KJ50N06K

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

- Advanced trench technology
- Excellent $R_{DS(ON)}$
- Low gate charge

Applications

- Battery protection
- Load switch
- Uninterruptible power supply

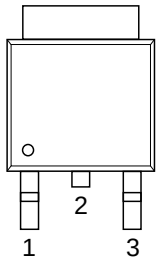
Quick reference

- V_{DS} = 60V
- I_D = 50A
- $R_{DS(ON)}$ ≦ 16mΩ @V_{GS} = 10V（Type:11mΩ）

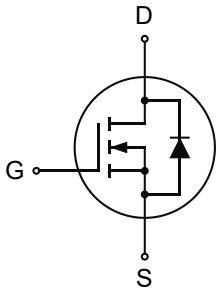
Pin Description

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)
KJ50N06K	TO-252	50N06 XXXXXX	13"	24 mm	2500

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V [1]	50	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V [1]	32	A
I_{DM}	Pulsed Drain Current [2]	150	A
E_{AS}	Single Pulse Avalanche Energy [3]	72	mJ
I_{AS}	Avalanche Current	38	A
P_D@T_C=25℃	Total Power Dissipation [4]	45	W
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case [1]	2.8	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	60	65	-	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃, I_D=1mA	-	0.057	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance [2]	V_{GS}=10V, I_D=20A	-	11	16	mΩ
		V_{GS}=4.5V, I_D=10A	-	16	20	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS}, I_D =250μA	1.2	1.8	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		-	-5.68	-	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=48V, V_{GS}=0V, T_J=25℃	-	-	1	μA
			-	-	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
gfs	Forward Transconductance	V_{DS}=5V, I_D=15A	-	45	-	S
R_g	Gate Resistance	V_{DS}=0V, V_{GS}=0V, f=1MHz	-	1.7	-	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=48V V_{GS}=4.5V I_D=30A	-	19.3	-	nC
Q_{gs}	Gate-Source Charge		-	7.1	-	
Q_{gd}	Gate-Drain Charge		-	7.6	-	
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=30V, V_{GS}=10V R_G=3.3Ω, I_D=15A	-	7.2	-	ns
t_r	Rise Time		-	50	-	
$t_{d(off)}$	Turn-Off Delay Time		-	36.4	-	
t_f	Fall Time		-	7.6	-	
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz	-	2423	-	pF
C_{oss}	Output Capacitance		-	145	-	
C_{rss}	Reverse Transfer Capacitance		-	97	-	
I_S	Continuous Source Current [1,5]	V_{GS}=V_{DS}=0V, Force Current	-	-	35	A
I_{SM}	Pulsed Source Current [2,5]		-	-	80	A
V_{SD}	Diode Forward Voltage [2]	V_{GS}=0V, I_S=1A, T_J=25℃	-	-	1	V
t_{rr}	Reverse Recovery Time	I_F=15A, dI/dt=100A/μs, T_J=25℃	-	16.3	-	ns
Q_{rr}	Reverse Recovery Charge		-	11	-	nC

Note:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≦ 300μs, duty cycle ≦ 2%.
3. The E_{AS} data shows Max. rating. The test condition is V_{DD}=30V, V_{GS}=10V, L=0.5mH, I_{AS}=38A.
4. The power dissipation is limited by 150℃ junction temperature.
5. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

