

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Advanced trench cell design
- ☒ Low Thermal Resistance

1.2 Applications

- ☒ Motor drivers
- ☒ DC - DC Converter

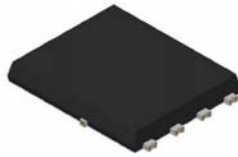
1.3 Quick reference

- ☒ $BV \geq 200\text{ V}$
- ☒ $R_{DS(ON)} \leq 19\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- ☒ $P_{tot} \leq 68\text{ W}$
- ☒ $R_{DS(ON)} \leq 23\text{ m}\Omega @ V_{GS} = 6\text{ V}$
- ☒ $I_D \leq 35\text{ A}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1,2,3	Source	Top View PDFN5x6-8L	
4	Gate		
5,6,7,8	Drain		

iMN220N20G



3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	200	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D	Drain Current (DC)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	35	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	24	A
I_{DM}^{**}	Drain Current (Pulsed)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	140	A
P_{tot}	Total Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	-	68	W
T_{stg}	Storage Temperature		- 55	175	$^{\circ}\text{C}$
T_J	Junction Temperature		-	175	$^{\circ}\text{C}$
I_S	Diode Forward Current	$T_C = 25\text{ }^{\circ}\text{C}$	-	35	A
E_{AS}	Single Pulsed Avalanche Energy	$V_{DD} = 50\text{ V}, L = 1.0\text{ mH}$	-	612	mJ
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	58	$^{\circ}\text{C} / \text{W}$
$R_{\theta JC}$	Thermal Resistance- Junction to Case		-	2.2	

Notes :

* Surface Mounted on 1 in² pad area, $t \leq 10\text{ sec}$

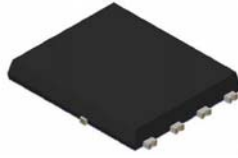
** Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

4. Marking Information

Product Name	Marking
iMN220N20G	220N20 XXXXXX X : Date Code

5. Ordering Code

iMN220N20G



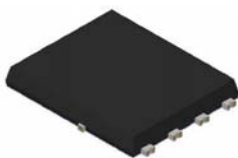
6. Electrical Characteristics (T_A = 25 °C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _{DS} = 250 μA	200	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	2	-	4	V
I _{DSS}	Drain Leakage Current	V _{DS} = 160 V, V _{GS} = 0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = 0 V, V _{GS} = ± 20 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} = 10 V, I _{DS} = 30 A	-	16	19	mΩ
		V _{GS} = 6 V, I _{DS} = 20 A	-	18	23	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 30 A, V _{GS} = 0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{DS} = 30 A, V _{GS} = 0 V dI _{SD} /dt = 100 A/μs	-	111	-	nS
Q _{rr}	Reverse Recovery Charge		-	427	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 100 V Frequency = 1 MHz	-	3869	-	pF
C _{oss}	Output Capacitance		-	190	-	
C _{rss}	Reverse Transfer Capacitance		-	37	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 100 V, V _{GEN} = 10 V, R _G = 3.9 Ω, R _L = 3.3 Ω, I _{DS} = 30 A	-	15	-	nS
t _r	Turn-on Rise Time		-	35	-	
t _{d(off)}	Turn-off Delay Time		-	39	-	
t _f	Turn-off Fall Time		-	32	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = 100 V, V _{GS} = 10 V, I _{DS} = 30 A	-	64	-	nC
Q _{gs}	Gate-Source Charge		-	22	-	
Q _{gd}	Gate-Drain Charge		-	14	-	

