

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

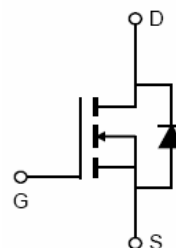
General Features

- $V_{DS} = 85V, I_D = 80A$
 $R_{DS(on)} = 7.5m\Omega$, typical @ $V_{GS} = 10V$
- 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!

TO-220



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCEP080N85	NCEP080N85	TO-220-3L	-	-	-

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	80	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	60	A
Pulsed Drain Current	I_{DM}	320	A
Maximum Power Dissipation	P_D	100	W
Derating factor		0.67	W/ $^\circ C$
Single pulse avalanche energy ^(Note 4)	E_{AS}	352	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.5	$^\circ C/W$
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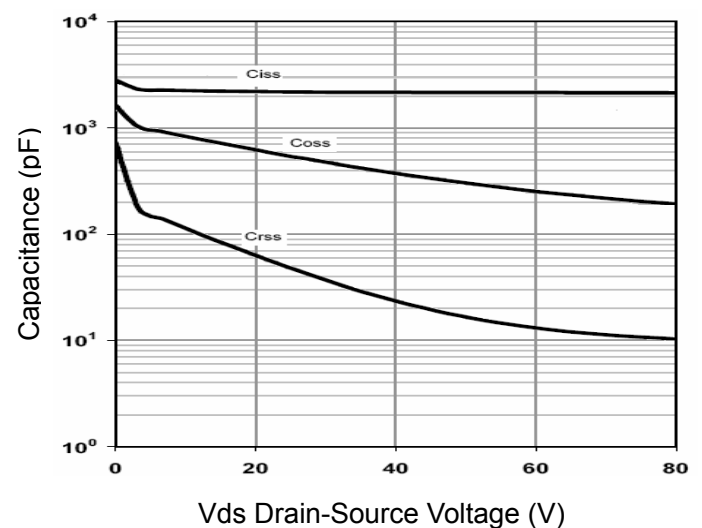
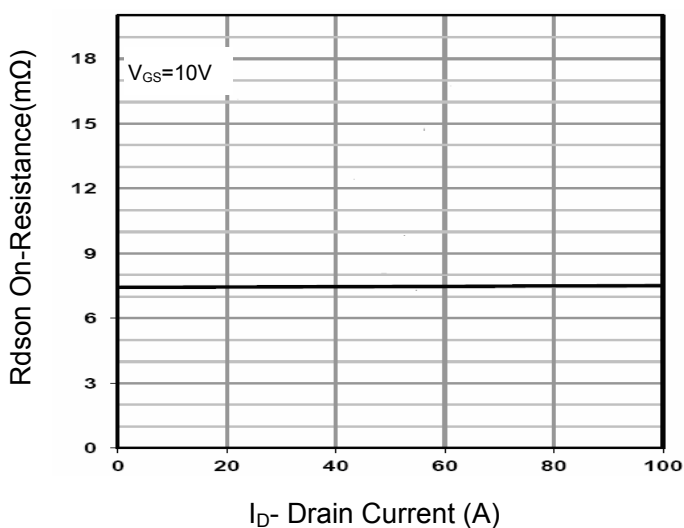
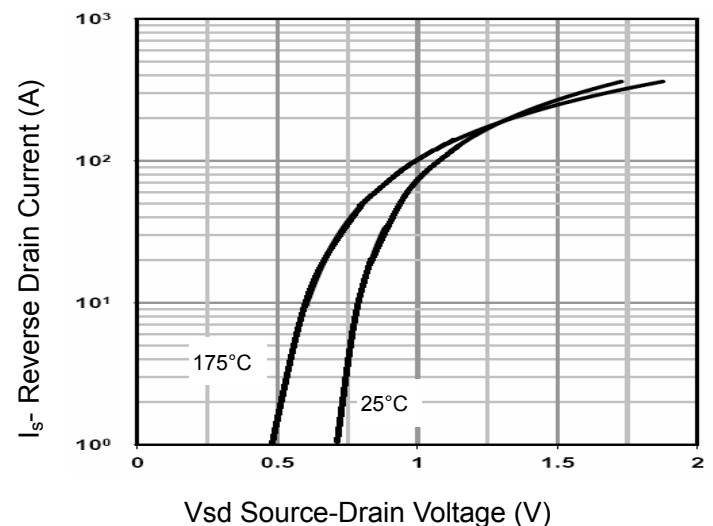
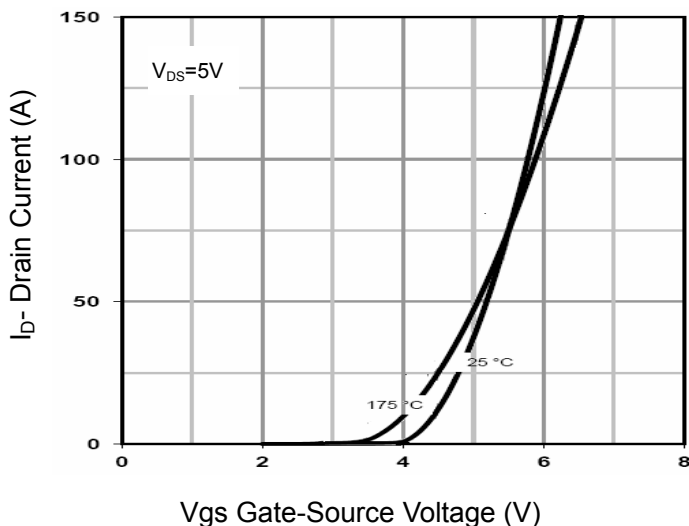
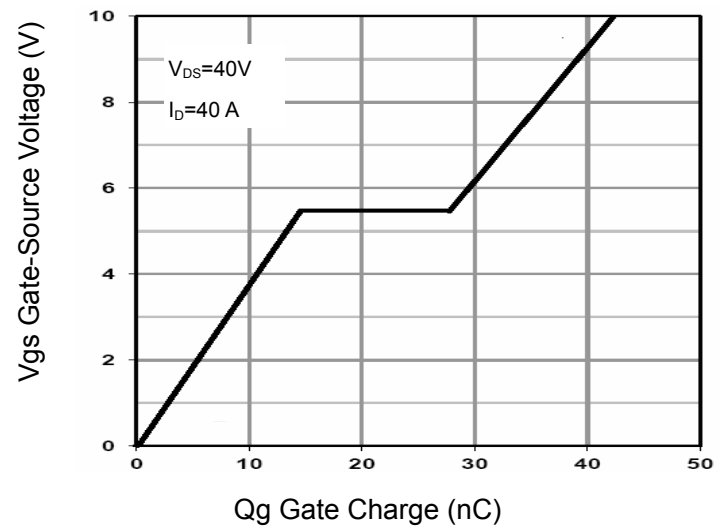
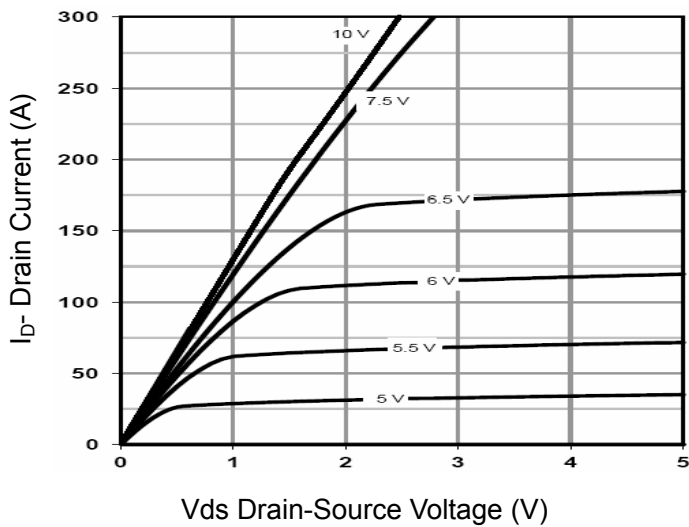
Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

