

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

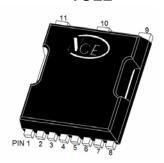
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

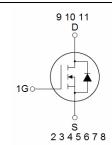
General Features

- V_{DS} = 82V, I_{D} =140A $R_{DS(ON)} < 5.0 \text{m}\Omega$ @ 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% ΔVds 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 ℃unless otherwise noted)

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	82	V	
Gate-Source Voltage	V _G s	±20	V	
Drain Current-Continuous	I _D	140	А	
Drain Current-Continuous(T _C =100 °C)	I _D (100℃)	99	Α	
Pulsed Drain Current (Note 1)	I _{DM}	560	Α	
Maximum Power Dissipation	P _D	250	W	
Derating factor		1.67	W/°C	
Single pulse avalanche energy (Note 5)	E _{AS}	1500	mJ	
Operating Junction and Storage Temperature Range	T_{J} , T_{STG}	-55 To 175	$^{\circ}$	

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	R _{θJc}	0.6	°C/W
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Electrical Characteristics (T_C=25°C unless otherwise noted)

Off Characteristics						
	D) /					
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	μΑ
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_{D}=250\mu A$	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 _{lss}	\/ -40\/\/ -0\/	-	7900	-	PF
Output Capacitance	Coss	V_{DS} =40V, V_{GS} =0V, F=1.0MHz	-	445	-	PF
Reverse Transfer Capacitance	C _{rss}	r-1.0IVInz	-	384	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}		-	23	-	nS
Turn-on Rise Time	t _r	V_{DD} =30V, R_L =1.5 Ω	-	42	-	nS
Turn-Off Delay Time	$t_{d(off)}$	V_{GS} =10 V , R_{GEN} =2.5 Ω	-	75	-	nS
Turn-Off Fall Time	t _f		-	26	-	nS
Total Gate Charge	Q_g	\/ -40\/ L -20A	-	158	-	nC
Gate-Source Charge	Q_{gs}	V_{DS} =40 V , I_{D} =20 A , V_{GS} =10 V	-	32	-	nC
Gate-Drain Charge	Q_{gd}	V _{GS} -10V	-	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	Α
Reverse Recovery Time	t _{rr}	$T_J = 25^{\circ}C, I_F = 20A$	-	50	-	nS
Reverse Recovery Charge	Qrr	$di/dt = 100A/\mu s^{(Note3)}$	-	110	-	nC

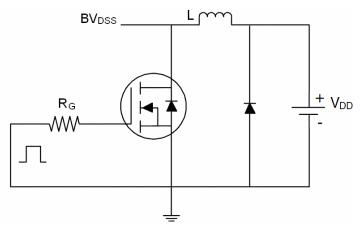
Notes:

- 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: Tj=25 $^{\circ}$ C,VDD=40V,VG=10V,L=0.5mH,Rg=25 Ω

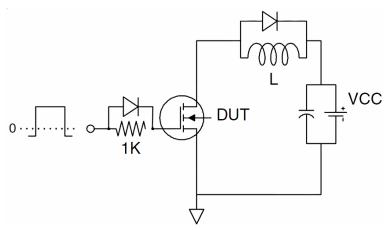


Test circuit

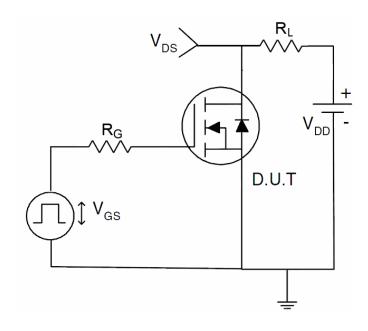
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit





Typical Electrical and Thermal Characteristics (Curves)

