

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

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

Applications

- DC/DC Converter
- LED Backlighting
- Power Management Switches

Quick reference

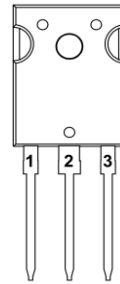
- $V_{DS} = 100V$
- $I_D = 220A$
- $R_{DS(ON)} < 2.8m\Omega$ @ $V_{GS} = 10V$ (Type: 2.1m Ω)

Pin Description

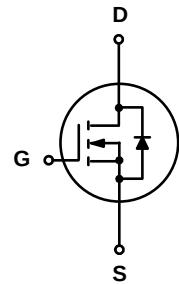
Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

Simplified Outline

Symbol



Top View
TO-247-3L



Package Marking and Ordering Information

Product Name	Package	Marking		Reel Size	Tape width	Quantity
KJ220N10P	TO-247-3L	220N10 XXXXYY	XXXXYY: Date Code	-	-	1000

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

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS}@10V$	220	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS}@10V$	180	A
I_{DM}	Pulsed Drain Current	840	A
E_{AS}	Single Pulse Avalanche Energy ³	500	mJ
I_{AS}	Avalanche Current	106.8	A
$P_D@T_C=25^\circ C$	Power Dissipation ⁴	296	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55~150	°C
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	0.42	°C/ W
$R_{\theta JC}$	Thermal Resistance Junction-Case	40	°C/ W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	100	-	-	V
I _{GSS}	Gate-body Leakage current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
I _{DSS}	Zero Gate Voltage Drain Current, T _J =25°C	V _{DS} =100V, V _{GS} =0V	-	-	1	μA
I _{DSS}	Zero Gate Voltage Drain Current, T _J =100°C		-	-	100	
V _{GS(th)}	Gate-Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2.0	2.9	4.0	V
R _{DS(on)}	Drain-Source on-Resistance ²	V _{GS} =10V, I _D =20A	-	2.1	2.8	mΩ
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, Frequency=1MHz	-	8800	-	pF
C _{oss}	Output Capacitance		-	1290	-	
C _{rss}	Reverse Transfer Capacitance		-	40	-	
R _g	Total Gate Charge	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	3.4	-	Ω
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =50V, I _D =20A	-	150	-	nC
Q _{gs}	Gate-Source Charge		-	34	-	
Q _{gd}	Gate-Drain Charge		-	26	-	
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =50V, R _G =3Ω, I _D =20A	-	30.8	-	ns
t _r	Turn-on Rise Time		-	26	-	
t _{d(off)}	Turn-off Delay Time		-	68	-	
t _f	Turn-off Fall Time		-	12.4	-	
V _{SD}	Diode Forward Voltage ²	I _F =20A, V _{GS} =0V	-	-	1.2	V
I _S	Continuous Source Current ^{1, 5}	V _G =V _D =0V, Force Current	-	-	190	A
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, dI/dt=100A/μs	-	110	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	202	-	nC

Notes:

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3、The E_{AS} data shows Max. rating. The test condition is V_{DD}=50V, V_{GS}=10V, L=0.4mH, I_{AS}=64A
- 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

