N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ Super Trench
- ☑ Low Thermal Resistance
- ☑ Low ciss

1.2 Applications

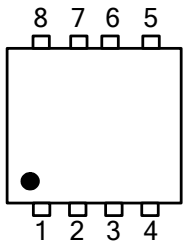
- ☑ Motor drivers
- ☑ DC - DC Converter

1.3 Quick reference

- ☑ BV ≦ 60 V
- ☑ P_{tot} ≦ 20.8 W
- ☑ I_D ≦ 50 A
- ☑ $R_{DS(ON)}$ ≦ 12 mΩ @ V_{GS} = 10 V
  $R_{DS(ON)}$ ≦ 20 mΩ @ V_{GS} = 4.5 V

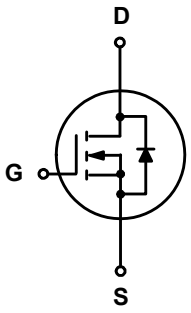
2. Pin Description

Pin	Description	Simplified Outline	Symbol
4	Gate(G)		
5,6,7,8	Drain(D)		
1,2,3	Source(S)		



Top View

PDFN3.3x3.3-8L



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	-	50	A
I_{DM}*,**,***	Pulsed Source Current	T_C = 25 ℃, V_{GS} = 10 V	-	112	A
P_{tot}*	Total Power Dissipation	T_C = 25 ℃	-	20.8	W
T_{stg}	Storage Temperature		- 55	150	℃
T_J	Junction Temperature		-	150	℃
I_S	Diode Forward Current	T_C = 25 ℃	-	50	A
$R_{\theta JA}$*	Thermal Resistance- Junction to Ambient		-	62.5	℃ / W
$R_{\theta JC}$*	Thermal Resistance- Junction to Case		-	6	

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. Marking Information

Product Name	Marking
N024N06QA	024N06 YWWXXX YWWXXXX : Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
N024N06QA	**PDFN3.3*3.3**			**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_D = 250 µA	60	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 250 µA	1.0	2.0	3.0	V
I_{DSS}	Zero Gate Voltage Source Current	V_{DS} = 48, V_{GS} = 0 V	-	-	1	µA
		T_J = 85 ℃	-	-	30	µA
I_{GSS}	Gate Leakage Current	V_{GS} = ± 20 V, V_{DS} = 0 V	-	-	± 100	nA
$R_{DS(ON)}$[a]	Drain-Source On-State Resistance	V_{GS} = 10 V, I_D = 20A	-	11	12	mΩ
		V_{GS} = 4.5 V, I_D = 10A	-	18	20	
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	-	53	-	ns
Q_{rr}	Reverse Recovery Charge		-	24	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 30 V Frequency = 1 MHz	-	789	-	pF
C_{oss}	Output Capacitance		-	376	-	
C_{rss}	Reverse Transfer Capacitance		-	32	-	
t_d(on)	Turn-on Delay Time	V_{DS} = 30 V, V_{GEN} = 10 V, R_G = 4.5 Ω, R_L = 1.5Ω, I_D = 20 A	-	6.5	-	ns
t_r	Turn-on Rise Time		-	29	-	
t_d(off)	Turn-off Delay Time		-	12.6	-	
t_f	Turn-off Fall Time		-	18.8	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{GS} = 10 V, V_{DS} = 30 V, I_{DS} = 20 A	-	16	-	nC
Q_{gs}	Gate-Source Charge		-	4	-	
Q_{gd}	Gate-Drain Charge		-	3.5	-	

