

# N-Channel Enhancement Mode MOSFET

## 1. Product Information

### 1.1 Features

- Advanced trench cell design
- Low Thermal Resistance

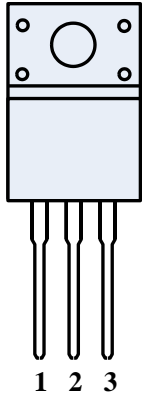
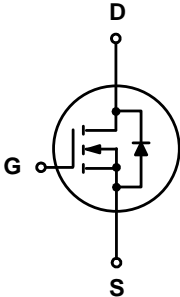
### 1.2 Applications

- Motor drivers
- DC - DC Converter

### 1.3 Quick reference

- $BV \geq 120\text{ V}$
- $R_{DS(ON)} \leq 6.5\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- $P_{tot} \leq 147\text{ W}$
- $R_{DS(ON)} \leq 8.0\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
- $I_D \leq 100\text{ A}$

## 2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate (G)		
2	Drain (D)		
3	Source (S)		
		<p>Top View</p> <p>TO-220-3L</p>	



### 3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>DS</sub>	Drain-Source Voltage	T <sub>C</sub> = 25 °C	120	-	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	-	100	A
		T <sub>C</sub> = 100 °C, V <sub>GS</sub> = 10 V	-	63	A
I <sub>DM</sub> **,**	Drain Current ( Pulsed )	T <sub>C</sub> = 25 °C, V <sub>GS</sub> = 10 V	-	240	A
P <sub>tot</sub>	Total Power Dissipation	T <sub>C</sub> = 25 °C	-	147	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	-	100	A
E <sub>AS</sub>	Single Pulsed Avalanche Energy	V <sub>DD</sub> = 50 V, L= 1.0 mH	-	722	mJ
R <sub>θJA</sub> *	Thermal Resistance- Junction to Ambient		-	62.5	°C / W
R <sub>θJC</sub> *	Thermal Resistance- Junction to Case		-	0.85	

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
KJ0512C	<div style="display: inline-block; border: 1px solid black; padding: 2px;">0512 YWWXXX</div> <span style="margin-left: 20px;">YWW: Date Code</span>

### 5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ0512C	TO220			50	

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<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	120	-	-	V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA	1	-	3	V
I <sub>DSS</sub>	Zero Gate Voltage Source Current	V <sub>DS</sub> = 96 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> = 50 A	-	5.5	6.5	mΩ
	Drain-Source On-State Resistance	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 30 A	-	7.0	8.0	mΩ
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>a</sup>	Diode Forward Voltage	I <sub>SD</sub> = 50 A, V <sub>GS</sub> = 0 V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> = 50 A, dI <sub>SD</sub> /dt = 100 A/μs	-	95	-	nS
Q <sub>rr</sub>	Reverse Recovery Charge		-	240	-	nC
<b>Dynamic Characteristics<sup>b</sup></b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 60 V Frequency = 1 MHz	-	4298	-	pF
C <sub>oss</sub>	Output Capacitance		-	569	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	31	-	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> = 60 V, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 3.9 Ω, R <sub>L</sub> = 1.2 Ω, I <sub>D</sub> = 50 A	-	13	-	nS
t <sub>r</sub>	Turn-on Rise Time		-	68	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	60	-	
t <sub>f</sub>	Turn-off Fall Time		-	110	-	
<b>Gate Charge Characteristics</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 60 V, I <sub>DS</sub> = 50 A	-	78	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	18	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	17	-	

Notes :

