

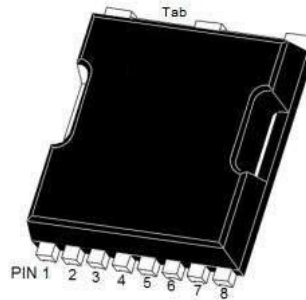
### Features

- Uses MOT advanced double trench technology
- Low On-Resistance (  $R_{DS(on)} \leq 4.0m\Omega$  )
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% avalanche tested
- Pb-free plating; RoHS compliant

### Applications

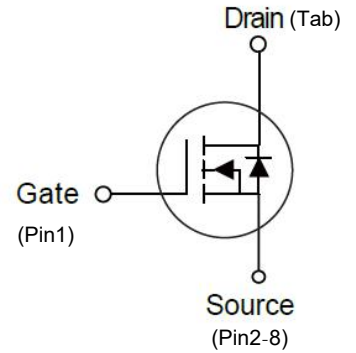
- Battery management
- Motor control and drive
- Synchronous rectification
- Switching applications

### Pin configuration (Top view)



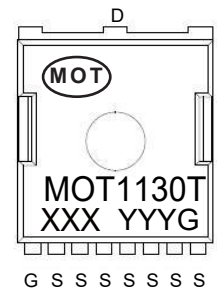
TOLL-8

### Symbol



### Key Performance Parameters

| Parameter         | Value | Unit |
|-------------------|-------|------|
| $V_{DS}$          | 100   | V    |
| $R_{DS(on),typ.}$ | 3.0   | mΩ   |
| $I_D$             | 176   | A    |



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

### Marking

### Ordering information

| Type/Ordering Code | Package | Marking  | Packing&Qty.(pcs) |
|--------------------|---------|----------|-------------------|
| MOT1130T           | TOLL-8  | MOT1130T | 2000/Reel         |

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

| Parameter                                           | Symbol          | Max        | Unit                |
|-----------------------------------------------------|-----------------|------------|---------------------|
| Drain-Source Voltage                                | $V_{DS}$        | 100        | V                   |
| Gate-Source Voltage                                 | $V_{GS}$        | $\pm 20$   | V                   |
| Drain Current-Continuous                            | $I_D$           | 176        | A                   |
| Drain Current-Continuous( $T_C=100^\circ\text{C}$ ) | $I_D$           | 124        | A                   |
| Pulsed Drain Current                                | $I_{DM}$        | 704        | A                   |
| Maximum Power Dissipation                           | $P_D$           | 263        | W                   |
| Derating factor                                     |                 | 1.73       | W/ $^\circ\text{C}$ |
| Single Pulsed Avalanche Energy                      | $E_{AS}$        | 1200       | mJ                  |
| Operating Junction and Storage temperature          | $T_J, T_{STG}$  | -55 to 175 | $^\circ\text{C}$    |
| Thermal Resistance- Junction to Case                | $R_{\theta JC}$ | 0.57       | $^\circ\text{C/W}$  |

