

# N-Channel Enhancement Mode MOSFET

## 1. Product Information

### 1.1 Features

- Surface-mounted package
- Low Thermal Resistance

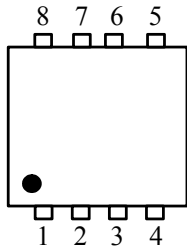
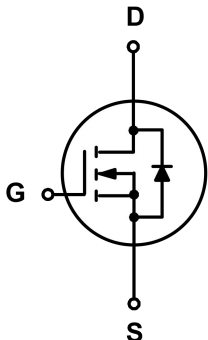
### 1.2 Applications

- Motor drivers
- DC - DC Converter

### 1.3 Quick reference

- $BV \leq 30\text{ V}$
- $R_{DS(ON)} \leq 6.5\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- $P_{tot} \leq 20.8\text{ W}$
- $R_{DS(ON)} \leq 9.5\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
- $I_D \leq 50\text{ A}$

## Pin Description

Pin	Description	Simplified Outline	Symbol
1,2,3	Source	 <p style="text-align: center;">Top View PDFN3x3-8L</p>	
4	Gate		
5,6,7,8	Drain		

## 2. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DS}$	Drain-Source Voltage	$T_C = 25\text{ }^\circ\text{C}$	30	-	V
$V_{GS}$	Gate-Source Voltage	$T_C = 25\text{ }^\circ\text{C}$	-	$\pm 20$	V
$I_D^{*,**}$	Drain Current	$T_C = 25\text{ }^\circ\text{C}, V_{GS} = 10\text{ V}$	-	50	A
$I_{DM}^{*,**,***}$	Pulsed Source Current	$T_C = 25\text{ }^\circ\text{C}, V_{GS} = 10\text{ V}$	-	112	A
$P_{tot}^*$	Total Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	-	20.8	W
$T_{stg}$	Storage Temperature		-55	150	$^\circ\text{C}$
$T_J$	Junction Temperature		-	150	$^\circ\text{C}$
$I_S$	Diode Forward Current	$T_C = 25\text{ }^\circ\text{C}$	-	50	A
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	62.5	$^\circ\text{C} / \text{W}$
$R_{\theta JC}^*$	Thermal Resistance- Junction to Case		-	6	

Notes :

- \* Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10\text{ sec}$
- \*\* Pulse width  $\leq 10\text{ }\mu\text{s}$ , duty cycle  $\leq 1\%$
- \*\*\* limited by bonding wire

## 4. Marking Information

Product Name	Marking
KJ0503Q	<div style="display: inline-block; border: 1px solid black; padding: 2px;"> <b>0503</b>  <b>YWWXXX</b> </div> <b>YWWXXX:</b> <b>Date Code</b>

## 5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ0503Q	DFN3.3*3.3			5000	

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** ( $T_A = 25\text{ }^\circ\text{C}$  Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{DS} = 250\text{ }\mu\text{A}$	1.0	-	2.0	V
$I_{DSS}$	Zero Gate Voltage Source Current	$V_{DS} = 24, V_{GS} = 0\text{ V}$	-	-	1	$\mu\text{A}$
		$T_J = 85\text{ }^\circ\text{C}$	-	-	30	$\mu\text{A}$
$I_{GSS}$	Gate Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$	-	-	$\pm 100$	nA
$R_{DS(ON)}^a$	Drain-Source On-State Resistance	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	-	5.8	6.5	m $\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}$	-	8.9	9.5	
<b>Diode Characteristics</b>						
$V_{SD}^a$	Diode Forward Voltage	$I_{SD} = 20\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 20\text{ A}, dI_{SD}/dt = 100\text{ A}/\mu\text{s}$	-	23	-	nS
$Q_{rr}$	Reverse Recovery Charge		-	10	-	nC
<b>Dynamic Characteristics<sup>b</sup></b>						
$C_{iss}$	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 15\text{ V}$ Frequency = 1 MHz	-	731	-	pF
$C_{oss}$	Output Capacitance		-	380	-	
$C_{rss}$	Reverse Transfer Capacitance		-	34	-	
$t_d(on)$	Turn-on Delay Time	$V_{DS} = 15\text{ V}, V_{GEN} = 10\text{ V},$ $R_G = 4.5\text{ }\Omega, R_L = 0.75\text{ }\Omega,$ $I_D = 20\text{ A}$	-	6.8	-	nS
$t_r$	Turn-on Rise Time		-	55	-	
$t_d(off)$	Turn-off Delay Time		-	12	-	
$t_f$	Turn-off Fall Time		-	20	-	
<b>Gate Charge Characteristics<sup>b</sup></b>						
$Q_g$	Total Gate Charge	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V},$ $I_{DS} = 20\text{ A}$	-	14	-	nC
$Q_{gs}$	Gate-Source Charge		-	3.2	-	
$Q_{gd}$	Gate-Drain Charge		-	2.2	-	

