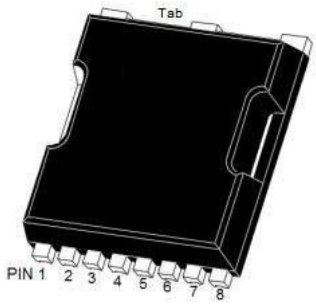
## Features

- Uses MOT advanced double trench technology
- Low On-Resistance ( RDS(on)≤4.8mΩ )
- Low Gate Charge
- Low Reverse transfer capacitances
- 100% avalanche tested
- Pb-free plating; RoHS compliant

## Applications

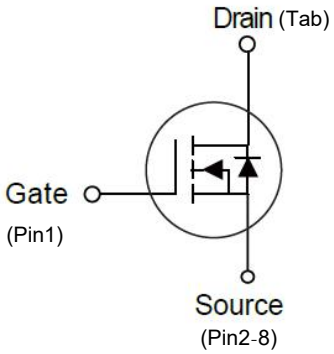
- Battery management
- Motor control and drive
- Synchronous rectification
- Switching applications

**Pin configuration (Top view)**



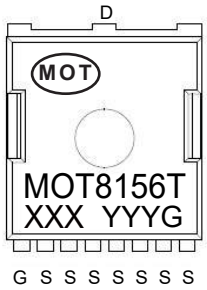

**TOLL-8**

**Symbol**




## Key Performance Parameters

| Parameter | Value | Unit |
|---|---|---|
| $V_{DS}$ | 85 | V |
| $R_{DS}$(on),typ. | 3.8 | mΩ |
| $I_D$ | 163 | A |




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

**Marking**

## Ordering information

| Type/Ordering Code | Package | Marking | Packing&Qty.(pcs) |
|---|---|---|---|
| MOT8156T | TOLL-8 | MOT8156T | 2000/Reel |

## ■ ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25°C unless otherwise noted)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | | $V_{DS}$ | 85 | V |
| Gate-to-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current * | $T_C$ = 25°C | $I_D$ | 163 | A |
| | $T_C$ = 100°C | $I_D$ | 115 | A |
| Pulsed Drain Current *** | | $I_{DM}$ | 652 | A |
| Avalanche Energy | | $E_{AS}$ | 486 | mJ |
| Power Dissipation | $T_C$ = 25°C | $P_D$ | 268 | W |
| | $T_C$ = 100°C | $P_D$ | 134 | W |
| Junction & Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 175 | °C |
| Thermal Resistance, Junction-to-Ambient ** | | $R_{\theta JA}$ | 56 | °C/W |
| Thermal Resistance, Junction-to-Case** | | $R_{\theta JC}$ | 0.56 | °C/W |

## ■ ELECTRICAL CHARACTERISTICS ( $T_C$=25°C, unless otherwise specified)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Static parameter | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$ = 250μA, $V_{GS}$ = 0V | 85 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 85V, $V_{GS}$ = 0V | - | - | 1.0 | μA |
| | | $T_J$ = 55°C | - | - | 5.0 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2.0 | - | 4.0 | V |
| Static Drain-Source ON-Resistance [a] | $R_{DS(ON)}$ | $V_{GS}$ = 10V, $I_D$ = 20A | - | 3.8 | 4.8 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$ = 5V, $I_D$ = 20A | 10 | - | - | S |
| Diode Forward Voltage [a] | $V_{SD}$ | $I_S$ = 1A, $V_{GS}$ = 0V | - | - | 1 | V |
| Diode Continuous Current | $I_S$ | $T_C$ = 25°C | - | - | 163 | A |
| Dynamic parameter | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 50V, f = 1MHz | - | 4102 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 592 | - | pF |
| Reverse Transfer Capacitance [b] | $C_{rss}$ | | - | 19.8 | - | pF |
| Gate Resistance | $R_g$ | $V_{GS}$ = 0V, $V_{DS}$= 0V, f = 1MHz | - | 2.5 | - | Ω |
| Switching parameter [b] | | | | | | |
| Total Gate Charge (@ $V_{GS}$ = 10V) | $Q_g$ | $V_{GS}$ = 0 to 10V, $V_{DS}$ = 50V, $I_D$ = 20A | - | 69 | - | nC |
| Total Gate Charge (@ $V_{GS}$ = 6.0V) | $Q_g$ | | - | 44 | - | nC |
| Gate Source Charge | $Q_{gs}$ | | - | 24 | - | nC |
| Gate Drain Charge | $Q_{gd}$ | | - | 18.5 | - | nC |
| Turn-On DelayTime | $t_{D(on)}$ | $V_{GS}$ = 10V, $V_{DS}$ = 50V, $R_L$ = 2.5Ω, $R_{GEN}$ = 6Ω | - | 18.0 | - | nS |
| Turn-On Rise Time | $t_r$ | | - | 23 | - | nS |
| Turn-Off DelayTime | $t_{D(off)}$ | | - | 37 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 15.7 | - | nS |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $I_F$ = 20A, $dI_F/dt$ = 100A/μs | - | 64 | - | nS |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | $I_F$ = 20A, $dI_F/dt$ = 100A/μs | - | 126 | - | nC |

