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

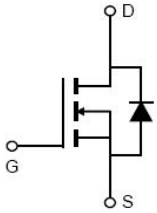
General Features

- V_{DS} =120V,I_D =46.5A
  $R_{DS(ON)}$=8.5mΩ , 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% ΔVds TESTED!

TO-220F



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCEP080N12F	NCEP080N12F	TO-220F	-	-	-

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	120	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	46.5	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	33	A
Pulsed Drain Current	I_{DM}	186	A
Maximum Power Dissipation	P_D	45	W
Derating factor		0.3	W/℃
Single pulse avalanche energy (Note 1)	E_{AS}	352	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	3.33	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	120		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=120V,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	-	8.5	9.4	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=20A		33	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=60V,V_{GS}=0V, F=1.0MHz	-	3715	-	pF
Output Capacitance	C_{oss}		-	275	-	pF
Reverse Transfer Capacitance	C_{rss}		-	18	-	pF
Switching Characteristics (Note 2)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=60V,I_D=20A V_{GS}=10V,R_G=1.6Ω	-	30	-	nS
Turn-on Rise Time	t_r		-	21	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	50	-	nS
Turn-Off Fall Time	t_f		-	21	-	nS
Total Gate Charge	Q_g	V_{DS}=60V,I_D=20A, V_{GS}=10V	-	58	-	nC
Gate-Source Charge	Q_{gs}		-	21	-	nC
Gate-Drain Charge	Q_{gd}		-	14.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=20A	-	-	1.2	V
Diode Forward Current	I_S		-	-	46.5	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 46.5A di/dt = 100A/μs	-	65	-	nS
Reverse Recovery Charge	Qrr		-	105	-	nC

Notes:

1. EAS condition : Tj=25℃,V_{DD}=50V,V_G=10V,L=0.5mH,Rg=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 $T_{J(MAX)}$=175°C. The SOA curve provides a single pulse rating.