■ 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 <sub>DSS</sub>   | V <sub>GS</sub> = 0 V, I <sub>DS</sub> = 250 μA                                                  | 100 | -    | -    | V    |
| Drain Leakage Current              | I <sub>DSS</sub>    | V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V                                                   | -   | -    | 1    | μA   |
| Gate Leakage Current               | I <sub>GSS</sub>    | V <sub>GS</sub> = 0 V, V <sub>GS</sub> = ± 20 V                                                  | -   | -    | ±100 | nA   |
| On Characteristics                 |                     |                                                                                                  |     |      |      |      |
| Gate Threshold Voltage             | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA                                     | 2   | -    | 4    | V    |
| On-State Resistance                | R <sub>DS(ON)</sub> | V <sub>GS</sub> = 10 V, I <sub>DS</sub> = 50 A                                                   | -   | 3.0  | 4.0  | mΩ   |
| Forward Transconductance           | g <sub>FS</sub>     | V <sub>DS</sub> = 10 V, I <sub>DS</sub> = 80 A                                                   | 30  | -    | -    | S    |
| Dynamic Characteristics            |                     |                                                                                                  |     |      |      |      |
| Input Capacitance                  | C <sub>iss</sub>    | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 50 V<br>Frequency = 1 MHz                               | -   | 7500 | -    | pF   |
| Output Capacitance                 | C <sub>oss</sub>    |                                                                                                  | -   | 755  | -    | pF   |
| Reverse Transfer Capacitance       | C <sub>rss</sub>    |                                                                                                  | -   | 45   | -    | pF   |
| Switching Characteristics          |                     |                                                                                                  |     |      |      |      |
| Turn-on Delay Time                 | t <sub>d(on)</sub>  | V <sub>DD</sub> = 50 V, V <sub>GS</sub> = 10 V,<br>I <sub>D</sub> = 80 A, R <sub>G</sub> = 4.7 Ω | -   | 20   | -    | nS   |
| Turn-on Rise Time                  | t <sub>r</sub>      |                                                                                                  | -   | 78   | -    | nS   |
| Turn-off Delay Time                | t <sub>d(off)</sub> |                                                                                                  | -   | 50   | -    | nS   |
| Turn-off Fall Time                 | t <sub>f</sub>      |                                                                                                  | -   | 16   | -    | nS   |
| Total Gate Charge                  | Q <sub>g</sub>      | V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 10 V,<br>I <sub>DS</sub> = 80 A                        | -   | 100  | -    | nC   |
| Gate-Source Charge                 | Q <sub>gs</sub>     |                                                                                                  | -   | 43.4 | -    | nC   |
| Gate-Drain Charge                  | Q <sub>gd</sub>     |                                                                                                  | -   | 19.7 | -    | nC   |
| Drain-source diode Characteristics |                     |                                                                                                  |     |      |      |      |
| Diode Forward Voltage              | V <sub>SD</sub>     | I <sub>SD</sub> =160 A, V <sub>GS</sub> = 0 V                                                    | -   | -    | 1.2  | V    |
| Diode Forward Current              | I <sub>S</sub>      |                                                                                                  | -   | -    | 176  | A    |
| Reverse Recovery Time              | t <sub>rr</sub>     | T <sub>J</sub> = 25°C, I <sub>F</sub> = I <sub>S</sub>                                           | -   | 65   | -    | nS   |
| Reverse Recovery Charge            | Q <sub>rr</sub>     | di/dt = 100A/μs                                                                                  | -   | 97   | -    | nC   |

