

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Surface-mounted package
- ☒ Low Thermal Resistance

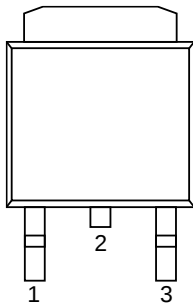
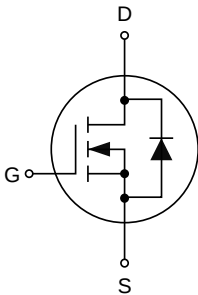
1.2 Applications

- ☒ Load Switch
- ☒ PWM Application
- ☒ Power management

1.3 Quick reference

- ☒ $BV \geq 40\text{ V}$
- ☒ $R_{DS(ON)} \leq 6.2\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- ☒ $P_D \leq 48\text{ W}$
- ☒ $R_{DS(ON)} \leq 11\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
- ☒ $I_D \leq 70\text{ A}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)		
2	Drain(D)		
3	Source(S)		

Top View
TO-252

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V _{DS}	Drain-Source Voltage	T _C =25°C	-	40	V
V _{GS}	Gate-Source Voltage	T _C =25°C	-	±20	V
I _D ^{*,***}	Drain Current (DC)	T _C =25°C, V _{GS} =10 V	-	70	A
		T _C =100°C, V _{GS} =10 V	-	45	A
I _{DM} [*]	Pulsed Source Current	T _C =25°C, V _{GS} =10 V	-	280	A
P _D	Power Dissipation	T _C =25°C	-	48	W
I _S	Diode Forward Current	T _C =25°C	-	70	A
E _{AS} [*]	Single Pulsed Avalanche Energy	V _{DD} =20 V, L=0.5 mH, I _{AS} =25 A	-	180	mJ
T _J , T _{stg}	Operating Junction and Storage Temperature Range		-55	150	°C
R _{θJC} ^{**}	Thermal Resistance-Junction to Case		-	2.6	°C/W

Notes:

- * Pulse width ≤ 300 μs, duty cycle ≤ 2%.
- ** Surface mounted on 1 in² pad area, t ≤ 10 sec.
- *** Limited by bonding wire.

4. Marking Information

Product Name	Marking
KJ70N04K	KJ70N04K XXXXXX

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity (pcs)
KJ70N04K	TO-252	13"	16 mm	2500

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	-	2.5	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} =40 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} =30 A	-	4.9	6.2	mΩ
		V _{GS} =4.5 V, I _{DS} =20 A	-	7.1	11	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} =30 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	-	20	-	ns
Q _{rr}	Reverse Recovery Charge		-	10	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =20 V Frequency=1 MHz	-	2960	-	pF
C _{oss}	Output Capacitance		-	230	-	
C _{rss}	Reverse Transfer Capacitance		-	195	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =20 V, V _{GEN} =10 V, R _G =3 Ω, R _L =1 Ω, I _{DS} =30 A	-	8	-	ns
t _r	Turn-on Rise Time		-	16	-	
t _{d(off)}	Turn-off Delay Time		-	21	-	
t _f	Turn-off Fall Time		-	10	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =20 V, V _{GS} =10 V, I _{DS} =30 A	-	48	-	nC
Q _{gs}	Gate-Source Charge		-	8	-	
Q _{gd}	Gate-Drain Charge		-	9	-	

Notes:

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

7. Typical Characteristics

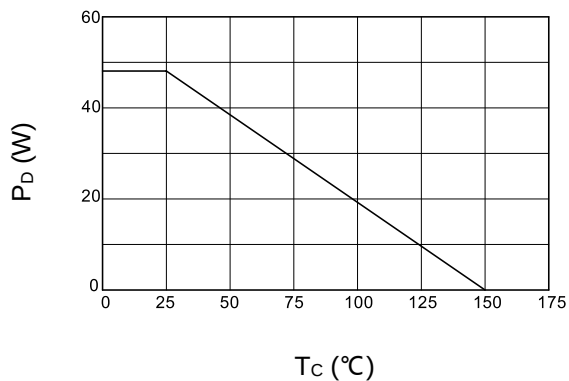


Figure 1. Power Capability

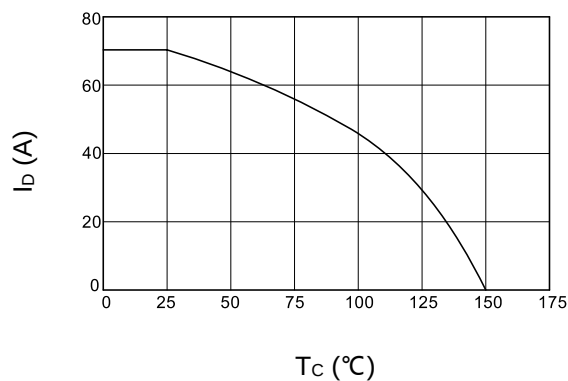


Figure 2. Current Capability

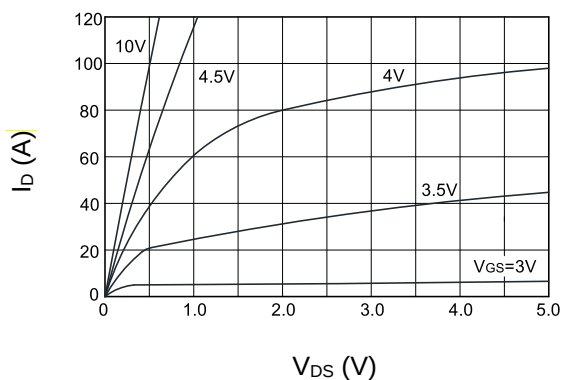


Figure 3. Output characteristics

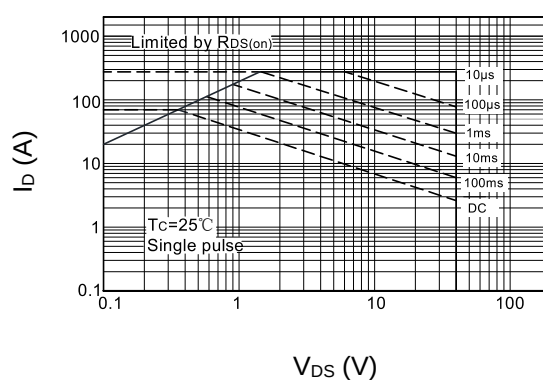


Figure 4. Safe operating area

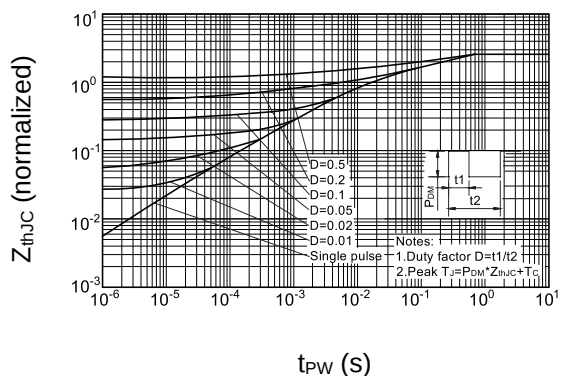


Figure 5. Normalized transient thermal impedance from junction to case

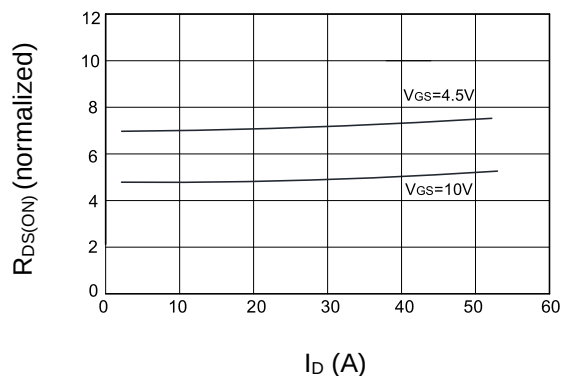


Figure 6. Normalized on-resistance vs drain current

7. Typical Characteristics (cont.)

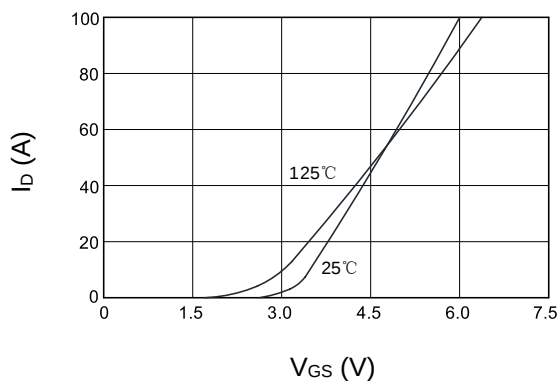


