KJ120N04C/D

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

Advanced Trench Technology

Excellent $R_{DS(ON)}$, Low gate charge

Applications

Brushless motor

Load switch

Uninterruptible power supply

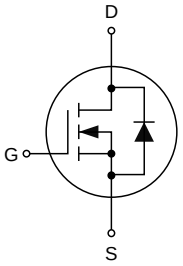
Quick reference

V_{DS} = 40V

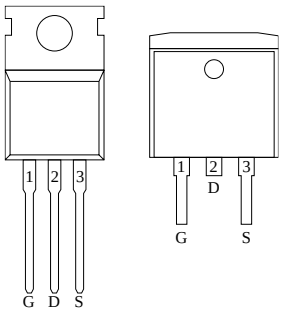
I_D = 120A

$R_{DS(ON)} \leqq$ 4.0mΩ @ V_{GS} = 10V (Type: 3.0mΩ)

Schematic diagram



Pin Assignment



TO-220 TO-263

Package Marking and Ordering Information

Product Name	Package	Marking	Reel Size	Tape width	Quantity
KJ120N04C	TO-220	120N04 YWWXXX YWWXXX: Date Code	-	-	1000
KJ120N04D	TO-263		-	-	800

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

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current, T_C=25℃ [1,6]	120	A
	Continuous Drain Current, T_C=100℃ [1,6]	98	A
I_{DM}	Pulsed Drain Current [2]	600	A
E_{AS}	Single pulse avalanche energy [3]	272	mJ
I_{AS}	Single pulse avalanche current	33	A
P_D	Power Dissipation [4]	180	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55~150	℃
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	50	℃/W
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.7	℃/W

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

BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0 V, I_D=250 μA	40	-	-	V
$V_{GS(th)}$	Gate-Threshold Voltage	V_{DS}=V_{GS}, I_D=250 μA	2.5	2.8	4.0	V
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0 V, V_{GS}=±20 V	-	-	±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40 V, V_{GS}=0 V	-	-	1	μA
$R_{DS(ON)}$	Drain-Source On-Resistance [3]	V_{GS}=10 V, I_D=30 A	-	3.0	4.0	mΩ
C_{iss}	Input Capacitance	V_{DS}=20 V, V_{GS}=0 V, f=1.0 MHz	-	4900	-	pF
C_{oss}	Output Capacitance		-	528	-	
C_{rss}	Reverse Transfer Capacitance		-	317	-	
Q_g	Total Gate Charge	V_{DS}=20 V, V_{GS}=10 V, I_D=30 A	-	80	-	nC
Q_{gs}	Gate-Source Charge		-	17	-	
Q_{gd}	Gate-Drain Charge		-	21	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=20 V, V_{GS}=10 V, I_D=30 A, R_L=1 Ω, R_{GEN}=3 Ω	-	21	-	ns
t_r	Turn-on Rise Time		-	32	-	
$t_{d(off)}$	Turn-off Delay Time		-	71	-	
t_f	Turn-off Fall Time		-	40	-	
V_{SD}	Diode Forward Voltage	V_{GS}=0 V, I_S=30 A	-	-	1.2	V
I_S	Diode Forward Current		-	-	150	A
I_{SM}	Diode Pulse Current		-	-	600	A
t_{rr}	Reverse Recovery Time	V_{GS}=10 V, I_S=20 A, dI/dt=100 A/μs	-	27	-	ns
Q_{rr}	Reverse Recovery Charge		-	46	-	uC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. The E_{AS} data shows Max. rating. The test condition is T_J=25℃, V_{DD}=20 V, V_G=10 V, L=0.5 mH, R_g=25 Ω, I_{AS}=33 A
3. The data tested by pulsed, pulse width ≤ 300 μs, duty cycle ≤ 2%
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.
6. Package limitation current is 180 A

