

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

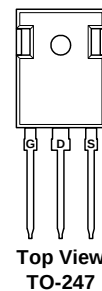
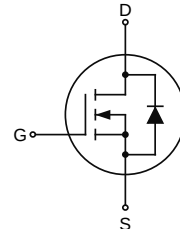
Advanced Trench Technology
Excellent $R_{DS(ON)}$
Low gate charge

1.2 Applications

Uninterrupted Power Supply (UPS)
Brushless DC electric motor (BLDC)

1.3 Quick reference

$V_{DS} = 250V$
 $I_D = 60A$
 $R_{DS(ON)} \leq 18m\Omega @ V_{GS} = 10V$ (Type:14 m Ω)



2. Package Marking and Ordering Information

Product Name	Package	Marking	Reel Size	Tape width	Quantity
KJ120N25P	TO-247	120N25 YWXXXX YWXXXX: Date Code	-	-	1000

3. Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	250	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current $V_{GS} @ 10V$	120	A
$I_D @ T_A = 100^\circ C$	Continuous Drain Current $V_{GS} @ 10V$	80	A
I_{DM}	Pulsed Drain Current (pulse width limited by T_{JM})	460	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy	600	mJ
E_{AR}^{a1}	Avalanche Energy, Repetitive	150	mJ
I_{AR}^{a1}	Avalanche Current	90	A
dv/dt^{a2}	Peak Diode Recovery dv/dt	10	V/ns
P_D	Power Dissipation	720	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150	°C
T_L	Maximum Temperature for Soldering	300	°C
$R_{\theta JC}$	Thermal Resistance, Junction-Case	0.22	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-Ambient	40	°C/W

4. Electrical Characteristics @T_j=25°C (unless otherwise specified)

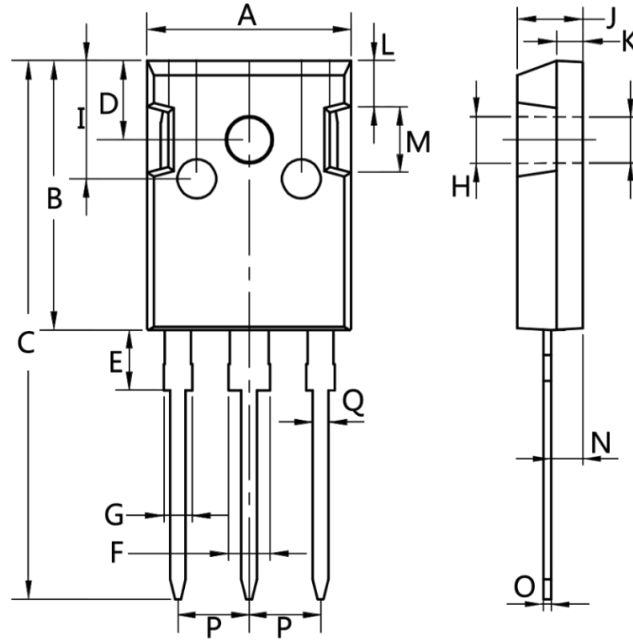
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	250	265	-	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =250V, V _{GS} =0V, T _a =25°C	-	-	1	μA
		V _{DS} =250V, V _{GS} =0V, T _a =125°C	-	-	100	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =+20V	-	-	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =-20V	-	-	-100	nA
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =35A	-	14	18	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	3.6	4.1	5.0	V
dv/dt ^{a2}	Forward Trans conductance	V _{DS} =10V, I _D =35A	100	-	-	S
R _g	Gate Resistance	V _{GS} =0V, V _{DS} open f=1.0MHz	-	1.5	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V f=1.0MHz	-	14000	-	pF
C _{oss}	Output Capacitance		-	960	-	pF
C _{rss}	Reverse Transfer Capacitance		-	420	-	pF
t _{d(ON)}	Turn-on Delay Time	I _D =35A, V _{DS} =50V V _{GS} =10V, R _g =2.5Ω	-	90	-	ns
t _r	Rise Time		-	140	-	ns
t _{d(OFF)}	Turn-Off Delay Time		-	220	-	ns
t _f	Fall Time		-	180	-	ns
Q _g	Total Gate Charge	I _D =35A, V _{DD} =100V V _{GS} =10V	-	400	-	nC
Q _{gs}	Gate to Source Charge		-	56	-	nC
Q _{gd}	Gate to Drain ("Miller") Charge		-	120	-	nC
I _{SD}	Continuous Source Current (Body Diode)		-	-	120	A
I _{SM}	Maximum Pulsed Current (Body Diode)		-	-	480	A
V _{SD}	Diode Forward Voltage	I _S =35A, V _{GS} =0V	-	-	1.2	V
t _{rr}	Reverse Recovery Time	I _S =30A, T _j =25°C, V _{DD} =50V diF/dt=100A/μs, V _{GS} =0V	-	240	-	ns
Q _{rr}	Reverse Recovery Charge		-	1.1	-	uC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. The E_{AS} data shows Max rating. I_{AS}=70A, R_G=25Ω, V_{DD}=50V, V_{GS}=10V, Starting T_J=25°C.
3. The test condition is Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%.
4. The power dissipation is limited by 150°C 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.

5. Package Dimensions

TO-247 Package



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	15.0	16.0
B	20.0	21.0
C	41.0	42.0
D	5.0	6.0
E	4.0	5.0
F	2.5	3.5
G	1.75	2.5
H	3.0	3.5
I	8.0	10.0
J	4.9	5.1
K	1.9	2.1
J	4.9	5.1
K	1.9	2.1
L	3.5	4.0
M	4.75	5.25
N	2.0	3.0
O	0.55	0.75
P	Typ 5.08	
Q	1.2	1.3