

## N-Channel Enhancement Mode MOSFET

### 1. Product Information

#### 1.1 Features

- ☒ Surface-mounted package
- ☒ Super Trench
- ☒ Advanced trench cell design
- ☒ MSL1

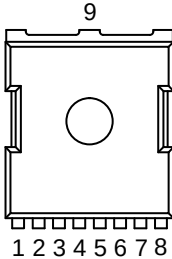
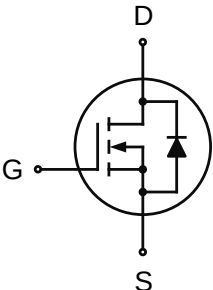
#### 1.2 Applications

- ☒ BMS appliance
- ☒ Drones
- ☒ High power inverter system
- ☒ Light electric vehicles

#### 1.3 Quick reference

- ☒  $BV \geq 85\text{ V}$
- ☒  $P_{tot} \leq 500\text{ W}$
- ☒  $I_D \leq 300\text{ A}$
- ☒  $R_{DS(ON)} \leq 1.4\text{ m}\Omega @ V_{GS} = 10\text{ V}$

### 2. Pin Description

| Pin           | Description | Simplified Outline                                                                                               | Symbol                                                                                |
|---------------|-------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1             | Gate(G)     |  <p>Top View<br/>TOLL-8L</p> |  |
| 2,3,4,5,6,7,8 | Source(S)   |                                                                                                                  |                                                                                       |
| 9             | Drain(D)    |                                                                                                                  |                                                                                       |

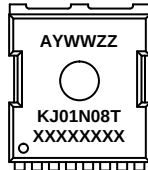
## 3. Limiting Values

| Symbol               | Parameter                              | Conditions                                                | Min  | Max      | Unit                 |
|----------------------|----------------------------------------|-----------------------------------------------------------|------|----------|----------------------|
| $V_{DS}$             | Drain-Source Voltage                   | $T_C = 25\text{ }^{\circ}\text{C}$                        | 85   | -        | V                    |
| $V_{GS}$             | Gate-Source Voltage                    | $T_C = 25\text{ }^{\circ}\text{C}$                        | -    | $\pm 20$ | V                    |
| $I_D$                | Drain Current (DC)                     | $T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$  | -    | 300      | A                    |
| $I_D$                | Drain Current (DC)                     | $T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$ | -    | 267      | A                    |
| $I_{DM}^*$           | Drain Current (Pulsed)                 | $T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$  | -    | 1200     | A                    |
| $P_{tot}$            | Drain Power Dissipation                | $T_C = 25\text{ }^{\circ}\text{C}$                        | -    | 500      | W                    |
| $T_{stg}$            | Storage Temperature                    |                                                           | - 55 | 150      | $^{\circ}\text{C}$   |
| $T_J$                | Junction Temperature                   |                                                           | -    | 150      | $^{\circ}\text{C}$   |
| $I_S$                | Continuous-Source Current              | $T_C = 25\text{ }^{\circ}\text{C}$                        | -    | 300      | A                    |
| $E_{AS}$             | Single Pulsed Avalanche Energy         | $V_{DD} = 40\text{ V}, L = 0.5\text{ mH}$                 | -    | 2800     | mJ                   |
| $R_{\theta JA}^{**}$ | Thermal Resistance-Junction to Ambient |                                                           | -    | 32.8     | $^{\circ}\text{C/W}$ |
| $R_{\theta JC}^{**}$ | Thermal Resistance-Junction to Case    |                                                           | -    | 0.45     | $^{\circ}\text{C/W}$ |

Notes:

- \* Pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$
- \*\* Surface Mounted on minimum footprint pad area
- \*\*\* Limited by bonding wire

## 4. Marking Information

| Product Name | Marking                                                                               |
|--------------|---------------------------------------------------------------------------------------|
| KJ01N08T     |  |

## 5. Ordering Code

| Product Name | Package | Reel Size | Tape width | Quantity | Note |
|--------------|---------|-----------|------------|----------|------|
| KJ01N08T     | TOLL-8L | -         | -          | 2000     |      |

Note: KUAJIEXIN defines "Green" as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)

