

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ T_J max 175°C
- ☑ Advanced trench cell design
- ☑ MSL1

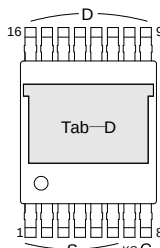
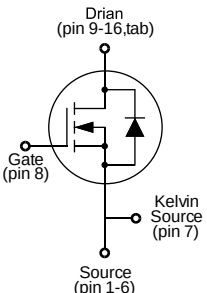
1.2 Applications

- ☑ Battery powered circuits
- ☑ BLDC Motor drive applications
- ☑ High power inverter systems

1.3 Quick reference

- ☑ $BV \geq 40\text{ V}$
- ☑ $P_D \leq 300\text{ W}$
- ☑ $I_D \leq 586\text{ A}$
- ☑ $R_{DS(ON)} \leq 0.53\text{ m}\Omega @V_{GS} = 10\text{ V}$
- ☑ $R_{DS(ON)} \leq 0.95\text{ m}\Omega @V_{GS} = 4.5\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1~6	Source	 TOLT-16L	
7	Kelvin Source		
8	Gate		
9~16, Tab	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
$I_D^{*,***}$	Drain Current (DC)	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	586	A
		$T_C=100^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	400	A
I_{DM}^{*}	Drain Current (Pulsed)	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	1800	A
P_D	Drain Power Dissipation	$T_C=25^{\circ}\text{C}$	-	300	W
I_S	Continuous-Source Current	$T_C=25^{\circ}\text{C}$	-	586	A
E_{AS}	Single Pulsed Avalanche Energy	$V_{DD}=40\text{ V}, L=1.0\text{ mH}$	-	3042	mJ
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55	175	$^{\circ}\text{C}$
$R_{\theta JA}^{**}$	Thermal Resistance-Junction to Ambient		-	44	$^{\circ}\text{C/W}$
$R_{\theta JC}^{**}$	Thermal Resistance-Junction to Case		-	0.5	

Notes:

* Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

** Surface mounted on 1 in^2 pad area, $t \leq 10\text{ sec}$.

*** Limited by bonding wire.

4. Marking Information

Product Name	Marking
KJ002N04LT1	KJ002N04LT1 XXXXXX-X

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity (pcs)
KJ002N04LT1	TOLT-16L	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 ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
--------	-----------	------------	-----	-----	-----	------

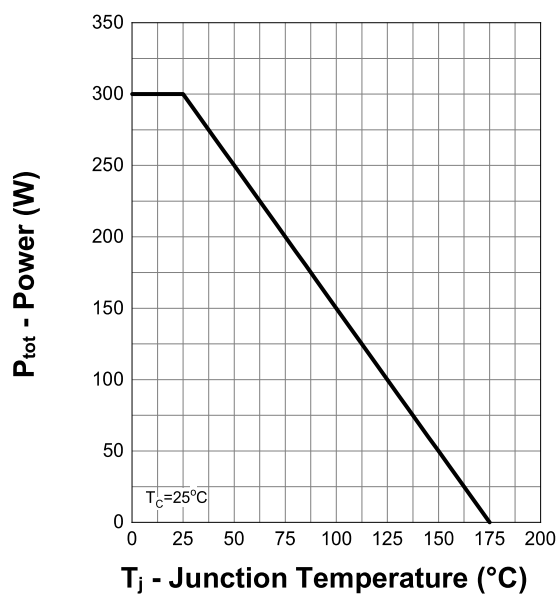
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _{DS} =250 μA	40	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	1	-	2	V
I _{DSS}	Drain Leakage Current	V _{DS} =32 V, V _{GS} =0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{DS} =0 V, V _{GS} =±20 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} =10 V, I _{DS} =50 A	-	0.45	0.53	mΩ
		V _{GS} =4.5 V, I _{DS} =30 A	-	0.75	0.95	mΩ
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	V _{GS} =0 V, I _{SD} =50 A	-	-	1.3	V
t _{rr}	Reverse Recovery Time	V _{GS} =0 V, I _{SD} =50 A, dI _{SD} /dt=100 A/μs	-	42	-	ns
Q _{rr}	Reverse Recovery Charge		-	43	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{DS} =20 V, V _{GS} =0 V, Frequency=1 MHz	-	32824	-	pF
C _{oss}	Output Capacitance		-	2465	-	
C _{rss}	Reverse Transfer Capacitance		-	1995	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =20 V, V _{GEN} =10 V, R _G =3.9 Ω, R _L =0.4 Ω, I _{DS} =50 A	-	35	-	ns
t _r	Turn-on Rise Time		-	141	-	
t _{d(off)}	Turn-off Delay Time		-	500	-	
t _f	Turn-off Fall Time		-	243	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =20 V, V _{GS} =10 V, I _{DS} =50 A	-	602	-	nC
Q _{gs}	Gate-Source Charge		-	131	-	
Q _{gd}	Gate-Drain Charge		-	83	-	

