## DESCRIPTION

The MXT03N08 uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

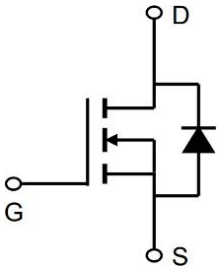
## GENERAL FEATURES

- $V_{DS}$=80V, $I_D$=250A
  $R_{DS(ON)}$(Typ.)=2.8mΩ @ $V_{GS}$=10V
- Surface-mounted package
- Advanced trench cell design

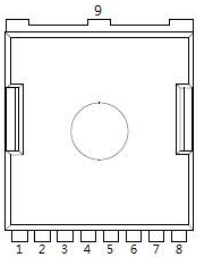
## APPLICATION

- Power appliances
- High Power inverter system
- BMS appliances

## PINOUT



Schematic diagram



Top View TOLL-8L

| 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 |
|---|---|---|---|
| MXT03N08 | -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 | $V_{DS}$ | 80 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous($V_{GS}$=10V)(Note1)(Note3) | $I_D$ | 250 | A |
| Pulsed Drain Current($V_{GS}$=10V)(Note1)(Note2)(Note3) | $I_{DM}$ | 800 | A |
| Single Pulse Avalanche Energy(Note1) | $E_{AS}$ | 2000 | mJ |
| Continuous-Source Current | $I_S$ | 250 | A |
| Drain Power Dissipation(Note1) | $P_{tot}$ | 500 | W |
| Operating Junction and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to 175 | °C |
| Thermal Resistance, Junction-to-Case(Note2) | $R_{\theta JC}$ | 0.25 | °C/W |

Note 1. Surface Mounted on 1 $in^2$ pad area, t ≤ 10 sec
Note 2. Pulse width ≤ 300μs, duty cycle ≤ 2%
Note 3. Limited by bonding wire

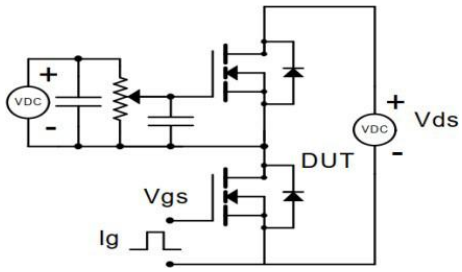
## ELECTRICAL CHARACTERISTICS($T_A$=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 80 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=64, $V_{GS}$=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 | - | 4 | V |
| Drain-Source On-State Resistance(Note1) | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=50A | - | 2.8 | 3.5 | mΩ |
| **Dynamic Characteristics(Note2)** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=25V, $V_{GS}$=0V, F=1.0MHz | - | 13200 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 950 | - | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 810 | - | pF |
| **Switching Characteristics(Note2)** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS}$=40V, $I_{DS}$=40A, $V_{GEN}$=10V, $R_G$=4.5Ω, $R_L$=1.3Ω, | - | 26 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 20 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 50 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 18 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=64V, $I_{DS}$=80A, $V_{GS}$=10V | - | 257 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 76 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 80 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage(Note1) | $V_{SD}$ | $V_{GS}$=0V, $I_{SD}$=30A | - | - | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $V_{GS}$=0V, $I_{DS}$=30A, dI/dt=100A/μs | - | 65 | - | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | - | 83 | - | nC |

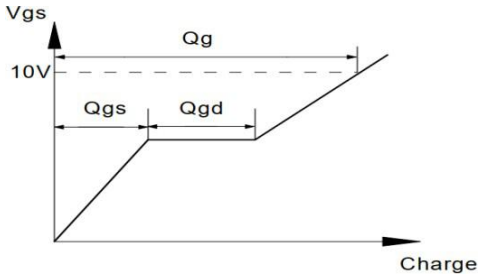
Note 1. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
Note 2. Guaranteed by design, not subject to prduction testing

