

## N-Channel Enhancement Mode MOSFET

### 1. Product Information

#### 1.1 Features

- Surface-mounted package
- Ultra-low  $R_{DS(ON)}$
- $T_J$  max 175°C
- Advanced trench cell design
- MSL1

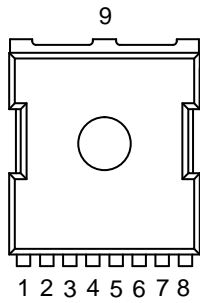
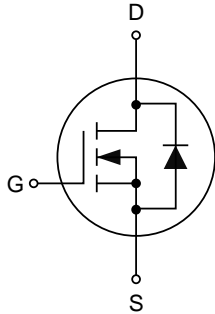
#### 1.2 Applications

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

#### 1.3 Quick reference

- $BV \geq 150\text{ V}$
- $P_D \leq 500\text{ W}$
- $I_D \leq 233\text{ A}$
- $R_{DS(ON)} \leq 4.0\text{ m}\Omega @V_{GS} = 10\text{ V}$

### 2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate	 <p style="text-align: center;">Top View TOLL-8L</p>	
2,3,4,5,6,7,8	Source		
9	Drain		

## 3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>DS</sub>	Drain-Source Voltage	T <sub>C</sub> =25°C	-	150	V
V <sub>GS</sub>	Gate-Source Voltage	T <sub>C</sub> =25°C	-	±20	V
I <sub>D</sub> *	Drain Current (DC)	T <sub>C</sub> =25°C, V <sub>GS</sub> =10 V	-	233	A
		T <sub>C</sub> =100°C, V <sub>GS</sub> =10 V	-	165	A
I <sub>DM</sub> *	Drain Current (Pulsed)	T <sub>C</sub> =25°C, V <sub>GS</sub> =10 V	-	815	A
P <sub>tot</sub>	Drain Power Dissipation	T <sub>C</sub> =25°C	-	500	W
I <sub>S</sub>	Continuous-Source Current	T <sub>C</sub> =25°C	-	233	A
E <sub>AS</sub> *	Single Pulsed Avalanche Energy	V <sub>DD</sub> =50 V, L=1.0 mH	-	1286	mJ
T <sub>J</sub> , T <sub>stg</sub>	Operating Junction and Storage Temperature		-55	175	°C
R <sub>θJA</sub> **	Thermal Resistance-Junction to Ambient		-	52	°C/W
R <sub>θJC</sub>	Thermal Resistance-Junction to Case		-	0.3	°C/W

Notes:

- \* Pulse width ≤ 300 μs, duty cycle ≤ 2%.
- \*\* Surface mounted on 1 in<sup>2</sup> pad area, t ≤ 10 sec.
- \*\*\* Limited by bonding wire.

## 4. Marking Information

Product Name	Marking
KJ039N15T	

## 5. Ordering Code

Product Name	Package	Reel size	Tape width	Quantity (pcs)
KJ039N15T	TOLL-8L	13"	24 mm	2000

Note: KUAJIEYIN 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).

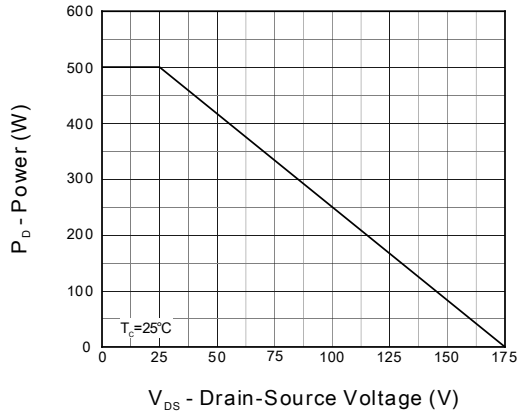
## 6. Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0 V, I <sub>DS</sub> =250 μA	150	-	-	V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250 μA	2.5	-	4.5	V
I <sub>DSS</sub>	Drain Leakage Current	V <sub>DS</sub> =150 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> =50 A	-	3.5	4.0	mΩ
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>a</sup>	Diode Forward Voltage	I <sub>SD</sub> =1 A, V <sub>GS</sub> =0 V	-	-	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =20 A, V <sub>GS</sub> =0 V, dI <sub>SD</sub> /dt=100 A/μs	-	122	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	279	-	nC
<b>Dynamic Characteristics<sup>b</sup></b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0 V, V <sub>DS</sub> =75 V, Frequency=1 MHz	-	6550	-	pF
C <sub>oss</sub>	Output Capacitance		-	770	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	8	-	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =75 V, V <sub>GEN</sub> =10 V, R <sub>G</sub> =6 Ω, R <sub>L</sub> =3.75 Ω, I <sub>DS</sub> =20 A	-	48	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	92	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	93	-	
t <sub>f</sub>	Turn-off Fall Time		-	59	-	
<b>Gate Charge Characteristics<sup>b</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =75 V, V <sub>GS</sub> =10 V, I <sub>DS</sub> =20 A	-	89	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	33	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	17	-	