Notes:

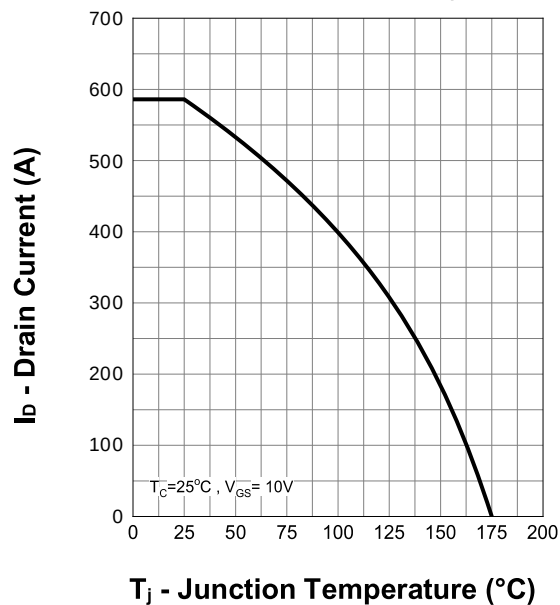
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

7. Typical Characteristics

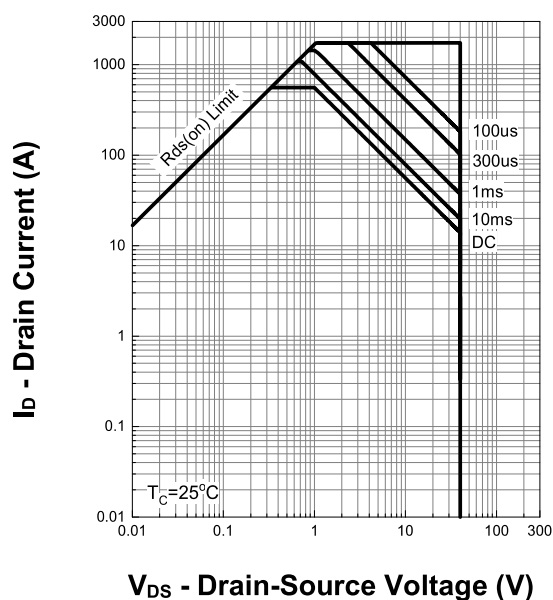
Power Capability



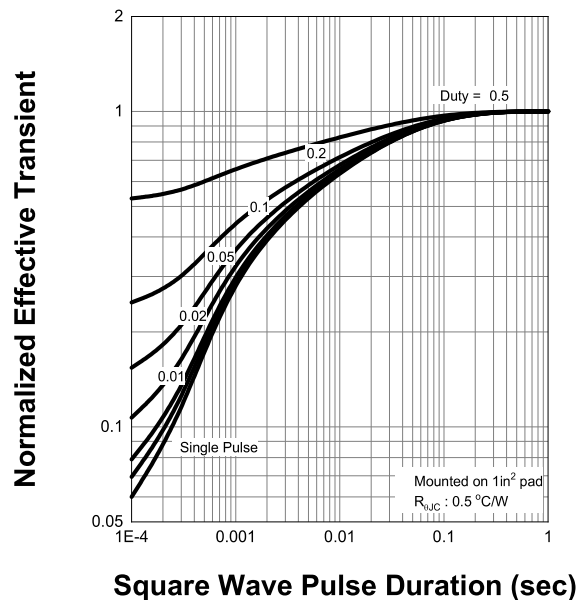
Current Capability



