

# N-Channel Enhancement Mode MOSFET

## 1. Product Information

### 1.1 Features

- ☒ Surface-mounted package
- ☒ Low Thermal Resistance

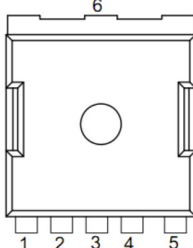
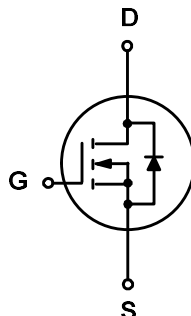
### 1.2 Applications

- ☒ Motor drivers
- ☒ DC - DC Converter

### 1.3 Quick reference

- ☒  $BV \geq 150 \text{ V}$
- ☒  $P_{tot} \leq 215 \text{ W}$
- ☒  $I_D \leq 103 \text{ A}$
- ☒  $R_{DS(ON)} \leq 7.5 \text{ m}\Omega @ V_{GS} = 10 \text{ V}$
- ☒  $R_{DS(ON)} \leq 9.5 \text{ m}\Omega @ V_{GS} = 6 \text{ V}$

## 2. Pin Description

| Pin     | Description | Simplified Outline                                                                                            | Symbol                                                                                |
|---------|-------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1,2,3,4 | Source(S)   |  <p>Top View<br/>STOLL</p> |  |
| 5       | Gate(G)     |                                                                                                               |                                                                                       |
| 6       | Drain(D)    |                                                                                                               |                                                                                       |

### 3. Limiting Values

| Symbol            | Parameter                               | Conditions                                                | Min | Max      | Unit                 |
|-------------------|-----------------------------------------|-----------------------------------------------------------|-----|----------|----------------------|
| $V_{DS}$          | Drain-Source Voltage                    | $T_C = 25\text{ }^{\circ}\text{C}$                        | -   | 150      | V                    |
| $V_{GS}$          | Gate-Source Voltage                     | $T_C = 25\text{ }^{\circ}\text{C}$                        | -   | $\pm 20$ | V                    |
| $I_D^*$           | Drain Current ( DC )                    | $T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$  | -   | 103      | A                    |
|                   |                                         | $T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$ | -   | 73       | A                    |
| $I_{DM}^{*,**}$   | Drain Current ( Pulsed )                | $T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$  | -   | 225      | A                    |
| $P_{tot}$         | Drain power dissipation                 | $T_C = 25\text{ }^{\circ}\text{C}$                        | -   | 215      | W                    |
| $T_{stg}$         | Storage Temperature                     |                                                           | -55 | 175      | $^{\circ}\text{C}$   |
| $T_J$             | Junction Temperature                    |                                                           | -   | 175      | $^{\circ}\text{C}$   |
| $I_S$             | Continuous-Source Current               | $T_C = 25\text{ }^{\circ}\text{C}$                        | -   | 103      | A                    |
| $E_{AS}$          | Single Pulsed Avalanche Energy          | $V_{DD} = 50\text{ V}, L = 1.0\text{ mH}$                 | -   | 612      | mJ                   |
| $R_{\theta JA}^*$ | Thermal Resistance- Junction to Ambient |                                                           | -   | 65       | $^{\circ}\text{C/W}$ |
| $R_{\theta JC}^*$ | Thermal Resistance- Junction to Case    |                                                           | -   | 0.7      |                      |

Notes :

- \* Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10\text{ sec}$
- \*\* Pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$
- \*\*\* Limited by bonding wire

### 4. Marking Information

| Product Name | Marking                                                                                                                                                            |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| US075N15ST   | <div style="display: inline-block; border: 1px solid black; padding: 2px;"> <b>075N15</b><br/> <b>YWWXXX</b><br/> <b>AAAAAA</b> </div> <b>AAAAAA:</b><br>Date Code |

