

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Surface-mounted package
- ☒ Low Thermal Resistance

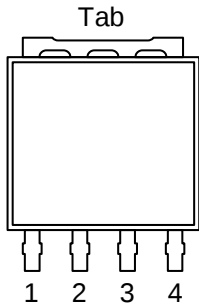
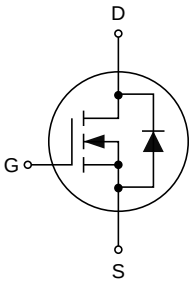
1.2 Applications

- ☒ Motor drivers
- ☒ DC/DC Converters

1.3 Quick reference

- ☒ $BV \geq 45\text{ V}$
- ☒ $P_{tot} \leq 125\text{ W}$
- ☒ $I_D \leq 290\text{ A}$
- ☒ $R_{DS(ON)} \leq 1.0\text{ m}\Omega @V_{GS} = 10\text{ V}$
- ☒ $R_{DS(ON)} \leq 1.85\text{ m}\Omega @V_{GS} = 4.5\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1,2,3	Source	 Tab 1 2 3 4 Top View LFPAK 5x6	
4	Gate		
Tab	Drain		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C=25^{\circ}\text{C}$	45	-	V
V_{GS}	Gate-Source Voltage	$T_C=25^{\circ}\text{C}$	-	± 20	V
$I_{D^{*}, **}$	Drain Current	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	290	A
		$T_C=100^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	205	A
$I_{DM}^{*, **}$	Pulsed Source Current	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	870	A
P_{tot}^{*}	Total Power Dissipation	$T_C=25^{\circ}\text{C}$	-	125	W
T_{stg}	Storage Temperature		-55	175	$^{\circ}\text{C}$
T_J	Junction Temperature		-	175	$^{\circ}\text{C}$
I_S	Diode Forward Current	$T_C=25^{\circ}\text{C}$	-	95	A
E_{AS}^{*}	Single Pulsed Avalanche Energy	$V_{DD}=32\text{ V}, L=0.5\text{ mH}$	-	306	mJ
$R_{\theta JA}^{*}$	Thermal Resistance-Junction to Ambient		-	45	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case		-	1.2	

Notes:

- * Surface mounted on 1 in² pad area, $t \leq 10\text{ sec.}$
- ** Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 1\%$.
- *** Limited by bonding wire

4. Marking Information

Product Name	Marking
KJ009N045LF	KJ009N045LF XXXXXX-X

5. Ordering Code

Product Name	Package	Reel size	Tape width	Quantity (pcs)
KJ009N045LF	LFPK5x6	13"	12 mm	5000

Note: KUAIJIEXIN 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°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	45	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	1.2	-	2.5	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} =36 V, V _{GS} =0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} =±20 V, V _{DS} =0 V	-	-	±100	nA
R _{DS(ON)} ^a	Drain-Source On-State Resistance	V _{GS} =10 V, I _{DS} =20 A	-	0.85	1.0	mΩ
		V _{GS} =4.5 V, I _{DS} =10 A	-	1.45	1.85	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} =20 A, V _{GS} =0 V	-	-	1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =20 A, dI _{SD} /dt=100 A/μs	-	45	-	ns
Q _{rr}	Reverse Recovery Charge		-	37	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =20 V Frequency=1 MHz	-	5850	-	pF
C _{oss}	Output Capacitance		-	1450	-	
C _{rss}	Reverse Transfer Capacitance		-	90	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =20 V, V _{GEN} =10 V, R _G =1 Ω, I _{DS} =20 A	-	16	-	ns
t _r	Turn-on Rise Time		-	12	-	
t _{d(off)}	Turn-off Delay Time		-	48	-	
t _f	Turn-off Fall Time		-	91	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =20 V, V _{GS} =10 V, I _{DS} =20 A	-	90	-	nC
Q _{gs}	Gate-Source Charge		-	20	-	
Q _{gd}	Gate-Drain Charge		-	19	-	

Notes:

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

b. Guaranteed by design, not subject to production testing.