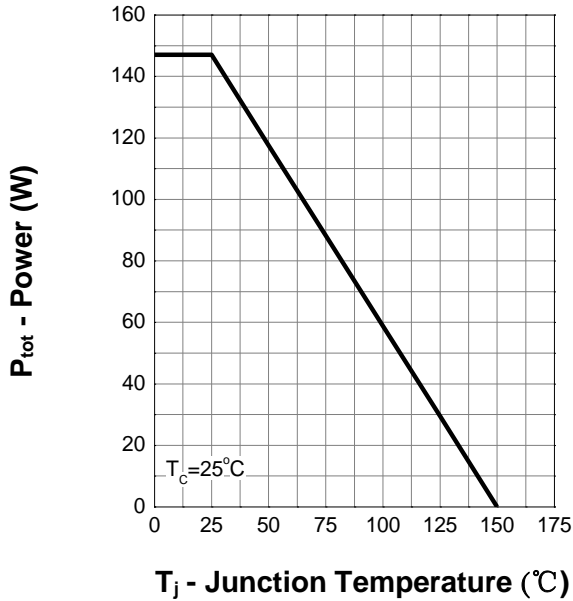
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing

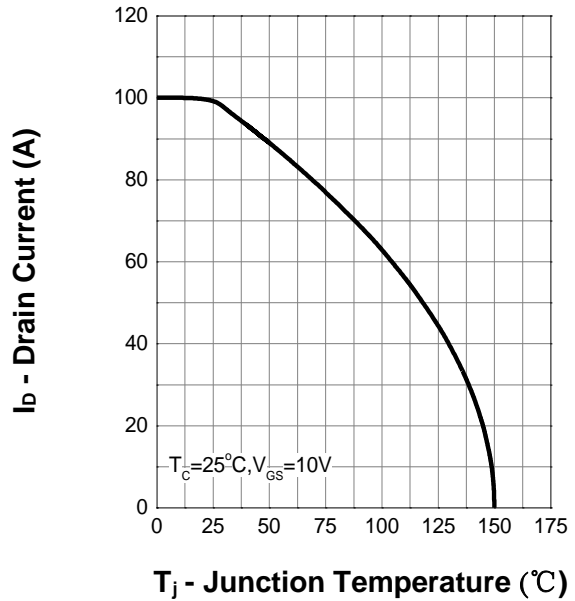


### 7. Typical Characteristics

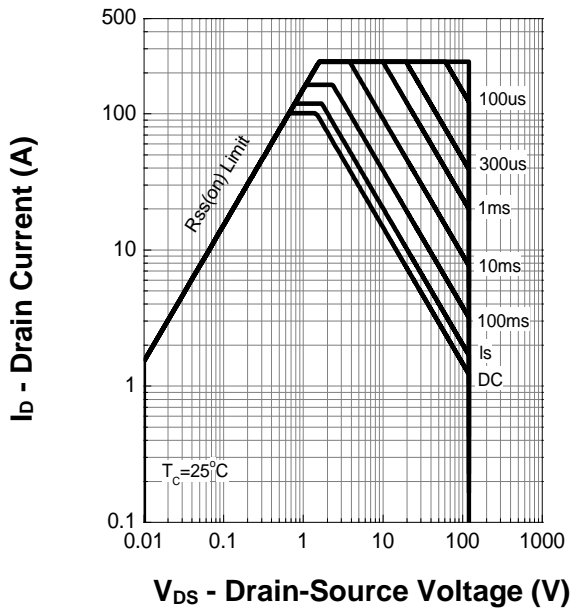
Power Capability



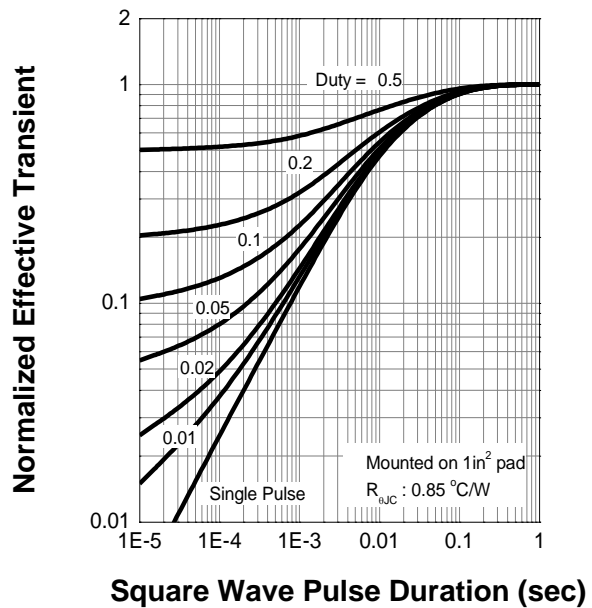
Current Capability



Safe Operating Area



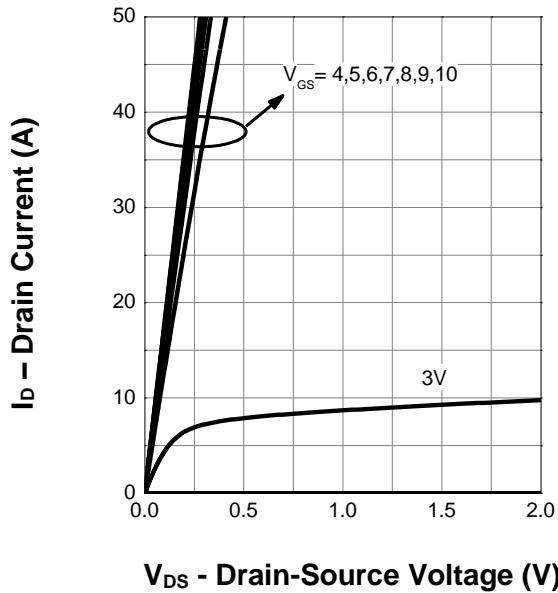
