

N-Channel Enhancement Mode MOSFET

1. Product Information

Features

- Fast Switching Capability
- Excellent $R_{DS(ON)}$
- Low Gate Charge

Pin Description

Pin	Description
1,2,3	Gate(G)
4	Drain(D)
5,6,7,8	Source(S)

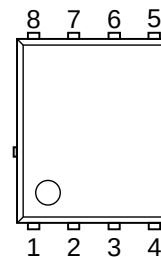
Applications

- Uninterruptible Power Supply
- Load Switch
- Automotive Lighting

Quick reference

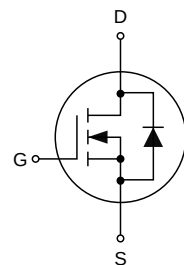
- $V_{DS} = 200\text{ V}$
- $I_D = 50\text{ A}$
- $R_{DS(ON)} \leq 52\text{ m}\Omega$ @ $V_{GS} = 10\text{ V}$ (Type: 43 m Ω)

Simplified Outline



Top View
PDFN5x6-8L

Symbol



Package Marking and Ordering Information

Product Name	Package	Marking	Reel size	Tape width	Quantity (pcs)
KJ50N20G	PDFN 5×6-8L	KJ50N20 XXXXYY	13"	12 mm	5000

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

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current Continuous, $T_C=25^\circ\text{C}$, $V_{GS}=10\text{ V}$	50	A
	Drain Current Continuous, $T_C=100^\circ\text{C}$, $V_{GS}=10\text{ V}$	35	A
I_{DM}	Pulsed Drain Current	200	A
E_{AS}	Single Pulse Avalanche Energy	279	mJ
P_D	Power Dissipation	52.5	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
R_{thJA}	Thermal Resistance, Junction-to-Ambient	28	$^\circ\text{C/W}$
R_{thJC}	Thermal Resistance, Junction-to-Case	2.0	$^\circ\text{C/W}$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _D =250 μA	200	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =200 V, V _{GS} =0 V	-	-	1	μA
		V _{DS} =200 V, T _J =75°C	-	-	10	
I _{GSS}	Gate-Source Leakage Current	V _{DS} =0 V, V _{GS} =±20 V	-	-	±100	nA
V _{GS(th)}	Gate-Source Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μA	2.5	3.5	4.5	V
R _{DS(ON)}	Drain-Source On-Resistance	V _{GS} =10 V, I _D =10 A	-	43	52	mΩ
R _g	Gate Resistance	f=1.0 MHz	-	1.0	-	Ω
C _{iss}	Input Capacitance	V _{DS} =100 V, V _{GS} =0 V, f=1.0 MHz	-	1455	-	pF
C _{oss}	Output Capacitance		-	114	-	
C _{rss}	Reverse Transfer Capacitance		-	9.2	-	
Q _g	Total Gate Charge	V _{DS} =100 V, V _{GS} =7.5 V, I _D =10 A	-	18.5	-	nC
Q _{gs}	Gate-Source Charge		-	6.5	-	
Q _{gd}	Gate-Drain Charge		-	6	-	
t _{d(on)}	Turn-on Delay Time	V _{DD} =100 V, V _{GEN} =10V, I _D =10 A, R _G =1 Ω, R _L =10 Ω,	-	11	-	ns
t _r	Turn-on Rise Time		-	19	-	
t _{d(off)}	Turn-off Delay Time		-	16	-	
t _f	Turn-off Fall Time		-	9	-	
I _S	Maximum Continuous Drain-Source Diode Forward Current		-	-	50	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	150	A
V _{SD}	Diode Forward Voltage	I _S =5 A	-	-	1.1	V
t _{rr}	Reverse Recovery Time	I _S =10 A, V _{GS} =0 V, dI/dt=100 A/μs	-	167	-	ns
Q _{rr}	Reverse Recovery Charge		-	574	-	μC

Note:

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. The test condition is V_{DD}=72 V, V_{GS}=10 V, I_{AS}=40 A, R_G=25 Ω, L=0.1 mH.
3. Pulse Test: Pulse width ≤ 300 μs, Duty cycle ≤ 2%.
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