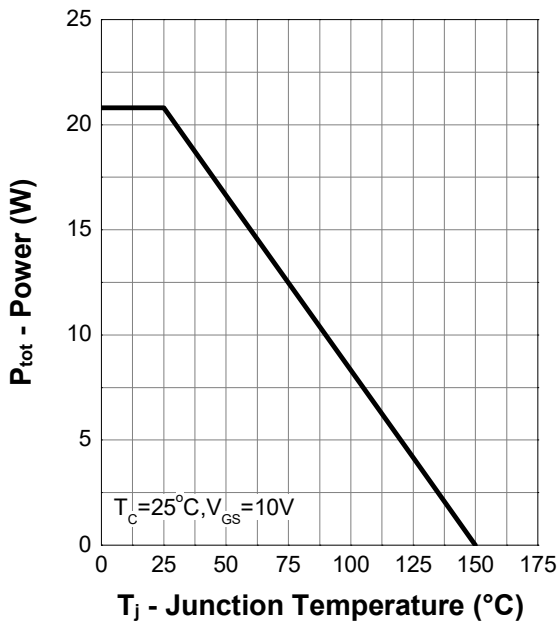
Notes：

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

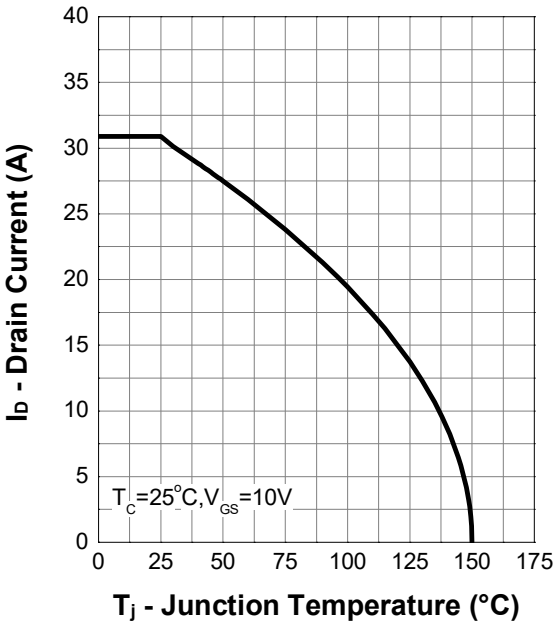
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics (Cont.)