■ TYPICAL CHARACTERISTICS

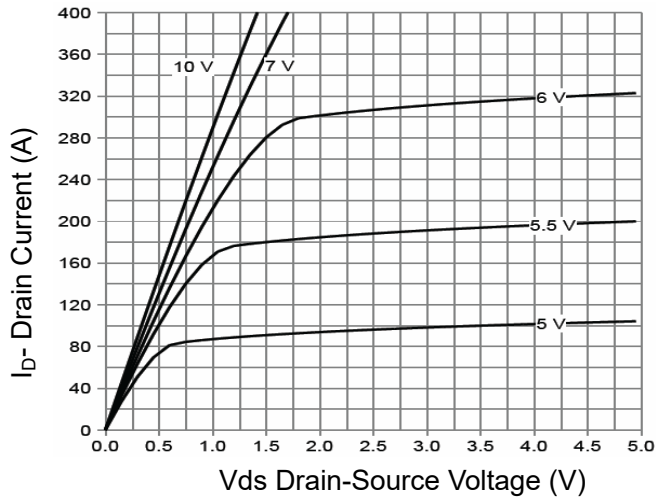


Figure1 output characteristics

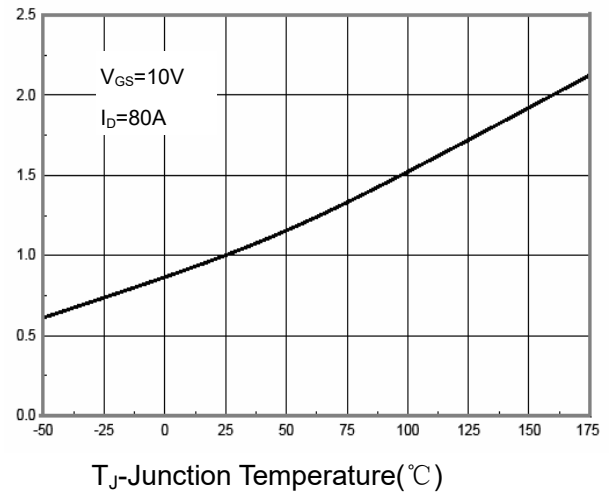


Figure2 Normalized  $R_{DS(on)}$ -junction temperature

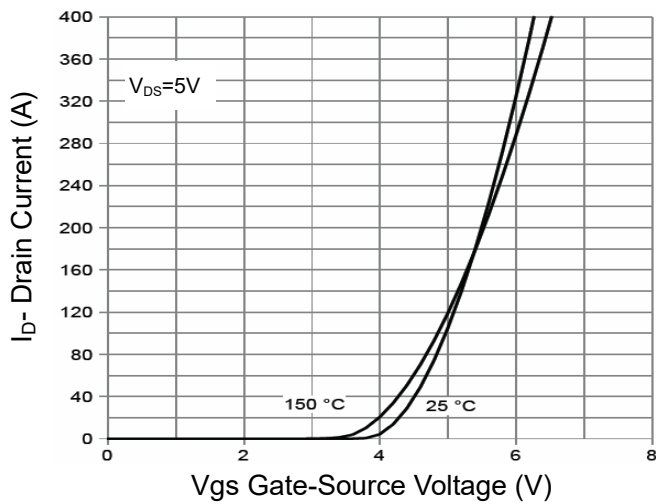


Figure3 transfer characteristics

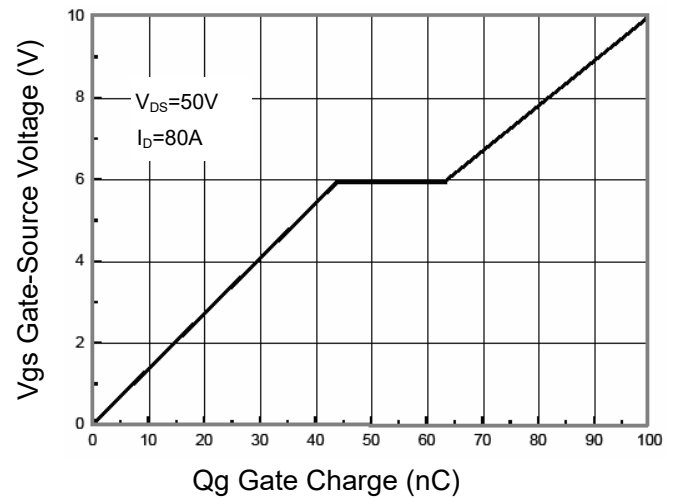


Figure4 gate charge

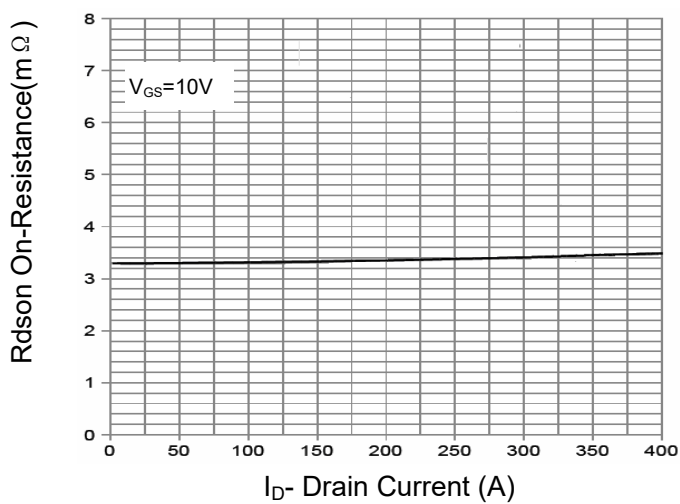


Figure5  $R_{DS(on)}$ -Drain current

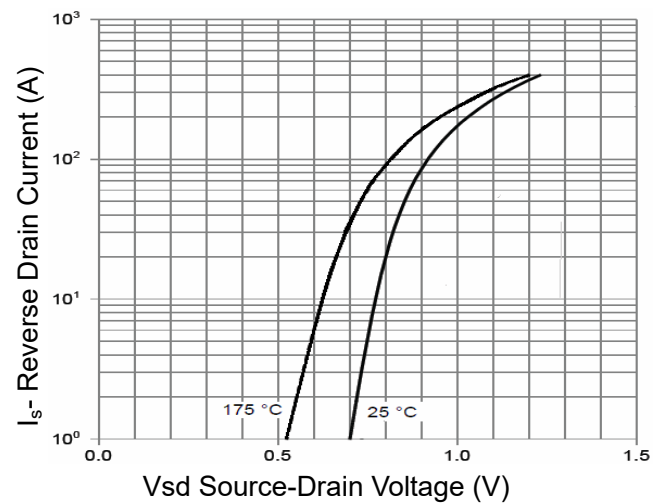


Figure6 Source-Drain diode forward

■ TYPICAL CHARACTERISTICS(Cont.)

