

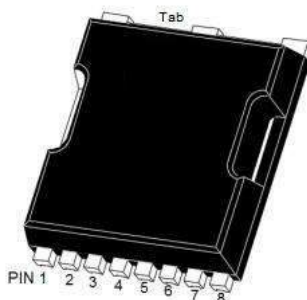
### Features

- Uses MOT advanced double trench technology
- Low On-Resistance (  $R_{DS(on)} \leq 22m\Omega$  )
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% avalanche tested
- Pb-free plating; RoHS compliant

### Applications

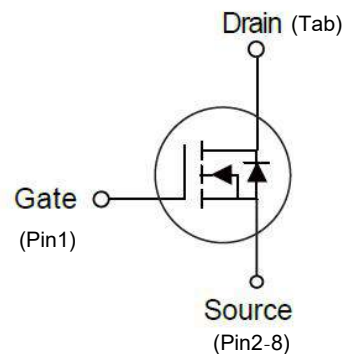
- Battery management
- Motor control and drive
- Synchronous rectification
- Switching applications

### Pin configuration (Top view)



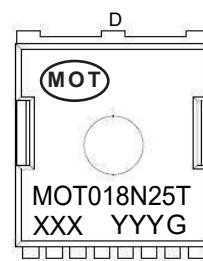
TOLL-8

### Symbol



### Key Performance Parameters

| Parameter         | Value | Unit |
|-------------------|-------|------|
| $V_{DS}$          | 250   | V    |
| $R_{DS(on),typ.}$ | 19    | mΩ   |
| $I_D$             | 90    | A    |



G S S S S S S S

XXX=Lot Number  
YYY=Year Week  
G=Vth Range

### Marking

### Ordering information

| Type/Ordering Code | Package | Marking    | Packing&Qty.(pcs) |
|--------------------|---------|------------|-------------------|
| MOT018N25T         | TOLL-8  | MOT018N25T | 2000/Reel         |

■ **ABSOLUTE MAXIMUM RATINGS** ( $T_C = 25^{\circ}\text{C}$  unless otherwise noted)

| Parameter                                             | Symbol                     | Limit      | Unit                 |
|-------------------------------------------------------|----------------------------|------------|----------------------|
| Drain-Source Voltage                                  | $V_{DS}$                   | 250        | V                    |
| Gate-Source Voltage                                   | $V_{GS}$                   | $\pm 20$   | V                    |
| Drain Current-Continuous                              | $I_D$                      | 90         | A                    |
| Drain Current-Continuous( $T_C=100^{\circ}\text{C}$ ) | $I_D(100^{\circ}\text{C})$ | 63.6       | A                    |
| Pulsed Drain Current                                  | $I_{DM}$                   | 360        | A                    |
| Maximum Power Dissipation                             | $P_D$                      | 330        | W                    |
| Single pulse avalanche energy                         | $E_{AS}$                   | 1700       | mJ                   |
| Thermal Resistance,Junction-to-Case                   | $R_{\theta JC}$            | 0.45       | $^{\circ}\text{C/W}$ |
| Operating Junction and Storage Temperature Range      | $T_J, T_{STG}$             | -55 To 175 | $^{\circ}\text{C}$   |

