

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

Excellent $R_{DS(ON)}$
Planar Technology

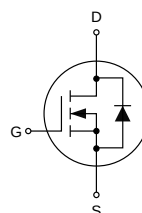
Applications

Uninterruptible Power Supply
Power Factor Correction

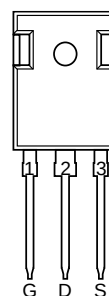
Quick reference

$V_{DS} = 300\text{ V}$
 $I_D = 100\text{ A}$
 $P_D = 790\text{ W}$
 $R_{DS(ON)} \leq 50\text{ m}\Omega @ V_{GS}=10\text{V}$ (Type: 44 m Ω)

Schematic Diagram



Pin Assignment



Package Marking and Ordering Information

Product Name	Package	Marking	Reel Size	Tape Width	Quantity
KJ90N30P	TO-247	KJ90N30P	-	-	300

2. Absolute Maximum Ratings (T_c=25°C unless otherwise noted)

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	300	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Continuous Drain Current	100	A
I_{DM}	Pulsed Drain Current	300	A
P_D	Power Dissipation	790	W
E_{AS}	Single Pulse Avalanche Energy	3000	mJ
I_{AS}	Avalanche Current	90	A
E_{AR}	Repetitive Avalanche Energy	520	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55~150	°C
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	40	°C/W
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.18	°C/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _D =250 μA	300	330	-	V
V _{GS(th)}	Gate-Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μA	2.0	3.0	4.0	V
I _{GSS}	Gate-Source Leakage	V _{DS} =0 V, V _{GS} =±20 V	-	-	±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =250 V, V _{GS} =0 V	-	-	1	μA
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =10 V, I _D =30 A	-	44	50	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25 V, V _{GS} =0 V, f=1.0 MHz	-	19000	-	pF
C _{oss}	Output Capacitance		-	1760	-	
C _{rss}	Reverse Transfer Capacitance		-	490	-	
R _G	Gate resistance	f=1.0 MHz open drain	-	0.88	-	Ω
Gate Charge Characteristics						
Q _g	Total Gate Charge	V _{DS} =250 V, V _{GS} =10 V, I _D =90 A	-	660	-	nC
Q _{gs}	Gate-Source Charge		-	110	-	
Q _{gd}	Gate-Drain Charge		-	365	-	
t _{d(on)}	Turn-on Delay Time	V _{DD} =150 V, V _{GS} =10 V, I _D =90A, R _G =25 Ω	-	40	-	ns
t _r	Turn-on Rise Time		-	180	-	
t _{d(off)}	Turn-off Delay Time		-	175	-	
t _f	Turn-off Fall Time		-	66	-	
Diode Characteristics						
I _{SD}	Continuous Source Current	T _C =25°C	-	-	90	A
I _{SM}	Pulsed Diode Forward Current		-	-	300	A
V _{SD}	Diode Forward Voltage ³	V _{GS} =0V, I _{SD} =30 A, V _{GS} =0V	-	-	1.4	V
t _{rr}	Reverse Recovery Time	V _{DD} =150 V, V _{GS} =0 V,	-	485	-	ns
Q _{rr}	Reverse Recovery Charge	I _S =30 A, diF/dt=100 A/μs	-	10	-	μC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2 OZ copper.
2. The E_{AS} data shows Max. rating. I_{AS}=80 A, V_{DD}=50 V, R_G=25 Ω, Starting T_J=25°C
3. The test condition is Pulse Test: Pulse width ≤ 300 μs, 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.