4. Typical Characteristics

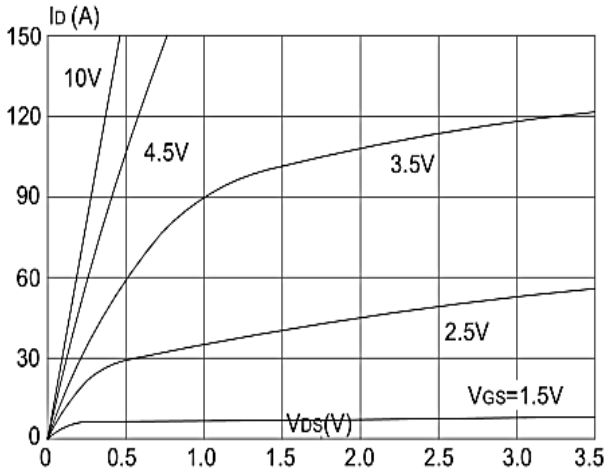


Figure1: Output Characteristics

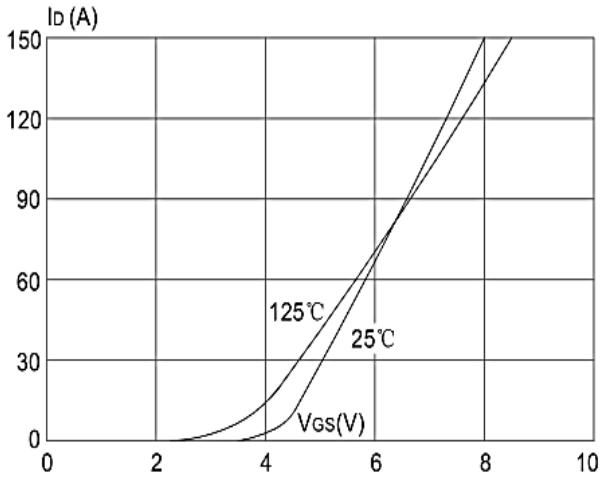


Figure 2: Typical Transfer Characteristics

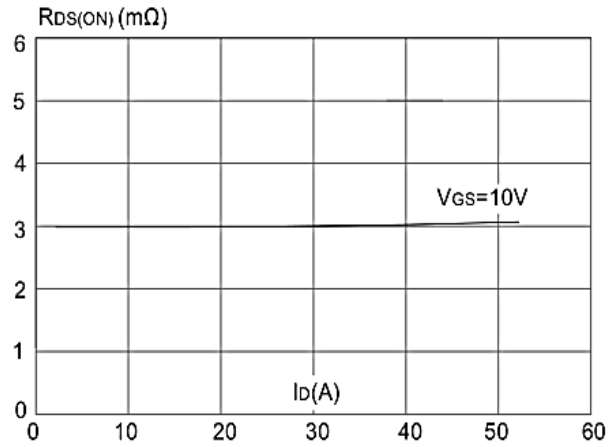


Figure 3:On-resistance vs. Drain Current

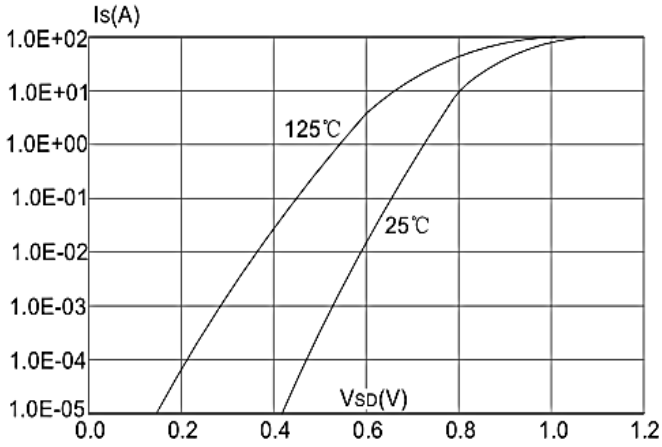