Notes：

* Pulse width 300 us, duty cycle 2 %

** Surface Mounted on minimum footprint pad area.

*** Limited by bonding wire

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

b : Guaranteed by design, not subject to production testing

## ■ ELECTRICAL CHARACTERISTICS

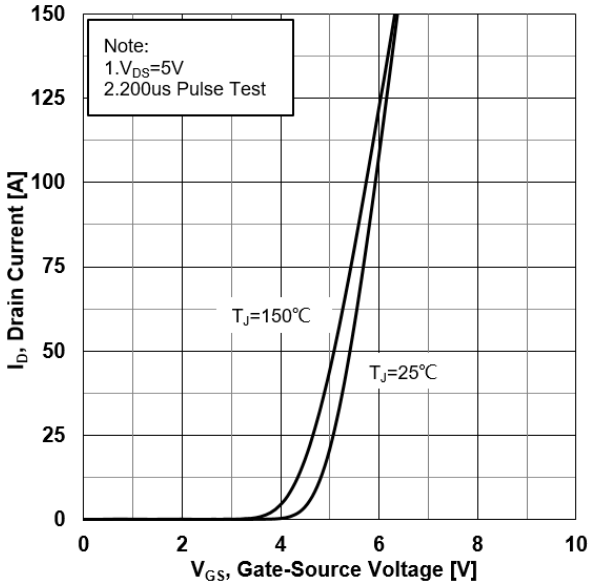



Figure 1. Typical Transfer Characteristics

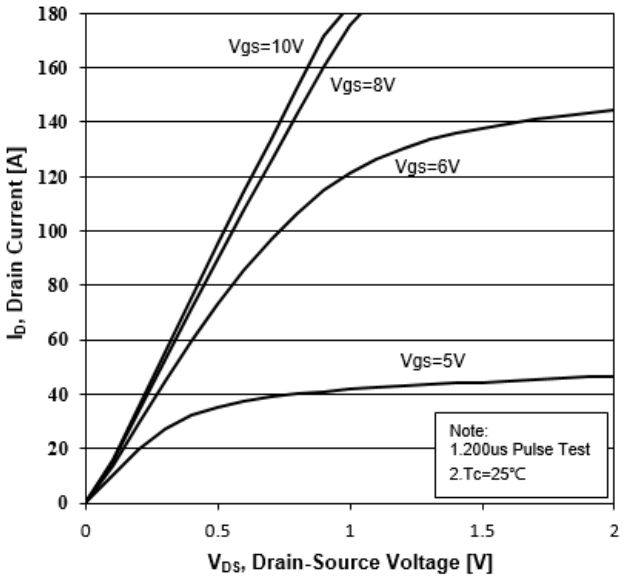



