

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ✓ Advanced Trench Technology
- ✓ Low $F_{OM} R_{DS(ON)} \times Q_{gd}$

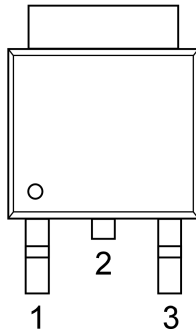
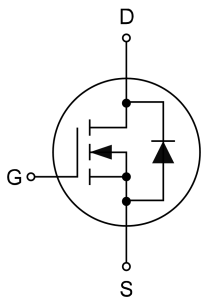
1.2 Applications

- ✓ PWM Application
- ✓ Power management
- ✓ Load Switch

1.3 Quick reference

- ✓ $BV \geq 30\text{ V}$
- ✓ $R_{DS(ON)} \leq 2.5\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- ✓ $P_{tot} \leq 83\text{ W}$
- ✓ $R_{DS(ON)} \leq 4\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
- ✓ $I_D \leq 139\text{ A}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)	 Top View TO-252	
2	Drain(D)		
3	Source(S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C=25^{\circ}\text{C}$	30	-	V
V_{GS}	Gate-Source Voltage	$T_C=25^{\circ}\text{C}$	-	± 20	V
$I_D^{*,***}$	Drain Current (DC)	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	139	A
		$T_C=100^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	88	A
I_{DM}^*	Pulsed Source Current	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	556	A
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}\text{C}$	-	83	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55	150	$^{\circ}\text{C}$
E_{AS}^*	Single Pulsed Avalanche Energy	$V_{DD}=30\text{ V}, L=0.5\text{ mH}, R_g=25\ \Omega$	-	306	mJ
$R_{\theta JA}^{**}$	Thermal Resistance, Junction to Ambient		-	64	$^{\circ}\text{C/W}$
$R_{\theta JC}^{**}$	Thermal Resistance, Junction to Case		-	1.5	

Notes:

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

4. Marking Information

Product Name	Marking
KJ023N03K	KJ023N03K XXXXXX

5. Ordering Code

Product Name	Package	Reel size	Tape width	Quantity (pcs)
KJ023N03K	TO-252	13"	16 mm	2500

Note: KUAIJIE XIN 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_J=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	30	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	1	1.5	2.5	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30 V, V _{GS} =0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{DS} =0 V, V _{GS} =±20 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} =10 V, I _{DS} =20 A	-	2	2.5	mΩ
		V _{GS} =4.5 V, I _{DS} =20 A	-	3	4	
R _g	Gate resistance	V _{DS} = V _{GS} =0V, Frequency=1.0 MHz	-	0.9	-	Ω
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 _{DS} =20 A, V _{GS} =0V, dI _{SD} /dt=100 A/μs	-	28	-	ns
Q _{rr}	Reverse Recovery Charge		-	18	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =15 V, Frequency=1.0 MHz	-	6000	-	pF
C _{oss}	Output Capacitance		-	630	-	
C _{rss}	Reverse Transfer Capacitance		-	60	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =15 V, V _{GEN} =10 V, R _G =3 Ω, R _L =0.75 Ω, I _{DS} =20 A	-	15	-	ns
t _r	Turn-on Rise Time		-	30	-	
t _{d(off)}	Turn-off Delay Time		-	82	-	
t _f	Turn-off Fall Time		-	55	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =15 V, V _{GS} =10 V, I _{DS} =20 A	-	106	-	nC
Q _{gs}	Gate-Source Charge		-	22	-	
Q _{gd}	Gate-Drain Charge		-	21	-	

Notes:

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

7. Typical Characteristics

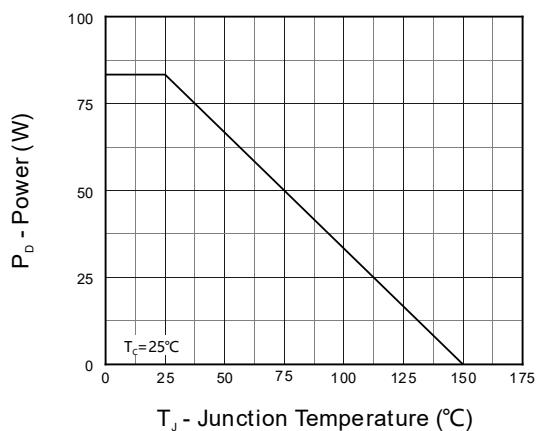


Figure 1. Power Capability

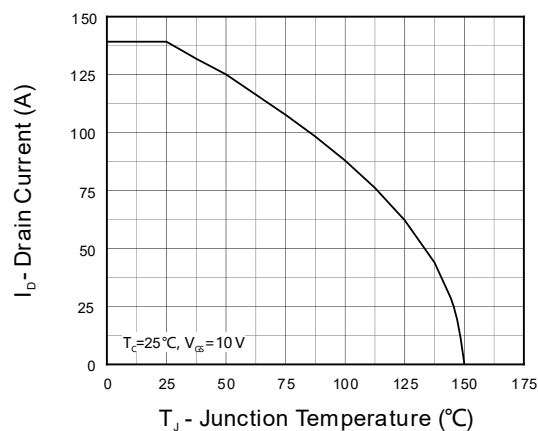


Figure 2. Current Capability

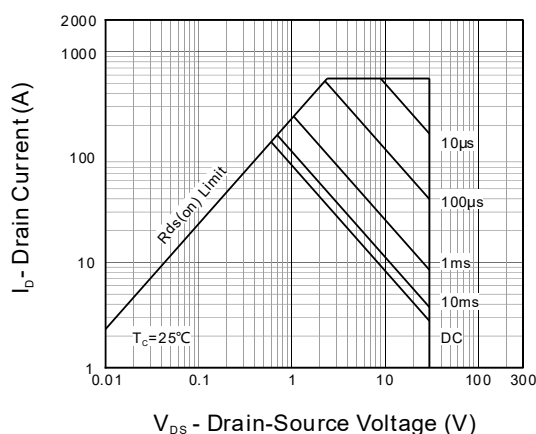


Figure 3. Safe Operation Area

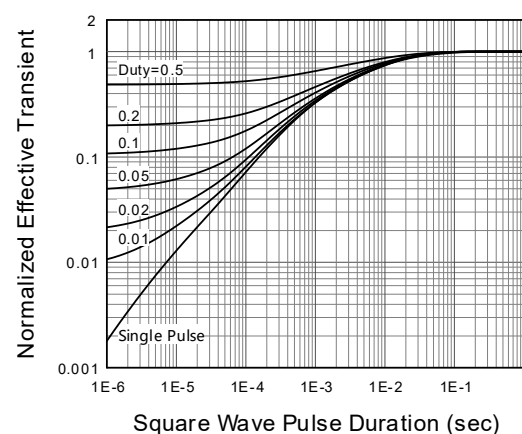


Figure 4. Transient Thermal Impedance

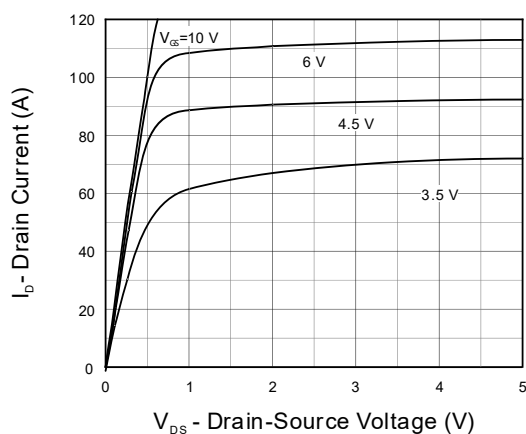


Figure 5. Output Characteristics