### 5. Ordering Code

| Product Name | Package | Reel Size | Tape width | Quantity | Note |
|--------------|---------|-----------|------------|----------|------|
| US075N15ST   | STOLL   |           |            | 2000     |      |

## 6. Electrical Characteristics (T<sub>A</sub> = 25 °C Unless Otherwise Noted)

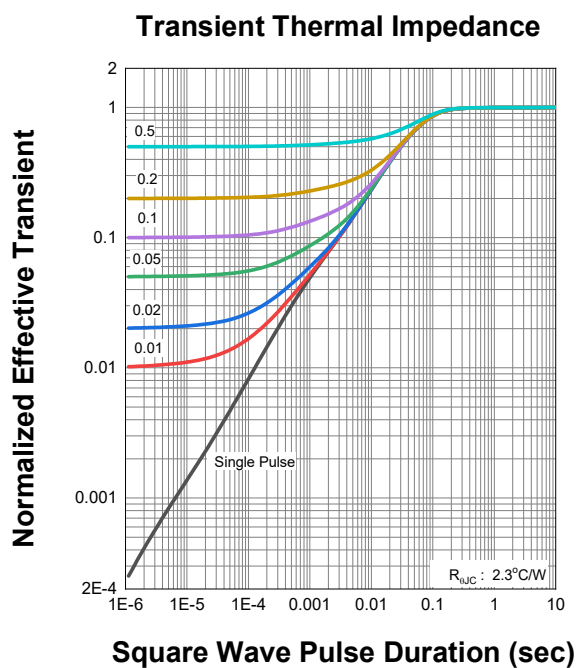
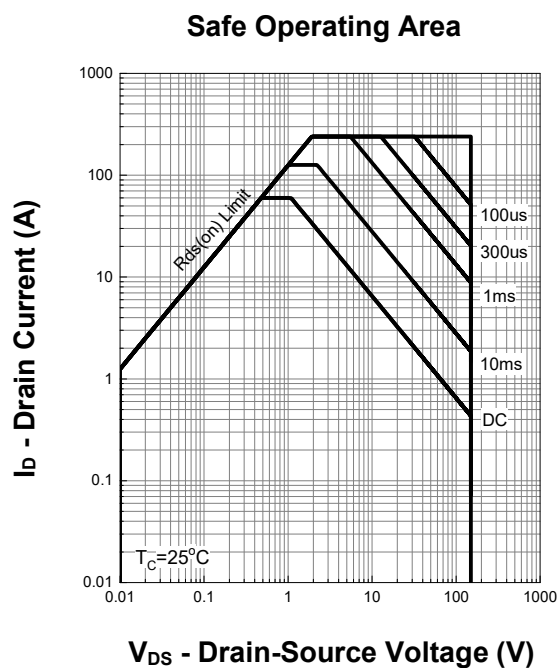
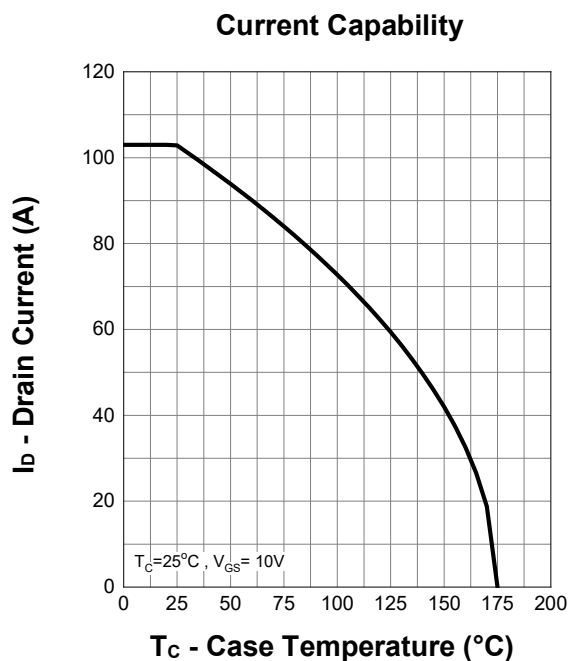
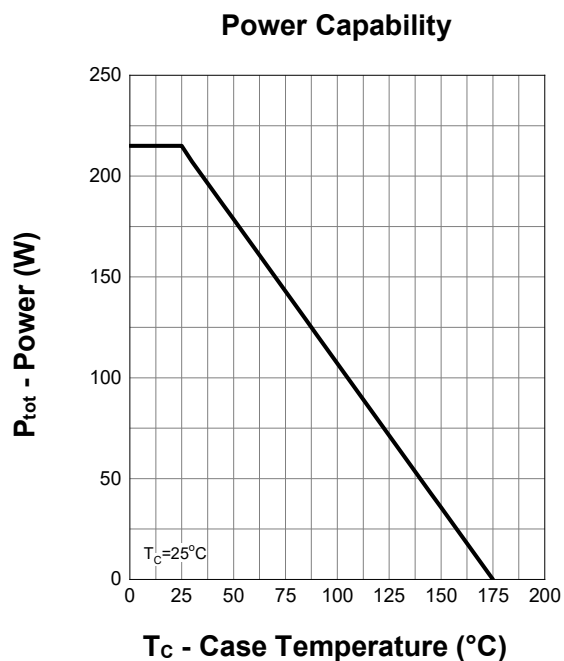
| Symbol                                   | Parameter                      | Conditions                                                                                                                    | Min | Typ  | Max  | Unit |
|------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----|------|------|------|
| Static Characteristics                   |                                |                                                                                                                               |     |      |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage | V <sub>GS</sub> = 0 V, I <sub>DS</sub> = 250 μA                                                                               | 150 | -    | -    | V    |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage         | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA                                                                  | 2   | -    | 4    | V    |
| I <sub>DSS</sub>                         | Drain Leakage Current          | V <sub>DS</sub> = 120 V, V <sub>GS</sub> = 0 V                                                                                | -   | -    | 1    | μA   |
| I <sub>GSS</sub>                         | Gate Leakage Current           | V <sub>GS</sub> = 0 V, V <sub>GS</sub> = ± 20 V                                                                               | -   | -    | ±100 | nA   |
| R <sub>DS(ON)</sub> <sup>a</sup>         | On-State Resistance            | V <sub>GS</sub> = 10 V, I <sub>DS</sub> = 30 A                                                                                | -   | 6.8  | 7.5  | mΩ   |
|                                          |                                | V <sub>GS</sub> = 6 V, I <sub>DS</sub> = 20 A                                                                                 | -   | 8.8  | 9.5  |      |
| Diode Characteristics                    |                                |                                                                                                                               |     |      |      |      |
| V <sub>SD</sub> <sup>a</sup>             | Diode Forward Voltage          | I <sub>SD</sub> = 30 A, V <sub>GS</sub> = 0 V                                                                                 | -   | -    | 1.3  | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time          | I <sub>DS</sub> = 30 A, V <sub>GS</sub> = 0 V<br>dI <sub>SD</sub> /dt = 100 A/μs                                              | -   | 92   | -    | nS   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge        |                                                                                                                               | -   | 258  | -    | nC   |
