

NCE N-Channel Super Trench II Power MOSFET

Description

The NCEP035N85GU 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

- $V_{DS} = 85V, I_D = 130A$
- $R_{DS(on)} = 3.0m\Omega$ (typical) @ $V_{GS} = 10V$
- Excellent gate charge $\times R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 150 °C operating temperature
- Pb-free lead plating

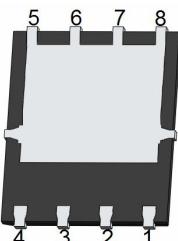
100% UIS TESTED!

100% ΔV_{ds} TESTED!

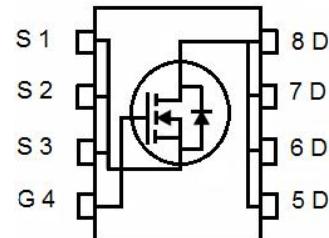
DFN 5X6



Top View



Bottom View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
P035N85GU	NCEP035N85GU	DFN5X6-8L	-	-	-

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	130	A
Drain Current-Continuous($T_c=100^\circ C$)	$I_D(100^\circ C)$	100	A
Pulsed Drain Current	I_{DM}	520	A
Maximum Power Dissipation	P_D	160	W
Derating factor		1.28	W/ $^\circ C$
Single pulse avalanche energy (Note 1)	E_{AS}	920	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case	R_{eJC}	0.78	°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	V _{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	3	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =65A	-	3.0	3.5	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =65A		60	-	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =40V, V _{GS} =0V, F=1.0MHz	-	4950	-	PF
Output Capacitance	C _{oss}		-	850	-	PF
Reverse Transfer Capacitance	C _{rss}		-	40	-	PF
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =0V, F=1.0MHz	-	3	-	Ω
Switching Characteristics (Note 2)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =40V, I _D =65A V _{GS} =10V, R _G =3Ω	-	18	-	nS
Turn-on Rise Time	t _r		-	11	-	nS
Turn-Off Delay Time	t _{d(off)}		-	38	-	nS
Turn-Off Fall Time	t _f		-	9	-	nS
Total Gate Charge	Q _g	V _{DS} =40V, I _D =65A, V _{GS} =10V	-	88	-	nC
Gate-Source Charge	Q _{gs}		-	22	-	nC
Gate-Drain Charge	Q _{gd}		-	25	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =65A	-		1.2	V
Diode Forward Current	I _S		-	-	130	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 65A di/dt = 100A/μs	-	72	-	nS
Reverse Recovery Charge	Q _{rr}		-	102	-	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