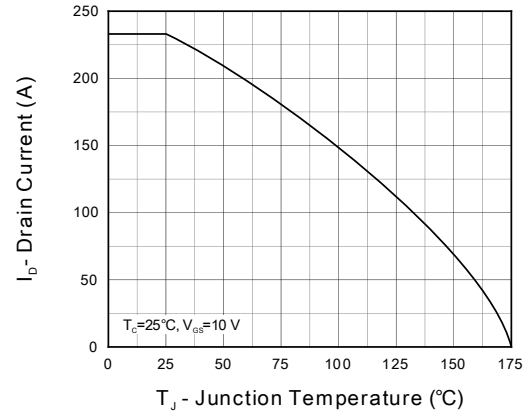
Notes:

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

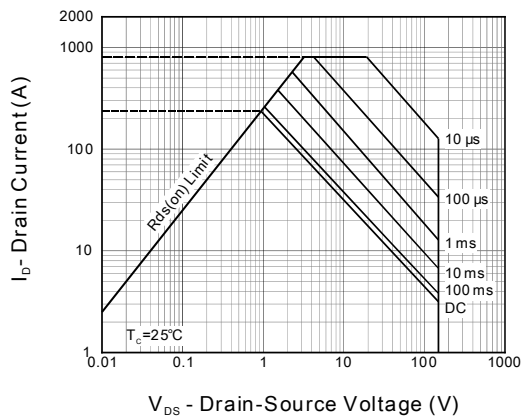
## 7. Typical Characteristics



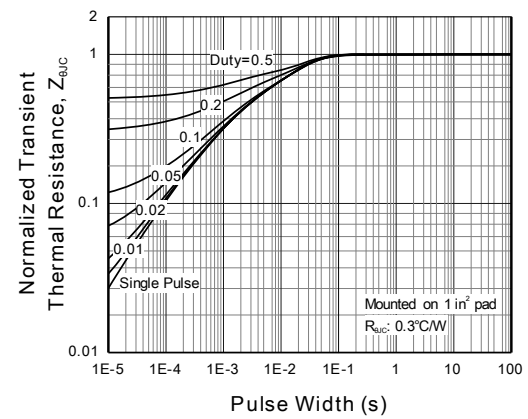
**Figure 1. Output Characteristics**



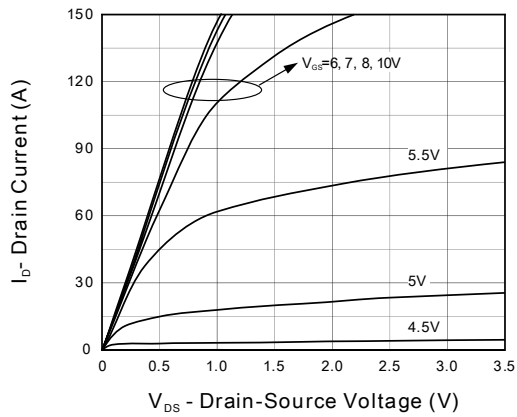
**Figure 2. Current Capability**



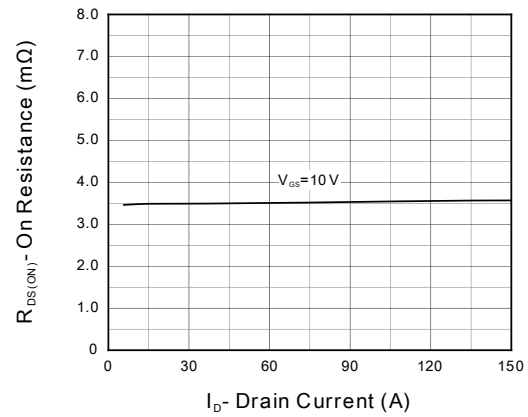