## TEST CIRCUIT AND WAVEFORM

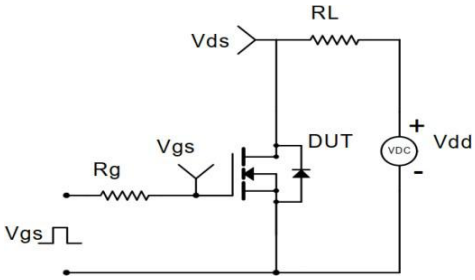
### Gate Charge Test Circuit



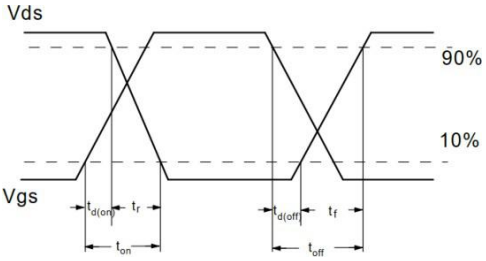

### Gate Charge Test Waveform



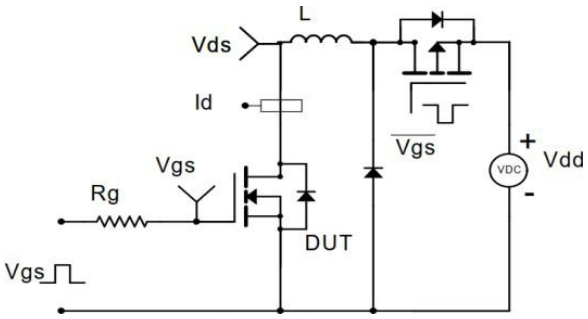

### Resistive Switching Test Circuit



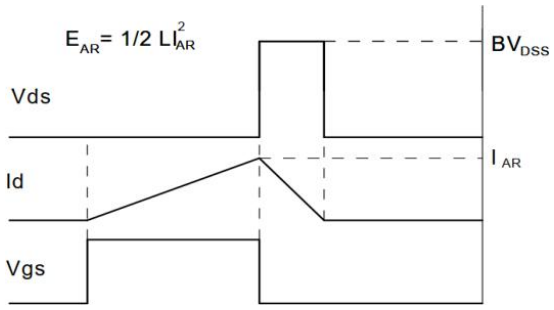

### Resistive Switching Test Waveforms



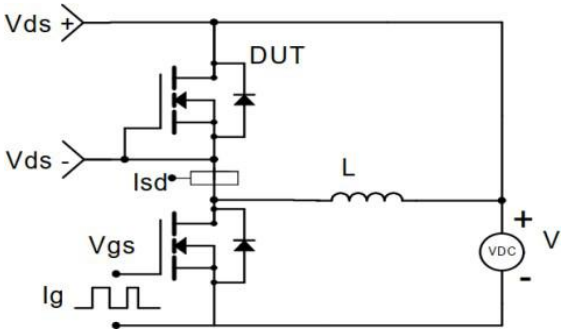

### Unclamped Inductive Switching (UIS) Test Circuit



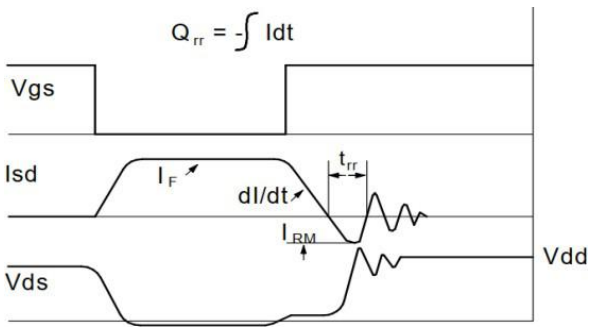

### Unclamped Inductive Switching(UIS)Test Waveforms




### Diode Recovery Test Circuit

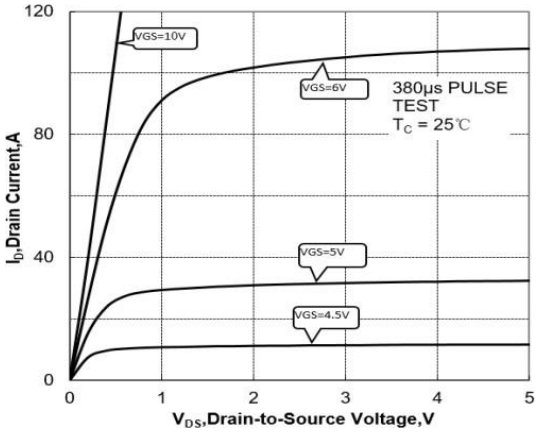



### Diode Recovery Test Waveforms

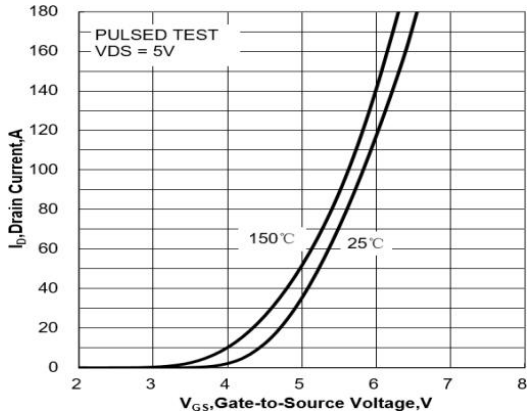