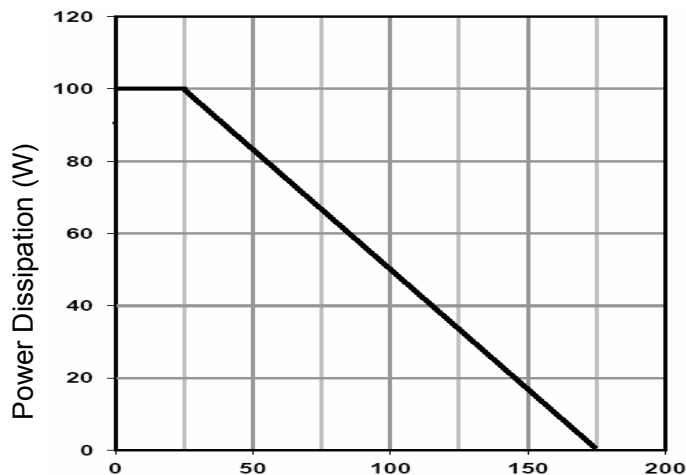
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	85		-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=85V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	3.0	4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=40A$	-	7.5	8.0	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=40A$		50	-	S
Dynamic Characteristics (Note3)						
Input Capacitance	C_{ISS}	$V_{DS}=40V, V_{GS}=0V,$ $F=1.0MHz$	-	2059	-	pF
Output Capacitance	C_{OSS}		-	393	-	pF
Reverse Transfer Capacitance	C_{RSS}		-	25.4	-	pF
Switching Characteristics (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=40V, I_D=40A$ $V_{GS}=10V, R_G=1.6\Omega$	-	12	-	nS
Turn-on Rise Time	t_r		-	9	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29	-	nS
Turn-Off Fall Time	t_f		-	7	-	nS
Total Gate Charge	Q_g	$V_{DS}=40V, I_D=40A,$ $V_{GS}=10V$	-	41.4	-	nC
Gate-Source Charge	Q_{gs}		-	14.9	-	nC
Gate-Drain Charge	Q_{gd}		-	12.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 2)	V_{SD}	$V_{GS}=0V, I_S=40A$	-	-	1.2	V
Diode Forward Current	I_S		-	-	80	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}C, I_F = 40A$ $di/dt = 100A/\mu s$ (Note3)	-	55	-	nS
Reverse Recovery Charge	Q_{rr}		-	98	-	nC