**Figure 3. Safe Operation Area**



**Figure 4. Transient Thermal Impedance**

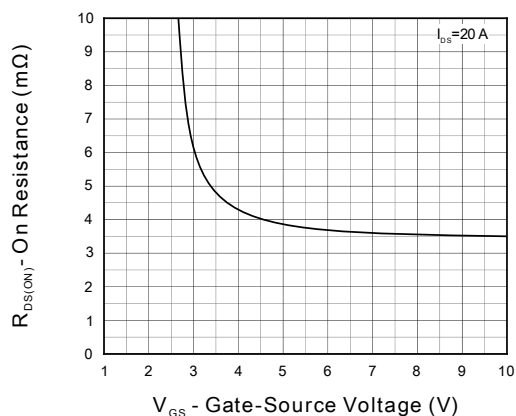


**Figure 5. Output Characteristics**

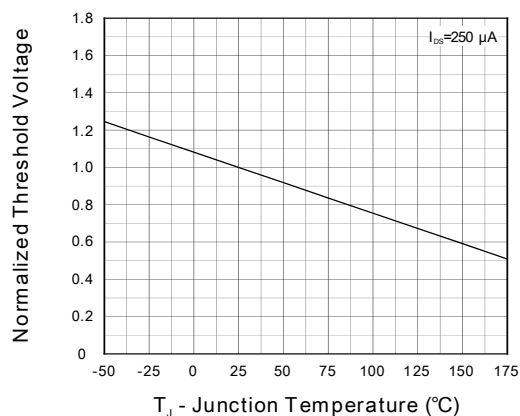


**Figure 6. On Resistance**

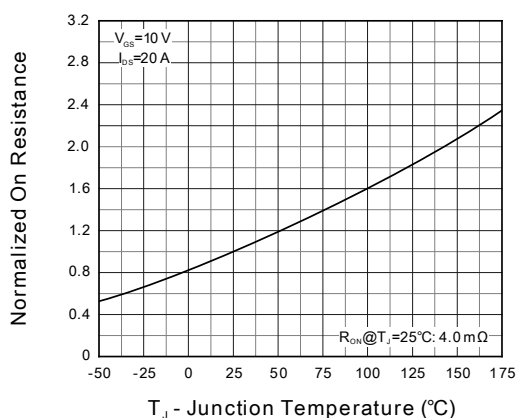
## 7. Typical Characteristics (cont.)



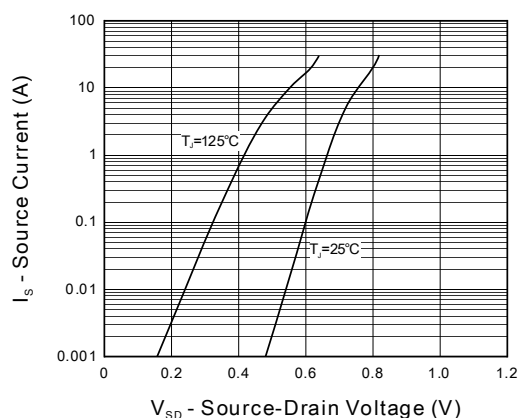
**Figure 7. Transfer Characteristics**



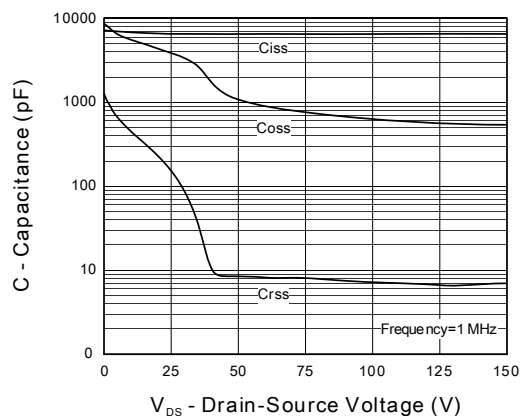
**Figure 8. Normalized Threshold Voltage**



