

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

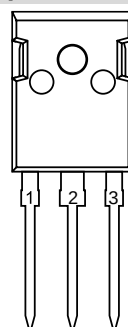
Quick reference

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

Pin Description

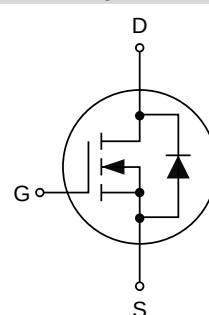
Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

Simplified Outline



Top View
TO-247-3L

Symbol



Package Marking and Ordering Information

Product Name	Package	Marking	Reel size	Tape width	Quantity (pcs)
KJ220N10P	TO-247-3L	KJ220N10P XXXXXX	-	-	600

2. Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS}@10\text{V}$	220	A
$I_D @ T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS}@10\text{V}$	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
$P_D @ T_C=25^\circ\text{C}$	Power Dissipation ⁴	296	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55~150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	0.42	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case	40	$^\circ\text{C/W}$

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

Notes:

1. Surface mounted on a 1 inch² FR-4 board with 2 OZ copper.
2. Pulse width ≤ 300 μs, duty cycle ≤ 2%.
3. E_{AS} test condition is V_{DD}=50 V, V_{GS}=10 V, L=0.4 mH, I_{AS}=64 A.
4. P_D 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

