

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

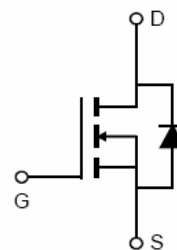
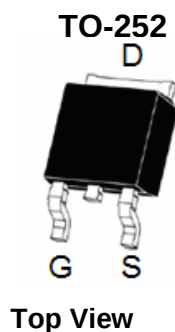
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

General Features

- $V_{DS} = 85V, I_D = 75A$
 $R_{DS(ON)} = 8.1m\Omega$, 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!



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCEP080N85AK	NCEP080N85AK	TO-252-2L	-	-	-

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	75	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	55	A
Pulsed Drain Current	I_{DM}	300	A
Maximum Power Dissipation	P_D	90	W
Derating factor		0.6	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	$R_{\theta JC}$	1.67	$^\circ C/W$
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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 =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 ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.7	2.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =37.5A	-	8.1	8.5	mΩ
		V _{GS} =4.5V, I _D =37.5A	-	10.0	11.0	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =37.5A		50	-	S
Dynamic Characteristics ^(Note3)						
Input Capacitance	C _{iss}	V _{DS} =40V, V _{GS} =0V, F=1.0MHz	-	2400	-	pF
Output Capacitance	C _{oss}		-	375	-	pF
Reverse Transfer Capacitance	C _{rss}		-	21	-	pF
Switching Characteristics ^(Note 3)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =40V, I _D =37.5A V _{GS} =10V, R _G =1.6Ω	-	14	-	nS
Turn-on Rise Time	t _r		-	31	-	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 =37.5A, V _{GS} =10V	-	39	-	nC
Gate-Source Charge	Q _{gs}		-	13.5	-	nC
Gate-Drain Charge	Q _{gd}		-	11.4	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 2)	V _{SD}	V _{GS} =0V, I _S =37.5A	-	-	1.2	V
Diode Forward Current	I _S		-	-	75	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 37.5A di/dt = 100A/μs ^(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