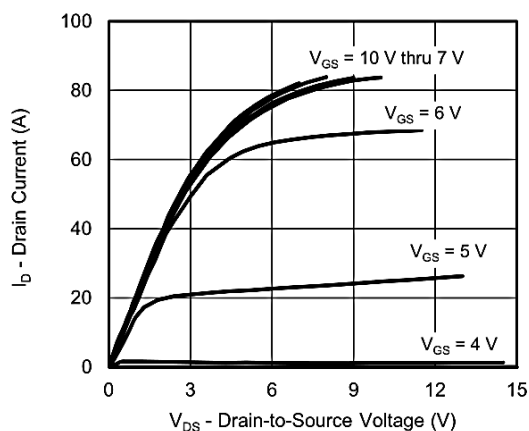


Figure1. Output Characteristics

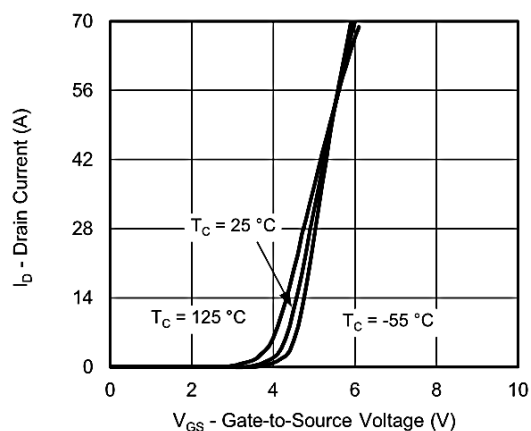


Figure 2. Transfer Characteristics

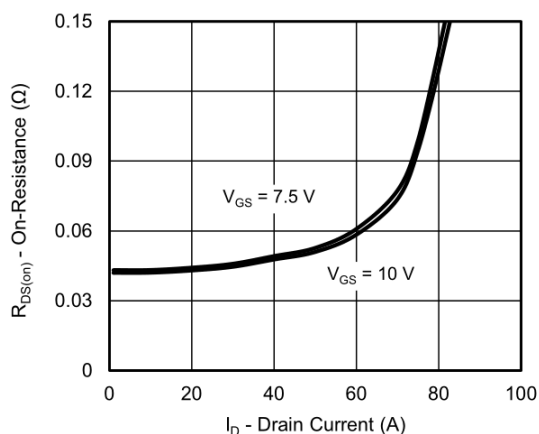


Figure 3. On-Resistance vs. Drain Current

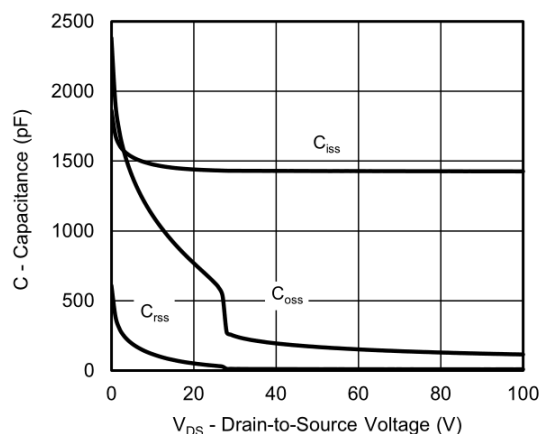


Figure 4. Capacitance

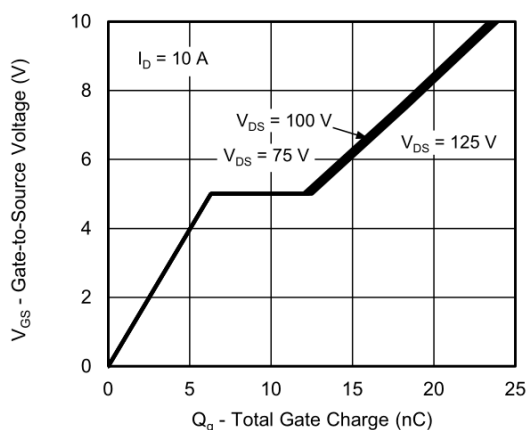


Figure 5. Gate Charge

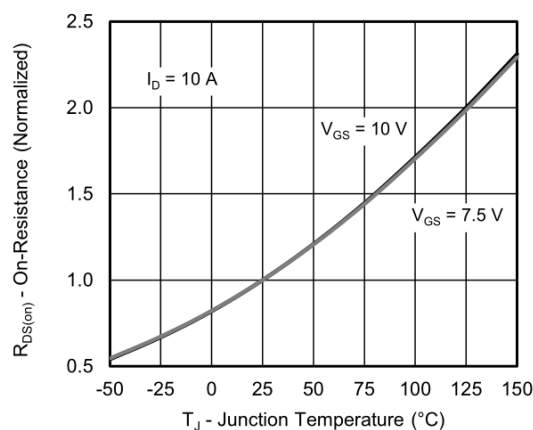


Figure 6. On-Resistance vs. Junction Temperature

