

## N-Channel Enhancement Mode MOSFET

### 1. Product Information

#### 1.1 Features

- ☒ Surface-mounted package
- ☒  $T_J$  175°C
- ☒ Low  $R_{DS(ON)}$  and Low gate charge
- ☒ MSL1

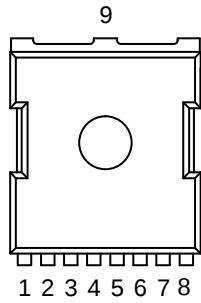
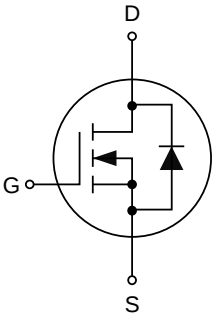
#### 1.2 Applications

- ☒ BMS appliances
- ☒ Motor drives
- ☒ High power inverter system
- ☒ Light electric vehicles

#### 1.3 Quick reference

- ☒  $BV \geq 100\text{ V}$
- ☒  $P_D \leq 429\text{ W}$
- ☒  $I_D \leq 380\text{ A}$
- ☒  $R_{DS(ON)} \leq 1.35\text{ m}\Omega @ V_{GS} = 10\text{ V}$

### 2. Pin Description

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

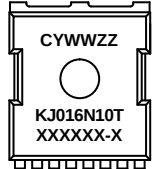
## 3. Limiting Values

| Symbol               | Parameter                                        | Conditions                                    | Min | Max      | Unit                 |
|----------------------|--------------------------------------------------|-----------------------------------------------|-----|----------|----------------------|
| $V_{DS}$             | Drain-Source Voltage                             | $T_C=25^{\circ}\text{C}$                      | 100 | -        | V                    |
| $V_{GS}$             | Gate-Source Voltage                              | $T_C=25^{\circ}\text{C}$                      | -   | $\pm 20$ | V                    |
| $I_D^*$              | Drain Current (DC)                               | $T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$  | -   | 380      | A                    |
|                      |                                                  | $T_C=100^{\circ}\text{C}, V_{GS}=10\text{ V}$ | -   | 270      | A                    |
| $I_{DM}^{*, **}$     | Drain Current (Pulsed)                           | $T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$  | -   | 1464     | A                    |
| $P_D$                | Power Dissipation                                | $T_C=25^{\circ}\text{C}$                      | -   | 429      | W                    |
| $I_S$                | Continuous-Source Current                        | $T_C=25^{\circ}\text{C}$                      | -   | 380      | A                    |
| $E_{AS}$             | Single Pulsed Avalanche Energy                   | $V_{DD}=50\text{ V}, L=0.3\text{ mH}$         | -   | 1829     | mJ                   |
| $T_J, T_{stg}$       | Operating Junction and Storage Temperature Range |                                               | -55 | 175      | $^{\circ}\text{C}$   |
| $R_{\theta JA}^{**}$ | Thermal Resistance-Junction to Ambient           |                                               | -   | 56       | $^{\circ}\text{C/W}$ |
| $R_{\theta JC}^{**}$ | Thermal Resistance-Junction to Case              |                                               | -   | 0.35     | $^{\circ}\text{C/W}$ |

Notes:

- \* Pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- \*\* Surface mounted on  $1\text{ in}^2$  pad area,  $t \leq 10\text{ sec}$ .
- \*\*\* Limited by bonding wire.

## 4. Marking Information

| Product Name | Marking                                                                               |
|--------------|---------------------------------------------------------------------------------------|
| KJ016N10T    |  |