## 6. Electrical Characteristics (T<sub>A</sub>=25°C Unless Otherwise Noted)

| Symbol                                   | Parameter                      | Conditions                                                                                                                  | Min | Typ   | Max  | Unit |
|------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----|-------|------|------|
| Static Characteristics                   |                                |                                                                                                                             |     |       |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage | V <sub>GS</sub> = 0 V, I <sub>DS</sub> = 250 μA                                                                             | 85  | 95    | -    | V    |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage         | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA                                                                | 2   | -     | 4    | V    |
| I <sub>DSS</sub>                         | Drain Leakage Current          | V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0 V                                                                                | -   | -     | 1    | μA   |
| I <sub>GSS</sub>                         | Gate Leakage Current           | V <sub>GS</sub> = 0 V, V <sub>GS</sub> = ± 20 V                                                                             | -   | -     | ±100 | nA   |
| R <sub>DS(ON)</sub> <sup>a</sup>         | On-State Resistance            | V <sub>GS</sub> = 10 V, I <sub>DS</sub> = 50 A                                                                              | -   | 1.2   | 1.4  | mΩ   |
| Diode Characteristics                    |                                |                                                                                                                             |     |       |      |      |
| V <sub>SD</sub> <sup>a</sup>             | Diode Forward Voltage          | I <sub>SD</sub> = 50 A, V <sub>GS</sub> = 0 V                                                                               | -   | -     | 1.2  | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time          | I <sub>DS</sub> = 50 A, V <sub>GS</sub> = 0 V<br>di <sub>SD</sub> /dt = 100 A/μs                                            | -   | 120   | -    | nS   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge        |                                                                                                                             | -   | 360   | -    | nC   |
| Dynamic Characteristics <sup>b</sup>     |                                |                                                                                                                             |     |       |      |      |
| C <sub>iss</sub>                         | Input Capacitance              | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 50 V<br>Frequency = 1 MHz                                                          | -   | 14490 | -    | pF   |
| C <sub>oss</sub>                         | Output Capacitance             |                                                                                                                             | -   | 2350  | -    |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance   |                                                                                                                             | -   | 472   | -    |      |
| t <sub>d(on)</sub>                       | Turn-on Delay Time             | V <sub>DS</sub> = 50 V, V <sub>GEN</sub> = 10 V,<br>R <sub>G</sub> = 4.5 Ω, R <sub>L</sub> = 1 Ω,<br>I <sub>DS</sub> = 50 A | -   | 39    | -    | nS   |
| t <sub>r</sub>                           | Turn-on Rise Time              |                                                                                                                             | -   | 122   | -    |      |
| t <sub>d(off)</sub>                      | Turn-off Delay Time            |                                                                                                                             | -   | 115   | -    |      |
| t <sub>f</sub>                           | Turn-off Fall Time             |                                                                                                                             | -   | 137   | -    |      |
| Gate Charge Characteristics <sup>b</sup> |                                |                                                                                                                             |     |       |      |      |
| Q <sub>g</sub>                           | Total Gate Charge              | V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 10 V,<br>I <sub>DS</sub> = 50 A                                                   | -   | 240   | -    | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge             |                                                                                                                             | -   | 56    | -    |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge              |                                                                                                                             | -   | 60    | -    |      |

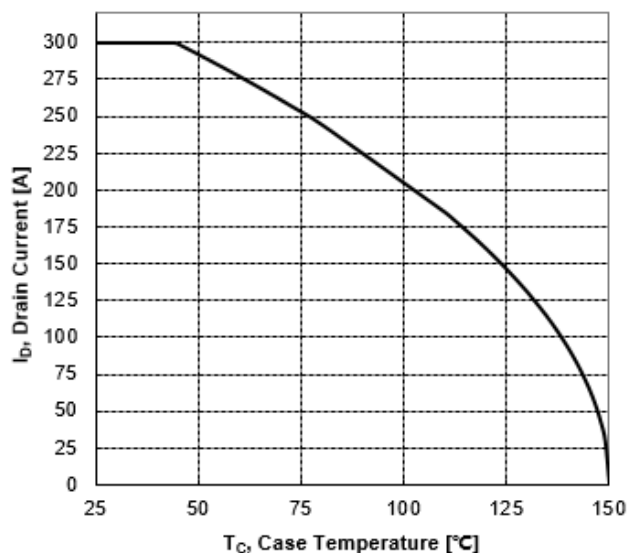
Notes:

a: Pulse test; Pulse width ≤ 300 μs, duty cycle ≤ 2 %

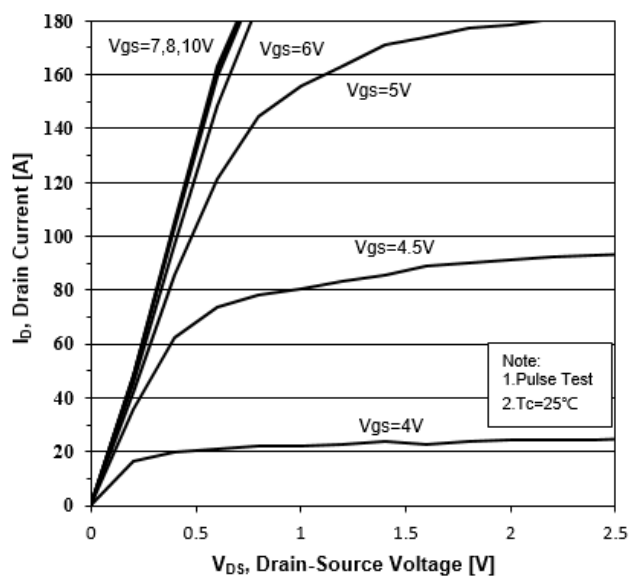
b: Guaranteed by design, not subject to production testing

## 7. Typical Characteristics

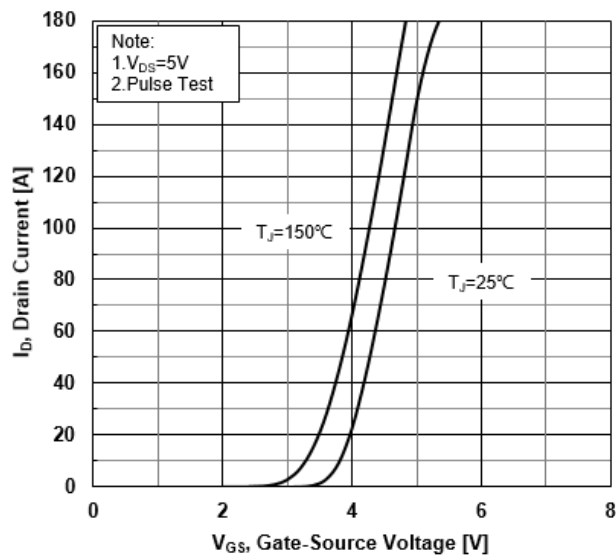
**Figure 1. Maximum Continuous Drain Current vs Case Temperature**



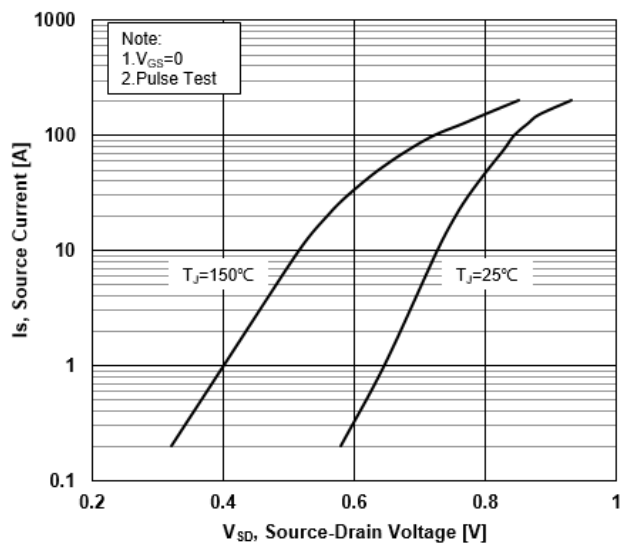
**Figure 2. Typical Output Characteristics**