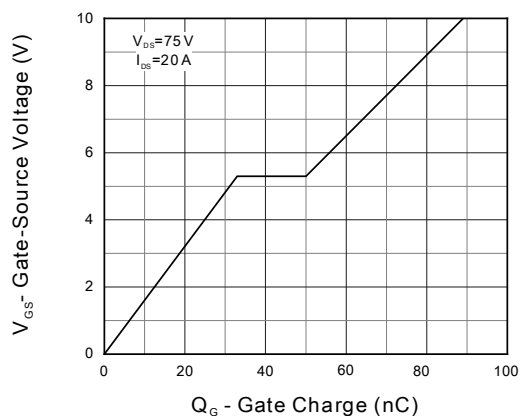
**Figure 9. Normalized On Resistance**



**Figure 10. Diode Forward Current**



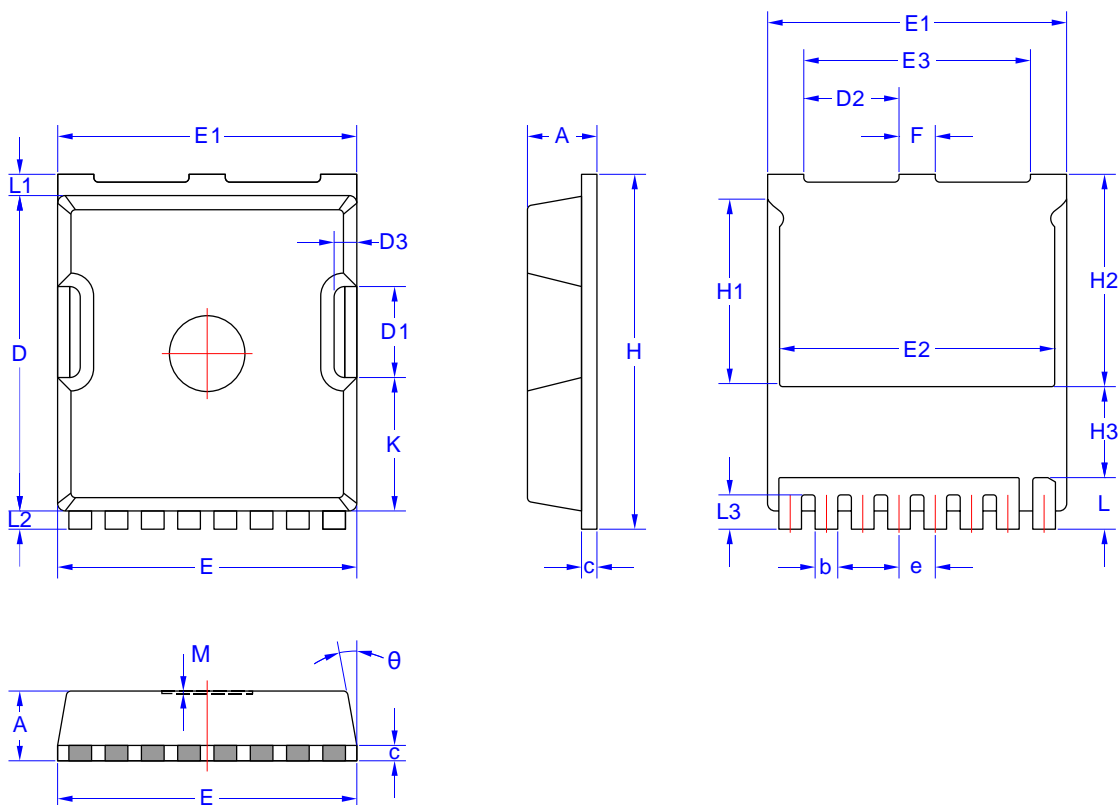
**Figure 11. Capacitance**



**Figure 12. Gate Charge**

## 8. Package Dimensions

### TOLL-8L Package



Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A	2.20	2.30	2.40
b	0.65	0.75	0.85
c		0.508 REF	
D	10.25	10.40	10.55
D1	2.85	3.00	3.15
D2	2.95	3.10	3.25
D3		0.75 REF	
E	9.75	9.90	10.05
E1	9.65	9.80	9.95
E2	8.95	9.10	9.25
E3	7.25	7.40	7.55
e		1.20 BSC	

Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
F	1.05	1.20	1.35
H	11.55	11.70	11.85
H1	6.03	6.18	6.33
H2	6.85	7.00	7.15
H3		3.00 BSC	
K	4.25	4.40	4.55
L	1.55	1.70	1.85
L1	0.55	0.70	0.85
L2	0.45	0.60	0.75
L3	1.00	1.15	1.30
M		0.08 REF	
θ	8°	10°	12°