## DESCRIPTION

The MXT015N10TAL uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

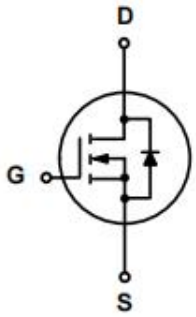
## GENERAL FEATURES

- $V_{DS}$=100V, $I_D$=500A
  $R_{DS(ON)}$(Typ.)=1.4mΩ @ $V_{GS}$=10V
- Advanced trench cell design
- Super-mounted package
- Super Trench

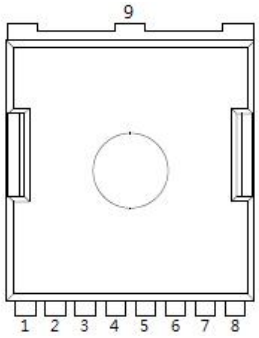
## APPLICATION

- Power Tool appliances
- High power inverter system
- BMS appliances

## PINOUT




Schematic diagram




TOLL-8L top view

| Pin | Description |
|---|---|
| 1 | Gate(G) |
| 2,3,4,5,6,7,8 | Source(S) |
| 9 | Drain(D) |

## ORDERING INFORMATION

| Part Number | StorageTemperature | Package | Devices Per Reel |
|---|---|---|---|
| MXT015N10TAL | -55°C to 175°C | TOLL-8L | 2000 |

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

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current($V_{GS}$=10V)(Note3) | $I_D$ | 500 | A |
| Drain Current($T_C$=100°C, $V_{GS}$=10V)(Note3) | $I_D$ | 367 | A |
| Pulsed Drain Current($V_{GS}$=10V)(Note1)(Note3) | $I_{DM}$ | 1200 | A |
| Diode Forward Current | $I_S$ | 500 | A |
| Drain Power Dissipation | $P_{tot}$ | 500 | W |
| Operating Junction and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to 175 | °C |
| Single Pulsed Avalanche Energy | $E_{AS}$ | 2900 | mJ |
| Thermal Resistance, Junction-to-Ambient(Note2) | $R_{\theta JA}$ | 40 | °C/W |
| Thermal Resistance, Junction-to-Case(Note2) | $R_{\theta JC}$ | 0.25 | °C/W |

Note 1. Pulse width ≤ 300μs, duty cycle ≤ 2%
Note 2. Surface Mounted on minimum footprint pad area
Note 3. Limited by bonding wire

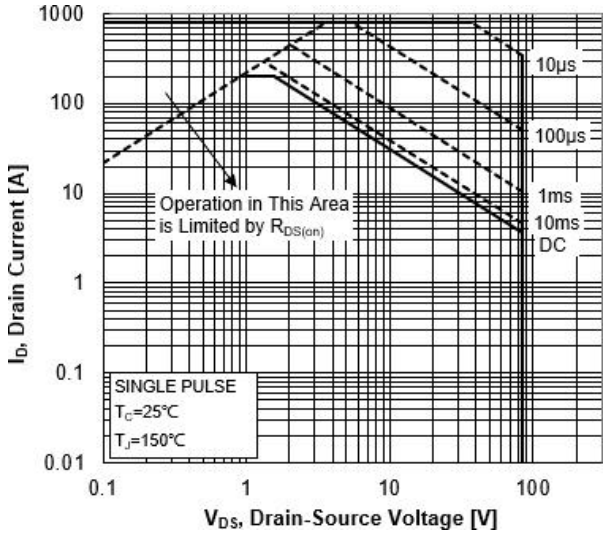
## ELECTRICAL CHARACTERISTICS($T_A$=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 100 | 110 | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=100V, $V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 2.0 | - | 4.0 | V |
| On-State Resistance(Note1) | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_{DS}$=50A | - | 1.4 | 1.6 | mΩ |
| **Dynamic Characteristics(Note2)** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=50V, $V_{GS}$=0V, F=1.0MHz | - | 11260 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 1715 | - | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 328 | - | pF |
| **Switching Characteristics(Note2)** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS}$=50V, $I_{DS}$=50A, $V_{GEN}$=10V, $R_G$=4.5Ω, $R_L$=1Ω, | - | 34 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 26 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 78 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 30 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=50V, $I_{DS}$=50A, $V_{GS}$=10V | - | 224 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 80 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 38 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage(Note1) | $V_{SD}$ | $V_{GS}$=0V, $I_{SD}$=50A | - | - | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_{DS}$=50A, $V_{GS}$=0V $dI_{SD}/dt$=100A/μs | - | 100 | - | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | - | 280 | - | nC |