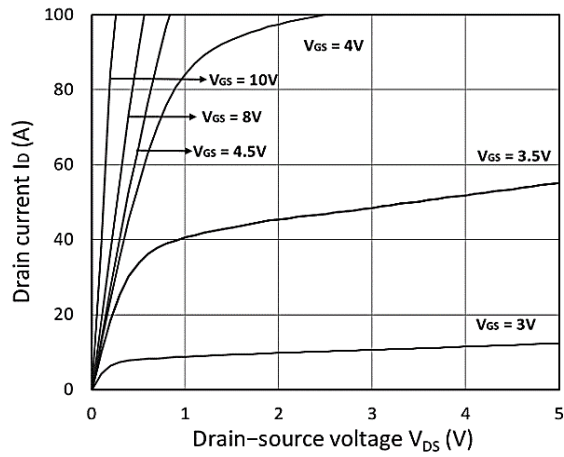


Figure 1. Output Characteristics

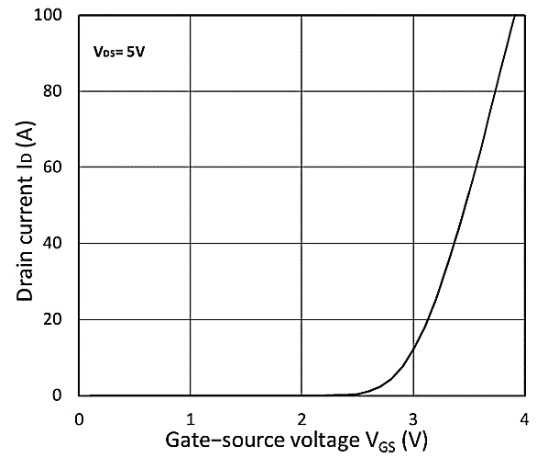


Figure 2. Transfer Characteristics

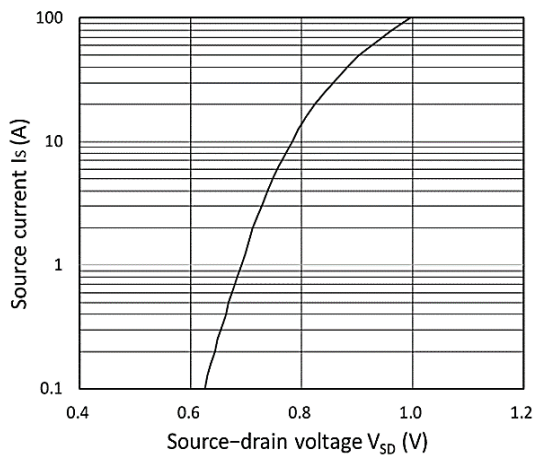


Figure 3. Forward Characteristics of Reverse

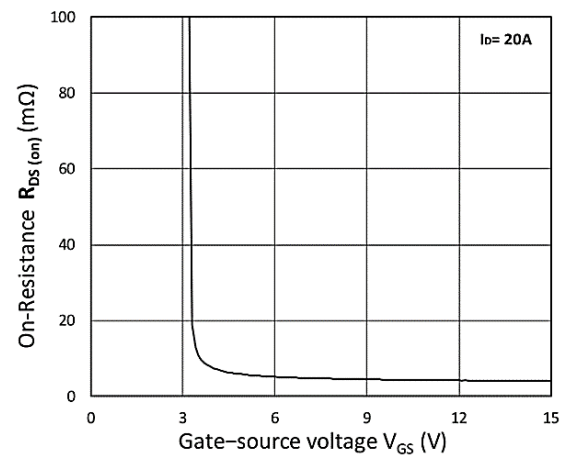


Figure 4. $R_{DS(on)}$ vs. V_{GS}

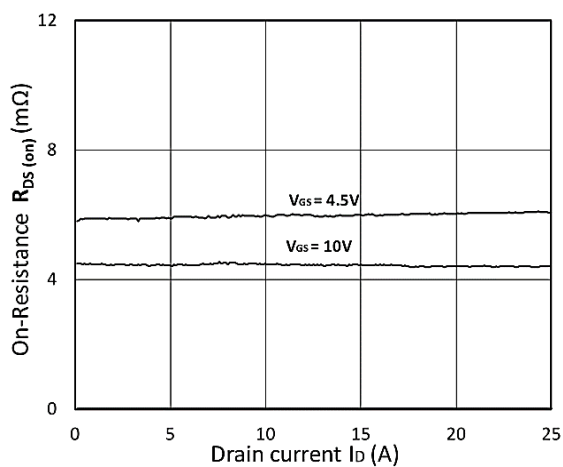