Figure 4: Body Diode Characteristics

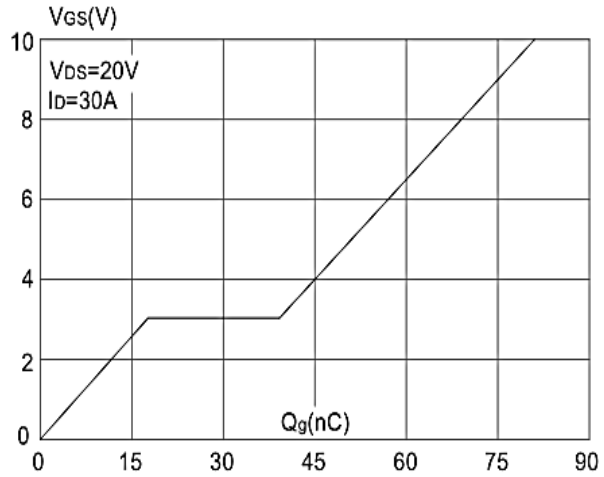


Figure 5: Gate Charge Characteristics

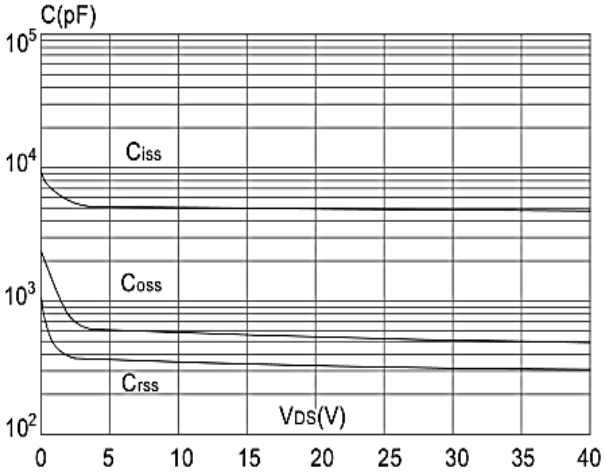


Figure 6: Capacitance Characteristics

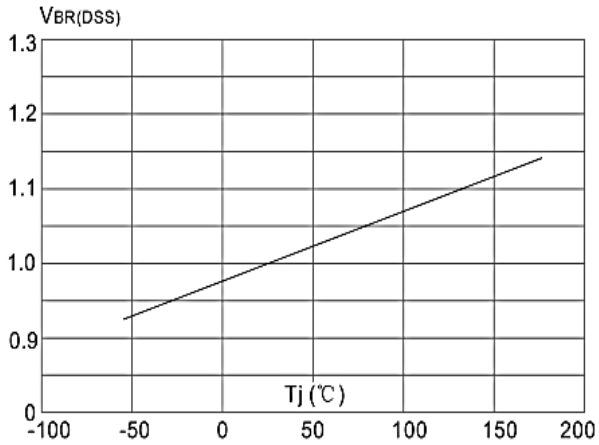


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

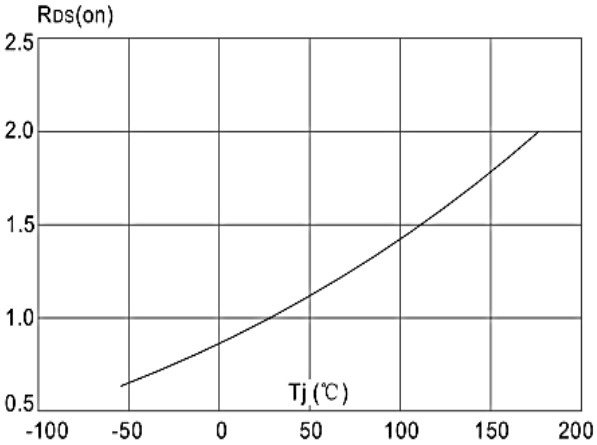