| Dynamic Characteristics <sup>b</sup>     |                                |                                                                                                                               |     |      |      |      |
| C <sub>iss</sub>                         | Input Capacitance              | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 75 V<br>Frequency = 1 MHz                                                            | -   | 4393 | -    | pF   |
| C <sub>oss</sub>                         | Output Capacitance             |                                                                                                                               | -   | 364  | -    |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance   |                                                                                                                               | -   | 7    | -    |      |
| t <sub>d(on)</sub>                       | Turn-on Delay Time             | V <sub>DS</sub> = 75 V, V <sub>GEN</sub> = 10 V,<br>R <sub>G</sub> = 3.9 Ω, R <sub>L</sub> = 2.5 Ω,<br>I <sub>DS</sub> = 30 A | -   | 16   | -    | nS   |
| t <sub>r</sub>                           | Turn-on Rise Time              |                                                                                                                               | -   | 34   | -    |      |
| t <sub>d(off)</sub>                      | Turn-off Delay Time            |                                                                                                                               | -   | 40   | -    |      |
| t <sub>f</sub>                           | Turn-off Fall Time             |                                                                                                                               | -   | 29   | -    |      |
| Gate Charge Characteristics <sup>b</sup> |                                |                                                                                                                               |     |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge              | V <sub>DS</sub> = 75 V, V <sub>GS</sub> = 10 V,<br>I <sub>DS</sub> = 30 A                                                     | -   | 73   | -    | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge             |                                                                                                                               | -   | 25   | -    |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge              |                                                                                                                               | -   | 18   | -    |      |