4. Typical Characteristics

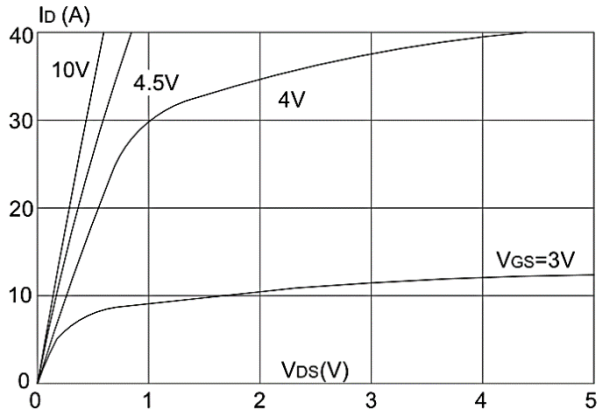


Figure1: Output Characteristics

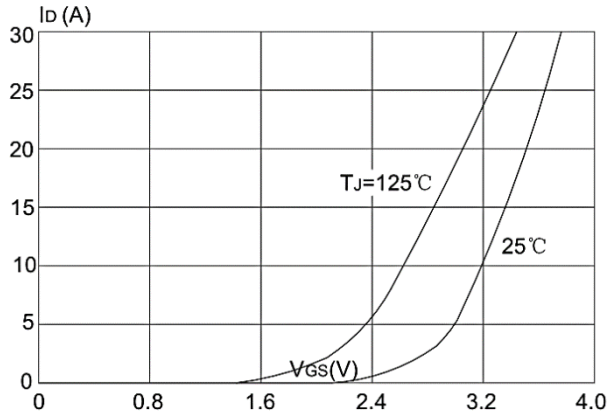


Figure 2: Typical Transfer Characteristics

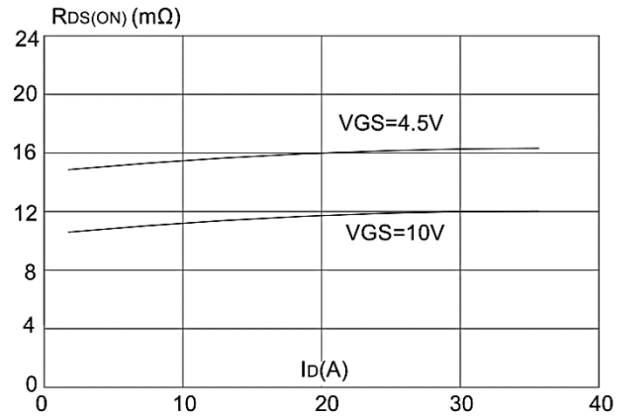


Figure 3:On-resistance vs. Drain Current

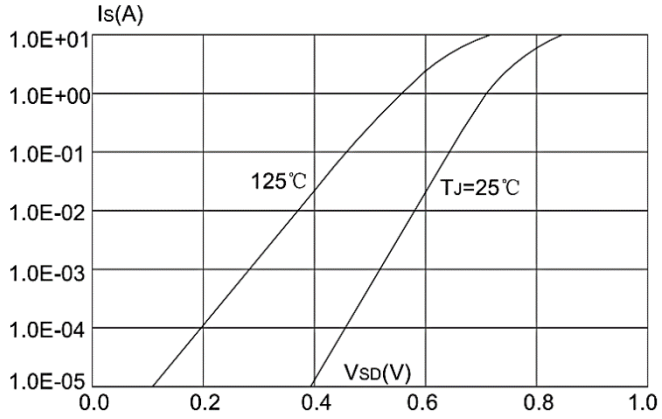


Figure 4: Body Diode Characteristics

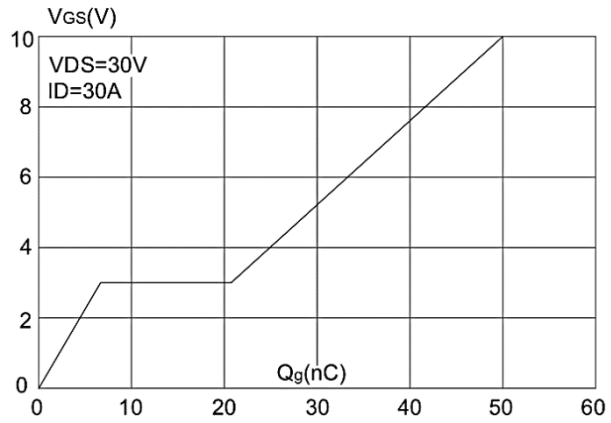


Figure 5: Gate Charge Characteristics

