

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Advanced trench cell design
- ☑ Low Thermal Resistance

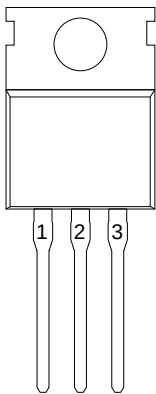
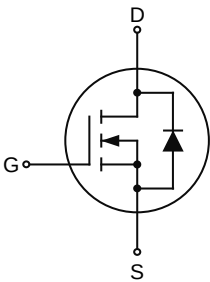
1.2 Applications

- ☑ Motor drivers
- ☑ DC/DC Converter

1.3 Quick reference

- ☑ $BV \geq 40\text{ V}$
- ☑ $P_{tot} \leq 250\text{ W}$
- ☑ $I_D \leq 180\text{ A}$
- ☑ $R_{DS(ON)} \leq 1.6\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- ☑ $R_{DS(ON)} \leq 2.2\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$

2. Pin Description

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

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C=25^{\circ}\text{C}$	-	40	V
V_{GS}	Gate-Source Voltage	$T_C=25^{\circ}\text{C}$	-	± 20	V
$I_{D^{*},***}$	Drain Current (DC)	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	180	A
		$T_C=100^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	177	A
I_{DM}^{*}	Drain Current (Pulsed)	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	720	A
P_{tot}	Drain power dissipation	$T_C=25^{\circ}\text{C}$	-	250	W
T_{stg}	Storage Temperature		-55	150	$^{\circ}\text{C}$
T_J	Junction Temperature		-	150	$^{\circ}\text{C}$
I_S	Continuous-Source Current	$T_C=25^{\circ}\text{C}$	-	180	A
E_{AS}	Single Pulsed Avalanche Energy	$V_{DD}=40\text{ V}, L=1.0\text{ mH}$	-	1512	mJ
$R_{\theta JA}^{**}$	Thermal Resistance-Junction to Ambient		-	42	$^{\circ}\text{C/W}$
$R_{\theta JC}^{**}$	Thermal Resistance-Junction to Case		-	0.5	

Notes:

- * Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- ** Surface Mounted on 1 in² pad area, $t \leq 10\text{ sec}$
- *** Limited by bonding wire

4. Marking Information

Product Name	Marking
KJ010N04C	010N04 YWWXXX YWWXXX: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ010N04C	TO-220	-	-	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_A=25°C Unless Otherwise Noted)

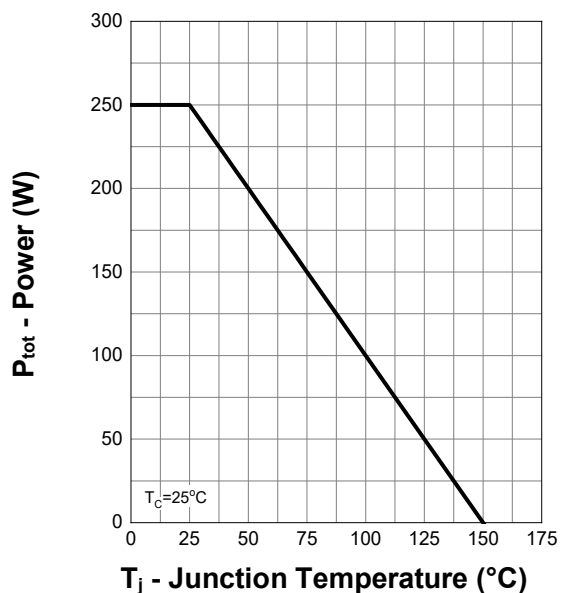
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _{DS} =250 μA	40	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	1.0	-	2.0	V
I _{DSS}	Drain Leakage Current	V _{DS} =32 V, V _{GS} =0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} =±20 V V _{GS} =0 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} =10 V, I _{DS} =30 A	-	1.4	1.6	mΩ
		V _{GS} =4.5 V, I _{DS} =20 A	-	1.9	2.2	mΩ
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} =30 A, V _{GS} =0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =30 A, V _{GS} =0 V dI _{SD} /dt=100 A/μs	-	33	-	ns
Q _{rr}	Reverse Recovery Charge		-	22	-	nC
Dynamic Characteristics ^b						
C _{iSS}	Input Capacitance	V _{GS} =0 V, V _{DS} =20 V Frequency=1 MHz	-	14127	-	pF
C _{oSS}	Output Capacitance		-	1056	-	
C _{rSS}	Reverse Transfer Capacitance		-	450	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =20 V, V _{GEN} =10 V, R _G =3.9 Ω, R _L =0.67 Ω, I _{DS} =30 A	-	22	-	ns
t _r	Turn-on Rise Time		-	79	-	
t _{d(off)}	Turn-off Delay Time		-	191	-	
t _f	Turn-off Fall Time		-	132	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =20 V, V _{GS} =10 V, I _{DS} =30 A	-	244	-	nC
Q _{gs}	Gate-Source Charge		-	51	-	
Q _{gd}	Gate-Drain Charge		-	36	-	