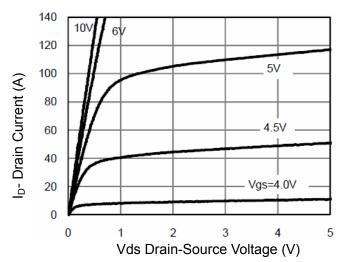


Figure 1 Output Characteristics

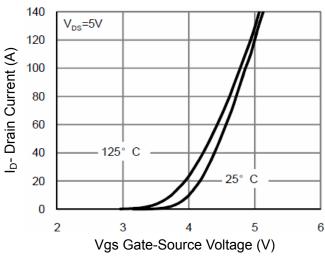


Figure 2 Transfer Characteristics

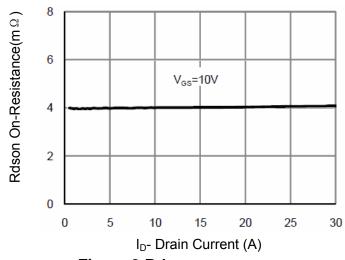


Figure 3 Rdson- Drain Current

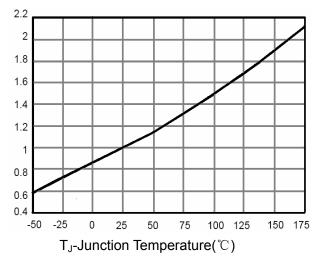


Figure 4 Rdson-JunctionTemperature

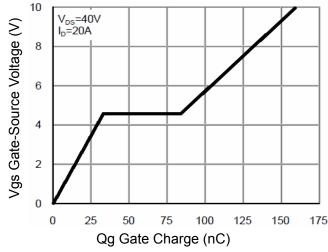


Figure 5 Gate Charge

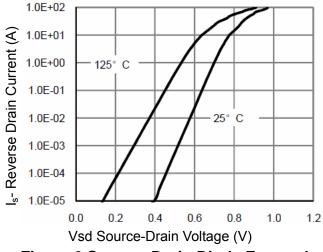


Figure 6 Source- Drain Diode Forward



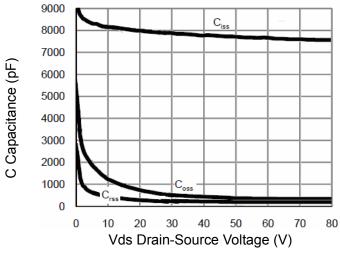


Figure 7 Capacitance vs Vds

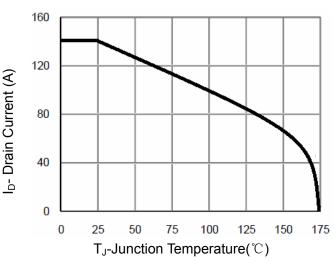


Figure 9 Current De-rating

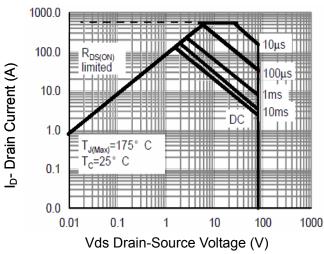


Figure 8 Safe Operation Area

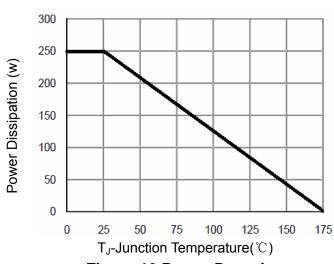


Figure 10 Power De-rating

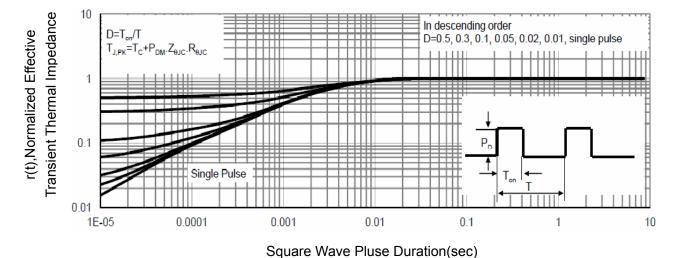
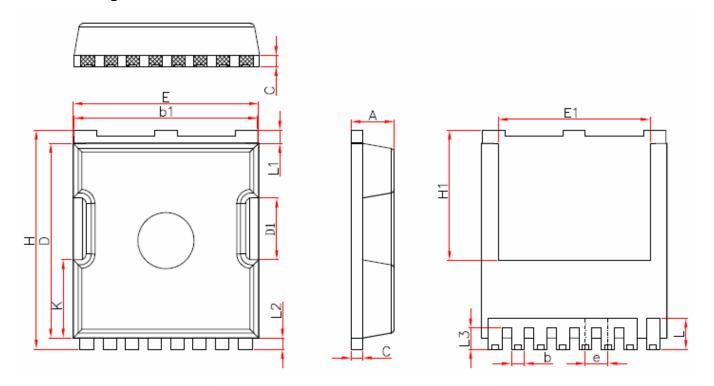


Figure 11 Normalized Maximum Transient Thermal Impedance



TOLL Package Information



Symbo1	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	
С	0.50	0.60	0.70	
D	10.30	10.40	10.50	
D1	3.15	3.3	3.45	
Е	9.70	9.90	10.10	
E1	8.00	8.10	8.20	
е	1.10	1.20	1.30	
Н	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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NCE82H140LL

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