



## General Description

The DMN2019UTS-13 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent  $R_{DS(on)}$  and gate charge for most of the small power switching and load switch applications. The meet the RoHS and Product requirement with full function reliability approved.

## General Features

$V_{DS} = 20V$   $I_D = 7A$

$R_{DS(on)} < 14m\Omega$  @  $V_{GS}=4.5V$

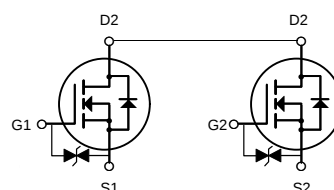
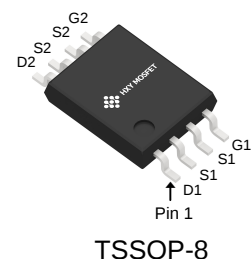
$R_{DS(on)} < 17m\Omega$  @  $V_{GS}=2.5V$

## Application

Battery protection

Load switch

Uninterruptible power supply



Dual N-Channel MOSFET

## Package Marking and Ordering Information

| Product ID    | Pack    | Brand      | Qty(PCS) |
|---------------|---------|------------|----------|
| DMN2019UTS-13 | TSSOP-8 | HXY MOSFET | 5000     |

## Absolute Maximum Ratings ( $T_A=25^{\circ}C$ unless otherwise noted)

| Symbol          | Parameter                                        | Limit      | Unit          |
|-----------------|--------------------------------------------------|------------|---------------|
| $V_{DS}$        | Drain-Source Voltage                             | 20         | V             |
| $V_{GS}$        | Gate-Source Voltage                              | $\pm 10$   | V             |
| $I_D$           | Drain Current-Continuous                         | 7          | A             |
| $I_{DM}$        | Drain Current-Pulsed (Note 1)                    | 23         | A             |
| $P_D$           | Maximum Power Dissipation                        | 1.25       | W             |
| $T_J, T_{STG}$  | Operating Junction and Storage Temperature Range | -55 To 150 | $^{\circ}C$   |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 111        | $^{\circ}C/W$ |



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

| Parameter                                 | Symbol       | Condition                                                | Min | Typ  | Max       | Unit       |
|-------------------------------------------|--------------|----------------------------------------------------------|-----|------|-----------|------------|
| Drain-Source Breakdown Voltage            | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                                | 20  | -    | -         | V          |
| Zero Gate Voltage Drain Current           | $I_{DSS}$    | $V_{DS}=16V, V_{GS}=0V$                                  | -   | -    | 1         | $\mu A$    |
| Gate-Body Leakage Current                 | $I_{GSS}$    | $V_{GS}=\pm 8V, V_{DS}=0V$                               | -   | -    | $\pm 100$ | nA         |
| Gate Threshold Voltage                    | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                            | 0.5 | 0.7  | 1.2       | V          |
| Drain-Source On-State Resistance          | $R_{DS(ON)}$ | $V_{GS}=4.5V, I_D=4.5A$                                  | -   | 12   | 14        | m $\Omega$ |
|                                           |              | $V_{GS}=2.5V, I_D=3.5A$                                  | -   | 15   | 17        | m $\Omega$ |
| Forward Transconductance                  | $g_{FS}$     | $V_{DS}=5V, I_D=3.5A$                                    | -   | 20   | -         | S          |
| Input Capacitance                         | $C_{iss}$    | $V_{DS}=8V, V_{GS}=0V,$<br>$F=1.0\text{MHz}$             | -   | 955  | -         | PF         |
| Output Capacitance                        | $C_{oss}$    |                                                          | -   | 200  | -         | PF         |
| Reverse Transfer Capacitance              | $C_{rss}$    |                                                          | -   | 150  | -         | PF         |
| Turn-on Delay Time                        | $t_{d(on)}$  | $V_{DD}=10V, I_D=3.5A$<br>$V_{GS}=4.5V, R_{GEN}=6\Omega$ | -   | 8    | -         | nS         |
| Turn-on Rise Time                         | $t_r$        |                                                          | -   | 17   | -         | nS         |
| Turn-Off Delay Time                       | $t_{d(off)}$ |                                                          | -   | 27   | -         | nS         |
| Turn-Off Fall Time                        | $t_f$        |                                                          | -   | 8.8  | -         | nS         |
| Total Gate Charge                         | $Q_g$        | $V_{DS}=10V, I_D=7A,$<br>$V_{GS}=4.5V$                   | -   | 11.3 | -         | nC         |
| Gate-Source Charge                        | $Q_{gs}$     |                                                          | -   | 1.89 | -         | nC         |
| Gate-Drain Charge                         | $Q_{gd}$     |                                                          | -   | 3.56 | -         | nC         |
| Diode Forward Voltage <sup>(Note 3)</sup> | $V_{SD}$     | $V_{GS}=0V, I_S=1.7A$                                    | -   | 0.75 | 1.2       | V          |
| Diode Forward Current <sup>(Note 2)</sup> | $I_S$        |                                                          | -   | -    | 7         | A          |