Figure 8: Normalized on Resistance vs. Junction Temperature

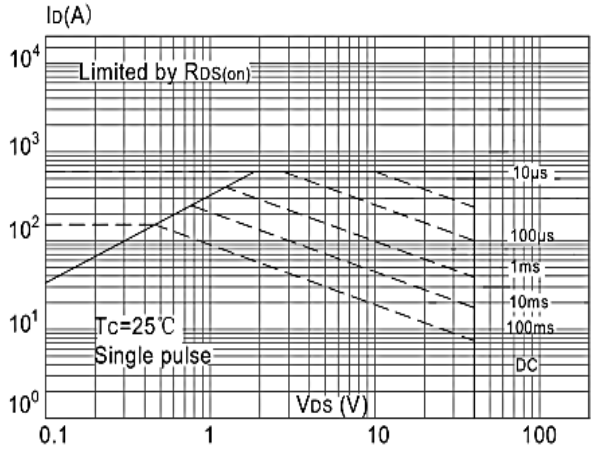


Figure 9: Maximum Safe Operating Area

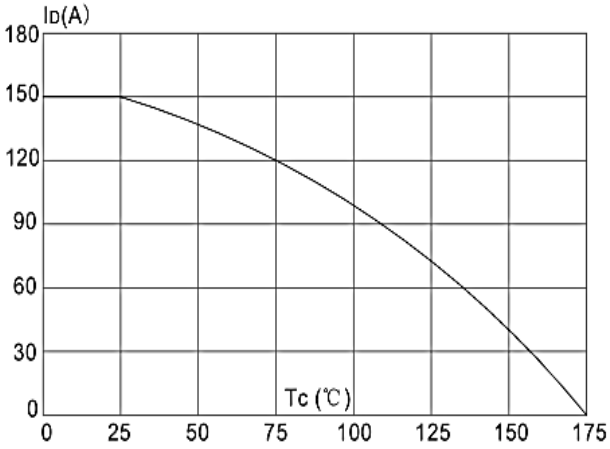


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

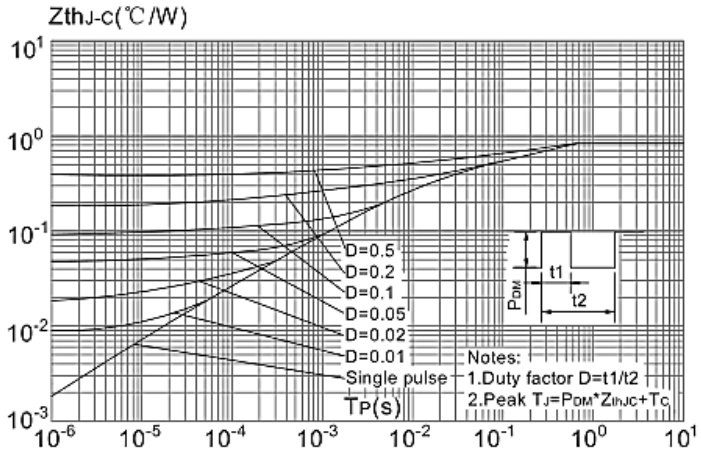
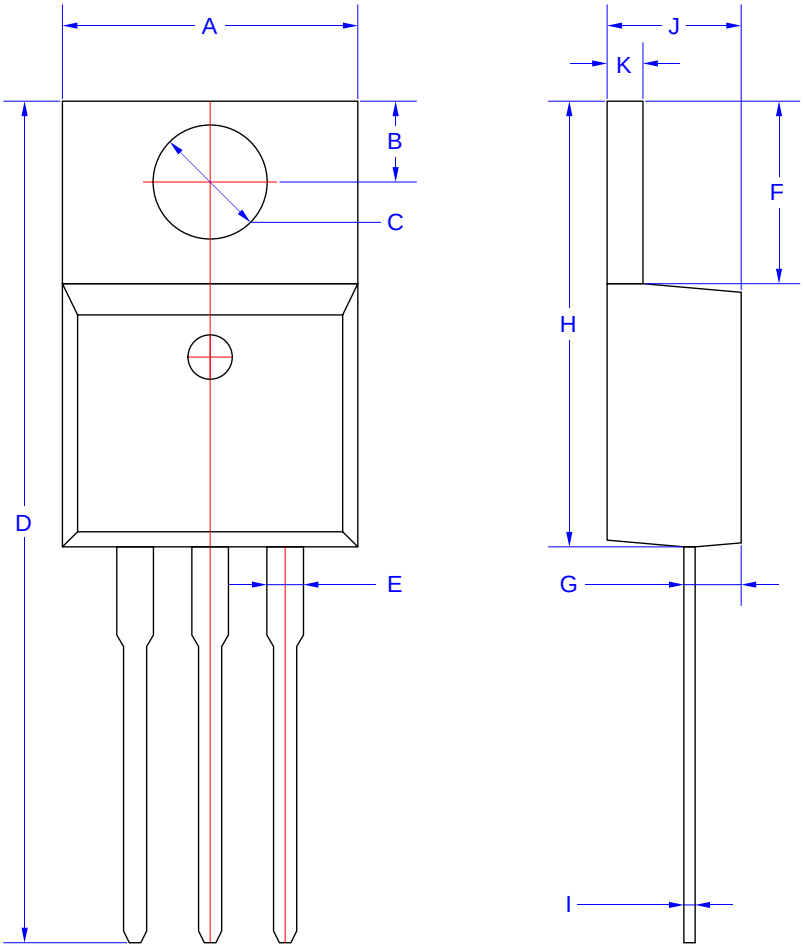