4. Typical Characteristics (cont.)

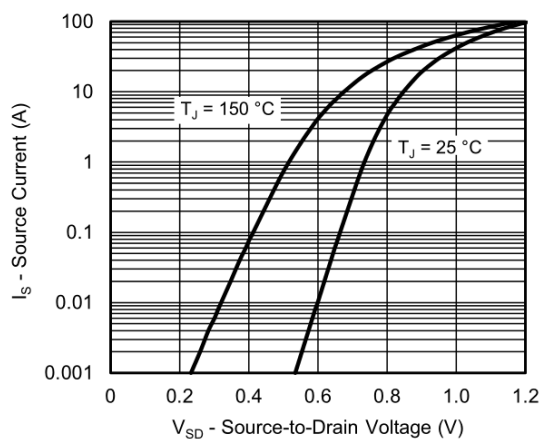


Figure 7. Source-Drain Diode Forward Voltage

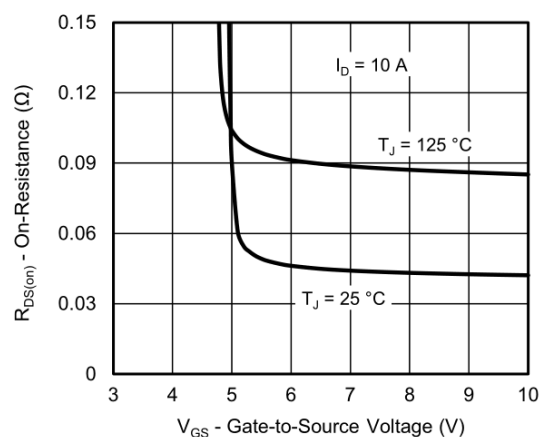


Figure 8. On-Resistance vs. Gate-to-Source Voltage

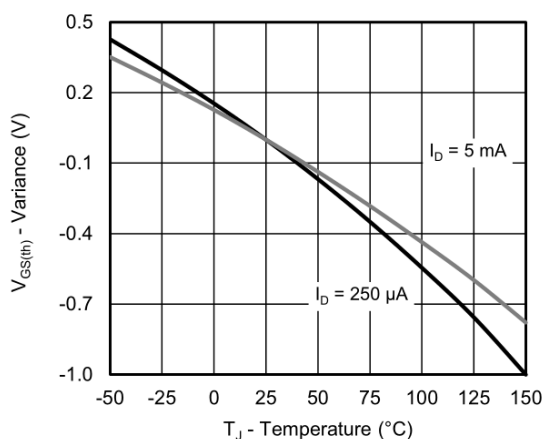


Figure 9. Threshold Voltage

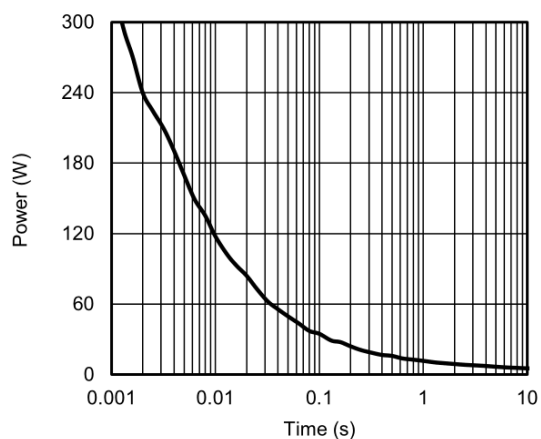


Figure 10. Single Pulse Power, Junction-to-Ambient

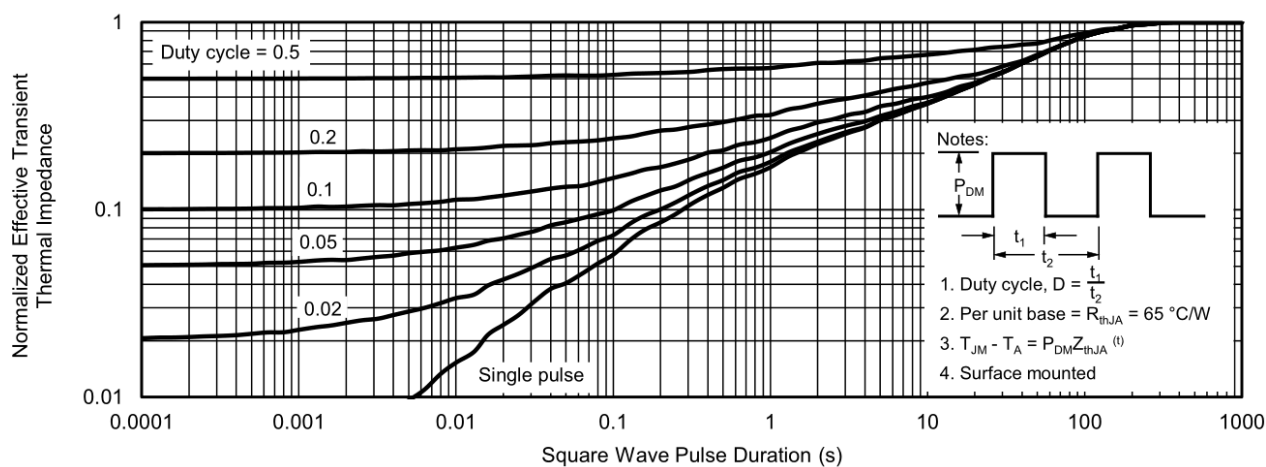
