N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ Low Thermal Resistance

1.2 Applications

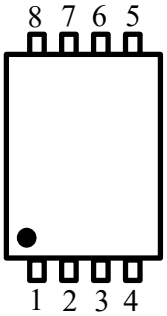
- ☑ Motor drivers
- ☑ DC - DC Converter

1.3 Quick reference

- ☑ BV ≧ 40 V
- ☑ P_{tot} ≦ 93 W
- ☑ I_D ≦ 178 A
- ☑ $R_{DS(ON)}$ ≦ 1.8 mΩ @ V_{GS} = 10 V
- ☑ $R_{DS(ON)}$ ≦ 3.0 mΩ @ V_{GS} = 4.5 V

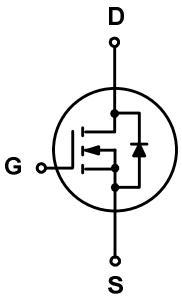
2. Pin Description

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



Top View

PDFN5x6-8L



3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	T_C = 25 ℃	-	40	V
V_{GS}	Gate-Source Voltage	T_C = 25 ℃	-	± 20	V
I_D*	Drain Current (DC)	T_C = 25 ℃, V_{GS} = 10 V	-	178	A
		T_C = 100 ℃, V_{GS} = 10 V	-	126	A
I_{DM}*,**	Drain Current (Pulsed)	T_C = 25 ℃, V_{GS} = 10 V	-	800	A
P_{tot}	Drain power dissipation	T_C = 25 ℃	-	93	W
T_{stg}	Storage Temperature		- 55	175	℃
T_J	Junction Temperature		-	175	℃
I_S	Continuous-Source Current	T_C = 25 ℃	-	178	A
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD} = 40 V , L= 1.0 mH	-	544	mJ
$R_{\theta JA}$*	Thermal Resistance- Junction to Ambient		-	62.5	℃/W
$R_{\theta JC}$	Thermal Resistance- Junction to Case		-	1.6	

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
N016N04G	**016N04** **YWWXXX** **YWWXXX: Date Code**

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
N016N04G	**PDFN5*6**			**5000**	

6. lectrical 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	40	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 250 μA	1	-	2	V
I_{DSS}	Drain Leakage Current	V_{DS} = 32 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	-	1.6	1.8	mΩ
		V_{GS} = 4.5 V, I_{DS} = 20 A	-	2.5	3.0	
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	-	45	-	nS
Q_{rr}	Reverse Recovery Charge		-	26	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 20 V Frequency = 1 MHz	-	2838	-	pF
C_{oss}	Output Capacitance		-	1333	-	
C_{rss}	Reverse Transfer Capacitance		-	123	-	
t_d(on)	Turn-on Delay Time	V_{DS} = 20 V, V_{GEN} = 10 V, R_G = 3.9 Ω, R_L = 0.66 Ω, I_{DS} = 30 A	-	12	-	nS
t_r	Turn-on Rise Time		-	58	-	
t_d(off)	Turn-off Delay Time		-	41	-	
t_f	Turn-off Fall Time		-	48	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{DS} = 20 V, V_{GS} = 10 V, I_{DS} = 30 A	-	60	-	nC
Q_{gs}	Gate-Source Charge		-	12	-	
Q_{gd}	Gate-Drain Charge		-	13	-	

