

NCE N-Channel Super Trench II Power MOSFET

Description

The series of devices uses **Super Trench II** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g . This device is ideal for high-frequency switching and synchronous rectification.

Application

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

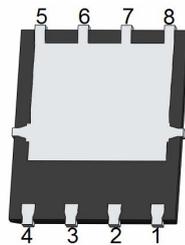
General Features

- $V_{DS} = 85V, I_D = 110A$
 $R_{DS(ON)} = 3.7m\Omega$, typical @ $V_{GS} = 10V$
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 150 °C operating temperature
- Pb-free lead plating
- 100% UIS tested
- 100% ΔV_{ds} tested

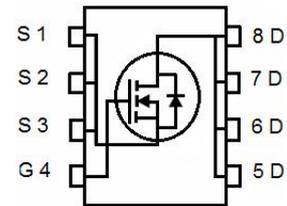
PDFN 5X6-8L



Top View



Bottom View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
P045N85G	NCEP045N85G	PDFN5x6-8L	Ø330mm	12mm	5000units

Absolute Maximum Ratings ($T_c = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	85	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	110	A
Drain Current-Continuous($T_c = 100^\circ C$)	$I_D(100^\circ C)$	82	A
Pulsed Drain Current	I_{DM}	440	A
Maximum Power Dissipation	P_D	120	W
Derating factor		0.96	W/ $^\circ C$
Single pulse avalanche energy (Note 1)	E_{AS}	538	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.04	$^\circ C/W$
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Electrical Characteristics (T_c=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	85	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =85V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0	3.0	4.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	4.0	4.5	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =40A	-	70	-	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =40V, V _{GS} =0V, F=1.0MHz	-	3600	-	pF
Output Capacitance	C _{oss}		-	775	-	pF
Reverse Transfer Capacitance	C _{rss}		-	35	-	pF
Switching Characteristics (Note 2)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =40V, I _D =20A V _{GS} =10V, R _G =1.6Ω	-	26	-	nS
Turn-on Rise Time	t _r		-	16	-	nS
Turn-Off Delay Time	t _{d(off)}		-	60	-	nS
Turn-Off Fall Time	t _f		-	15	-	nS
Total Gate Charge	Q _g	V _{DS} =40V, I _D =20A, V _{GS} =10V	-	61	-	nC
Gate-Source Charge	Q _{gs}		-	17	-	nC
Gate-Drain Charge	Q _{gd}		-	16.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =20A	-	-	1.2	V
Diode Forward Current	I _S		-	-	110	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F =55A di/dt = 100A/μs	-	72	-	nS
Reverse Recovery Charge	Q _{rr}		-	160	-	nC

Notes:

1. EAS condition : T_j=25°C, V_{DD}=40V, V_G=10V, L=0.5mH, R_g=25Ω
2. Guaranteed by design, not subject to production
3. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_J(MAX)=150°C. The SOA curve provides a single pulse rating.