7. Typical Characteristics

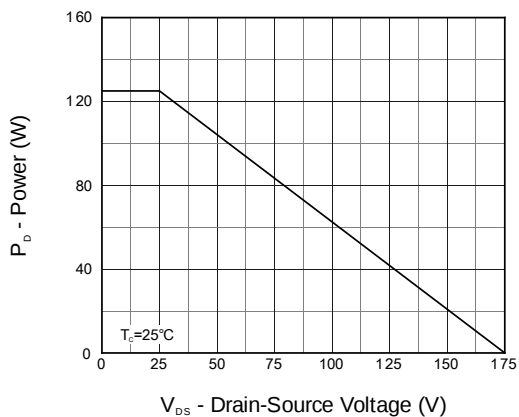


Fig 1. Output Characteristics

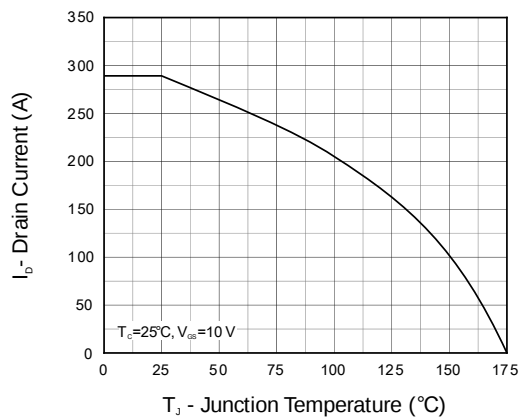


Fig 2. Current Capability

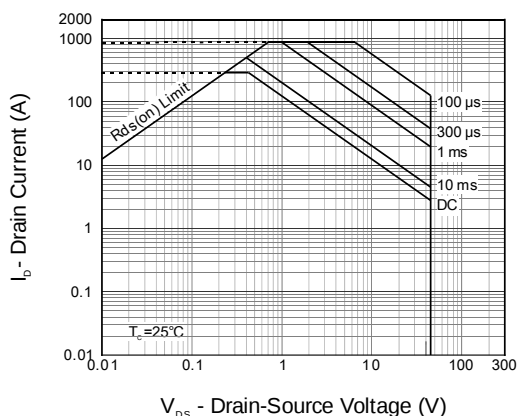


Fig 3. Safe Operation Area

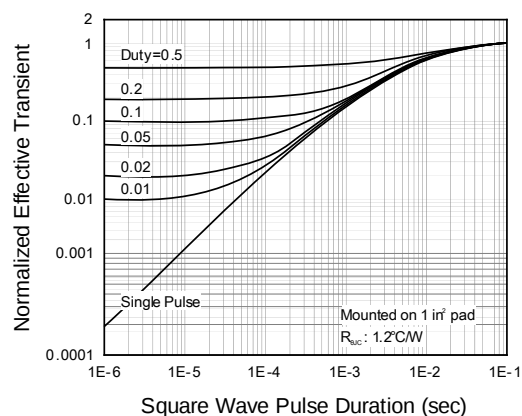


Fig 4. Transient Thermal Impedance

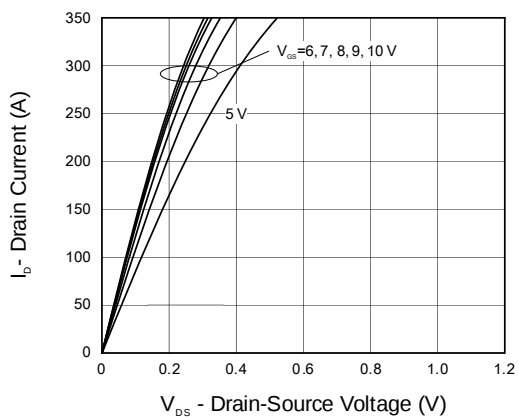


Fig 5. Output Characteristics

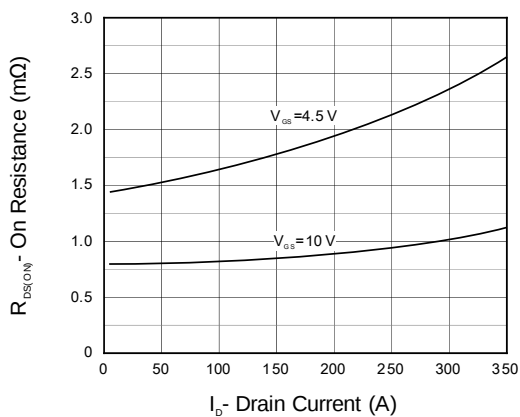


Fig 6. On Resistance