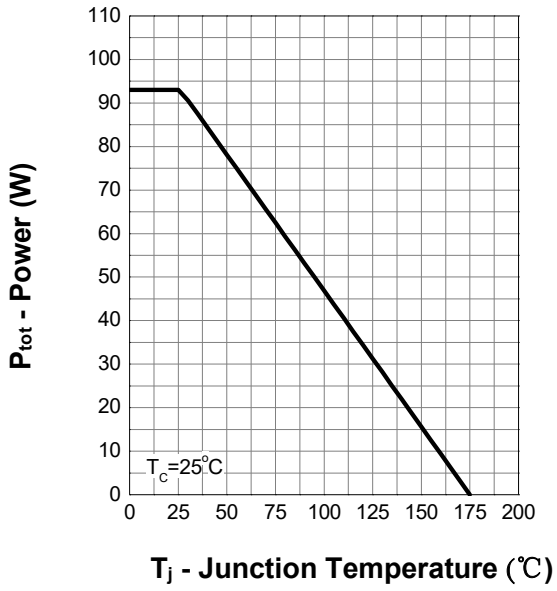
Notes：

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

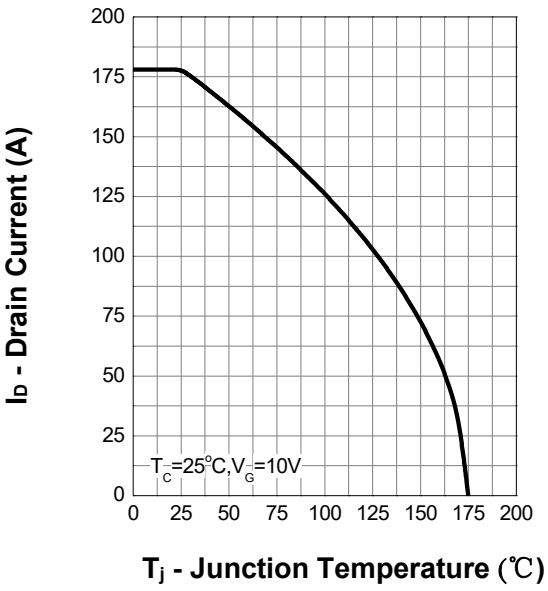
b : Guaranteed by design, not subject to production testing

7. ypical Characteristics

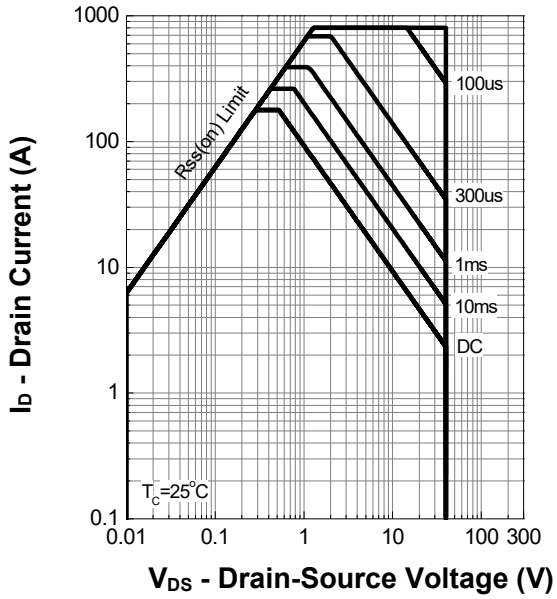
Power Capability



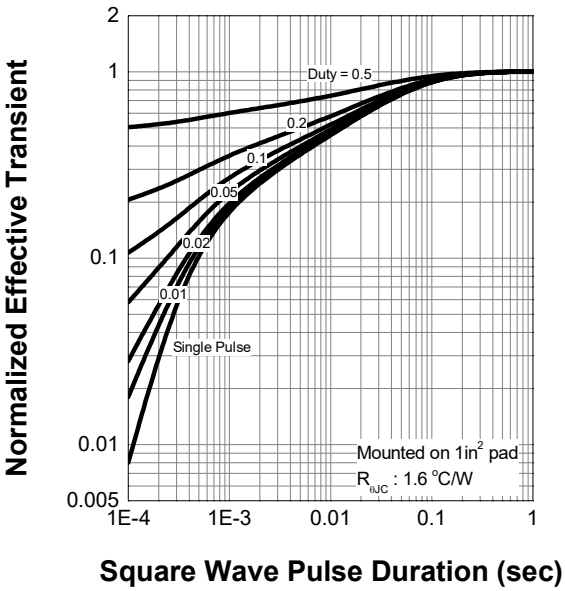
Current Capability



Safe Operation Area

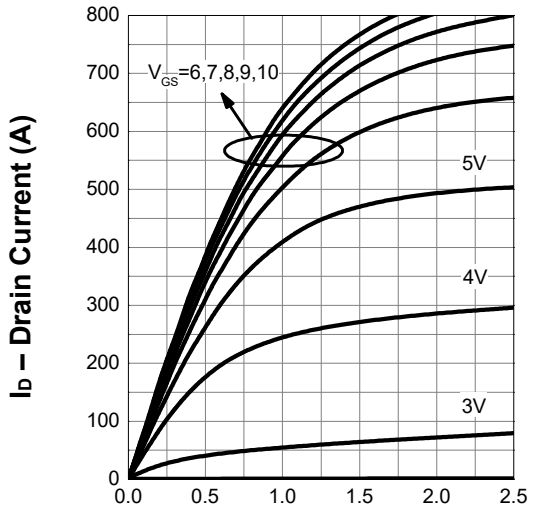


Thermal Transient Impedance

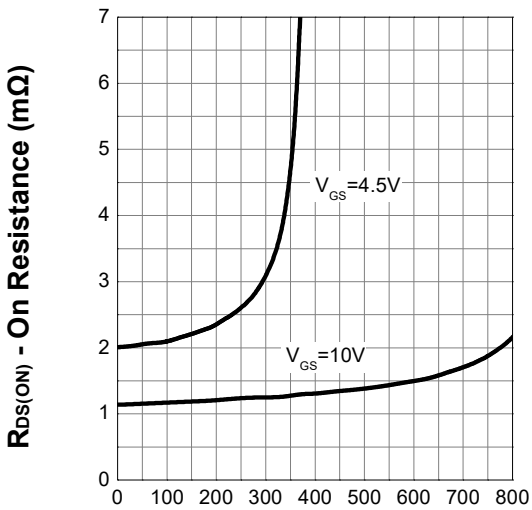


7. ypical Characteristics (cont.)