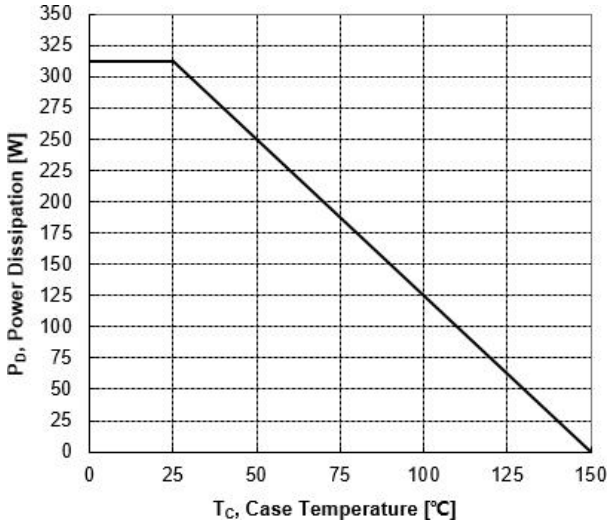
Note 1. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
Note 2. Guaranteed by design, not subject to prduction testing

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

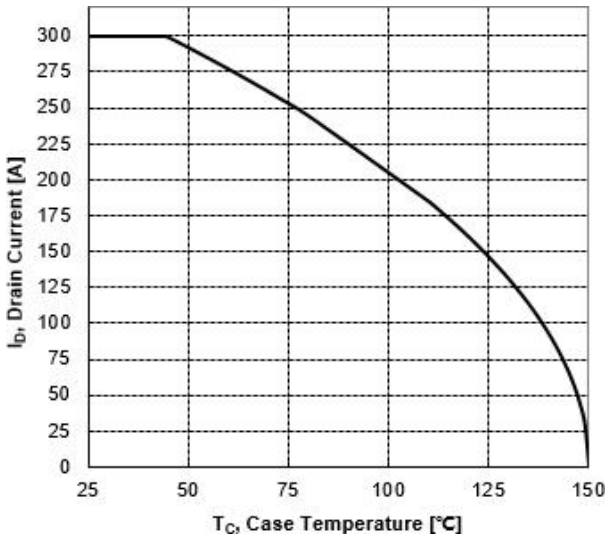
### Figure 1. Safe Operation Area



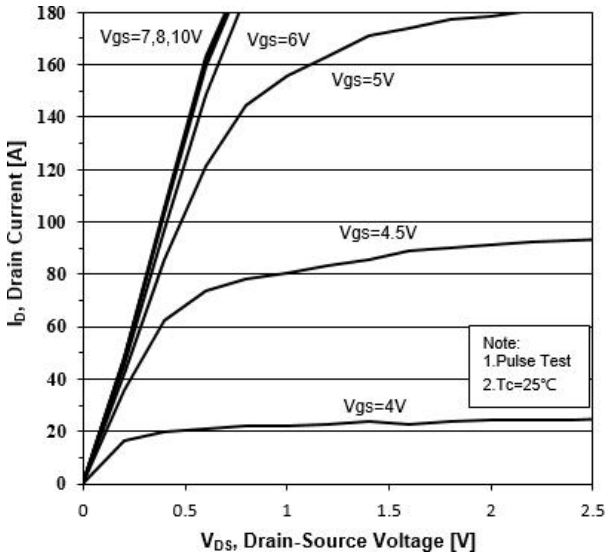

### Figure 2. Maximum Power Dissipation vs Case Temperature




### Figure 3. Maximum Continuous Drain Current vs Case