Typical Electrical and Thermal Characteristics

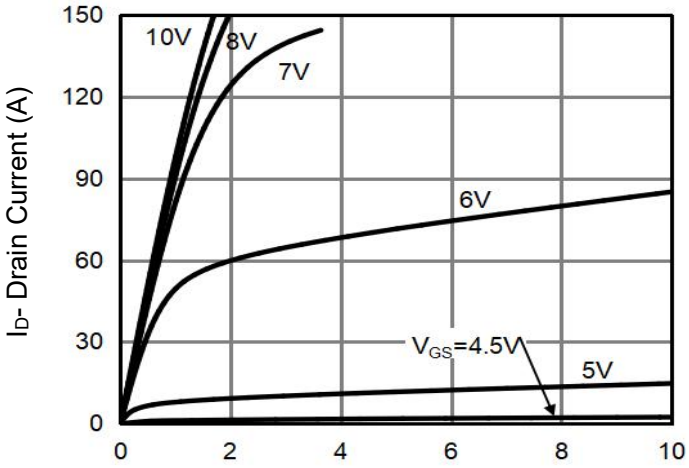


Figure 1 Output Characteristics

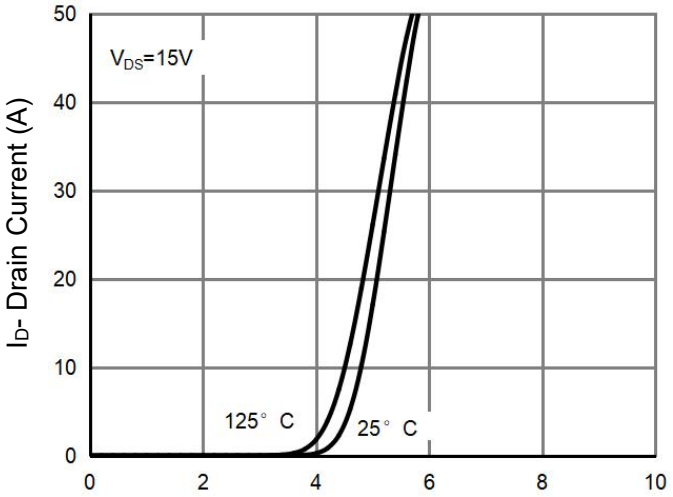


Figure 2 Transfer Characteristics

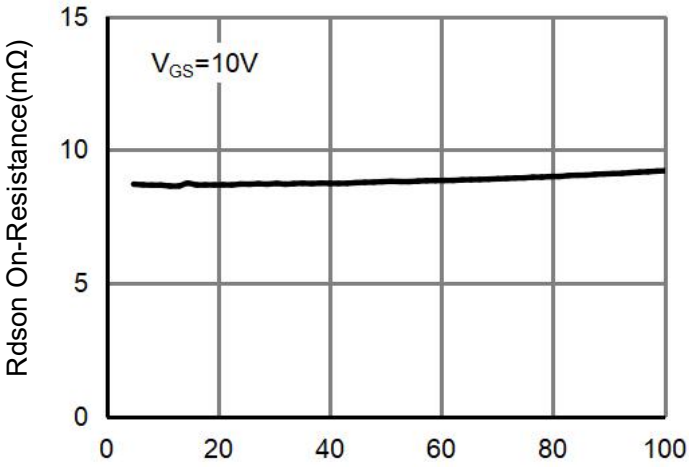


Figure 3 Rdson- Drain Current

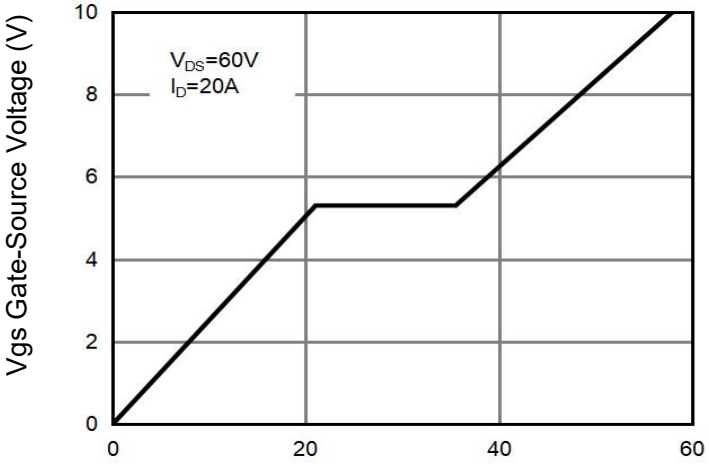


Figure 4 Gate Charge