4. Typical Characteristics

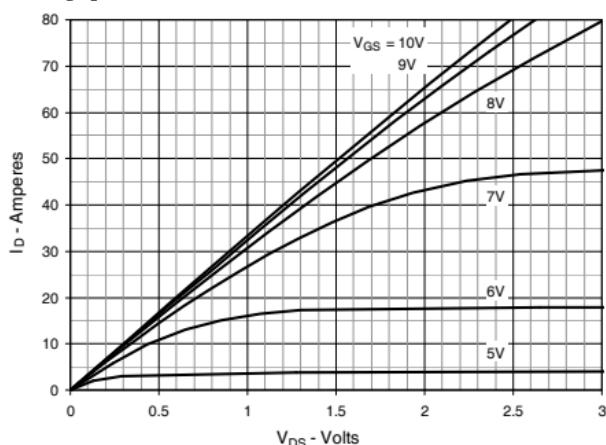


Figure 1. Output Characteristics

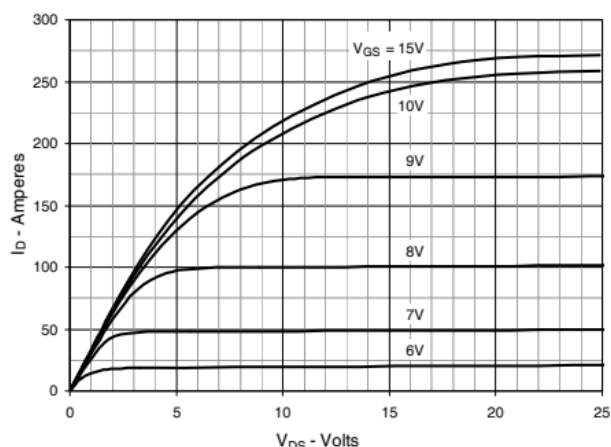


Figure 2. Extended Output Characteristics

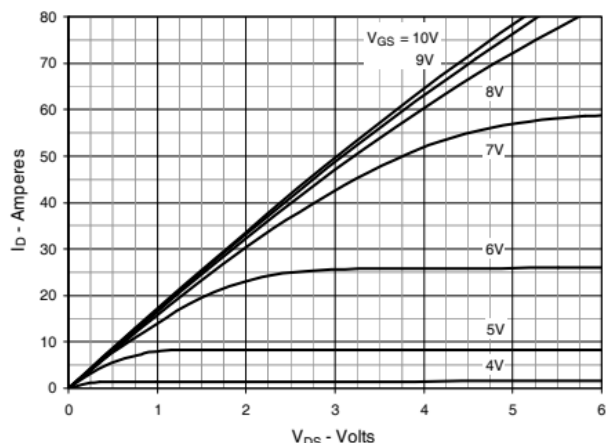


Figure 3. Output Characteristics

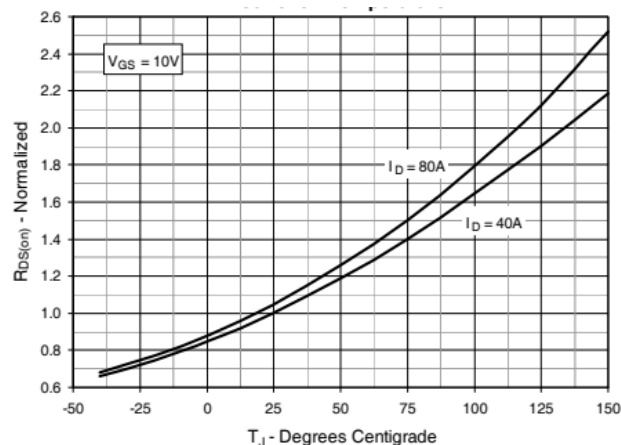


Figure 4. $R_{DS(on)}$ Normalized to $I_D=40A$ Value vs. Junction Temperature

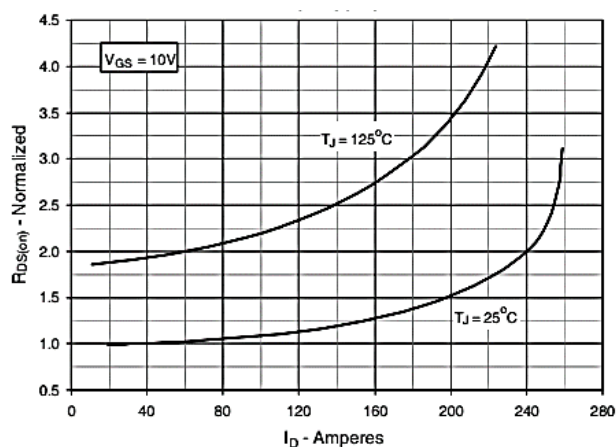


Figure 5. $R_{DS(on)}$ Normalized to $I_D=40A$ Value vs. Drain Current