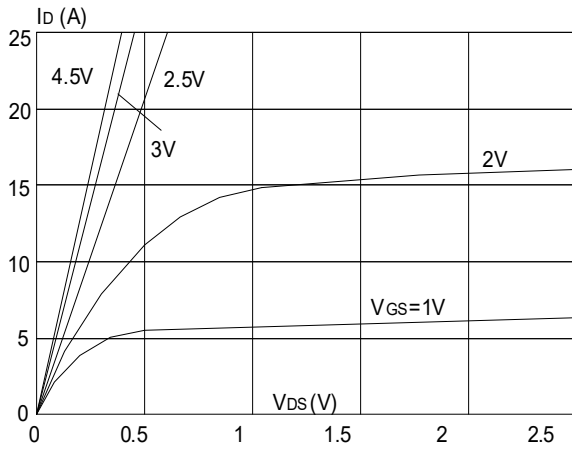
**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

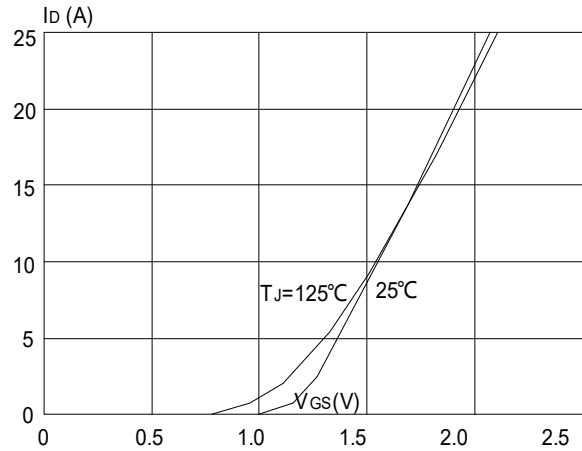


## Typical Characteristics

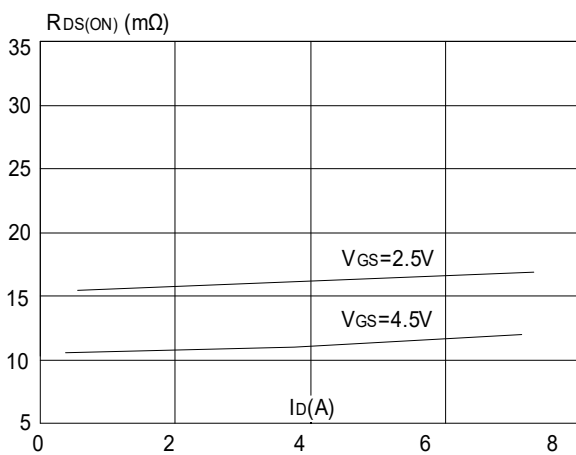
**Figure1:** Output Characteristics



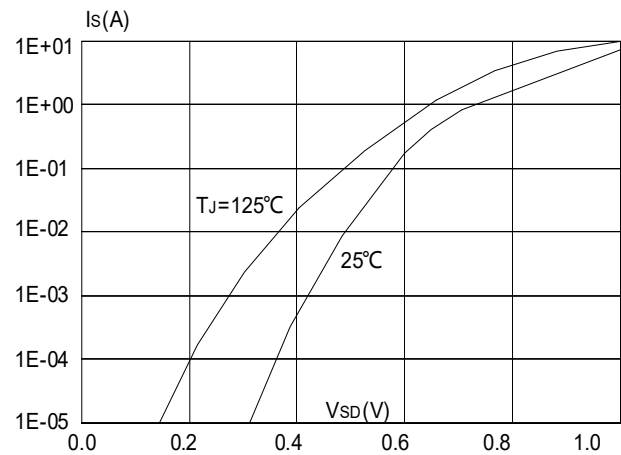
**Figure 2:** Typical Transfer Characteristics



