NCE N-Channel Super Trench Power MOSFET

Description

The NCEP02580D uses **Super Trench** 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.

General Features

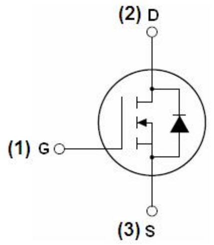
- V_{DS} =250V,I_D =80A
  $R_{DS(ON)}$ <18.5mΩ @ V_{GS}=10V
- Excellent gate charge x $R_{DS(on)}$ product
- Very low on-resistance $R_{DS(on)}$
- 175 °C operating temperature
- Pb-free lead plating
- 100% UIS tested

Application

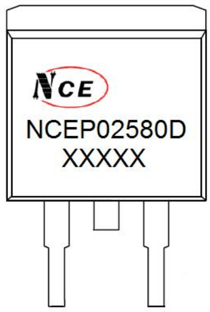
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

100% UIS TESTED!

100% ΔVds TESTED!



Schematic diagram



Marking and pin assignment


TO-263-2L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCEP02580D	NCEP02580D	TO-263-2L	Ø330mm	21mm	800 units

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	250	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	80	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	56.6	A
Pulsed Drain Current	I_{DM}	320	A
Maximum Power Dissipation	P_D	300	W
Derating factor		2	W/℃
Single pulse avalanche energy (Note 1)	E_{AS}	1200	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{θJC}$	0.5	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

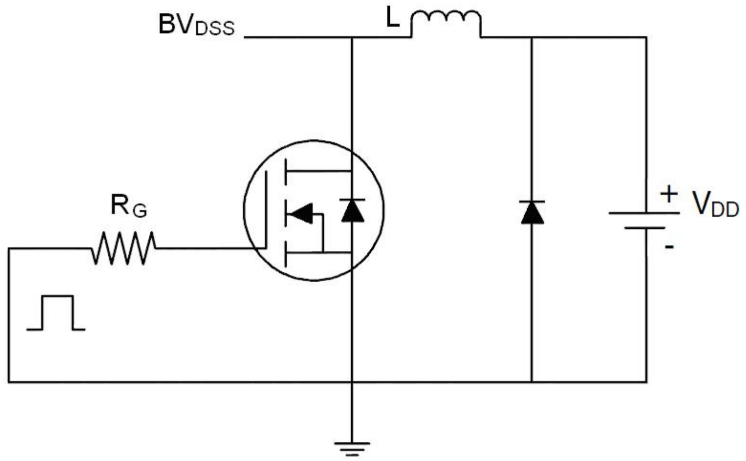
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	250		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=250V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.5	3.5	4.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=40A	-	16	18.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=40A	70	-	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=125V,V_{GS}=0V, F=1.0MHz	-	5400	-	PF
Output Capacitance	C_{oss}		-	329	-	PF
Reverse Transfer Capacitance	C_{rss}		-	12	-	PF
Switching Characteristics (Note 2)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=125V,I_D=40A V_{GS}=10V,R_G=4.7Ω	-	18	-	nS
Turn-on Rise Time	t_r		-	26	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	41	-	nS
Turn-Off Fall Time	t_f		-	11	-	nS
Total Gate Charge	Q_g	V_{DS}=125V,I_D=40A, V_{GS}=10V	-	76.7		nC
Gate-Source Charge	Q_{gs}		-	22.7		nC
Gate-Drain Charge	Q_{gd}		-	20		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=80A	-		1.2	V
Diode Forward Current	I_S		-	-	80	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 40A di/dt = 100A/μs	-	140		nS
Reverse Recovery Charge	Qrr		-	600		nC

Notes:

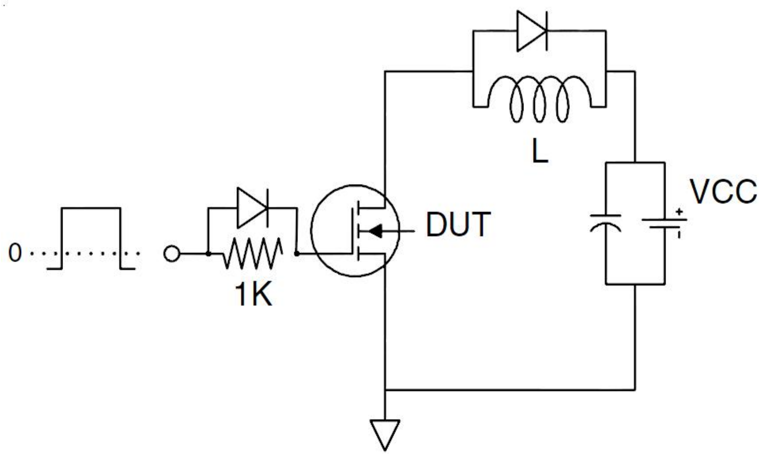
1. EAS condition : Tj=25℃,V_{DD}=50V,V_G=10V,L=0.5mH,Rg=25Ω.
2. Guaranteed by design, not subject to production
3. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsin k, assuming a maximum junction temperature of TJ(MAX)=175° C. The SOA curve provides a single pulse rating.