Safe Operating Area

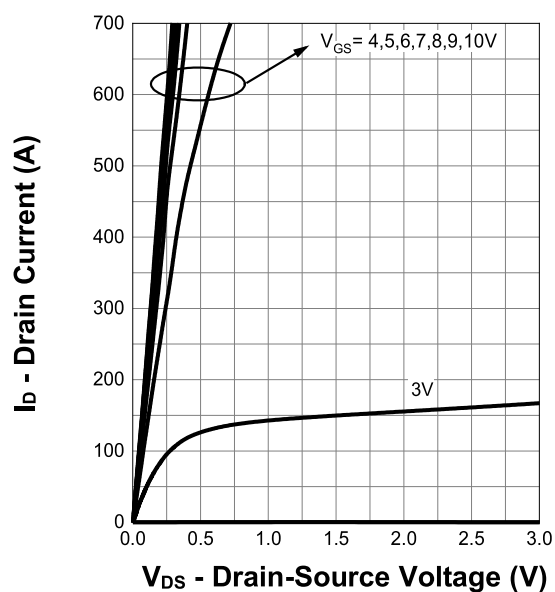


Transient Thermal Impedance

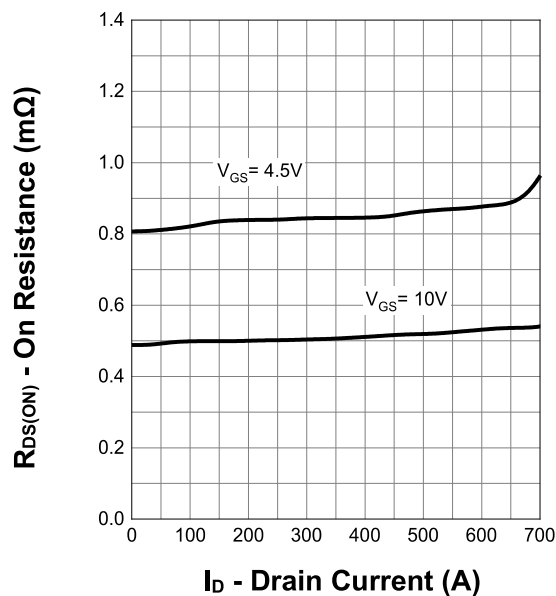


7. Typical Characteristics (cont.)

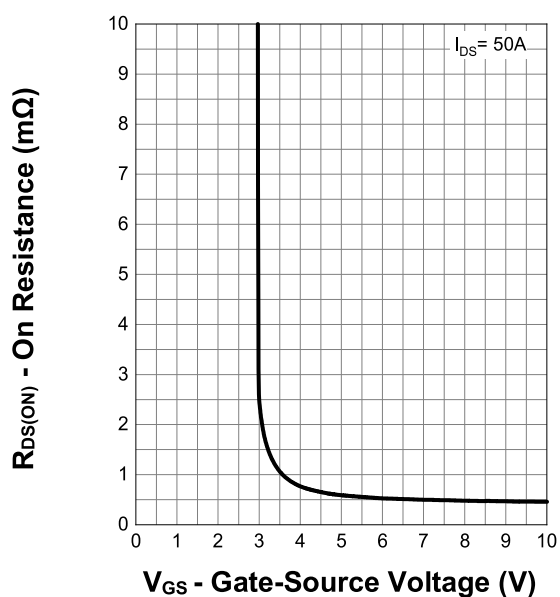
Output Characteristics