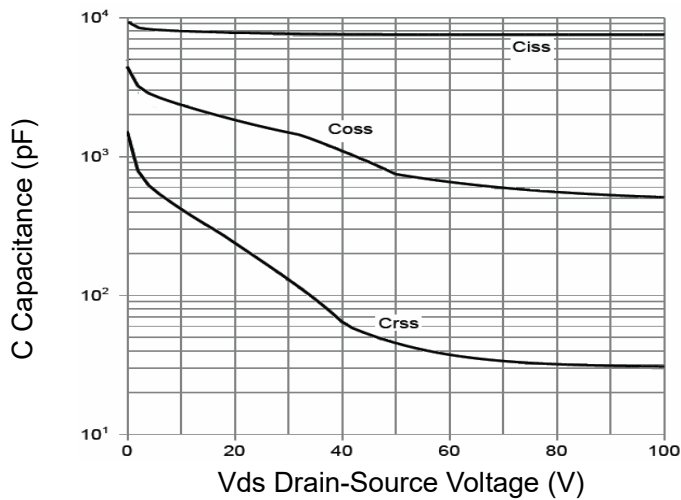


Figure7 capacitance vs vds

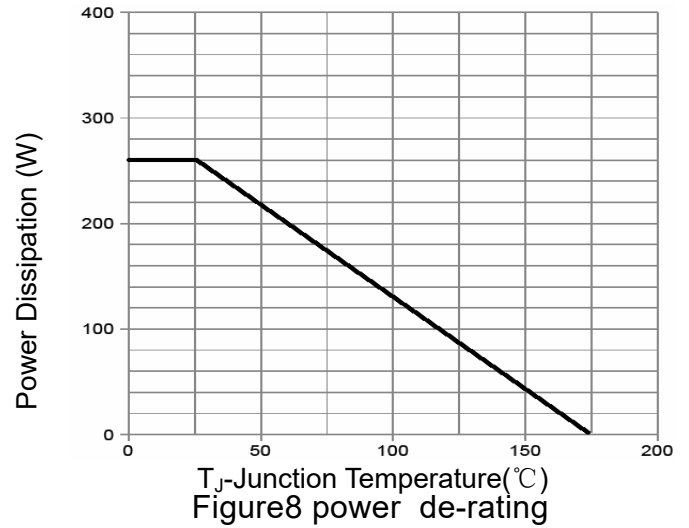


Figure8 power de-rating

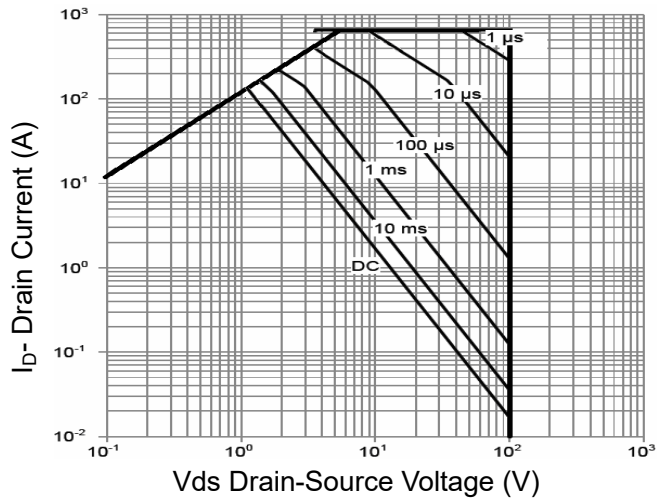


Figure9 safe operation area

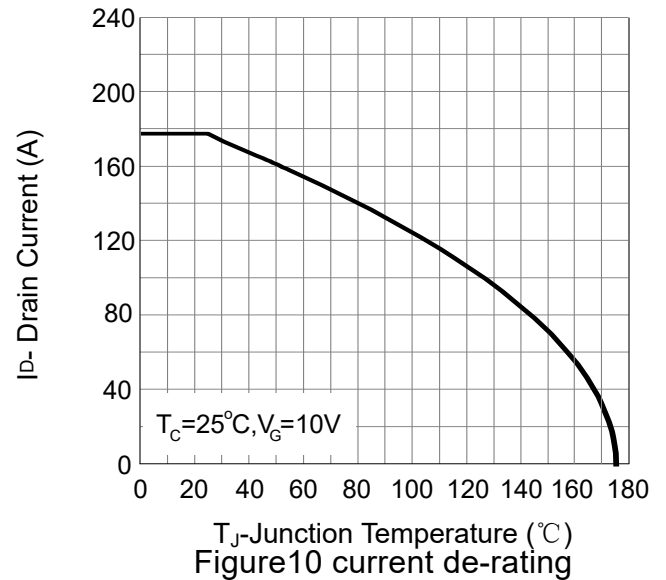