**Figure 3. Typical Transfer Characteristics**



**Figure 4. Source-Drain Diode Forward Characteristics**



## 7. Typical Characteristics (cont.)

Figure 5. Drain-Source On-Resistance vs Drain Current

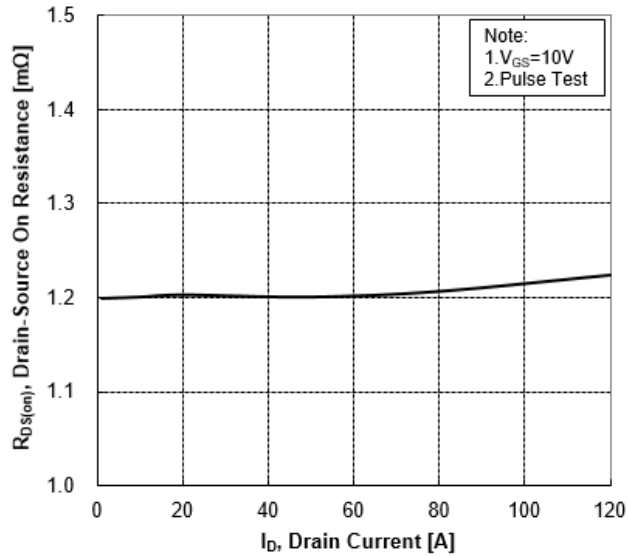


Figure 6. Normalized On-Resistance vs Junction Temperature

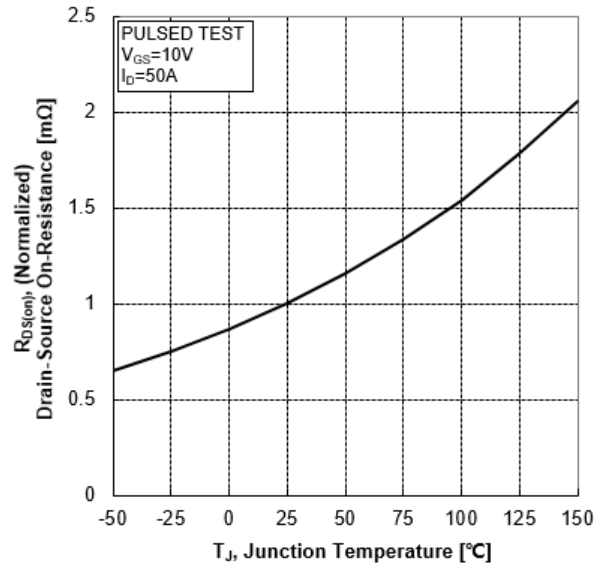


Figure 7. Normalized Threshold Voltage vs Junction Temperature

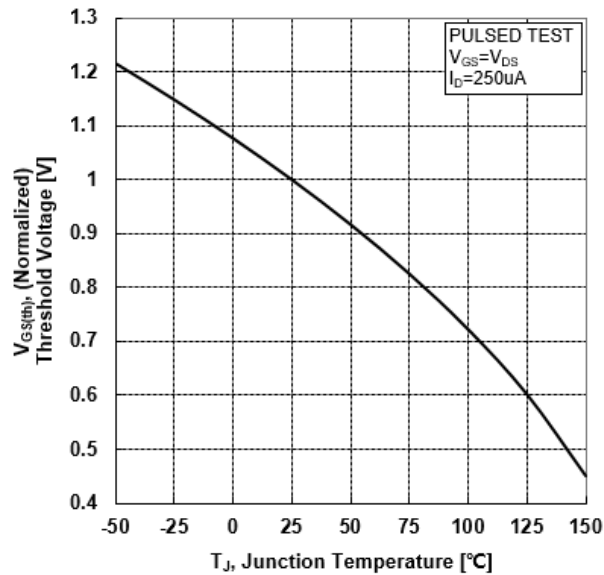
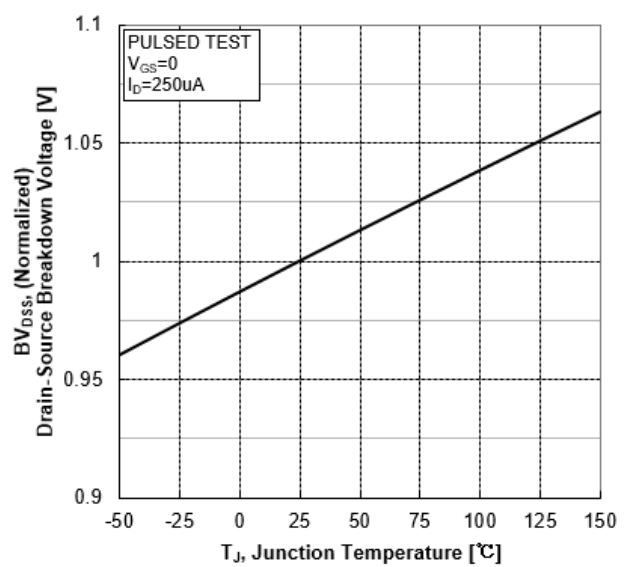
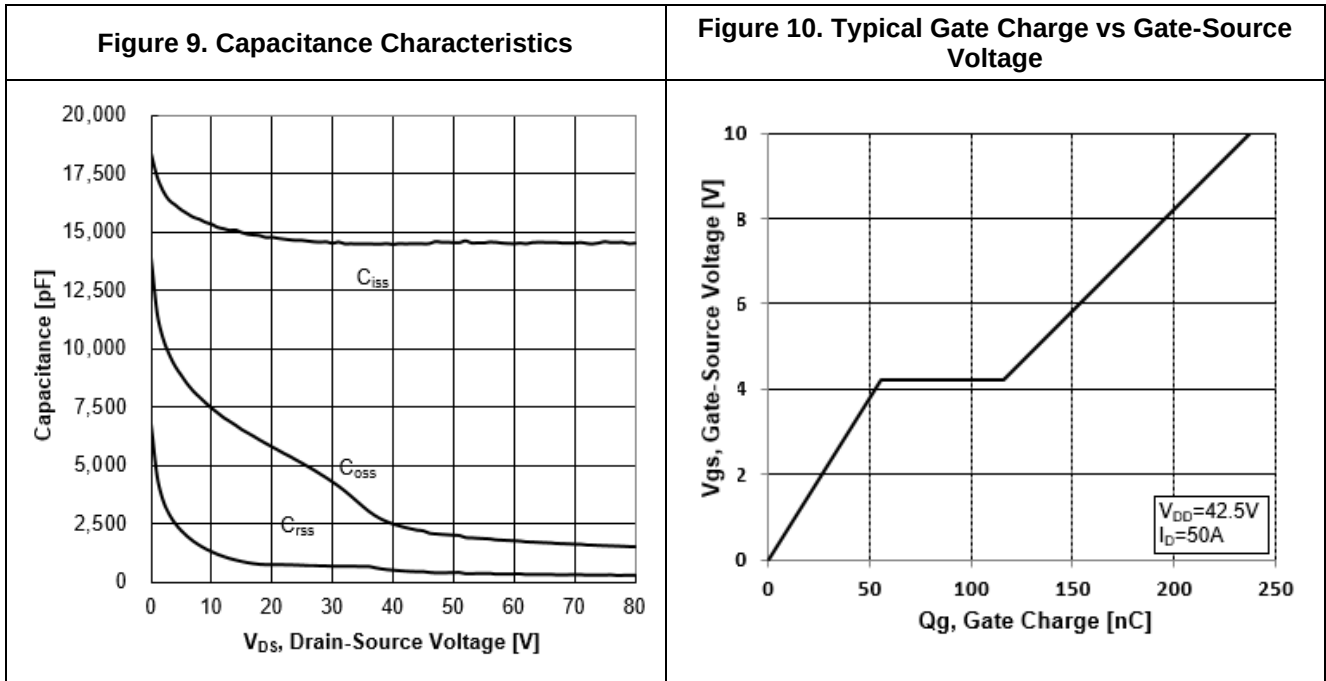


