

## P-Channel Enhancement Mode MOSFET

### 1. Product Information

#### 1.1 Features

- Advanced trench cell design
- Low Thermal Resistance

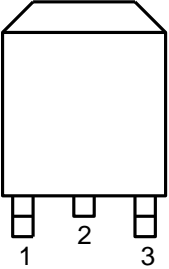
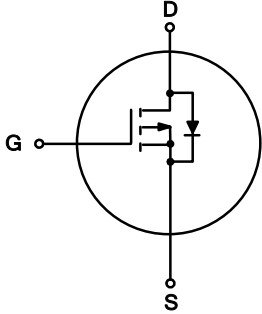
#### 1.2 Applications

- Motor drivers
- DC - DC Converter

#### 1.3 Quick reference

- $BV \geq -30\text{ V}$
- $R_{DS(ON)} \leq 18\text{ m}\Omega @ V_{GS} = -10\text{ V}$
- $P_{tot} \leq 20\text{ W}$
- $R_{DS(ON)} \leq 28\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$
- $I_D \leq -50\text{ A}$

### 2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)		
2	Drain(D)		
3	Source(S)		

**Top View  
TO252**



## 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	T <sub>C</sub> = 25 °C, V <sub>GS</sub> = -10 V	-	-50	A
I <sub>DM</sub> *,**,***	Pulsed Source Current	T <sub>C</sub> = 25 °C, V <sub>GS</sub> = -10 V	-	-96	A
P <sub>tot</sub> *	Total Power Dissipation	T <sub>C</sub> = 25 °C	-	20	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
R <sub>θJC</sub> *	Thermal Resistance- Junction to Ambient		-	6	°C / W

Notes :

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

## 4. Marking Information

Product Name	Marking
KJ50P03K	<div style="display: inline-block; border: 1px solid black; padding: 2px;"> <b>50P03</b>  <b>YWWXXX</b> </div> <b>YWW:</b> <b>Date Code</b>

## 5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ50P03K	TO252			2500	

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 )



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## 6. Electrical Characteristics (T<sub>C</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	-1.0	-	-2.0	V
I <sub>DSS</sub>	Zero Gate Voltage Source Current	V <sub>DS</sub> = -24 V, V <sub>GS</sub> = 0 V	-	-	-1	μA
		T <sub>J</sub> = 85 °C	-	-	-30	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> = -20 A	-	15	18	mΩ
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -10 A	-	25	28	mΩ
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>a</sup>	Diode Forward Voltage	I <sub>SD</sub> = -20 A, V <sub>GS</sub> = 0 V	-	-	-1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> = -20 A, dI <sub>SD</sub> /dt = 100 A/μs	-	8.3	-	nS
Q <sub>rr</sub>	Reverse Recovery Charge		-	0.6	-	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	-	1811	-	pF
C <sub>oss</sub>	Output Capacitance		-	172	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	134	-	
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> = 4.5 Ω, R <sub>L</sub> = 0.75 Ω, I <sub>D</sub> = -20 A	-	18	-	nS
t <sub>r</sub>	Turn-on Rise Time		-	86	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	231	-	
t <sub>f</sub>	Turn-off Fall Time		-	127	-	
<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> = -20 A	-	31	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	8.6	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	4.8	-	

Notes :

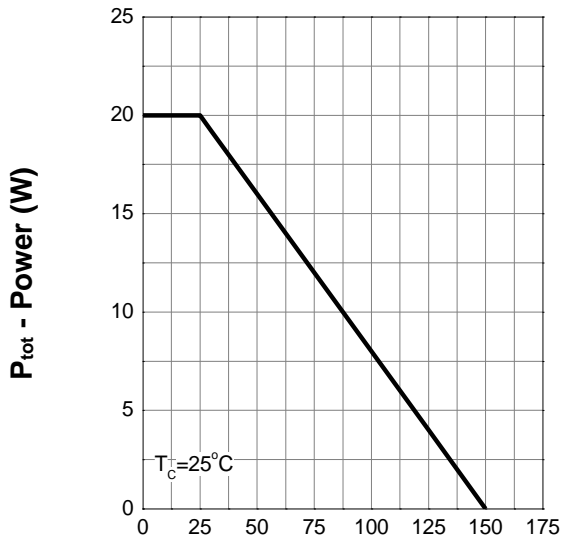
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing



