KJD9N50K

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

Fast switching capability
Avalanche energy specified
Improved dv/dt capability, high ruggedness

Applications

High frequency switching mode power supply
Electronic ballast
LED power supply
Power factor correction (PFC)

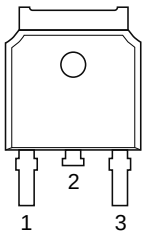
Quick reference

V_{DS} = 500 V
I_D = 9 A
$R_{DS(ON)}$ ≤ 720 mΩ @V_{GS}=10 V

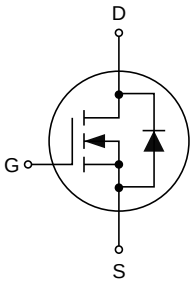
Pin Description

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

Simplified Outline	Symbol



Top View
TO-252



Package Marking and Ordering Information

Product Name	Package	Marking	Reel size	Tape width	Quantity (pcs)
KJD9N50K	TO-252	KJD9N50K XXXXXX	13"	16 mm	2500

2. Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current Continuous	9	A
I_{DM}	Pulsed Drain Current [1]	36	A
P_D	Power Dissipation	178	W
I_{AR}	Repetitive Avalanche Current [1]	9	A
E_{AS}	Single Pulse Avalanche Energy [2]	360	mJ
E_{AR}	Repetitive Avalanche Energy [1]	22	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	℃

Notes: 1. Surface mounted on a 1 inch^2 FR-4 board with 2 OZ copper.
2. L = 20 mH, I_{AS} = 6 A, V_{DD} = 50 V, R_G = 25 Ω, starting T_J = 25°C.

3. Electrical Characteristics (T_C=25℃, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0 V, I_D=250 μA	500	530	-	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=500 V, V_{GS}=0 V	-	-	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0 V, V_{GS}=±30 V	-	-	±100	nA
$V_{GS(th)}$	Gate-Threshold Voltage	V_{DS}=V_{GS}, I_D=250 μA	2	3	4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10 V, I_D=4.5 A	-	630	720	Ω
C_{iss}	Input Capacitance	V_{GS}=0 V, V_{DS}=25 V, f=1.0 MHz	-	1110	-	pF
C_{oss}	Output Capacitance		-	110	-	
C_{rss}	Reverse Transfer Capacitance		-	33	-	
Q_g	Total Gate Charge	V_{DS}=400 V, V_{GS}=10 V, I_D=9 A	-	19.5	-	nC
Q_{gs}	Gate-Source Charge		-	3	-	
Q_{gd}	Gate-Drain Charge		-	7	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=250 V, I_D=9 A, R_G=25 Ω	-	24	-	ns
t_r	Turn-on Rise Time		-	45	-	
$t_{d(off)}$	Turn-off Delay Time		-	56	-	
t_f	Turn-off Fall Time		-	35	-	
I_S	Maximum Continuous Drain-Source Diode Forward Current		-	-	9	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	36	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0 V, I_S=9 A	-	-	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS}=0 V, I_S=9 A, dI/dt=100 A/μs	-	335	-	ns
Q_{rr}	Reverse Recovery Charge		-	3.5	-	μC

Note:

1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%

4. Typical Characteristics

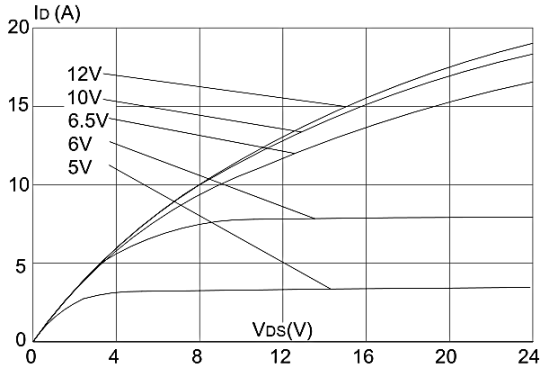


Figure 1. Output Characteristics

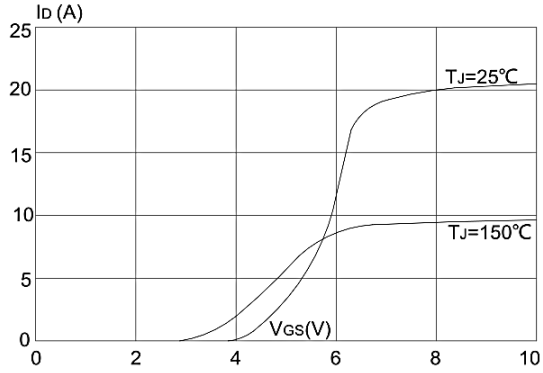


Figure 2. Typical Transfer Characteristics

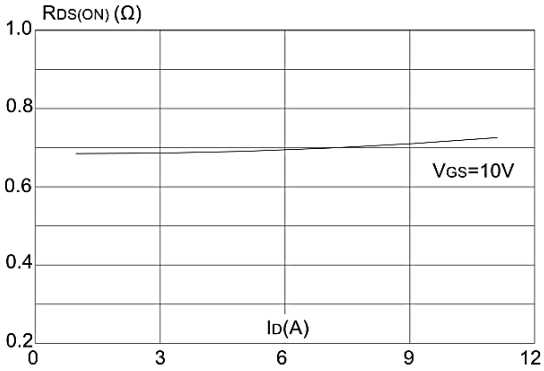


Figure 3. On-resistance vs. Drain Current

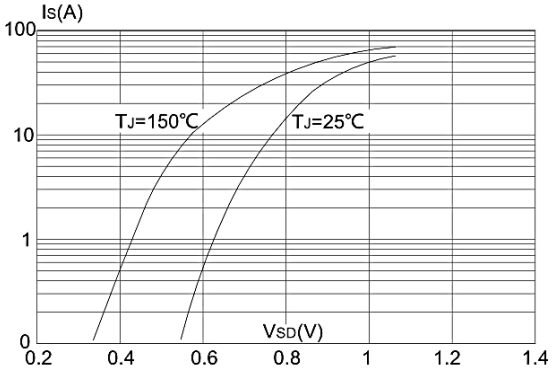


Figure 4. Body Diode Characteristics

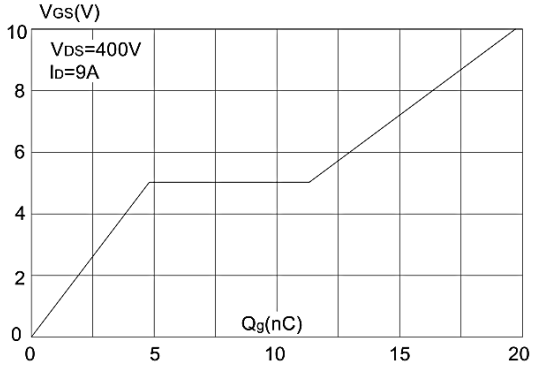


Figure 5. Gate Charge Characteristics

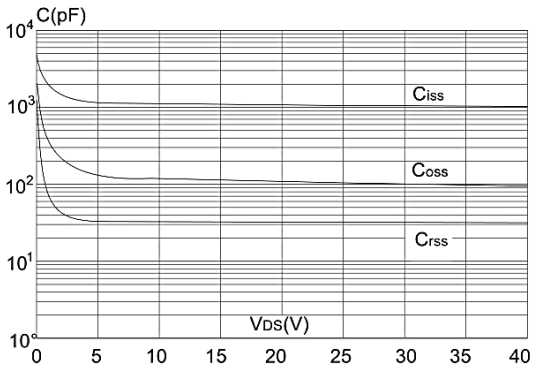


Figure 6. Capacitance Characteristics

4. Typical Characteristics (cont.)

