NCE P-Channel Enhancement Mode Power MOSFET

Description

The NCE01P30BK uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety of applications.

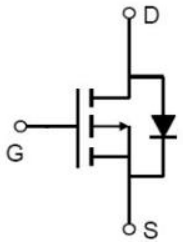
General Features

- V_{DS} = -100 V,I_D =-30 A
  $R_{DS(on)}$ < 50 mΩ @ V_{GS}=-10V
  $R_{DS(on)}$ < 60 mΩ @ V_{GS}=-4.5V
- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

- Portable equipment and battery powered systems

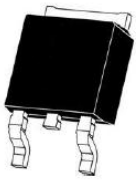
100% UIS TESTED!
100% ΔVds TESTED!



Schematic diagram



Marking and pin assignment



TO-252-2L Top View

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE01P30BK	NCE01P30BK	TO-252-2L	Ø330mm	16mm	2500units

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	-30	A
Drain Current-Continuous(100℃)	I_D (100℃)	-22.8	A
Pulsed Drain Current (T_C=25℃)	I_{DM}	-120	A
Maximum Power Dissipation	P_D	125	W
Derating factor		0.833	W/℃
Single pulse avalanche energy(Note 1)	E_{AS}	243	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	1.2	℃/W
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	50	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

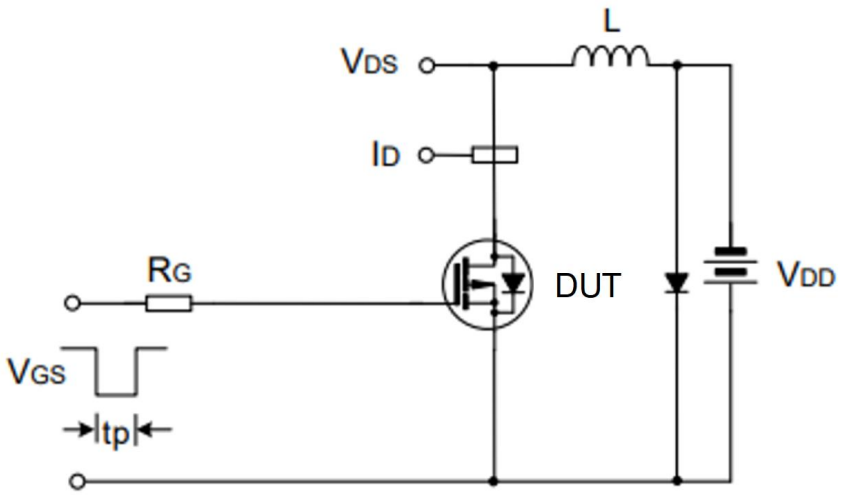
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-100V,V_{GS}=0V	-	-	-1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1.2	-1.8	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A	-	43	50	mΩ
		V_{GS}=-4.5V, I_D=-15A	-	46	60	
Forward Transconductance	g_{FS}	V_{DS}=-10V,I_D=-30A	-	50	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=-50V,V_{GS}=0V, F=1.0MHz	-	5612.4	-	pF
Output Capacitance	C_{oss}		-	132.8	-	pF
Reverse Transfer Capacitance	C_{rss}		-	106.4	-	pF
Switching Characteristics (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-50V,R_L=1Ω, V_{GS}=-10V,R_{GEN}=3Ω	-	20	-	nS
Turn-on Rise Time	t_r		-	35	-	nS
Turn-off Delay Time	$t_{d(off)}$		-	68	-	nS
Turn-off Fall Time	t_f		-	21	-	nS
Total Gate Charge	Q_g	V_{DS}=-50V,I_D=-10A, V_{GS}=-10V	-	96.6	-	nC
Gate-Source Charge	Q_{gs}		-	15.2	-	nC
Gate-Drain Charge	Q_{gd}		-	17.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=-20A	-	-	-1.2	V
Diode Forward Current	I_S		-	-	-30	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F =-20A di/dt = -100A/μs	-	51	-	nS
Reverse Recovery Charge	Qrr		-	139	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