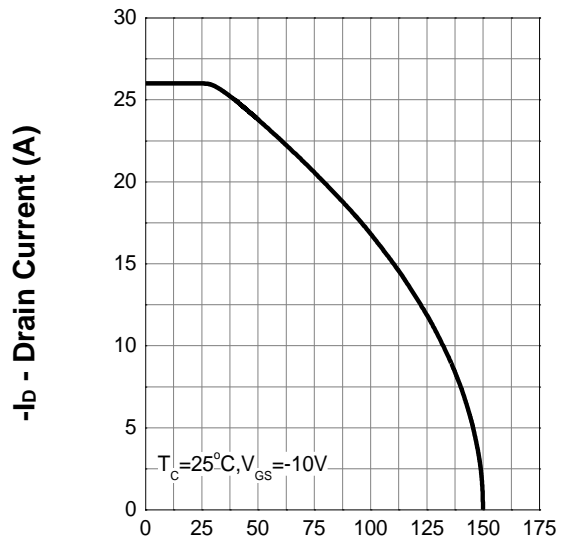
### 7. Typical Characteristics

Power Capability



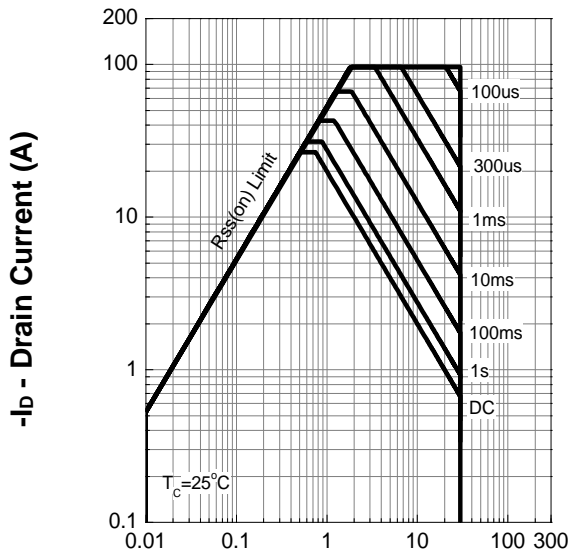
T<sub>j</sub> - Junction Temperature (°C)

Current Capability



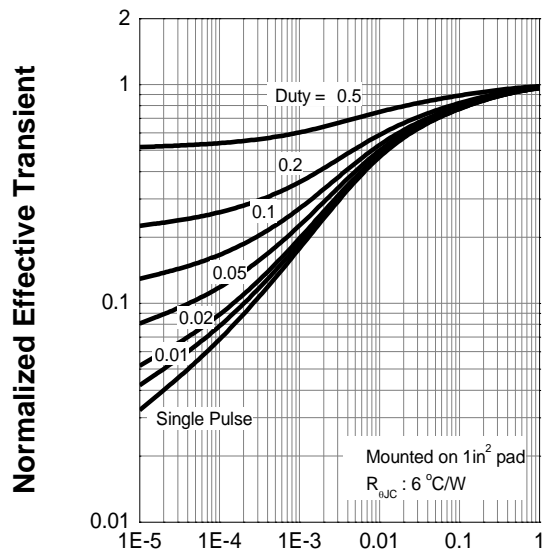
T<sub>j</sub> - Junction Temperature (°C)

Safe Operation Area



-V<sub>DS</sub> - Drain-Source Voltage (V)