## 5. Ordering Code

| Product Name | Package | Reel size | Tape width | Quantity (pcs) |
|--------------|---------|-----------|------------|----------------|
| KJ016N10T    | TOLL-8L | 13"       | 24 mm      | 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                                                                           | 100 | -     | -    | V    |
| V <sub>GS(TH)</sub>                      | Gate Threshold Voltage         | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250 μA                                                              | 2   | 2.8   | 4    | V    |
| I <sub>DSS</sub>                         | Drain Leakage Current          | V <sub>DS</sub> =80 V, V <sub>GS</sub> =0 V                                                                             | -   | -     | 1    | μA   |
| I <sub>GSS</sub>                         | Gate Leakage Current           | V <sub>DS</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> =20 A                                                                            | -   | 1.15  | 1.35 | mΩ   |
| R <sub>g</sub>                           | Gate Resistance                | T <sub>C</sub> =25°C                                                                                                    | -   | 4     | -    | Ω    |
| Diode Characteristics                    |                                |                                                                                                                         |     |       |      |      |
| V <sub>SD</sub> <sup>a</sup>             | Diode Forward Voltage          | V <sub>GS</sub> =0 V, I <sub>SD</sub> =20 A                                                                             | -   | -     | 1.2  | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time          | V <sub>DS</sub> =50 V, V <sub>GS</sub> =0 V,<br>I <sub>DS</sub> =20 A, di/dt=100 A/μs                                   | -   | 125   | -    | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge        |                                                                                                                         | -   | 340   | -    | nC   |
| Dynamic Characteristics <sup>b</sup>     |                                |                                                                                                                         |     |       |      |      |
| C <sub>iss</sub>                         | Input Capacitance              | V <sub>DS</sub> =50 V, V <sub>GS</sub> =0 V,<br>f=1 MHz                                                                 | -   | 12675 | -    | pF   |
| C <sub>oss</sub>                         | Output Capacitance             |                                                                                                                         | -   | 4800  | -    |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance   |                                                                                                                         | -   | 88    | -    |      |
| t <sub>d(on)</sub>                       | Turn-on Delay Time             | V <sub>DS</sub> =50 V, V <sub>GS</sub> =10 V,<br>I <sub>DS</sub> =20 A, R <sub>G</sub> =2.5 Ω,<br>R <sub>GEN</sub> =3 Ω | -   | 40    | -    | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time              |                                                                                                                         | -   | 50    | -    |      |
| t <sub>d(off)</sub>                      | Turn-off Delay Time            |                                                                                                                         | -   | 120   | -    |      |
| t <sub>f</sub>                           | Turn-off Fall Time             |                                                                                                                         | -   | 60    | -    |      |
| 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> =20 A                                                  | -   | 200   | -    | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge             |                                                                                                                         | -   | 66    | -    |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge              |                                                                                                                         | -   | 35    | -    |      |

Notes:

- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

## 7. Typical Characteristics

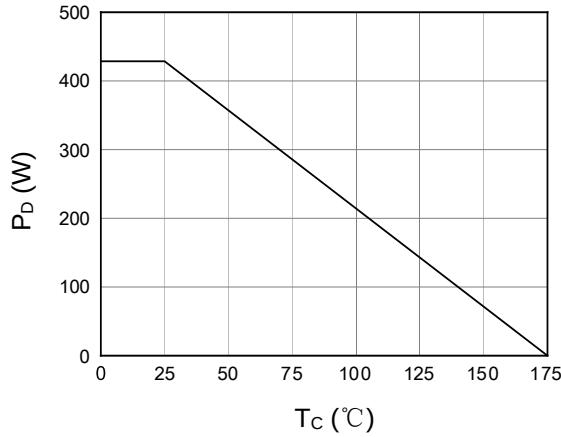


Figure 1. Power Capability

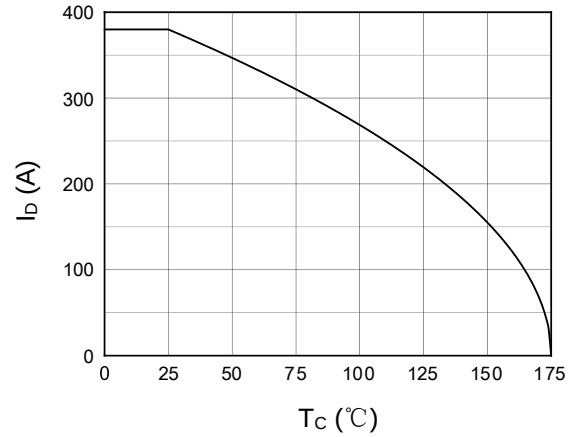


Figure 2. Current Capability

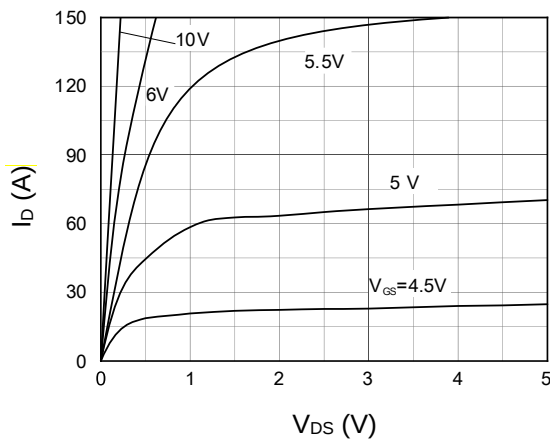


Figure 3. Output characteristics

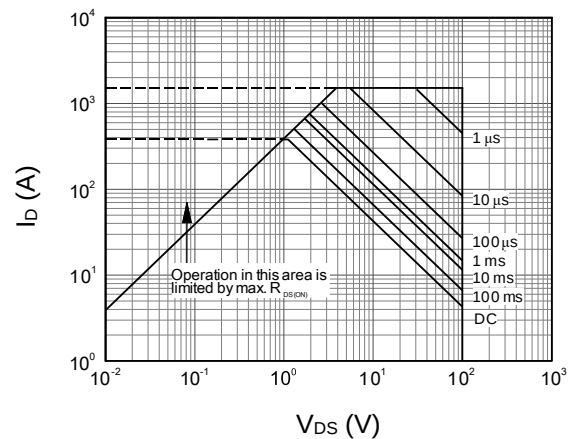


Figure 4. Safe operating area

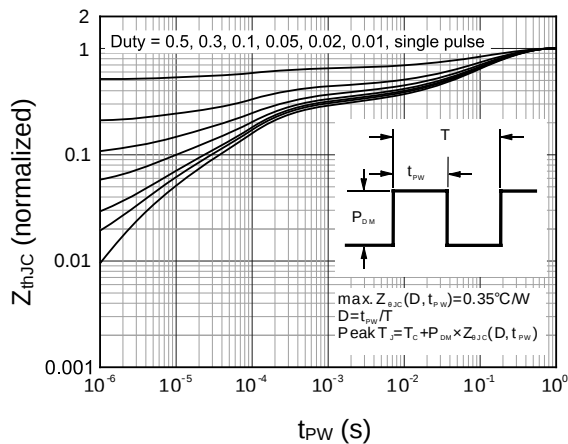


Figure 5. Normalized transient thermal impedance from junction to case

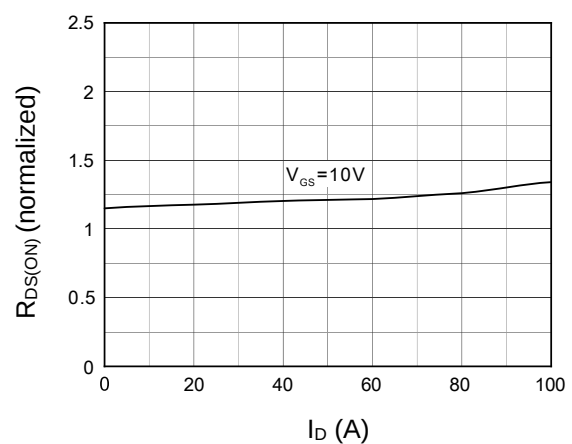
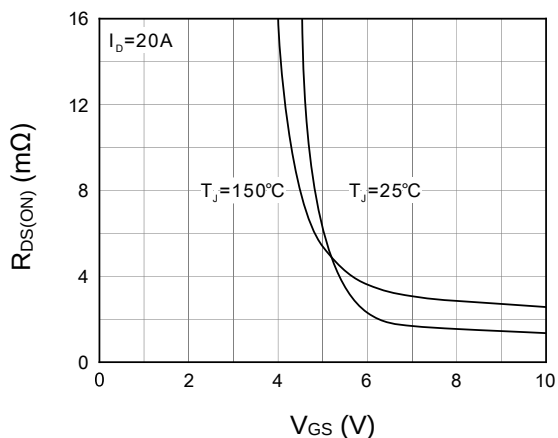
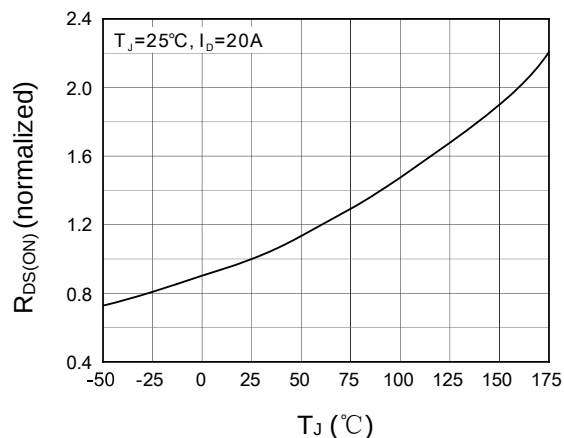