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

5. Package Mechanical Data

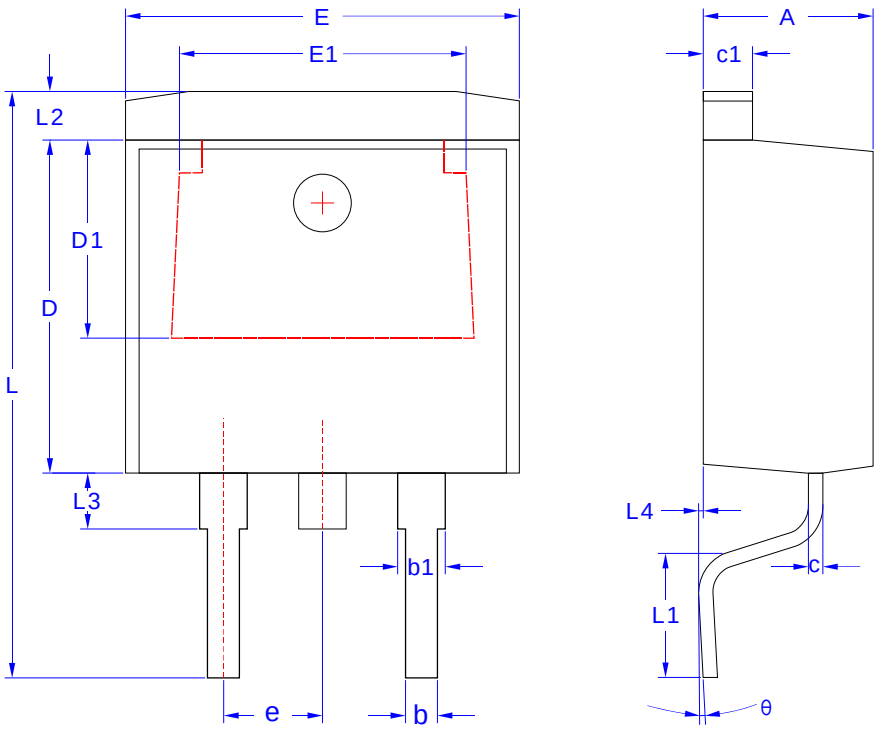
TO-220 Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4

5. Package Mechanical Data

TO-263 Package



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	4.40	4.80
b	0.76	1.00
b1	1.17	1.47
c	0.36	0.50
c1	1.25	1.45
D	8.60	9.00
D1	5.10 REF	
E	9.80	10.40
E1	7.40 REF	
e	2.54 REF	
L	14.6	15.8
L1	2.29	2.79
L2	1.27 REF	
L3	1.50 REF	
L4	0.00	0.25
θ	0° ± 3°	