**■ ELECTRICAL CHARACTERISTICS** (  $T_C=25^{\circ}\text{C}$ , unless otherwise specified)

| Parameter                          | Symbol       | Conditions                                            | Min | Typ  | Max       | Unit       |
|------------------------------------|--------------|-------------------------------------------------------|-----|------|-----------|------------|
| Off characteristics                |              |                                                       |     |      |           |            |
| Drain-Source Breakdown Voltage     | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                             | 250 | -    | -         | V          |
| Zero Gate Voltage Drain Current    | $I_{DSS}$    | $V_{DS}=250V, V_{GS}=0V$                              | -   | -    | 1         | $\mu A$    |
| Gate-Body Leakage Current          | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$                           | -   | -    | $\pm 100$ | nA         |
| On characteristics                 |              |                                                       |     |      |           |            |
| Gate Threshold Voltage             | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                         | 2.0 | -    | 4.0       | V          |
| Drain-Source On-State Resistance   | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=45A$                                 | -   | 19   | 22        | m $\Omega$ |
| Gate resistance                    | $R_G$        |                                                       | -   | 1.6  | -         | $\Omega$   |
| Forward Transconductance           | $g_{FS}$     | $V_{DS}=10V, I_D=5A$                                  | 10  | -    | -         | S          |
| Dynamic characteristics            |              |                                                       |     |      |           |            |
| Input Capacitance                  | $C_{iss}$    | $V_{DS}=25V, V_{GS}=0V,$<br>$F=1.0MHz$                | -   | 7000 | -         | PF         |
| Output Capacitance                 | $C_{oss}$    |                                                       | -   | 2500 | -         | PF         |
| Reverse Transfer Capacitance       | $C_{rss}$    |                                                       | -   | 1700 | -         | PF         |
| Switching characteristics          |              |                                                       |     |      |           |            |
| Turn on Delay Time                 | $t_{d(on)}$  | $V_{DD}=125V, I_D=45A$<br>$V_{GS}=10V, R_G=4.7\Omega$ | -   | 19.5 | -         | nS         |
| Turn-on Rise Time                  | $t_r$        |                                                       | -   | 28   | -         | nS         |
| Turn-Off Delay Time                | $t_{d(off)}$ |                                                       | -   | 48   | -         | nS         |
| Turn-Off Fall Time                 | $t_f$        | $V_{DS}=125V, I_D=45A,$<br>$V_{GS}=10V$               | -   | 15   | -         | nS         |
| Total Gate Charge                  | $Q_g$        |                                                       | -   | 90.9 | -         | nC         |
| Gate-Source Charge                 | $Q_{gs}$     |                                                       | -   | 40.4 | -         | nC         |
| Gate-Drain Charge                  | $Q_{gd}$     |                                                       | -   | 18   | -         | nC         |
| Drain-source diode characteristics |              |                                                       |     |      |           |            |
| Diode Forward Voltage              | $V_{SD}$     | $V_{GS}=0V, I_S=90A$                                  | -   | -    | 1.2       | V          |
| Diode Forward Current              | $I_S$        |                                                       | -   | -    | 90        | A          |
| Reverse Recovery Time              | $t_{rr}$     | $T_J=25^{\circ}C, I_F=45A$<br>$di/dt=100A/\mu s$      | -   | 186  | -         | nS         |
| Reverse Recovery Charge            | $Q_{rr}$     |                                                       | -   | 1.35 | -         | $\mu C$    |