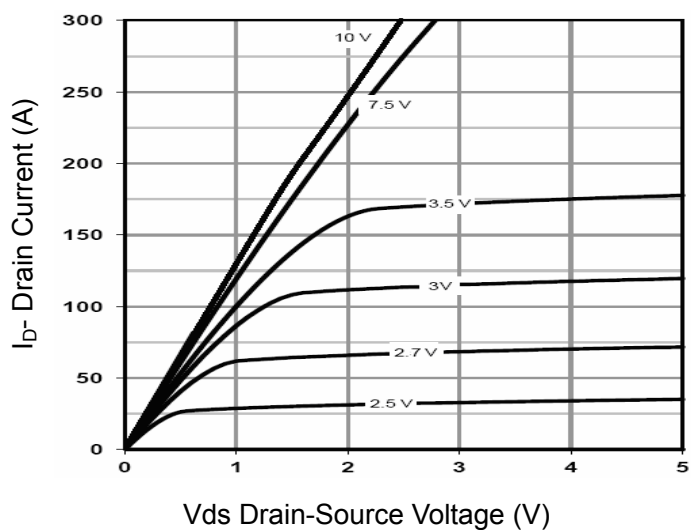


Figure 1 Output Characteristics

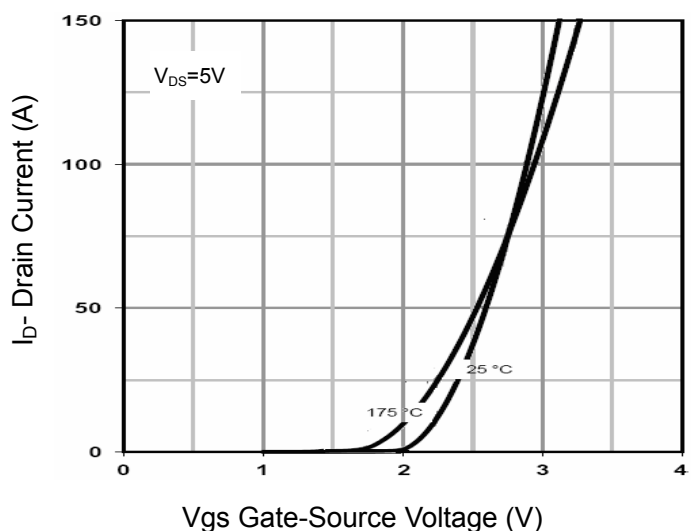


Figure 2 Transfer Characteristics

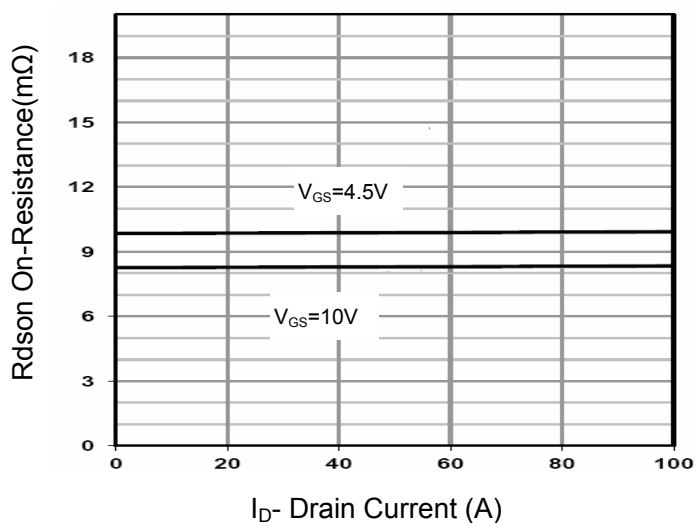


Figure 3 Rdson- Drain Current

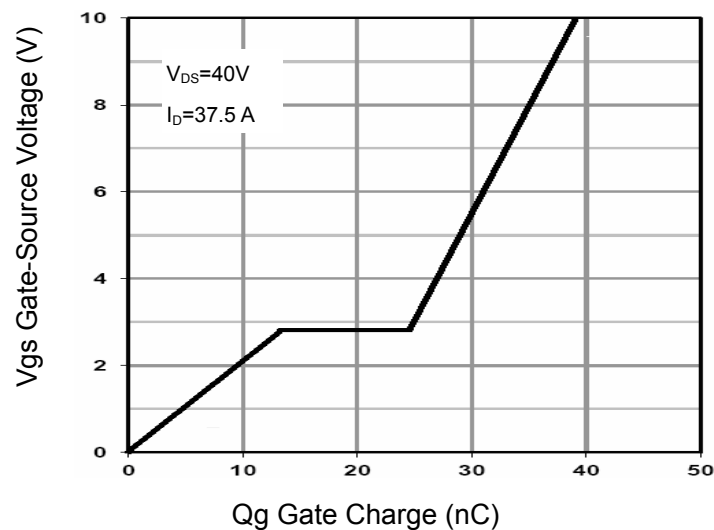


Figure 4 Gate Charge

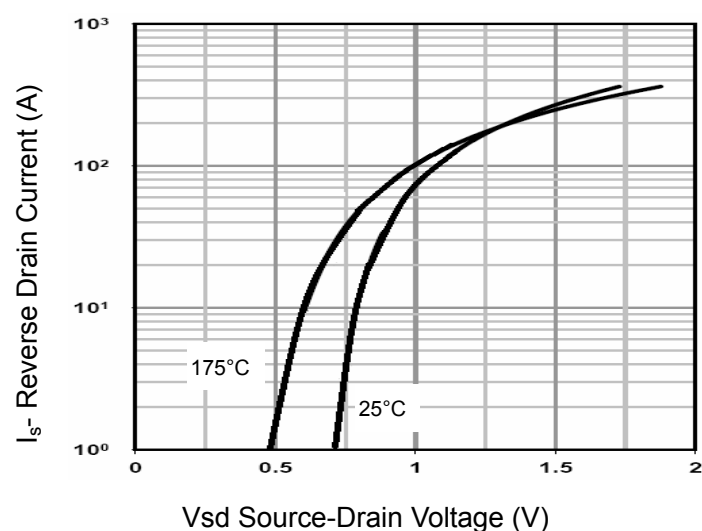