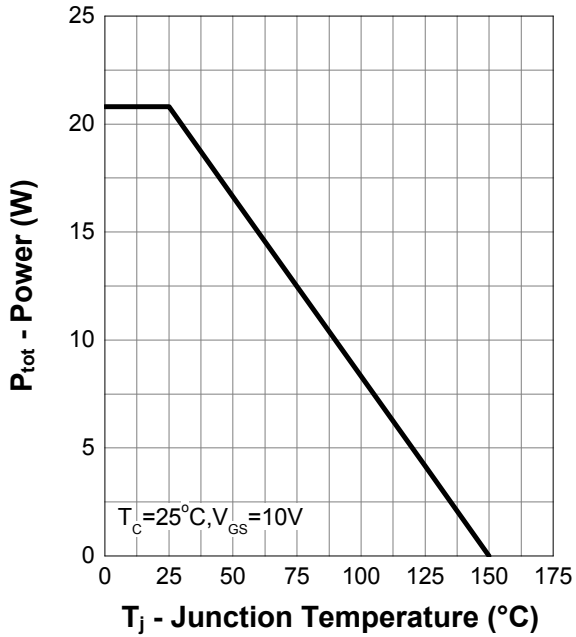
Notes :

 a : Pulse test ; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ 

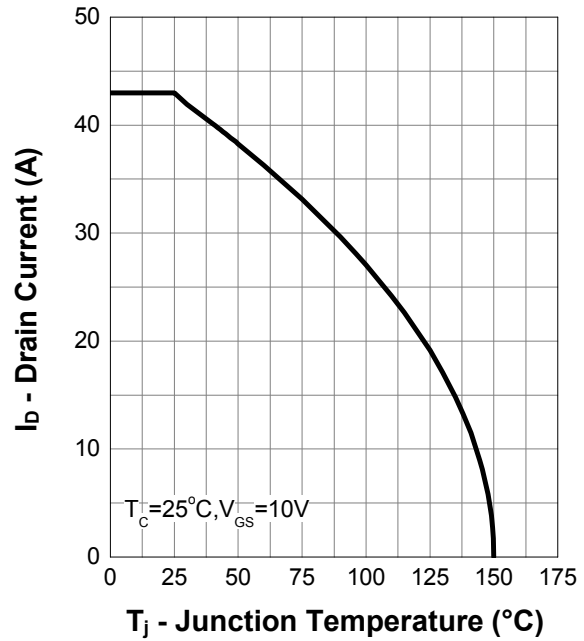
b : Guaranteed by design, not subject to production testing