Temperature




### Figure 4. Typical Output Characteristics



## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

**Figure 5. Typical Transfer Characteristics**

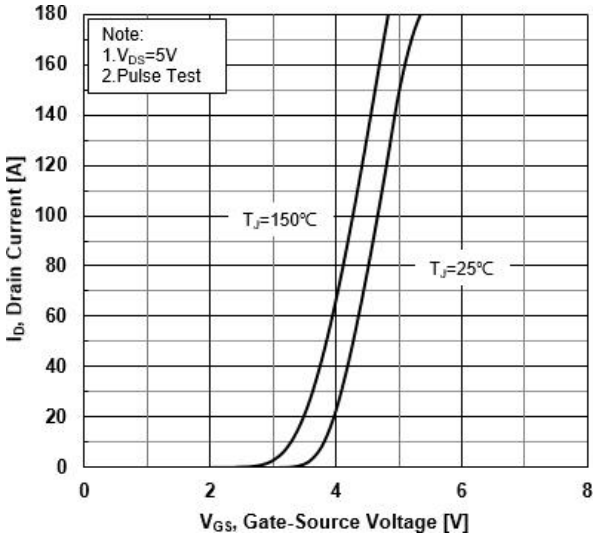



**Figure 6. Source-Drain Diode Forward Characteristics**

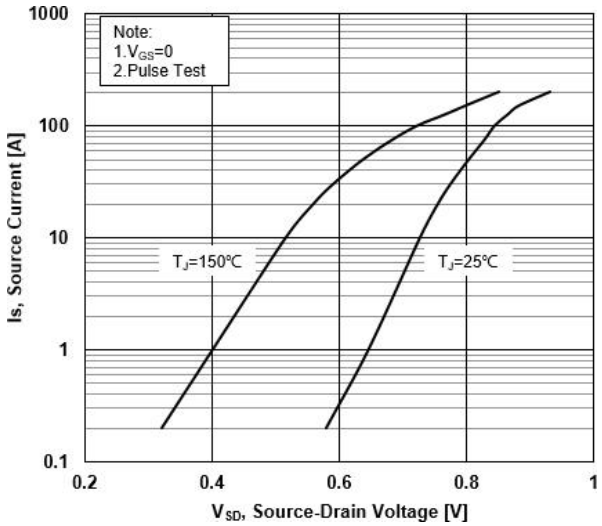



**Figure 7. Drain-Source On-Resistance vs Drain Current**

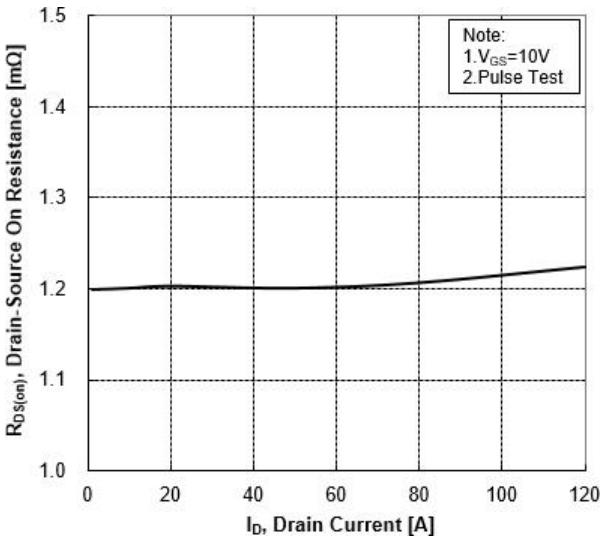
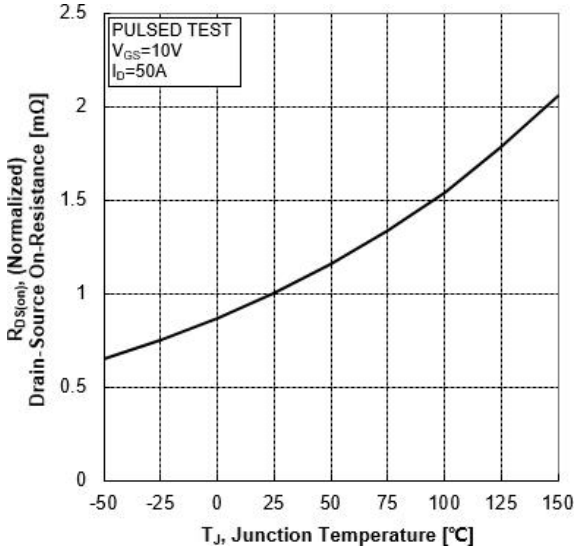



