N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ Low gate charge

1.2 Applications

- ☑ Motor driver appliances
- ☑ Adapter appliances
- ☑ High power inverter system

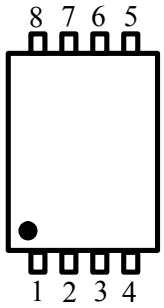
1.3 Quick reference

- ☑ BV ≧ 60 V
- ☑ P_{tot} ≦ 56 W
- ☑ I_D ≦ 78 A
- ☑ $R_{DS(ON)}$ ≦ 4.8 mΩ @ V_{GS} = 10 V
- ☑ $R_{DS(ON)}$ ≦ 6.0 mΩ @ V_{GS} = 6 V
- ☑ $R_{DS(ON)}$ ≦ 7.5 mΩ @ V_{GS} =4.5 V

2. Pin Description

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

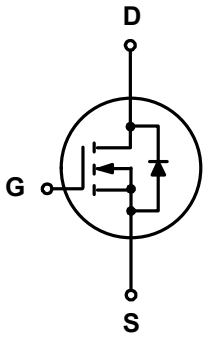
Simplified Outline



Top View

PDFN5x6-8L

Symbol



3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	T_C = 25 ℃	60	-	V
V_{GS}	Gate-Source Voltage	T_C = 25 ℃	-	± 20	V
I_D*	Drain Current	T_C = 25 ℃, V_{GS} = 10 V	-	78	A
		T_C = 100 ℃, V_{GS} = 10 V	-	49	
I_{DM}*	Pulsed Drain Current	T_C = 25 ℃, V_{GS} = 10 V	-	312	A
P_{tot}*	Total Power Dissipation	T_C = 25 ℃	-	56	W
T_{stg}	Storage Temperature		- 55	150	℃
T_J	Junction Temperature		-	150	℃
I_S	Continuous-Source Current	T_C = 25 ℃	-	78	A
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD}=50V , L=1.0mH	-	162	mJ
$R_{\theta JC}$*	Thermal Resistance- Junction to Case		-	2.2	℃ / W
$R_{\theta JA}$*	Thermal Resistance- Junction to Ambient		-	43	℃ / W

Notes：

* Surface Mounted on 1 in^2 pad area, $t \leq 10$ sec

** Pulse width ≤ 10 μs, duty cycle ≤ 1 %

*** limited by bonding wire

4. arking Information

Product Name	Marking
N0406GM	0406M YWWXXX YWW: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
N0406GM	PDFN5*6-8L			5000	

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	60	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 250 μA	1.0	-	2.0	V
I_{DSS}	Drain Leakage Current	V_{DS} = 48 V, V_{GS} = 0 V	-	-	1	μA
I_{GSS}	Gate Leakage Current	V_{GS} = ± 20 V, V_{DS} = 0 V	-	-	± 100	nA
$R_{DS(ON)}$[a]	Channel On-State Resistance	V_{GS} = 10 V, I_D = 20 A	-	4.2	4.8	mΩ
	Channel On-State Resistance	V_{GS} = 6 V, I_D = 15 A	-	4.9	6.0	
	Channel On-State Resistance	V_{GS} = 4.5 V, I_D = 10 A	-	5.9	7.5	
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_{SD} = 20 A, dI_{SD} / dt = 100 A / μs	-	36	-	ns
Q_{rr}	Reverse Recovery Charge		-	19	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 30 V Frequency = 1 MHz	-	1855	-	pF
C_{oss}	Output Capacitance		-	736	-	
C_{rss}	Reverse Transfer Capacitance		-	56	-	
t_d(on)	Turn-on Delay Time	V_{DS} = 30 V, V_{GEN} = 10 V, R_G = 3.9 Ω, R_L = 1.5 Ω, I_{DS} = 20 A	-	9	-	nS
t_r	Turn-on Rise Time		-	26	-	
t_d(off)	Turn-off Delay Time		-	34	-	
t_f	Turn-off Fall Time		-	29	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{GS} = 10 V, V_{DS} = 30 V, I_{DS} = 20 A	-	41	-	nC
Q_{gs}	Gate-Source Charge		-	7.6	-	
Q_{gd}	Gate-Drain Charge		-	9	-	

