

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

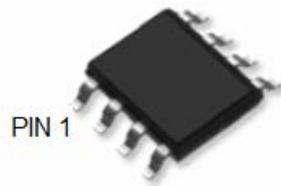
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

General Features

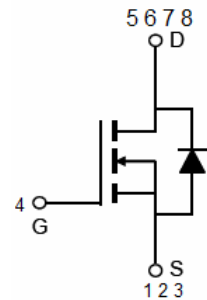
- $V_{DS} = 100V, I_D = 14A$
 $R_{DS(ON)} = 8.4m\Omega$, typical@ $V_{GS} = 10V$
 $R_{DS(ON)} = 10.0m\Omega$, typical@ $V_{GS} = 4.5V$
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 175 °C operating temperature
- Pb-free lead plating

100% UIS TESTED!
100% ΔV_{ds} TESTED!

SOP-8



Top View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCEP092N10AS	NCEP092N10AS	SOP-8	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	14	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	10	A
Pulsed Drain Current	I_{DM}	300	A
Maximum Power Dissipation	P_D	3.5	W
Single pulse avalanche energy ^(Note 4)	E_{AS}	350	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	36	$^\circ C/W$
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Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100		-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.7	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=14A$	-	8.4	9.2	m Ω
		$V_{GS}=4.5V, I_D=14A$	-	10.0	12.0	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=14A$		60	-	S
Dynamic Characteristics (Note3)						
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V,$ $F=1.0MHz$	-	3650	-	pF
Output Capacitance	C_{oss}		-	315	-	pF
Reverse Transfer Capacitance	C_{rss}		-	22	-	pF
Switching Characteristics (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=50V, I_D=14A$ $V_{GS}=10V, R_G=1.6\Omega$	-	16	-	nS
Turn-on Rise Time	t_r		-	11	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	35	-	nS
Turn-Off Fall Time	t_f		-	9	-	nS
Total Gate Charge	Q_g	$V_{DS}=50V, I_D=14A,$ $V_{GS}=10V$	-	70	-	nC
Gate-Source Charge	Q_{gs}		-	14.5	-	nC
Gate-Drain Charge	Q_{gd}		-	16.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 2)	V_{SD}	$V_{GS}=0V, I_S=14A$	-	-	1.2	V
Diode Forward Current	I_S		-	-	14	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}, I_F=14A$ $di/dt = 100A/\mu s$ (Note3)	-	60	-	nS
Reverse Recovery Charge	Q_{rr}		-	106	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
3. Guaranteed by design, not subject to production
4. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, L=0.25mH, R_g=25\Omega$