## TYPICAL CHARACTERISTICS

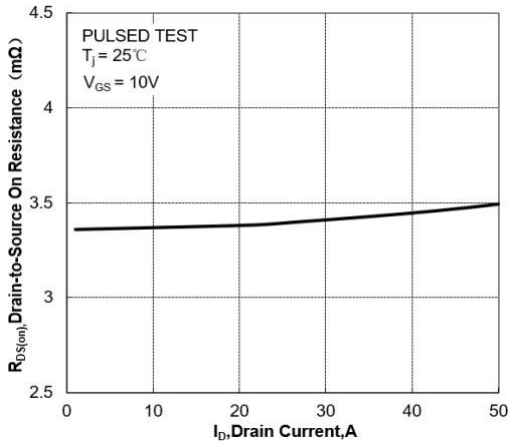
### Figure 1. Output Characteristics



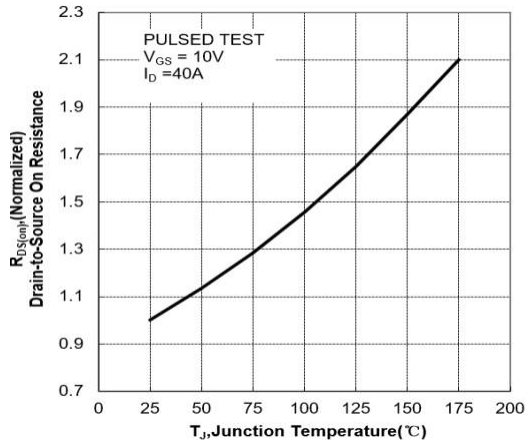

### Figure 2. Transfer Characteristics



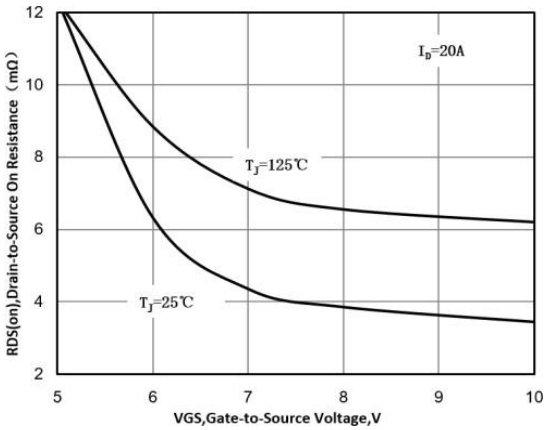

### Figure 3. On-Resistance vs. $I_D$ and $V_{GS}$



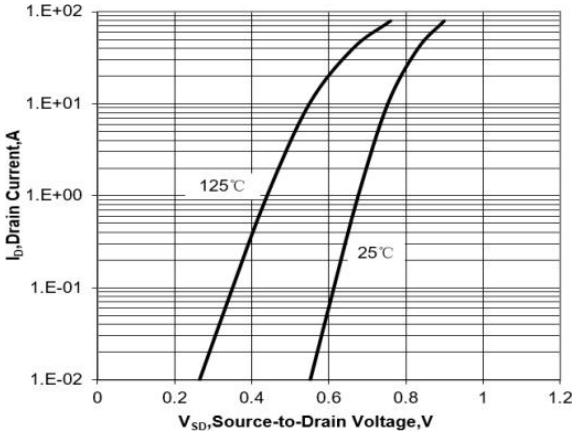

### Figure 4. On-Resistance vs. Junction Temperature




### Figure 5. On-Resistance vs. $V_{GS}$

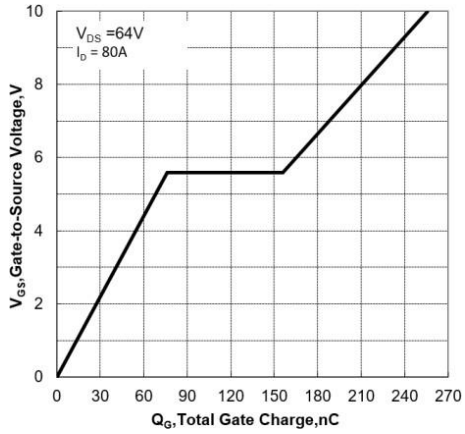



### Figure 6. Body Diode Forward Voltage

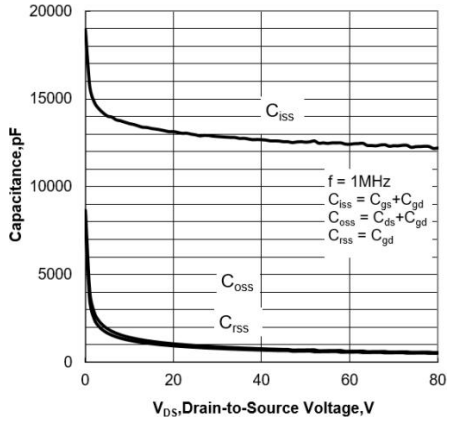


## TYPICAL CHARACTERISTICS

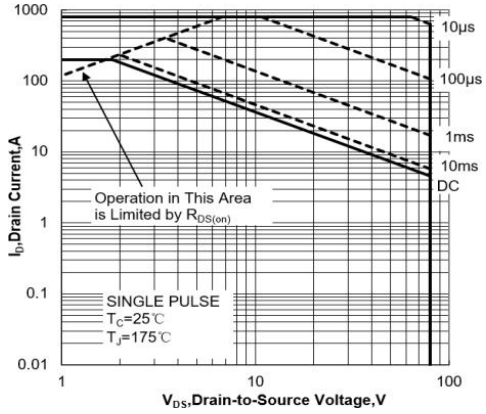
### Figure 7. Gate-Charge Characteristics



