

NCE N-Channel Enhancement Mode Power MOSFET

Description

The NCE82H140LL 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.

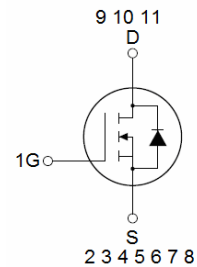
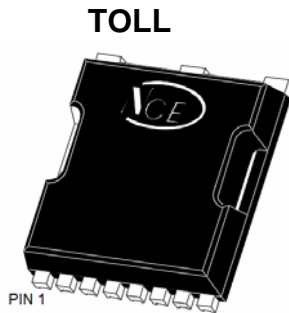
Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

General Features

- $V_{DS} = 82V, I_D = 140A$
 $R_{DS(ON)} < 5.0m\Omega @ V_{GS}=10V$ (Typ:4.0m Ω)
- Special process technology for high ESD capability
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

100% UIS TESTED!
100% AVds TESTED!



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE82H140LL	NCE82H140LL	TOLL	-	-	-

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	82	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	140	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D(100^\circ C)$	99	A
Pulsed Drain Current (Note 1)	I_{DM}	560	A
Maximum Power Dissipation	P_D	250	W
Derating factor		1.67	W/ $^\circ C$
Single pulse avalanche energy (Note 5)	E_{AS}	1500	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta Jc}$	0.6	$^\circ C/W$
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Electrical Characteristics (T_C=25°C unless otherwise noted)

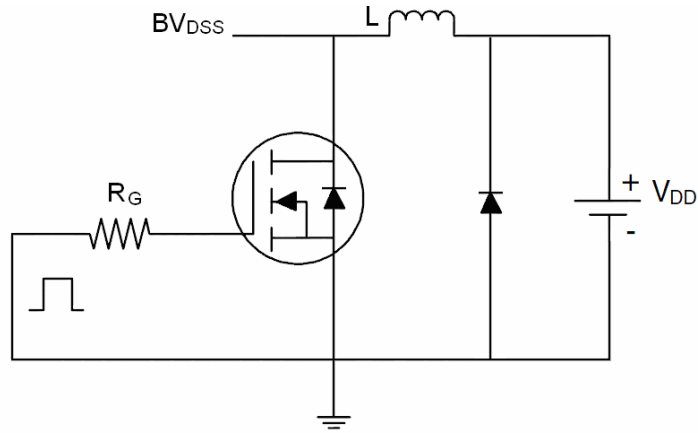
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	82	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =82V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0	3.0	3.8	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	4.0	5.0	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =20A	65	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =40V, V _{GS} =0V, F=1.0MHz	-	7900	-	PF
Output Capacitance	C _{oss}		-	445	-	PF
Reverse Transfer Capacitance	C _{rss}		-	384	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, R _L =1.5Ω V _{GS} =10V, R _{GEN} =2.5Ω	-	23	-	nS
Turn-on Rise Time	t _r		-	42	-	nS
Turn-Off Delay Time	t _{d(off)}		-	75	-	nS
Turn-Off Fall Time	t _f		-	26	-	nS
Total Gate Charge	Q _g	V _{DS} =40V, I _D =20A, V _{GS} =10V	-	158	-	nC
Gate-Source Charge	Q _{gs}		-	32	-	nC
Gate-Drain Charge	Q _{gd}		-	51	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =140A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S	-	-	-	140	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 20A	-	50	-	nS
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs (Note3)	-	110	-	nC

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
5. EAS condition: T_J=25°C, V_{DD}=40V, V_G=10V, L=0.5mH, R_g=25Ω

Test circuit

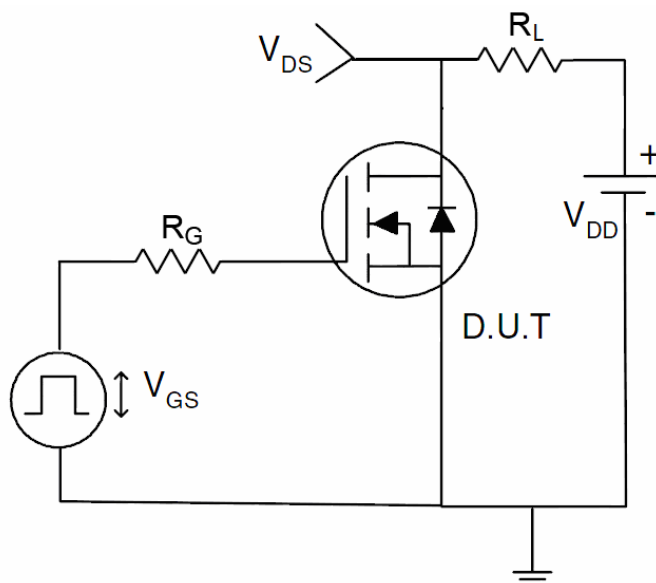
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