Notes:

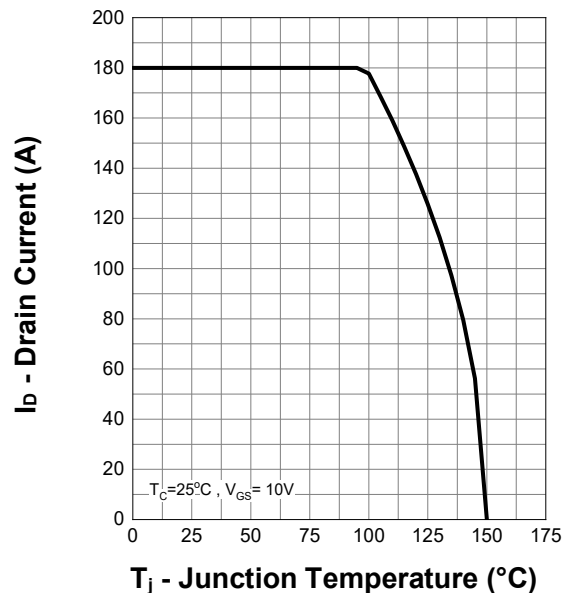
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%
- Guaranteed by design, not subject to production testing

7. Typical Characteristics

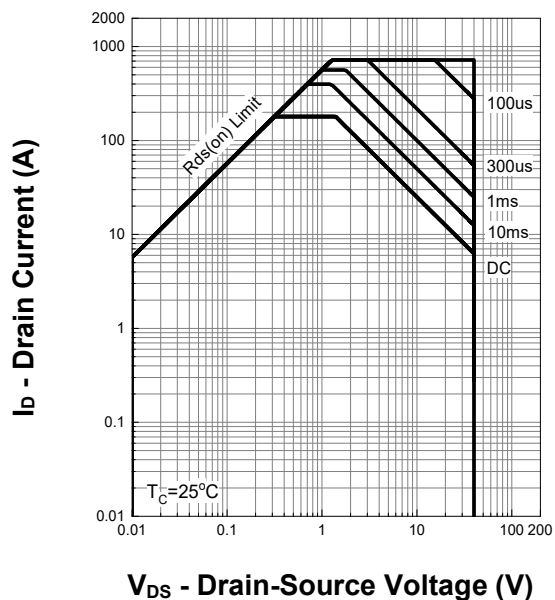
Power Capability