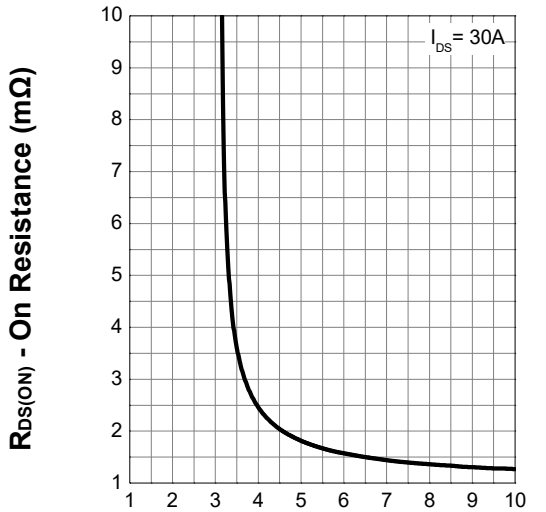
Output Characteristics



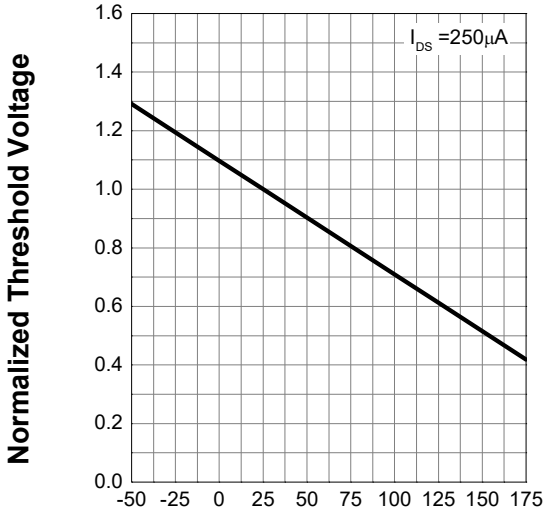
Drain-Source On Resistance



Transfer Characteristics

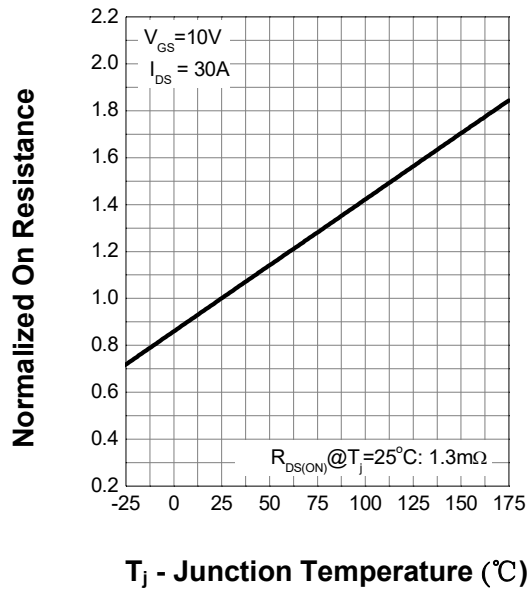


Gate Threshold Voltage

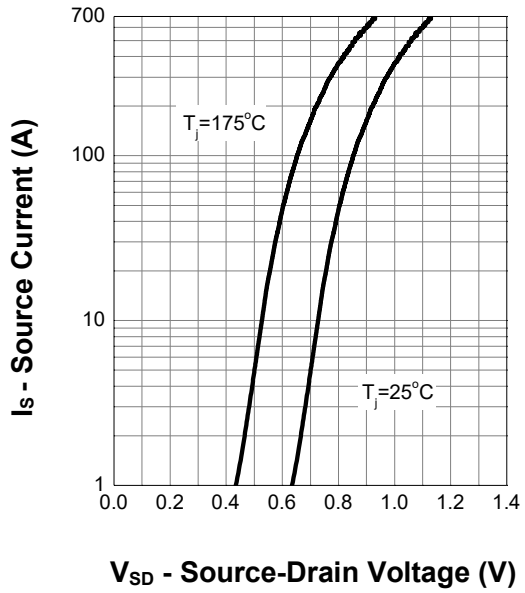


7. ypical Characteristics (cont.)