## ■ TYPICAL CHARACTERISTICS

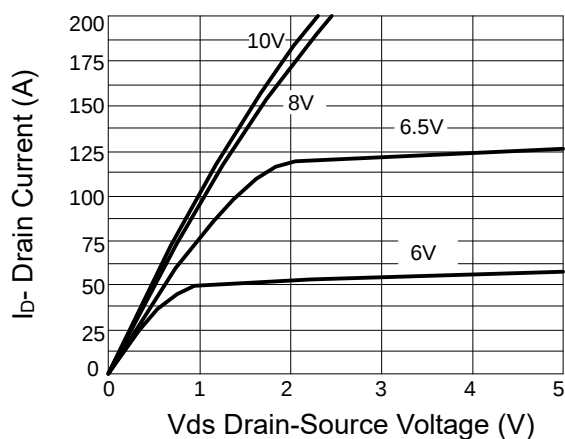


Figure 1 Output Characteristics

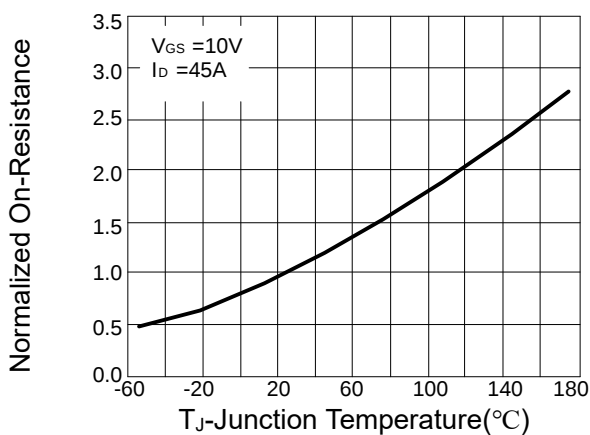


Figure 2 Rdson-Junction Temperature

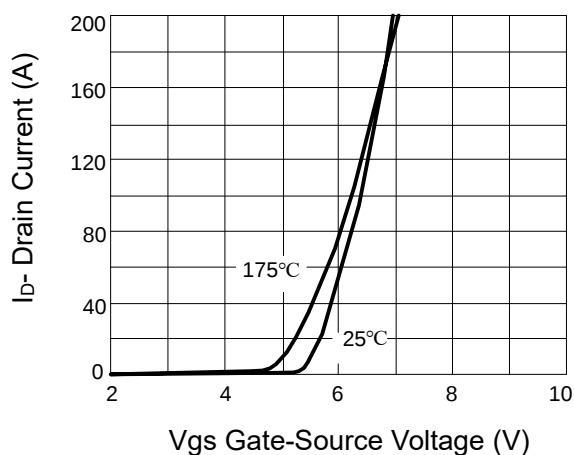


Figure 3 Transfer Characteristics

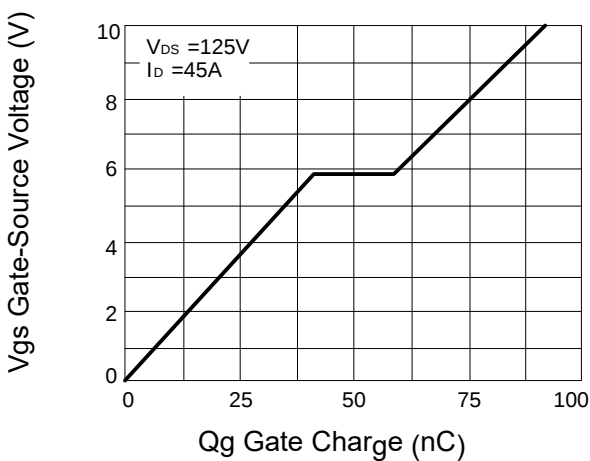


Figure 4 Gate Charge

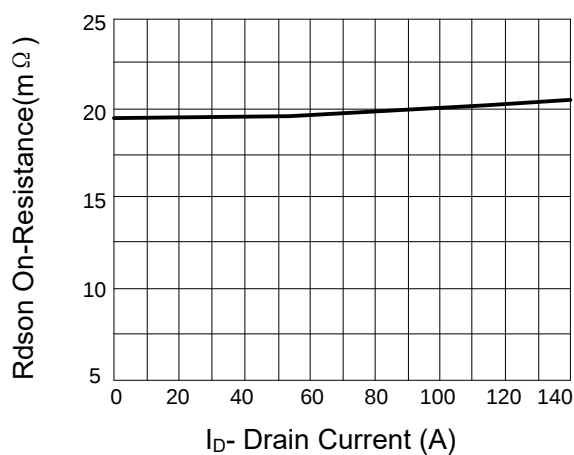


Figure 5 Rdson- Drain Current

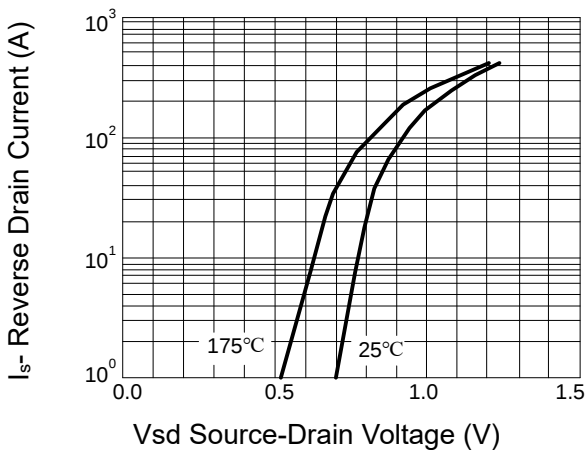


Figure 6 Source- Drain Diode Forward

■ TYPICAL CHARACTERISTICS(Cont.)

