

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

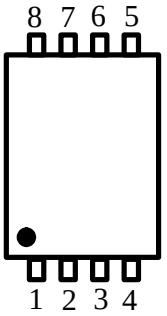
1.3 Quick reference

- ☑ BV ≧ 20 V
- ☑ P_{tot} ≦ 83 W
- ☑ I_D ≦ 100 A
- ☑ $R_{DS(ON)}$ ≦ 2.3 mΩ @ V_{GS} = 4.5 V
  $R_{DS(ON)}$ ≦ 2.6 mΩ @ V_{GS} = 2.5 V
  $R_{DS(ON)}$ ≦ 3.5 mΩ @ V_{GS} = 1.8 V

2. Pin Description

Pin	Description
1,2,3	Source
4	Gate
5,6,7,8	Drain

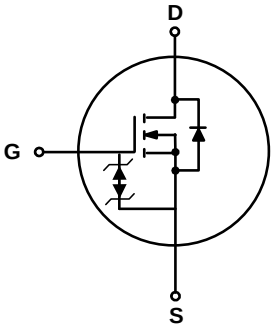
Simplified Outline

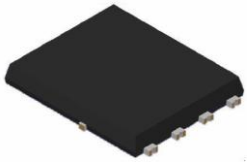


Top View

PDFN5x6-8L

Symbol





3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	T_C = 25 ℃	-	20	V
V_{GS}	Gate-Source Voltage	T_C = 25 ℃	-	± 12	V
I_D*,***	Drain Current (DC)	T_C = 25 ℃, V_{GS} = 4.5 V	-	100	A
		T_C = 100 ℃, V_{GS} = 4.5 V	-	94	A
I_{DM}*,**	Drain Current (Pulsed)	T_C = 25 ℃, V_{GS} = 4.5 V	-	430	A
P_{tot}*	Total Power Dissipation	T_C = 25 ℃	-	83	W
T_{stg}	Storage Temperature		- 55	150	℃
T_J	Junction Temperature		-	150	℃
I_S	Diode Forward Current	T_C = 25 ℃	-	100	A
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD}= 20 V , L= 1.0 mH	-	420	mJ
$R_{\theta JA}$*	Thermal Resistance- Junction to Ambient		-	62	℃ / W
$R_{\theta JC}$	Thermal Resistance- Junction to Case		-	1.5	

Notes：

* Surface Mounted on 1 in^2 pad area, t ≤ 10 sec

** Pulse width ≤ 300 μs, duty cycle ≤ 2 %

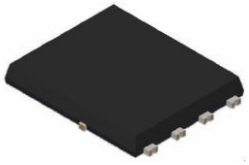
*** Limited by bonding wire

4. Marking Information

Product Name	Marking
iM18121	iM18121 XXXXX

5. Ordering Code

iM18121



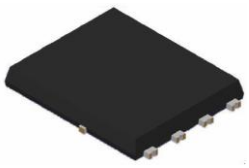
6. Electrical Characteristics (T_A = 25 °C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 250 µA	20	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = 0 V_{GS}, I_{DS} = 250 µA	0.5	-	1.0	V
I_{DSS}	Drain Leakage Current	V_{DS} = 16 V, V_{GS} = 0 V	-	-	1	µA
I_{GSS}	Gate Leakage Current	V_{GS} = 0 V, V_{GS} = ± 10 V	-	-	±10	µA
$R_{DS(ON)}$[a]	On-State Resistance	V_{GS} = 4.5 V, I_{DS} = 20 A	-	1.9	2.3	mΩ
		V_{GS} = 2.5 V, I_{DS} = 10 A	-	2.1	2.6	
		V_{GS} = 1.8 V, I_{DS} = 5 A	-	2.7	3.5	
Diode Characteristics						
V_{SD}[a]	Diode Forward Voltage	I_{SD} = 20 A, V_{GS} = 0 V	-	-	1.3	V
t_{rr}	Reverse Recovery Time	I_{DS} = 20 A, V_{GS} = 0 V dI_{SD}/dt = 100 A/µs	-	472	-	nS
Q_{rr}	Reverse Recovery Charge		-	3901	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 10 V Frequency = 1 MHz	-	5503	-	pF
C_{oss}	Output Capacitance		-	732	-	
C_{rss}	Reverse Transfer Capacitance		-	449	-	
t_d(on)	Turn-on Delay Time	V_{DS} = 10 V, V_{GEN} = 4.5 V, R_G = 3.9 Ω, R_L = 0.5 Ω, I_{DS} = 20 A	-	11	-	nS
t_r	Turn-on Rise Time		-	85	-	
t_d(off)	Turn-off Delay Time		-	774	-	
t_f	Turn-off Fall Time		-	499	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{DS} = 10 V, V_{GS} = 4.5 V, I_{DS} = 20 A	-	60	-	nC
Q_{gs}	Gate-Source Charge		-	13	-	
Q_{gd}	Gate-Drain Charge		-	13.3	-	