Thermal Transient Impedance



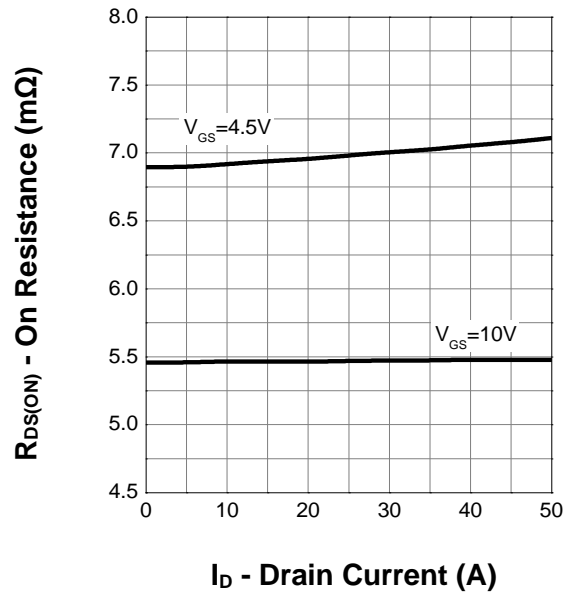


### 7. Typical Characteristics (cont.)

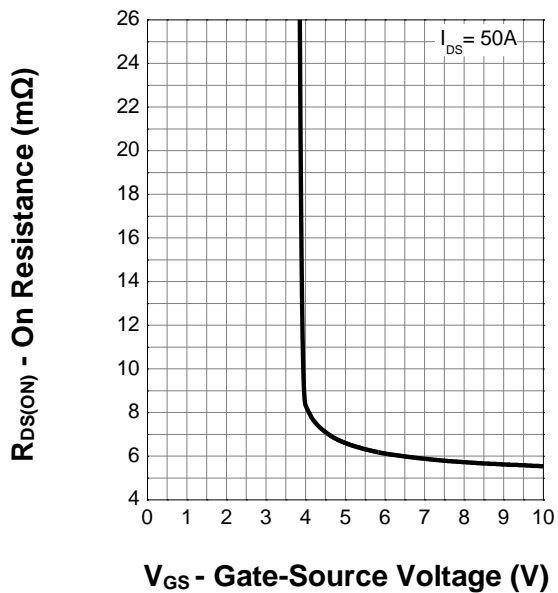
Output Characteristics



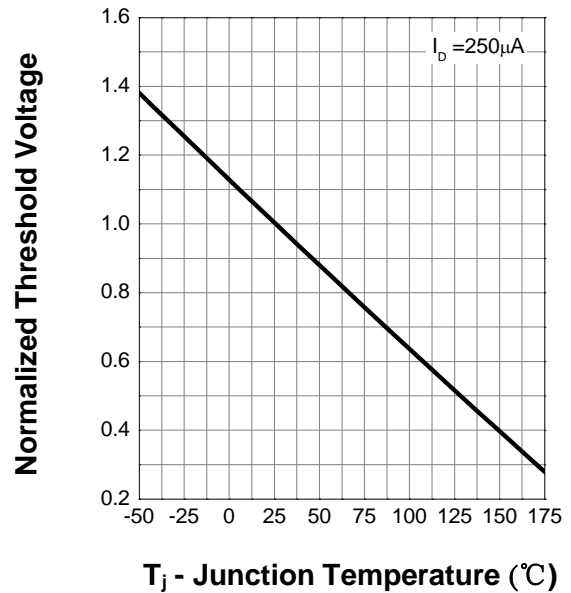
Drain-Source On Resistance



Transfer Characteristics



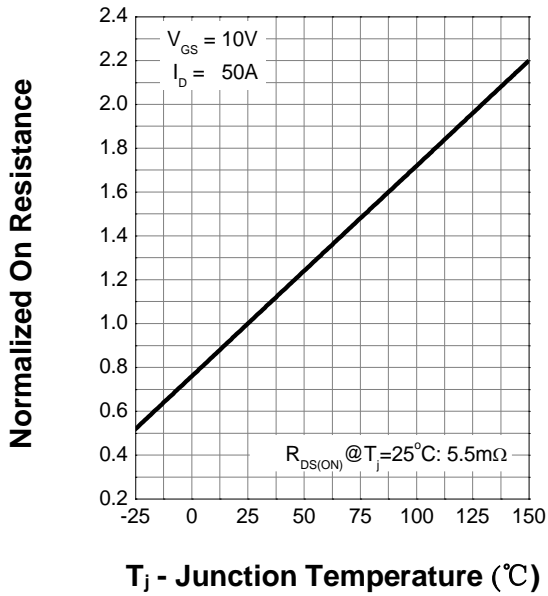
