P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Advanced trench cell design
- ☑ Low Thermal Resistance

1.2 Applications

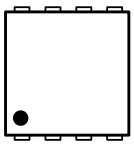
- ☑ Motor drivers
- ☑ DC - DC Converter

1.3 Quick reference

- ☑ BV ≧ - 20V
- ☑ P_{tot} ≦ 50 W
- ☑ I_D ≦ - 90 A
- ☑ $R_{DS(ON)}$ ≦ 4.5 mΩ @ V_{GS} = - 4.5 V
- ☑ $R_{DS(ON)}$ ≦ 6.5 mΩ @ V_{GS} = - 2.5 V
- ☑ $R_{DS(ON)}$ ≦ 9.5 mΩ @ V_{GS} = - 1.8 V

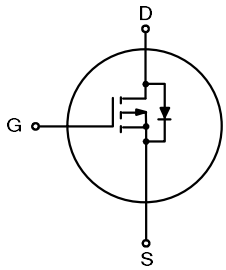
2. Pin Description

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



Top View

PDFN3.3x3.3-8L



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	T_C = 25 ℃, V_{GS} = -4.5 V	-	-90	A
		T_C = 100 ℃, V_{GS} = -4.5 V	-	-56	A
I_{DM}*,**,***	Pulsed Source Current	T_C = 25 ℃, V_{GS} = -4.5V	-	-194	A
P_{tot}*	Total Power Dissipation	T_C = 25 ℃	-	20	W
T_{stg}	Storage Temperature		- 55	150	℃
T_J	Junction Temperature		-	150	℃
I_S	Diode Forward Current	T_C = 25 ℃	-	-90	A
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD}= -20V , L= 1 mH	-	564	mJ
$R_{\theta JC}$*	Thermal Resistance- Junction to Ambient		-	6	℃ / 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. Marking Information

Product Name	Marking
N90P02Q	**90P02** **YWWXXX** **YWW: Date Code**

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
N90P02Q	**PDFN3.3*3.3-8L**			**2500**	

Note: JSHD defines " Green " as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)

6. Electrical Characteristics (T_C = 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	-20	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = -250 μA	-0.5	-	-1	V
I_{DSS}	Zero Gate Voltage Source Current	V_{DS} = -16V, V_{GS} = 0 V	-	-	-1	μA
I_{GSS}	Gate Leakage Current	V_{GS} = ± 12V, V_{DS} = 0 V	-	-	±100	nA
$R_{DS(ON)}$[a]	Drain-Source On-State Resistance	V_{GS} = -4.5 V, I_D = -10A	-	3.8	4.5	mΩ
		V_{GS} = -2.5 V, I_D = -5A	-	5.5	6.5	mΩ
		V_{GS} = -1.8 V, I_D = -3 A	-	8.5	9.5	mΩ
Diode Characteristics						
V_{SD}[a]	Diode Forward Voltage	I_{SD} = -10A, V_{GS} = 0 V	-	-	-1.3	V
t_{rr}	Reverse Recovery Time	I_{SD} = -10A, dI_{SD}/dt = 100 A/μs	-	45	-	nS
Q_{rr}	Reverse Recovery Charge		-	25	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = -10V Frequency = 1 MHz	-	5008	-	pF
C_{oss}	Output Capacitance		-	614	-	
C_{rss}	Reverse Transfer Capacitance		-	499	-	
t_d(on)	Turn-on Delay Time	V_{DS} = -10V, V_{GEN} = -4.5 V, R_G = 3.9 Ω, R_L = 1Ω, I_D = -10A	-	7.8	-	nS
t_r	Turn-on Rise Time		-	42	-	
t_d(off)	Turn-off Delay Time		-	177	-	
t_f	Turn-off Fall Time		-	64	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{DS} = -10V, VGS = -4.5 V, I_{DS} = -10A	-	46	-	nC
Q_{gs}	Gate-Source Charge		-	14	-	
Q_{gd}	Gate-Drain Charge		-	10	-	