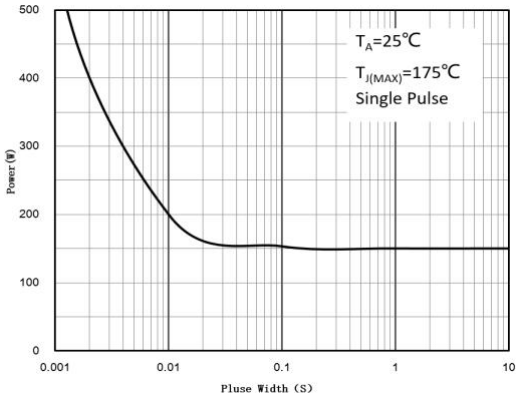

### Figure 8. Capacitance Characteristics



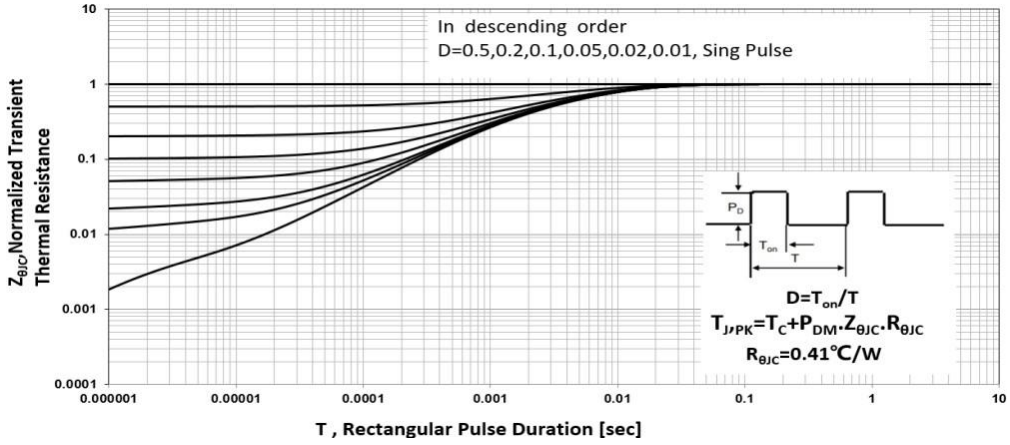

### Figure 9. Maximum Forward Biased Safe Operation Area




### Figure 10. Single Pulse Power Rating Junction-to-Ambient

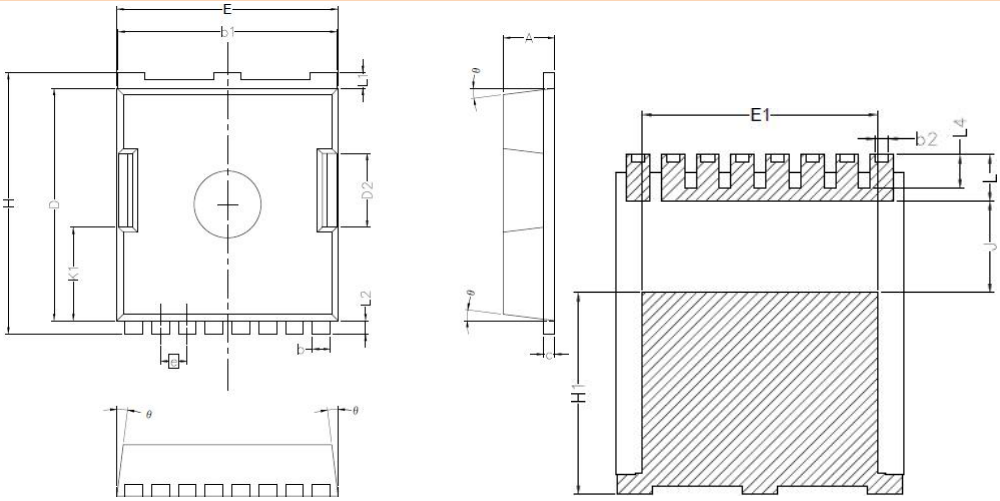



### Figure 11. Normalized Maximum Transient Thermal Impedance



## 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° |