Typical Electrical and Thermal Characteristics

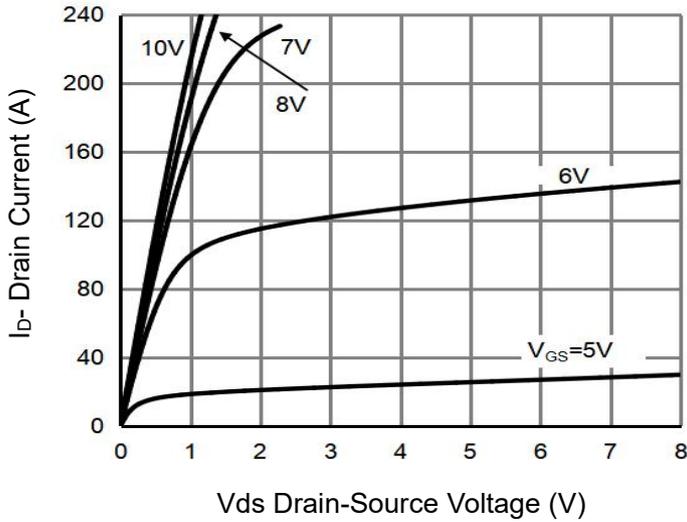


Figure 1 Output Characteristics

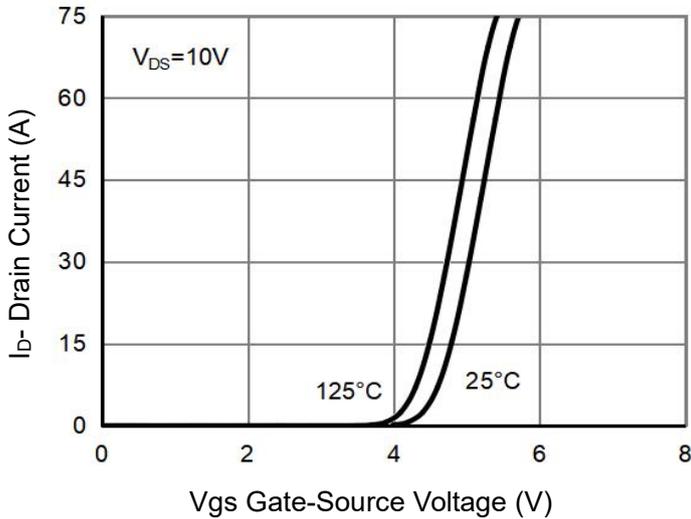


Figure 2 Transfer Characteristics

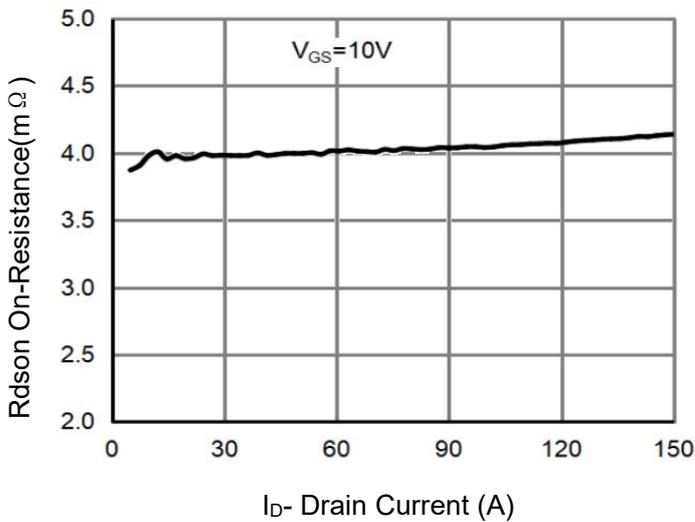


Figure 3 Rdson- Drain Current

