NCE N-Channel Enhancement Mode Power MOSFET

Description

The NCE75H21 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in Automotive applications and a wide variety of other applications.

General Features

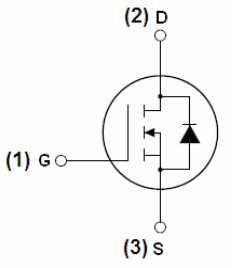
- V_{DSS} =75V,I_D =210A
  $R_{DS(ON)}$ < 4mΩ @ V_{GS}=10V
- Good stability and uniformity with high E_{AS}
- Special process technology for high ESD capability
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

- Automotive applications
- Hard switched and high frequency circuits
- Uninterruptible power supply

100% UIS TESTED!

100% ΔVds TESTED!



Schematic diagram

Marking and pin assignment

TO-220-3L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE75H21	NCE75H21	TO-220	-	-	-

Absolute Maximum Ratings (TC=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DSS}	75	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	210	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	150	A
Pulsed Drain Current	I_{DM}	840	A
Maximum Power Dissipation	P_D	310	W
Derating factor		2.07	W/℃

Single pulse avalanche energy (Note 4)	E_{AS}	2200	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 1)	$R_{\theta JC}$	0.48	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

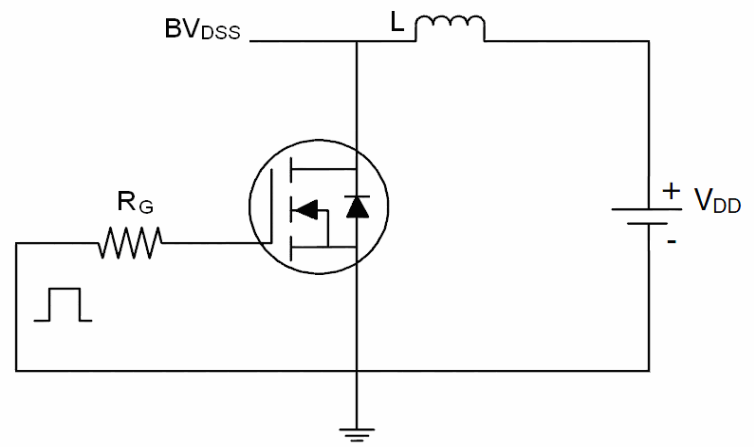
Parameter		Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V I_D=250μA	75			V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=75V,V_{GS}=0V			1	μA
Gate-Body Leakage Current		I_{GSS}	V_{GS}=±20V,V_{DS}=0V			±200	nA
On Characteristics							
Gate Threshold Voltage		$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2	3	4	V
Drain-Source On-State Resistance	25℃	$R_{DS(ON)}$	V_{GS}=10V, I_D=40A		2.8	4	mΩ
	125℃				4.7	6.5	mΩ
Forward Transconductance		g_{FS}	V_{DS}=25V,I_D=40A	100	165		S
Dynamic Characteristics							
Input Capacitance		C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz		11000		PF
Output Capacitance		C_{oss}			914		PF
Reverse Transfer Capacitance		C_{rss}			695		PF
Switching Characteristics							
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=30V,I_D=2A,R_L=15Ω V_{GS}=10V,R_G=2.5Ω		23		nS
Turn-on Rise Time		t_r			190		nS
Turn-Off Delay Time		$t_{d(off)}$			130		nS
Turn-Off Fall Time		t_f			120		nS
Total Gate Charge		Q_g	ID=30A,VDD=30V,VGS=10V	-	250		nC
Gate-Source Charge		Q_{gs}		-	48		nC
Gate-Drain Charge		Q_{gd}		-	98		nC
Drain-Source Diode Characteristics							
Diode Forward Voltage		V_{SD}	V_{GS}=0V,I_S=40A			1.2	V
Reverse Recovery Time		t_{rr}	TJ = 25°C, IF = 40A di/dt = 100A/μs (Note2)		63		nS
Reverse Recovery Charge		Qrr			98		nC
Forward Turn-On Time		t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