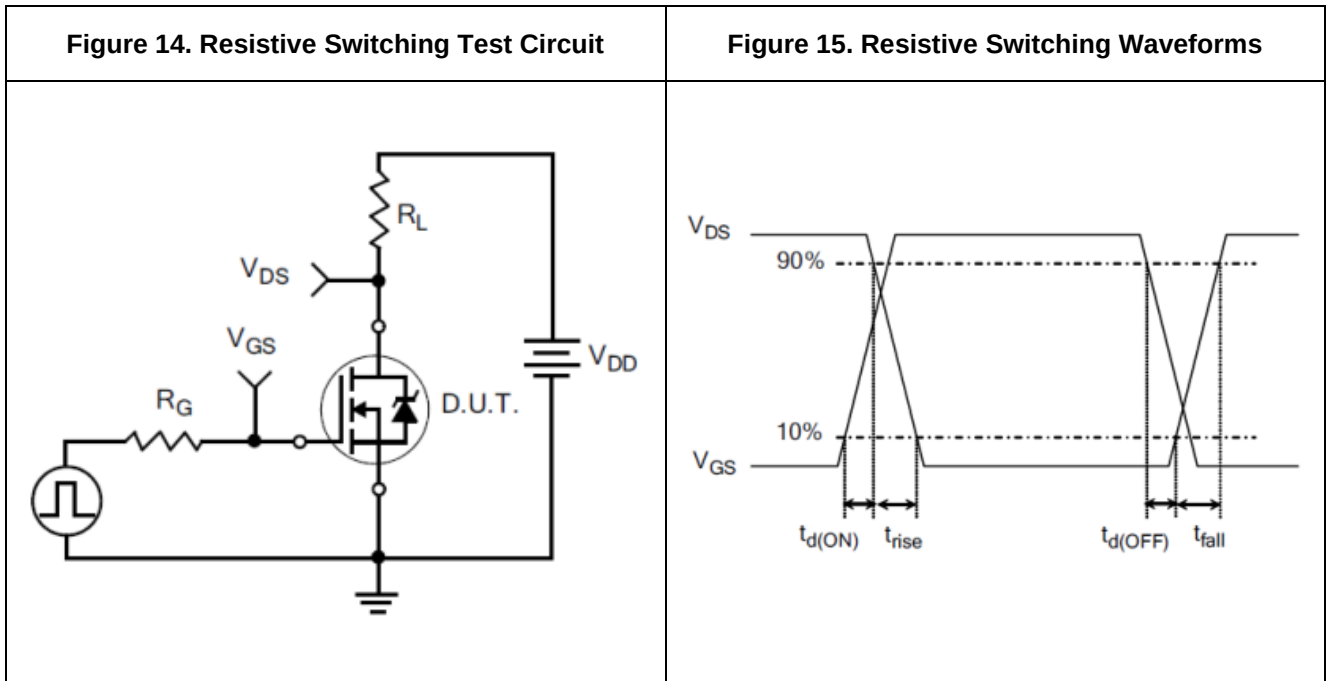
Figure 8. Normalized Breakdown Voltage vs Junction Temperature