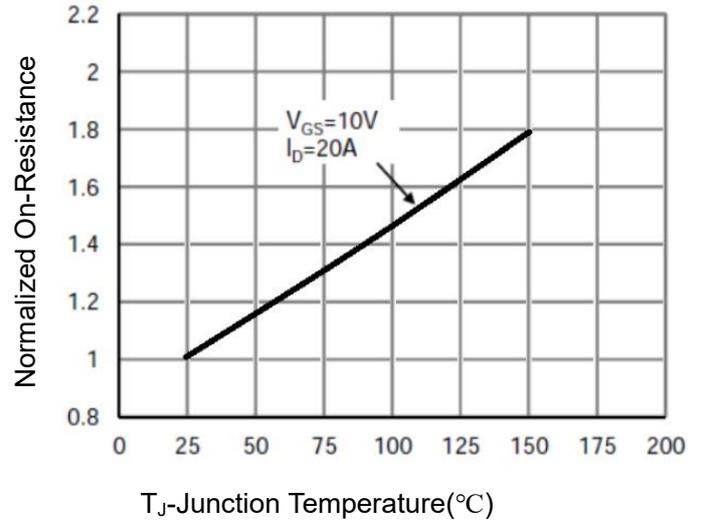


Figure 4 Rdson-Junction Temperature

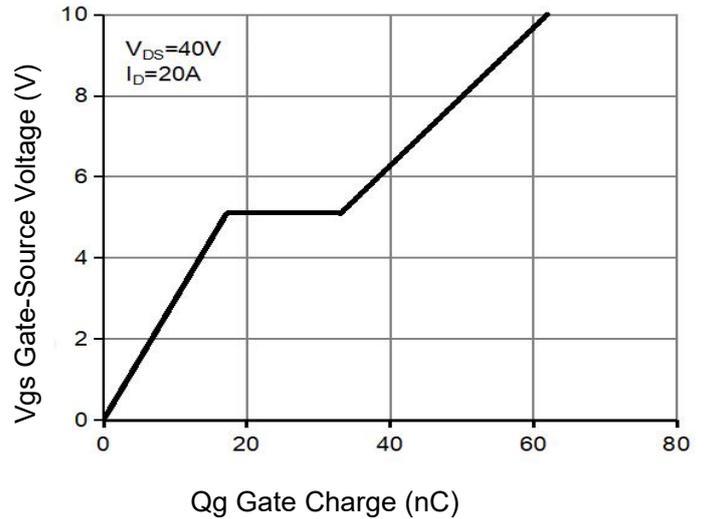


Figure 5 Gate Charge

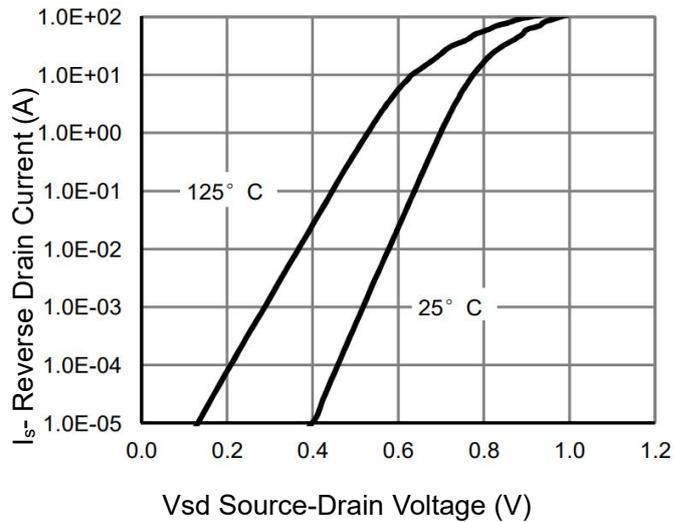
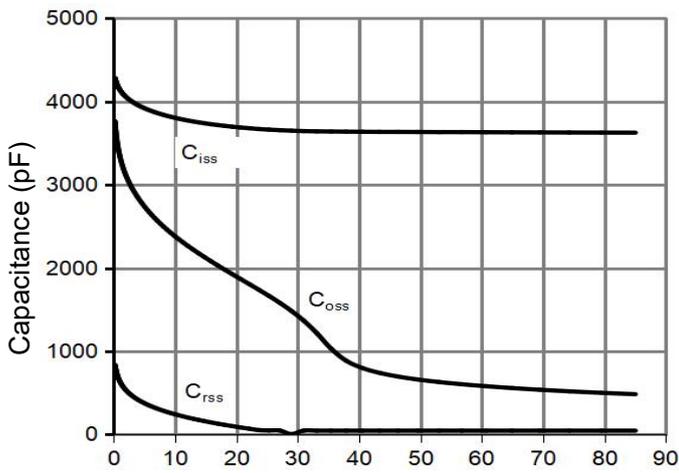
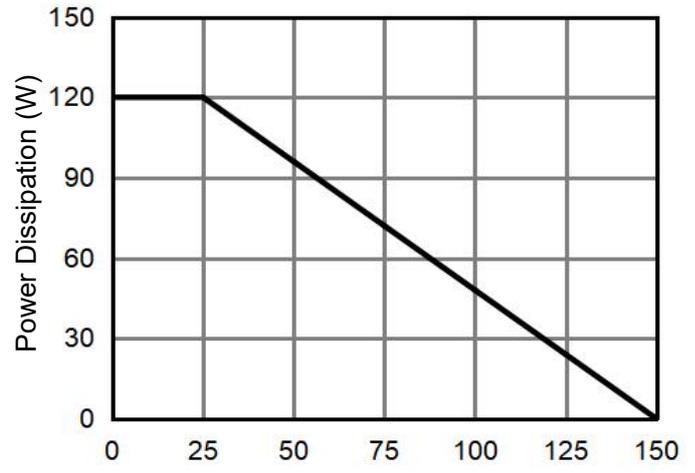