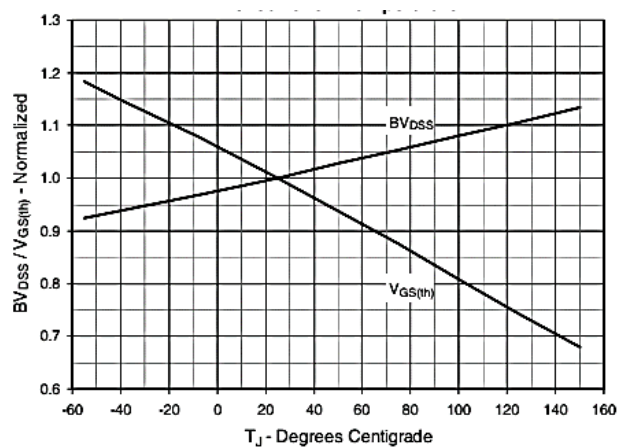


Figure 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

4. Typical Characteristics (cont.)

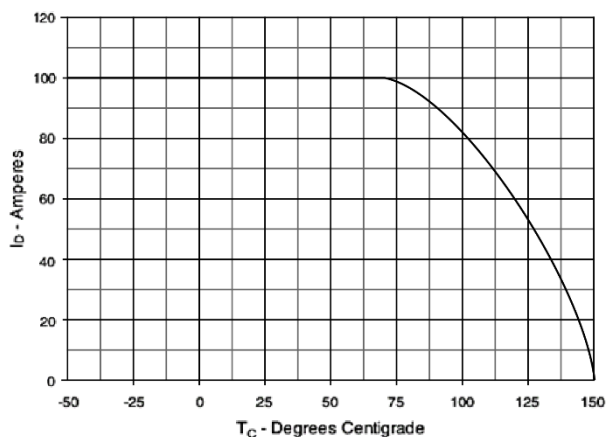


Figure 7. Transconductance

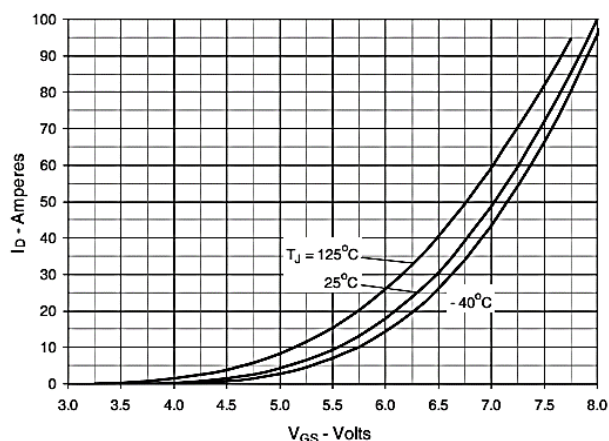


Figure 8. Forward Voltage Drop of Intrinsic Diode

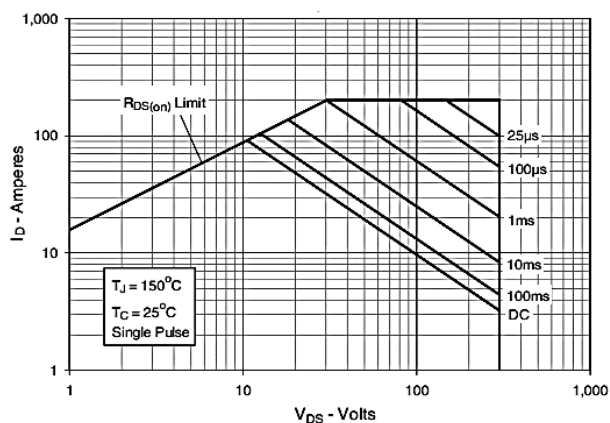


Figure 9. Forward-Bias Safe Operating Area

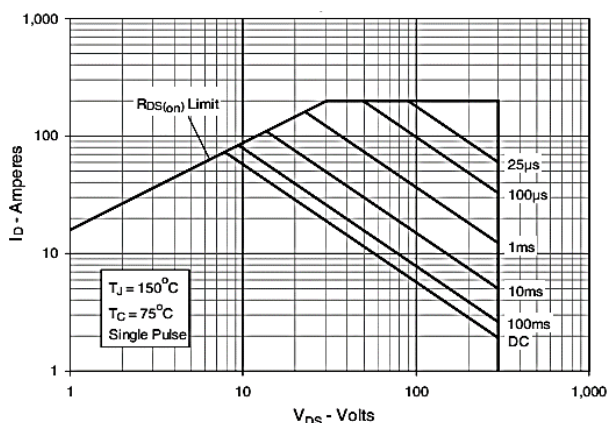