Figure10 current de-rating

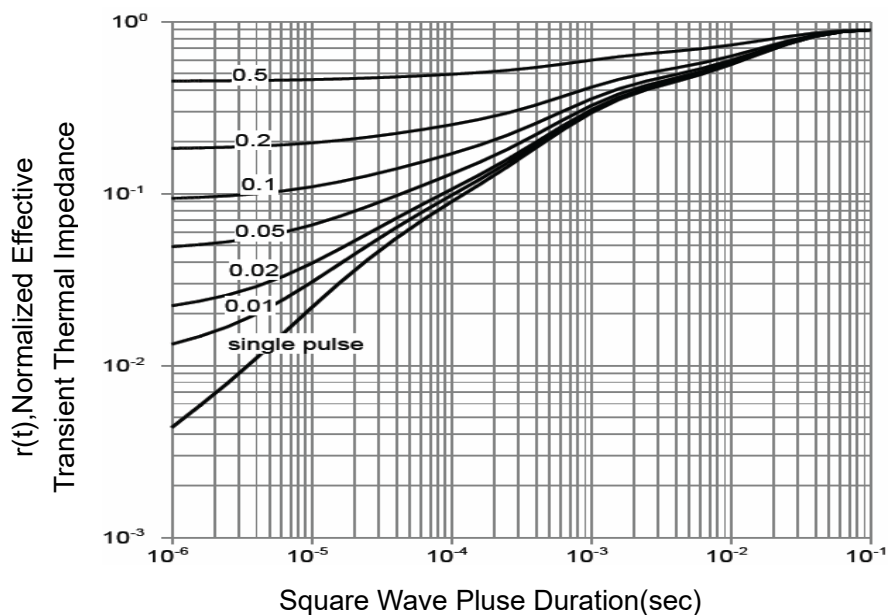
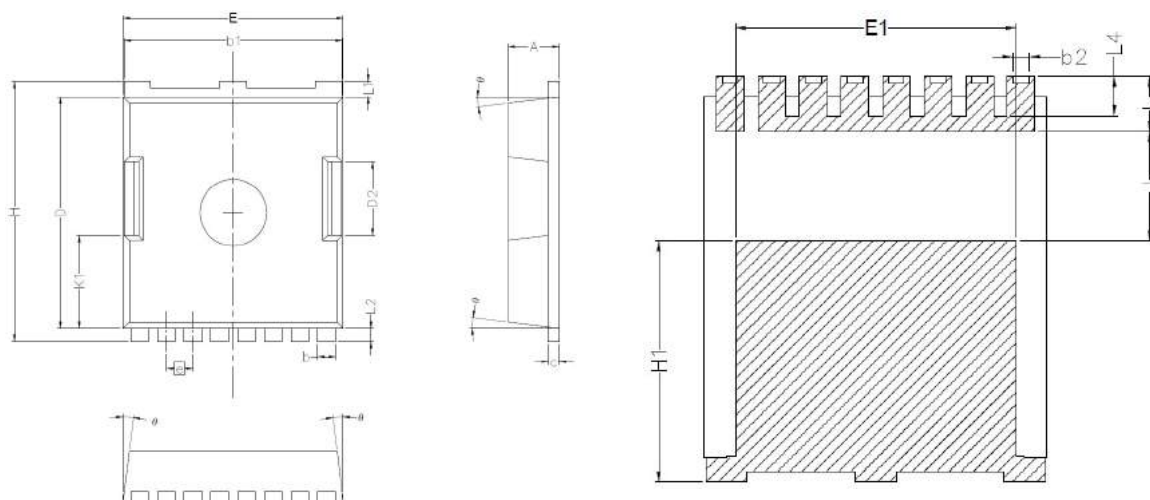


Figure11 normalized maximum transfer thermal impedance

■ 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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