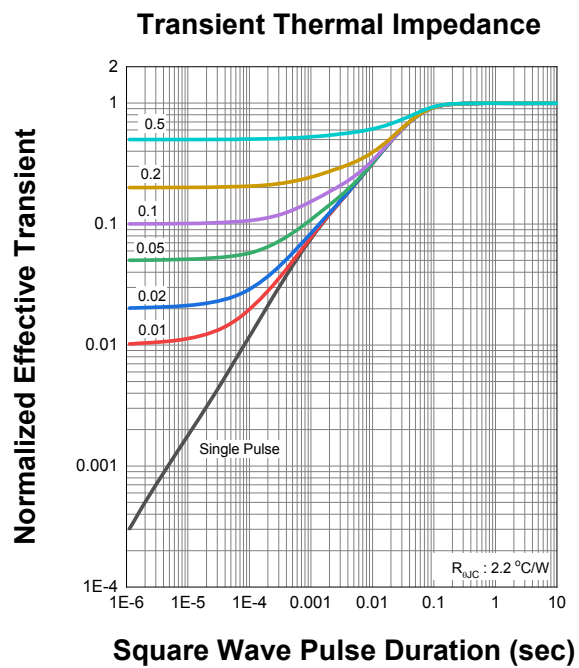
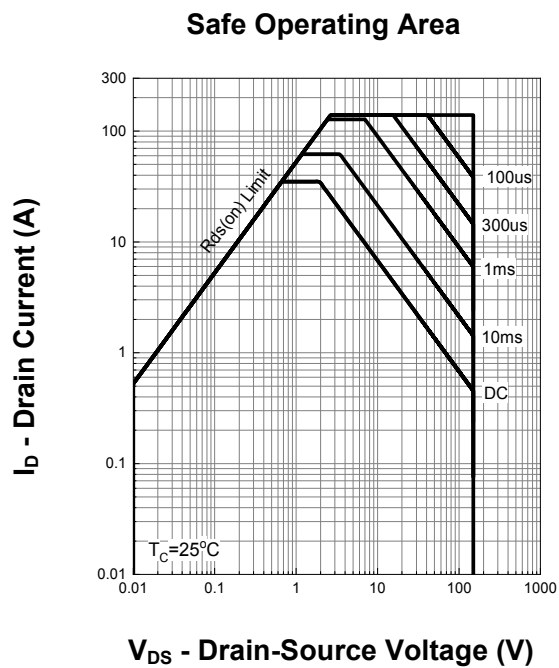
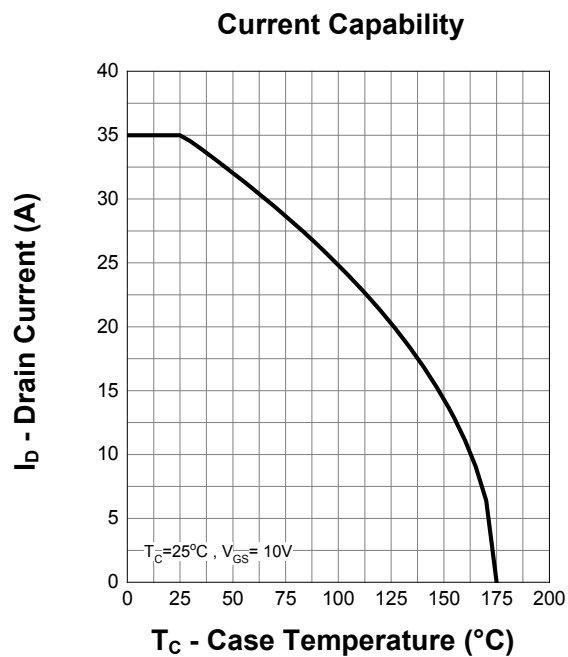
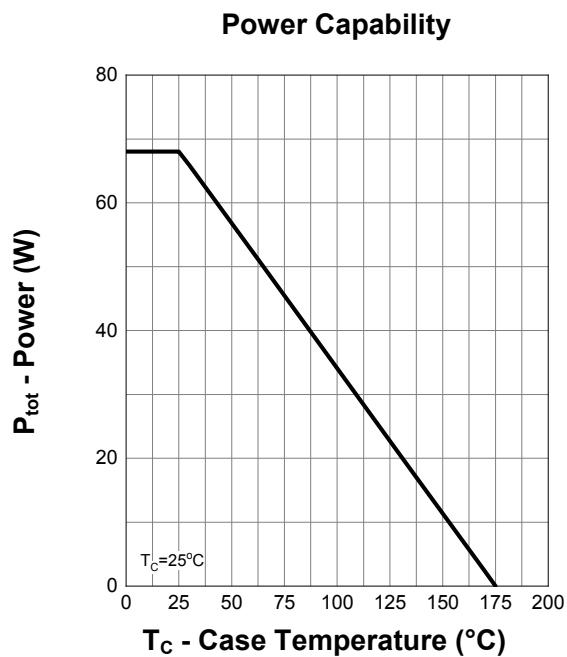
Notes :

