NCE P-Channel Enhancement Mode Power MOSFET

Description

The NCE01P30I 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. It is ESD protested.

General Features

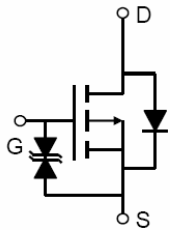
- V_{DS} =-100V,I_D =-30A
  $R_{DS(ON)}$ <58mΩ @ V_{GS}=-10V (Typ:44mΩ)
  $R_{DS(ON)}$ <65mΩ @ V_{GS}=-4.5V (Typ:48mΩ)
- Super high dense cell design
- Advanced trench process technology
- Reliable and rugged
- High density cell design for ultra low On-Resistance

Application

- Portable equipment and battery powered systems

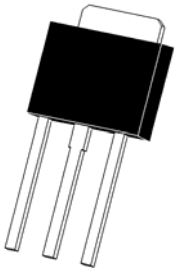
100% UIS TESTED!

100% ΔVds TESTED!



Schematic diagram

Marking and pin assignment



TO-251 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE01P30I	NCE01P30I	TO-251	-	-	-

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(T_C=100℃)	I_D (100℃)	-21	A
Pulsed Drain Current	I_{DM}	-150	A
Maximum Power Dissipation	P_D	120	W
Single pulse avalanche energy (Note 5)	E_{AS}	360	mJ
Derating factor		0.8	W/℃
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta Jc}$	1.25	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

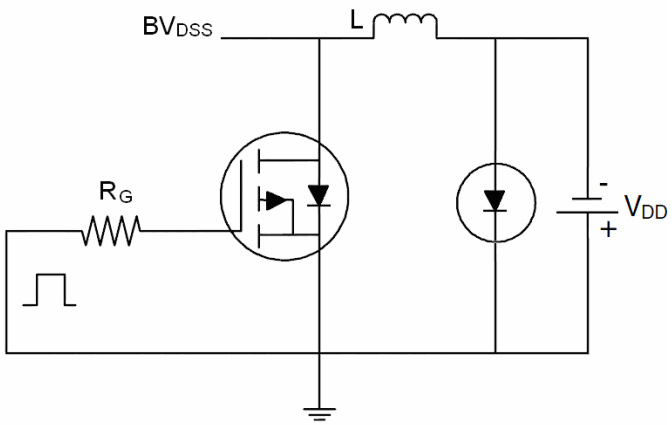
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-100V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1.5	-1.9	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-15A	-	44	58	mΩ
		V_{GS}=-4.5V, I_D=-15A	-	48	65	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-50V,I_D=-10A	5	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-50V,V_{GS}=0V, F=1.0MHz	-	3810	-	PF
Output Capacitance	C_{oss}		-	93	-	PF
Reverse Transfer Capacitance	C_{rss}		-	91	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-50V,I_D=-15A V_{GS}=-10V,R_{GEN}=9.1Ω	-	17	-	nS
Turn-on Rise Time	t_r		-	80	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	45	-	nS
Turn-Off Fall Time	t_f		-	65	-	nS
Total Gate Charge	Q_g	V_{DS}=-50V,I_D=-15A, V_{GS}=-10V	-	136	-	nC
Gate-Source Charge	Q_{gs}		-	22	-	nC
Gate-Drain Charge	Q_{gd}		-	26	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-10A	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S	-	-	-	-30	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF =-15A di/dt = 100A/μs (Note3)	-	90	-	nS
Reverse Recovery Charge	Qrr		-	70	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

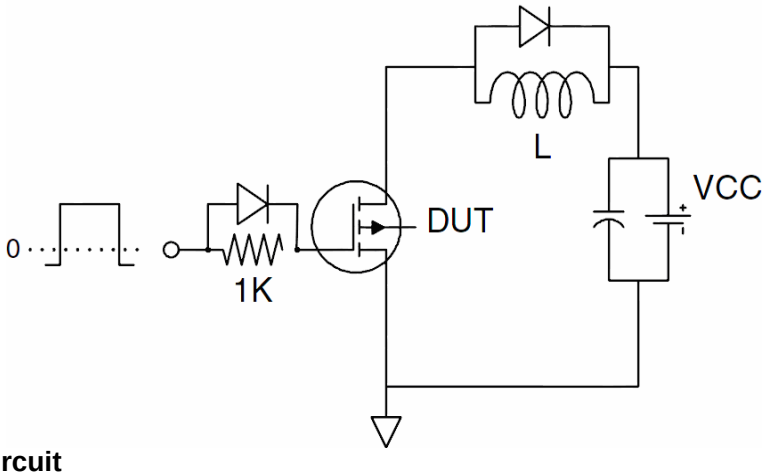
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Test Circuit