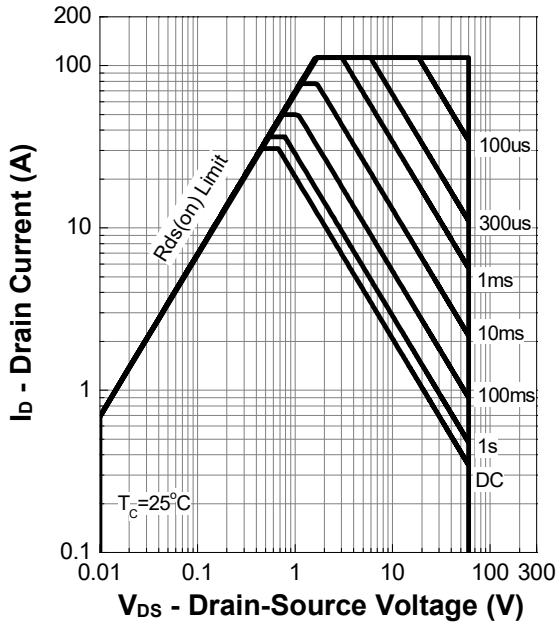
Power Capability



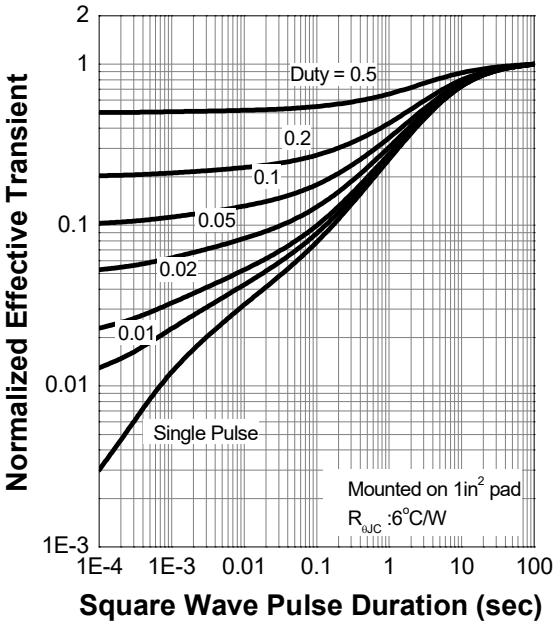
Current Capability



Safe Operation Area

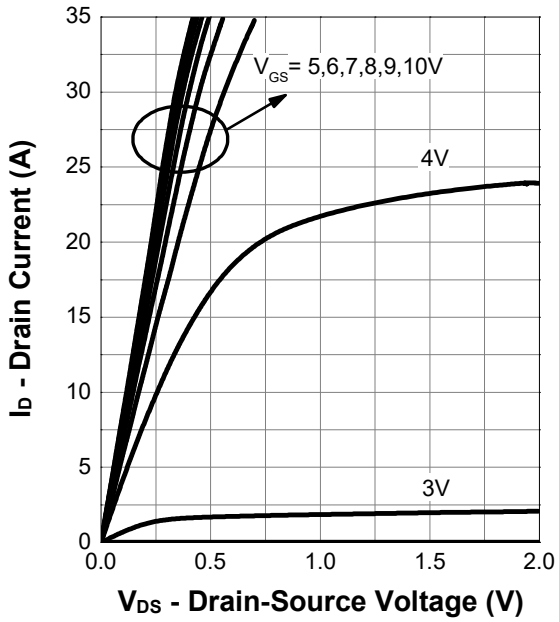


Transient Thermal Impedance

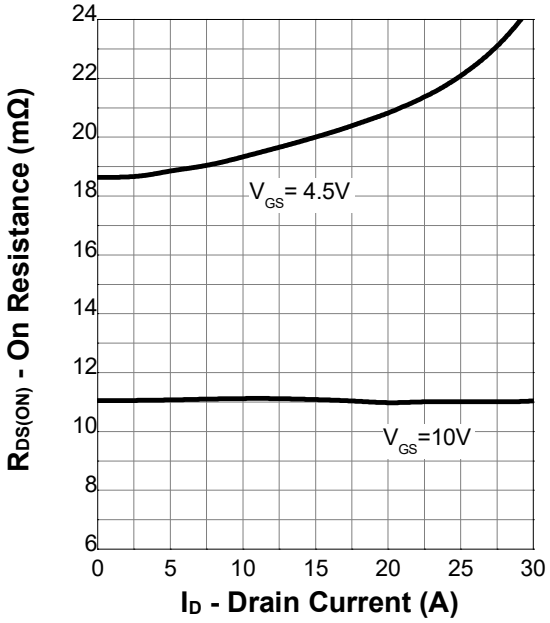


7. Typical Characteristics (Cont.)