Test Circuit

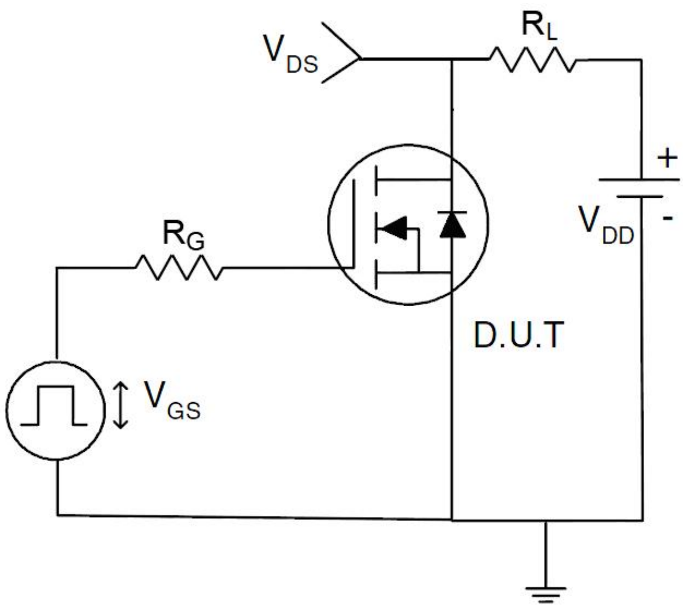
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

