NCE P-Channel Super Trench Power MOSFET

Description

The NCEP01P60D 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

Application

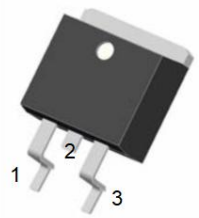
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

General Features

- V_{DS} =-100V,I_D =-60A
  $R_{DS(ON)}$=22mΩ (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!

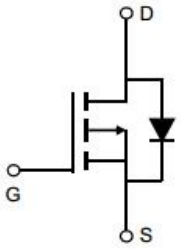
TO-263-2L



Top View



Device Marking



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCEP01P60D	NCEP01P60D	TO-263-2L	-	-	-

Absolute Maximum Ratings (T_C=25℃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	-60	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	-42	A
Pulsed Drain Current	I_{DM}	-240	A
Maximum Power Dissipation	P_D	230	W
Derating factor		1.53	W/℃
Single pulse avalanche energy (Note 1)	E_{AS}	697	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	0.65	℃/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	-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}=±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	-	22	26	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-20A	-	30	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=-50V,V_{GS}=0V, F=1.0MHz	-	4600	-	PF
Output Capacitance	C_{oss}		-	490	-	PF
Reverse Transfer Capacitance	C_{rss}		-	16	-	PF
Switching Characteristics (Note 2)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-50V,I_D=-20A V_{GS}=-10V,R_G=1.6Ω	-	15	-	nS
Turn-on Rise Time	t_r		-	18	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	50	-	nS
Turn-Off Fall Time	t_f		-	18	-	nS
Total Gate Charge	Q_g	V_{DS}=-50V,I_D=-20A, V_{GS}=-10V	-	60	-	nC
Gate-Source Charge	Q_{gs}		-	22.3	-	nC
Gate-Drain Charge	Q_{gd}		-	8.1	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=-20A	-		-1.2	V
Diode Forward Current	I_S		-	-	-60	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F =-20A di/dt = 100A/μs	-	55	-	nS
Reverse Recovery Charge	Qrr		-	101	-	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.