Figure 10. Forward-Bias Safe Operating Area

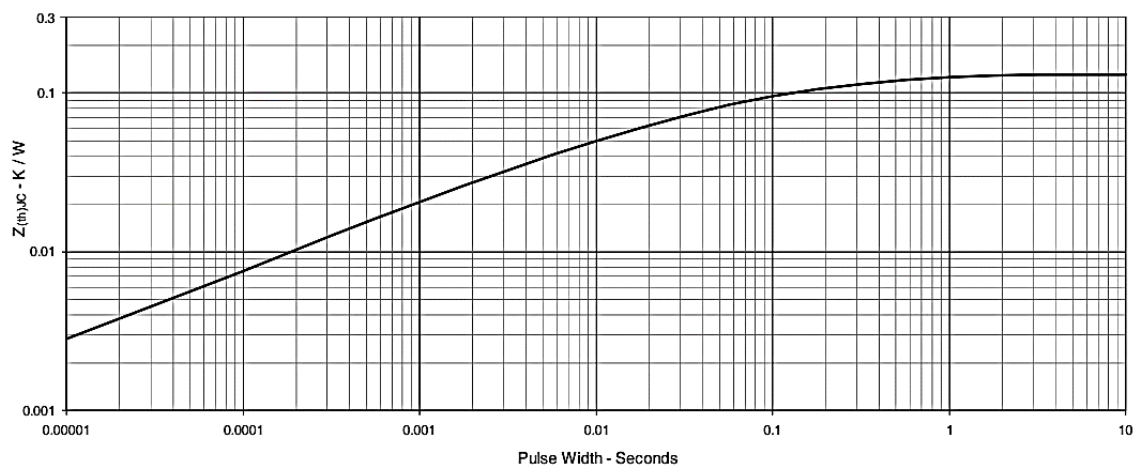
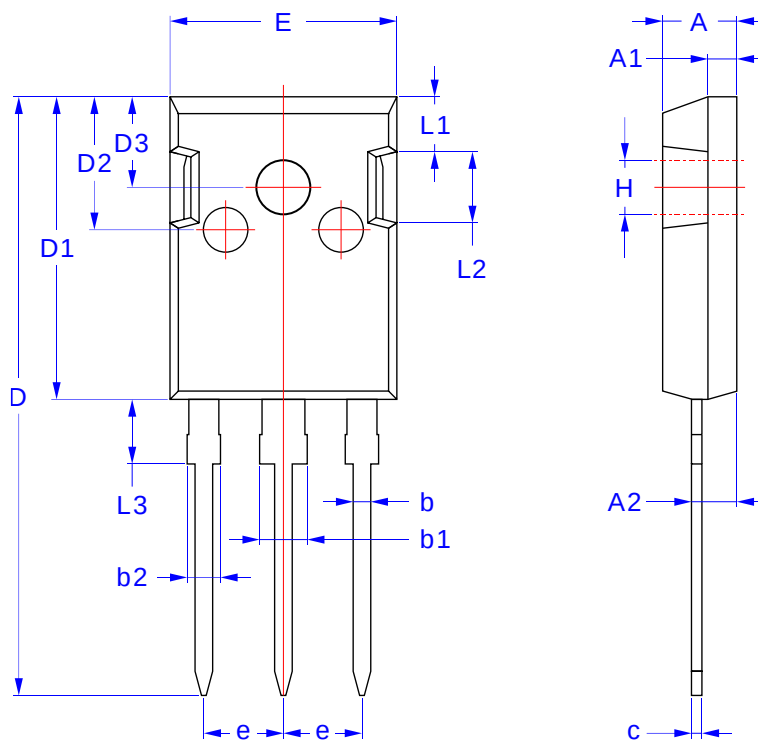


Figure 11. Maximum Transient Thermal Impedance

5. Package Mechanical Data

TO-247 Package



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	4.90	5.10
A1	1.90	2.10
A2	2.00	3.00
b	0.55	0.75
b1	2.50	3.50
b2	1.75	2.50
c	1.20	1.30
D	41.00	42.00
D1	20.00	21.00
D2	8.00	10.00
D3	5.00	6.00
E	15.00	16.00
e	TYP 5.08	
H	3.00	3.50
L1	3.50	4.00
L2	4.75	5.25
L3	4.00	5.00