

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

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

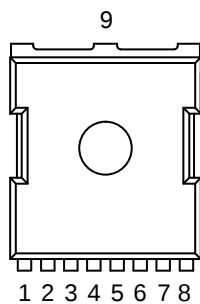
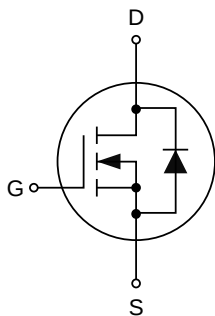
1.2 Applications

- ✓ Motor drivers
- ✓ BMS appliances
- ✓ DC/DC converter

1.3 Quick reference

- ✓ $BV \geq 40\text{ V}$
- ✓ $P_D \leq 230\text{ W}$
- ✓ $I_D \leq 300\text{ A}$
- ✓ $R_{DS(ON)} \leq 1.3\text{ m}\Omega @ V_{GS} = 10\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate	 Top View TOLL-8L	
2,3,4,5,6,7,8	Source		
9	Drain		

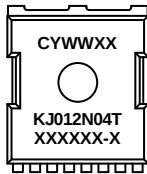
3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_c=25^{\circ}\text{C}$	40	-	V
V_{GS}	Gate-Source Voltage	$T_c=25^{\circ}\text{C}$	-	± 20	V
$I_D^{*,**}$	Continuous Drain Current	$T_c=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	300	A
		$T_c=100^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	212	A
$I_{DM}^{**,**}$	Pulsed Drain Current	$T_c=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	1200	A
E_{AS}	Single Pulsed Avalanche Energy	$V_{DD}=35\text{ V}, L=0.5\text{ mH}$	-	462	mJ
P_D	Drain Power Dissipation	$T_c=25^{\circ}\text{C}$	-	230	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55	175	$^{\circ}\text{C}$
$R_{\theta JA}^{***}$	Thermal Resistance-Junction to Ambient, Steady-State		-	50	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case, Steady-State		-	0.65	

Notes:

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

4. Marking Information

Product Name	Marking
KJ012N04T	

5. Ordering Code

Product Name	Package	Reel size	Tape width	Quantity (pcs)
KJ012N04T	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_J=25°C unless otherwise noted)

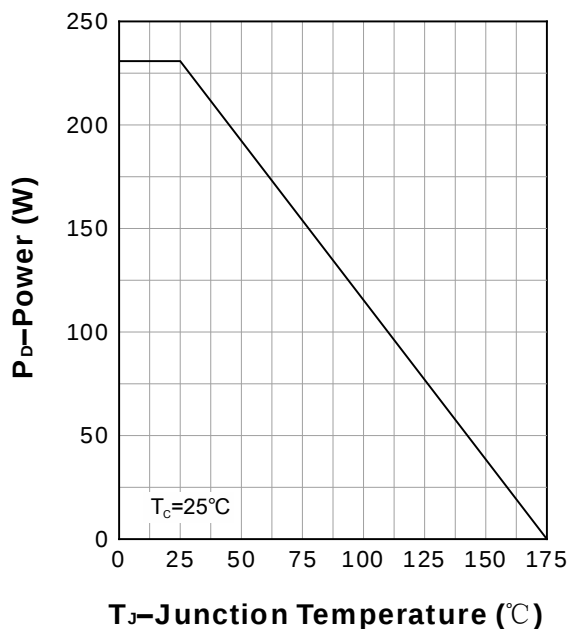
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _{DS} =250 μA	40	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	1.0	1.7	2.5	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} =40 V, V _{GS} =0 V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} =0 V, V _{GS} =±20 V	-	-	±100	nA
R _{DS(ON)} ^a	Drain-Source On-Resistance	V _{GS} =10 V, I _{DS} =30 A	-	1.1	1.3	mΩ
		V _{GS} =4.5 V, I _{DS} =20 A	-	2.0	2.8	mΩ
V _{SD} ^a	Diode Forward Voltage	I _{SD} =30 A, V _{GS} =0 V	-	-	1.2	V
I _S	Maximum Body-Diode Continuous Current		-	-	300	A
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{DS} =20 V, V _{GS} =0 V, Frequency=1 MHz	-	14650	-	pF
C _{oss}	Output Capacitance		-	850	-	
C _{rss}	Reverse Transfer Capacitance		-	112	-	
Switching Parameters ^b						
Q _g	Total Gate Charge	V _{DS} =20 V, V _{GS} =10 V, I _{DS} =30 A	-	94	-	nC
Q _{gs}	Gate-Source Charge		-	16	-	
Q _{gd}	Gate-Drain Charge		-	18	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =20 V, V _{GS} =10 V, R _G =3 Ω, I _D =30 A	-	14	-	ns
t _r	Turn-on Rise Time		-	10	-	
t _{d(off)}	Turn-off Delay Time		-	100	-	
t _f	Turn-off Fall Time		-	17	-	
t _{rr}	Body Diode Reverse Recovery Time	V _{GS} =0 V, I _{SD} =30 A, dI _{SD} /dt=100 A/μs	-	30	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	23	-	nC