## 7. Typical Characteristics (Cont.)

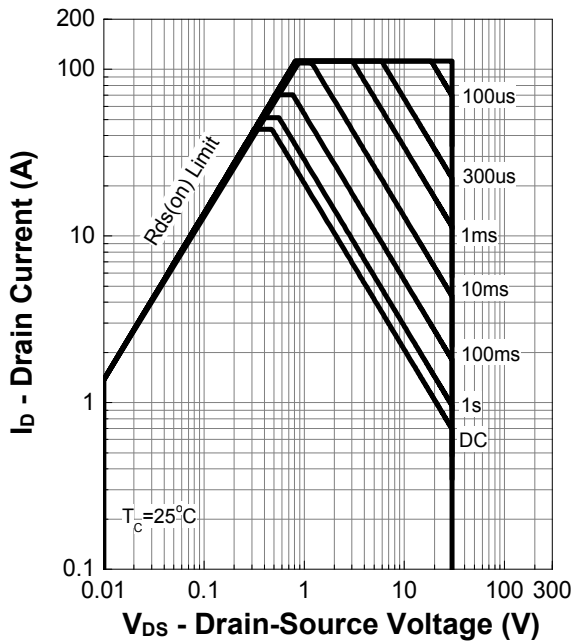
Power Capability



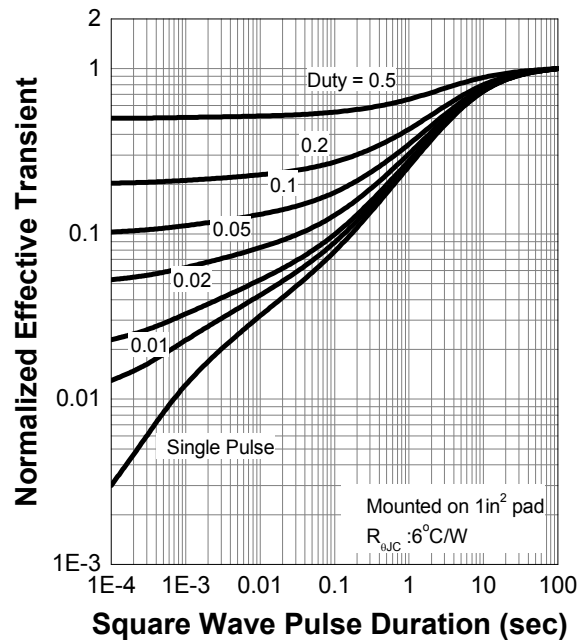
Current Capability



Safe Operation Area

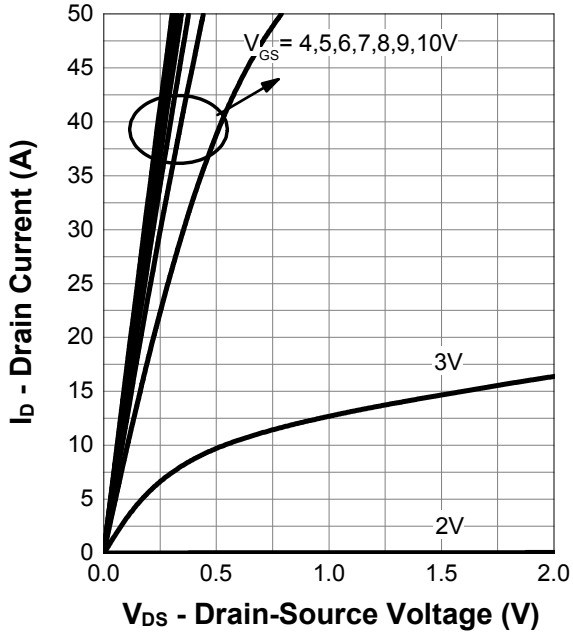


Transient Thermal Impedance

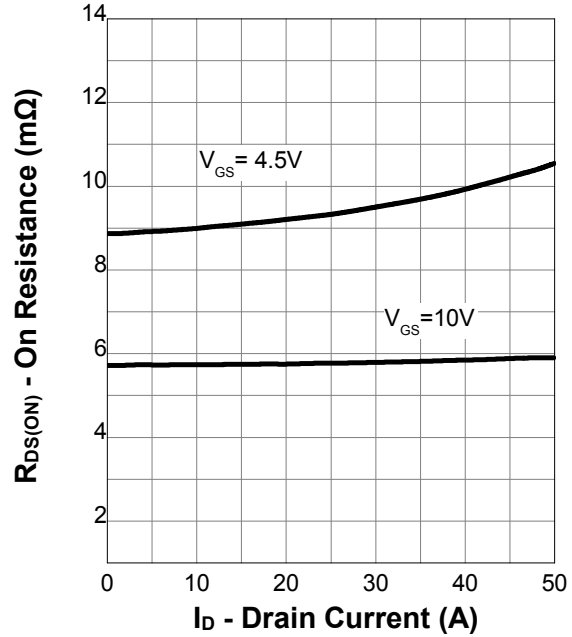


## 7. Typical Characteristics (Cont.)

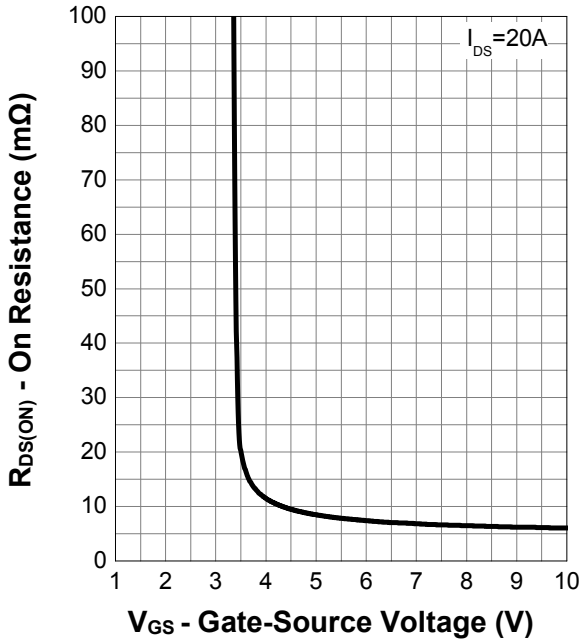