Figure 5. $R_{DS(on)}$ vs. I_D

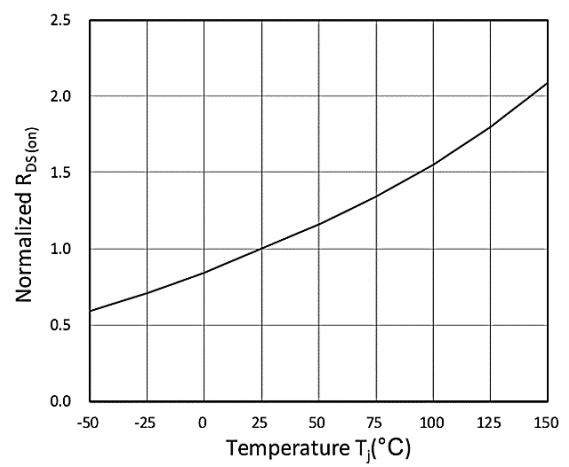


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

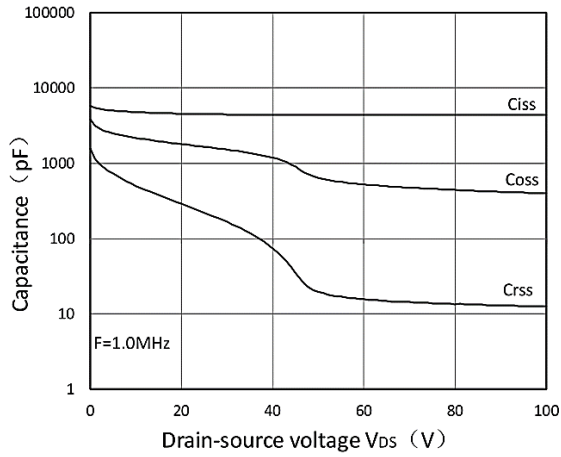


Figure 7. Capacitance Characteristics

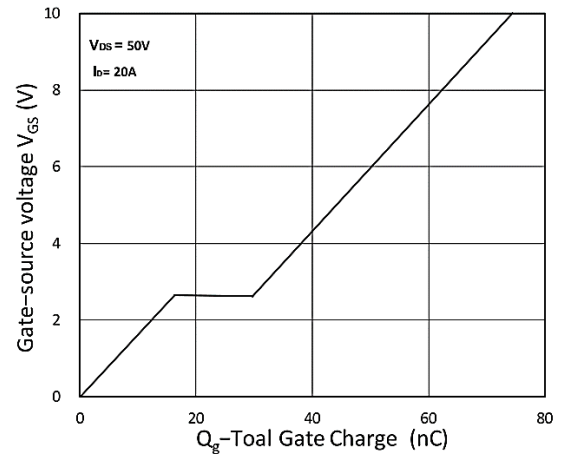


Figure 8. Gate Charge Characteristics

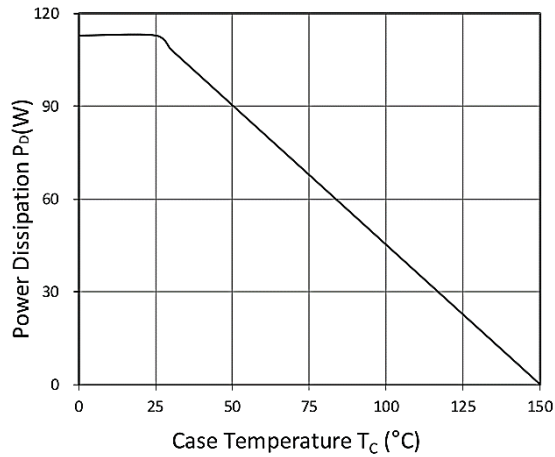