Notes :

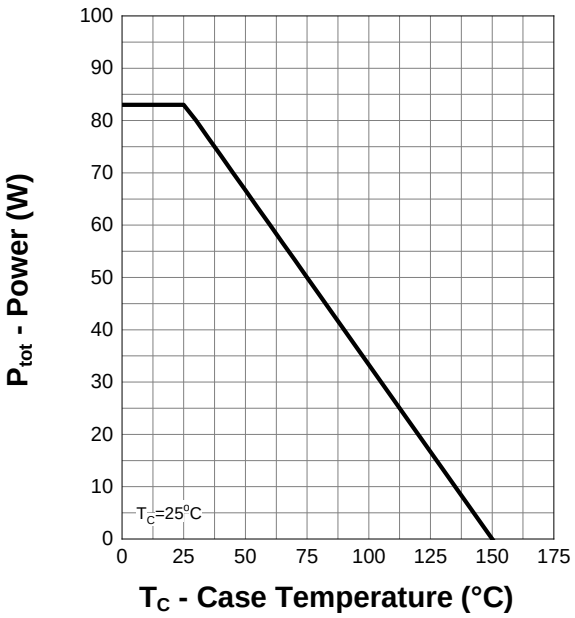
a : Pulse test ; pulse width ≤ 300 µs, duty cycle ≤ 2%