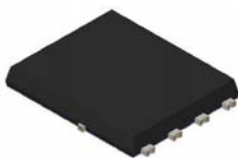
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2%

b : Guaranteed by design, not subject to production testing



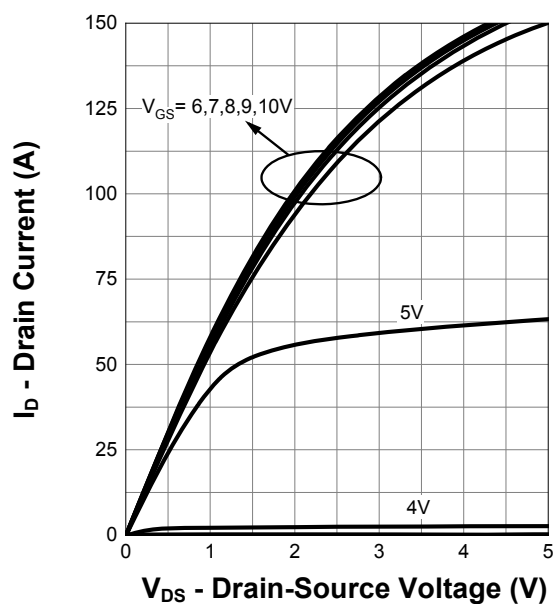
7. Typical Characteristics



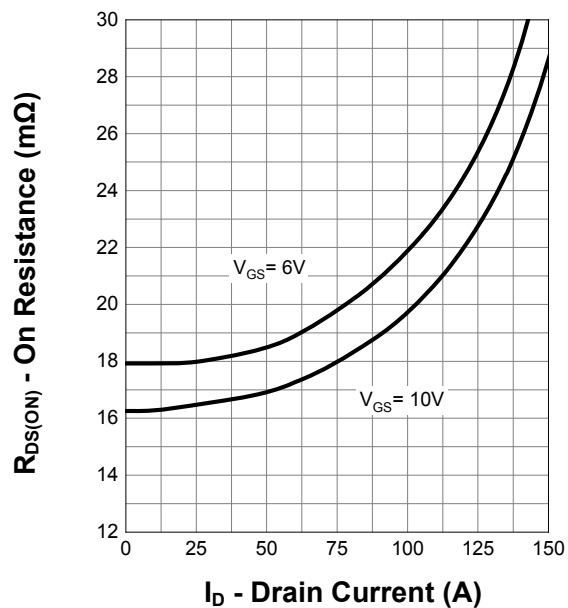


7. Typical Characteristics (cont.)

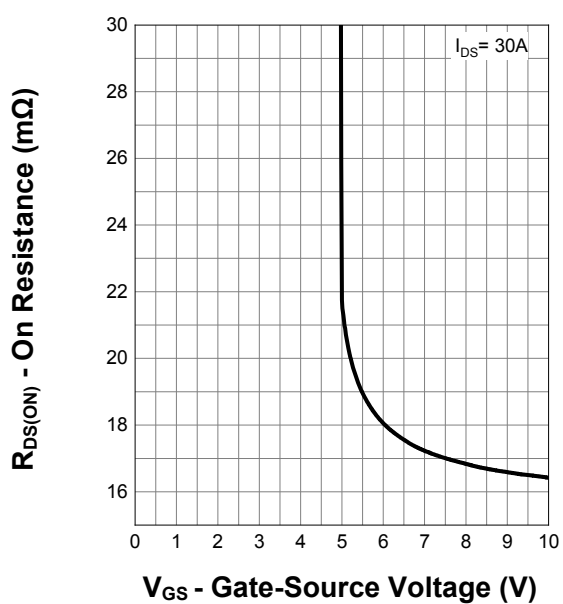