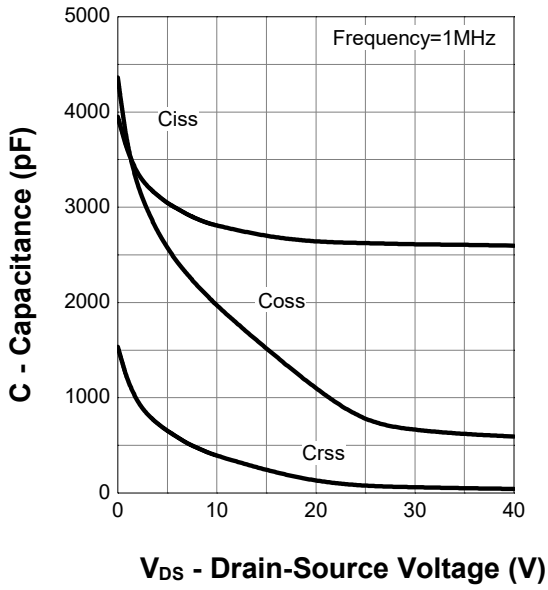
Drain-Source On Resistance



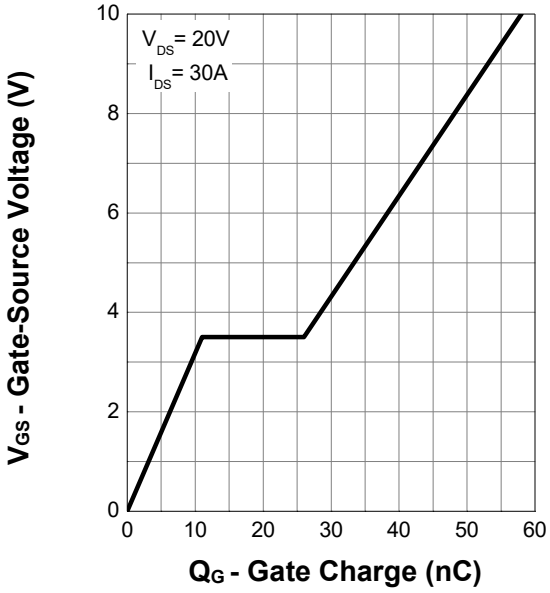
Body Diode Characteristics



Capacitance

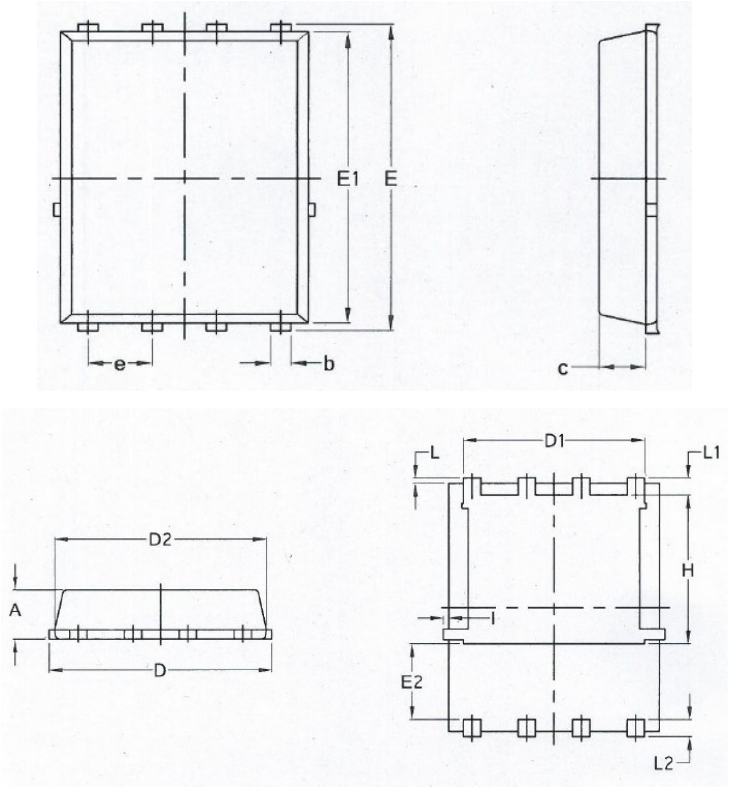


Gate Charge



8. Package Dimensions

PDFN5x6 - 8L Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	1.030	1.170
b	0.340	0.480
c	0.824	0.970
D	4.800	5.400
D1	4.110	4.310
D2	4.800	5.000
E	5.950	6.150
E1	5.650	5.850
E2	1.600	-
e	1.27 BSC	
L	0.050	0.250
L1	0.380	0.500
L2	0.380	0.500
H	3.300	3.500
I	-	0.180