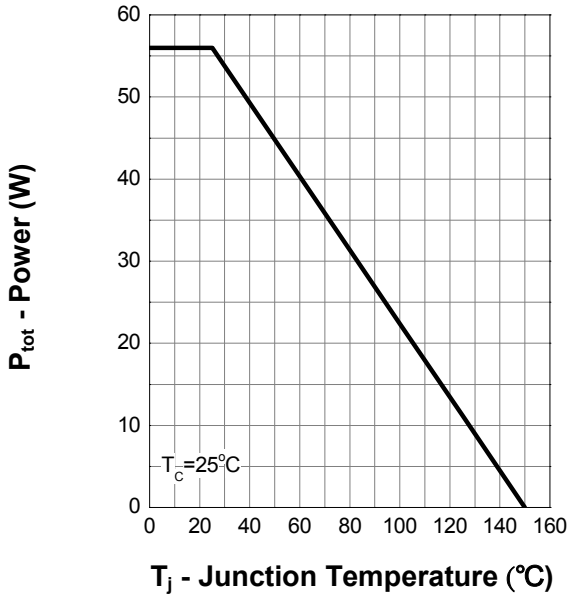
Notes：

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

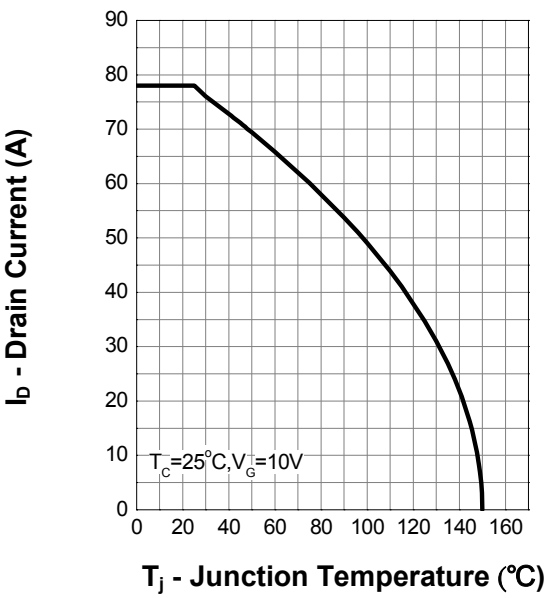
b : Guaranteed by design, not subject to production testing