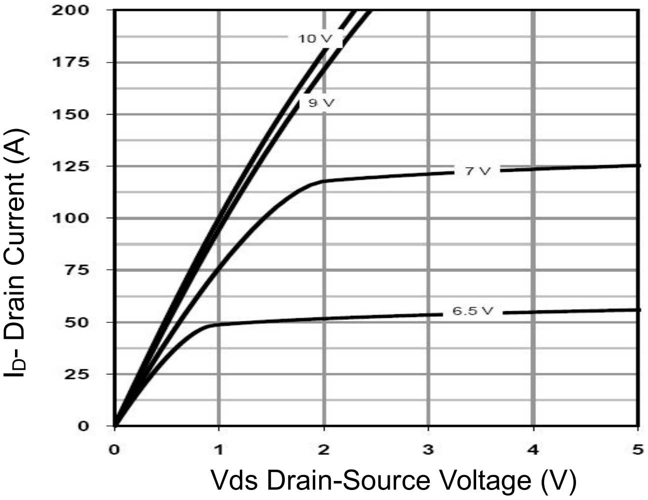


Figure 1 Output Characteristics

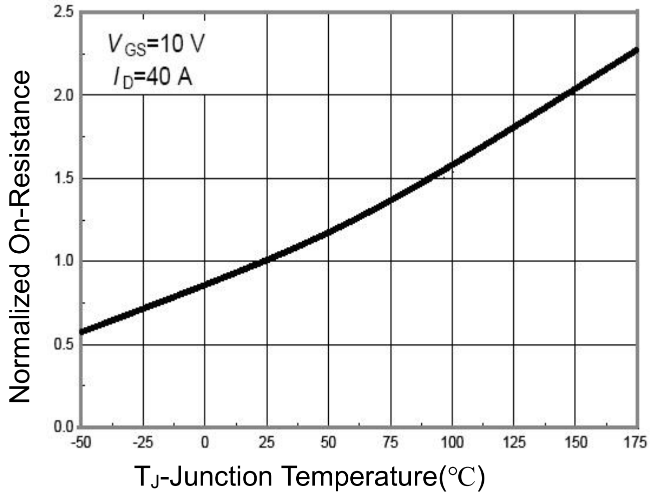


Figure 4 Rdson-JunctionTemperature

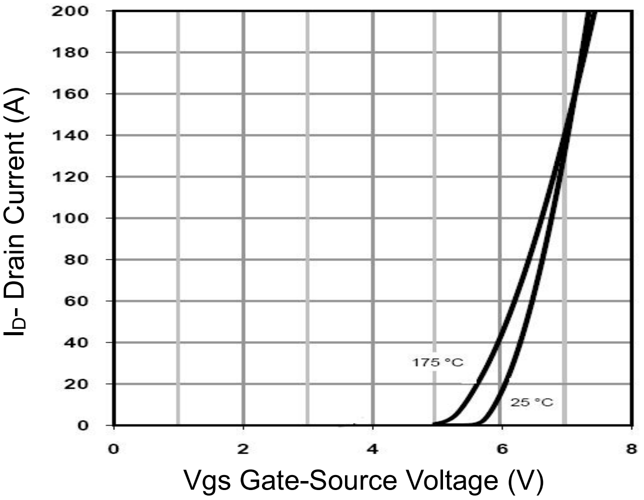


Figure 2 Transfer Characteristics

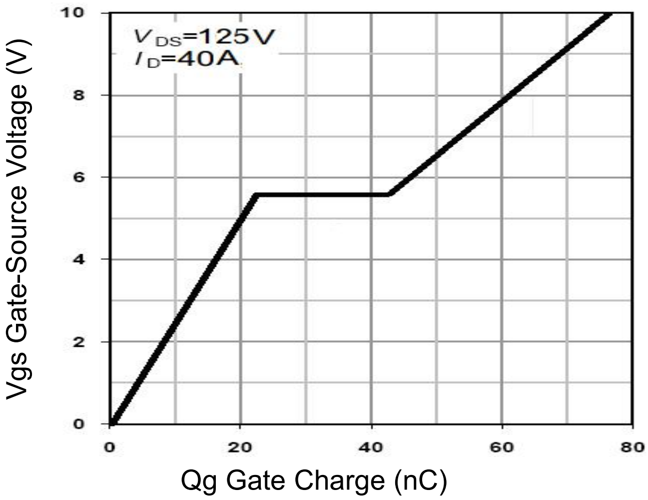


Figure 5 Gate Charge

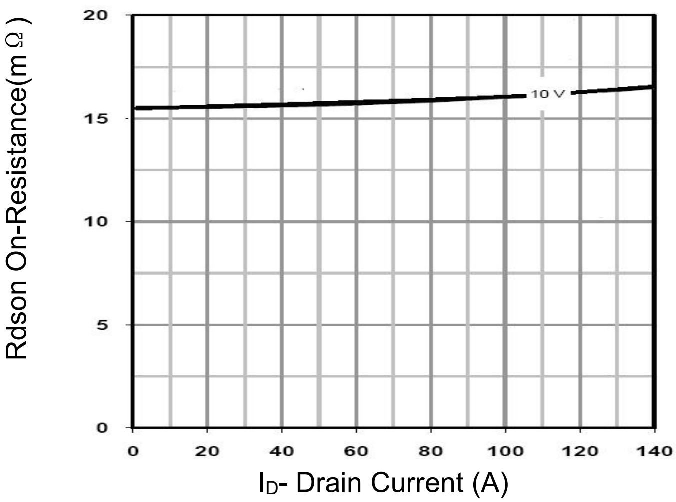