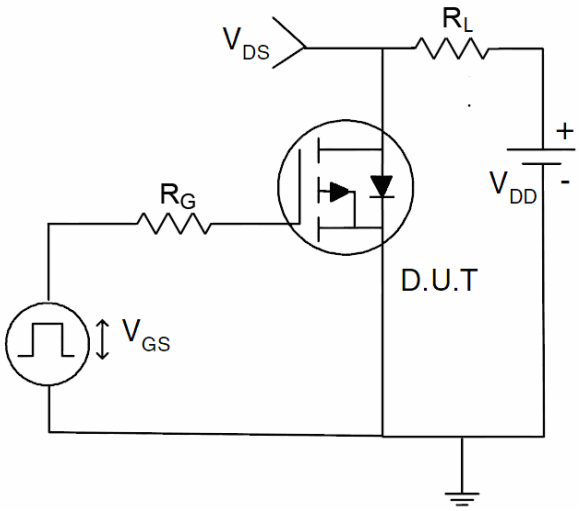
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

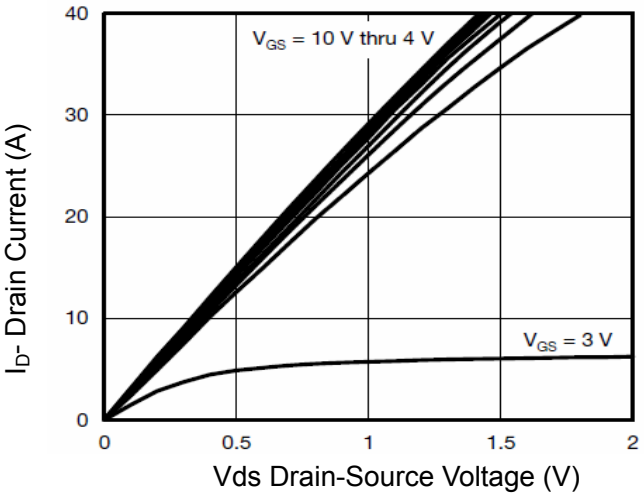


Figure 1 Output Characteristics

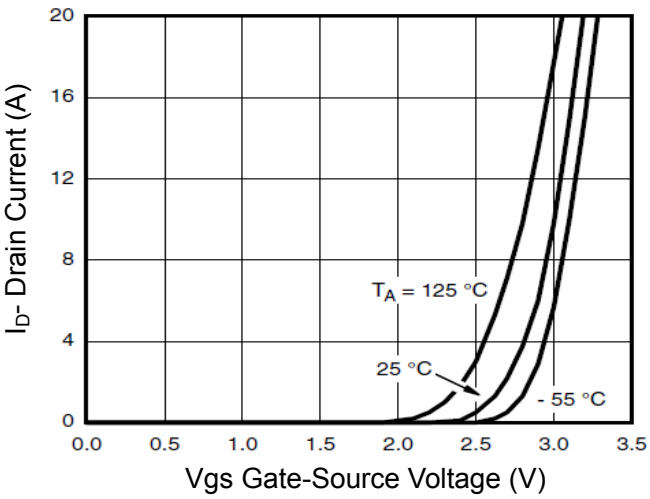


Figure 2 Transfer Characteristics

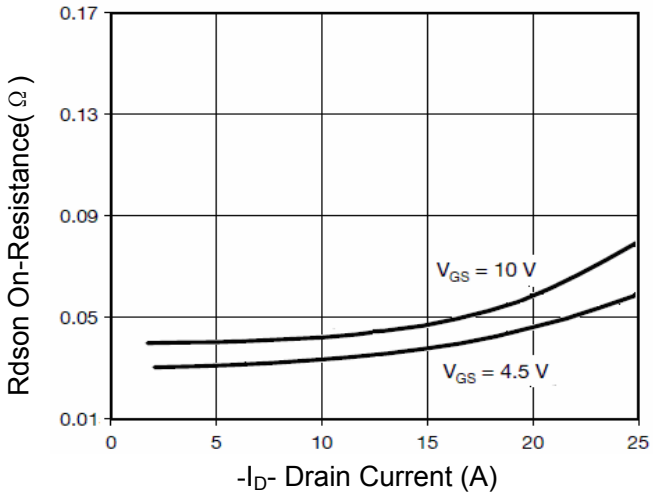


Figure 3 Rdson- Drain Current