7. ypical Characteristics

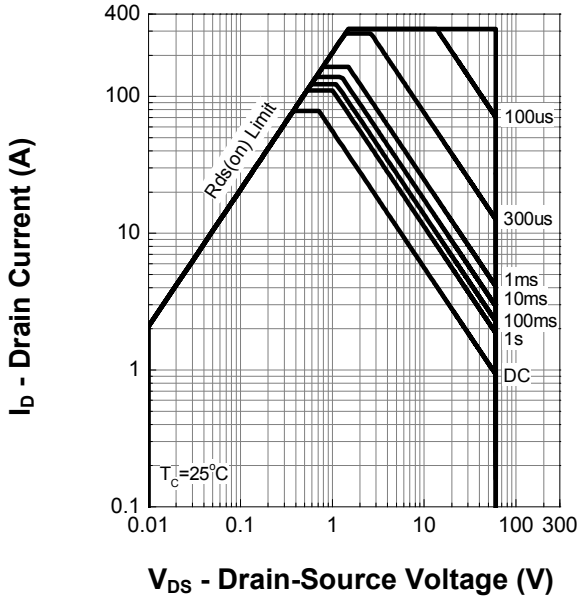
Power Dissipation



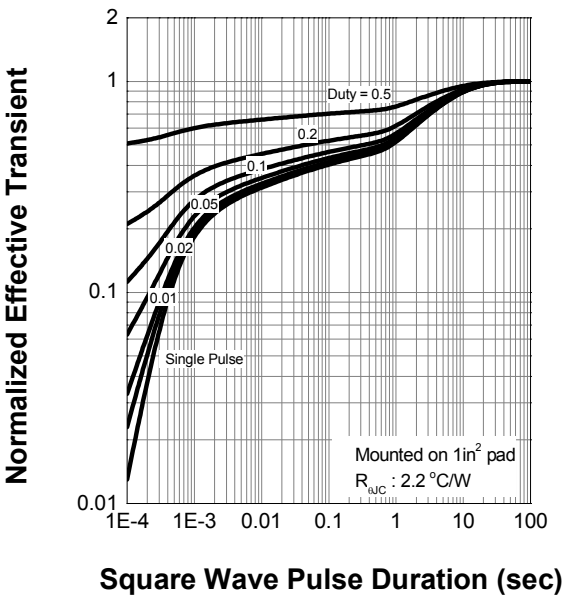
Drain Current



Safe Operation Area

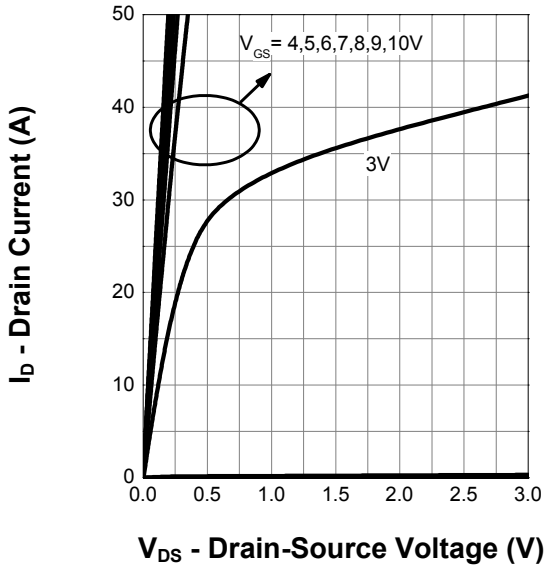


Thermal Transient Impedance

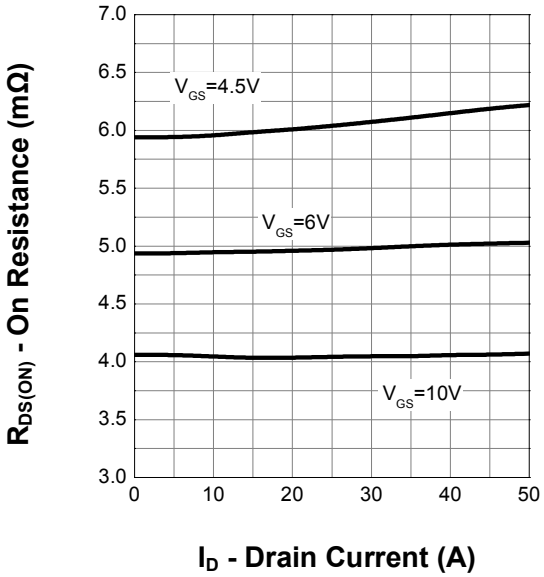


7. ypical Characteristics (cont.)

