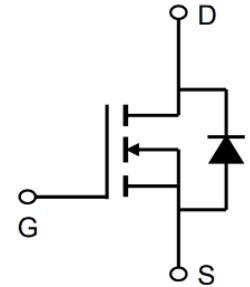


## 200V N-Channel Enhancement Mode MOSFET

### Description

The HN50N20PM is silicon N-channel Enhanced VDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency.



### General Features

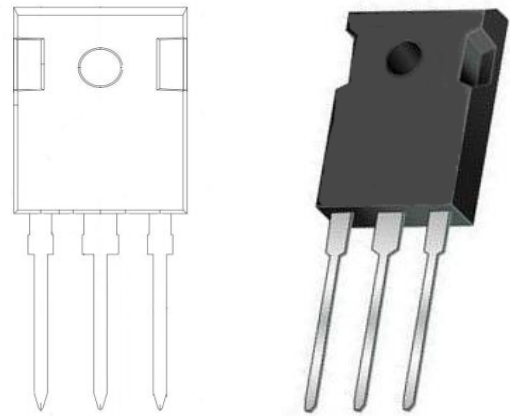
$V_{DS} = 200V, I_D = 50A$

$R_{DS(ON)} < 60m\Omega @ V_{GS} = 10V$

### Application

Power amplifier

motor drive



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HN50N20PM	TO-247-3L	HN50N20PM XXX YYYY	600

### Absolute Maximum Ratings $T_C = 25^\circ C$ , unless otherwise noted

Symbol	Parameter	Rating	Units
VDSS	Drain-Source Voltage	200	V
ID	Continuous Drain Current	50	A
IDM	Pulsed Drain Current	160	A
VGSS	Gate-Source Voltage	$\pm 20$	V
EAS	Single Pulse Avalanche Energy	191	mJ
IAS	Avalanche Current	31	A
EAR	Repetitive Avalanche Energy	124	mJ
PD	Power Dissipation ( $T_C = 25^\circ C$ )	104	W
TJ, Tstg	Operating Junction and Storage Temperature Range	-55~+150	$^\circ C$
RthJC	Thermal Resistance, Junction-to-Case	1.2	$^\circ C/W$
RthJA	Thermal Resistance, Junction-to-Ambient	60	$^\circ C/W$

## 200V N-Channel Enhancement Mode MOSFET

**Electrical Characteristics** at  $T_j=25\text{ }^\circ\text{C}$  unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	200	--	--	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 200V, V_{GS} = 0V, T_J = 25^\circ C$	--	--	1	$\mu A$
$I_{DSS}$		$V_{DS} = 200V, V_{GS} = 0V, T_J = 125^\circ C$	--	--	100	
$I_{GSS}$	Gate-Source Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	--	--	$\pm 100$	nA
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	--	4.0	V
$R_{DS(on)}$	Drain-Source On-Resistance (Note4)	$V_{GS} = 10V, I_D = 20A$	--	50	60	m $\Omega$
gfs	Forward Transconductance (Note4)	$V_{DS} = 25V, I_D = 20A$	--	16	--	S
$C_{iss}$	Input Capacitance	$V_{GS} = 0V,$ $V_{DS} =$ $25V, f =$ $1.0MHz$	--	2800	--	$\mu F$
$C_{oss}$	Output Capacitance		--	355	--	
$C_{rss}$	Reverse Transfer Capacitance		--	101	--	
$Q_g$	Total Gate Charge	$V_{DD} = 160V, I_D = 40A,$	--	154	--	nC
$Q_{gs}$	Gate-Source Charge		--	13	--	
$Q_{gd}$	Gate-Drain Charge		--	58	--	
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 160V, I_D = 40A,$ $V_{GS} = 15V, R_G = 25\Omega$	--	46	--	ns
$t_r$	Turn-on Rise Time		--	54	--	
$t_{d(off)}$	Turn-off Delay Time		--	360	--	
$t_f$	Turn-off Fall Time		--	96	--	
$I_{SD}$	Continuous Source Current	Integral PN-diode in MOSFET	--	--	40	A
$I_{SM}$	Pulsed Source Current		--	--	160	
$V_{SD}$	Body Forward Voltage	$I_S = 20A, V_{GS} = 0V$	--	--	1.4	V
$t_{rr}$	Reverse Recovery Time	$V_{GS} = 0V, I_F = 10A,$ $di_F/dt = 100A/\mu s$	--	152	--	ns
$Q_{rr}$	Reverse Recovery Charge		--	1	--	$\mu C$

**Notes:**

- 1、Repetitive Rating: Pulse width limited by maximum junction temperature
- 2、L = 1mH,  $V_{DD} = 30V$ ,  $R_G = 25\ \Omega$ , Starting  $T_J = 25\text{ }^\circ\text{C}$
- 3、Pulse Test: Pulse width  $\leq 300\mu s$ , Duty Cycle  $\leq 1\%$