b : Guaranteed by design, not subject to production testing

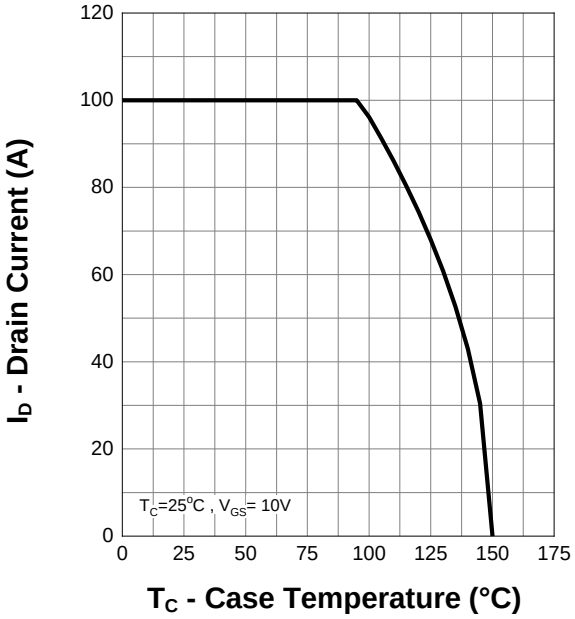


7. Typical Characteristics

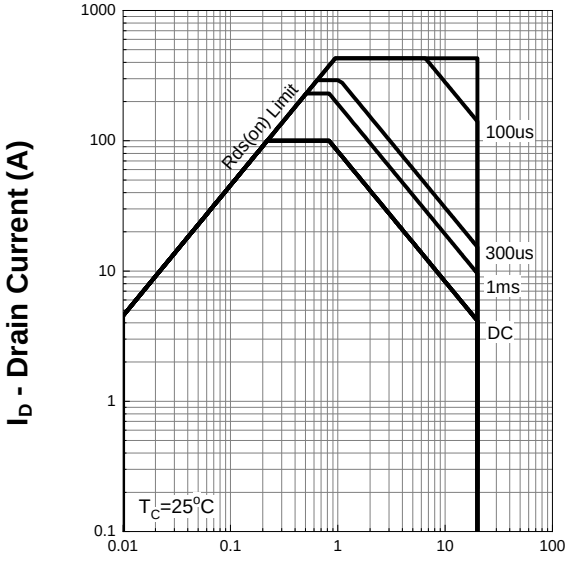
Power Capability



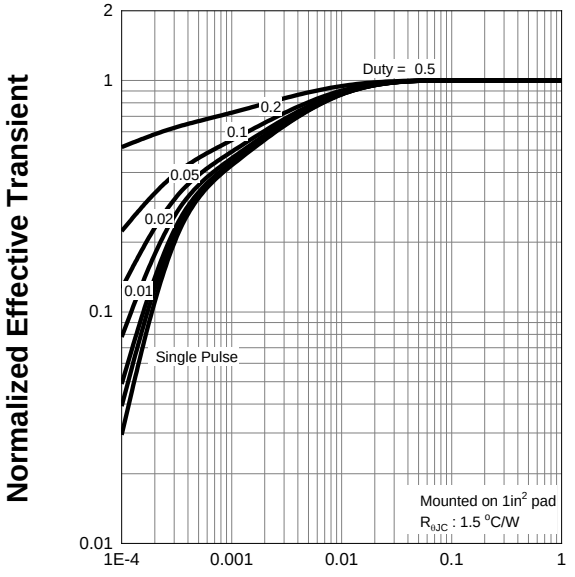
Current Capability

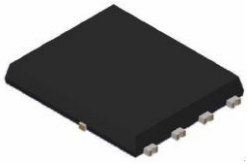


Safe Operating Area



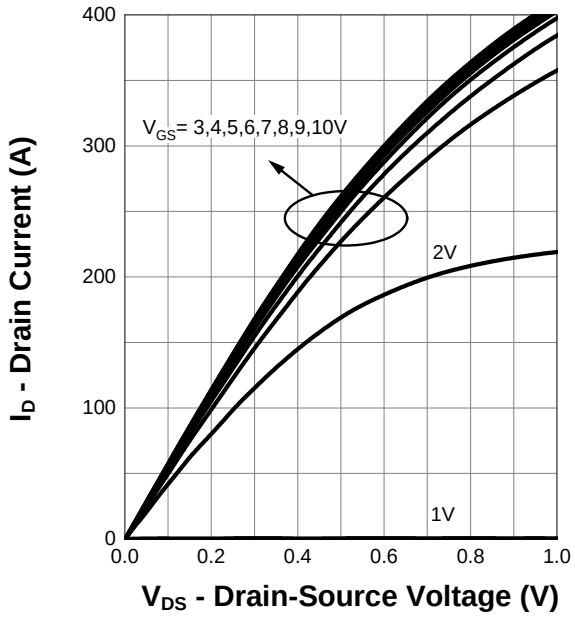