Figure 2. Typical Output Characteristics

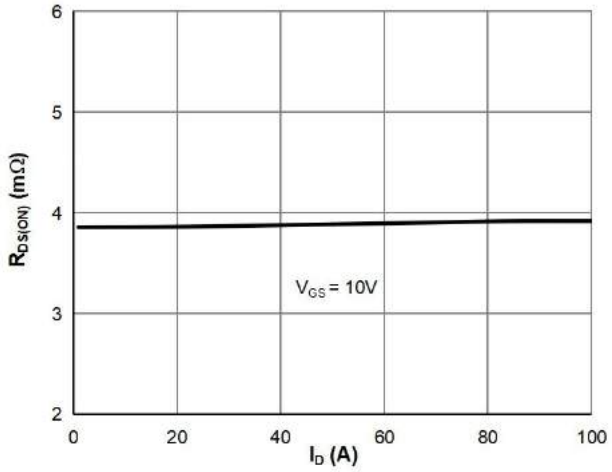



Figure 3: $R_{DS(ON)}$ vs. Drain Current

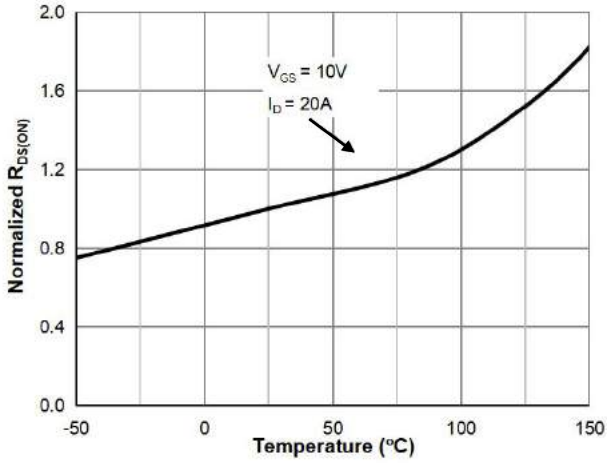



Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

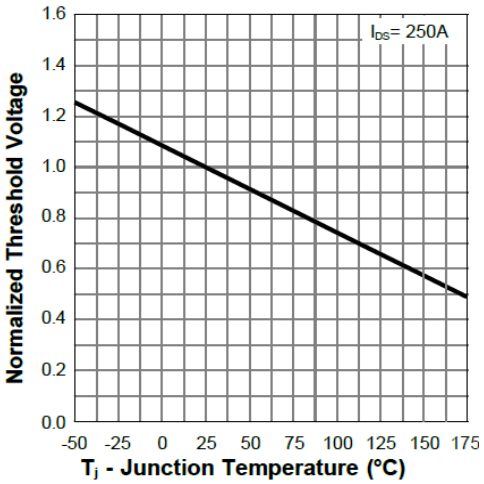



Figure 5. Normalized Threshold Voltage

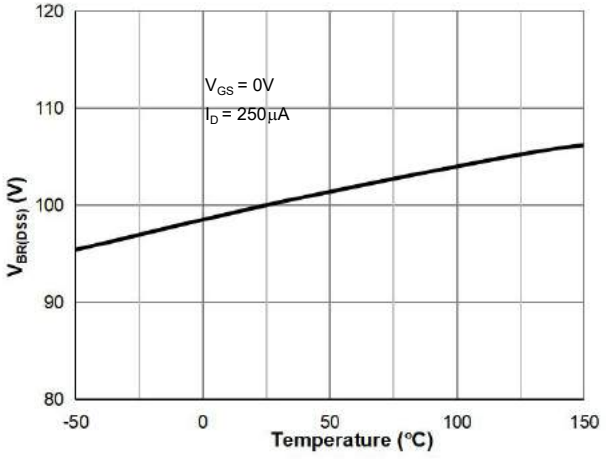



Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

■ TYPICAL CHARACTERISTICS(Cont.)