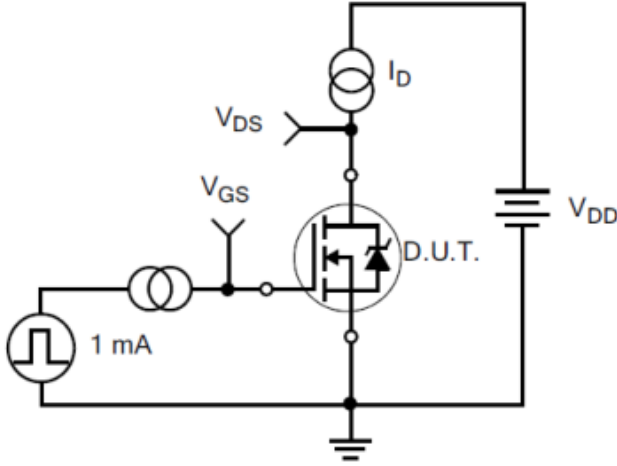
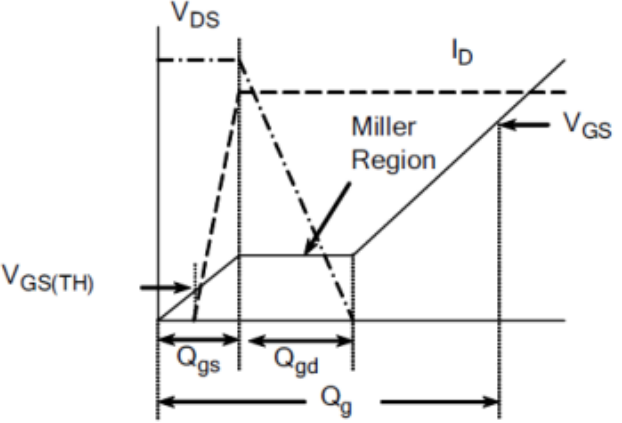
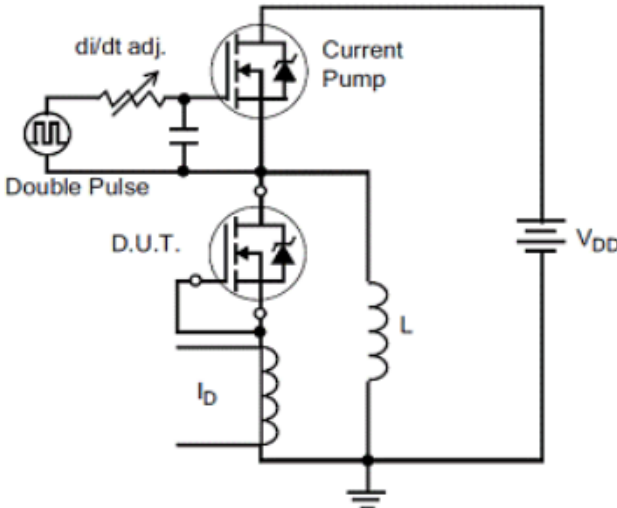
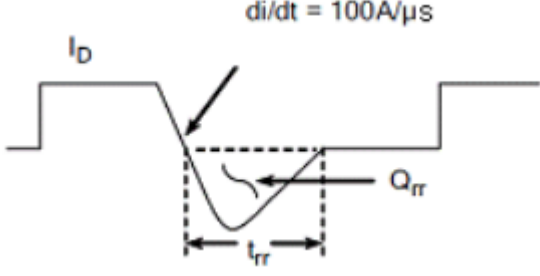
## 7. Typical Characteristics (cont.)



