KSD20N10

100V N-Channel MOSFET

General Description

The KSD20N10 combines advanced trench MOSFET technology with a low resistance package to provide extremely low R_{DS}(ON). This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

Product Summary

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
100	70 at V_{GS} = 10 V	20
	84 at V_{GS} = 4.5 V	13

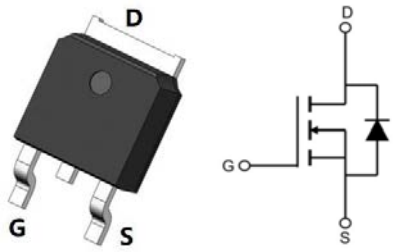
Features

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Applications

- Power switching application
- Hard switched and high frequency circuits

TO-252 Pin Configuration



Absolute Maximum Ratings **Tc=25℃ unless otherwise noted**

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	20	A
	Drain Current – Continuous (T_C=100℃)	14.5	A
I_{DM}	Drain Current – Pulsed[1]	60	A
P_D	Power Dissipation (T_C=25℃)	46	W
	Power Dissipation (T_C=100℃)	2	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62.3	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.75	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=80V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=10A	---	70	82	mΩ
		V_{GS}=4.5V , I_D=5A	---	84	96	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	2.0	3	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4	---	mV/℃
gfs	Forward Transconductance	V_{DS}=10V , I_S=5A	---	17	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=50V , V_{GS}=10V , I_D=10A	---	22.5	28	nC
Q_{gs}	Gate-Source Charge[2,3]		---	2.9	3.6	
Q_{gd}	Gate-Drain Charge[2,3]		---	8	9.6	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DS}=50V, R_L=6.4Ω V_{GS}=10V,R_G=3Ω	---	15	18	ns
T_r	Rise Time[2,3]		---	5	7	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	25	32	
T_f	Fall Time[2,3]		---	7	9	
C_{iss}	Input Capacitance	V_{DS}=50V , V_{GS}=0V , F=1MHz	---	830	1000	pF
C_{oss}	Output Capacitance		---	105		
C_{rss}	Reverse Transfer Capacitance		---	72		

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	20	A
I_{SM}	Pulsed Source Current		---	---	45	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristics (Curves)