Output Characteristics



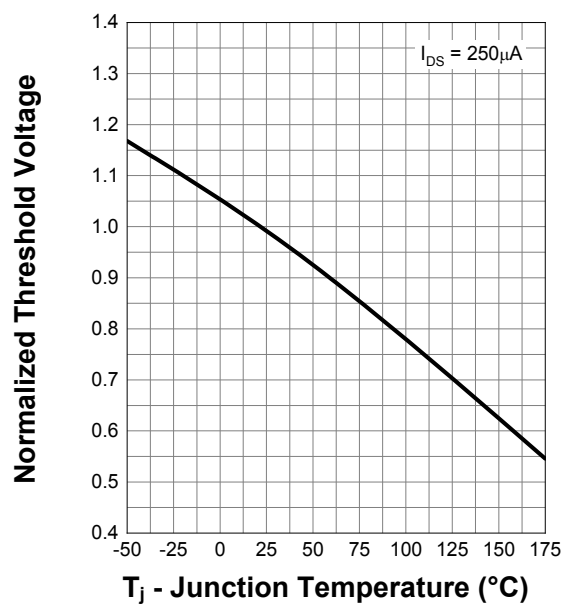
On Resistance

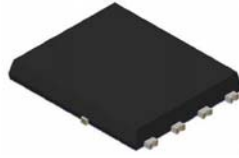


Transfer Characteristics

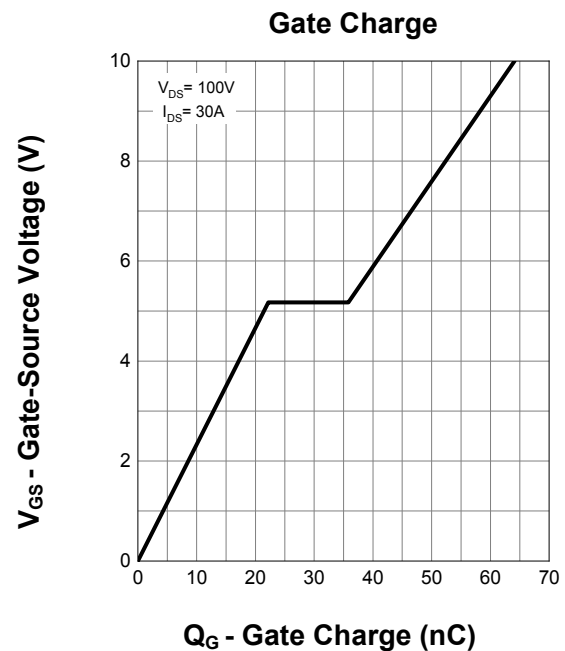
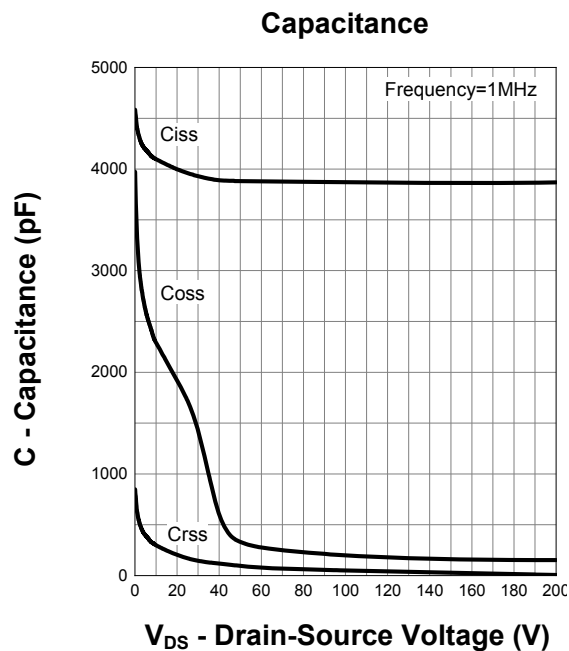
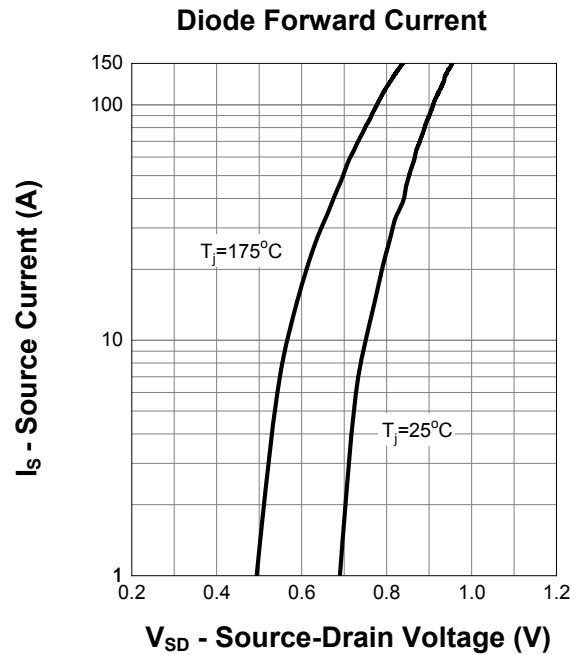
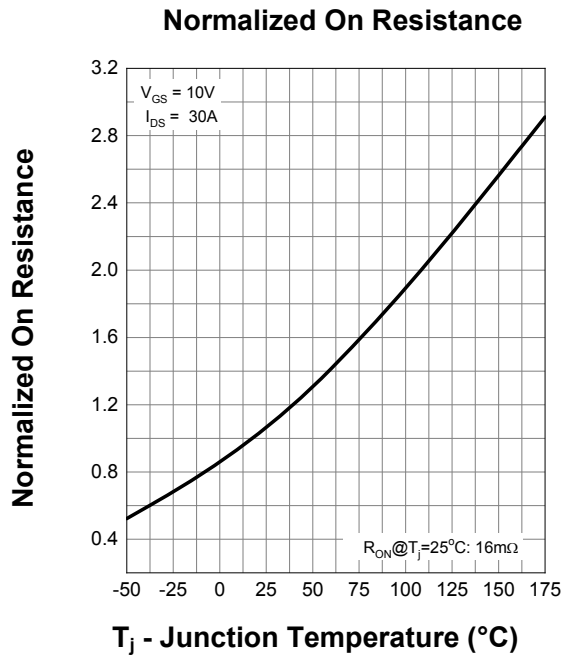