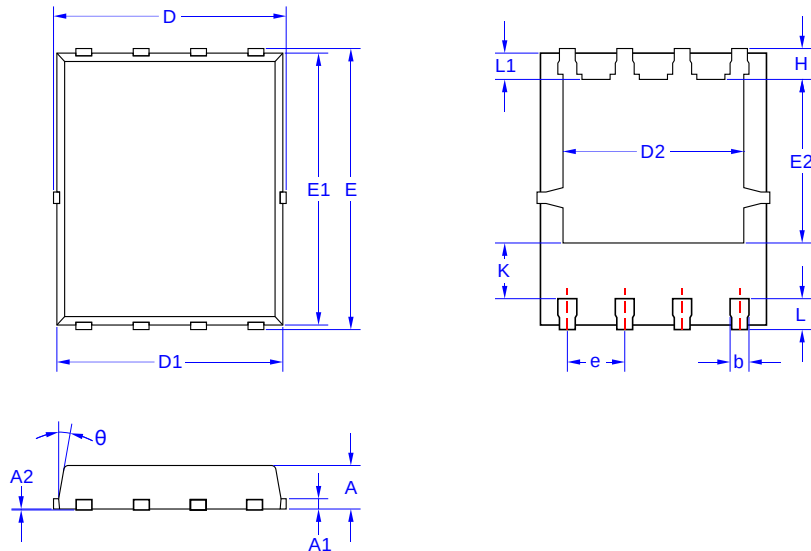


Figure 11. Normalized Thermal Transient Impedance, Junction-to-Ambient

5. Package Mechanical Data

PDFN 5×6-8L Package



Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A	0.900	-	1.100
A1	0.254 REF		
A2	0	-	0.050
b	0.350	-	0.450
D	4.944	-	5.096
D1	4.824	-	4.976
D2	3.910	-	4.110
E	5.974	-	6.126
E1	5.674	-	5.826
E2	3.375	-	3.575
e	1.270 TYP		
H	0.549	-	0.726
K	1.190	-	1.390
L	0.534	-	0.711
L1	0.424	-	0.576
θ	8°	-	12°