Notes:

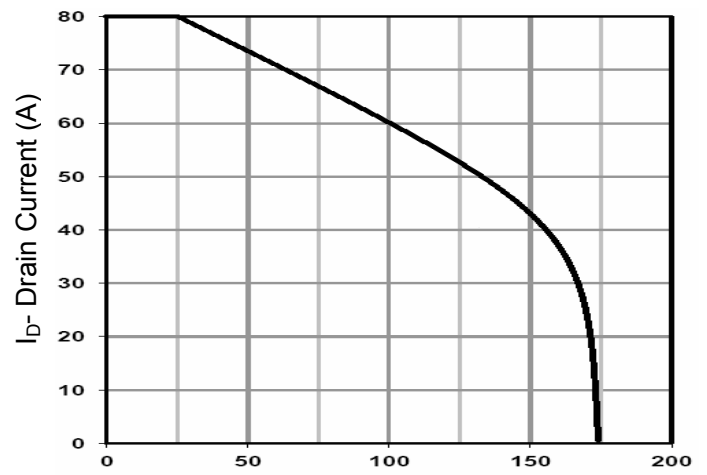
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
3. Guaranteed by design, not subject to production
4. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, L=0.25mH, R_g=25\Omega$

Typical Electrical and Thermal Characteristics

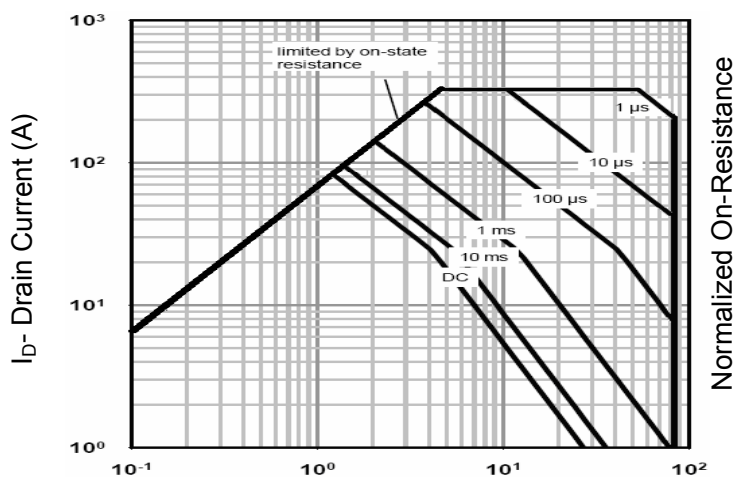




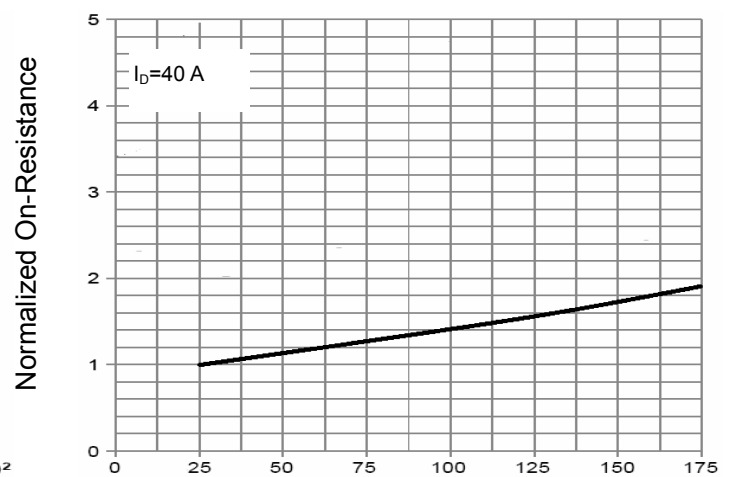
T_J -Junction Temperature(°C)
Figure 7 Power De-rating