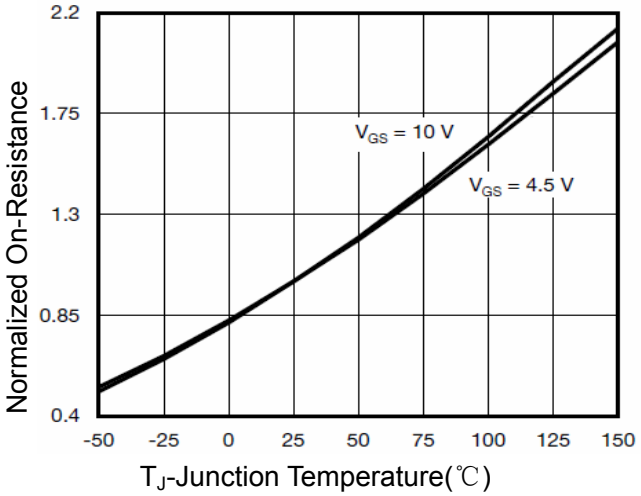


Figure 4 Rdson-JunctionTemperature

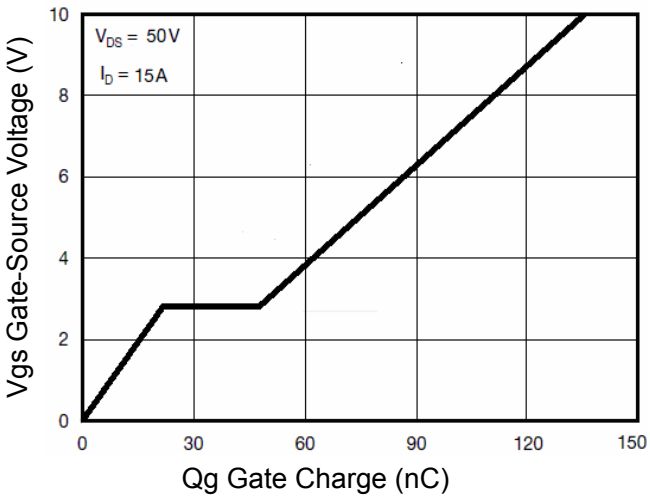


Figure 5 Gate Charge

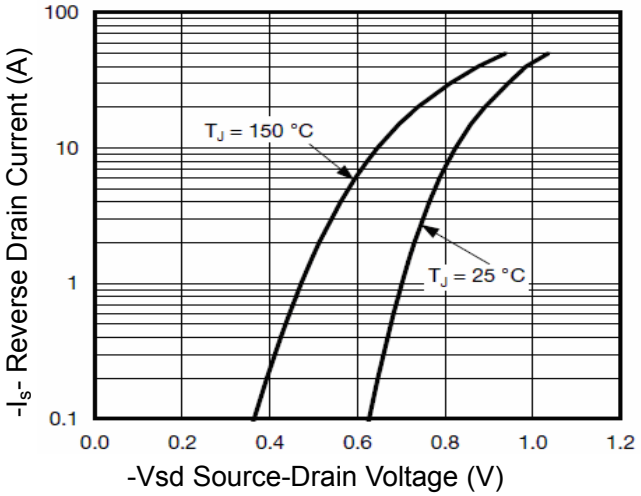


Figure 6 Source- Drain Diode Forward

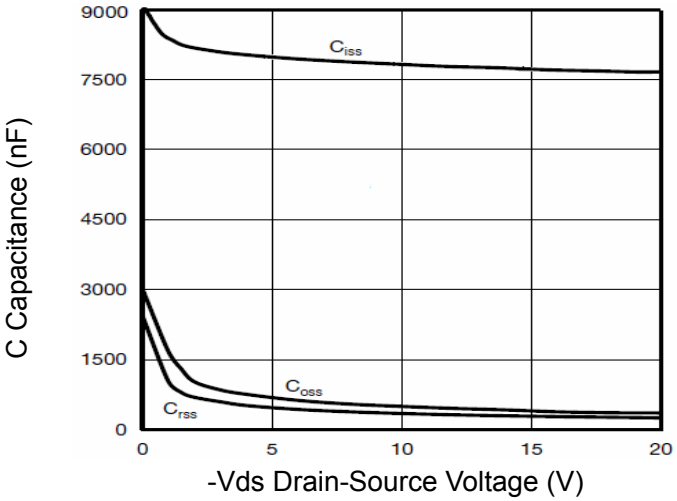


Figure 7 Capacitance vs Vds