7. Typical Characteristics (cont.)

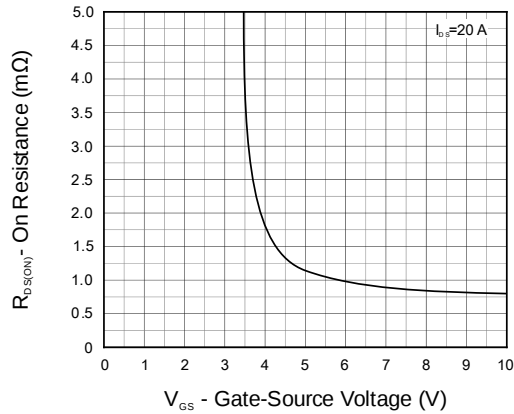


Fig 7. Transfer Characteristics

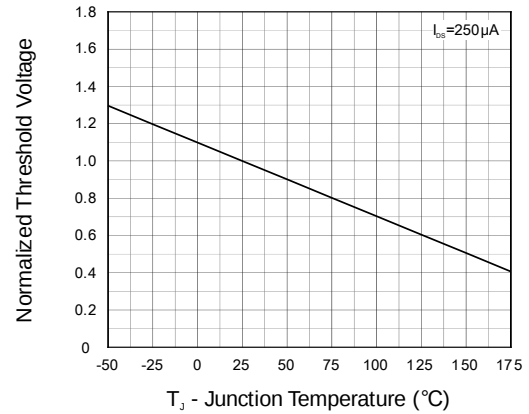


Fig 8. Normalized Threshold Voltage

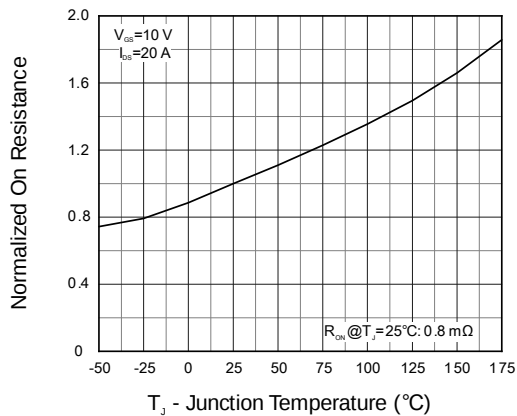


Fig 9. Normalized On Resistance

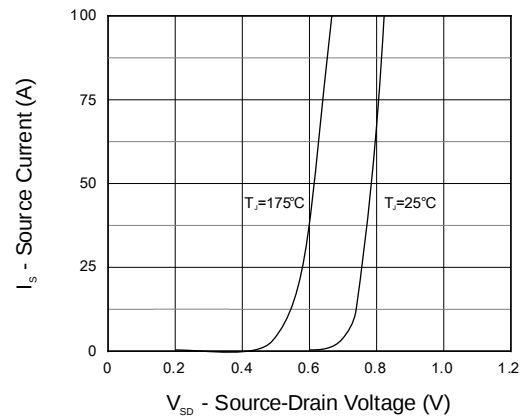


Fig 10. Diode Forward Current

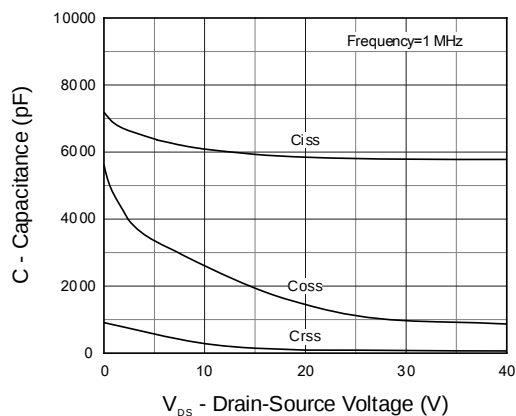


Fig 11. Capacitance

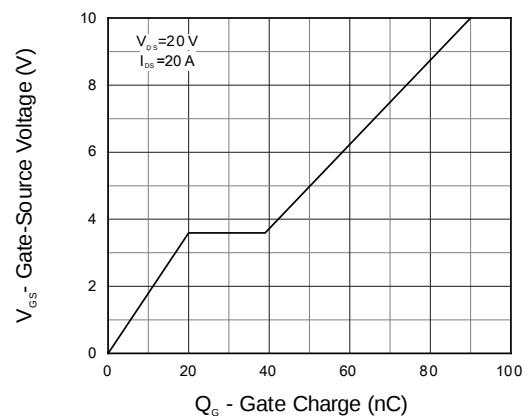