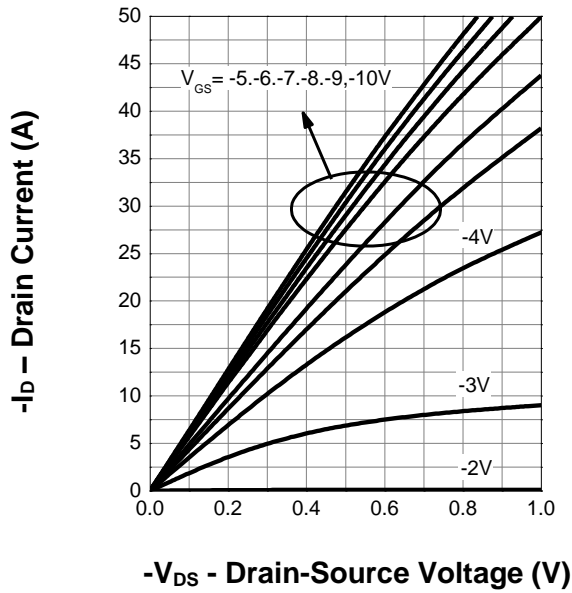
Thermal Transient Impedance



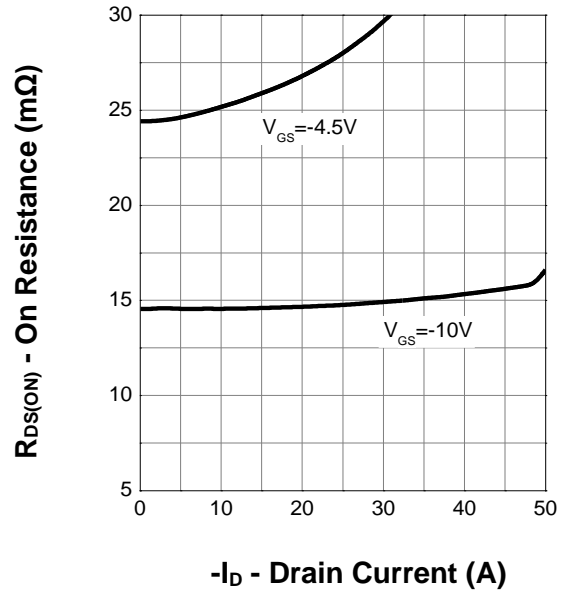
Square Wave Pulse Duration (sec)