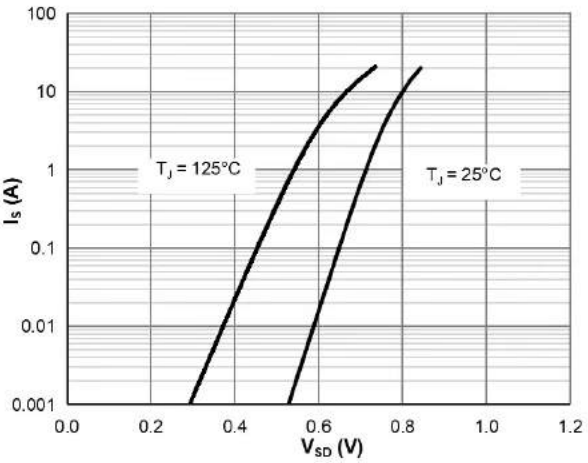



Figure 7: Body-Diode Characteristics

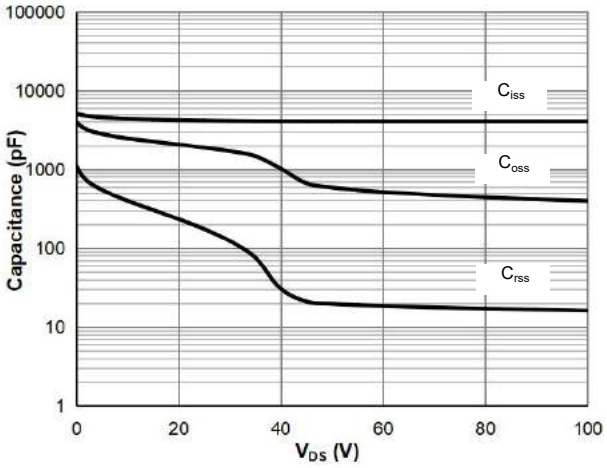



Figure 8: Capacitance Characteristics

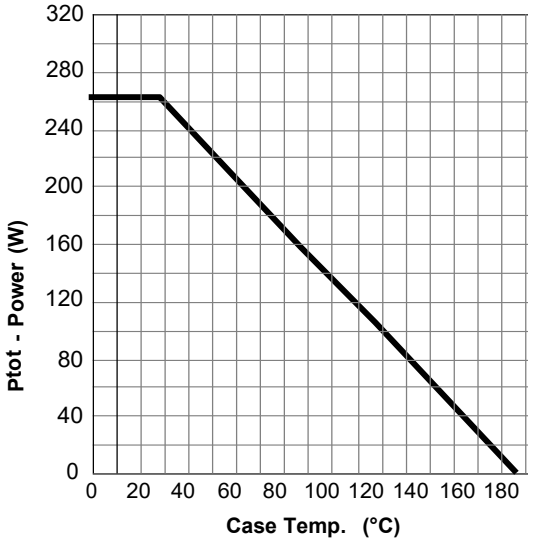



Figure 9. Maximum Power Dissipation vs Case Temp.

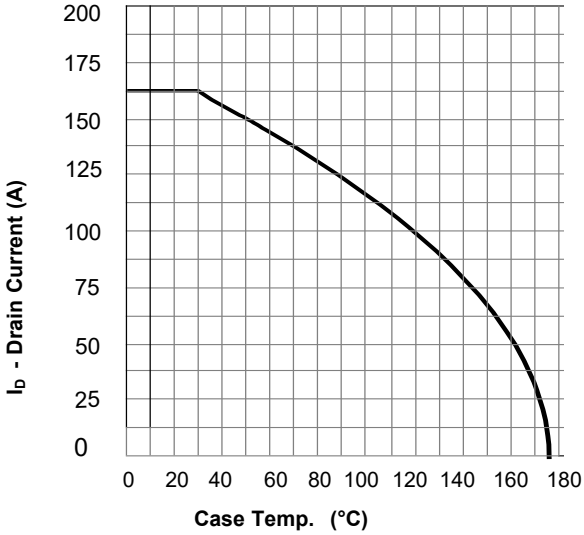



Figure 10. Maximum Continuous Drain Current vs Case Temp.

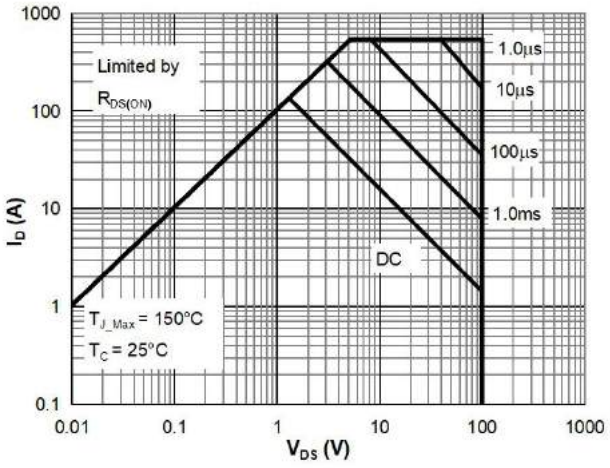



Figure 11: Maximum Safe Operating Area

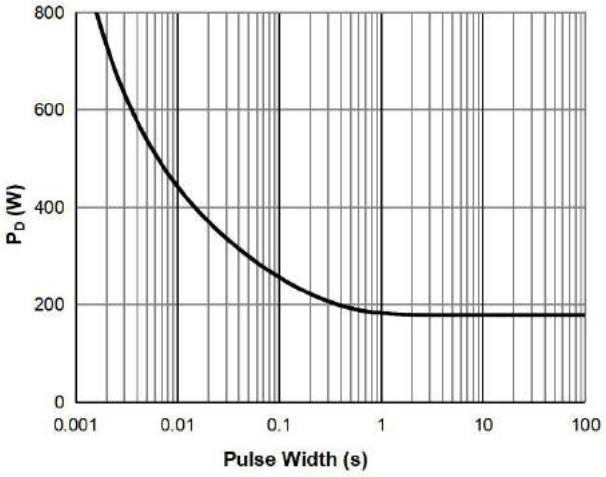



Figure 12: Single Pulse Power Rating, Junction-to-Case

■ TYPICAL CHARACTERISTICS(Cont.)