Figure 9. Power Dissipation

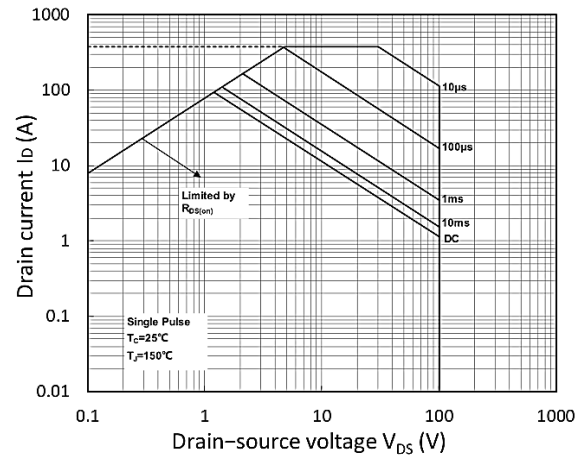


Figure 10. Safe Operating Area

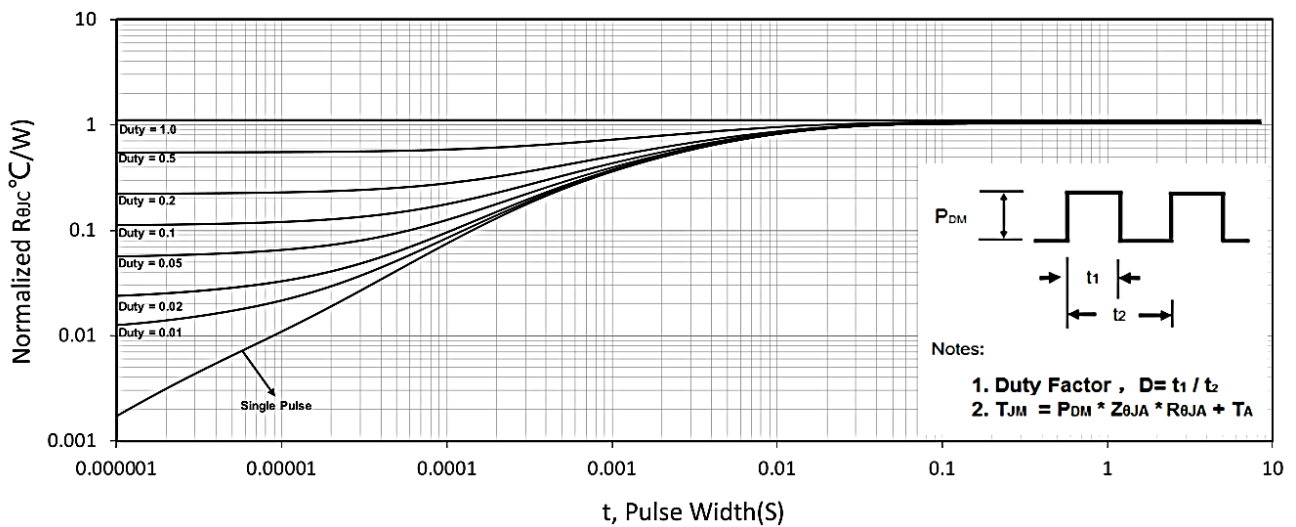
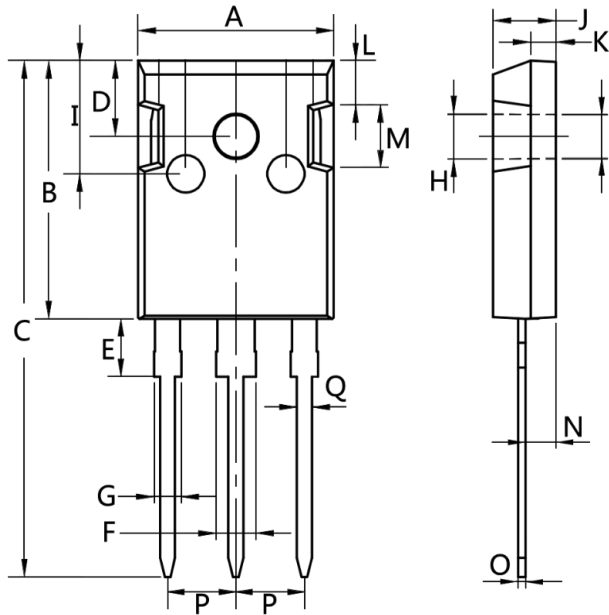


Figure 11. Normalized Maximum Transient Thermal Impedance

5.Package Mechanical Data

TO-247-3L



Dim.	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