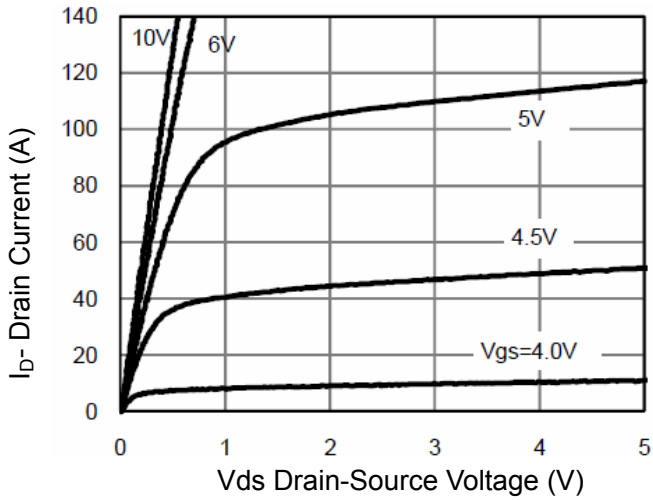


Figure 1 Output Characteristics

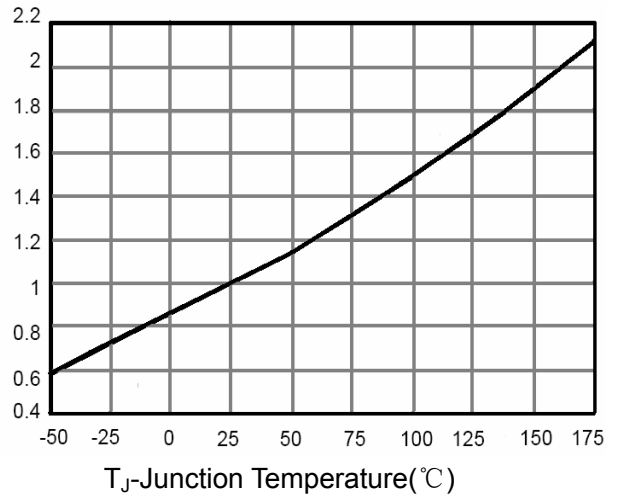


Figure 4 $R_{DS(on)}$ -Junction Temperature

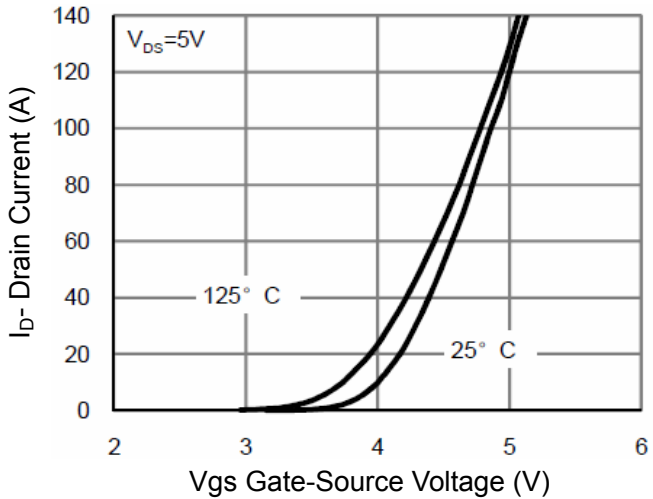


Figure 2 Transfer Characteristics

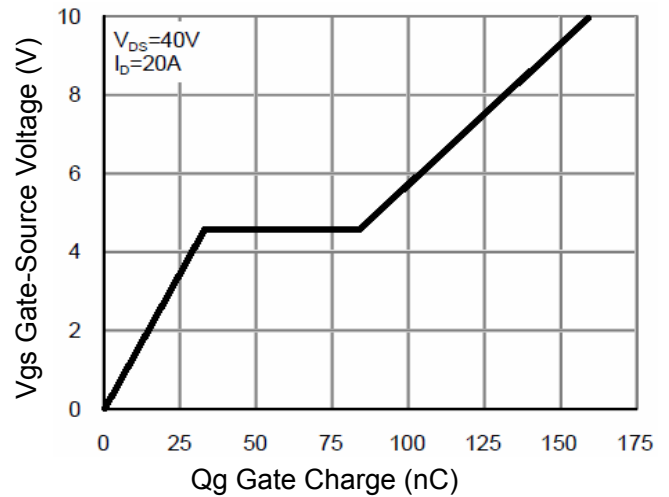


Figure 5 Gate Charge