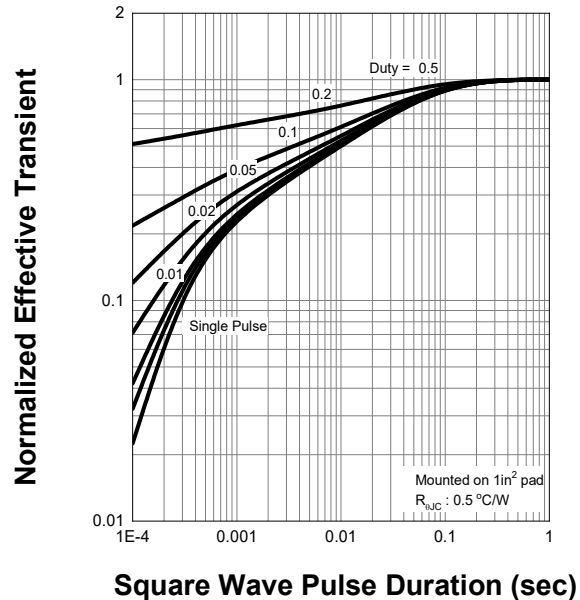
Current Capability



Safe Operating Area

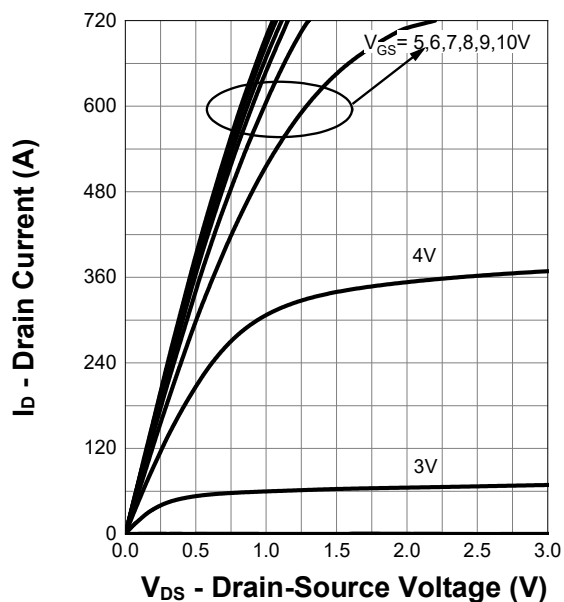


Transient Thermal Impedance

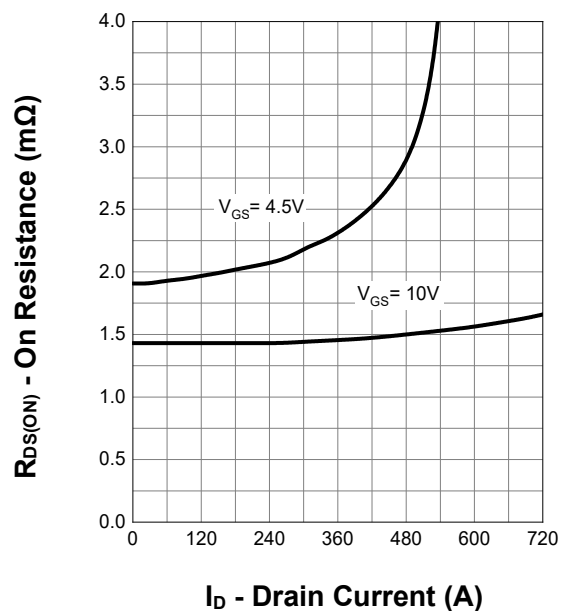


7. Typical Characteristics (Cont.)

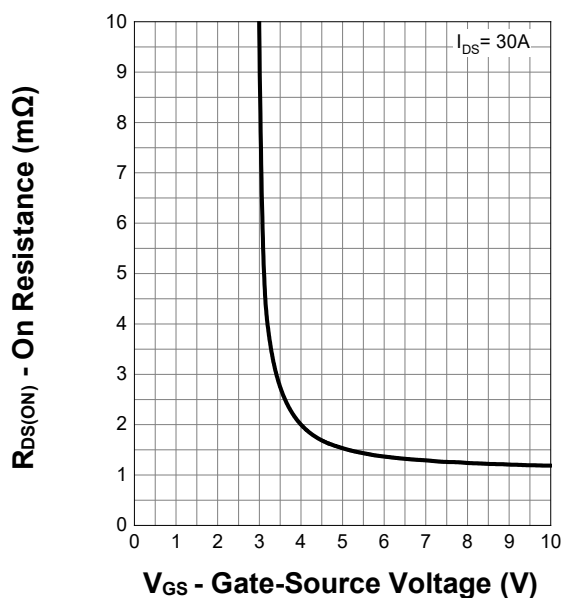