Notes:

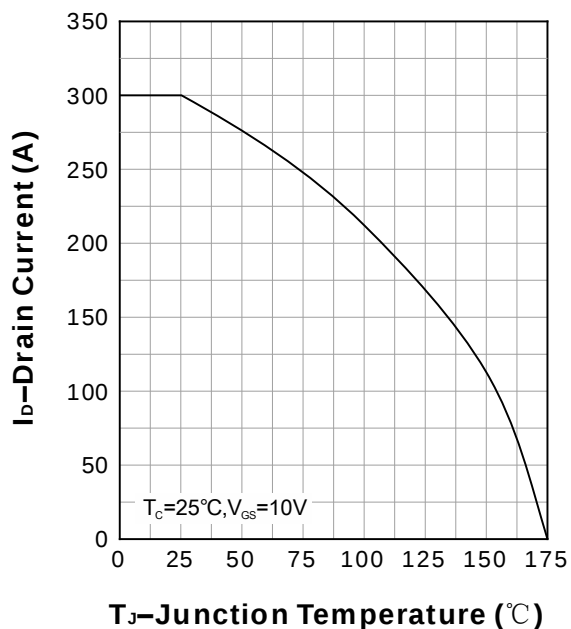
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

7. Typical Electrical and Thermal Characteristics

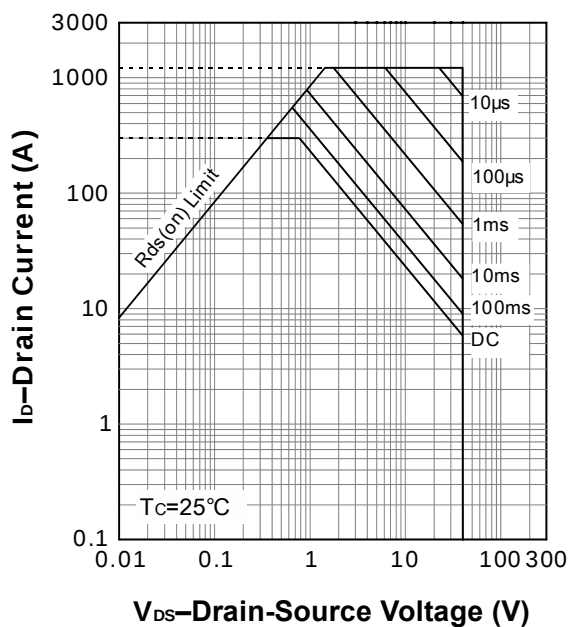
Power Capability



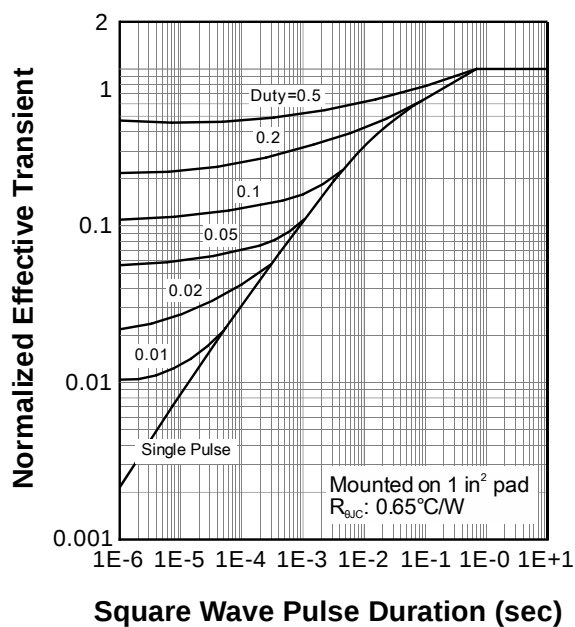
Current Capability



Safe Operating Area

