

## N-Channel Enhancement Mode MOSFET

### 1. Product Information

#### 1.1 Features

- Surface-mounted package
- Low Thermal Resistance

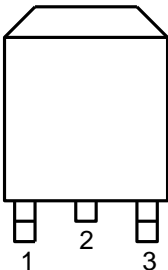
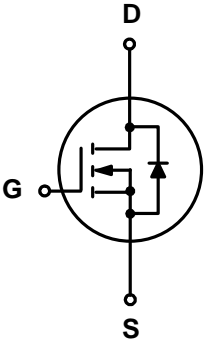
#### 1.2 Applications

- Motor drivers
- DC - DC Converter

#### 1.3 Quick reference

- $BV \geq 30\text{ V}$
- $R_{DS(ON)} \leq 7.5\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- $P_{tot} \leq 32\text{ W}$
- $R_{DS(ON)} \leq 12.0\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
- $I_D \leq 50\text{ A}$

### 2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)	 Top View TO-252	
2	Drain(D)		
3	Source(S)		



### 3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>DS</sub>	Drain-Source Voltage	T <sub>C</sub> = 25 °C	30	-	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	-	50	A
		T <sub>C</sub> = 100 °C, V <sub>GS</sub> = 10 V		36	A
I <sub>DM</sub> *,**,***	Drain Current ( Pulsed )	T <sub>C</sub> = 25 °C, V <sub>GS</sub> = 10 V	-	144	A
P <sub>tot</sub> *	Total Power Dissipation	T <sub>C</sub> = 25 °C	-	32	W
T <sub>stg</sub>	Storage Temperature		- 55	150	°C
T <sub>J</sub>	Junction Temperature		-	150	°C
I <sub>S</sub>	Diode Forward Current	T <sub>C</sub> = 25 °C	-	50	A
E <sub>AS</sub> *	Single Pulsed Avalanche Energy	V <sub>DD</sub> = 30 V , L= 1 mH	-	92	mJ
R <sub>θJA</sub> *	Thermal Resistance- Junction to Ambient		-	62.5	°C / W
R <sub>θJC</sub> *	Thermal Resistance- Junction to Case		-	6	

Notes :

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

### 4. Marking Information

Product Name	Marking
KJ50N03K	<div style="display: inline-block; border: 1px solid black; padding: 2px;"> <b>50N03</b>  <b>YWWXXX</b> </div> <b>YWWXXX:</b> Date Code

### 5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ50N03K	TO252			2500	

Note: KUAJIJIXIN 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>D</sub> = 250 μA	30	-	-	V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA	1	-	2	V
I <sub>DSS</sub>	Zero Gate Voltage Source Current	V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V	-	-	1	μA
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> = ± 20 V, V <sub>DS</sub> = 0 V	-	-	± 100	nA
R <sub>DS(ON)</sub> <sup>a</sup>	Drain-Source On-State Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 10 A	-	6.5	7.5	mΩ
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 5 A	-	10.5	12.0	
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>a</sup>	Diode Forward Voltage	I <sub>SD</sub> = 10 A, V <sub>GS</sub> = 0 V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> = 10 A, dI <sub>SD</sub> /dt = 100 A/μs	-	8.2	-	nS
Q <sub>rr</sub>	Reverse Recovery Charge		-	2.3	-	nC
<b>Dynamic Characteristics<sup>b</sup></b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 15 V Frequency = 1 MHz	-	1244	-	pF
C <sub>oss</sub>	Output Capacitance		-	137	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	114	-	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> = 15 V, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 3.9 Ω, R <sub>L</sub> = 1.5 Ω, I <sub>D</sub> = 10 A	-	5.9	-	nS
t <sub>r</sub>	Turn-on Rise Time		-	29	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	25	-	
t <sub>f</sub>	Turn-off Fall Time		-	15	-	
<b>Gate Charge Characteristics<sup>b</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 15 V, I <sub>DS</sub> = 10 A	-	23	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	5.4	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	3.4	-	

Notes :