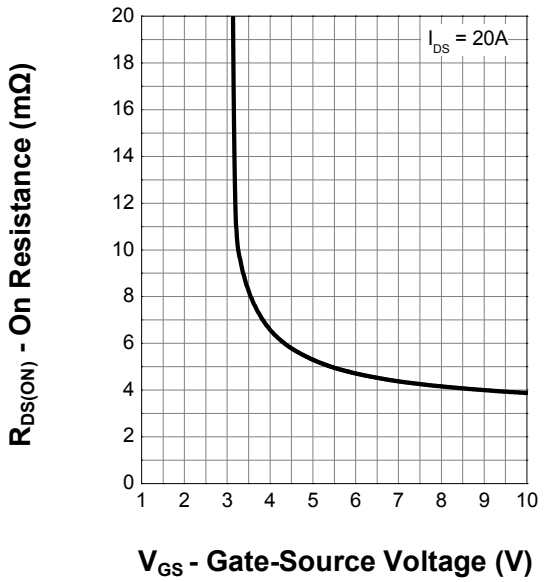
Output Characteristics



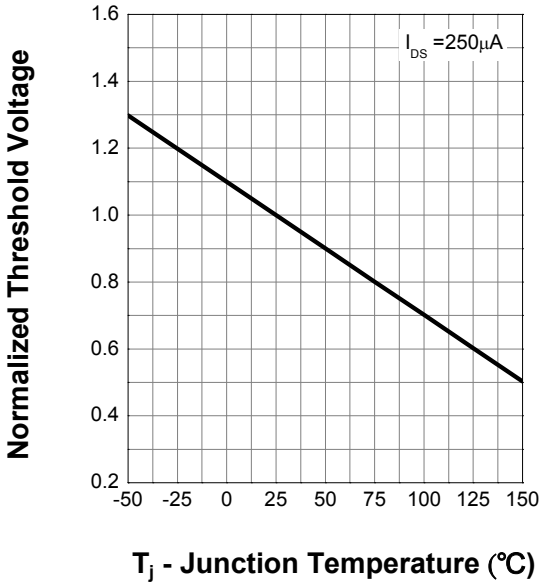
Drain-Source On Resistance



Transfer Characteristics

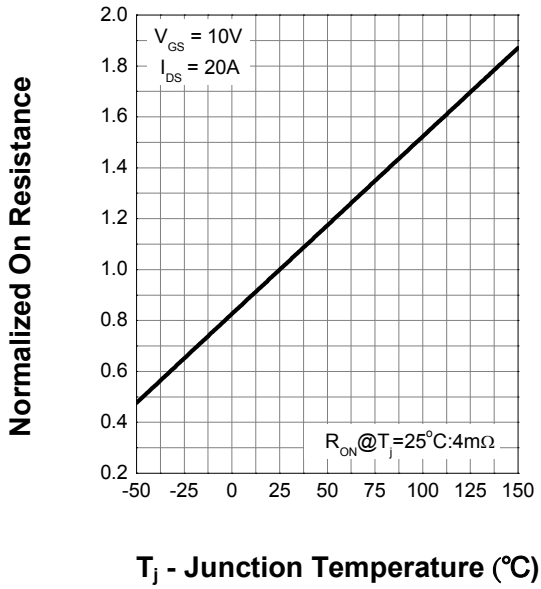


Gate Threshold Voltage

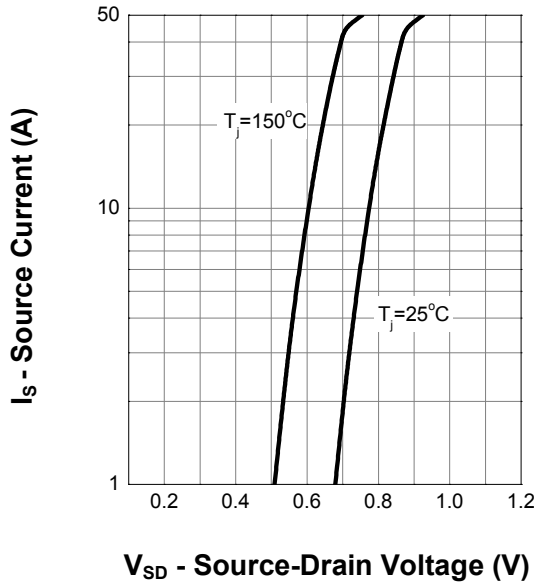


7. ypical Characteristics (cont.)