## 200V N-Channel Enhancement Mode MOSFET

### Electrical Characteristics Diagrams

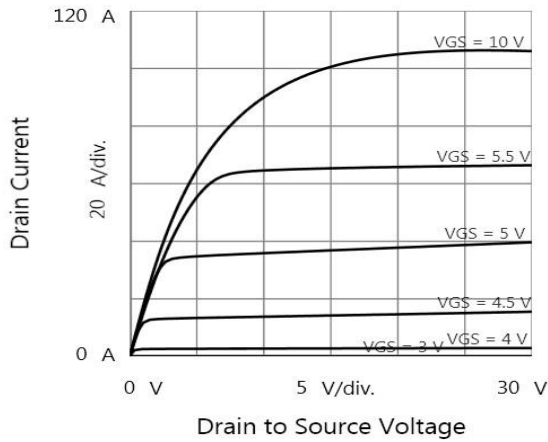


Figure 1. Output Characteristics ( $T_J = 25^\circ\text{C}$ )

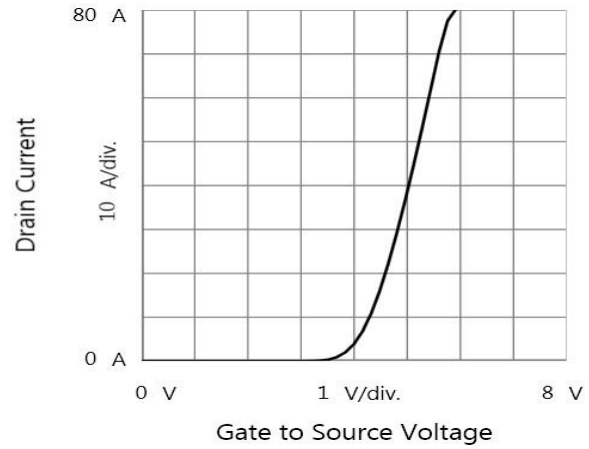


Figure 2. Transfer Characteristics

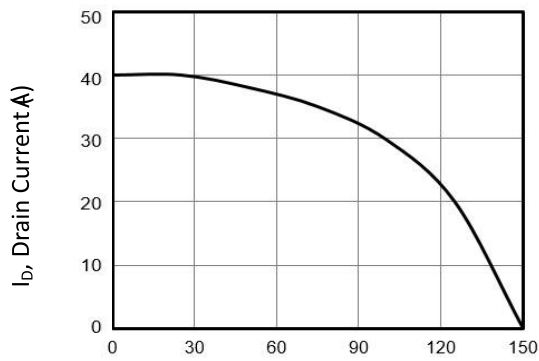


Figure 5. Drain to Source Voltage vs. Gate to Source Voltage

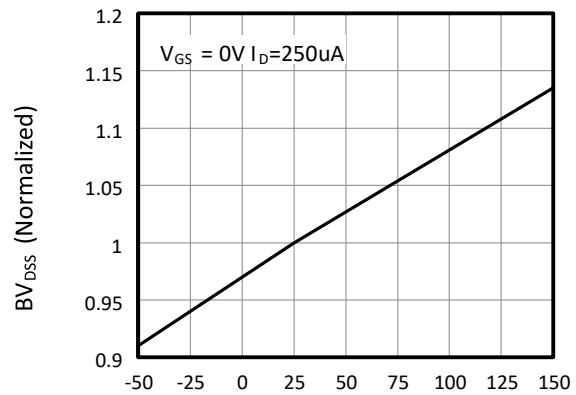
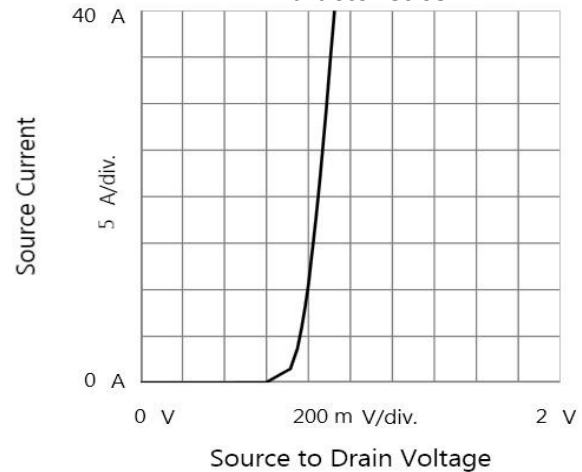
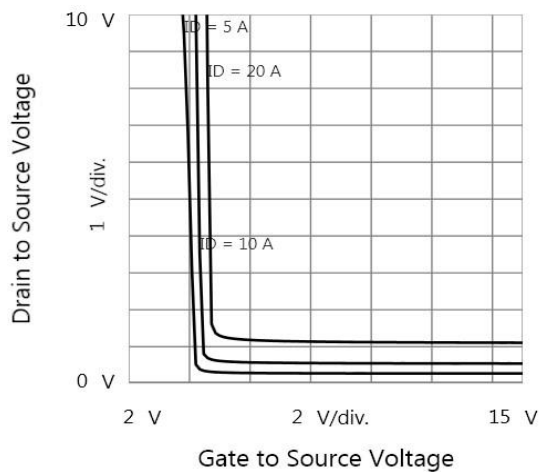
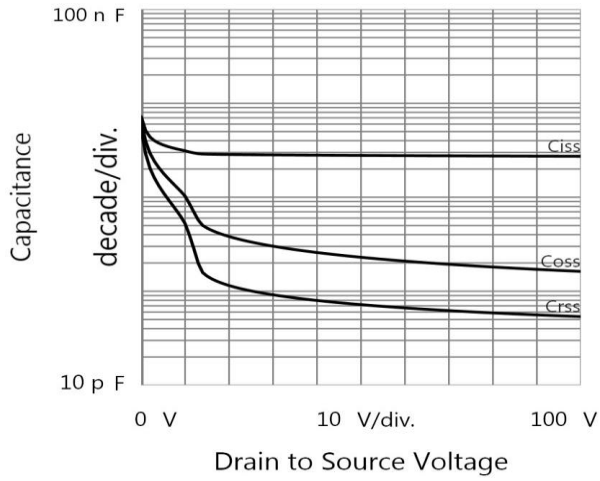