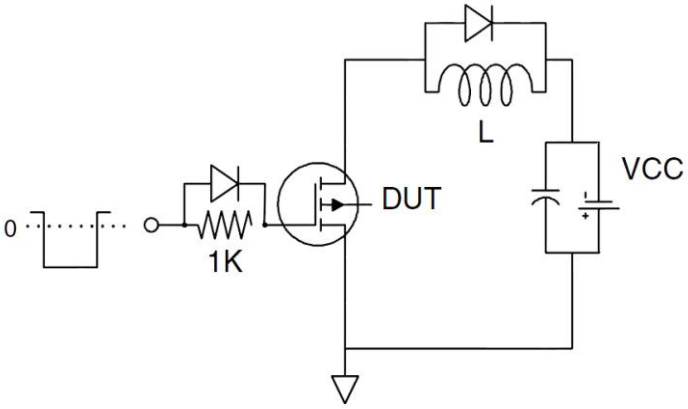
1. EAS condition : Tj=25℃,V_{DD}=-50V,V_G=-10V,L=0.5mH,Rg=25Ω.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The maximum allowed junction temperature of 175°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.
3. Guaranteed by design, not subject to production.
4. 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.

Test Circuit

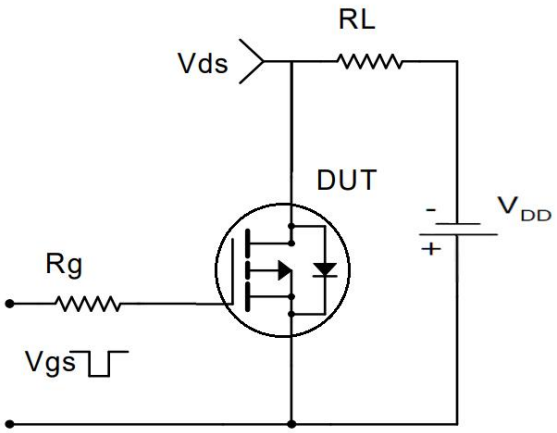
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