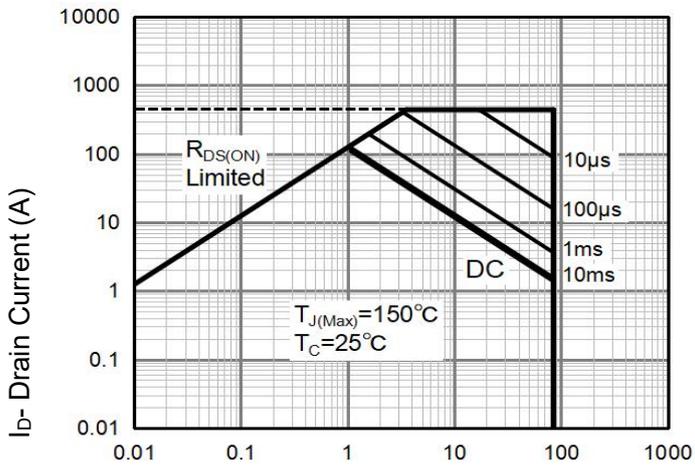
Figure 6 Source- Drain Diode Forward



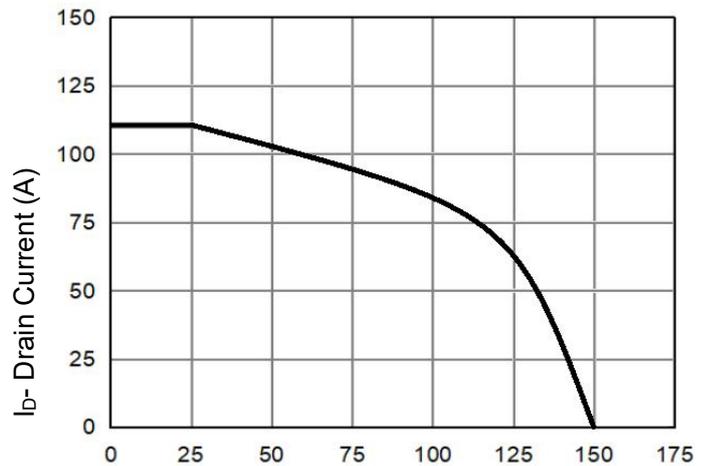
Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



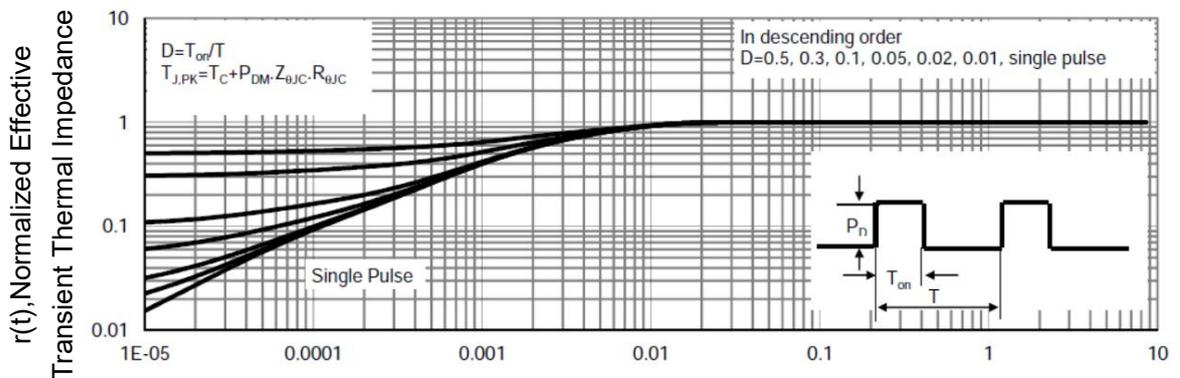
T_C-Case Temperature(°C)
Figure 9 Power De-rating