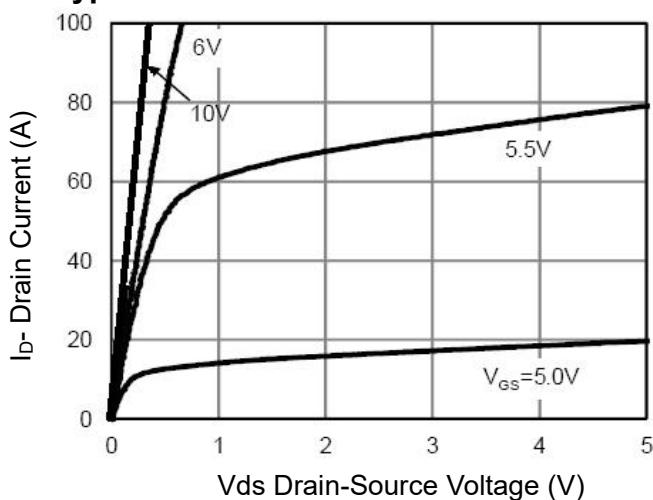


Figure 1 Output Characteristics

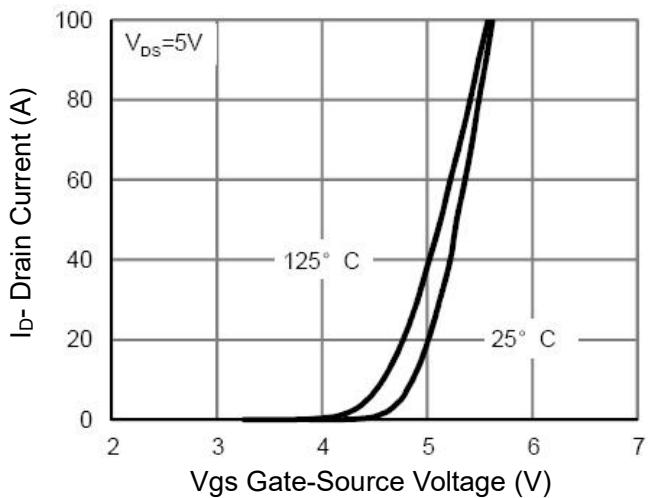


Figure 2 Transfer Characteristics

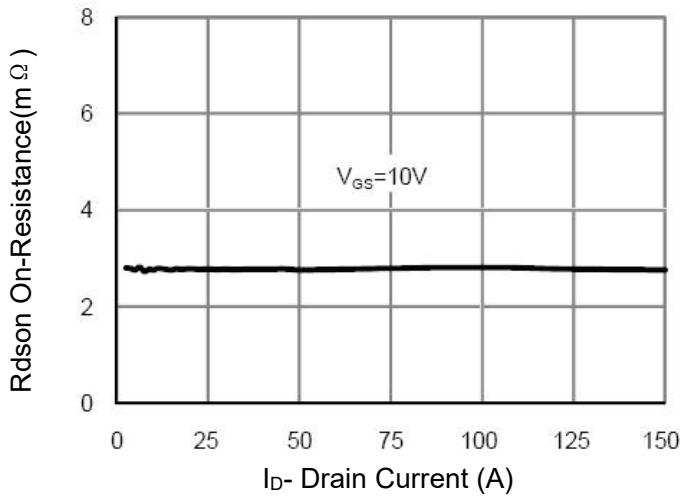


Figure 3 Rdson- Drain Current

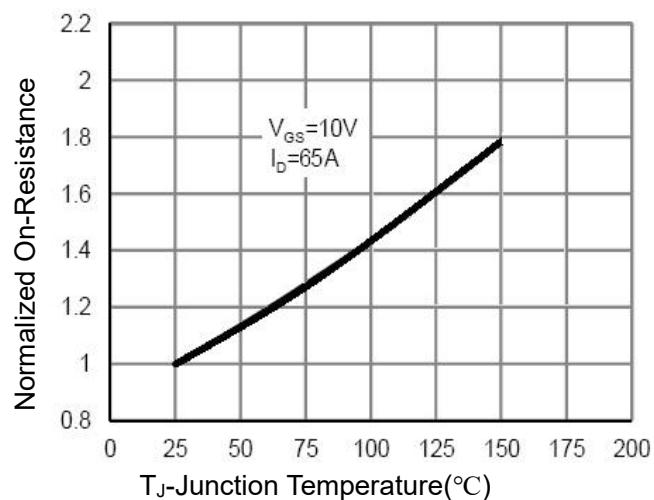


Figure 4 Rdson-Junction Temperature

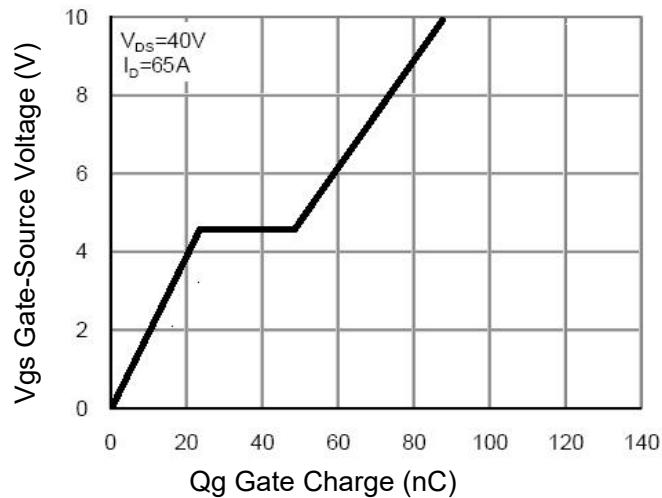