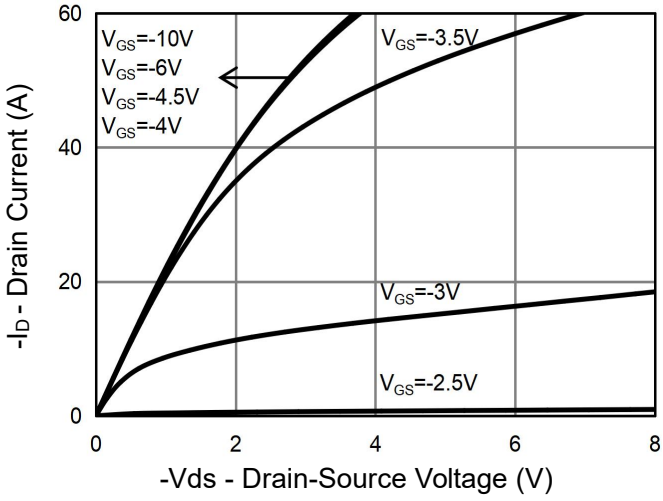


Figure 1 Output Characteristics

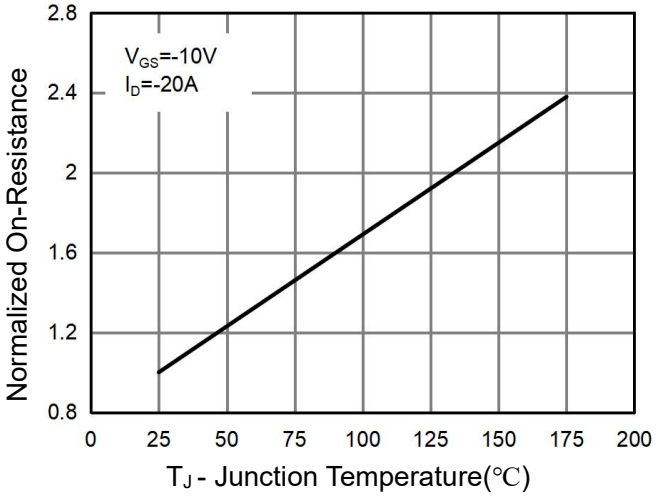


Figure 4 Rdson vs Junction Temperature

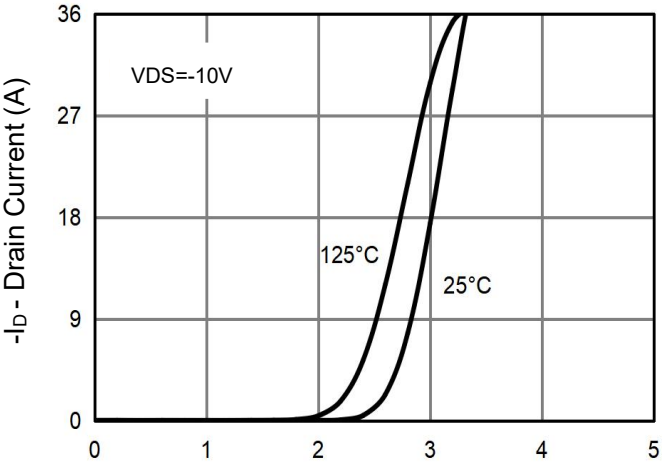


Figure 2 Transfer Characteristics

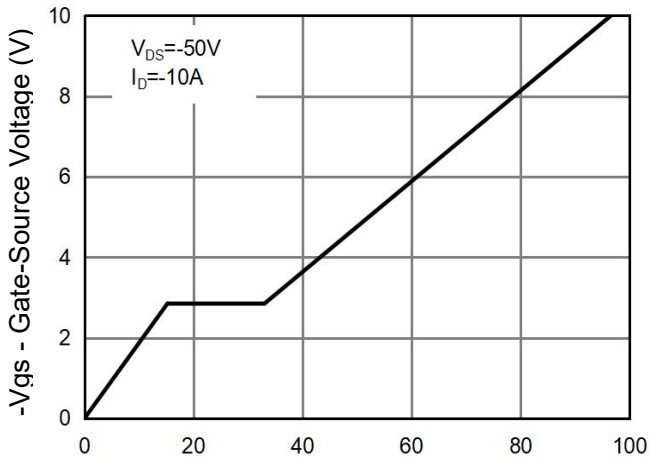


Figure 5 Gate Charge

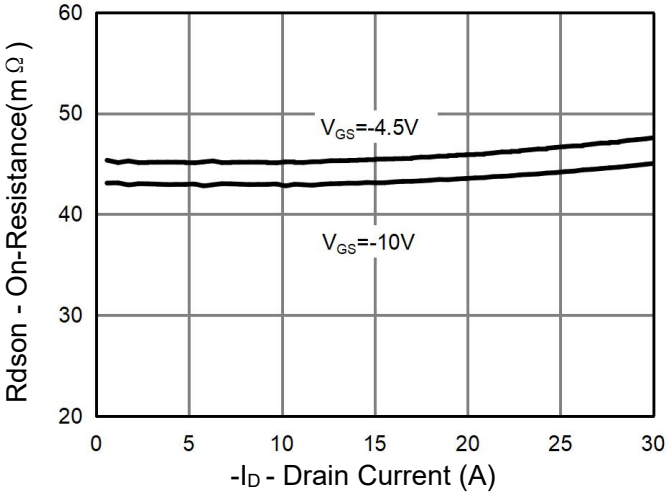