Figure 3 Rdson- Drain Current

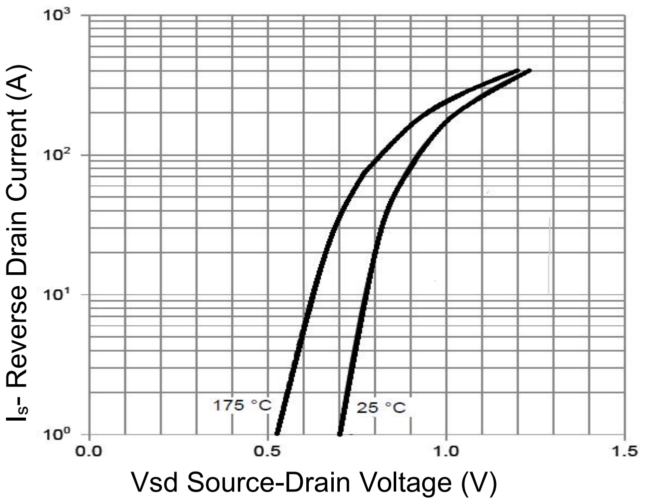


Figure 6 Source- Drain Diode Forward

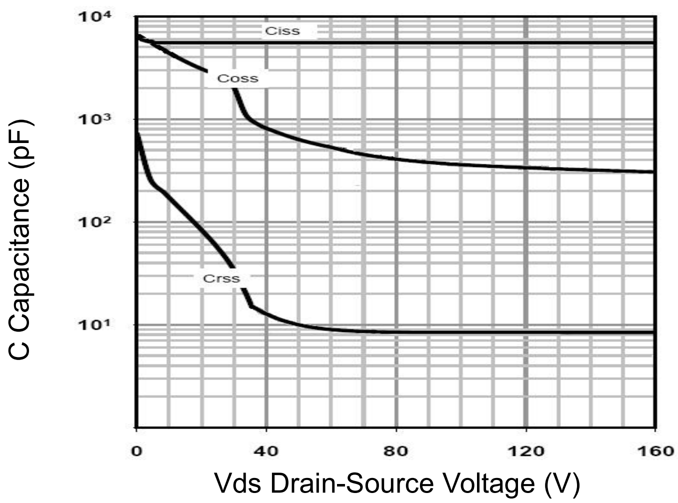


Figure 7 Capacitance vs Vds

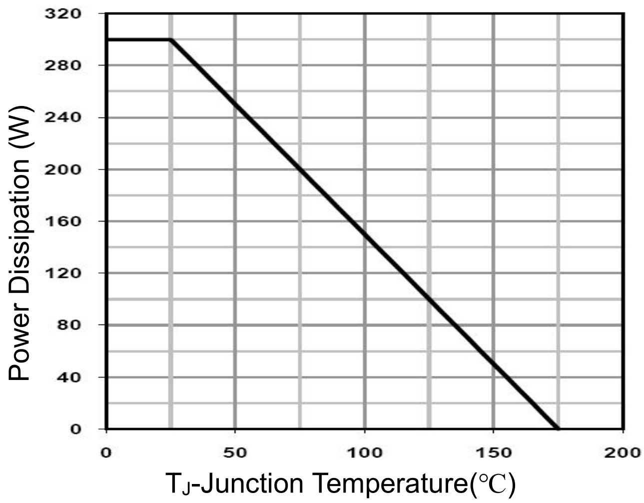


Figure 9 Power De-rating

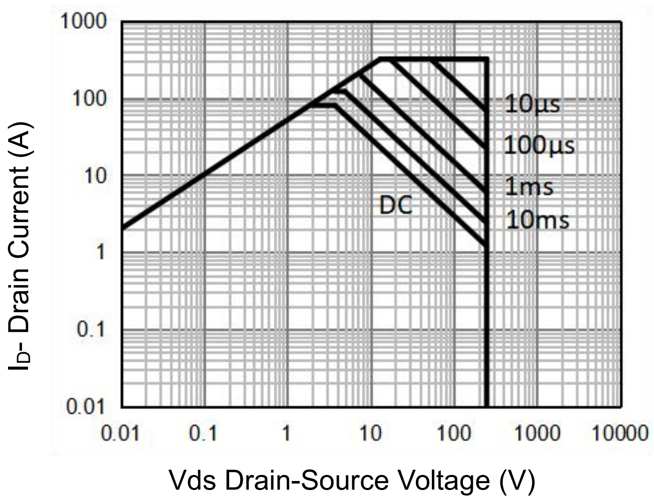


Figure 8 Safe Operation Area(Note 3)