Typical Electrical and Thermal Characteristics

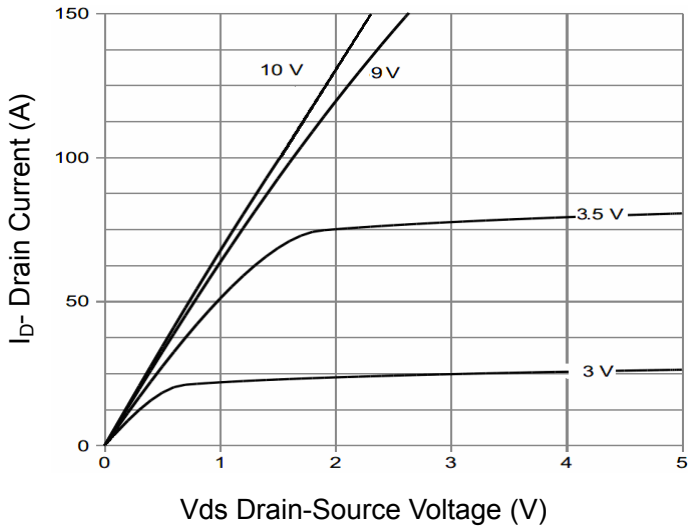


Figure 1 Output Characteristics

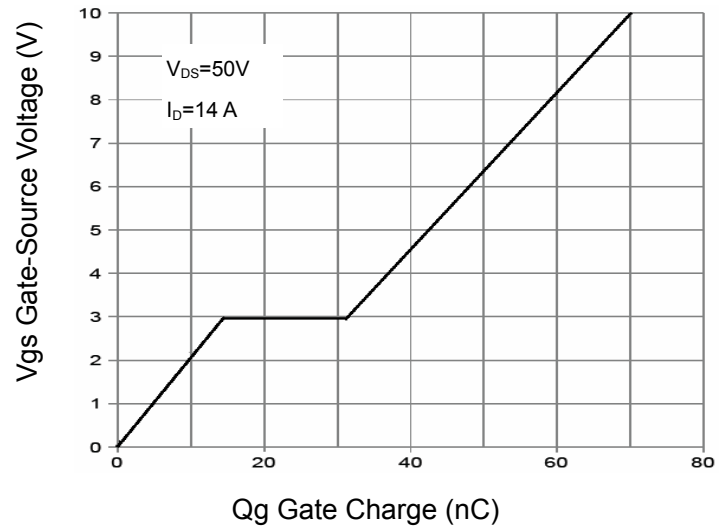


Figure 4 Gate Charge

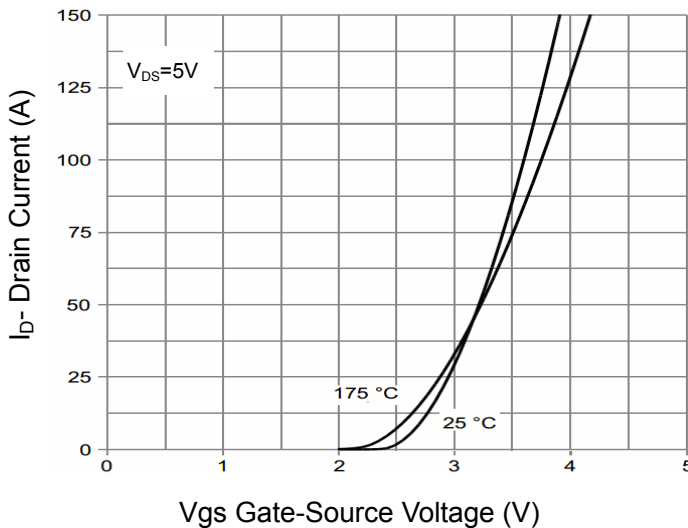


Figure 2 Transfer Characteristics