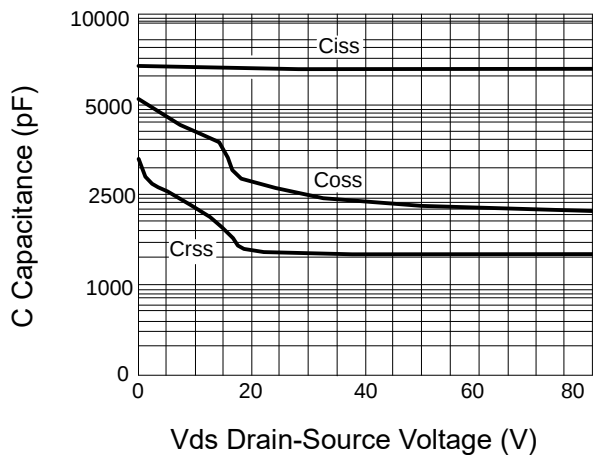


Figure 7 Capacitance vs  $V_{ds}$

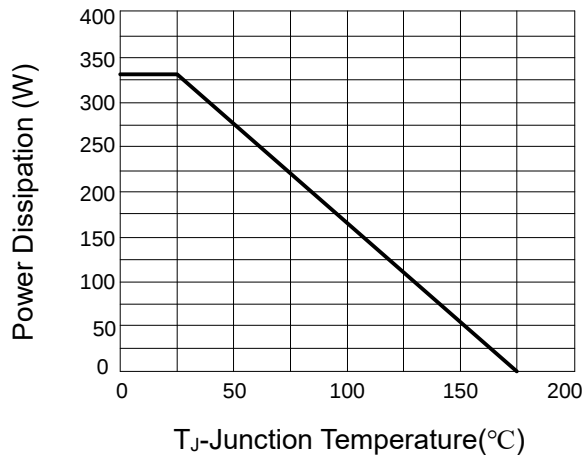


Figure 8 Power De-rating

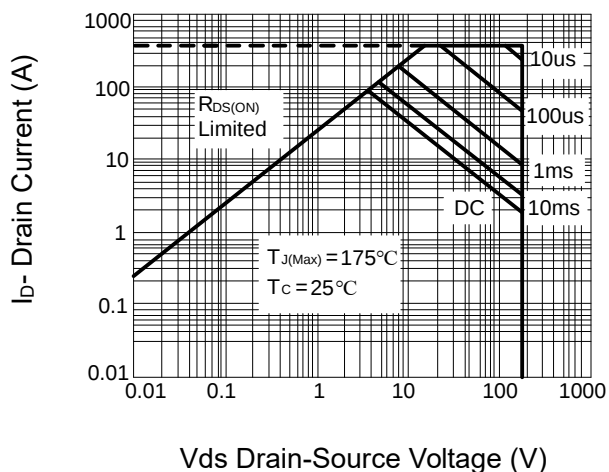


Figure 9 Safe Operation Area

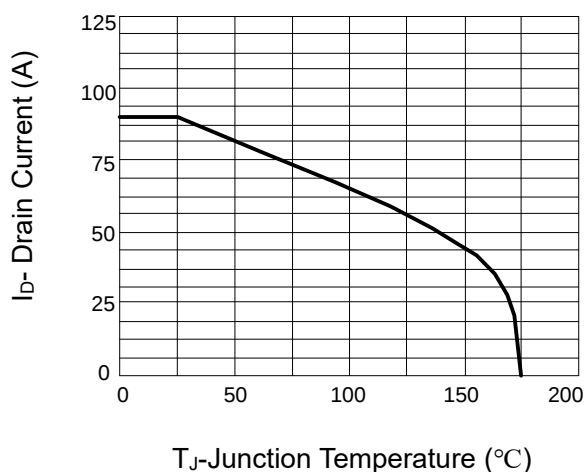
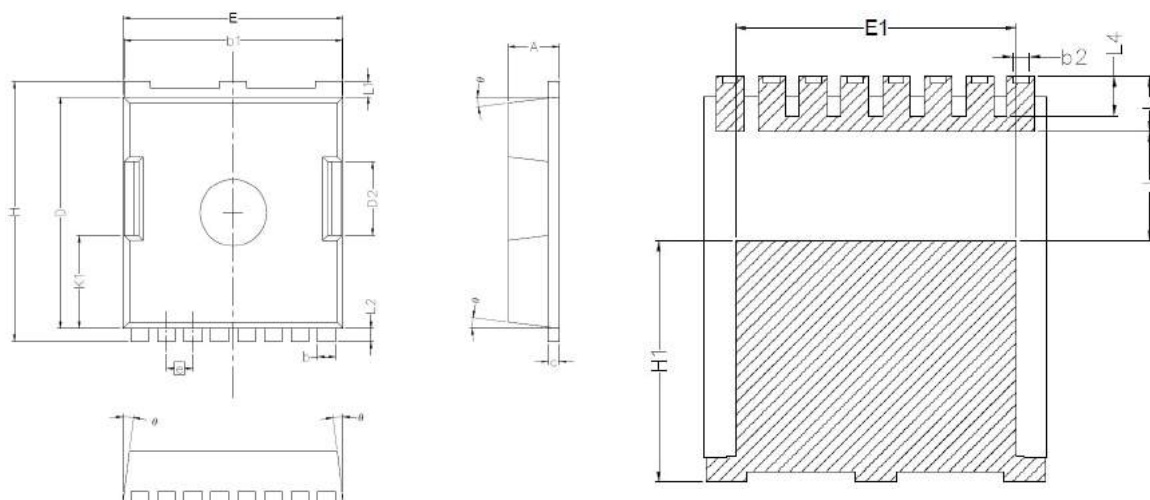


Figure 10 Current De-rating

**■ TOLL-8L PACKAGE OUTLINE DIMENSIONS**


| Symbol | Dimesions In Millimeters |       |
|--------|--------------------------|-------|
|        | Min.                     | Max.  |
| A      | 2.20                     | 2.40  |
| b      | 0.70                     | 0.90  |
| b1     | 9.70                     | 9.90  |
| b2     | 0.42                     | 0.50  |
| c      | 0.40                     | 0.60  |
| D      | 10.28                    | 10.58 |
| D2     | 3.10                     | 3.50  |
| E      | 9.70                     | 10.10 |
| E1     | 7.90                     | 8.30  |
| e      | 1.20BSC                  |       |
| H      | 11.48                    | 11.88 |
| H1     | 6.75                     | 7.15  |
| N      | 8                        |       |
| J      | 3.00                     | 3.30  |
| K1     | 3.98                     | 4.38  |
| L      | 1.40                     | 1.80  |
| L1     | 0.60                     | 0.80  |
| L2     | 0.50                     | 0.70  |
| L4     | 1.00                     | 1.30  |
| θ      | 4°                       | 10°   |

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