Figure 3 Rdson vs Drain Current

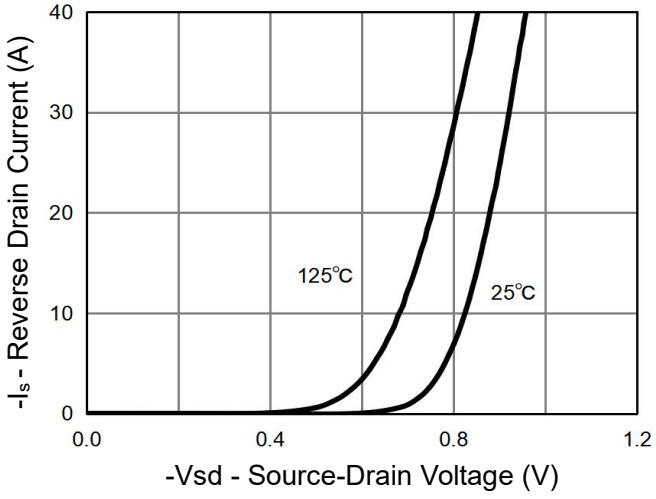


Figure 6 Source-Drain Diode Forward

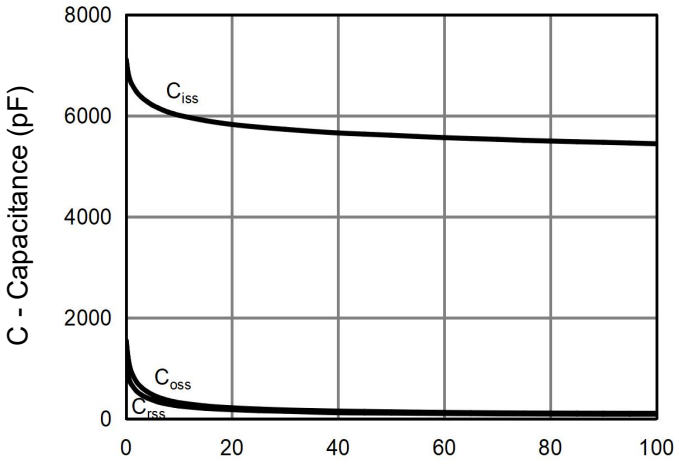


Figure 7 Capacitance vs Vds

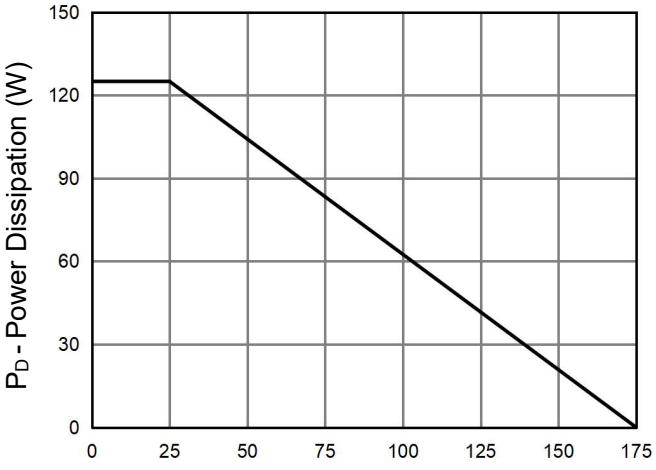


Figure 9 Power De-rating

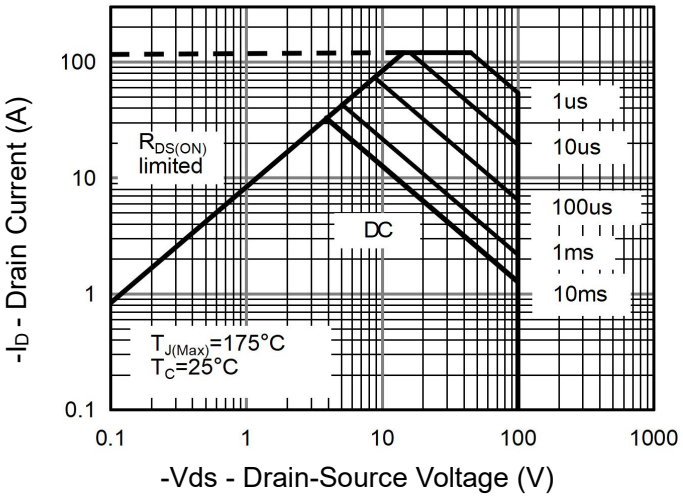


Figure 8 Safe Operation Area(Note 4)