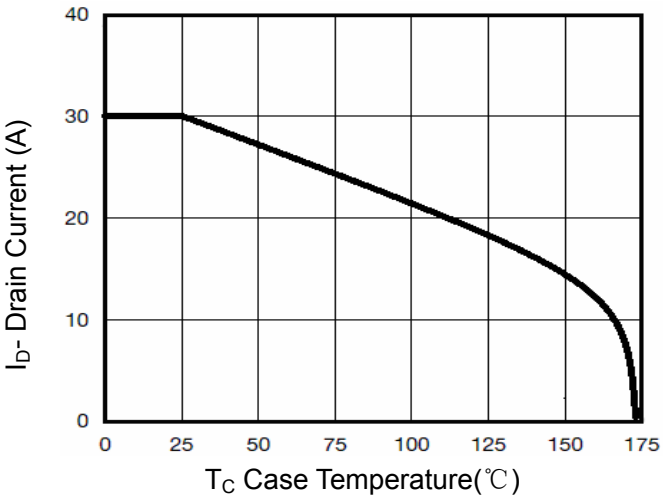


Figure 9 Drain Current vs Case Temperature

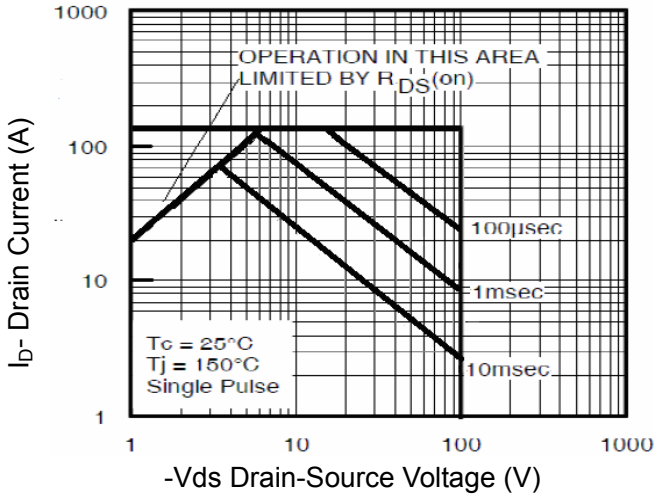


Figure 8 Safe Operation Area

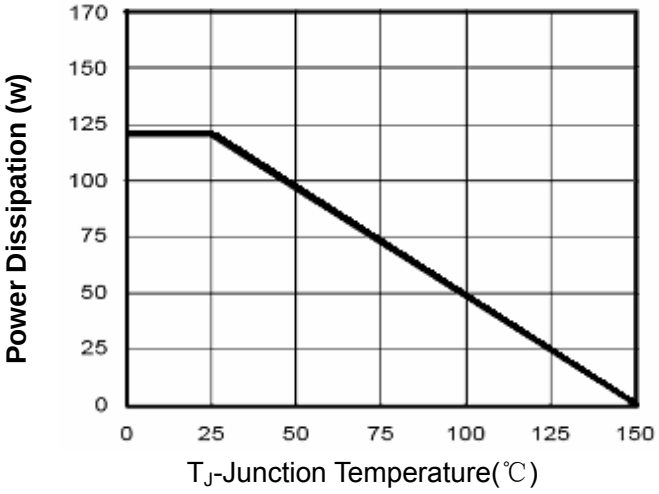


Figure 10 Power De-rating

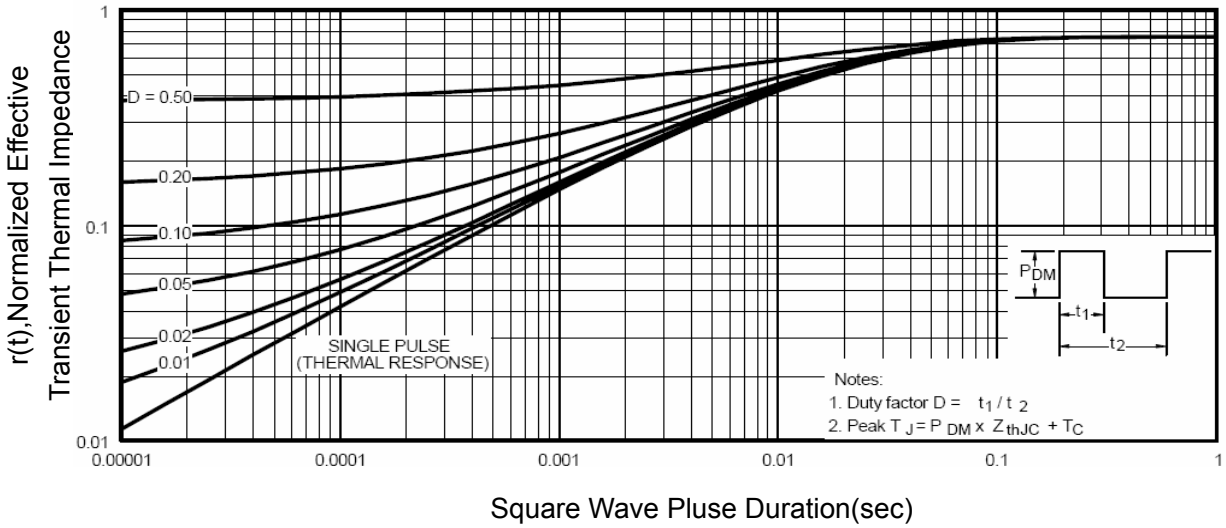
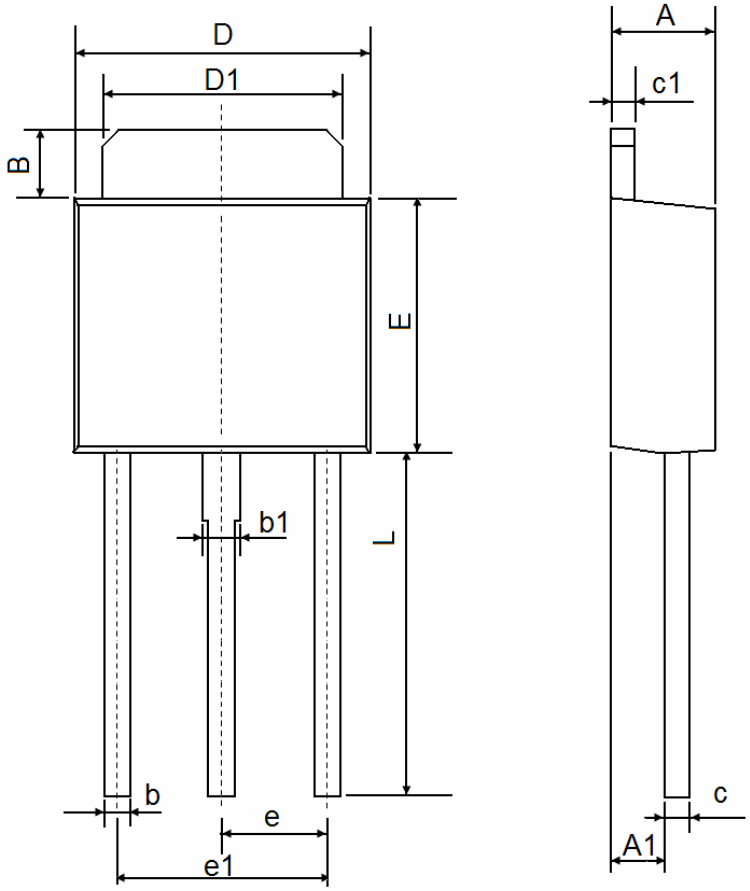


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-251 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	1.050	1.350	0.042	0.054
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP		0.091 TYP	
e1	4.500	4.700	0.177	0.185
L	7.500	7.900	0.295	0.311

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