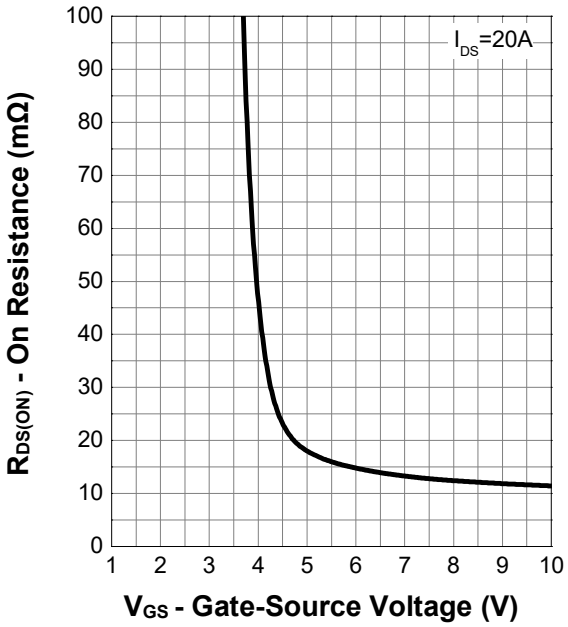
Output Characteristics



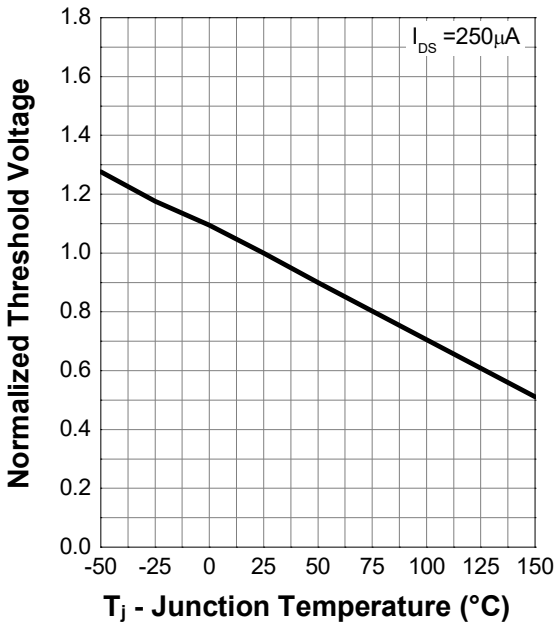
On Resistance



Transfer Characteristics

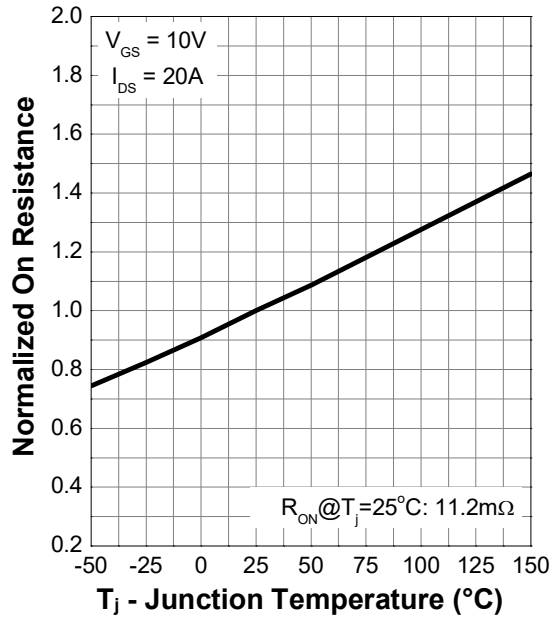


Normalized Threshold Voltage

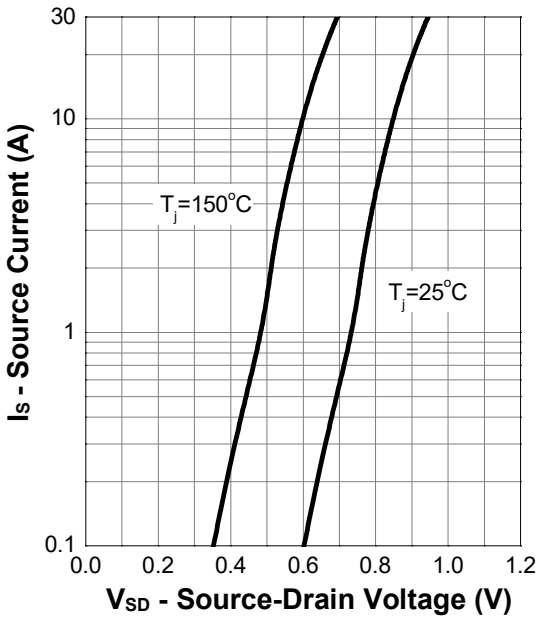


7. Typical Characteristics (Cont.)