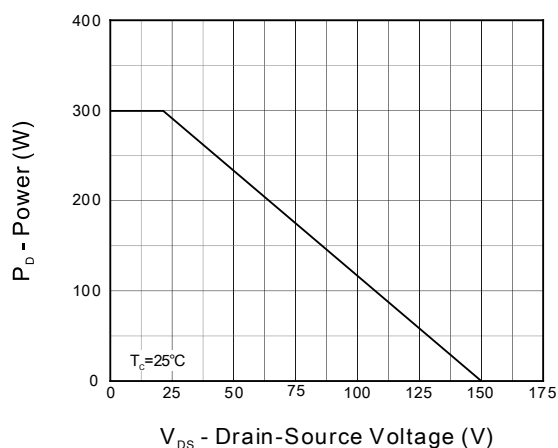


Figure 1. Output Characteristics

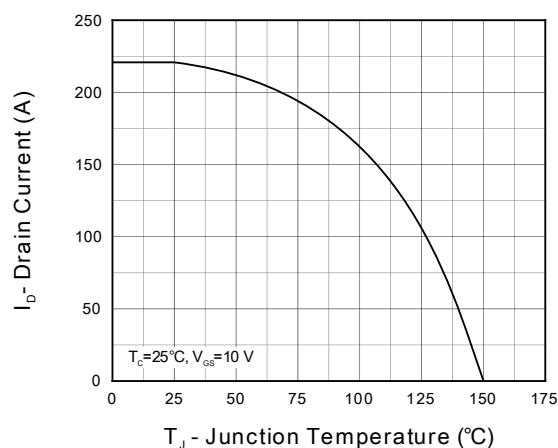


Figure 2. Current Capability

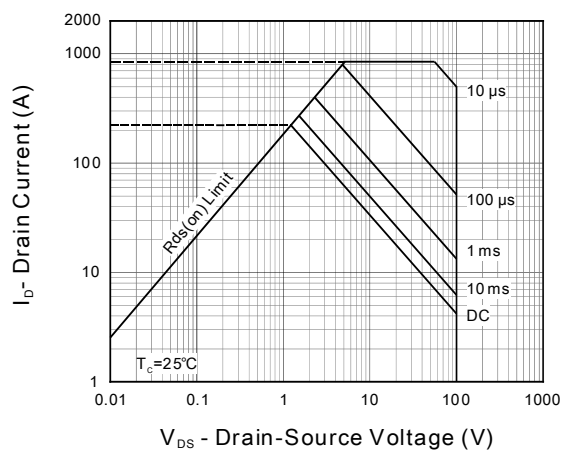


Figure 3. Safe Operation Area

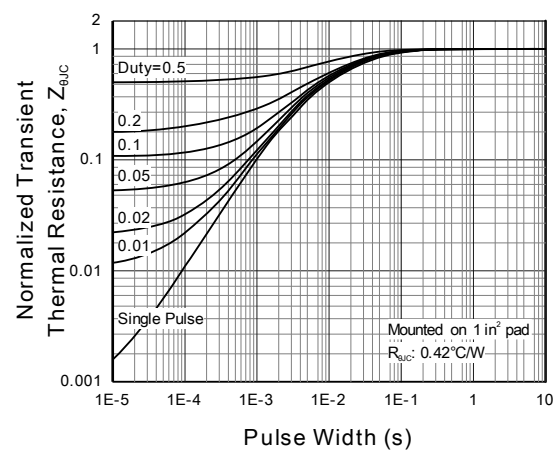


Figure 4. Transient Thermal Impedance

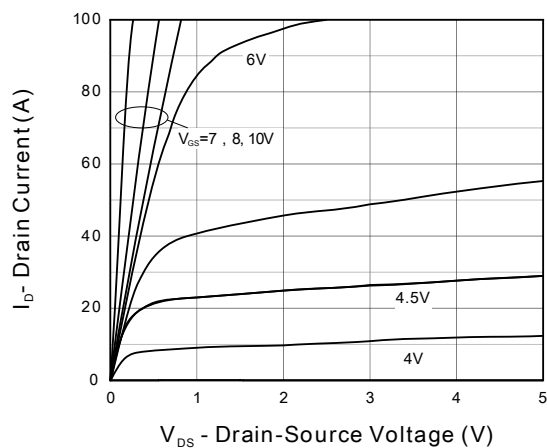


Figure 5. Output Characteristics

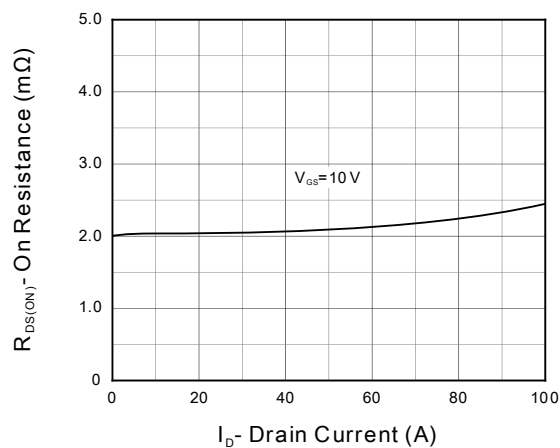


Figure 6. On Resistance

4. Typical Characteristics (cont.)

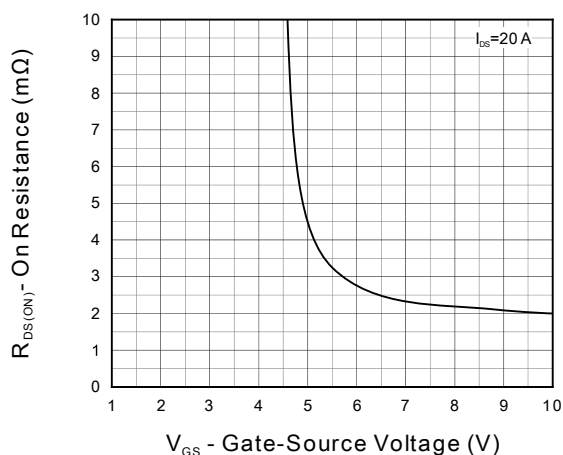


Figure 7. Transfer Characteristics

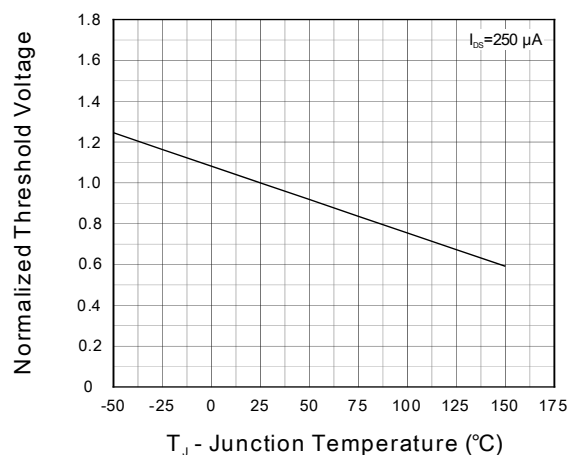