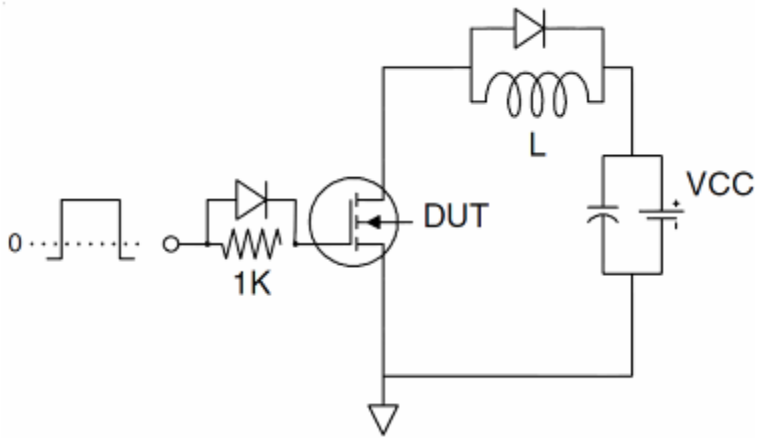
1. Surface Mounted on FR4 Board, t ≤ 10 sec.
2. Pulse Test: Pulse Width ≤ 400μs, Duty Cycle ≤ 2%.
3. EAS condition：Tj=25℃,VDD=37.5V,VG=10V,L=2mH,Rg=25Ω,IAS=37A