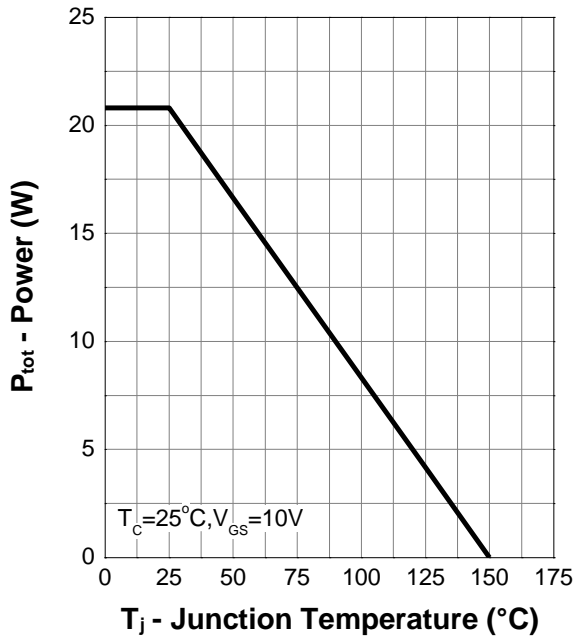
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing

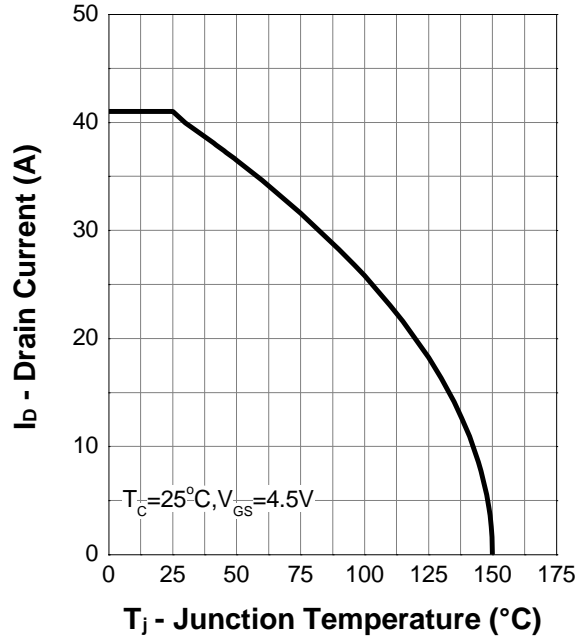


### 7. Typical Characteristics (Cont.)

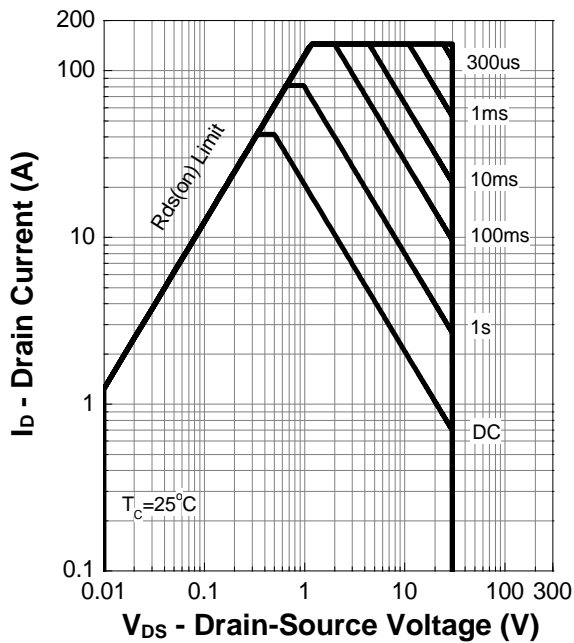
Power Capability



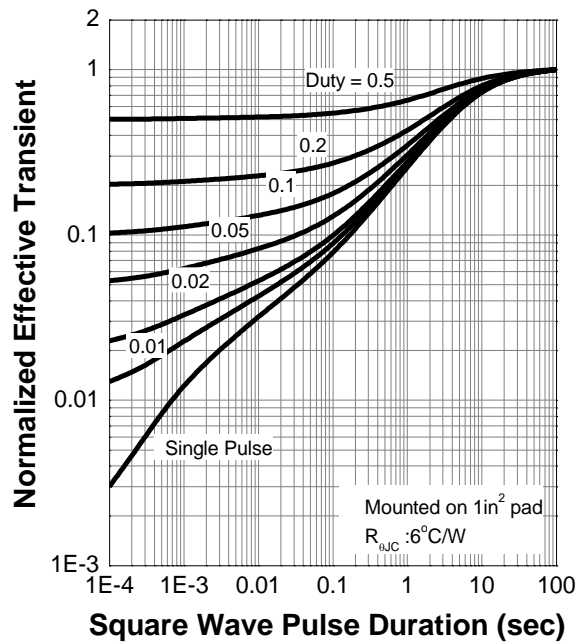
Current Capability



