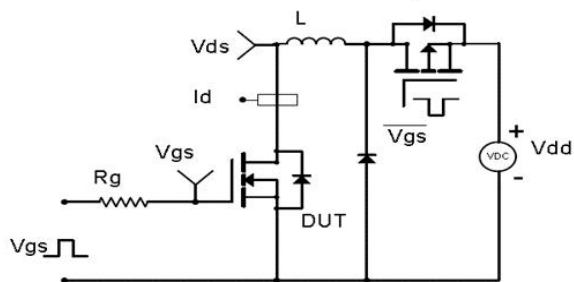
Gate Charge Test Circuit & Waveform



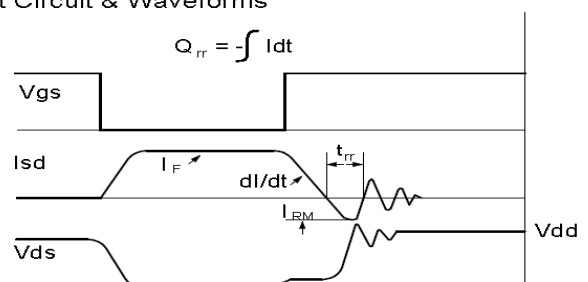
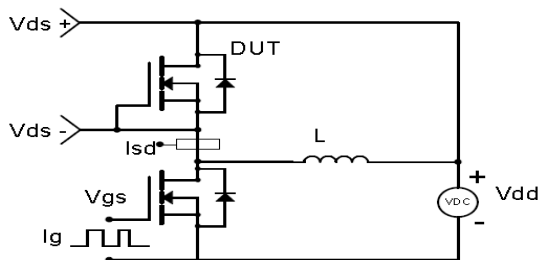
Resistive Switching Test Circuit & Waveforms

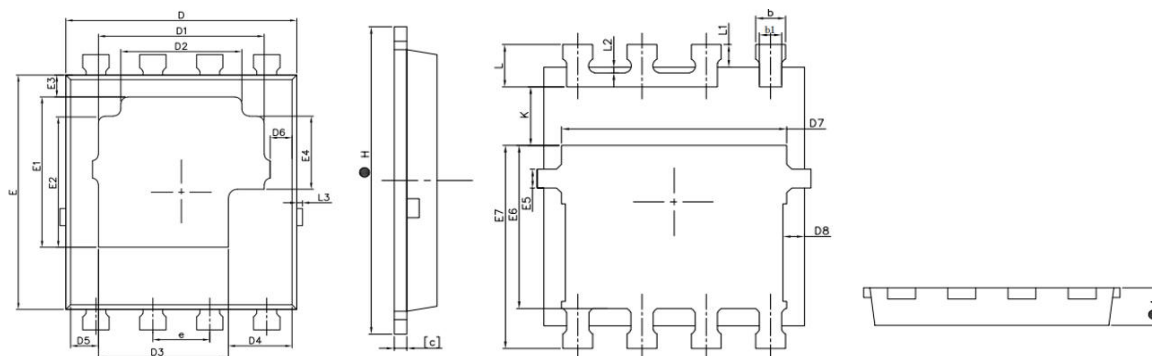


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



**Package Outline: DFN5X6 Double Cooling**

| SYMBOL | MILLIMETERS |      | INCHES |       |
|--------|-------------|------|--------|-------|
|        | MIN         | MAX  | MIN    | MAX   |
| A      | 0.75        | 0.95 | 0.030  | 0.037 |
| b      | 0.49        | 0.69 | 0.019  | 0.027 |
| b1     | 0.34        | 0.54 | 0.013  | 0.021 |
| c      | 0.20        | 0.30 | 0.008  | 0.012 |
| D      | 4.95        | 5.35 | 0.195  | 0.211 |
| D1     | 3.45        | 3.95 | 0.136  | 0.156 |
| D2     | 2.45        | 2.95 | 0.096  | 0.116 |
| D3     | 2.65        | 3.15 | 0.104  | 0.124 |
| D4     | 1.17        | 1.67 | 0.046  | 0.066 |
| D5     | 0.37        | 0.87 | 0.015  | 0.034 |
| D6     | 0.29        | 0.69 | 0.011  | 0.027 |
| D7     | 4.45        | 4.85 | 0.175  | 0.191 |
| D8     | 0.23        | 0.63 | 0.009  | 0.025 |
| E      | 5.28        | 5.68 | 0.208  | 0.224 |
| E1     | 3.27        | 3.77 | 0.129  | 0.148 |
| E2     | 2.80        | 3.30 | 0.110  | 0.130 |
| E3     | 0.50        | 1.10 | 0.020  | 0.043 |
| E4     | 1.46        | 1.96 | 0.057  | 0.077 |
| E5     | 0.25        | 0.60 | 0.010  | 0.024 |
| E6     | 3.20        | 3.70 | 0.126  | 0.146 |
| E7     | 4.05        | 4.55 | 0.159  | 0.179 |
| e      | 1.27        |      | 0.050  |       |
| H      | 6.19        | 6.69 | 0.244  | 0.263 |
| L      | 0.65        | 1.15 | 0.026  | 0.045 |
| L1     | 0.28        | 0.68 | 0.011  | 0.027 |
| L2     | 0.12        |      | 0.005  |       |
| L3     | -           | 0.23 | -      | 0.009 |
| K      | 1.04        | 1.44 | 0.041  | 0.057 |



## Revision History

| Revision | Date      | Major changes             |
|----------|-----------|---------------------------|
| 1.0      | 2026/9/23 | Release of Formal Version |

## Disclaimer

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