Figure 6. Normalized on-resistance vs drain current

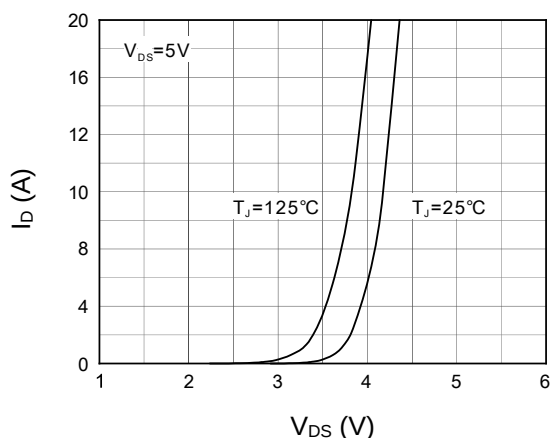
## 7. Typical Characteristics (cont.)



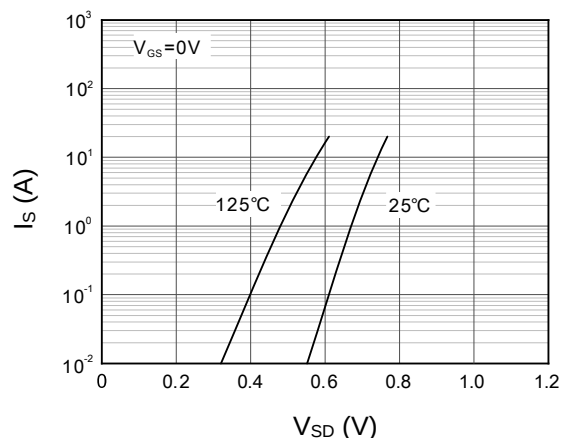
**Figure 7. On-resistance vs gate-source voltage**



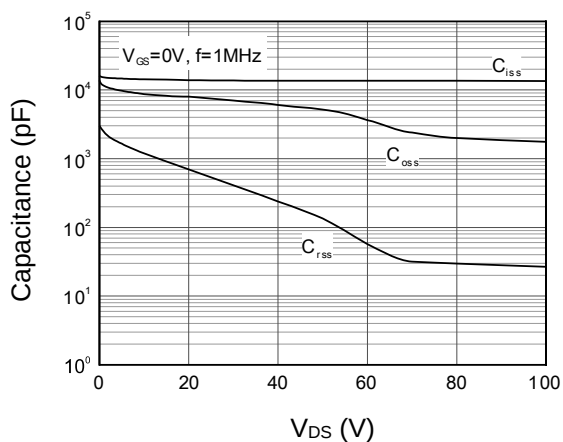
**Figure 8. Normalized on-resistance vs junction temperature**



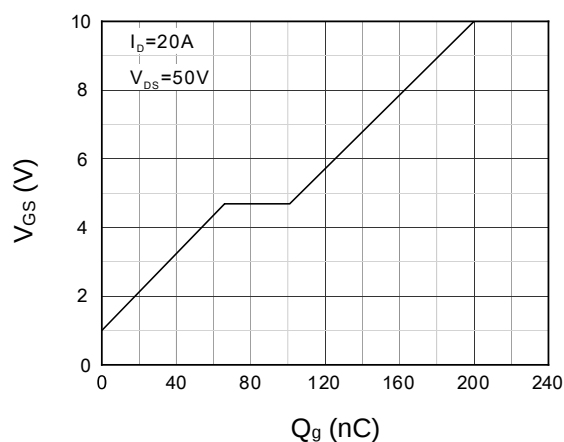
**Figure 9. Typical Transfer Characteristics**