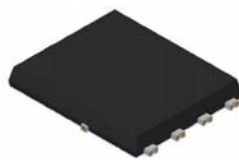
Normalized Threshold Voltage





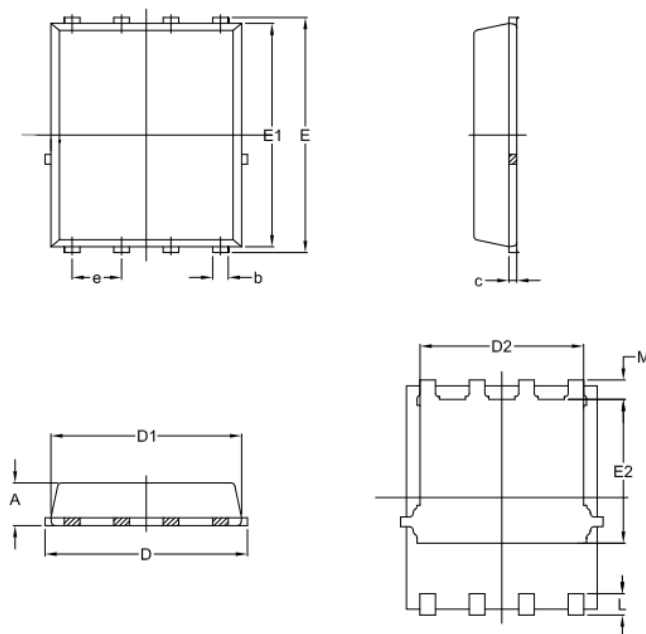
7. Typical Characteristics (cont.)





8. Package Dimensions

PDFN5x6 - 8L Package



SYMBOL	Dimension in mm	
	MIN.	MAX.
A	0.9	1.2
b	0.3	0.51
c	0.11	0.35
D	4.7	5.35
D1	4.7	5.35
D2	3.7	4.4
e	1.17	1.37
E	5.75	6.25
E1	5.6	6
E2	3.18	3.9
L	0.35	0.71
M	0.35	0.71