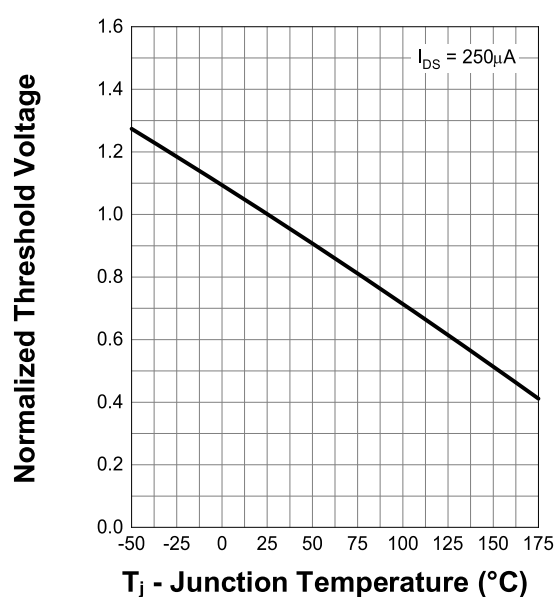
On Resistance



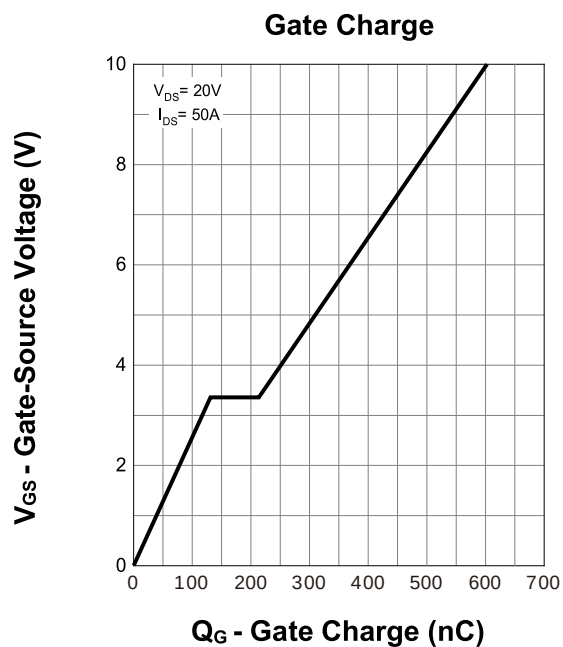
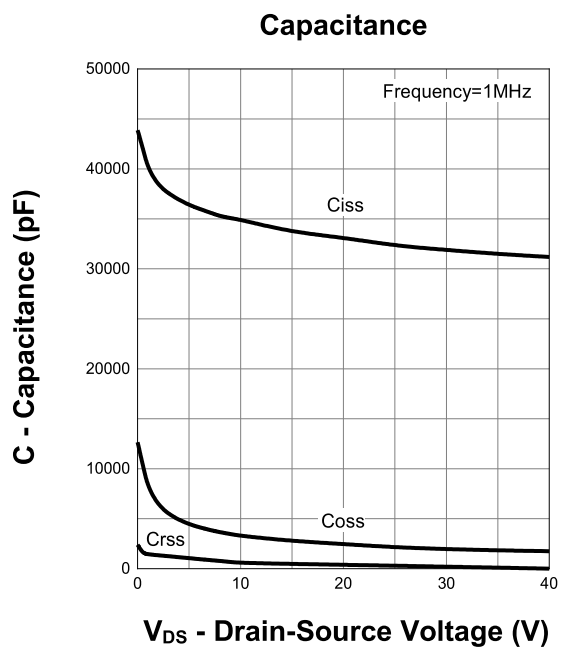
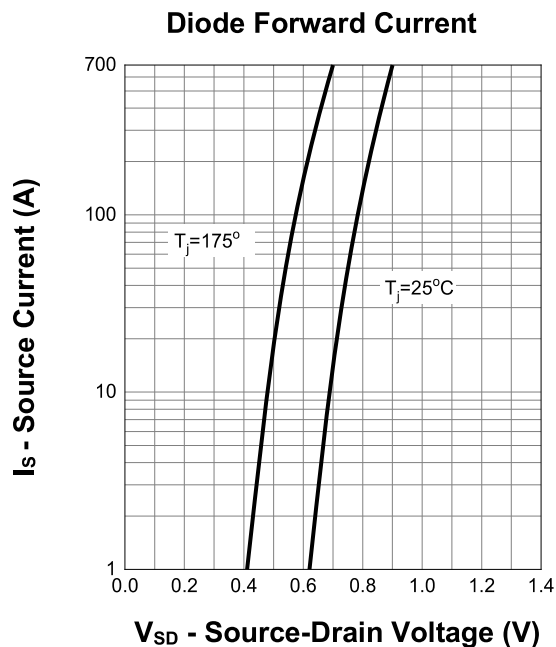
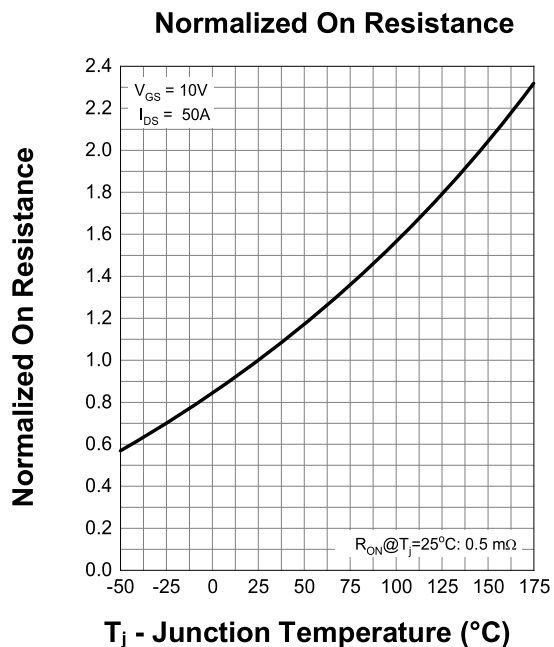
Transfer Characteristics