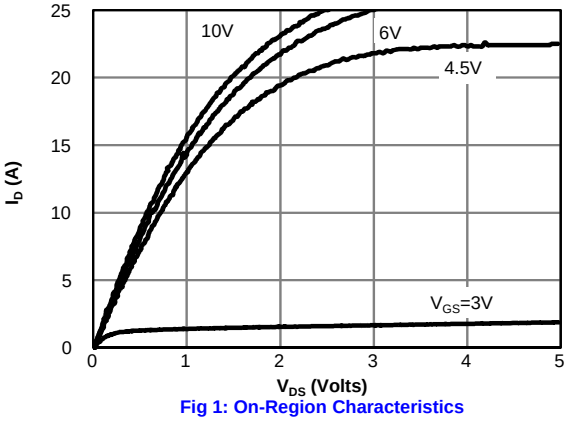


Fig 1: On-Region Characteristics

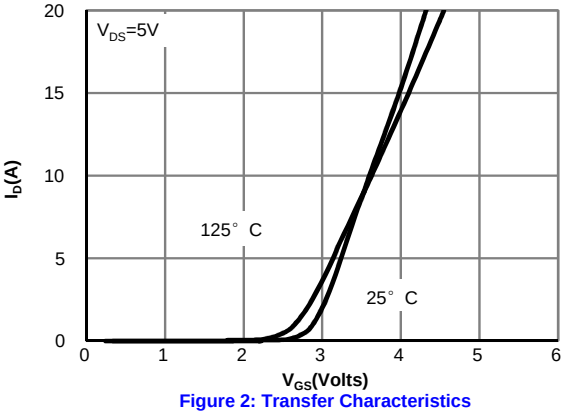


Figure 2: Transfer Characteristics

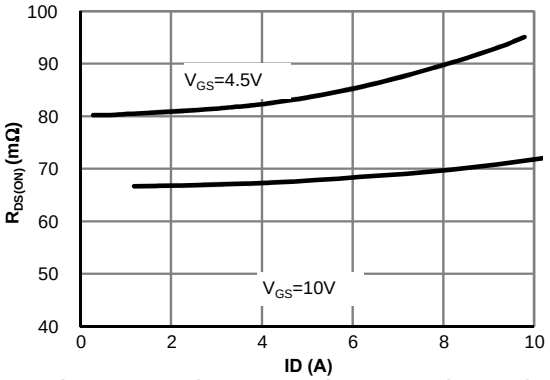


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

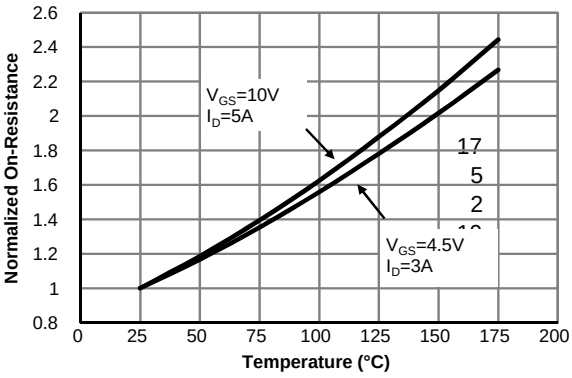


Figure 4: On-Resistance vs. Junction Temperature

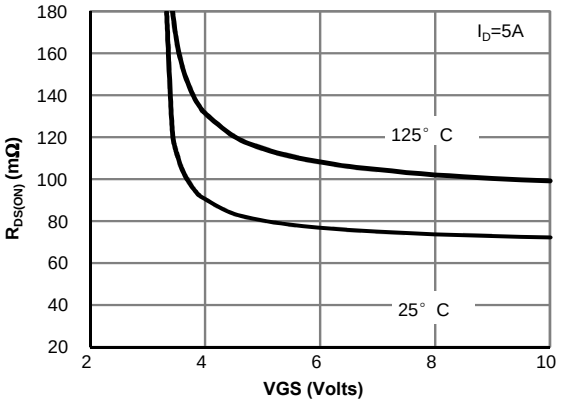


Figure 5: On-Resistance vs. Gate-Source Voltage

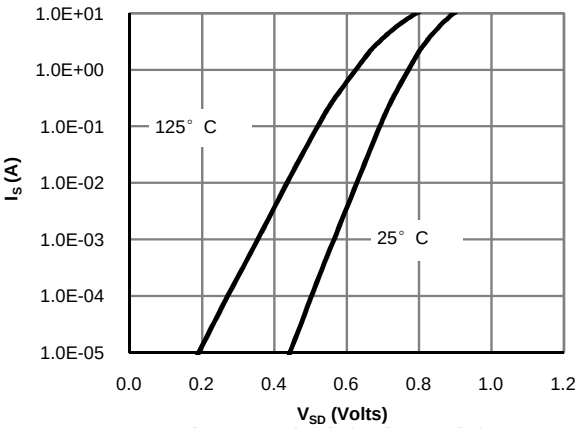


Figure 6: Body-Diode Characteristics

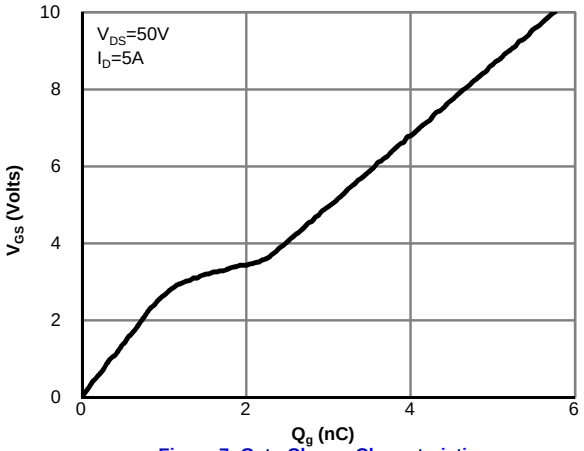


Figure 7: Gate-Charge Characteristics

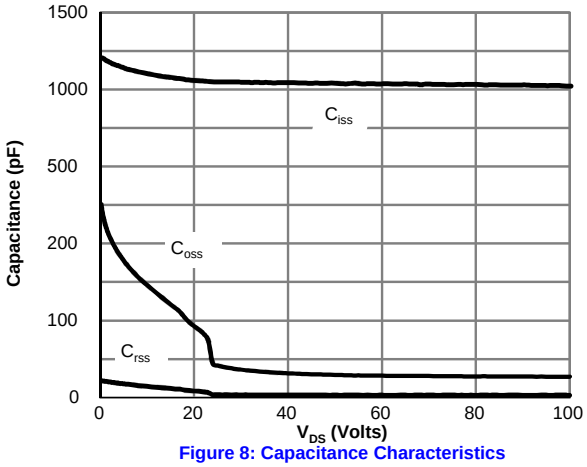


Figure 8: Capacitance Characteristics

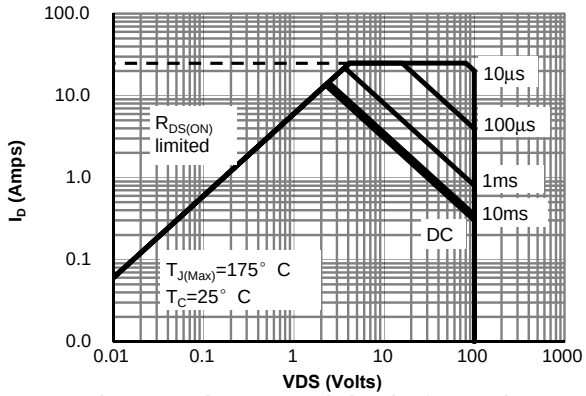


Figure 9: Maximum Forward Biased Safe Operating Area

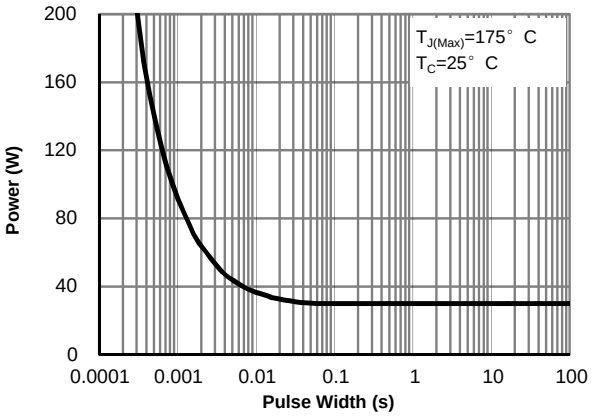


Figure 10: Single Pulse Power Rating Junction-to-Case

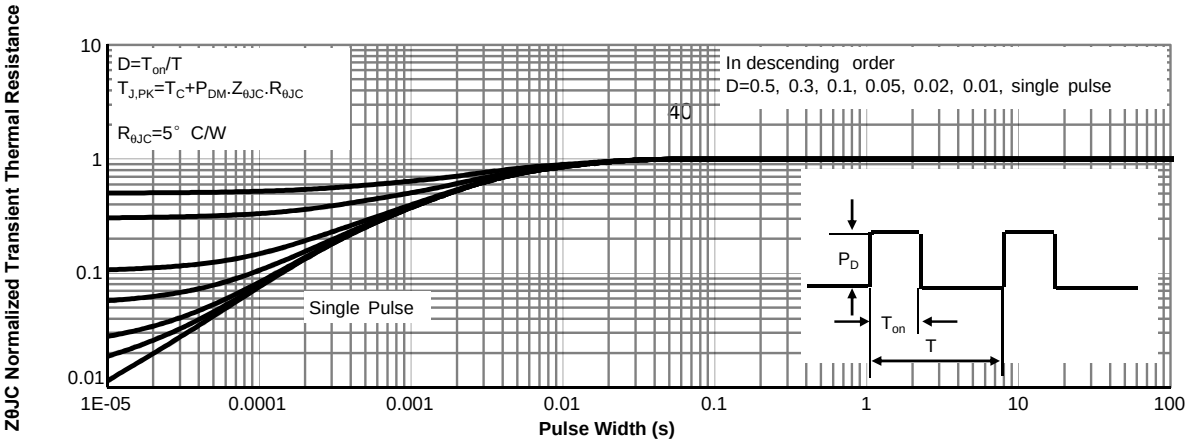


Figure 11: Normalized Maximum Transient Thermal Impedance

Disclaimer

1. Any and all Korsun Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your Korsun Semiconductor representative nearest you before using any Korsun Semiconductor products described or contained herein in such applications.

2.Korsun Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all Korsun Semiconductor products described or contained herein.

3. Specifications of any and all Korsun Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

4. Korsun Semiconductor CO.,LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

5.In the event that any or all Korsun Semiconductor products(including technical data, services described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

6. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of Korsun Semiconductor CO.,LTD.

7. Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. Korsun Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

8. Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the Korsun Semiconductor product that you intend to use.

9. This catalog provides information as of Sep.2010. Specifications and information herein are subject to change without notice.