Figure 5 Gate Charge

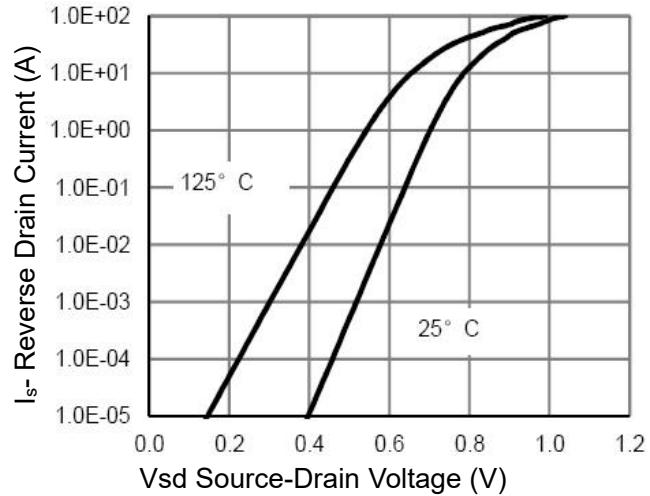


Figure 6 Source- Drain Diode Forward

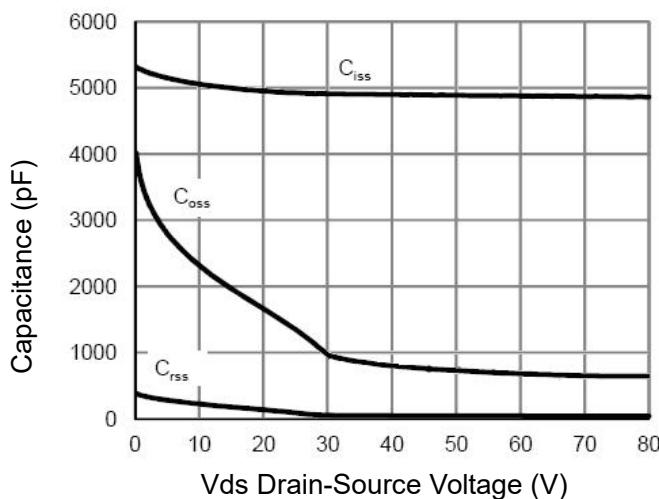


Figure 7 Capacitance vs Vds

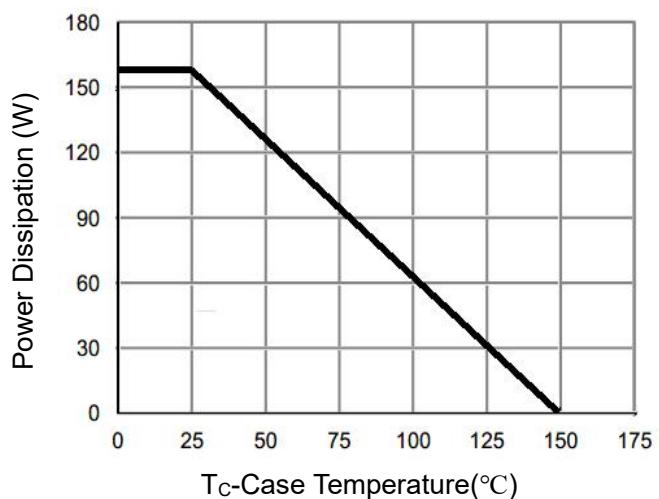


Figure 9 Power De-rating

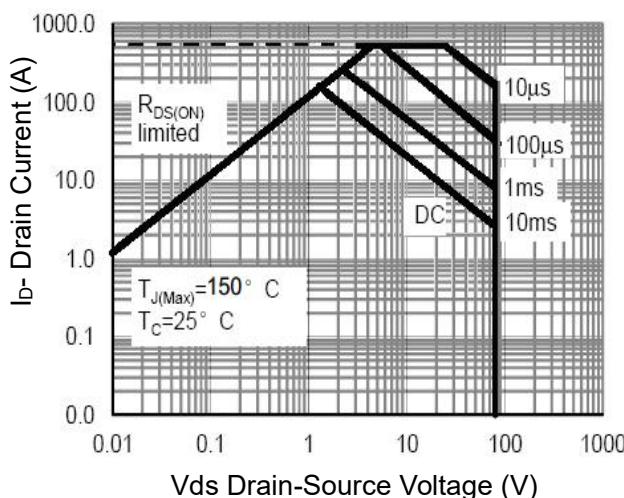


Figure 8 Safe Operation Area (Note 3)