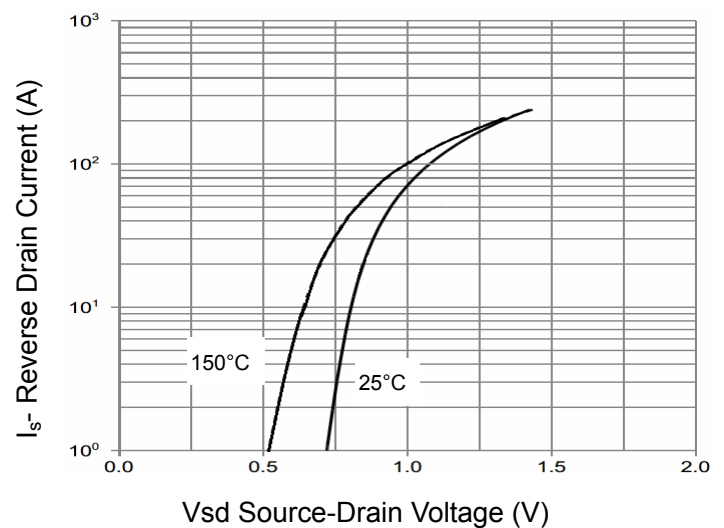


Figure 5 Source- Drain Diode Forward

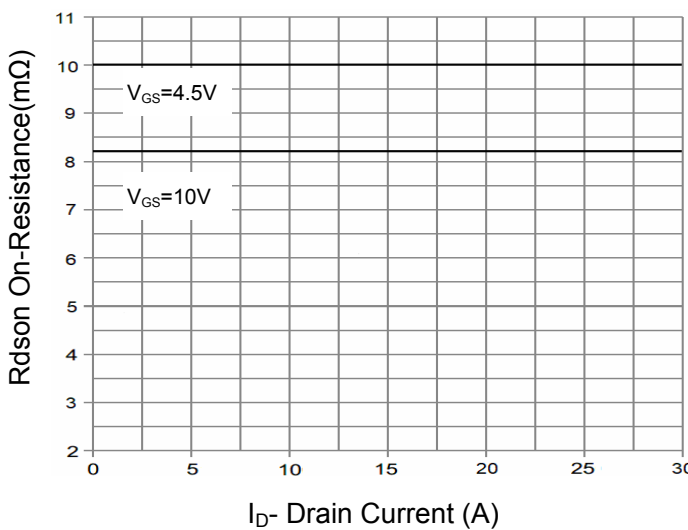


Figure 3 Rdson- Drain Current

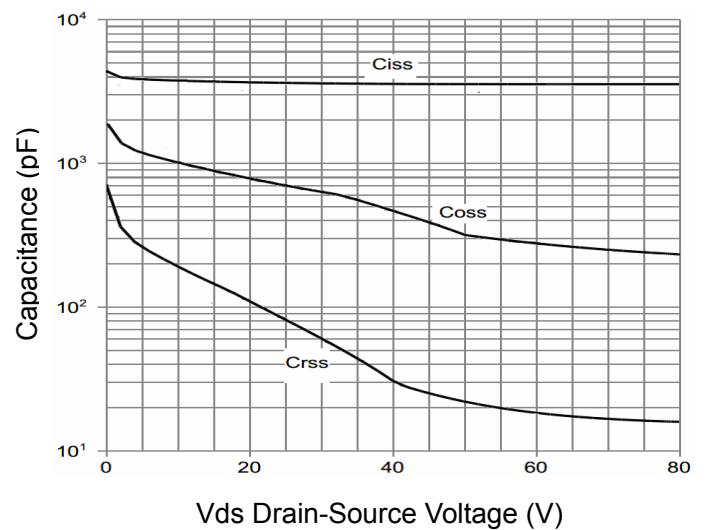
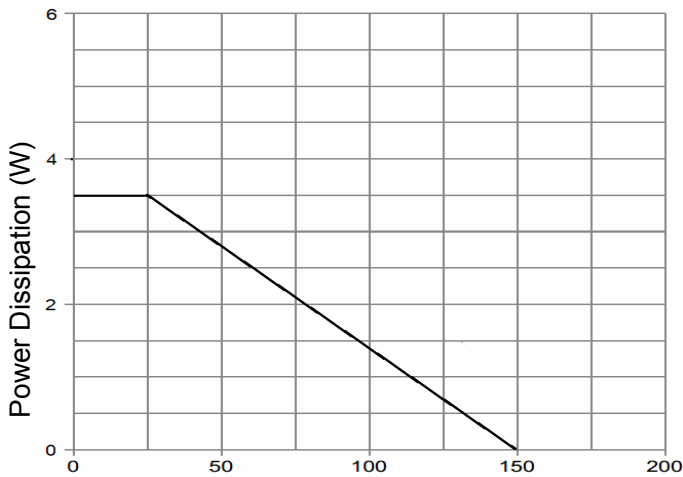
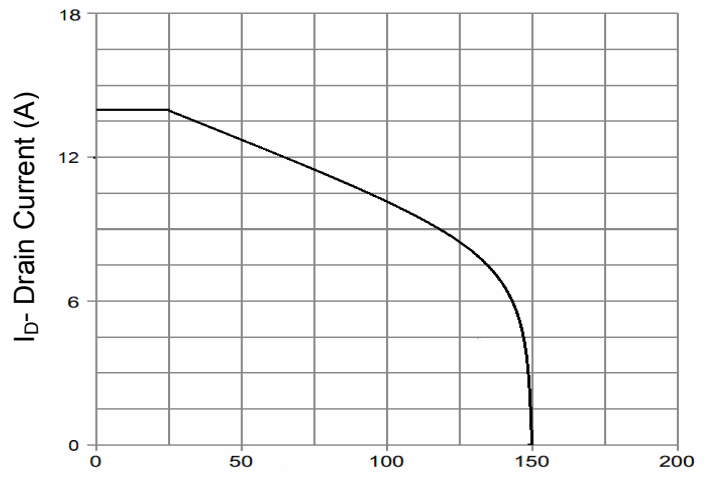