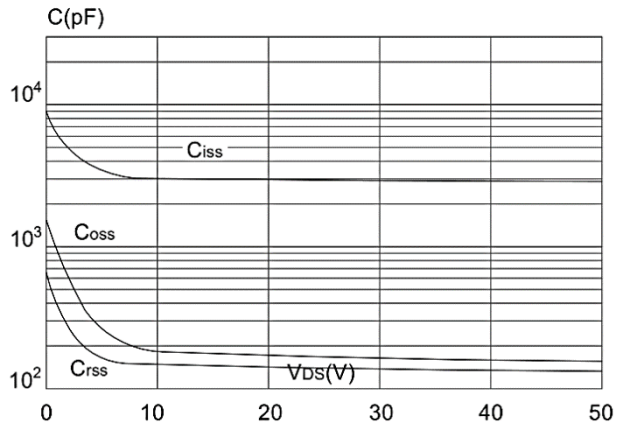


Figure 6: Capacitance Characteristics

4. Typical Characteristics (cont.)

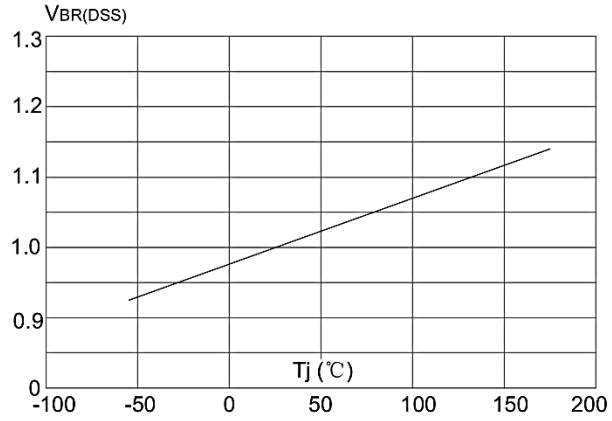


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

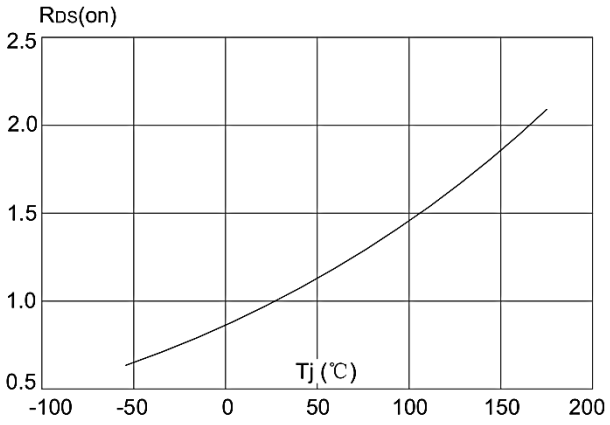


Figure 8: Normalized on Resistance vs. Junction Temperature

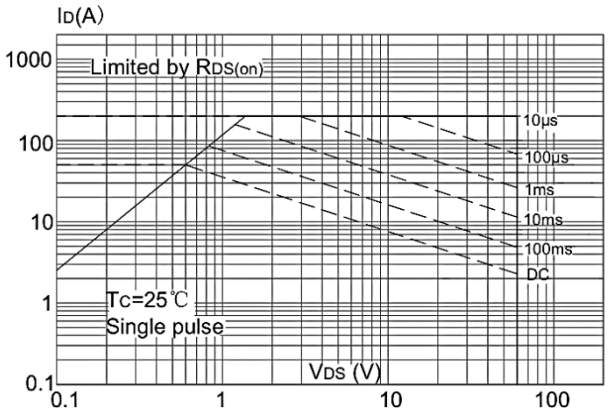


Figure 9: Maximum Safe Operating Area