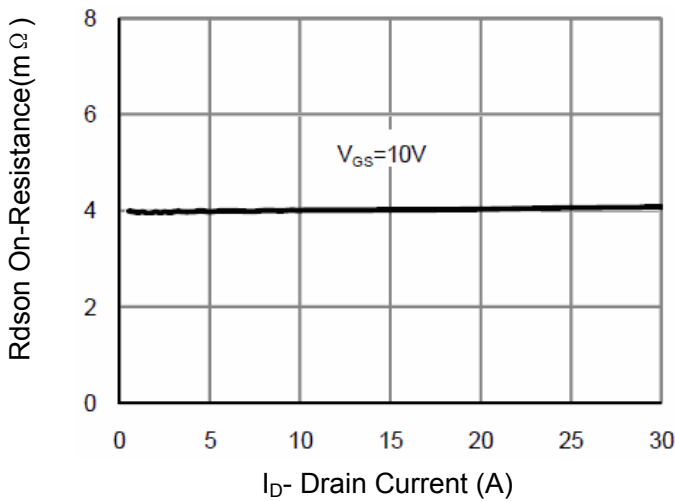


Figure 3 $R_{DS(on)}$ - Drain Current

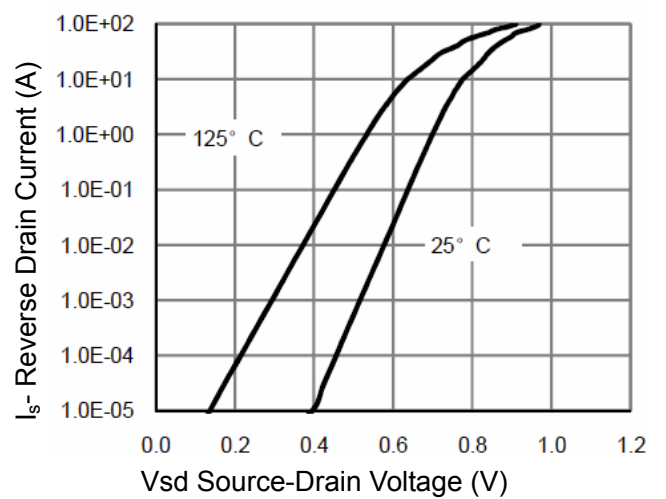


Figure 6 Source- Drain Diode Forward

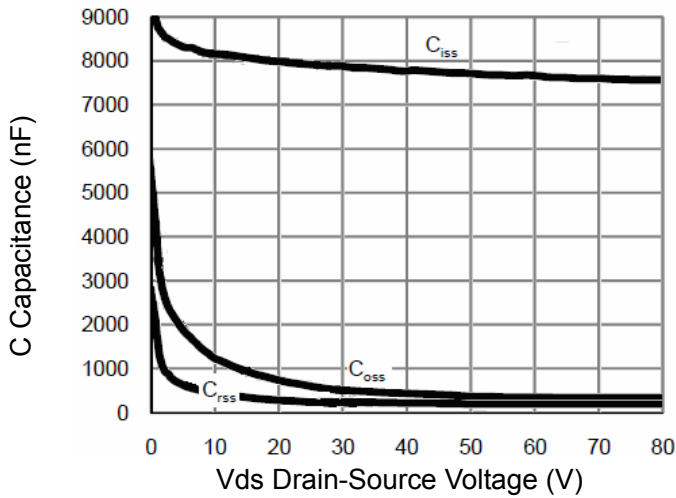


Figure 7 Capacitance vs Vds

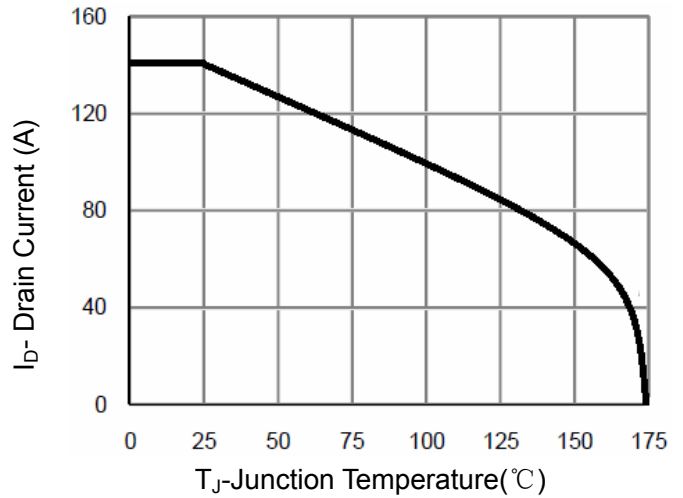


Figure 9 Current De-rating

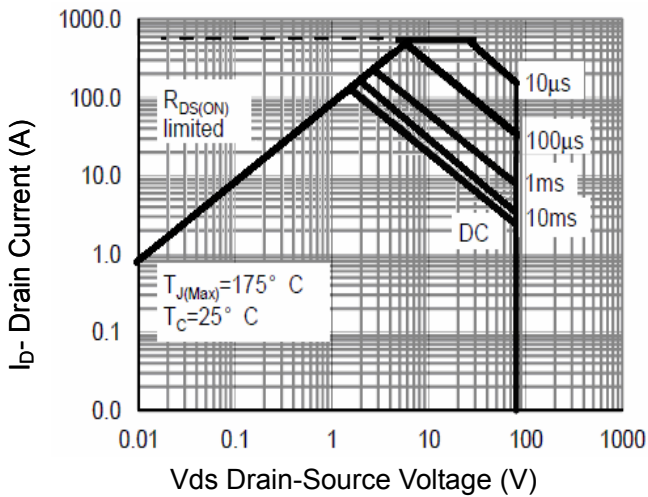