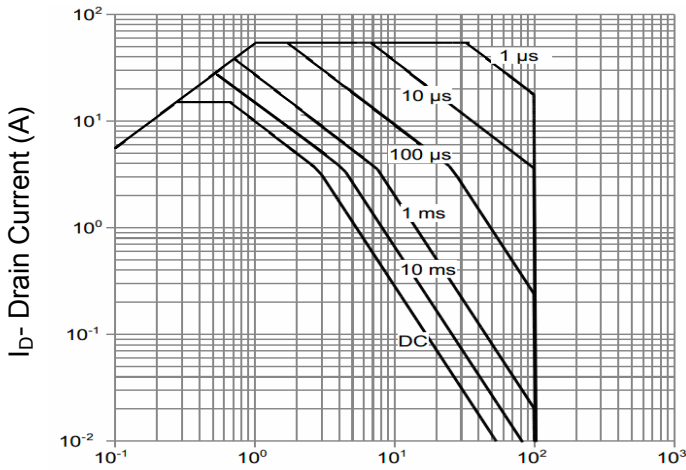
Figure 6 Capacitance vs Vds



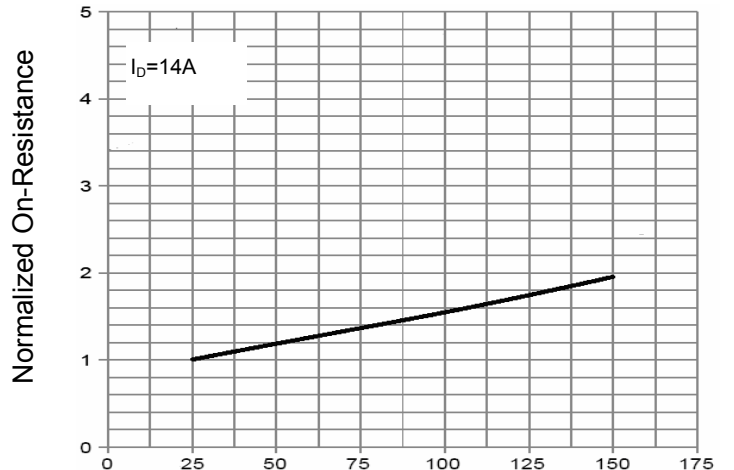
T_J -Junction Temperature ($^{\circ}C$)
Figure 7 Power De-rating



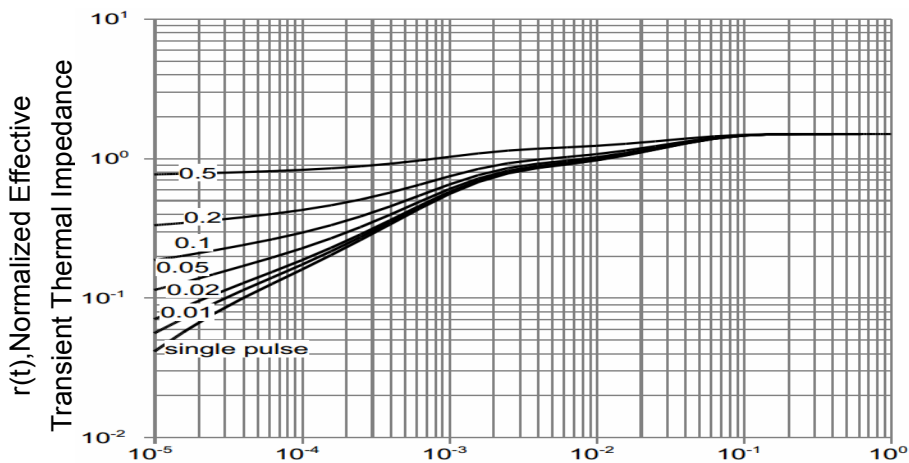
T_J -Junction Temperature ($^{\circ}C$)
Figure 9 Current De-rating