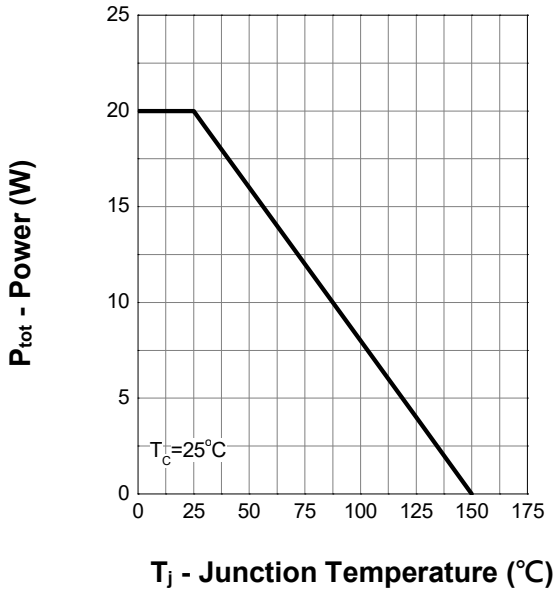
Notes：

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

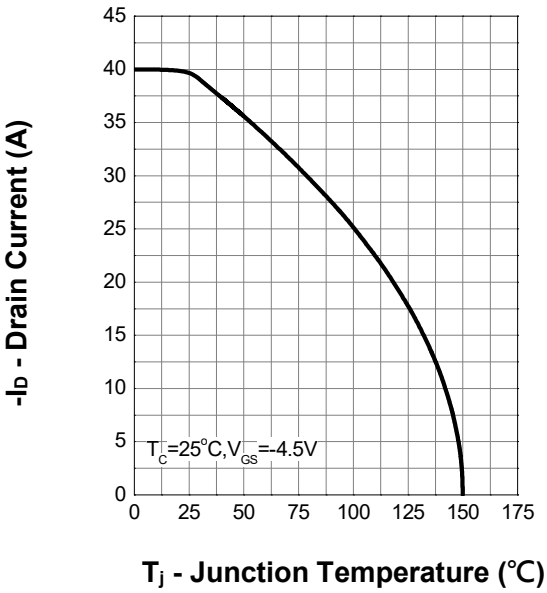
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics

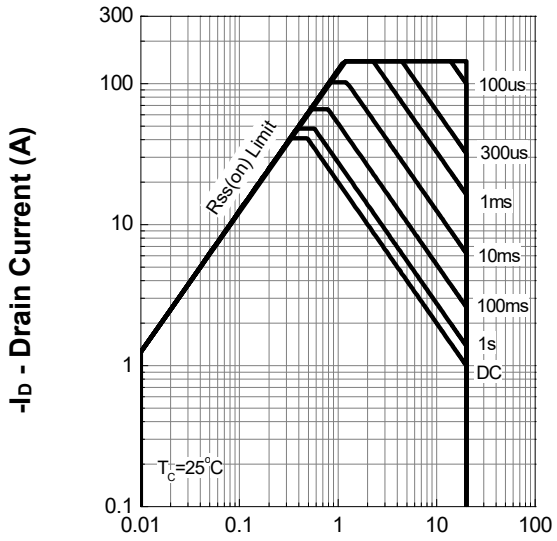
Power Capability



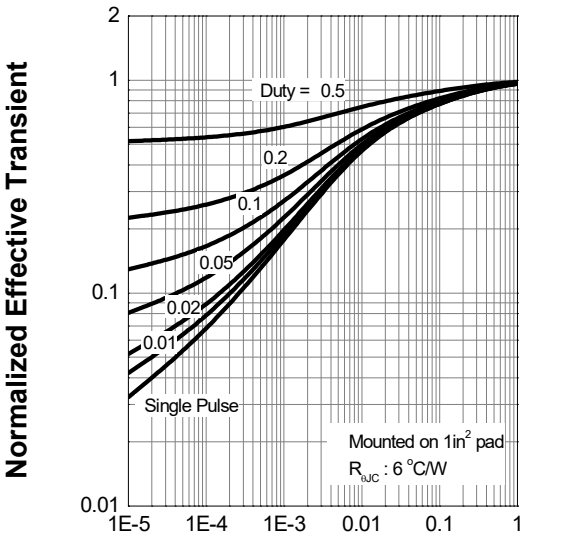
Current Capability



Safe Operation Area

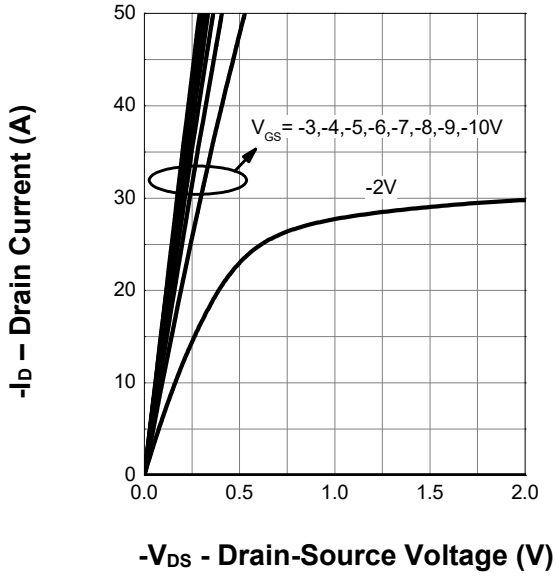


Thermal Transient Impedance

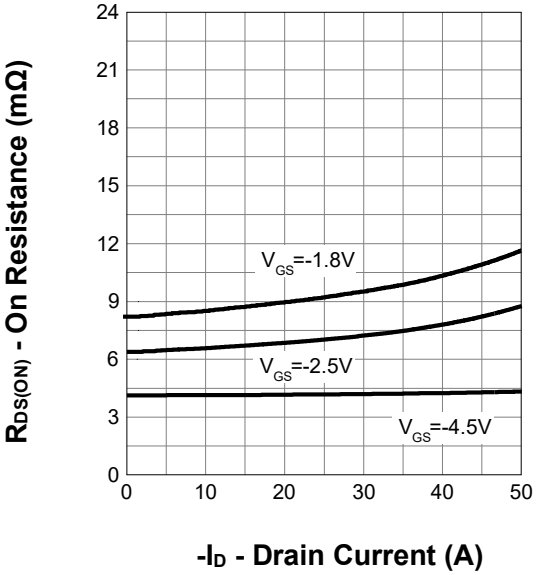


7. Typical Characteristics (cont.)

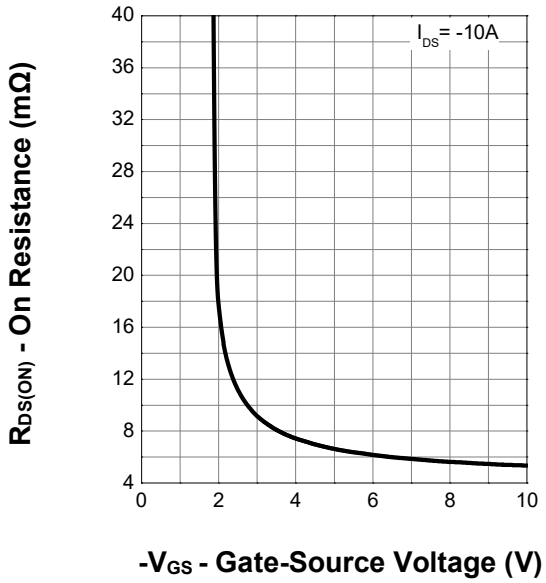
Output Characteristics



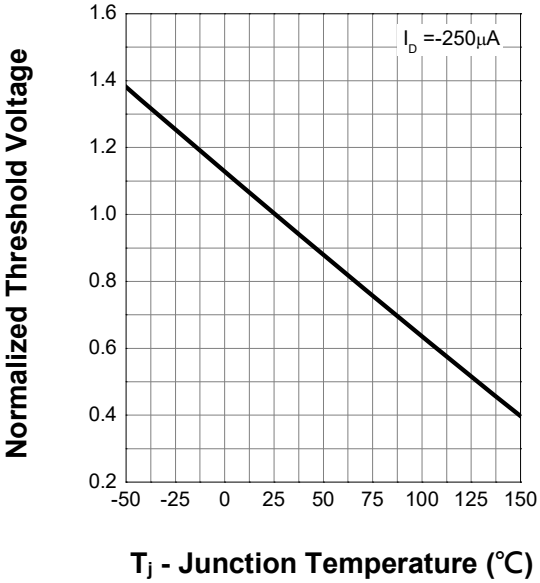