Safe Operating Area



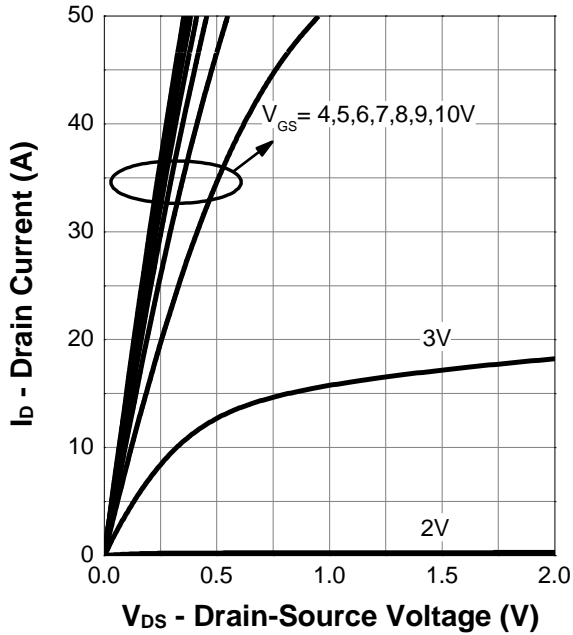
Transient Thermal Impedance



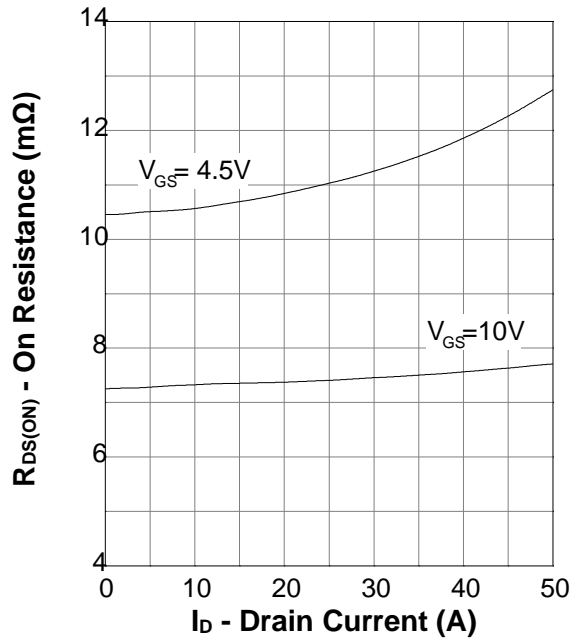


### 7. Typical Characteristics (Cont.)

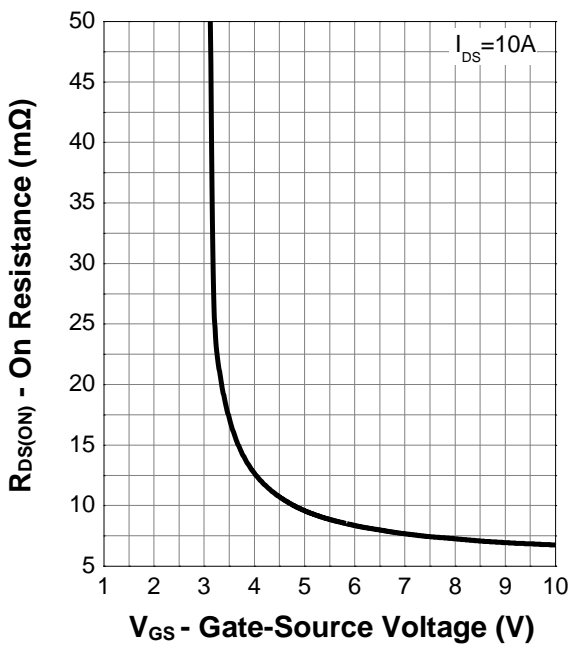
Output Characteristics



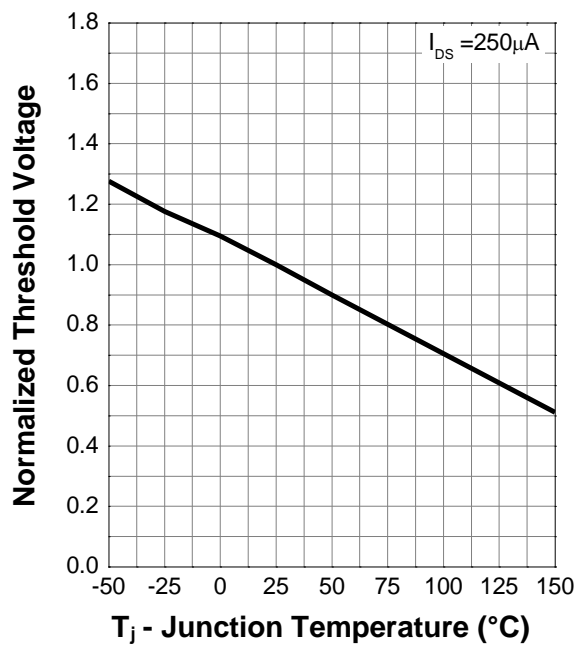
On Resistance



Transfer Characteristics