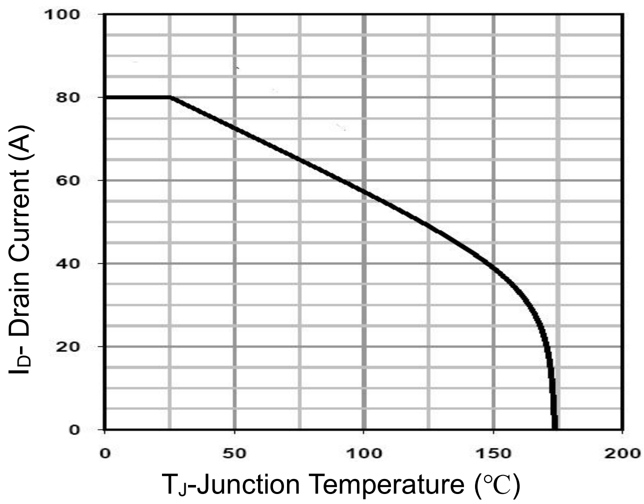


Figure 10 Current De-rating

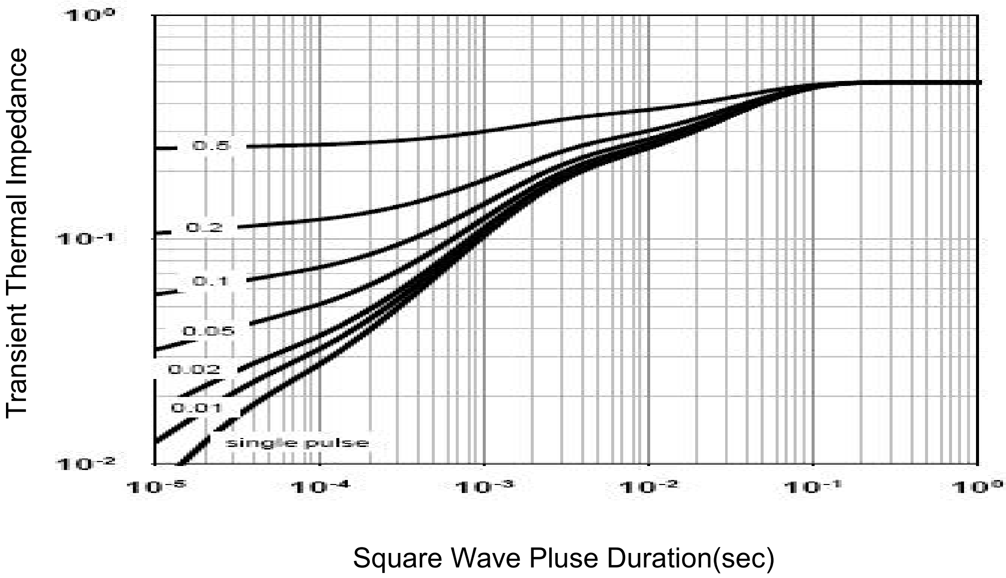
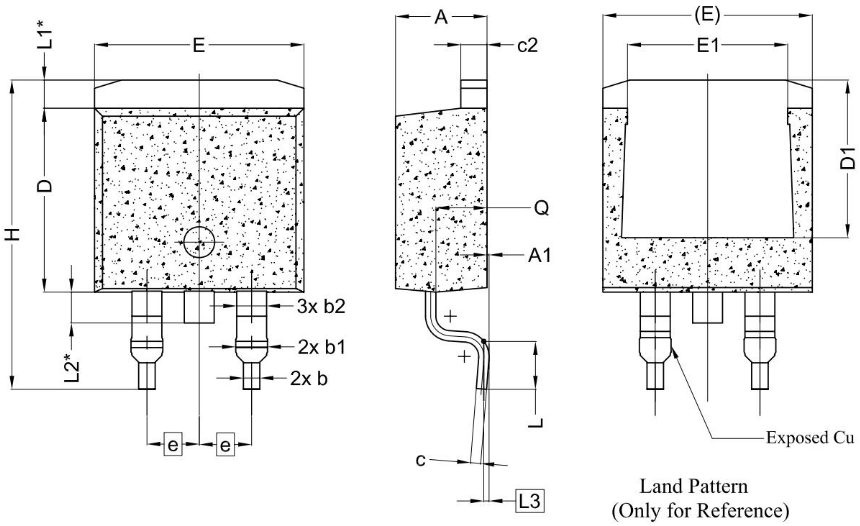
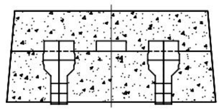


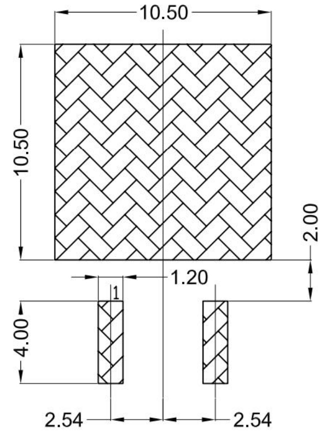
Figure 11 Normalized Maximum Transient Thermal Impedance

TO-263-2L Package Information





Land Pattern
(Only for Reference)



Note:
1. All Dimensions Are In mm.
2. Dimension D & E Do Not Include Mold Flash.
   Mold Flash Shall Not Exceed 0.127mm Pre Side.
   These Dimensions Are Measured At The Outermost
   Extreme Of The Plastic Body.
3. Thermal Pad Contour Optional Within Dimensions E, L1, D1 & E1.
4. Dimension D1 & E1 Establish A Minmum Mounting Surface for
   The Thermal Pad.
5. "*" is reference .

SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	4.24	4.44	4.64
A1	0.00	0.10	0.25
b	0.70	0.80	0.90
b1	1.20	1.55	1.75
b2	1.20	1.45	1.70
c	0.40	0.50	0.60
c2	1.15	1.27	1.40
D	8.82	8.92	9.02
D1	6.86	7.65	—
E	9.96	10.16	10.36
E1	6.89	7.77	7.89
e	2.54 BSC		
H	14.61	15.00	15.88
L	1.78	2.32	2.79
L1	1.36 REF.		
L2	1.50 REF.		
L3	0.25 BSC		
Q	2.30	2.48	2.70

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