Typical Electrical and Thermal Characteristics

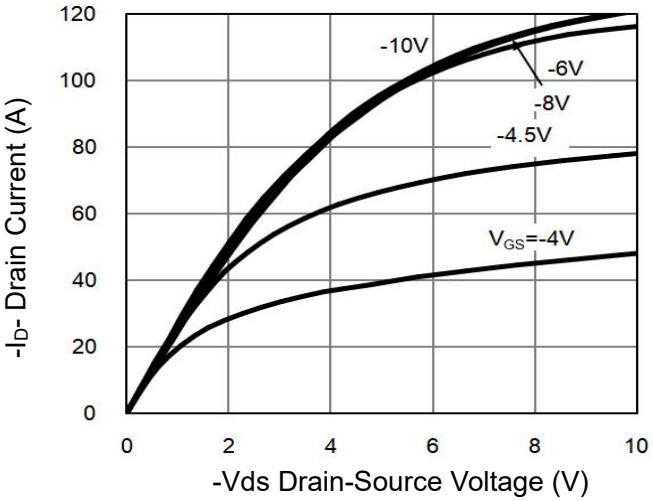


Figure 1 Output Characteristics

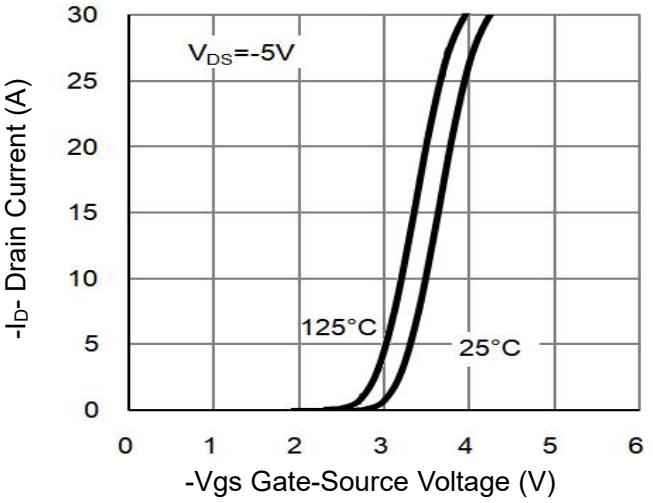


Figure 2 Transfer Characteristics

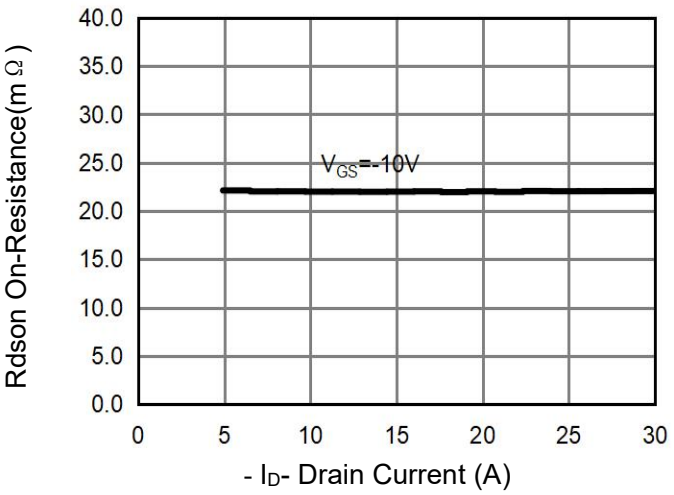


Figure 3 Rdson- Drain Current

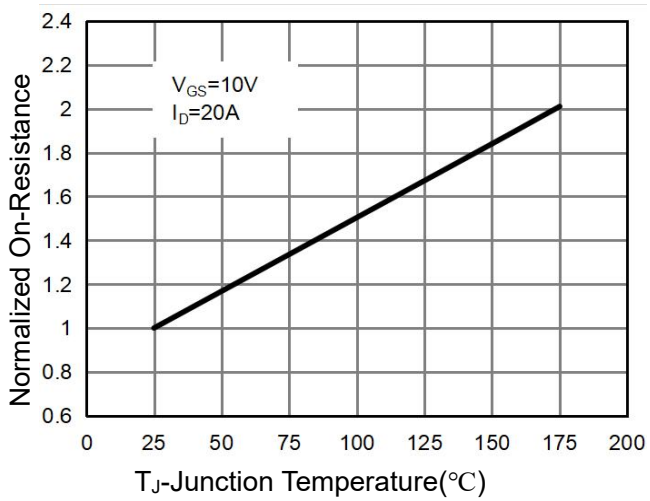


Figure 4 Rdson-JunctionTemperature