Notes :

a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2%

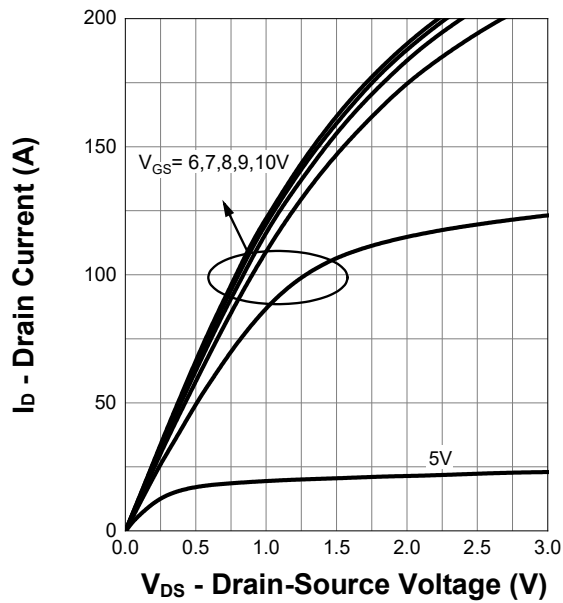
b : Guaranteed by design, not subject to production testing

## 7. Typical Characteristics

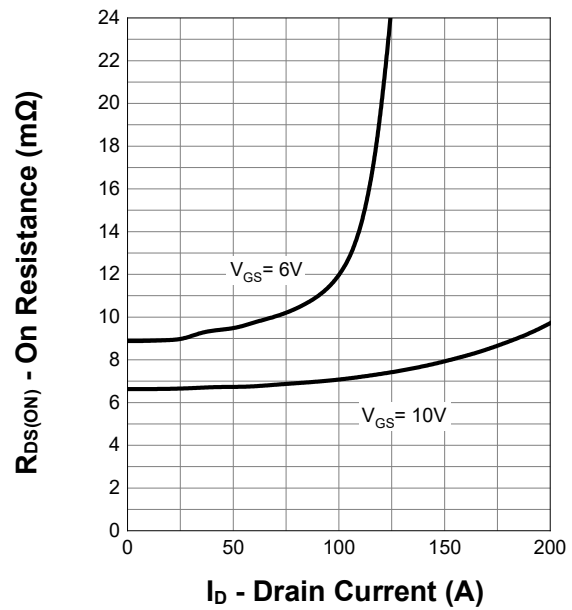


## 7. Typical Characteristics (cont.)

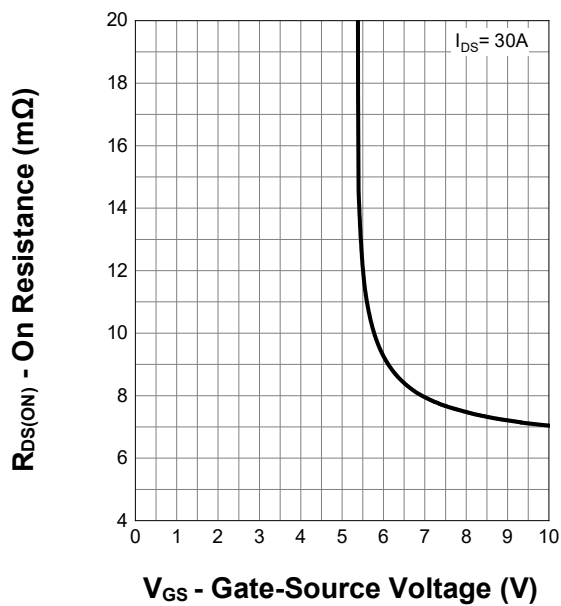
Output Characteristics



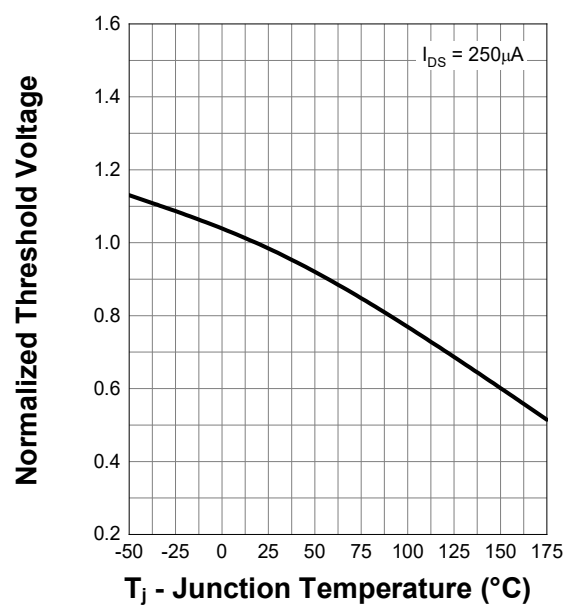
On Resistance