Figure 7. Typical Transfer Characteristics

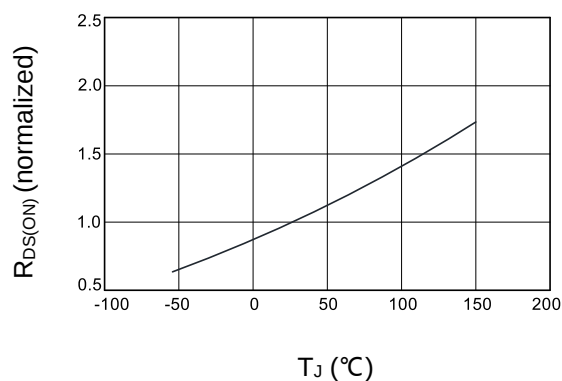


Figure 8. Normalized on-resistance vs junction temperature

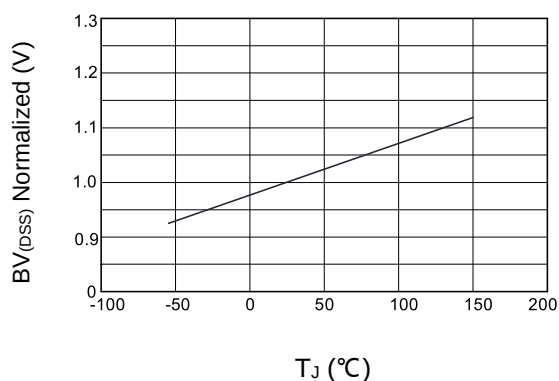


Figure 9. Normalized Breakdown Voltage

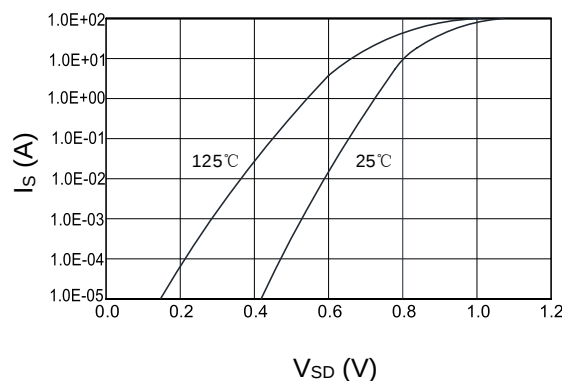


Figure 10. Forward characteristics of body diode

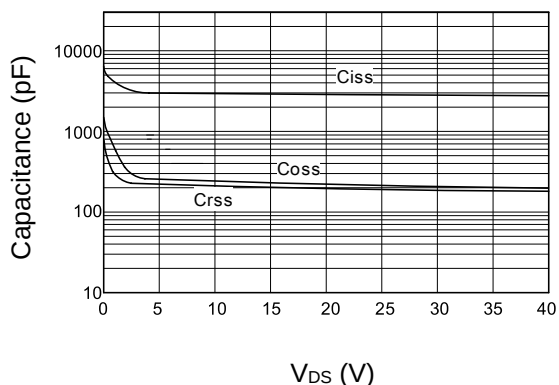


Figure 11. Capacitance

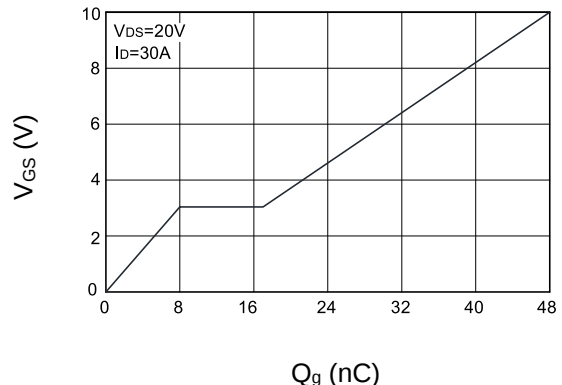
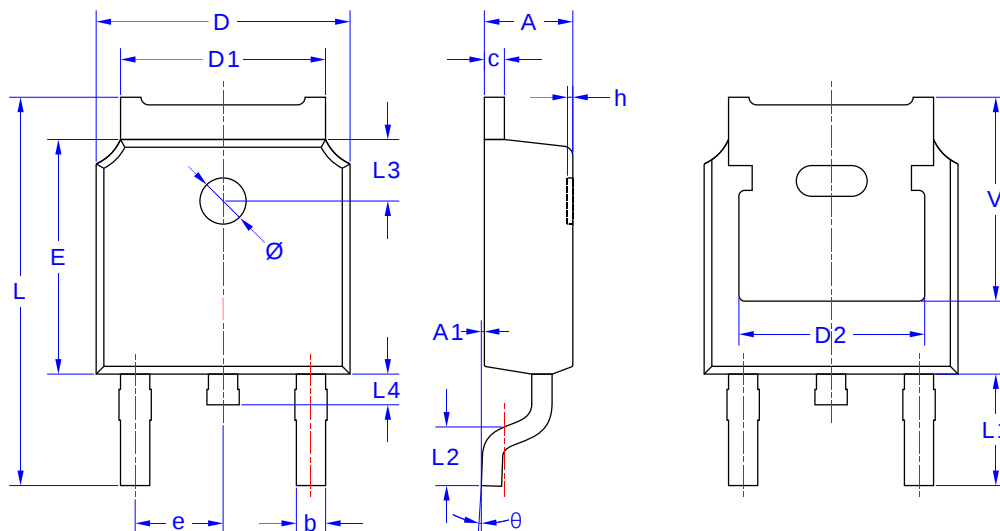


Figure 12. Gate charge

8. Package Dimensions

TO-252 Package



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
Ø	1.100	1.300
θ	0°	8°
H	0	0.300
V	5.350 REF.	