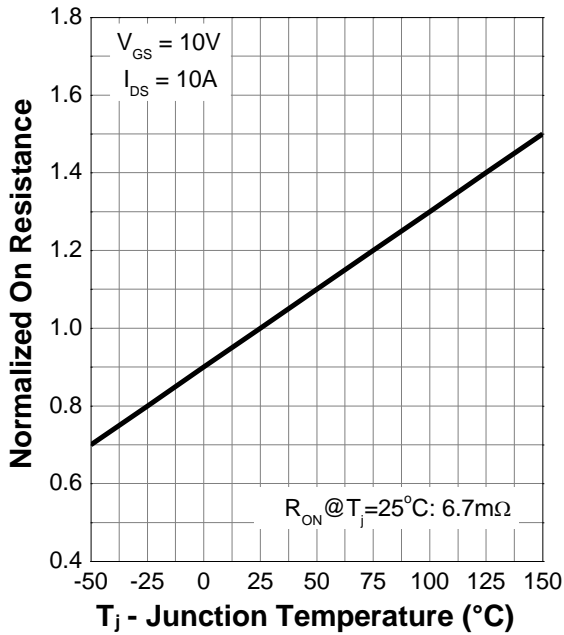
Normalized Threshold Voltage



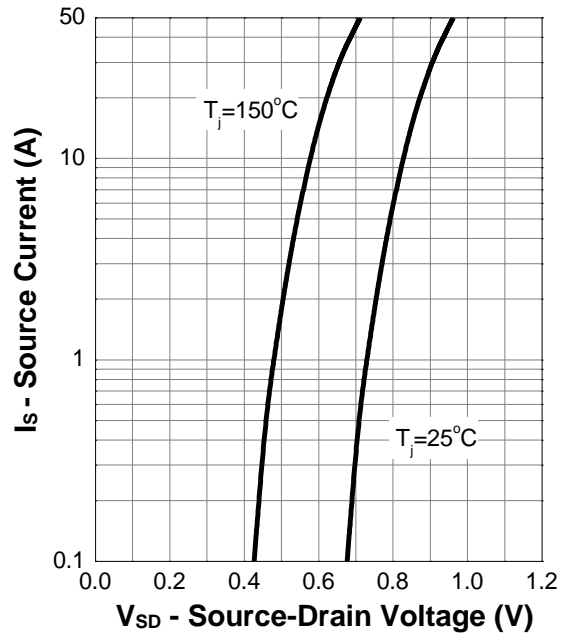


### 7. Typical Characteristics (Cont.)

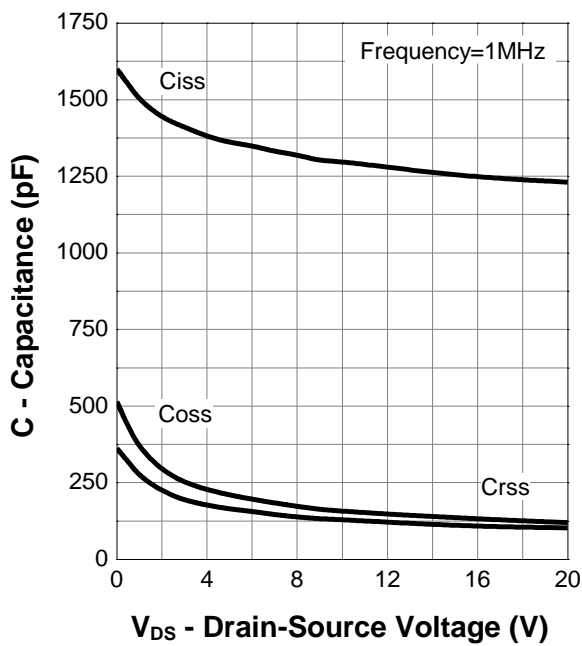
Normalized On Resistance



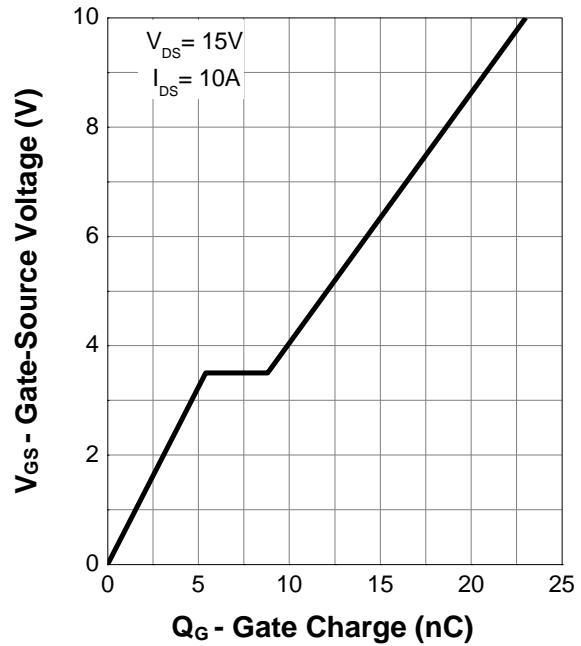
Diode Forward Current



Capacitance