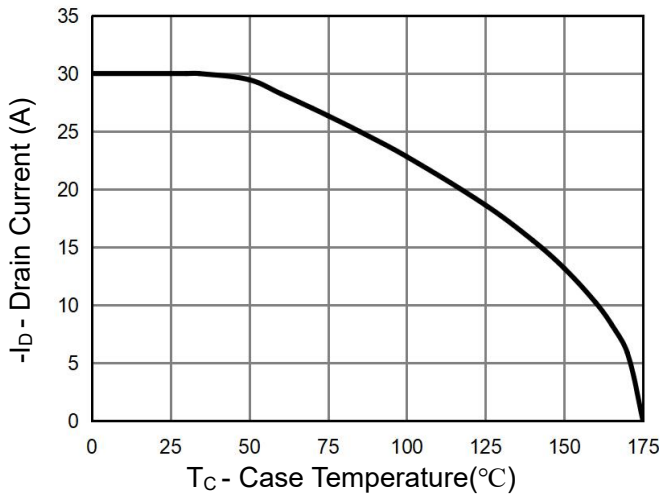


Figure10 Drain Current De-rating

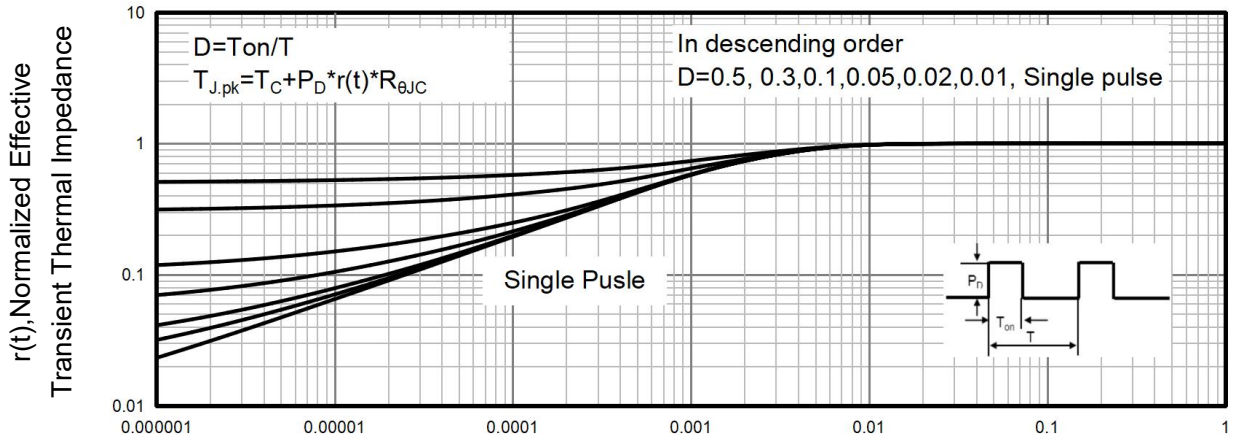
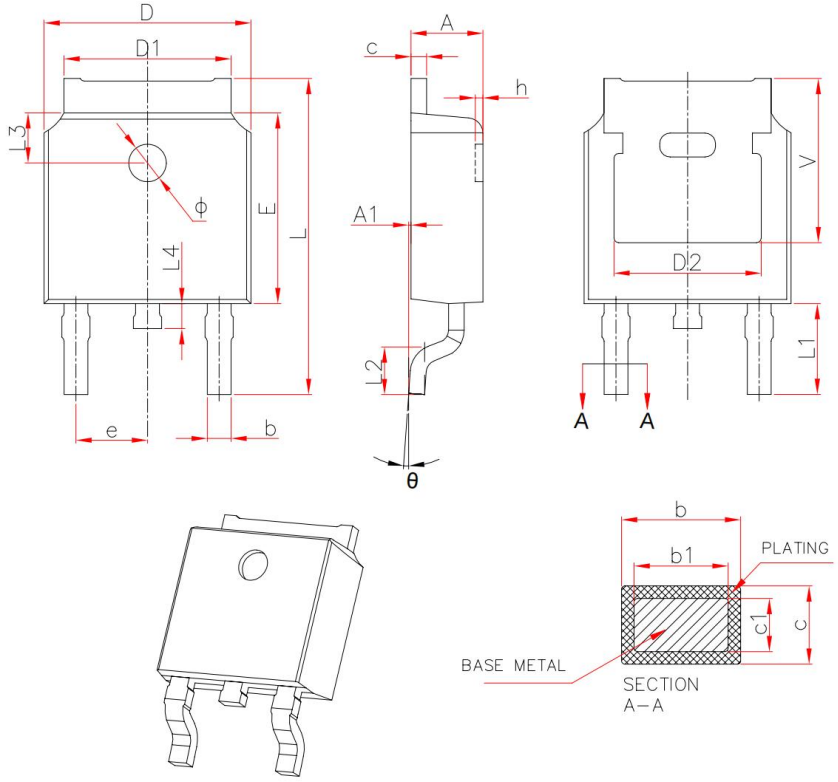


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252-2L(E) Package Information



Symbol	Millimeters	
	Min.	Max.
A	2.20	2.40
A1	0.00	0.13
b	0.66	0.86
b1	0.73	0.79
c	0.46	0.58
c1	0.50	0.52
D	6.50	6.70
D1	5.10	5.46
D2	4.83 REF.	
E	6.00	6.20
e	2.19	2.39
L	9.80	10.40
L1	2.90 REF.	
L2	1.40	1.70
L3	1.60 REF.	
L4	0.60	1.00
Φ	1.10	1.30
θ	0°	8°
h	0.00	0.30
V	5.35 REF.	

Revision History

Revision	Date	Subjects
V1.0	2025.10	Initial test completed

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