Drain-Source On Resistance



Transfer Characteristics

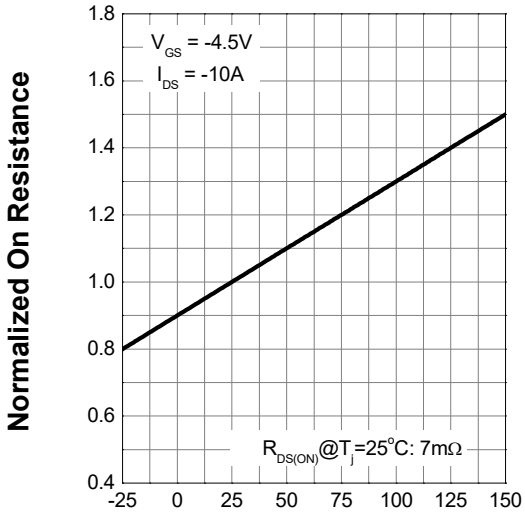


Gate Threshold Voltage

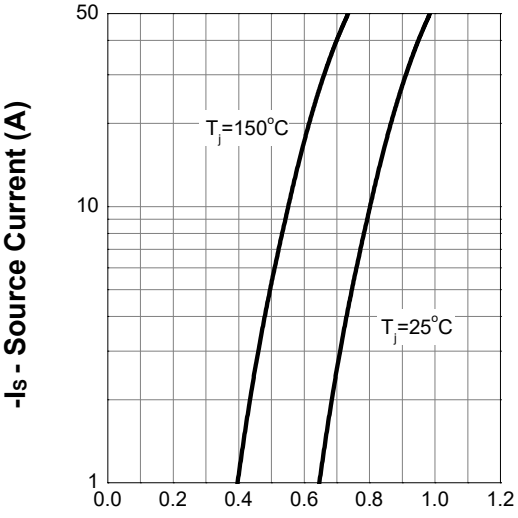


7. Typical Characteristics (cont.)

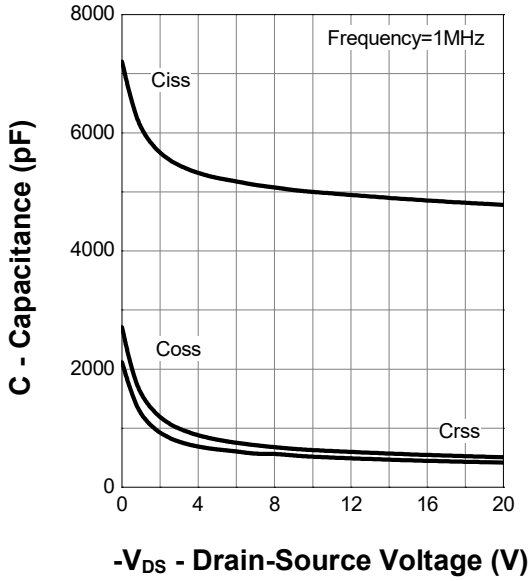
Drain-Source On Resistance



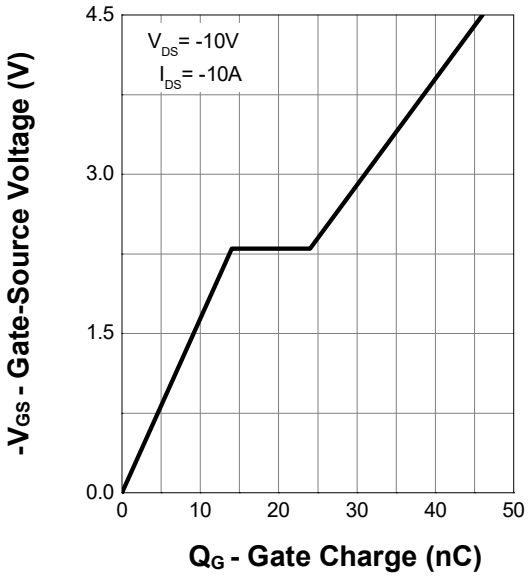
Body Diode Characteristics



Capacitance



Gate Charge



8. Package Dimensions

PDFN3.3*3.3-8L