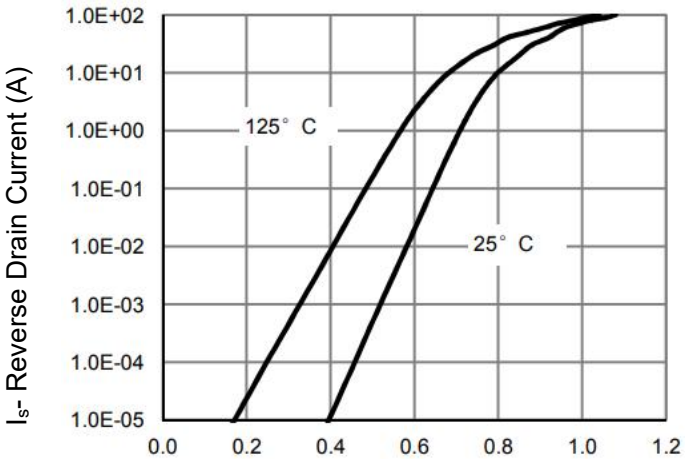


Figure 5 Source- Drain Diode Forward

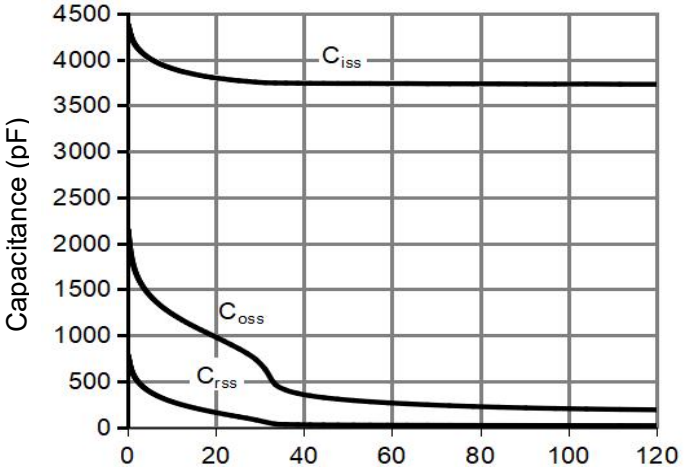


Figure 6 Capacitance vs Vds

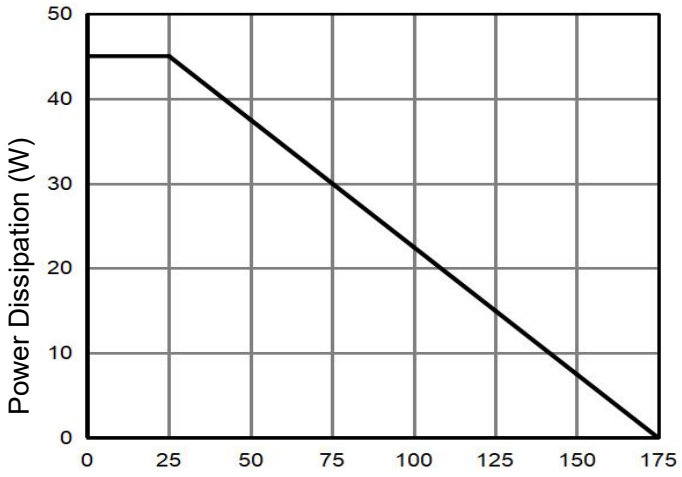


Figure 7 Power De-rating

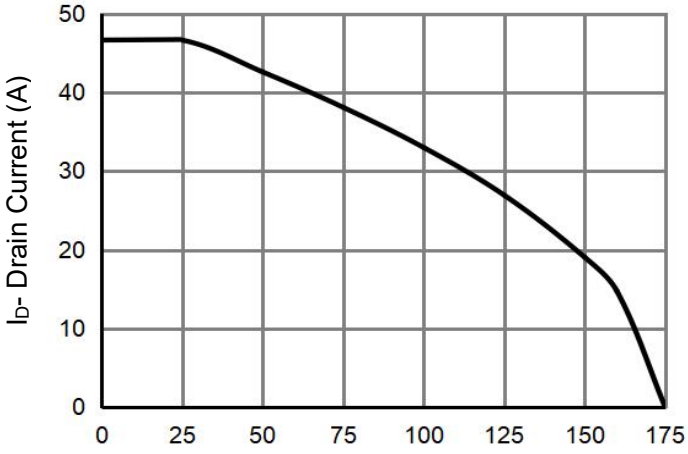


Figure 9 Current De-rating

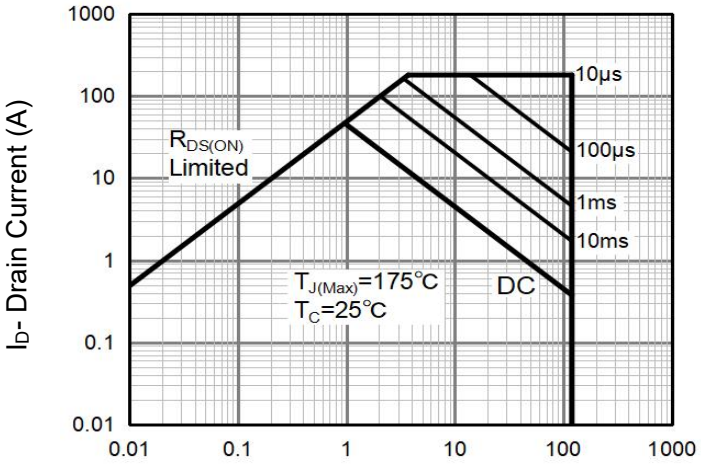


Figure 8 Safe Operation Area (Note3)