Vds Drain-Source Voltage (V) (Note3)
Figure 8 Safe Operation Area



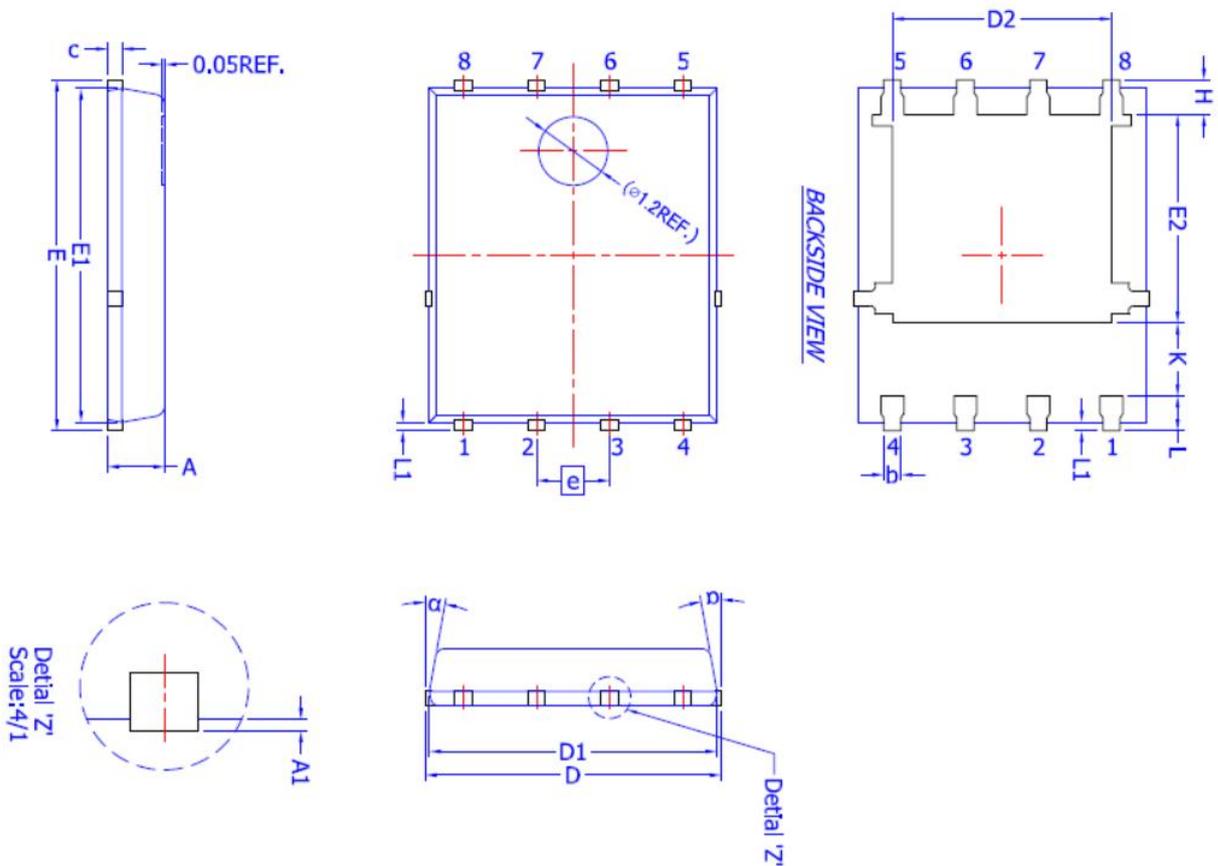
T_C-Case Temperature (°C)
Figure 10 Current De-rating



Square Wave Pluse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.30	0.40	0.50
c	0.20	0.25	0.30
D	5.15 BSC		
D1	5.00 BSC		
D2	3.76	3.81	3.86
E	6.15 BSC		
E1	5.80	5.85	5.90
E2	3.45	3.65	3.85
e	1.27 BSC		
H	0.51	0.61	0.71
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.08	0.15	0.23
α	10°	11°	12°

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