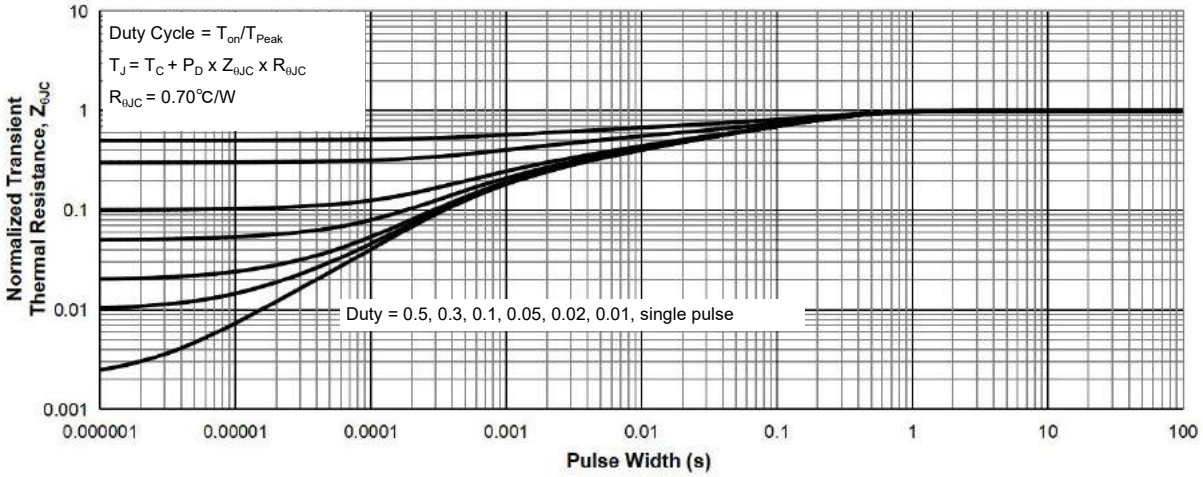
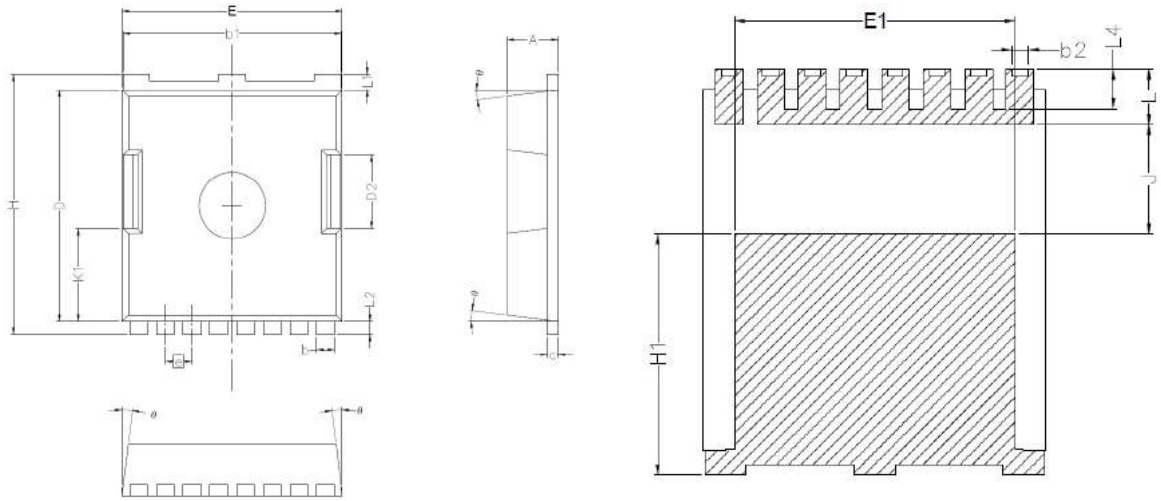



**Figure 13: Normalized Maximum Transient Thermal Impedance**

■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 |
| $\theta$ | 4° | 10° |

- The information contained hSurface-mounted package  Advnced terch cell design  Super trencherein is subject to change without notice.

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