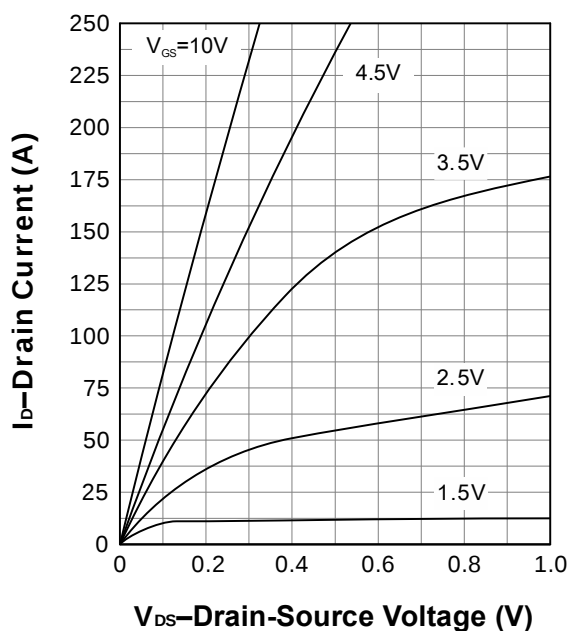


Transient Thermal Impedance

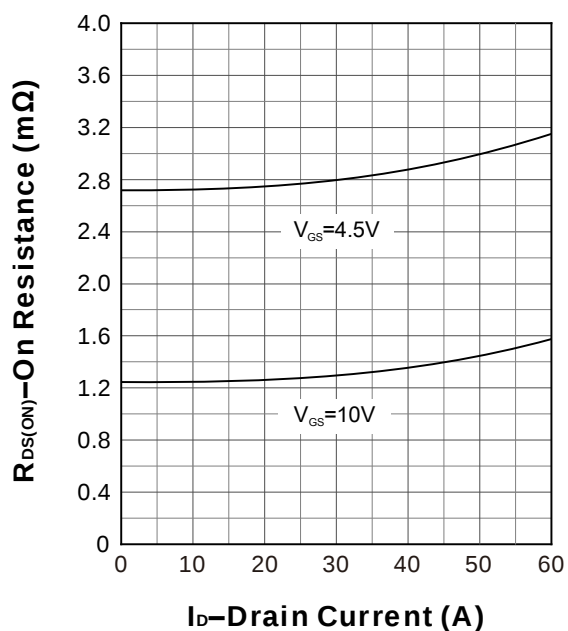


7. Typical Characteristics(cont.)

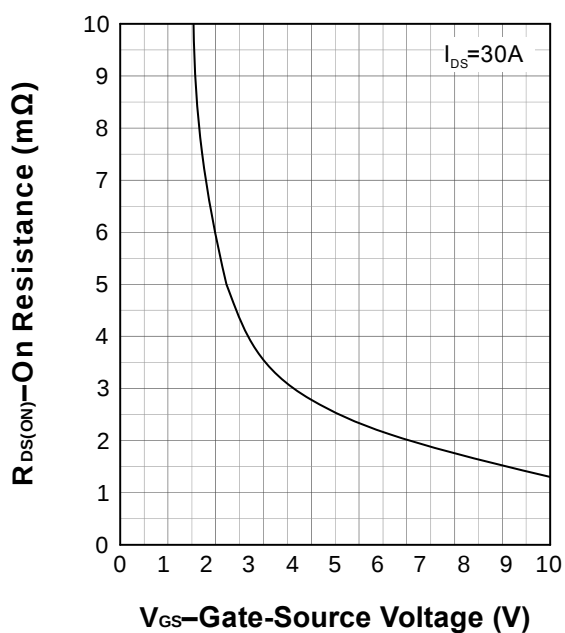
Output Characteristics



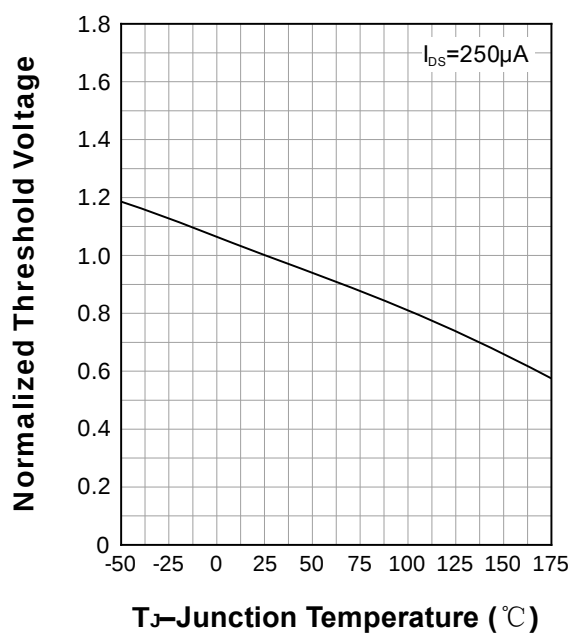
On Resistance



Transfer Characteristics

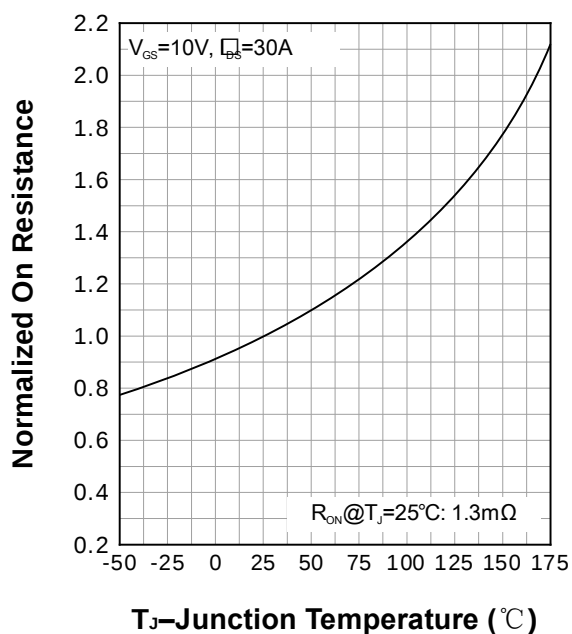