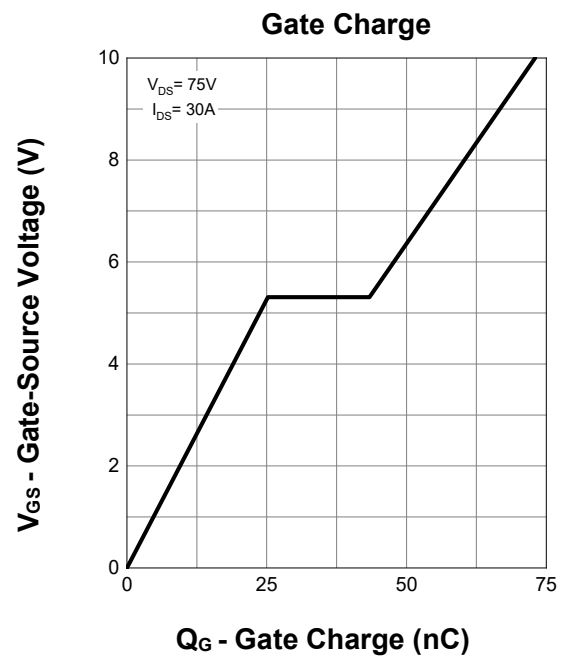
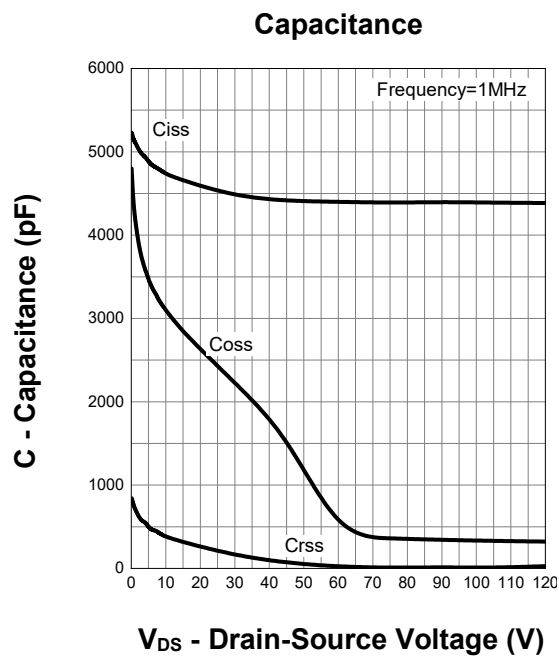
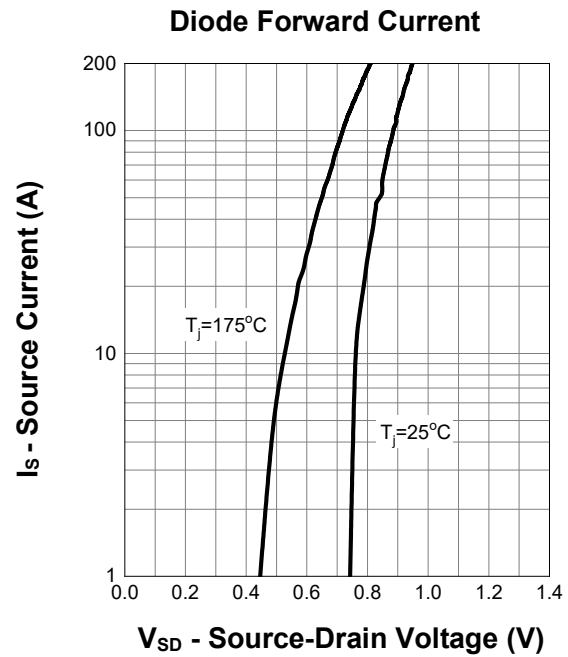
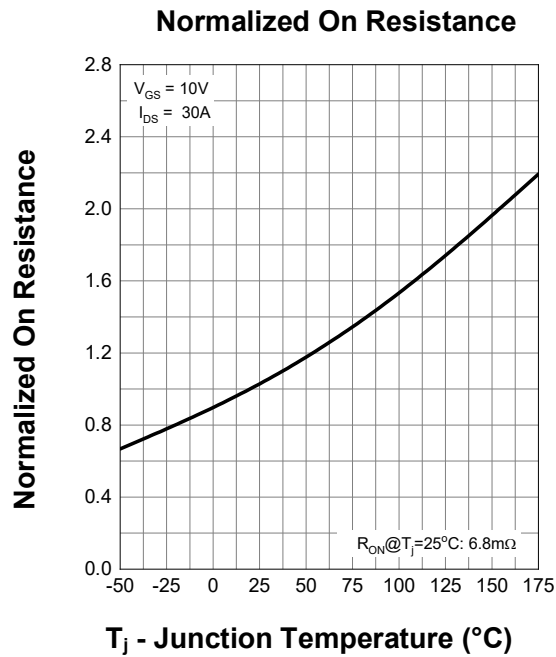
Transfer Characteristics