Figure 5 Source- Drain Diode Forward

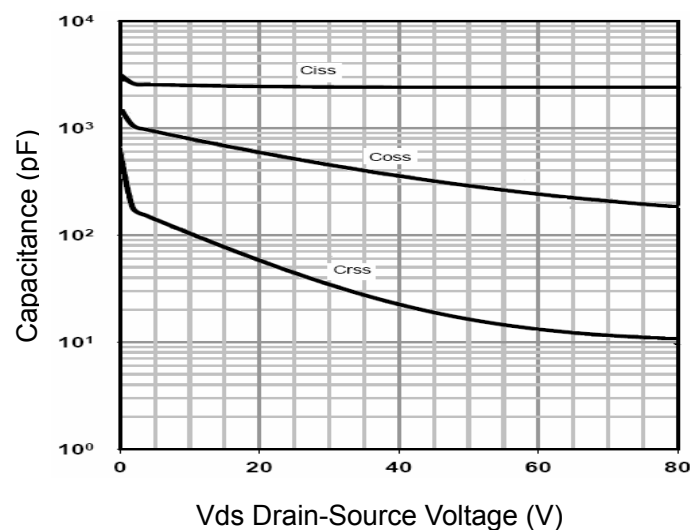
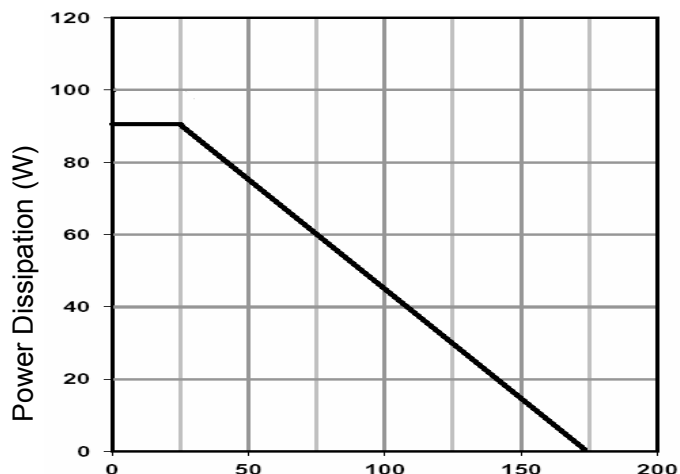
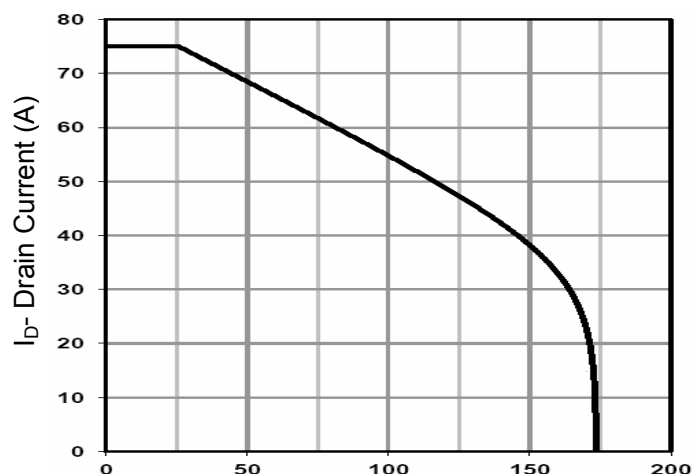


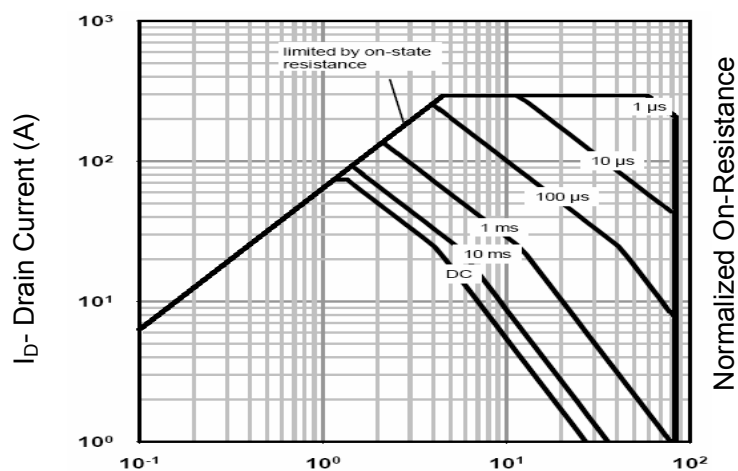
Figure 6 Capacitance vs Vds



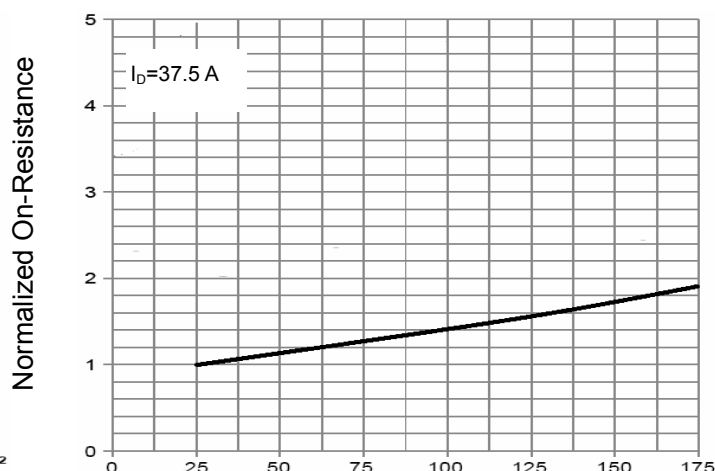
T_J -Junction Temperature($^{\circ}\text{C}$)
Figure 7 Power De-rating