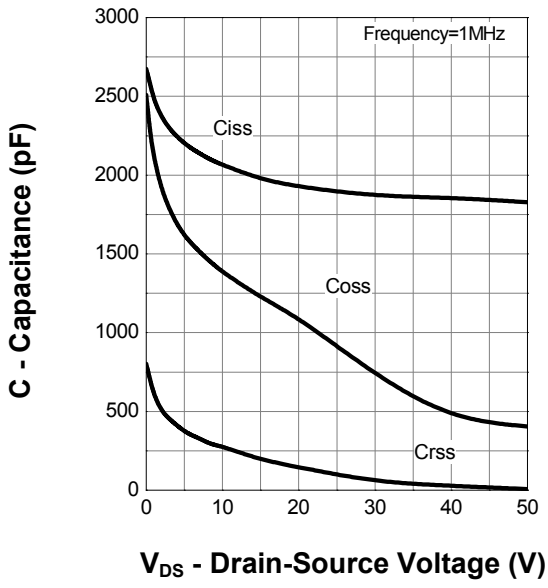
Drain-Source On Resistance



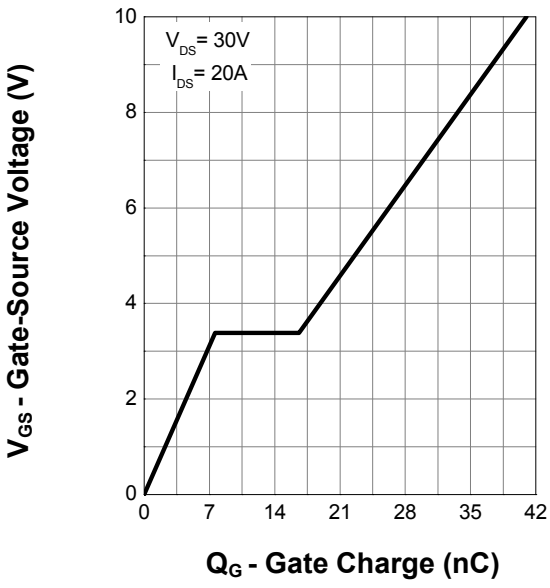
Source-Drain Diode Forward



Capacitance

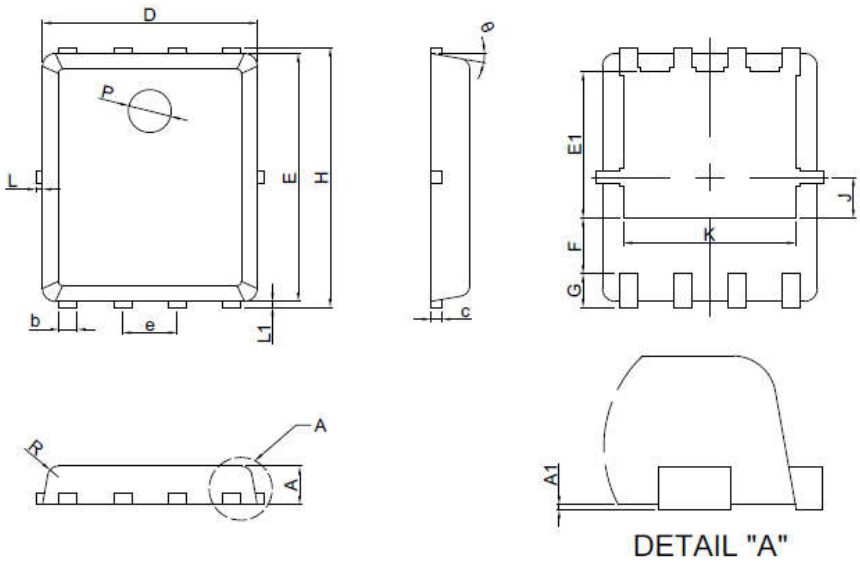


Gate Charge



8. Package Dimensions

PDFN5x6-8L Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.80	1.00
A1	0.00	0.05
b	0.35	0.49
c	0.254REF	
D	4.90	5.10
F	1.40REF	
E	5.70	5.90
e	1.27BSC	
H	5.95	6.20
L1	0.10	0.18
G	0.60REF	
K	4.00REF	
L	-	0.15
J	0.95BSC	
P	1.00REF	
E1	3.40REF	
θ	6°	14°
R	0.25REF	