Test circuit

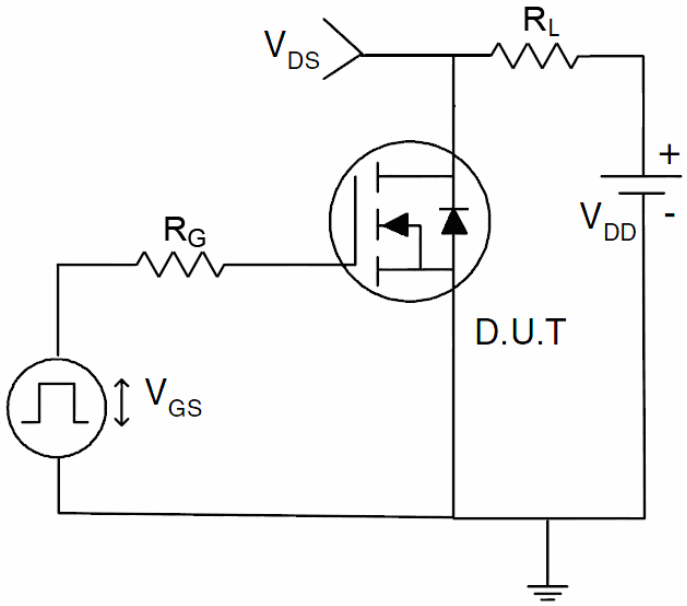
1）E_{AS} test Circuit



2）Gate charge test Circuit



3）Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

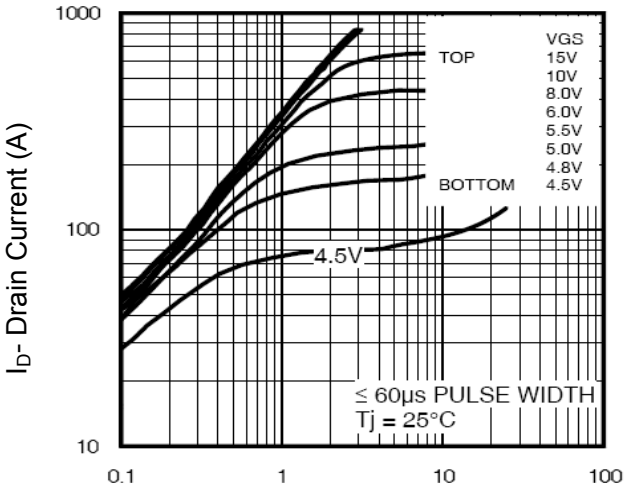


Figure 1 Output Characteristics

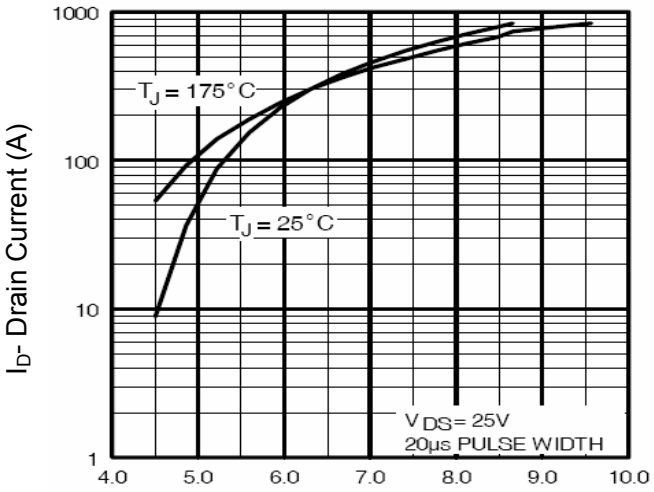


Figure 2 Transfer Characteristics

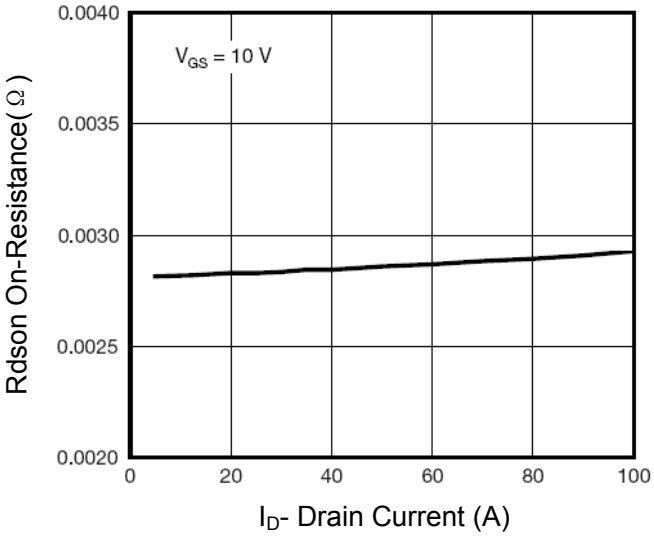