## 7. Typical Characteristics (cont.)

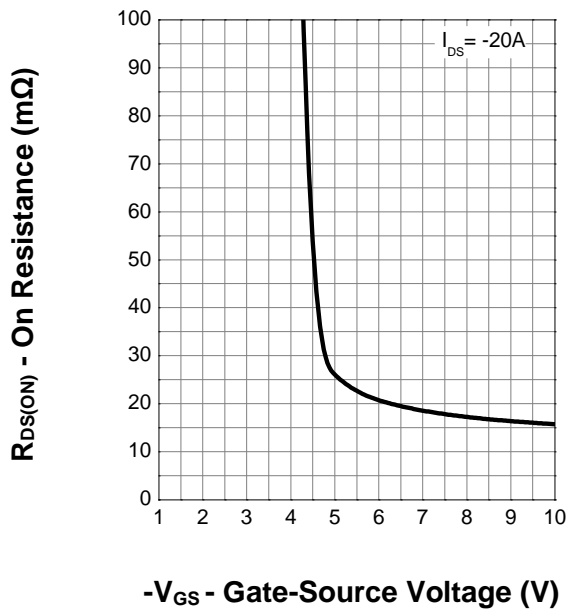
Output Characteristics



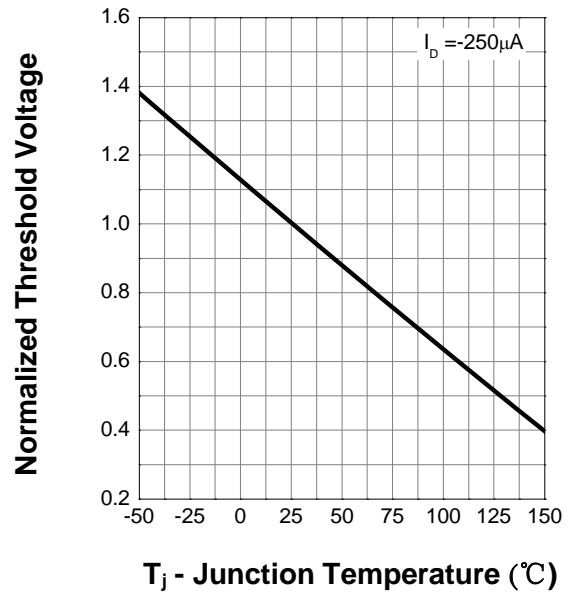
Drain-Source On Resistance



Transfer Characteristics



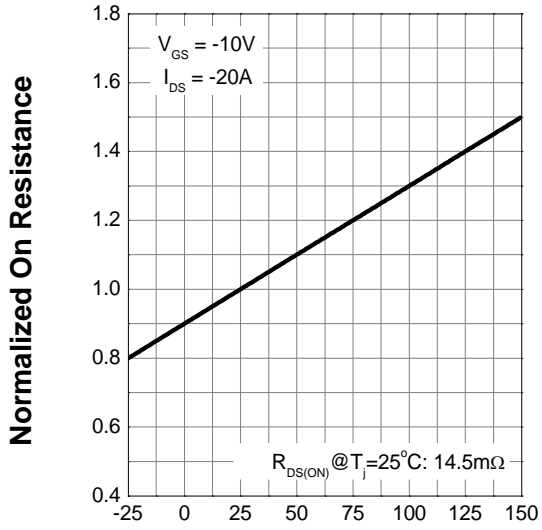
Gate Threshold Voltage



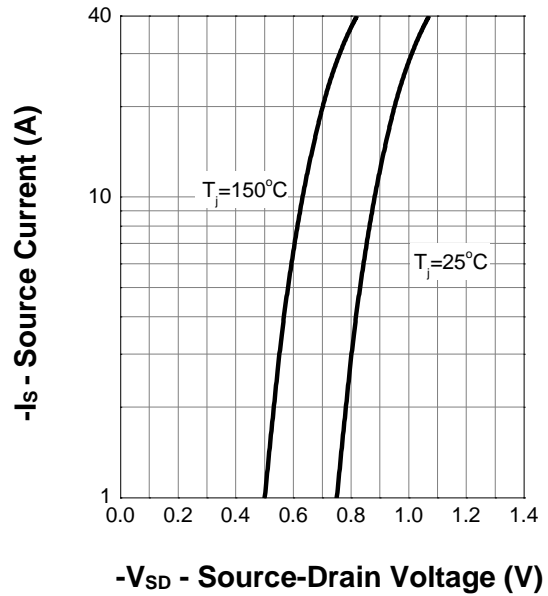


### 7. Typical Characteristics (cont.)

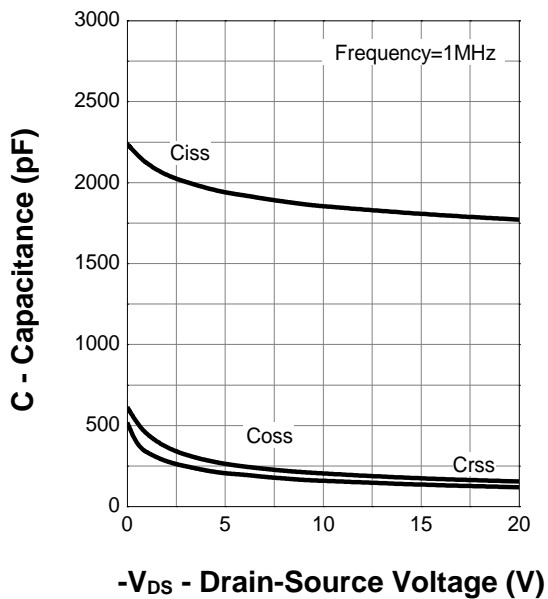
Drain-Source On Resistance



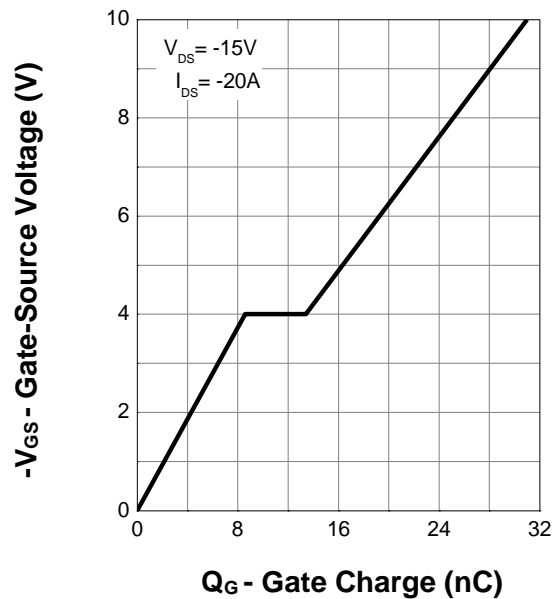
Body Diode Characteristics



Capacitance



Gate Charge



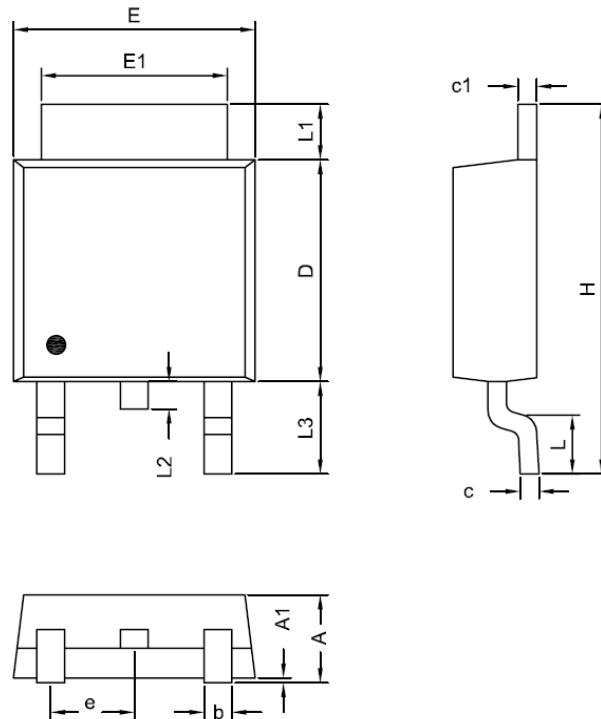


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## 8.Package Dimensions

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