Figure 8 Safe Operation Area

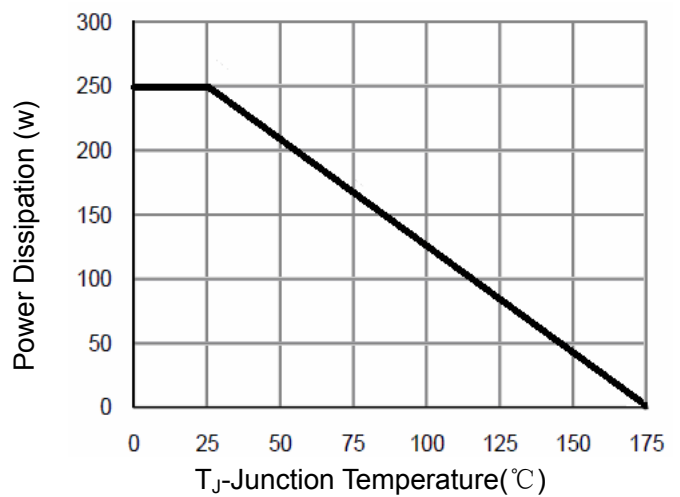


Figure 10 Power De-rating

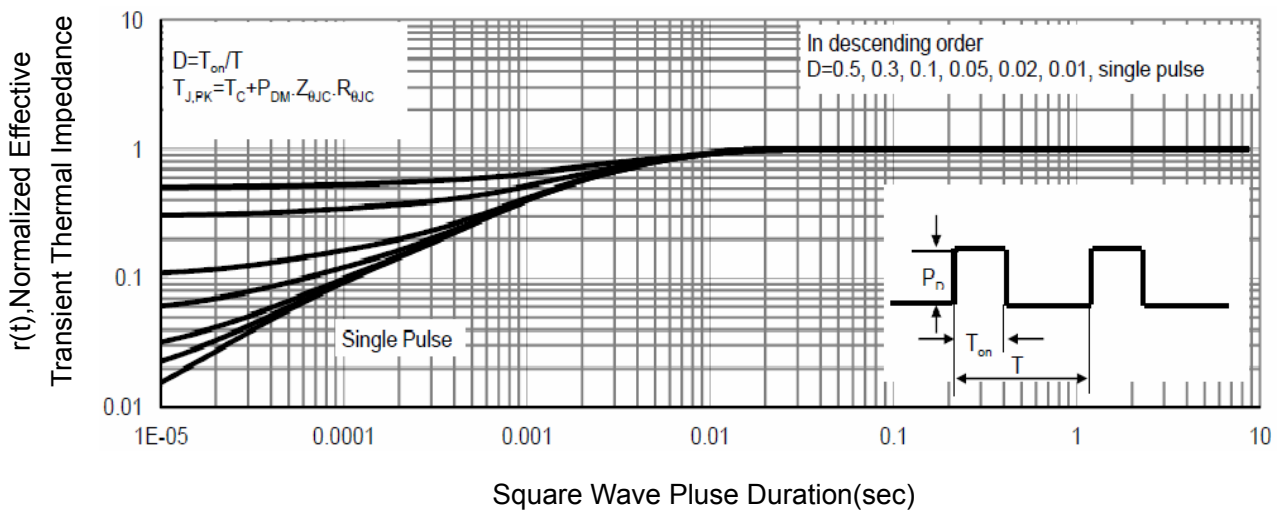
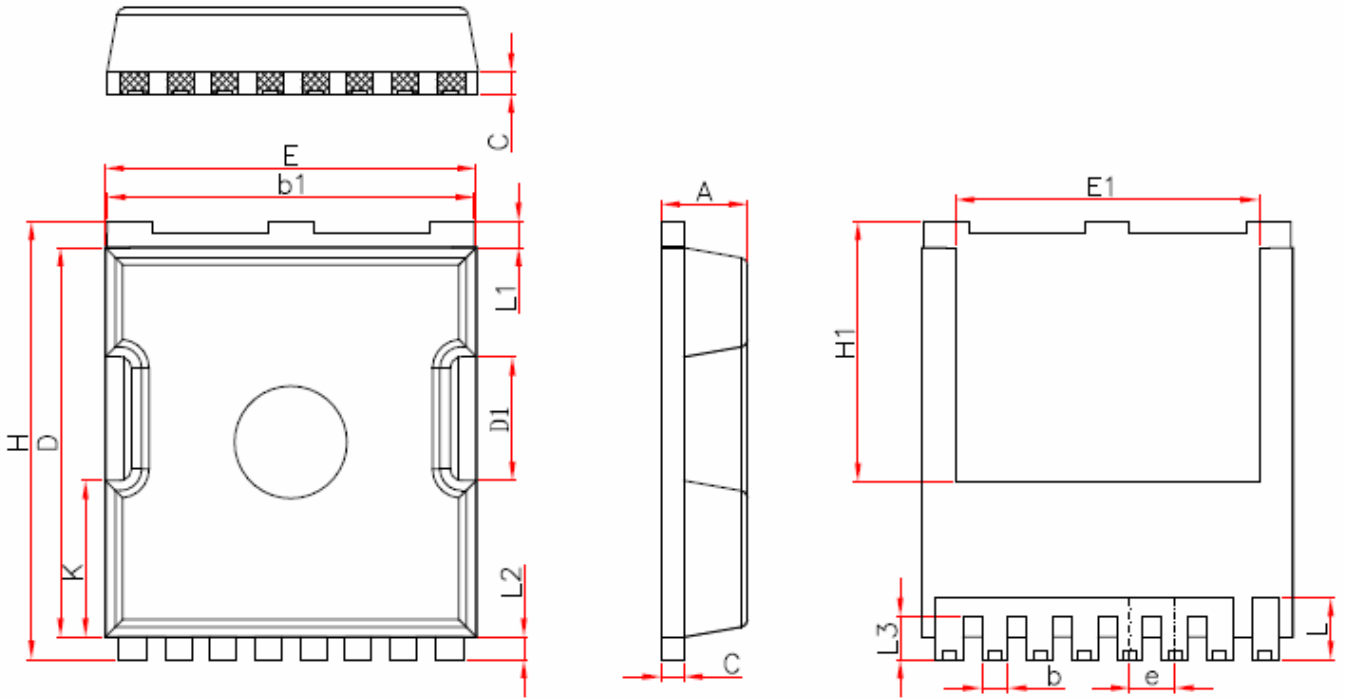


Figure 11 Normalized Maximum Transient Thermal Impedance

TOLL Package Information



Symbol	Millimeters		
	Min.	Nom.	Max.
A	2.20	2.30	2.40
b	0.65	0.75	0.85
b1	9.70	9.80	9.90
C	0.50	0.60	0.70
D	10.30	10.40	10.50
D1	3.15	3.3	3.45
E	9.70	9.90	10.10
E1	8.00	8.10	8.20
e	1.10	1.20	1.30
H	11.6	11.7	11.8
H1	6.85	6.95	7.05
K	4.08	4.18	4.28
L	1.60	1.65	2.10
L1	0.60	0.70	0.80
L2	0.50	0.60	0.70
L3	1.05	1.20	1.30

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