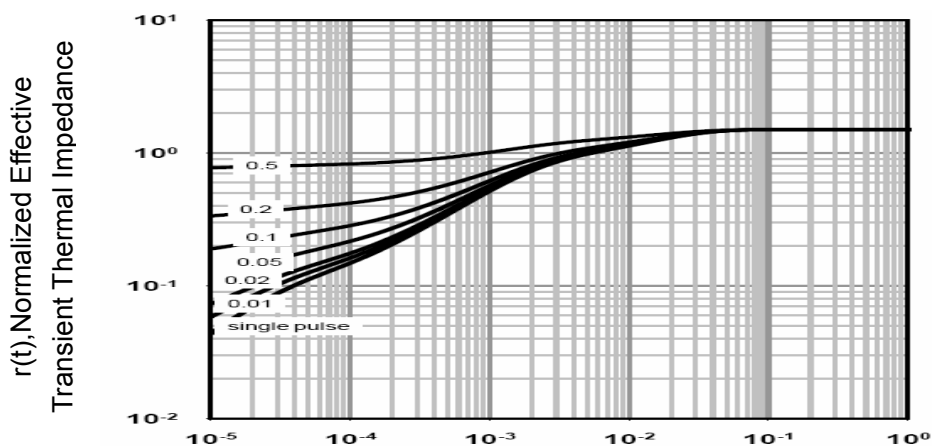
T_J -Junction Temperature ($^{\circ}\text{C}$)
Figure 9 Current De-rating



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

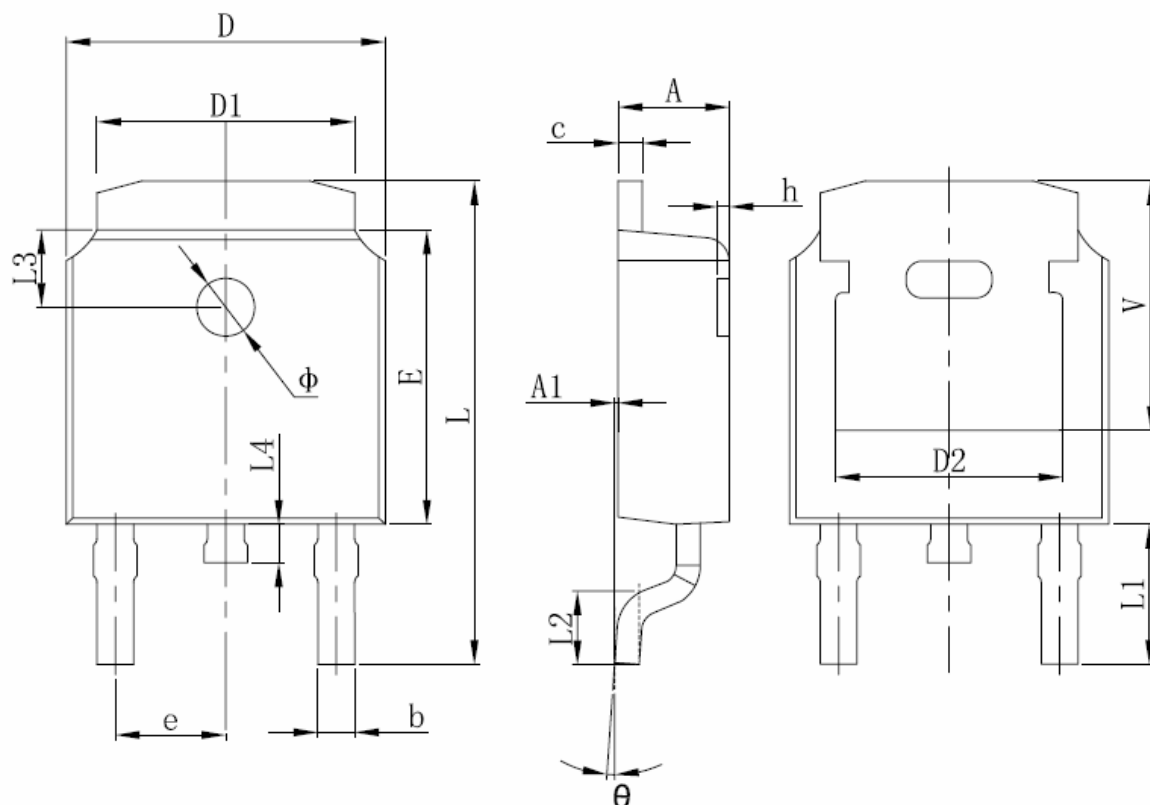


T_J -Junction Temperature($^{\circ}\text{C}$)
Figure 10 $R_{ds(on)}$ -Junction Temperature



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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