Output Characteristics



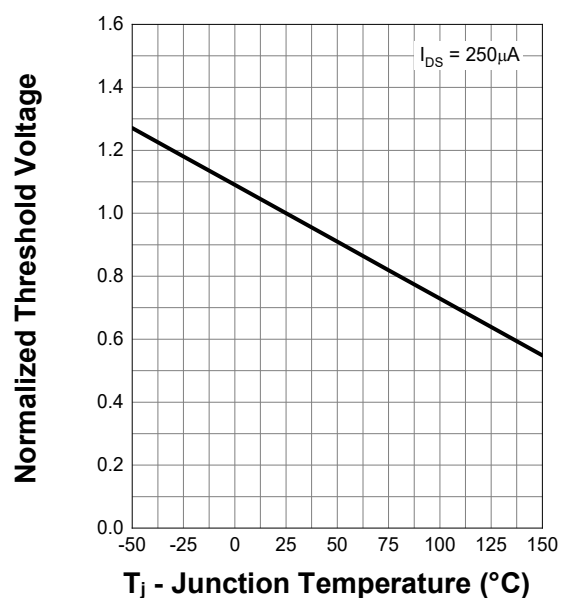
On Resistance



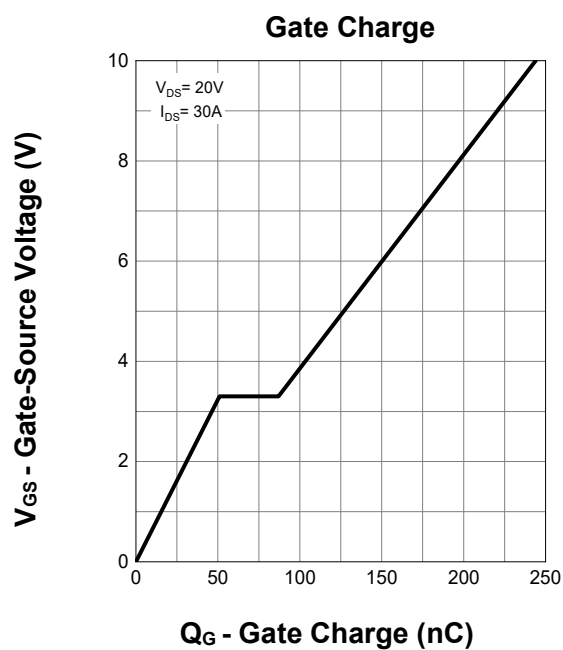
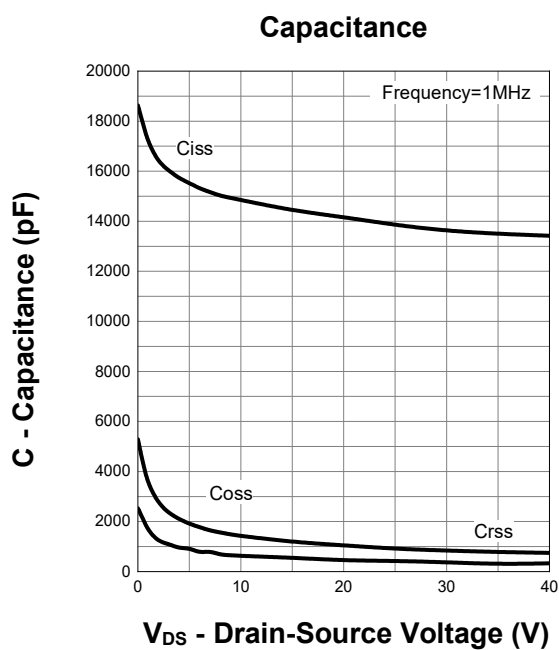
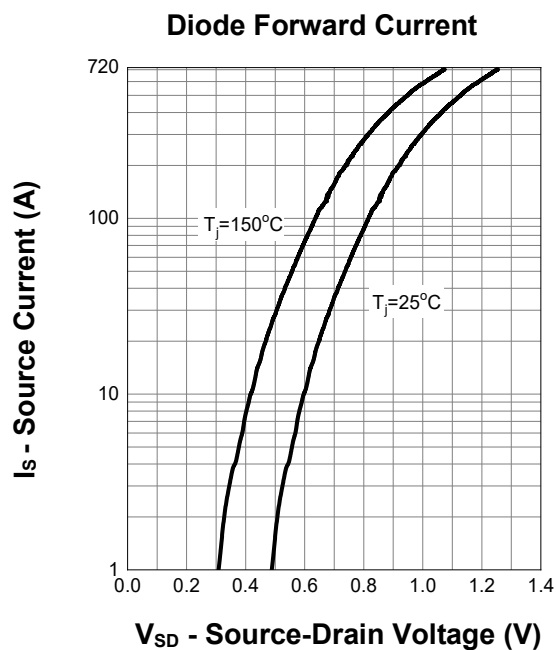
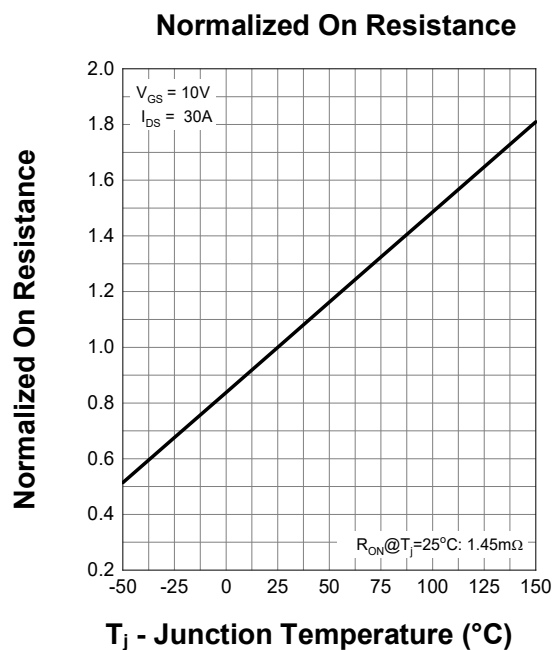
Transfer Characteristics