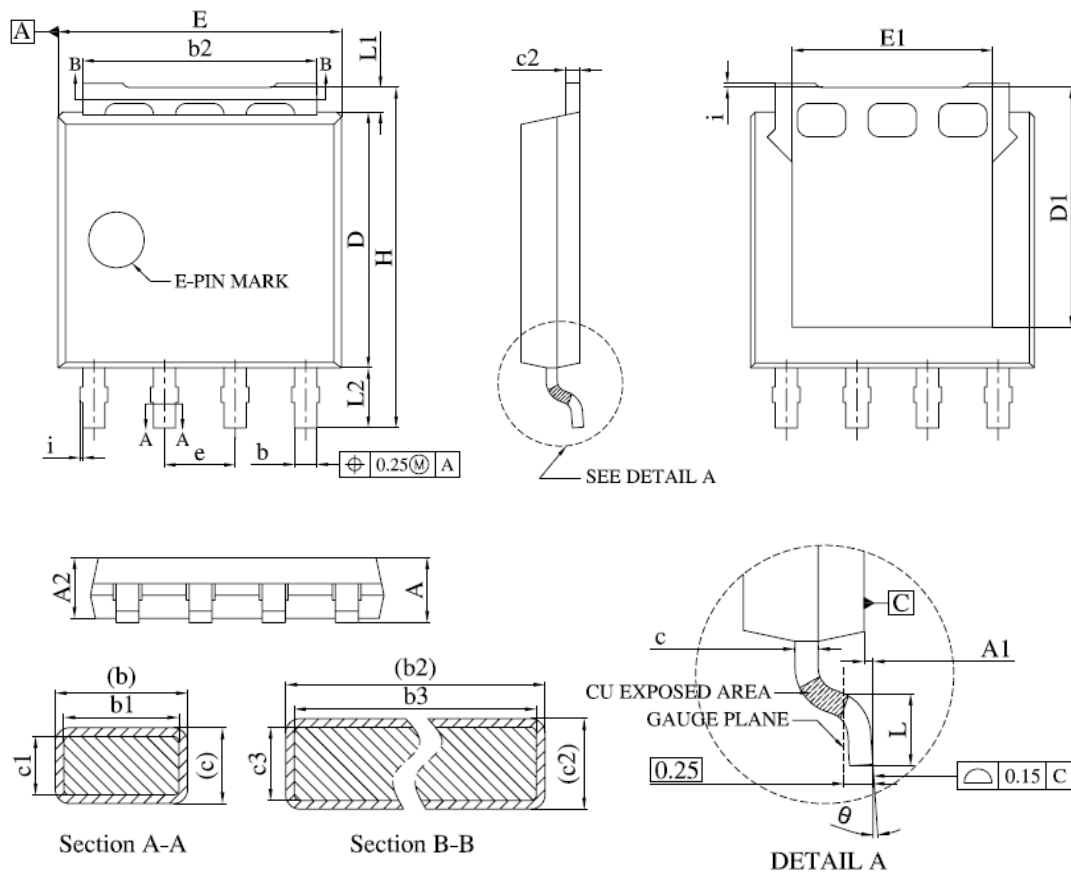


Fig 12. Gate Charge

8. Package Dimensions

LFPACK 5x6 Package



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	1.00	1.30
A1	0	0.15
A2	0.98	1.12
b	0.35	0.50
b1	0.32	0.46
b2	4.02	4.41
b3	4.00	4.37
c	0.19	0.25
c1	0.17	0.23
c2	0.24	0.30
c3	0.22	0.28

Symbol	Dimensions in Millimeters	
	MIN.	MAX.
D	4.45	4.70
D1	-	4.45
E	4.95	5.30
E1	3.50	3.70
e	1.27 BSC	
H	5.95	6.25
i	-	0.25
L	0.40	0.85
L1	0.27	0.57
L2	0.80	1.30
θ	0°	8°