Transient Thermal Impedance



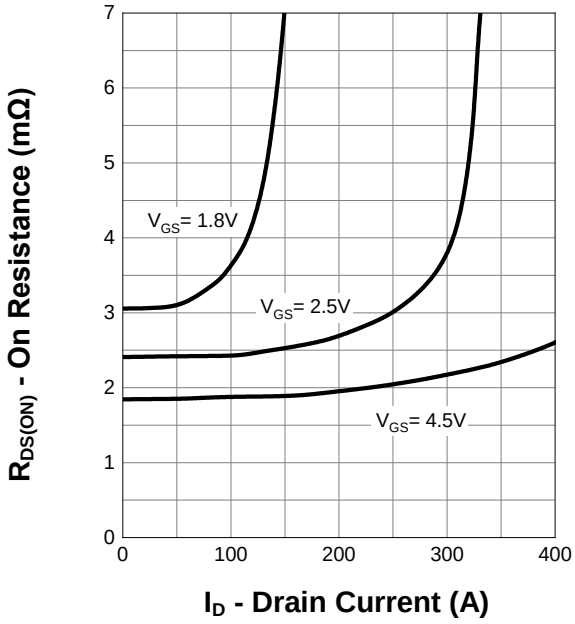


7. Typical Characteristics (cont.)

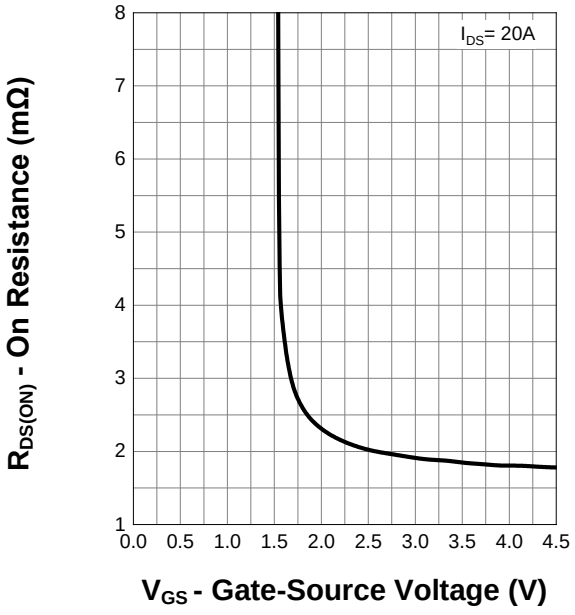
Output Characteristics



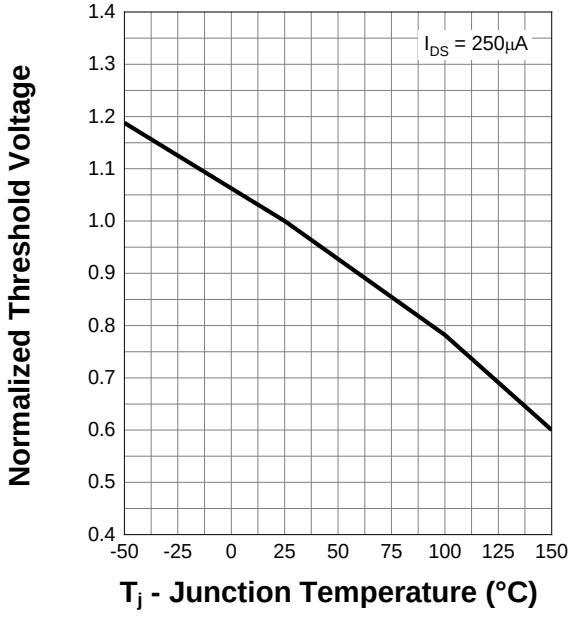
On Resistance

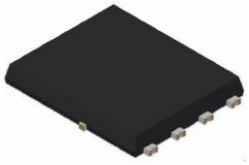


Transfer Characteristics



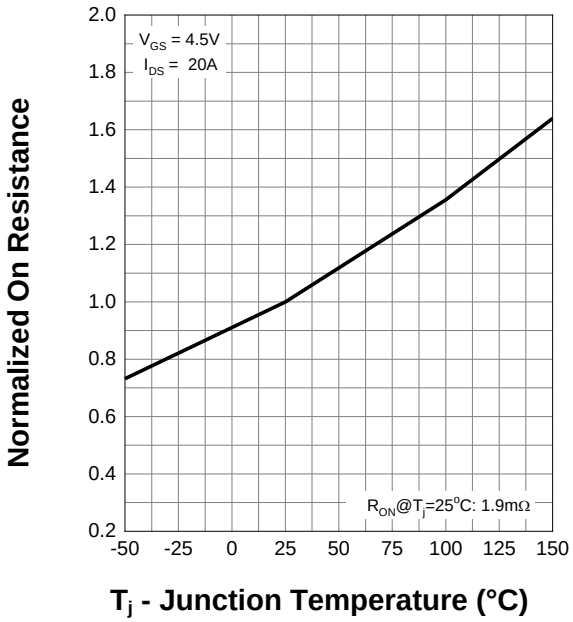