Normalized Threshold Voltage

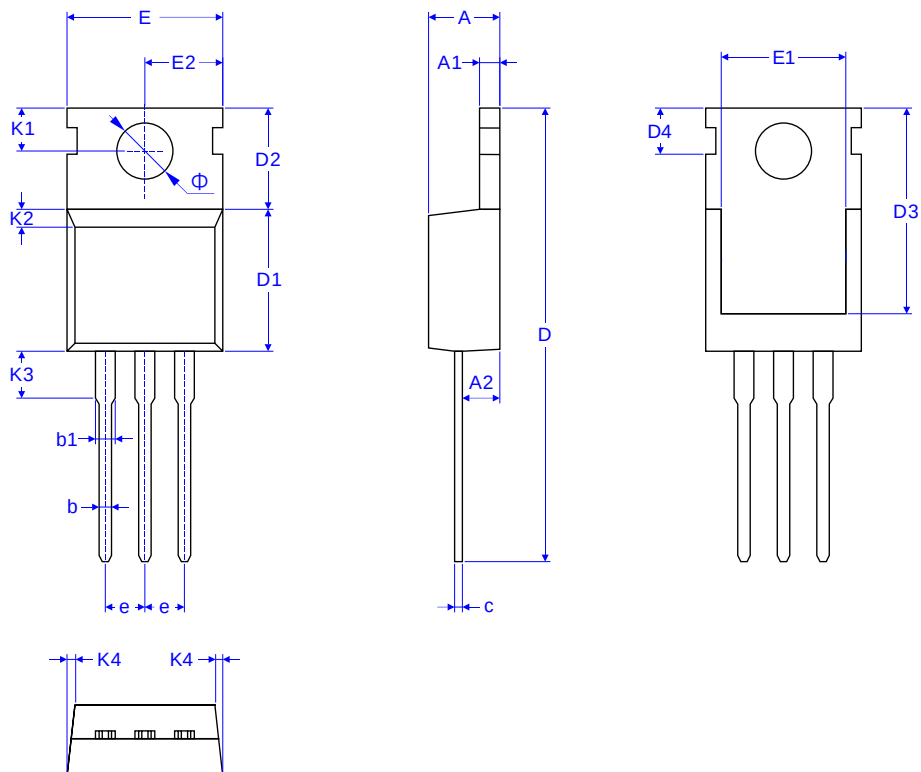


7. Typical Characteristics (Cont.)



8. Package Dimensions

TO-220 Package



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	MIN.	MAX.	MIN.	MAX.
E	9.80	10.20	0.3858	0.4016
E1	7.80	8.20	0.3071	0.3228
E2	4.80	5.20	0.1890	0.2047
b	0.65	0.95	0.0256	0.0374
b1	1.15	1.45	0.0453	0.0571
c	0.35	0.65	0.0138	0.0256
D	28.68	29.08	1.1291	1.1449
D1	9.00	9.40	0.3543	0.3701
D2	6.40	6.80	0.2520	0.2677
D3	13.00	13.40	0.5118	0.5276
D4	2.85	3.15	0.1122	0.1240
e	TYP 2.54		TYP 0.100	
K1	2.65	2.95	0.1043	0.1161
K2	0.15	0.35	0.0059	0.0138
K3	2.80	3.20	0.1102	0.1260
K4	0.15	0.35	0.0059	0.0138
A	4.35	4.65	0.1713	0.1831
A1	1.15	1.45	0.0453	0.0571
A2	2.20	2.60	0.0866	0.1024
Φ	3.45	3.75	0.1358	0.1476