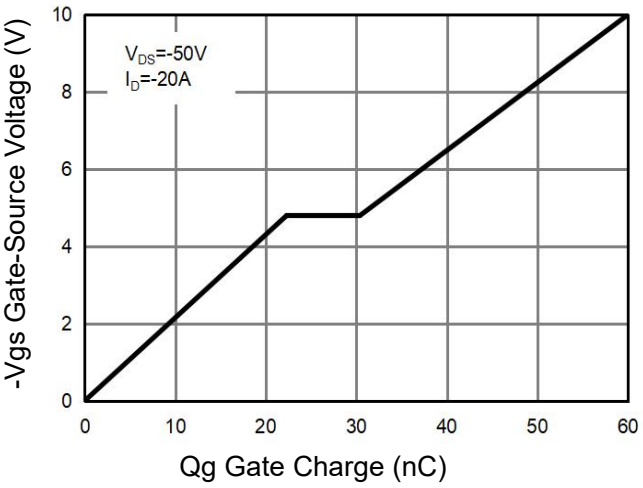


Figure 5 Gate Charge

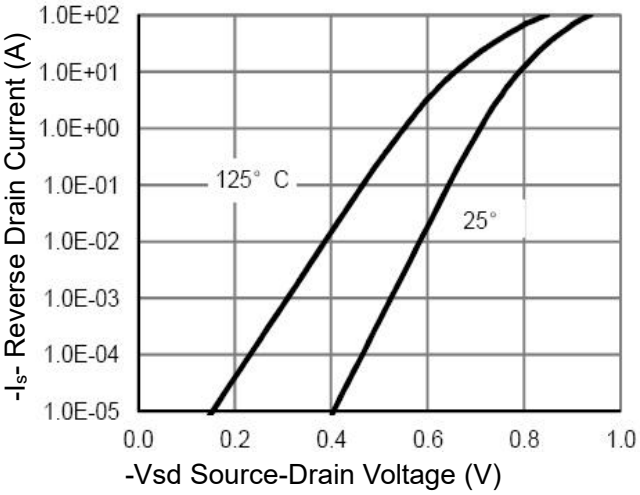


Figure 6 Source- Drain Diode Forward

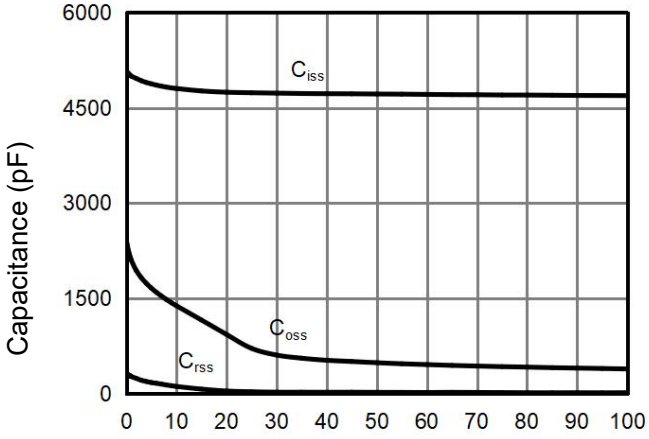


Figure 7 Capacitance vs Vds

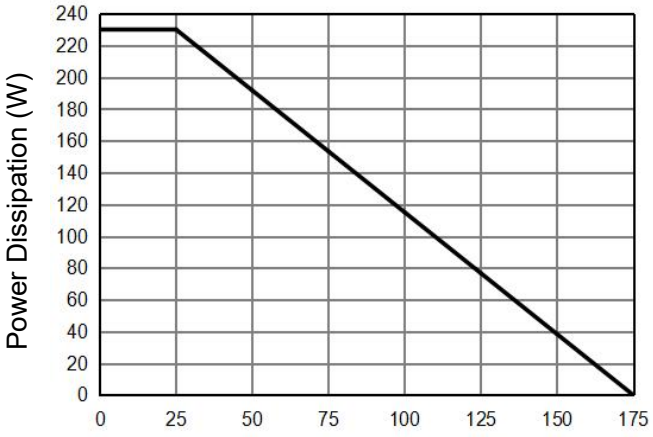


Figure 9 Power De-rating

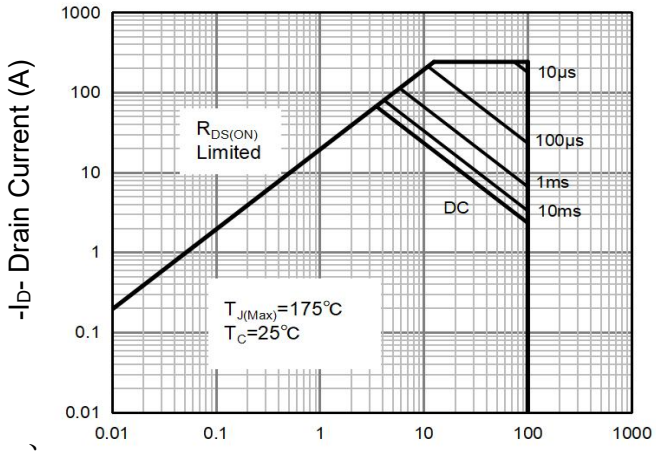


Figure 8 Safe Operation Area(Note 3)