Normalized Threshold Voltage

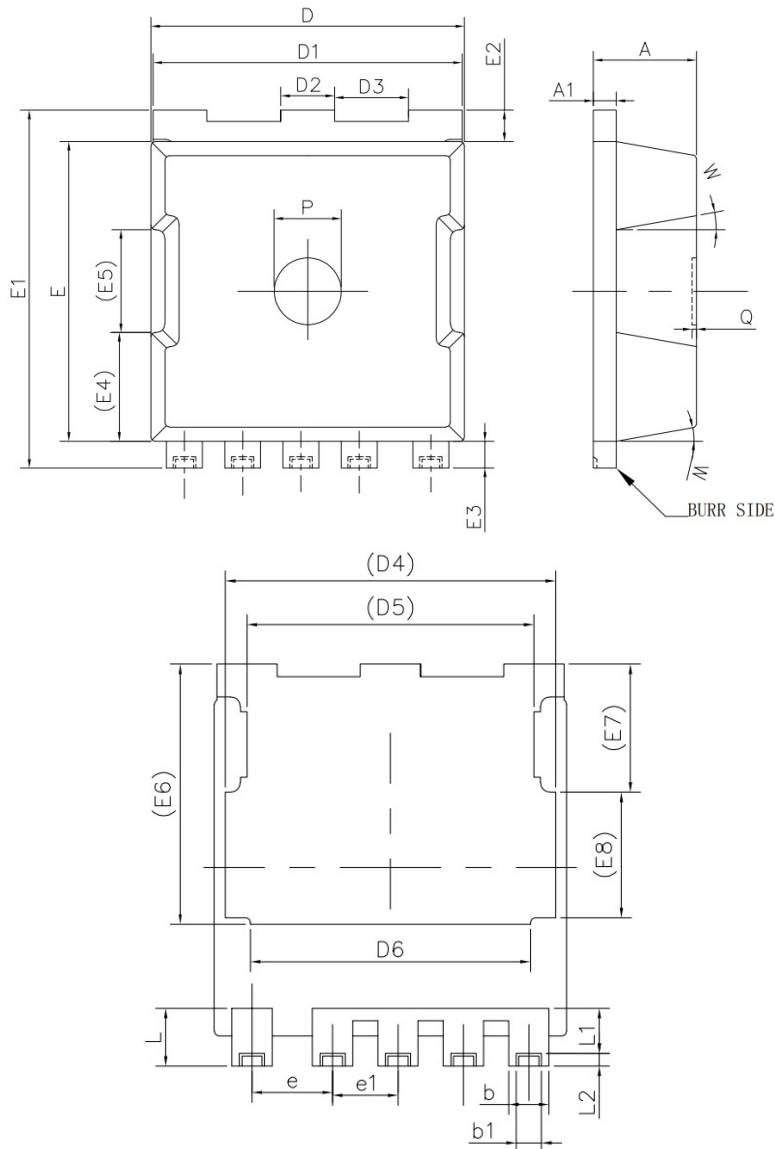


## 7. Typical Characteristics (cont.)



## 8. Package Dimensions

### sTOLL Package



| SYMBOLS | DIMENSION IN MM |       |       |
|---------|-----------------|-------|-------|
|         | MIN             | NOM   | MAX   |
| A       | 2.200           | 2.300 | 2.400 |
| A1      | 0.400           | 0.500 | 0.600 |
| b       | 0.700           | 0.800 | 0.900 |
| b1      | 0.400           | 0.500 | 0.600 |
| D       | 6.800           | 7.000 | 7.200 |
| D1      | 6.800           | 6.900 | 7.200 |
| D2      | 1.100           | 1.200 | 1.300 |
| D3      | 1.550           | 1.650 | 1.750 |
| D4      |                 | 6.560 |       |
| D5      |                 | 5.700 |       |
| D6      |                 | 5.560 |       |
| E       | 6.500           | 6.700 | 6.900 |
| E1      | 7.800           | 8.000 | 8.200 |
| E2      | 0.600           | 0.700 | 0.800 |
| E3      | 0.500           | 0.600 | 0.700 |
| E4      |                 | 2.430 |       |
| E5      |                 | 2.300 |       |
| E6      |                 | 5.180 |       |
| E7      |                 | 2.550 |       |
| E8      |                 | 2.500 |       |
| e       |                 | 1.600 |       |
| e1      |                 | 1.300 |       |
| L       | 1.050           | 1.150 | 1.250 |
| L1      | 0.800           | 0.900 | 1.000 |
| L2      | 0.150           | 0.250 | 0.350 |
| P       | 1.400           | 1.500 | 1.600 |
| Q       | 0               | 0.080 | 0.100 |
| W       | 8°              | 10°   | 11°   |