Normalized Threshold Voltage



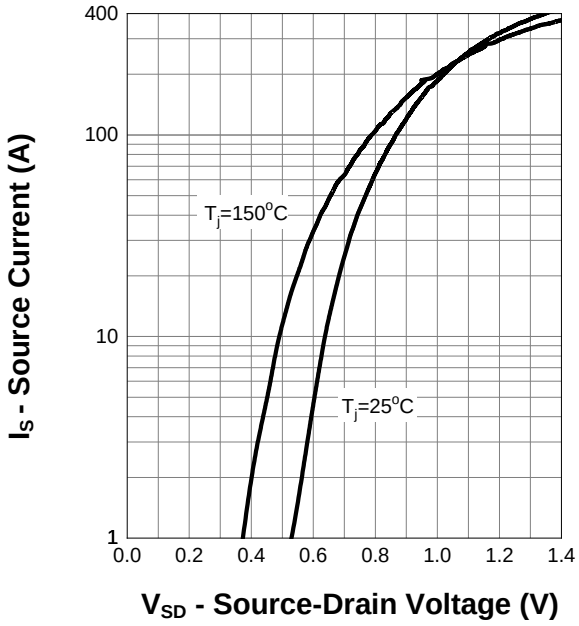


7. Typical Characteristics (cont.)

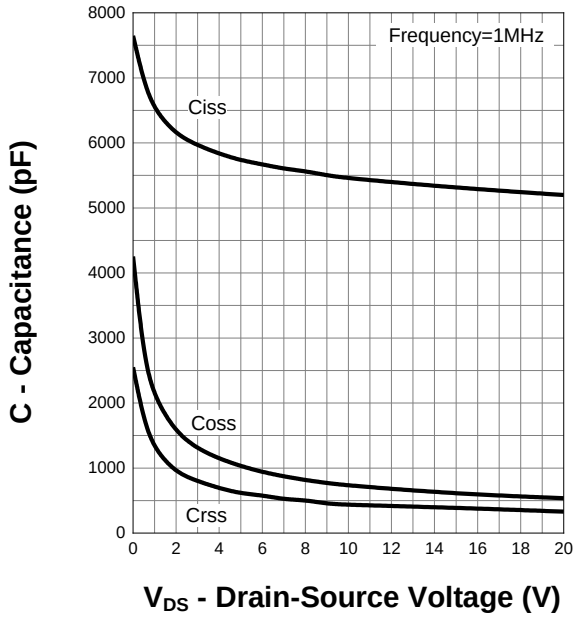
Normalized On Resistance



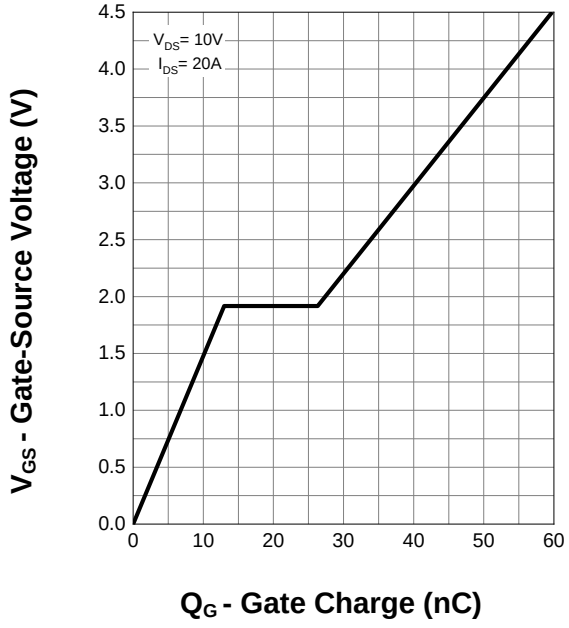
Diode Forward Current

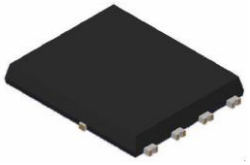


Capacitance



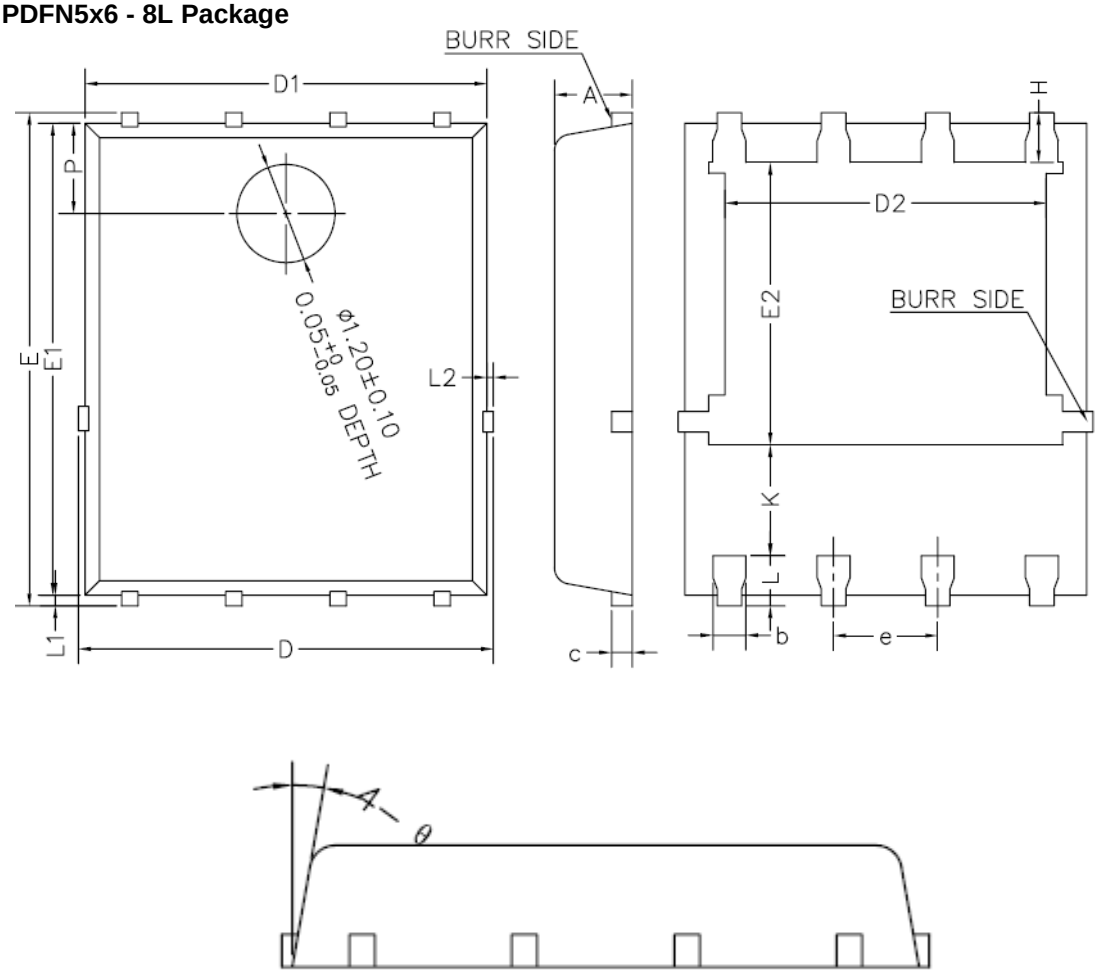
Gate Charge



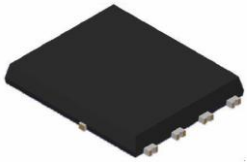


8. Package Dimensions

PDFN5x6 - 8L Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.90	1.00
b	0.35	0.46
c	0.21	0.34
D	-	5.10
D1	4.80	5.00
D2	3.82	4.02
e	1.17	1.37
E	5.90	3.10
E1	5.70	5.80
E2(OptionA)	3.34	3.54



E2(OptionB)	3.18	3.38
H	0.51	0.71
K	1.10	-
L	0.51	0.71
L1	0.06	0.20
L2	-	0.10
P	1.00	1.20
θ	8°	12°