Gate Threshold Voltage



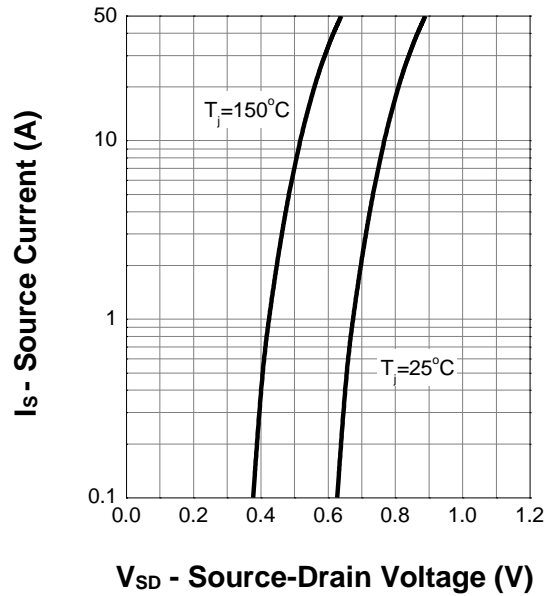


### 7. Typical Characteristics (cont.)

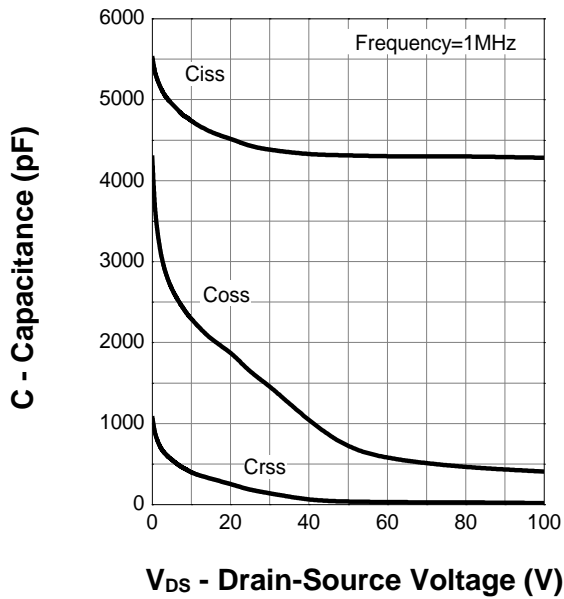
Drain-Source On Resistance



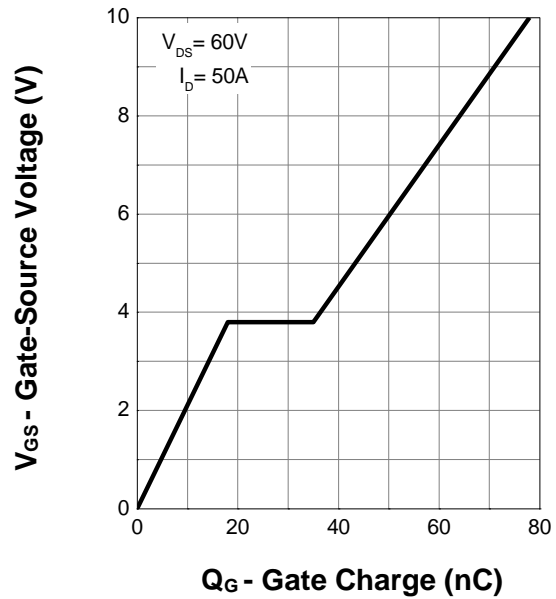
Body Diode Characteristics



Capacitance



Gate Charge



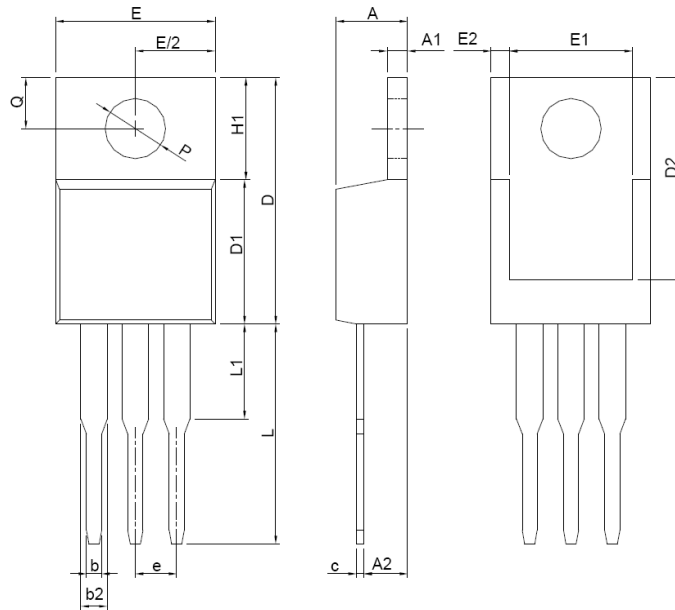


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## 8. Package Dimensions

TO-220-3L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	3.56	4.83
A1	0.51	1.40
A2	2.03	2.92
b	0.38	1.02
b2	1.14	1.78
c	0.36	0.61
D	14.22	16.51
D1	8.38	9.02
D2	12.19	12.88
E	9.65	10.67
E1	6.86	8.89
E2	0.76BSC	
e	2.54BSC	
H1	5.84	6.86
L	12.70	14.73
L1	6.35BSC	
P	3.53	4.09
Q	2.54	3.43