Figure 3 Rdson- Drain Current

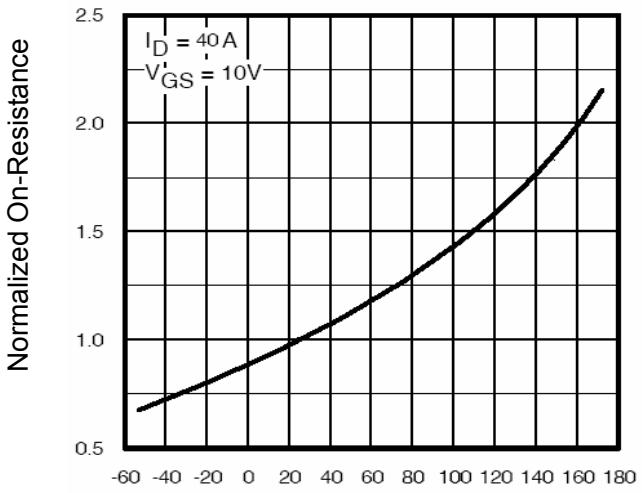


Figure 4 Rdson-JunctionTemperature

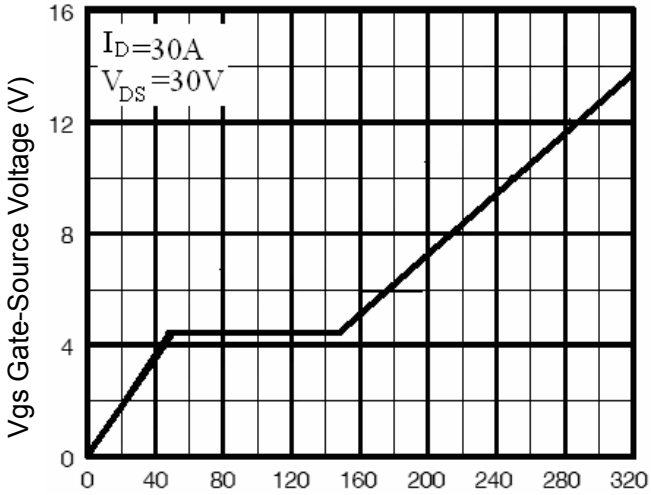


Figure 5 Gate Charge

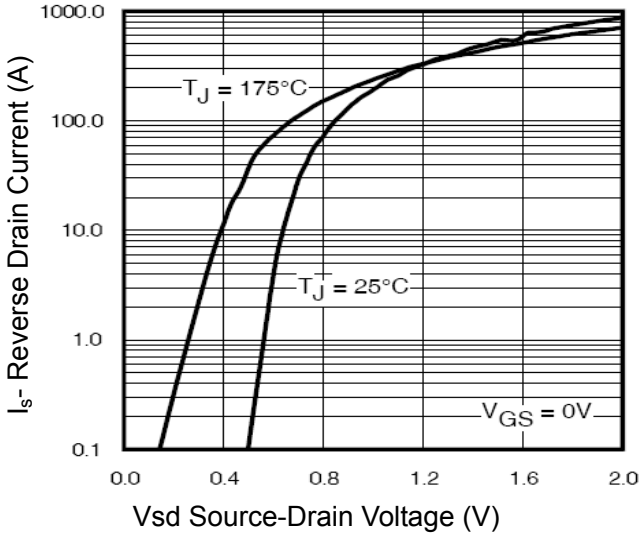


Figure 6 Source- Drain Diode Forward

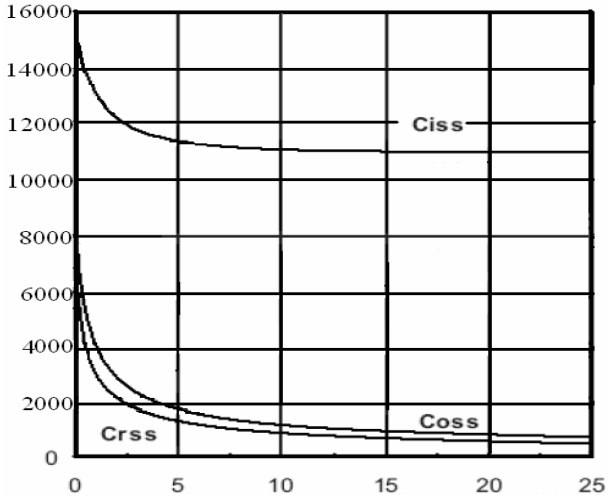


Figure 7 Capacitance vs Vds

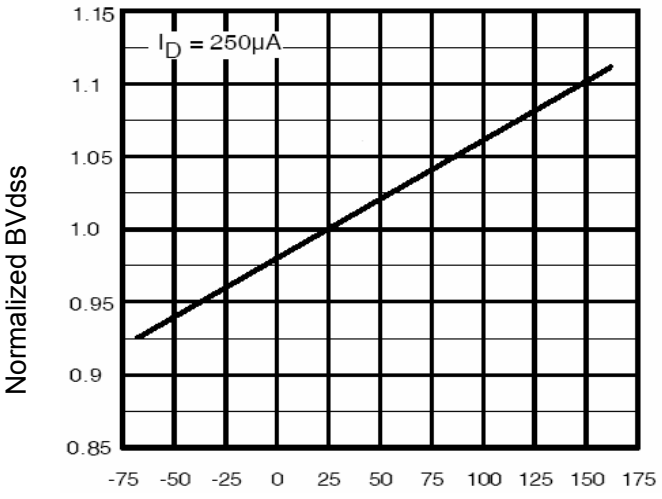


Figure 9 BV_{DSS} vs Junction Temperature