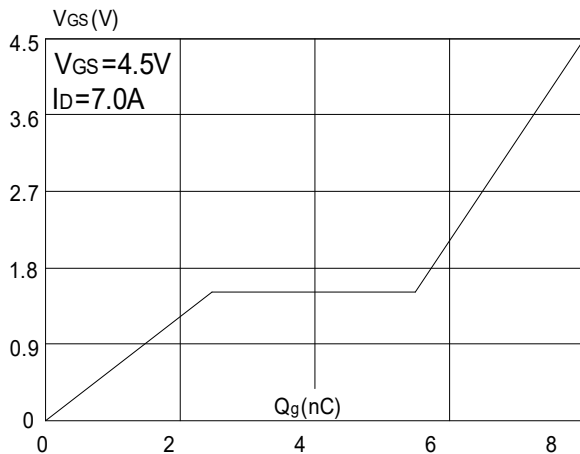
**Figure 3:** On-resistance vs. Drain Current



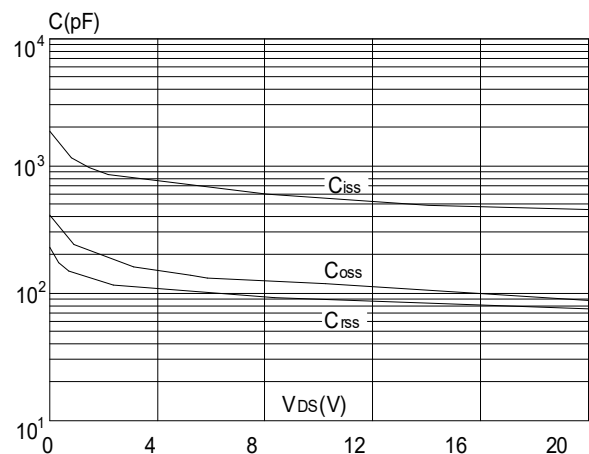
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics

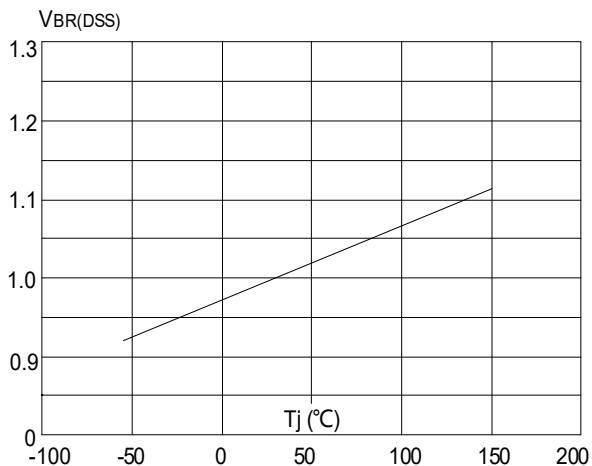


**Figure 6:** Capacitance Characteristics

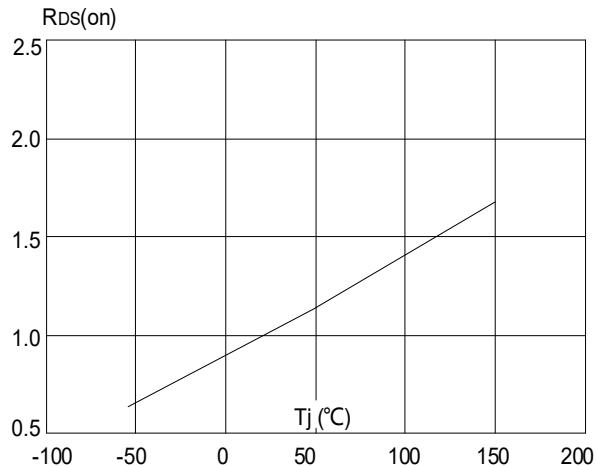




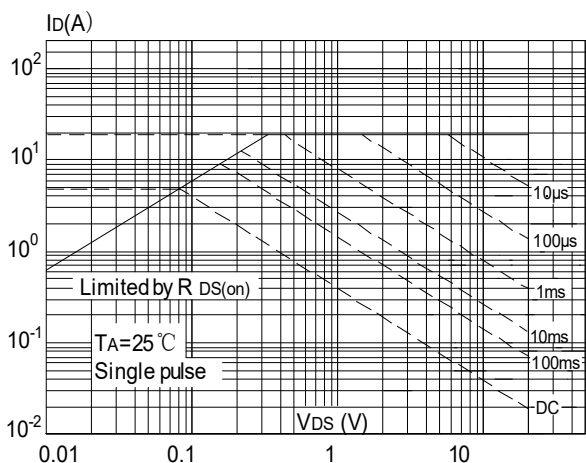
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