**Figure 8. Normalized On-Resistance vs Junction Temperature**



## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

**Figure 9. Normalized Threshold Voltage vs Junction Temperature**

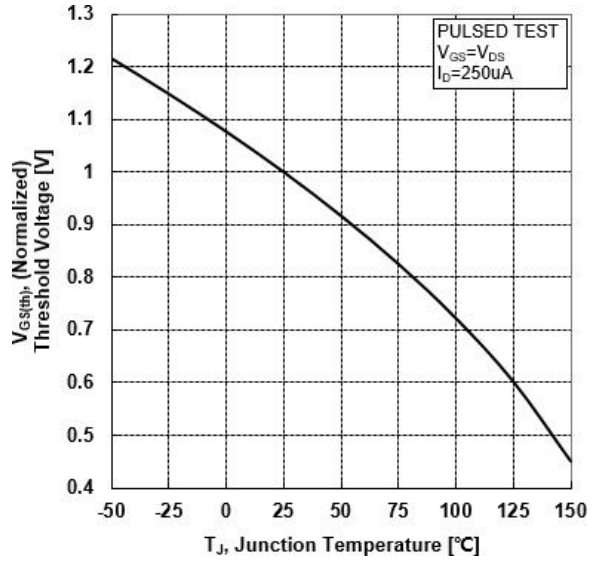



**Figure 10. Normalized Breakdown Voltage vs Junction Temperature**

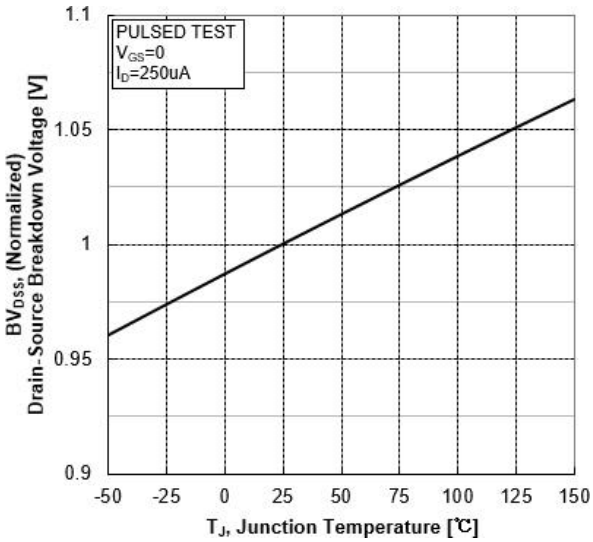