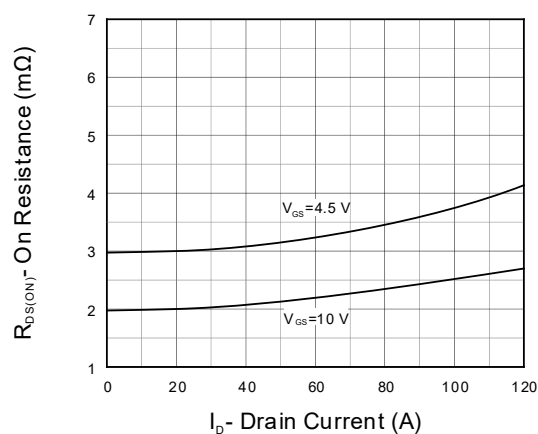


Figure 6. On Resistance

7. Typical Characteristics (cont.)

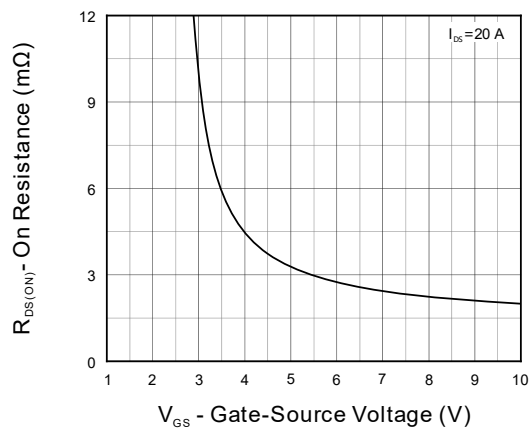


Figure 7. Transfer Characteristics

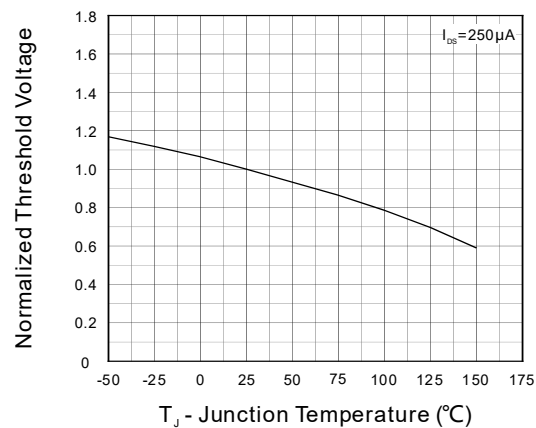


Figure 8. Normalized Threshold Voltage

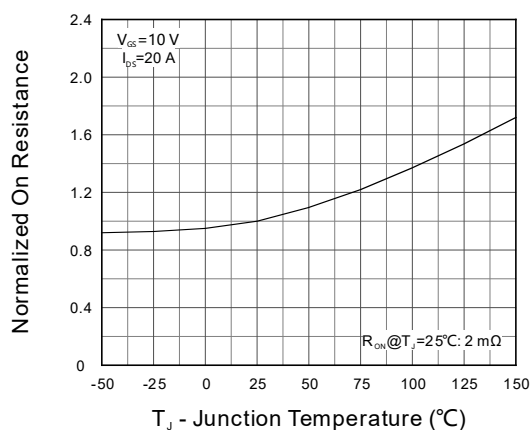


Figure 9. Normalized On Resistance

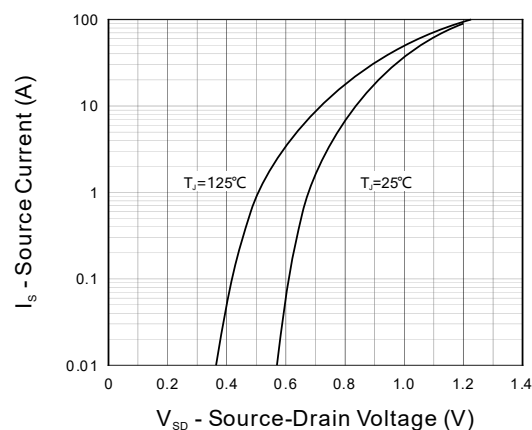


Figure 10. Diode Forward Current

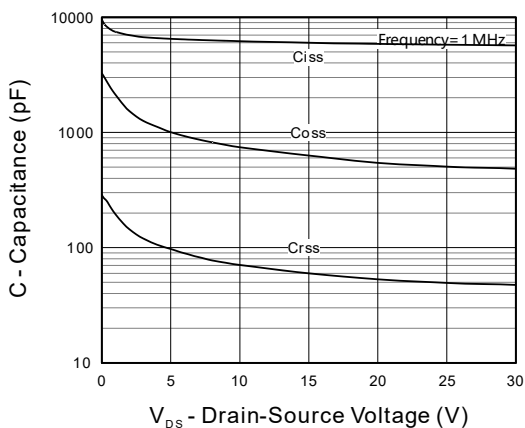


Figure 11. Capacitance