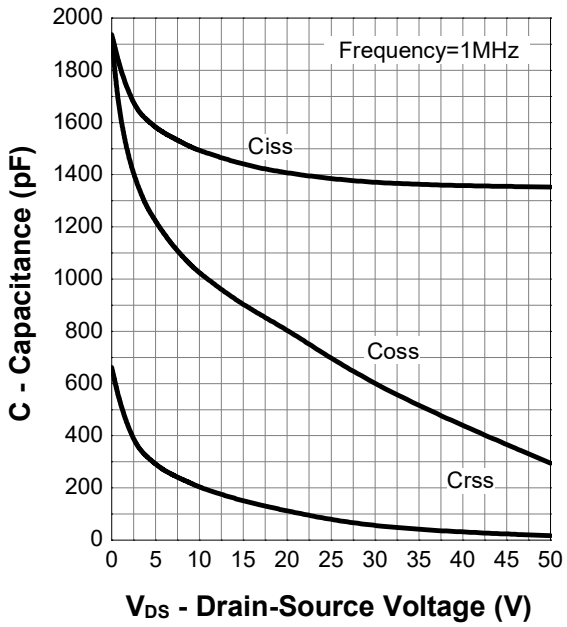
Normalized On Resistance



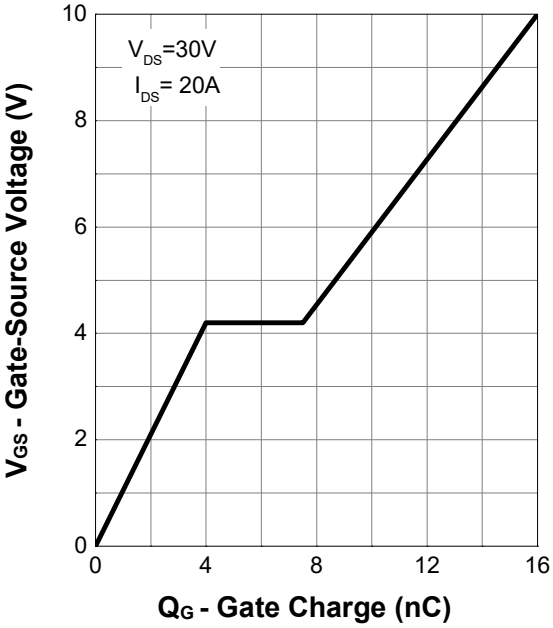
Diode Forward Current



Capacitance

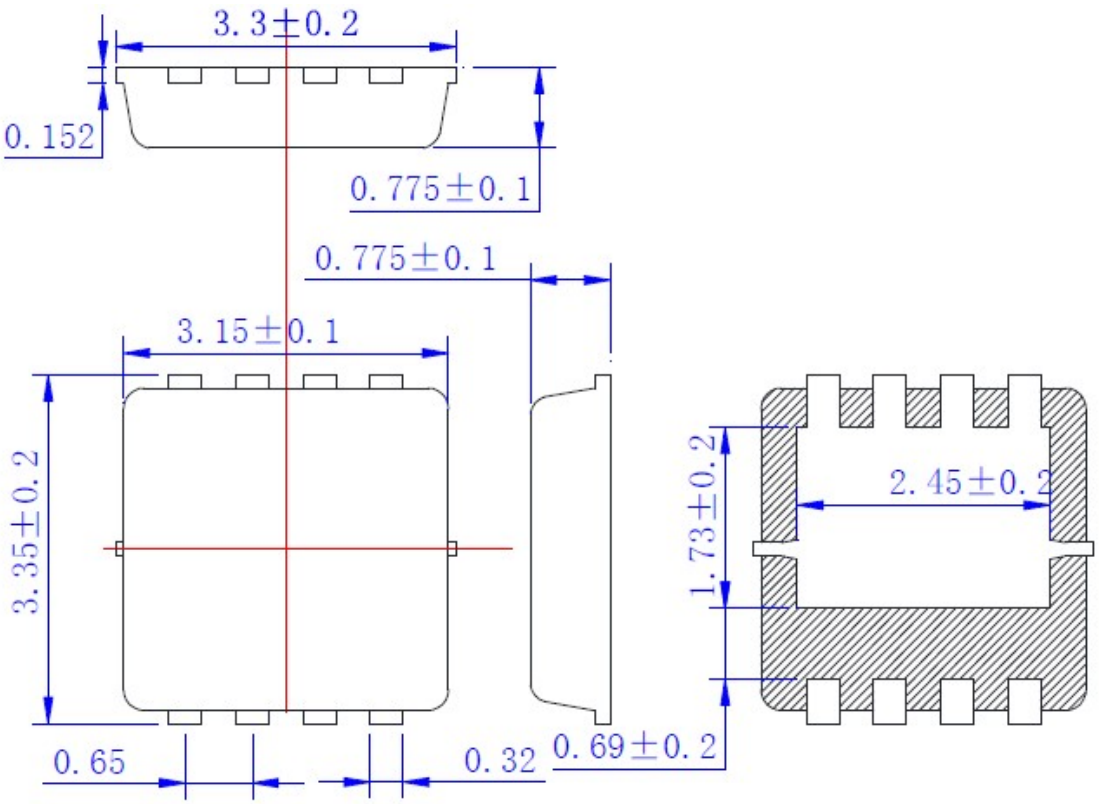


Gate Charge



8. Package Dimensions

PDFN3.3*3.3



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