**Figure 11. Capacitance Characteristics**

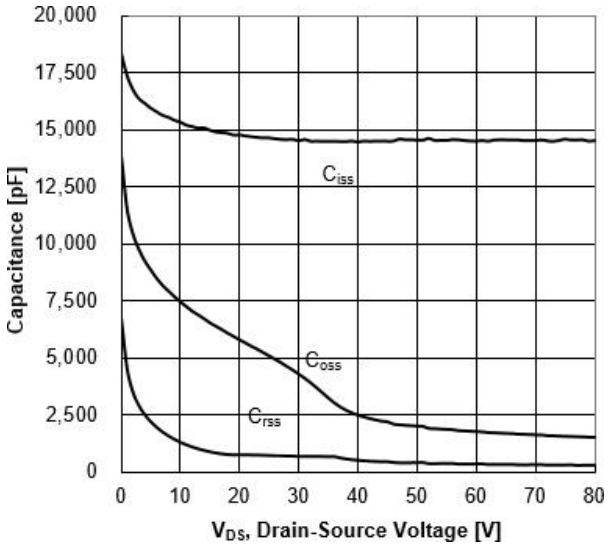
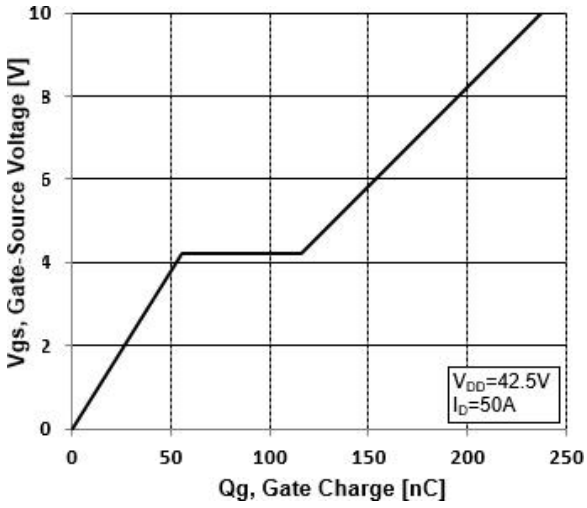
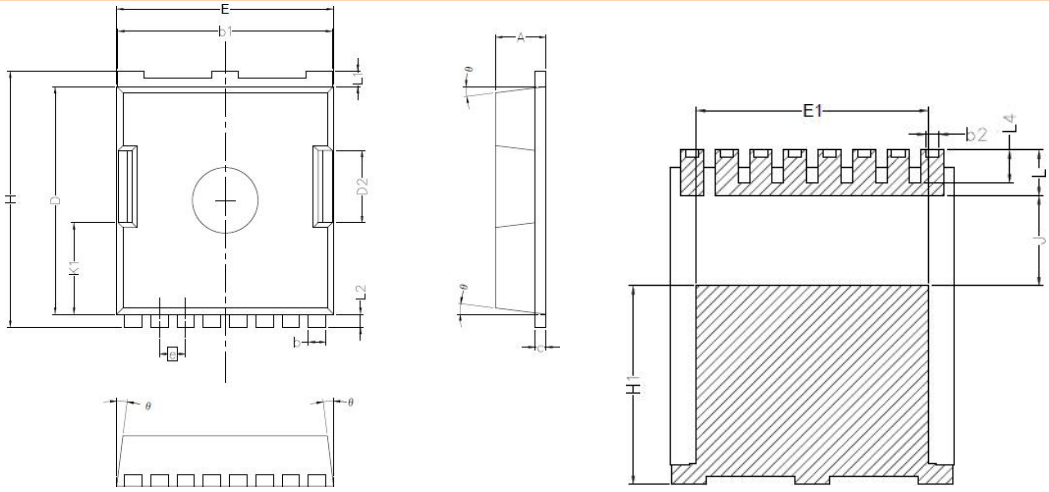



**Figure 12. Typical Gate Charge vs Gate-Source Voltage**



## PACKAGE INFORMATION

**TOLL-8L**




| Symbol | Dimensions In Millimeters | |
|---|---|---|
| | MIN. | MAX. |
| A | 2.20 | 2.40 |
| b | 0.90 | 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° |