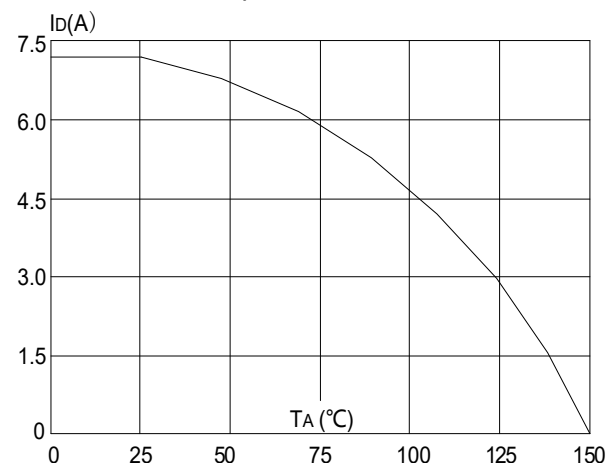
**Figure 8:** Normalized on Resistance vs. Junction Temperature



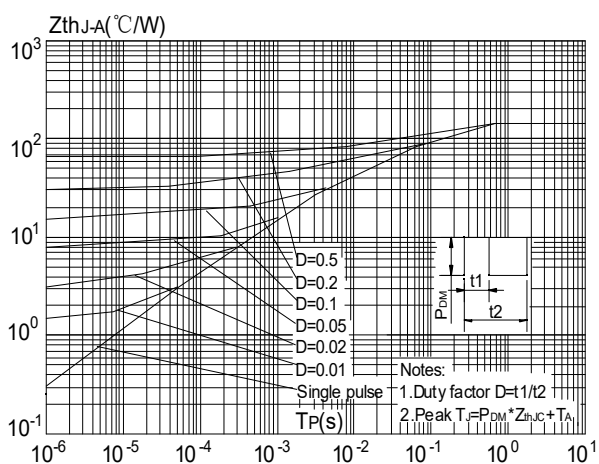
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

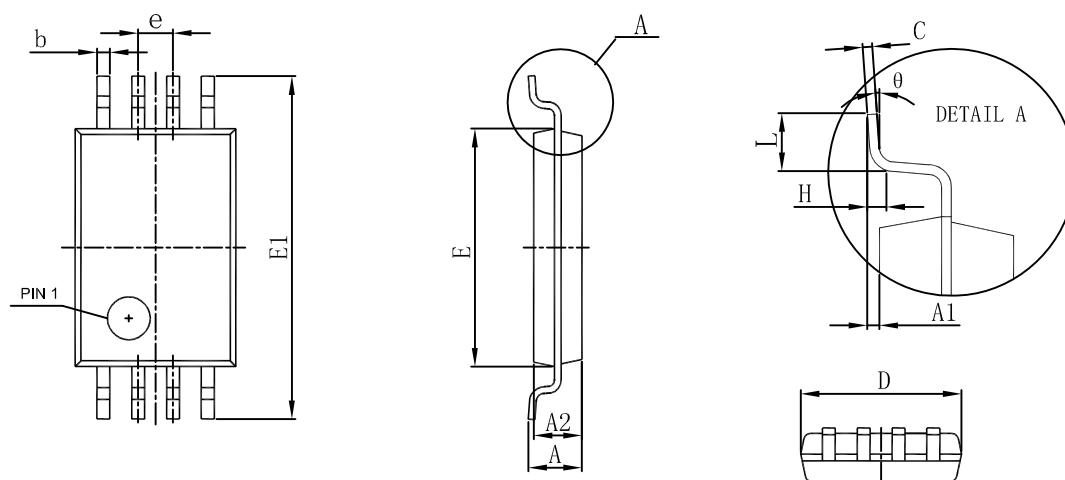


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





## TSSOP-8 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| D      | 2.900                     | 3.100 | 0.114                | 0.122 |
| E      | 4.300                     | 4.500 | 0.169                | 0.177 |
| b      | 0.190                     | 0.300 | 0.007                | 0.012 |
| c      | 0.090                     | 0.200 | 0.004                | 0.008 |
| E1     | 6.250                     | 6.550 | 0.246                | 0.258 |
| A      |                           | 1.200 |                      | 0.047 |
| A2     | 0.800                     | 1.000 | 0.031                | 0.039 |
| A1     | 0.050                     | 0.150 | 0.002                | 0.006 |
| e      | 0.65 (BSC)                |       | 0.026 (BSC)          |       |
| L      | 0.500                     | 0.700 | 0.020                | 0.028 |
| H      | 0.25(TYP)                 |       | 0.01(TYP)            |       |
| θ      | 1°                        | 7°    | 1°                   | 7°    |



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