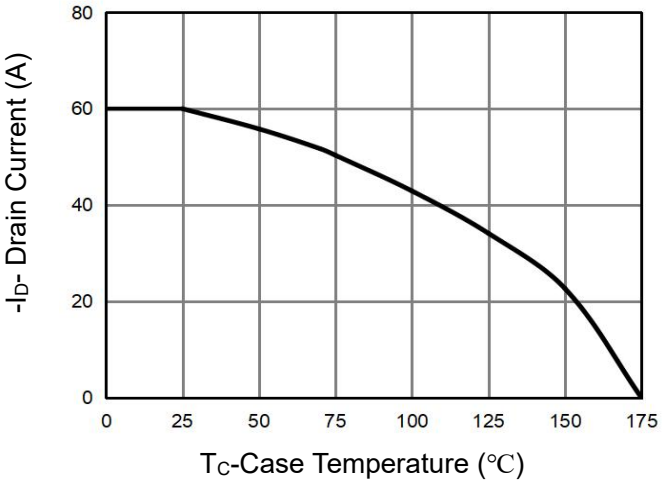


Figure 10 Current De-rating

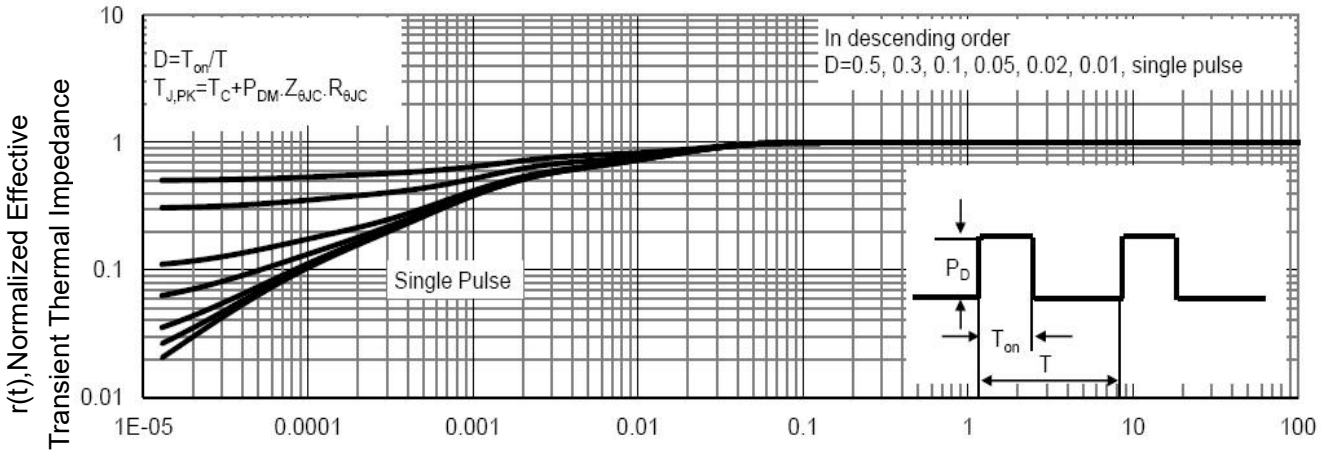
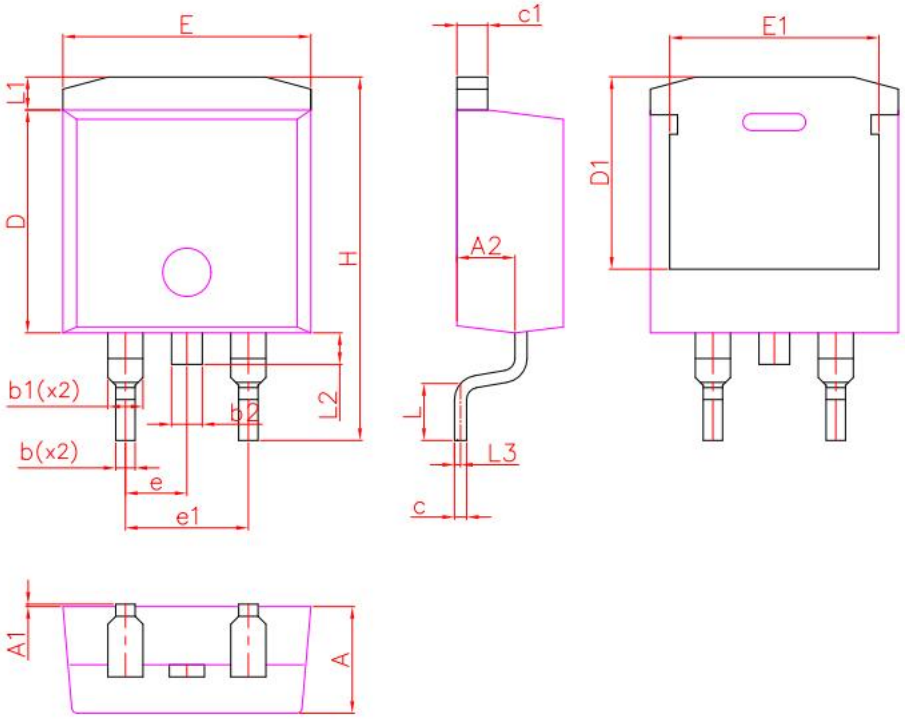


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-263-3L Package Information



TO263			
DIM.	MIN.	NOM.	MAX.
A	4.20	4.40	4.60
A1	0.00	0.10	0.25
A2	2.20	2.40	2.60
b	0.70	0.80	0.90
b1	1.20	1.45	1.75
b2	1.17	1.27	1.37
c	0.40	0.50	0.60
c1	1.15	1.27	1.40
D	9.10	9.20	9.30
D1	7.63	7.93	8.23
E	10.05	10.25	10.45
E1	8.35	8.65	8.95
e	2.54BSC		
e1	5.08BSC		
H	14.61	15.00	15.88
L	1.78	2.35	2.79
L1	1.36REF		
L2	1.3REF		
L3	0.25REF		
All dimensions in millimeters			

Revision History

Revision	Date	Subjects
V1.0	2025.04.01	Product data sheet
V1.1	2025.07.17	Correct Schematic Diagram

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