Normalized Threshold Voltage

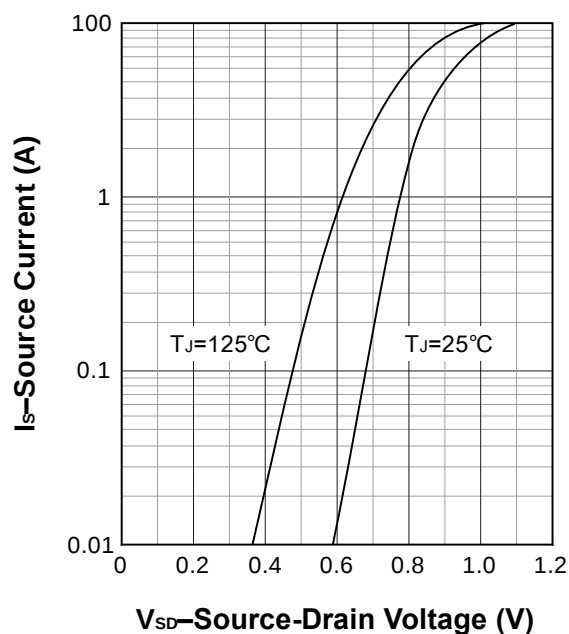


7. Typical Characteristics(cont.)

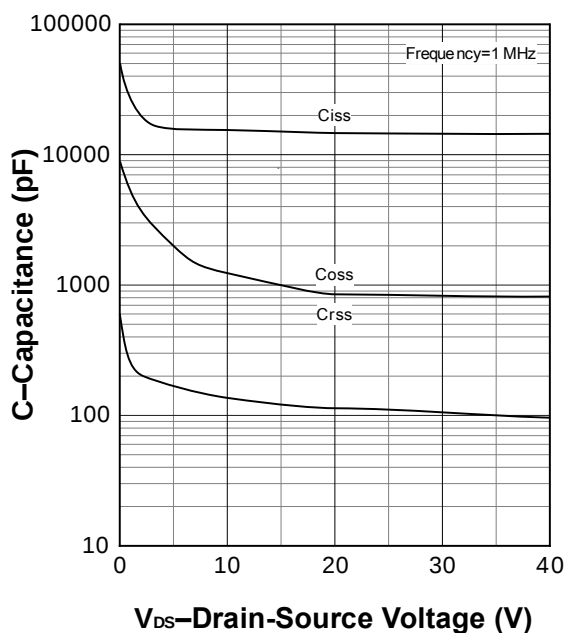
Normalized On Resistance



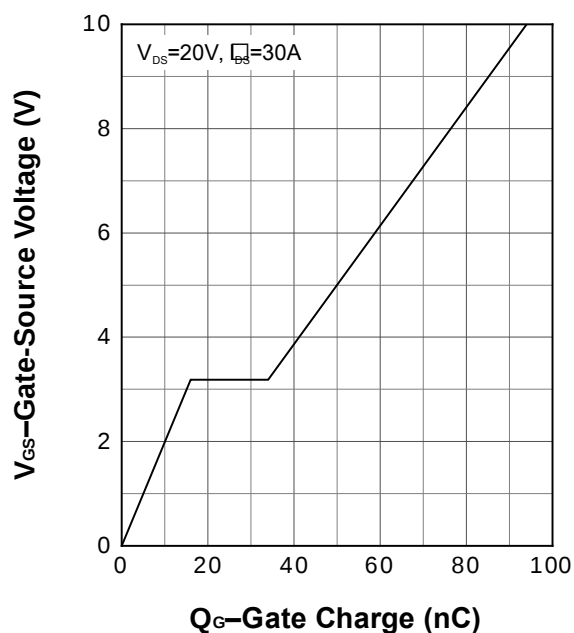
Diode Forward Current



Capacitance

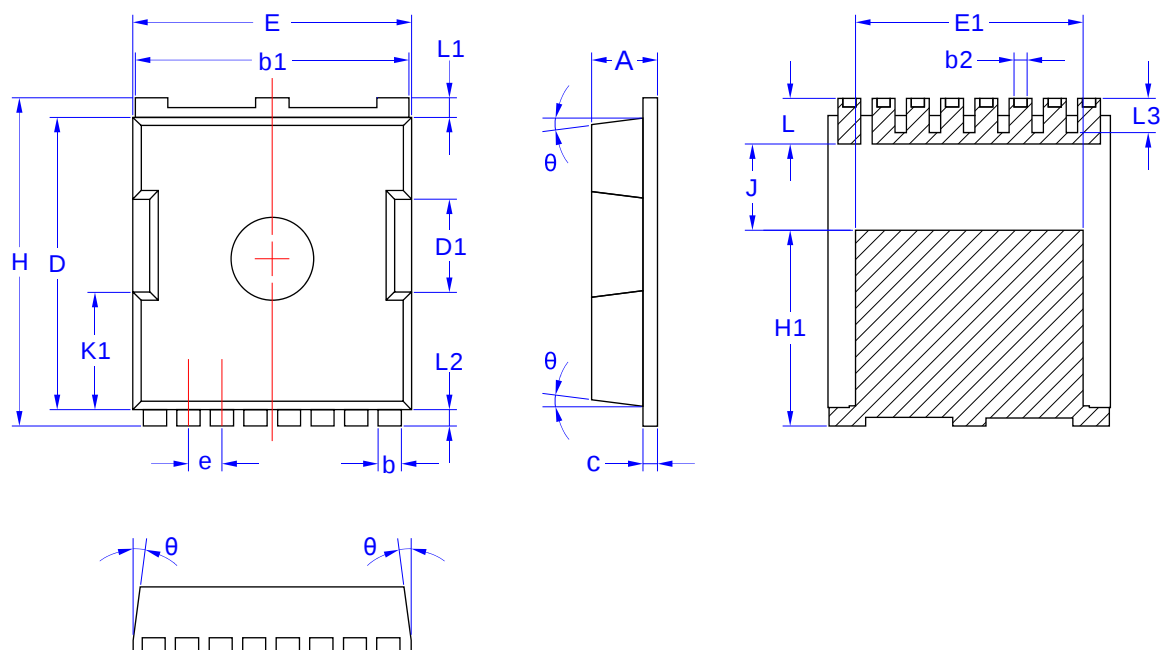


Gate Charge



8. Package Dimensions

TOLL-8L Package



Symbol	Dimensions in Millimeters	
	MIN	MAX
A	2.20	2.40
b	0.70	0.90
b1	9.70	9.90
b2	0.42	0.50
c	0.40	0.60
D	10.28	10.58
D1	3.10	3.50
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
K1	3.98	4.38
L	1.40	1.80
L1	0.60	0.80
L2	0.50	0.70
L3	1.00	1.30
θ	4°	10°