Output Characteristics



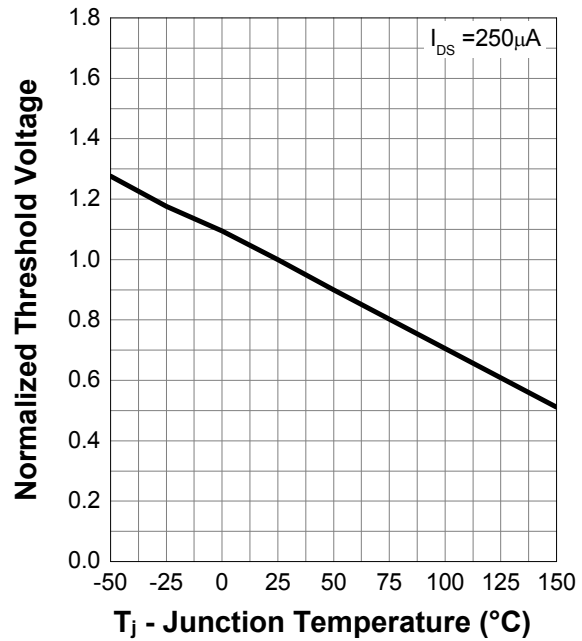
On Resistance



Transfer Characteristics

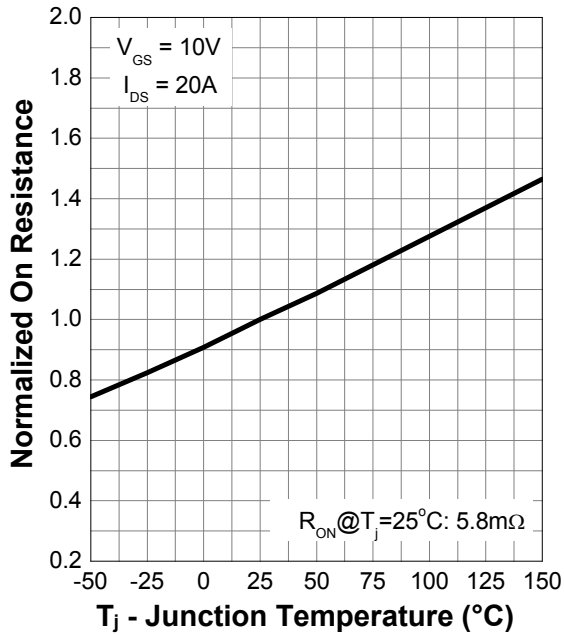


Normalized Threshold Voltage

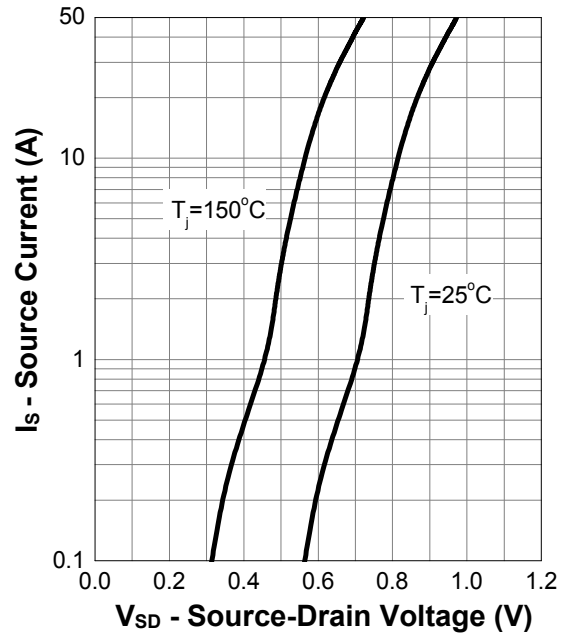


## 7. Typical Characteristics (Cont.)

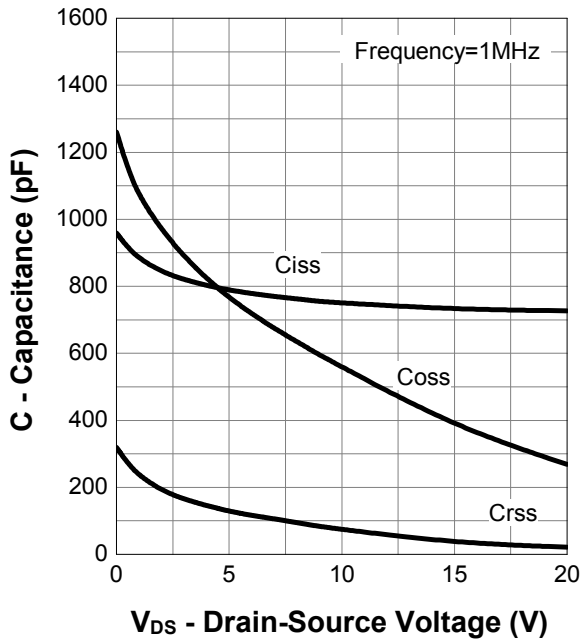
Normalized On Resistance



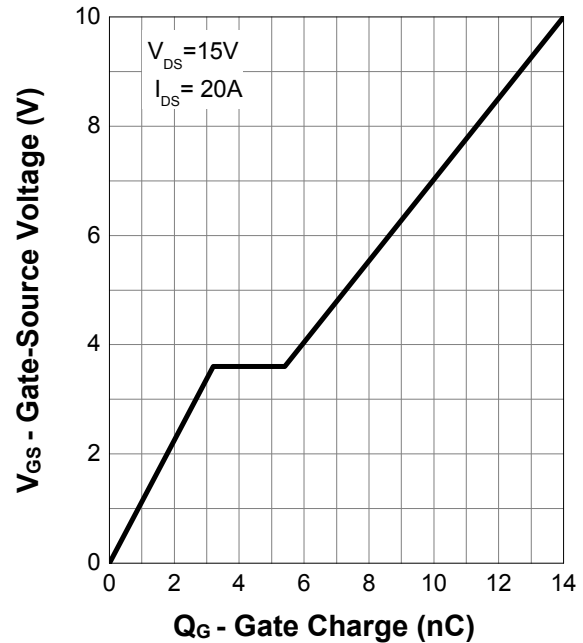