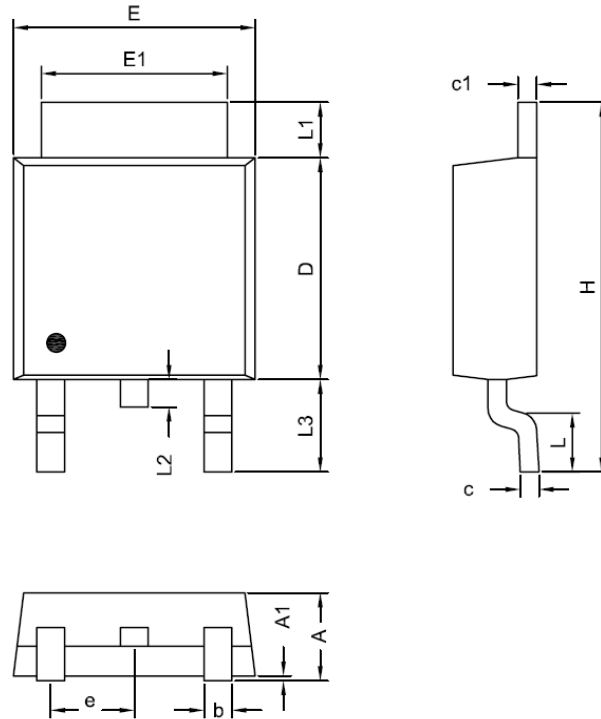
Gate Charge





## 8.Package Dimensions

T0252-3L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.19	2.38
A1	0.02	0.13
D	5.30	6.40
E	6.35	6.80
E1	5.20	5.50
c	0.40	0.60
c1	0.40	0.60
b	0.55	0.85
e	2.30 BCS	
L	1.00	1.80
L1	0.70	1.80
L2	0.70 BCS	
L3	2.40	2.80
H	9.20	10.40