**Figure 10. Forward characteristics of body diode**



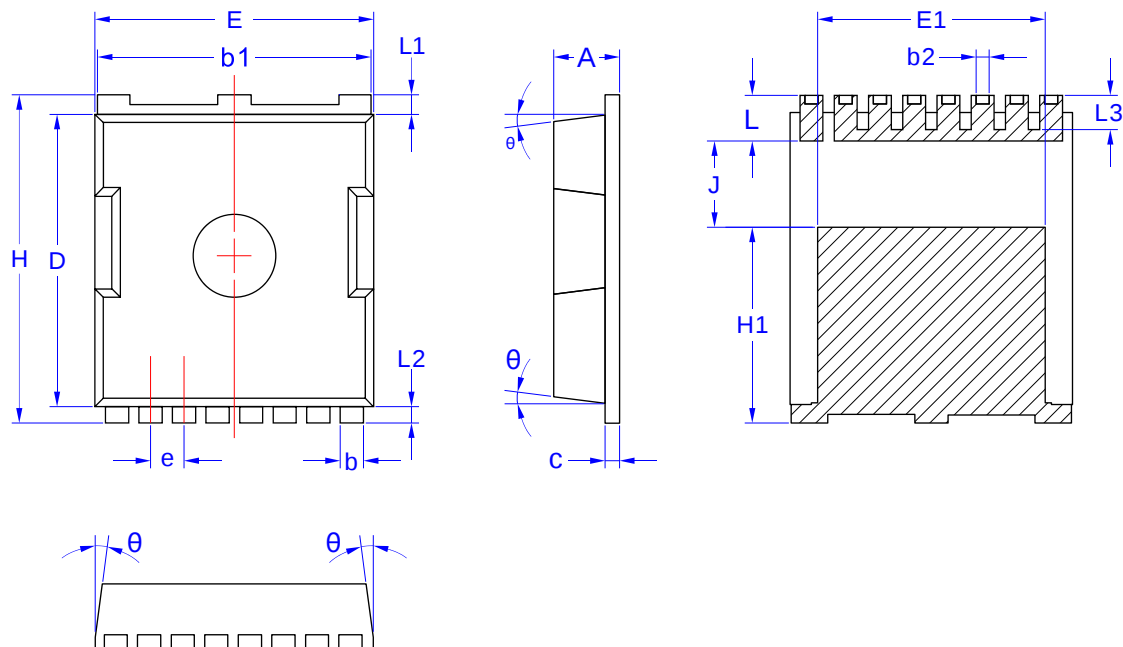
**Figure 11. Capacitance**



**Figure 12. Gate charge**

## 8. Package Dimensions

### TOLL-8L Package



| Symbol | Dimensions in Millimeters |       |
|--------|---------------------------|-------|
|        | MIN                       | MAX   |
| A      | 2.20                      | 2.40  |
| b      | 0.60                      | 0.90  |
| b1     | 9.70                      | 9.90  |
| b2     | 0.30                      | 0.50  |
| c      | 0.40                      | 0.60  |
| D      | 10.28                     | 10.58 |
| E      | 9.70                      | 10.10 |
| E1     | 7.90                      | 8.30  |
| e      | 1.20 BSC                  |       |

| Symbol   | Dimensions in Millimeters |       |
|----------|---------------------------|-------|
|          | MIN                       | MAX   |
| H        | 11.48                     | 11.88 |
| H1       | 6.75                      | 7.15  |
| J        | 3.00                      | 3.30  |
| L        | 1.40                      | 1.80  |
| L1       | 0.60                      | 0.80  |
| L2       | 0.50                      | 0.70  |
| L3       | 1.00                      | 1.30  |
| $\theta$ | 4°                        | 12°   |
|          |                           |       |