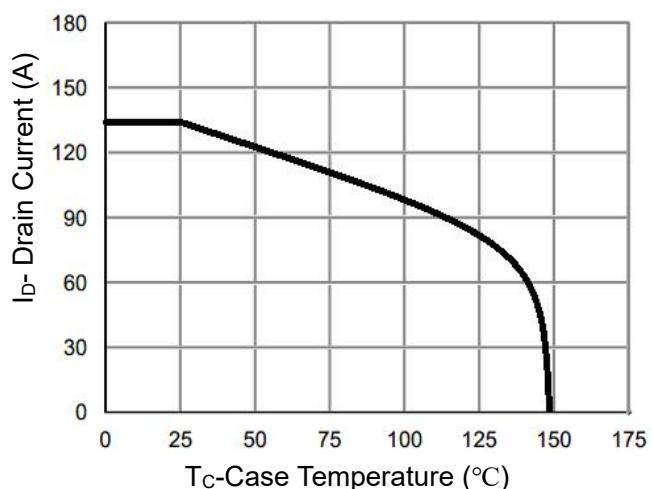


Figure 10 Current De-rating

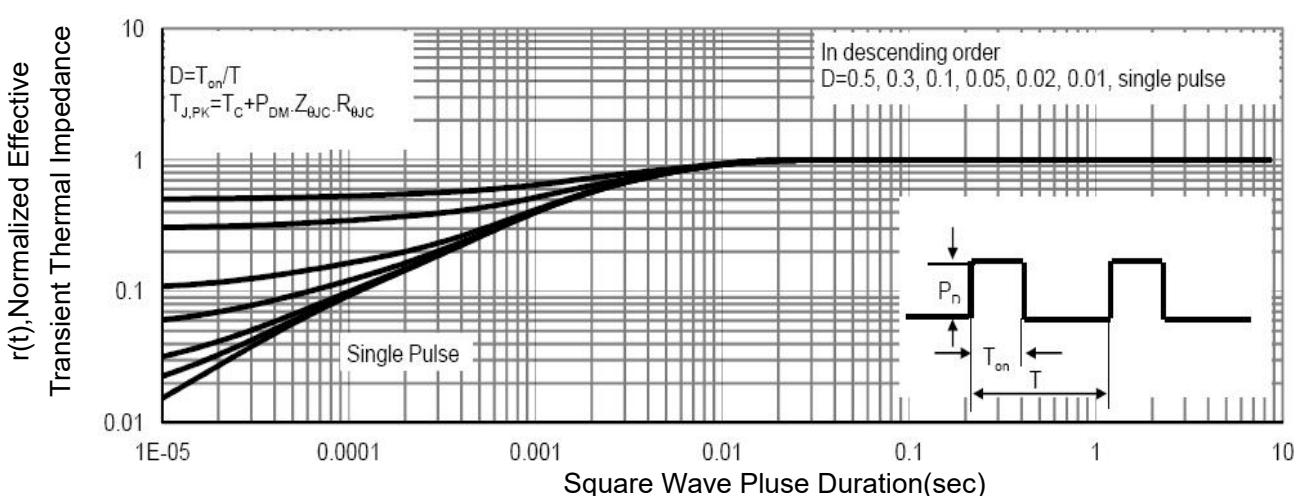
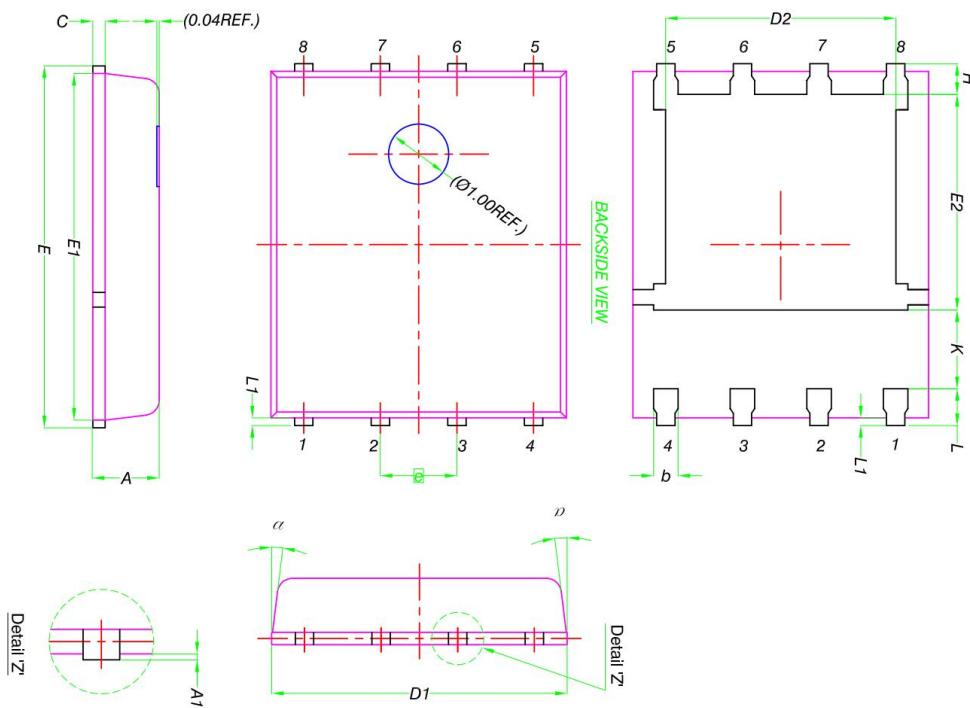
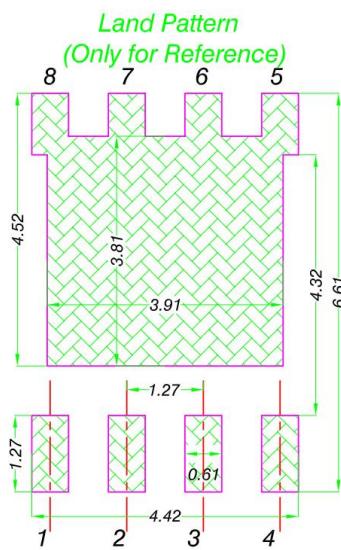


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
[e] 1.27 BSC			
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°



Note:

- All Dimension Are In mm.
- Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs.
Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
- Package Body Sizes Determined At The Outermost Extremes Of The Plastic Body Exclusive Of Mold Flash, Tie Bar , Tie Bar Burrs, Gate Burrs And Interlead Flash, But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.
- The Package Top May Be Smaller Than The Package Bottom.

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