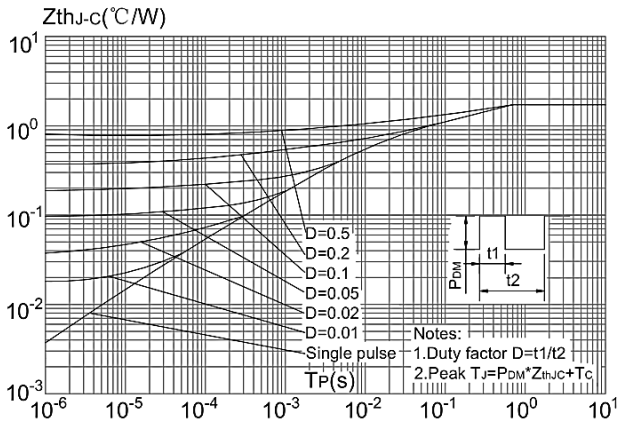


Figure.10: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

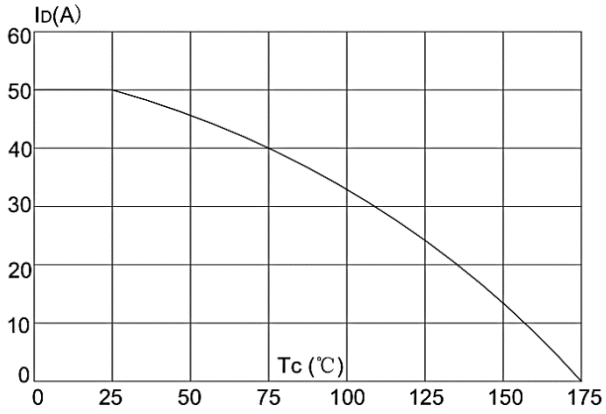
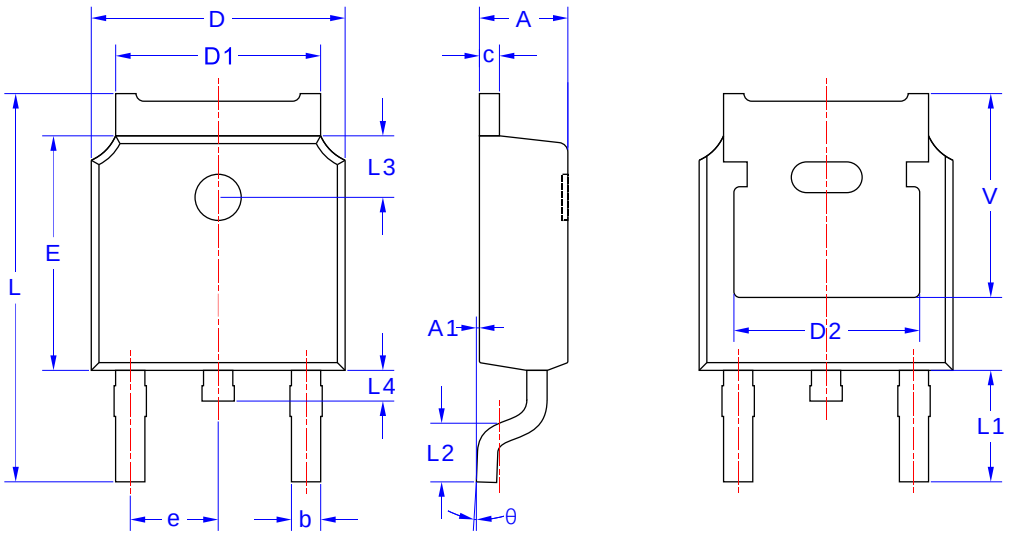


Figure 11: Maximum Continuous Drain Current vs. Ambient Temperature

5. Package Mechanical Data

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	2.386
L	9.800	10.400
L1	2.900 REF.	
L2	1.400	1.700
L3	1.800 REF.	
L4	0.600	1.000
θ	0°	8°
V	5.600 REF.	