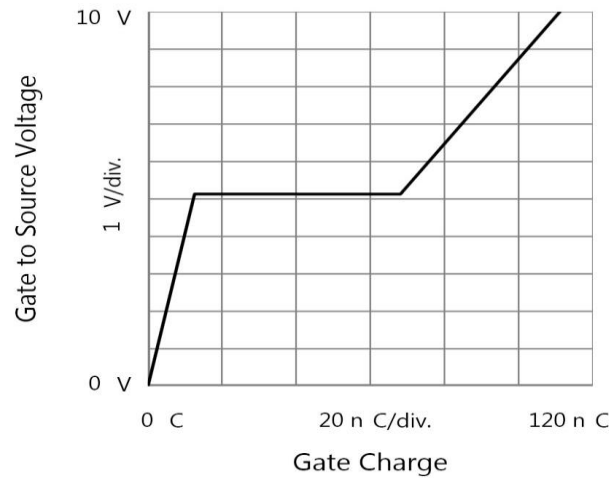
Figure 6. Body Diode Forward Characteristics



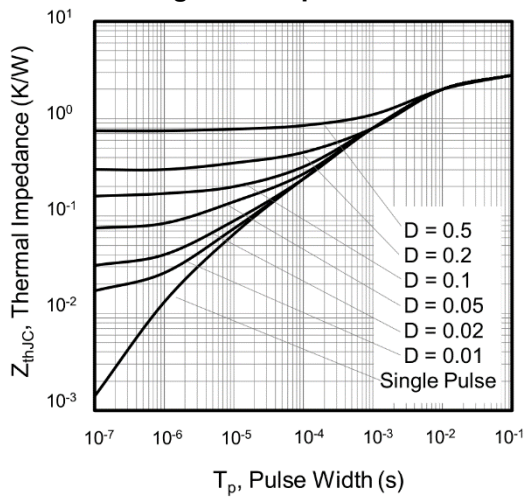
## 200V N-Channel Enhancement Mode MOSFET



**Figure 7. Capacitance**



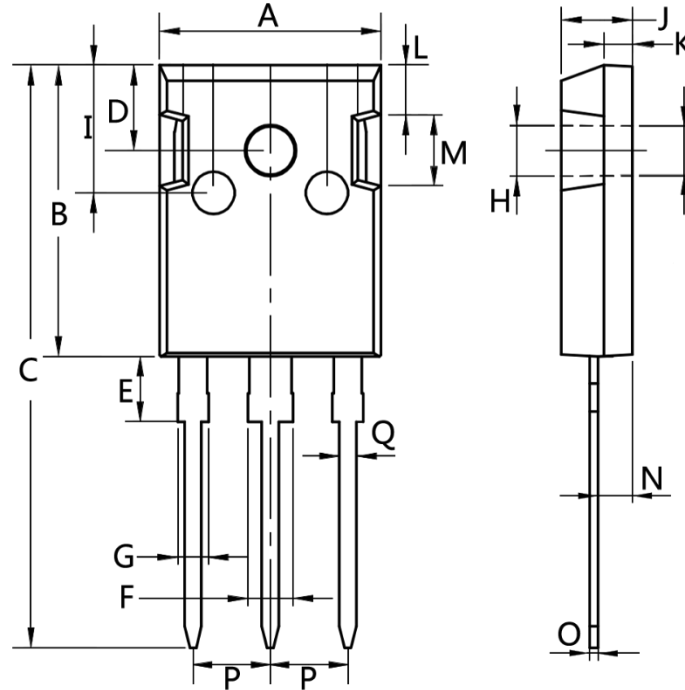
**Figure 8. Gate Charge**



**Figure 9. Transient Thermal Impedance**



### Package Mechanical Data-TO-247-LX



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
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

## Attention

1, Any and all Huban 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 Huban representative nearest you before using any Huban products described or contained herein in such applications.

2, Huban 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 Huban products described or contained herein.

3, Specifications of any and all Huban products described or contained here instipulate the performance, characteristics, 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, Huban 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 Huban 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 Huban Semiconductor CO., LTD.

7, Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. Huban 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 Huban product that you intend to use.