V_{ds} Drain-Source Voltage (V)
Figure 8 Safe Operation Area

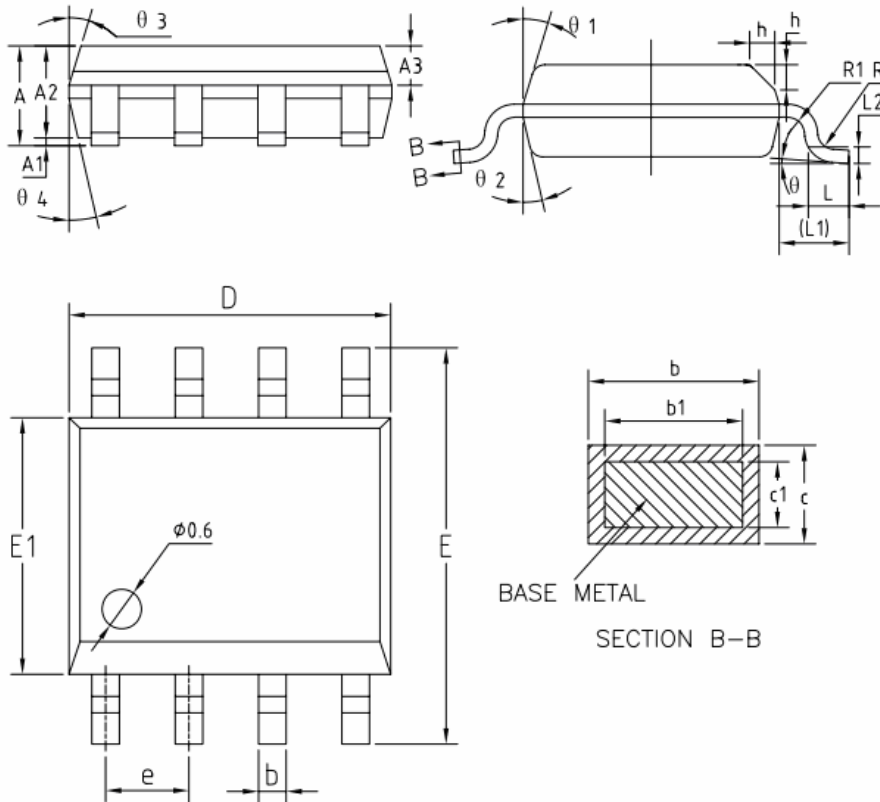


T_J -Junction Temperature ($^{\circ}C$)
Figure 10 R_{dson} -Junction Temperature



Square Wave Pulse Duration(sec)
Figure 11 Normalized Maximum Transient Thermal Impedance

Sop-8 Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0.10	0.15	0.25
A2	1.25	1.40	1.65
A3	0.50	0.60	0.70
b	0.38	-	0.51
b1	0.37	0.42	0.47
c	0.18	-	0.25
c1	0.17	0.20	0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.17	1.27	1.37
L	0.45	0.60	0.80
L1	1.04REF		
L2	0.25BSC		
R	0.07	-	-
R1	0.07	-	-
h	0.30	0.40	0.50
θ	0°	-	8°
θ 1	15°	17°	19°
θ 2	11°	13°	15°
θ 3	15°	17°	19°
θ 4	11°	13°	15°

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