## 8. Test Circuit and Waveform



## 8. Test Circuit and Waveform (cont.)

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>Figure 16. Gate Charge Test Circuit</p>                                          | <p>Figure 17. Gate Charge Waveforms</p>                                              |
|    |    |
| <p>Figure 18. Diode Reverse Recovery Test Circuit</p>                               | <p>Figure 19. Diode Reverse Recovery Waveform</p>                                    |
|  |  |

## 8. Test Circuit and Waveform (cont.)

Figure 20. Unclamped Inductive Switching Test Circuit

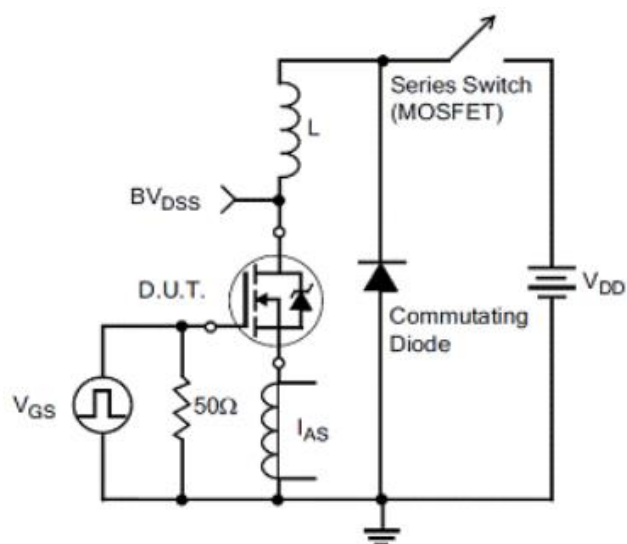
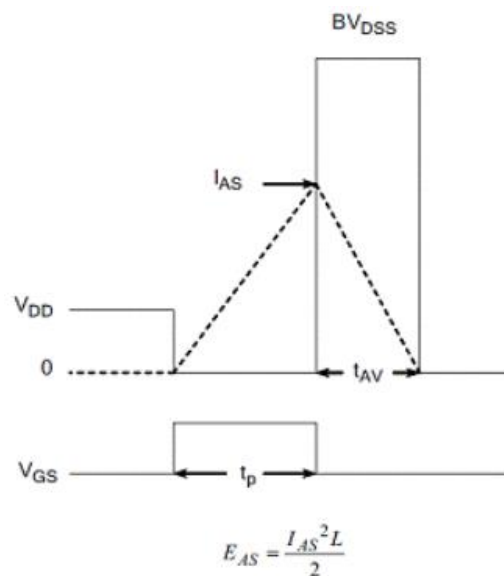


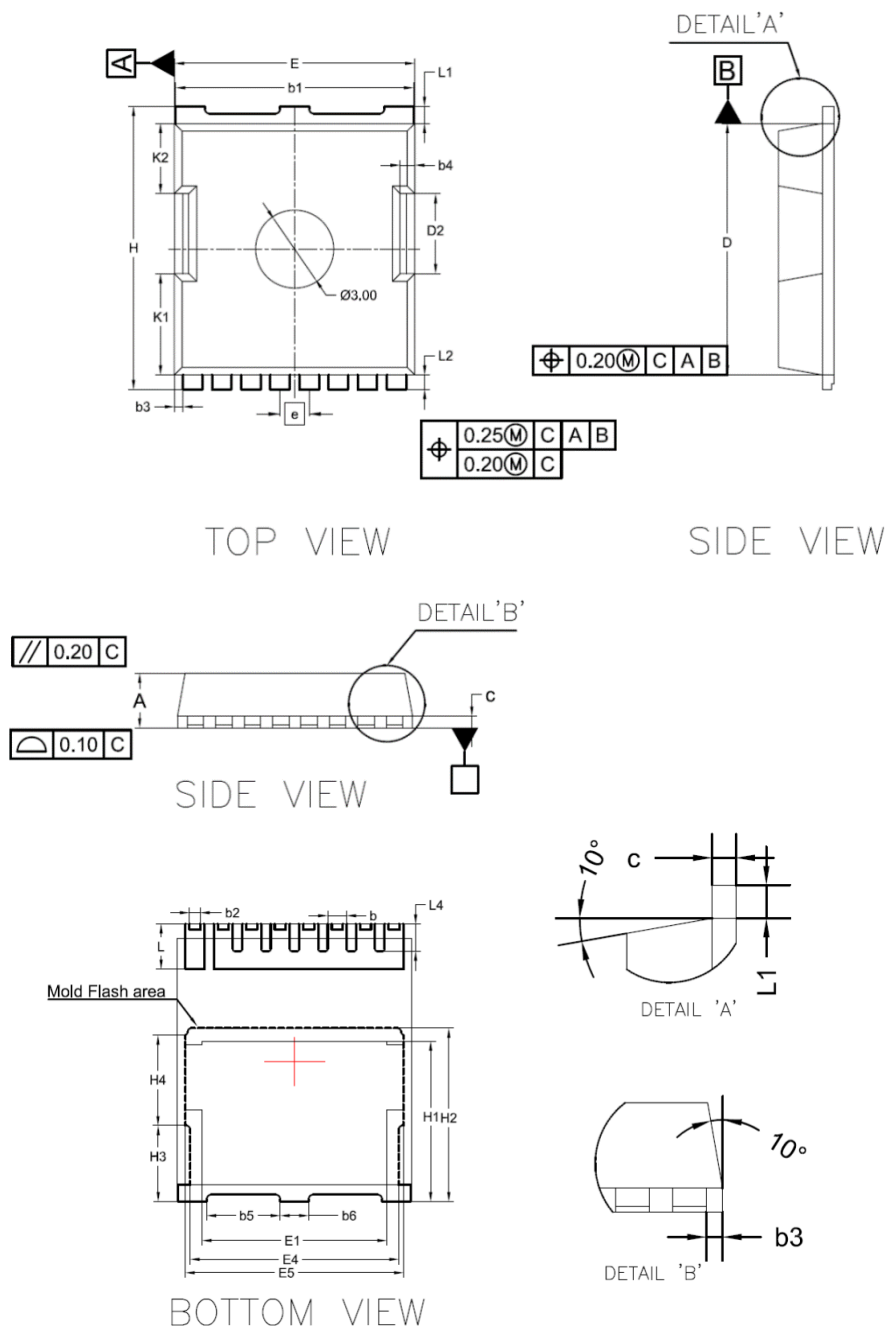
Figure 21. Unclamped Inductive Switching Waveform