Diode Forward Current



Capacitance

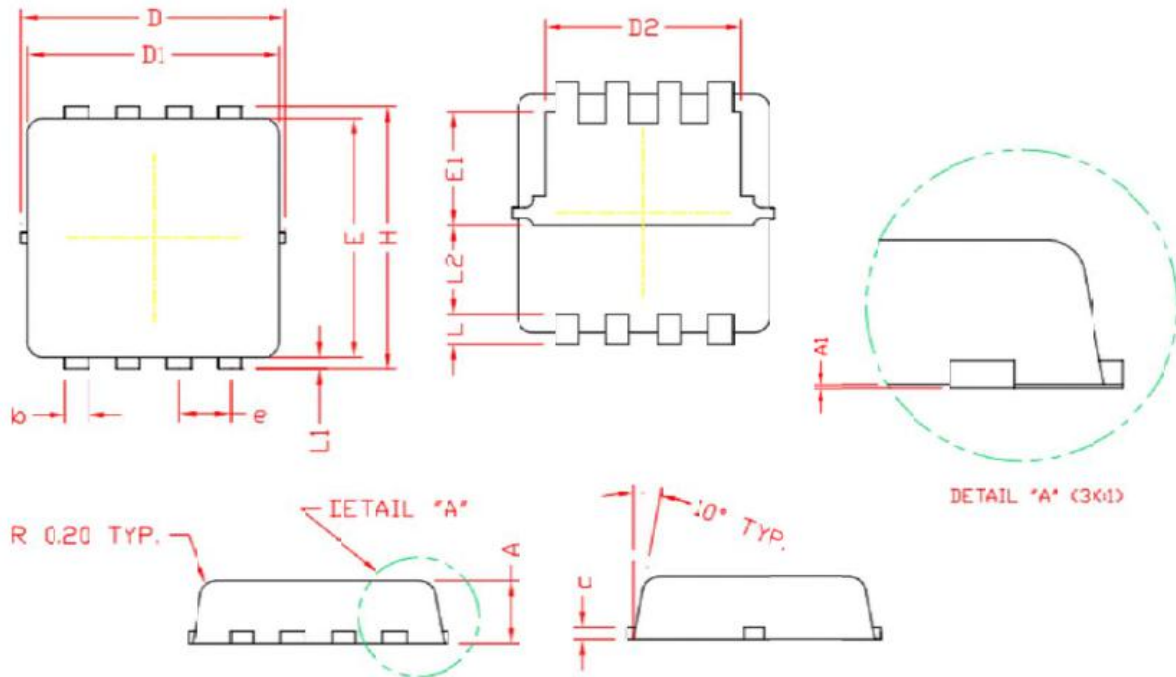


Gate Charge



## 8. Package Dimensions

PDFN 3x3-8L Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.70	0.90
A1	0.00	0.05
b	0.24	0.35
c	0.10	0.20
D	3.25	3.40
D1	3.05	3.25
D2	2.40	2.60
E	3.00	3.20
E1	1.35	1.55
e	0.65 BSC.	
H	3.20	3.40
L	0.30	0.50
L1	0.10	0.20
L2	1.13 REF.	