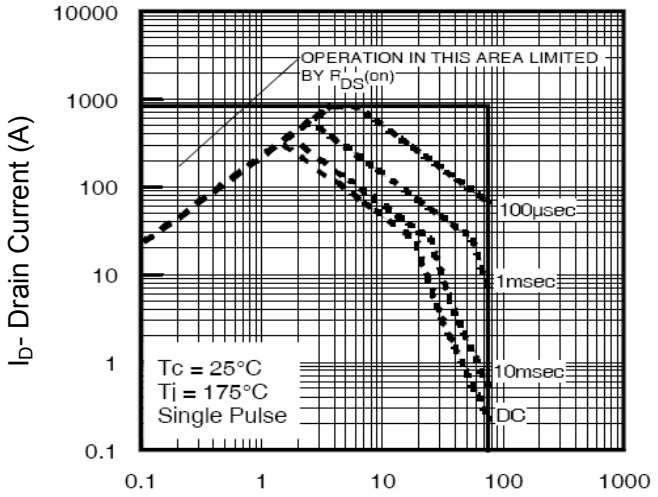


Figure 8 Safe Operation Area

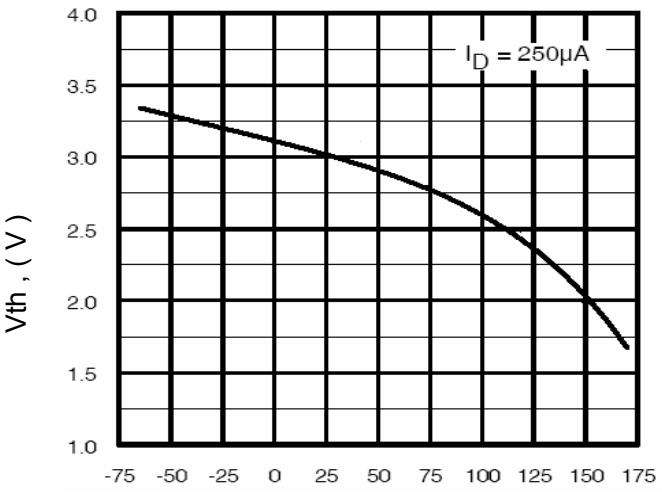


Figure 10 $V_{GS(th)}$ vs Junction Temperature

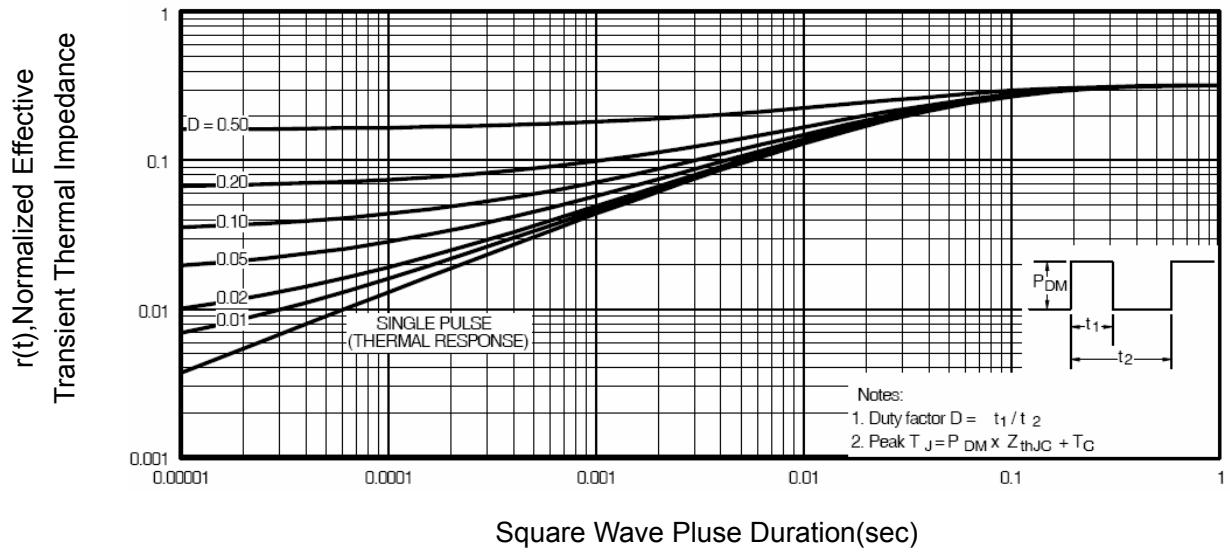
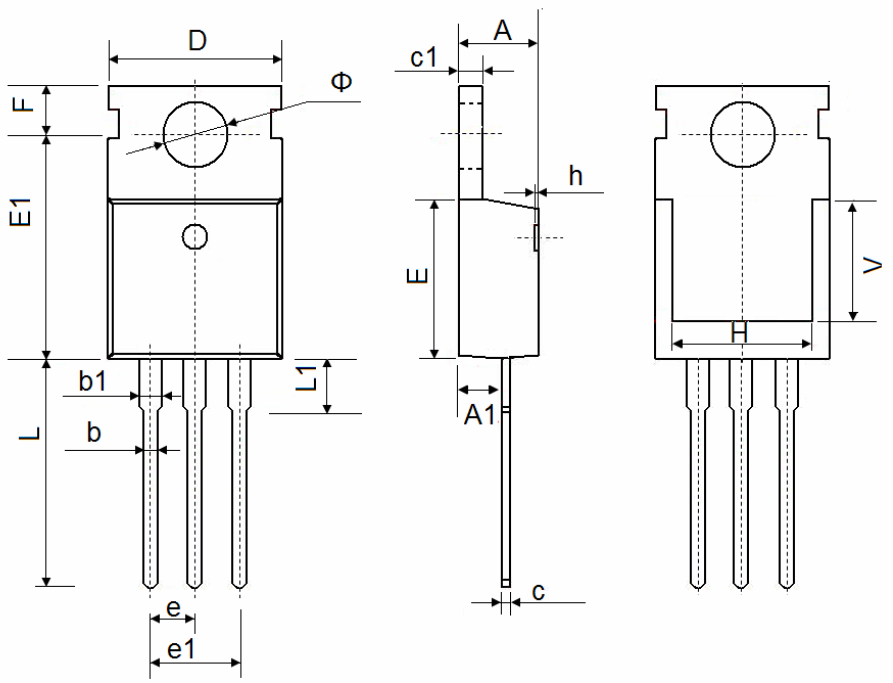


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150

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