Normalized Threshold Voltage

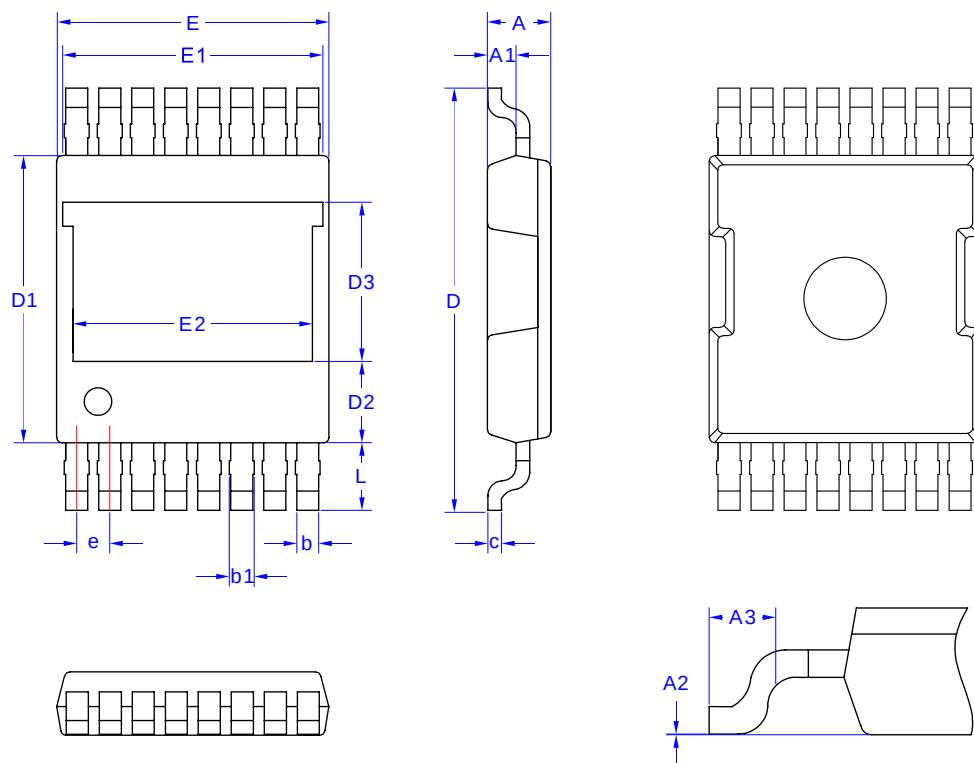


7. Typical Characteristics (cont.)



8. Package Dimensions

TOLT-16L Package



Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.99	1.04	1.09
A2	0.00	0.08	0.16
A3	1.50 REF		
b	0.70	0.75	0.80
b1	0.65	0.70	0.75
c	0.45	0.50	0.55
D	14.50	15.00	15.50

Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
D1	9.60	10.10	10.60
D2	2.30	2.80	3.30
D3	5.77 REF		
E	9.40	9.90	10.40
E1	9.46 REF		
E2	8.70 REF		
e	1.15	1.20	1.25
L	2.40	2.45	2.50