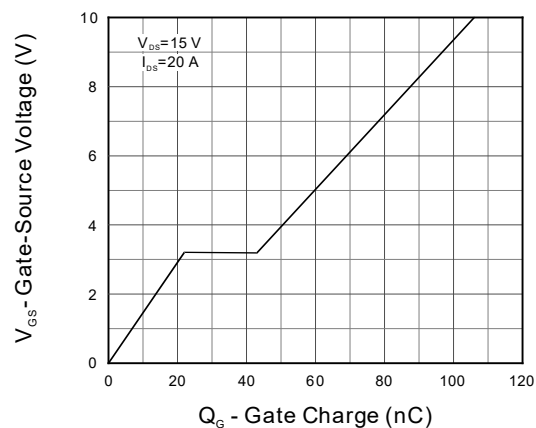
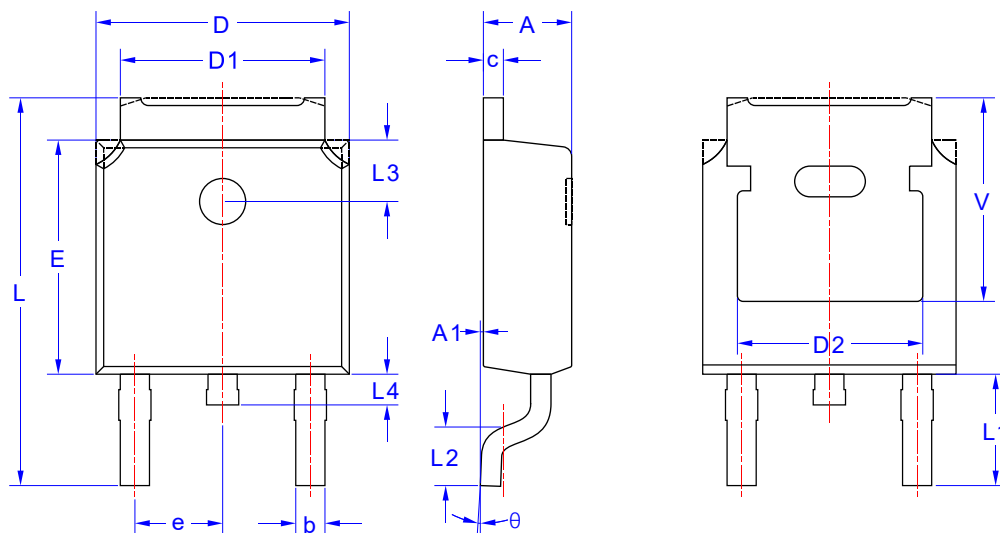


Figure 12. Gate Charge

8. Package Dimensions

TO-252 Package



Note: There are two possible shapes for the dashed area.

Symbol	Dimensions in Millimeters	
	MIN	MAX
A	2.200	2.400
A1	0	0.127
b	0.660	0.860
c	0.460	0.580
D	6.500	6.700
D1	5.100	5.460
D2	4.830 REF.	
E	6.000	6.200
e	2.186	1.386
L	9.800	10.400
L1	2.900 REF.	
L2	1.400	1.700
L3	1.600 REF.	
L4	0.600	1.000
V	5.350 REF.	
θ	0°	8°