## 9. Package Dimensions

### TOLL-8L Package



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### TOLL-8L Package

| Symbol | Dimensions In Millimeters |        |        | Dimensions In Inches |       |       |
|--------|---------------------------|--------|--------|----------------------|-------|-------|
|        | MIN.                      | NOM.   | MAX.   | MIN.                 | NOM.  | MAX.  |
| A      | 2.200                     | 2.300  | 2.400  | 0.087                | 0.091 | 0.094 |
| c      | 0.492                     | 0.500  | 0.508  | 0.019                | 0.020 | 0.021 |
| D      | 10.280                    | 10.380 | 10.480 | 0.405                | 0.409 | 0.413 |
| E      | 9.800                     | 9.900  | 10.000 | 0.386                | 0.390 | 0.394 |
| e      | 1.20BSC                   |        |        | 0.047BSC             |       |       |
| H      | 11.580                    | 11.680 | 11.780 | 0.456                | 0.460 | 0.464 |
| H1     | 6.650                     | 6.750  | 6.850  | 0.262                | 0.266 | 0.270 |
| H2     | 7.300                     |        |        | 0.287                |       |       |
| H3     | 3.200                     |        |        | 0.126                |       |       |
| H4     | 3.800                     |        |        | 0.150                |       |       |
| K1     | 4.180                     |        |        | 0.165                |       |       |
| K2     | 2.900                     |        |        | 0.114                |       |       |
| D2     | 3.300                     |        |        | 0.130                |       |       |
| b      | 0.700                     | 0.800  | 0.900  | 0.028                | 0.031 | 0.035 |
| b1     | 9.700                     | 9.800  | 9.900  | 0.382                | 0.386 | 0.390 |
| b2     | 0.420                     | 0.460  | 0.500  | 0.017                | 0.018 | 0.020 |
| b3     | 0.350                     |        |        | 0.014                |       |       |
| b4     | 0.600                     |        |        | 0.024                |       |       |
| b5     | 3.100                     |        |        | 0.122                |       |       |
| b6     | 1.200                     |        |        | 0.047                |       |       |
| L      | 1.700                     | 1.900  | 2.100  | 0.067                | 0.075 | 0.083 |
| L1     | 0.700                     |        |        | 0.028                |       |       |
| L2     | 0.600                     |        |        | 0.024                |       |       |
| L4     | 1.050                     | 1.150  | 1.250  | 0.041                | 0.045 | 0.049 |
| L5     | 0.500                     | 0.600  | 0.700  | 0.020                | 0.024 | 0.028 |
| E1     | 7.800                     |        |        | 0.310                |       |       |
| E4     | 8.800                     |        |        | 0.350                |       |       |
| E5     | 9.200                     |        |        | 0.360                |       |       |