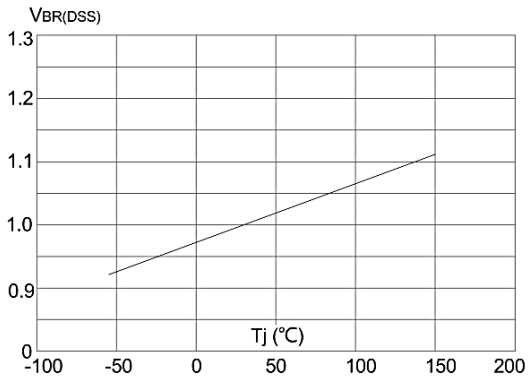


Figure 7. Normalized Breakdown Voltage vs. Junction Temperature

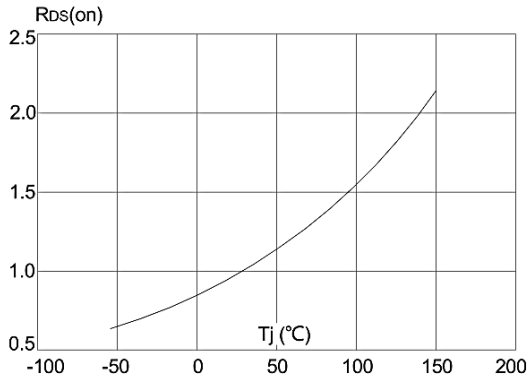


Figure 8. Normalized on Resistance vs. Junction Temperature

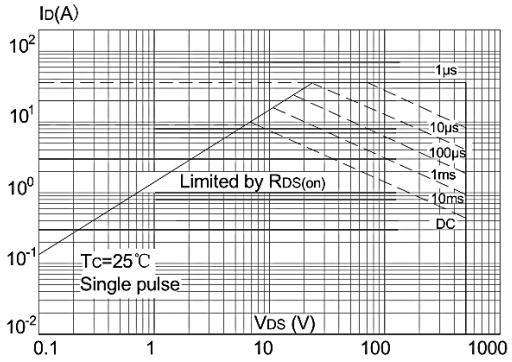


Figure 9. Maximum Safe Operating Area vs. Case Temperature

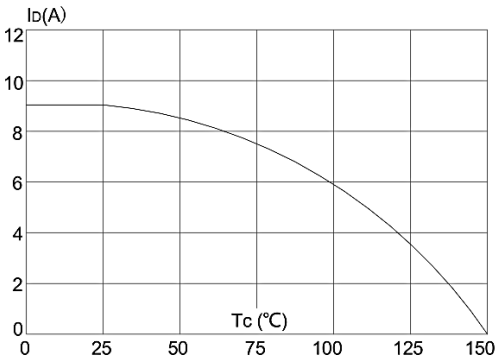


Figure 10. Maximum Continuous Drain Current

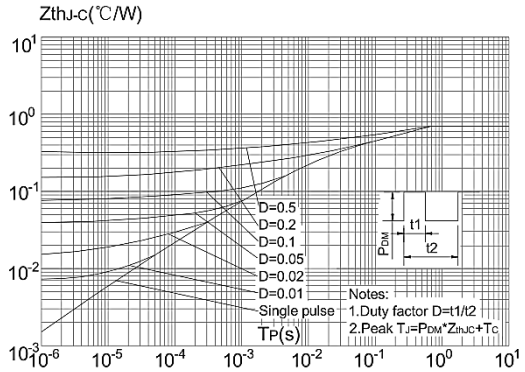
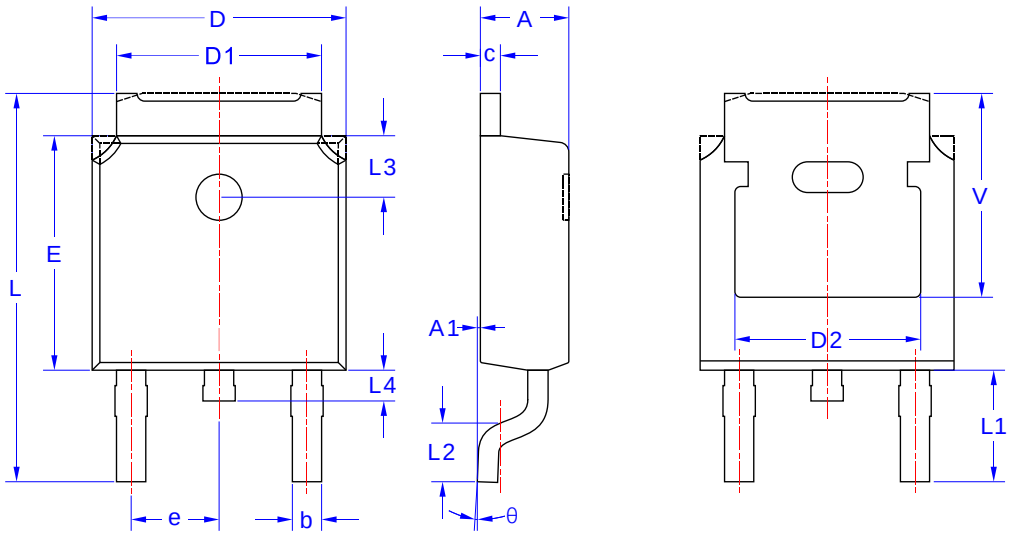


Figure 11. Maximum Effective Transient Thermal Impedance, Junction to Case

5. Package Mechanical Data

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°