Figure 8. Normalized Threshold Voltage

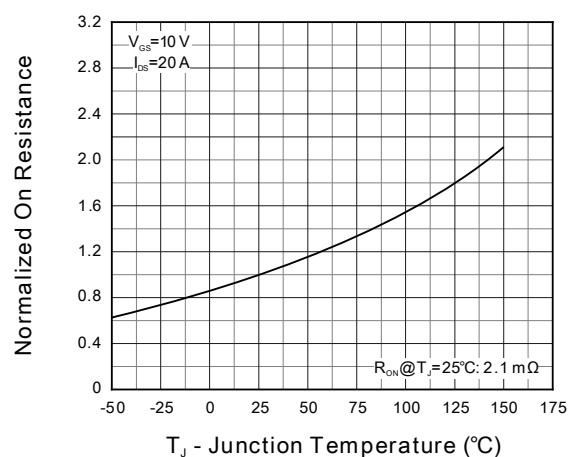


Figure 9. Normalized On Resistance

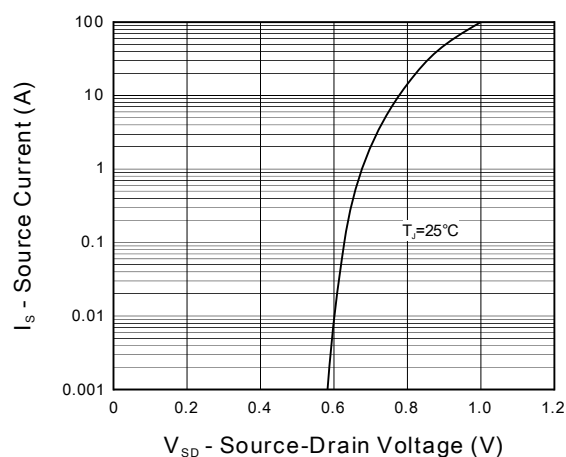


Figure 10. Diode Forward Current

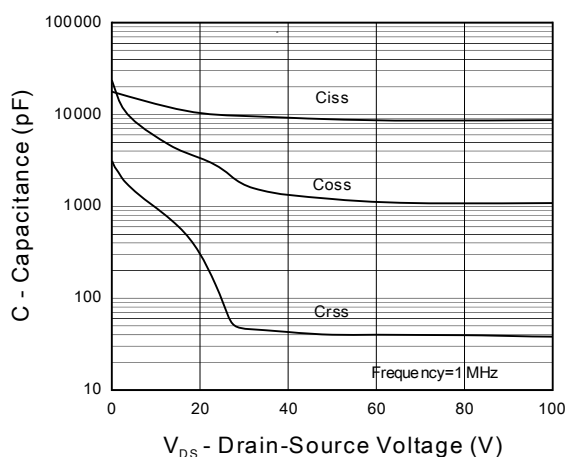


Figure 11. Capacitance

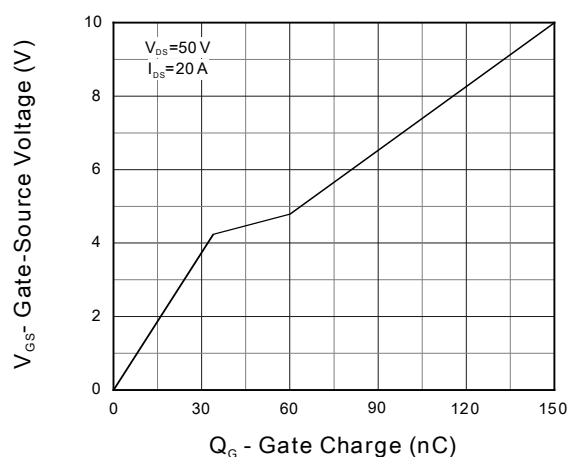
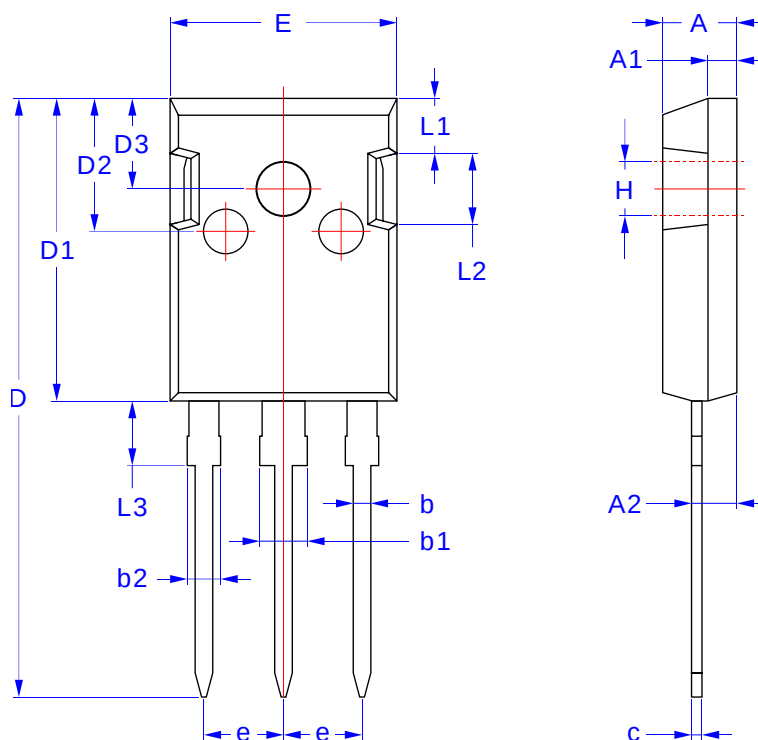


Figure 12. Gate Charge

5. Package Mechanical Data

TO-247-3L Package



Symbol	Dimensions in Millimeters	
	MIN	MAX
A	4.90	5.10
A1	1.90	2.10
A2	2.00	3.00
b	1.20	1.30
b1	2.50	3.50
b2	1.75	2.50
c	0.55	0.75
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