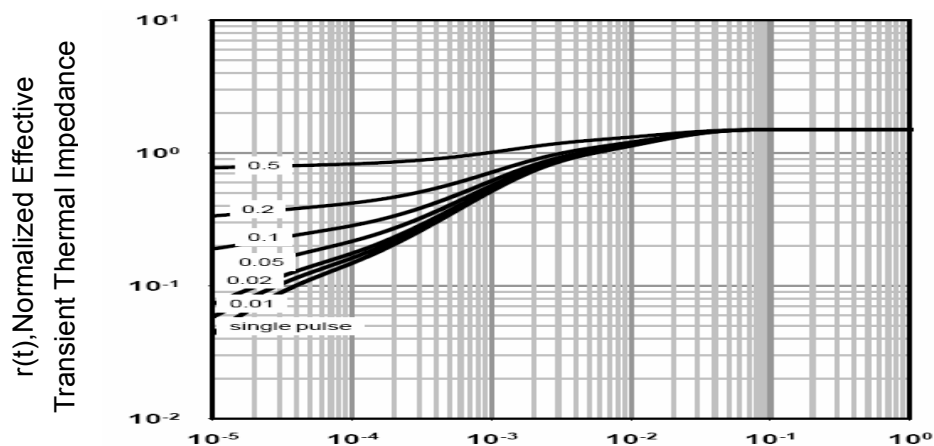
T_J -Junction Temperature (°C)
Figure 9 Current De-rating



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

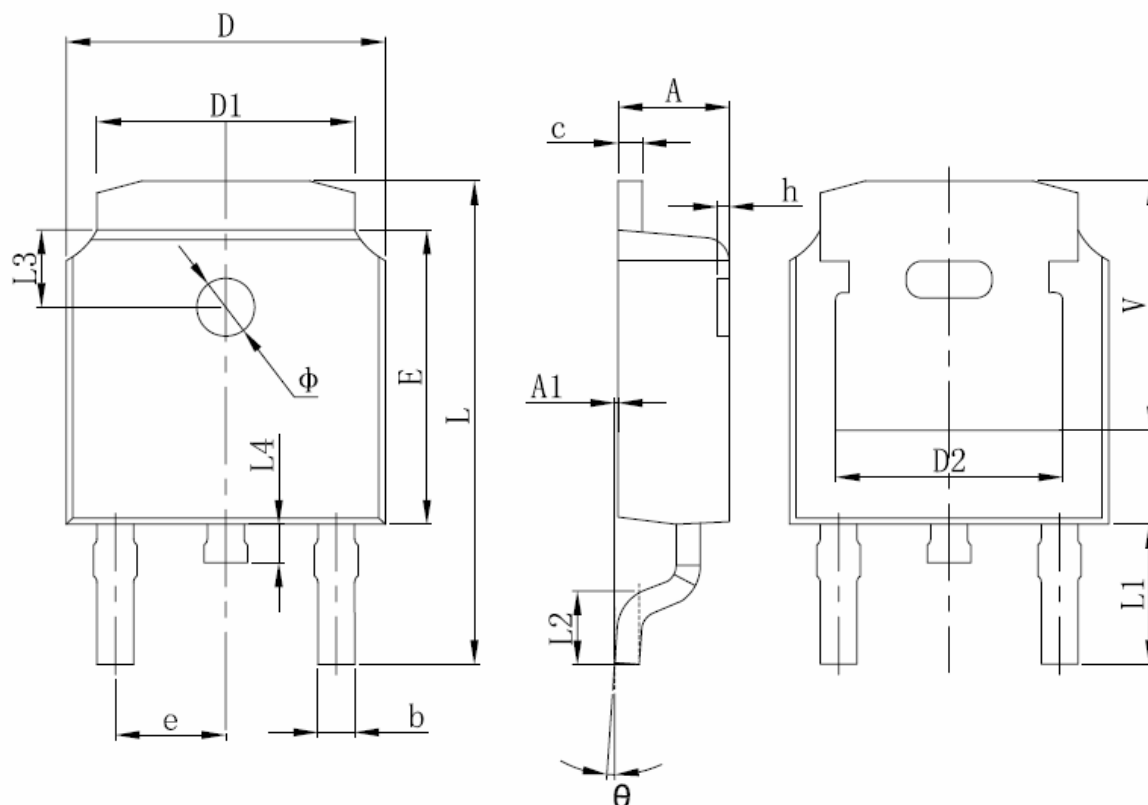


T_J -Junction Temperature(°C)
Figure 10 R_{dson} -Junction Temperature



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

TO-252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

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