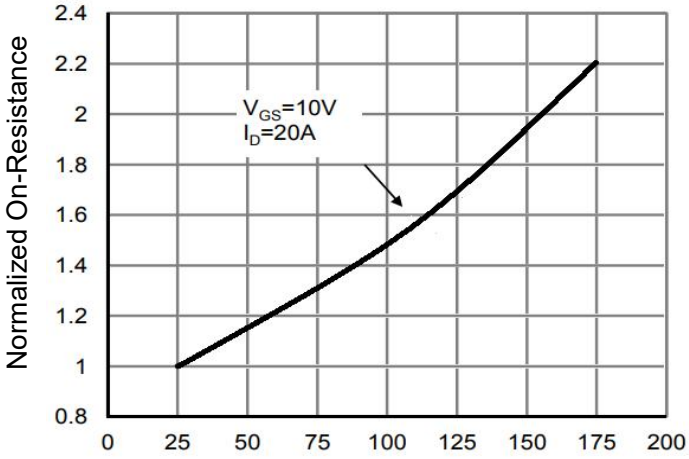


Figure 10 Rdson-Junction Temperature

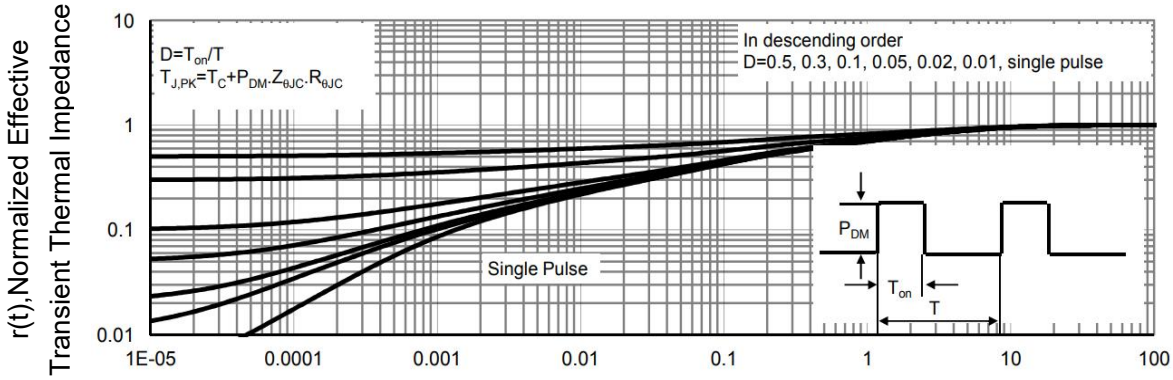
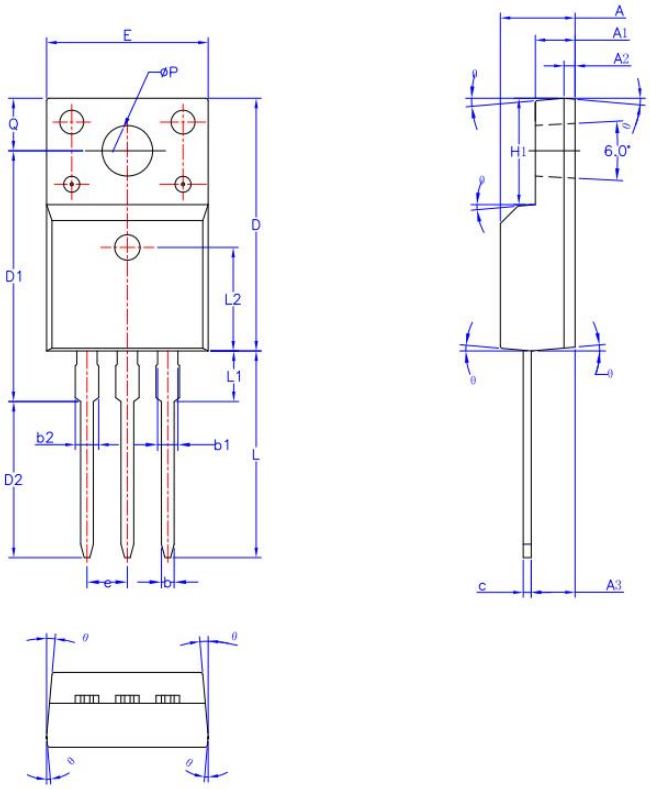


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220F-3L Package Information



SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2		0.70 REF	
A3	2.56	2.76	2.93
b	0.70	–	0.90
b1	1.18	–	1.38
b2	–	–	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.0
E	9.96	10.16	10.36
e		2.54BSC	
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	–	–	3.50
L2		6.50REF	
ØP	3.08	3.18	3.28
Q	3.20	–	3.40
θ1	1°	3°	5°

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