NCE Automotive N-Channel Enhancement Mode Power MOSFET (Primary)

Description

The NCEA0130AG 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

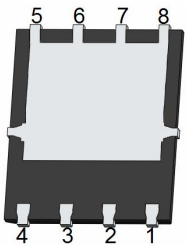
- Automotive application
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

General Features

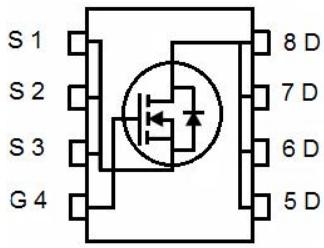
- V_{DS} = 100V,I_D =36A
  $R_{DS(ON)}$ < 32mΩ @ V_{GS}=10V (Typ:24mΩ)
  $R_{DS(ON)}$ < 35mΩ @ V_{GS}=4.5V (Typ:27mΩ)
- High density cell design for ultra low Rdson
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- 175 °C operating temperature
- Pb-free lead plating;RoHS compliant
- Halogen-freeaccordingtoIEC61249-2-21
- 100% UIS tested
- 100% ΔVds tested

DFN 5X6-8L

Top View



Bottom View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
A0130AG	NCEA0130AG	DFN5X6-8L	Ø330mm	12mm	5000units

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

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current-Continuous	36	A
I_D (100℃)	Drain Current-Continuous(T_C=100℃)	21	A
I_{DM}	Pulsed Drain Current	144	A
P_D	Maximum Power Dissipation	100	W
	Derating factor	0.68	W/℃
E_{AS}	Single pulse avalanche energy (Note 1)	164	mJ
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	℃

Thermal Characteristic

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.5	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V,V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.3	1.9	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=15A	-	24	32	mΩ
		V_{GS}=4.5V, I_D=15A	-	27	35	
g_{FS}	Forward Transconductance	V_{DS}=5V,I_D=15A	-	15	-	S
Dynamic Characteristics						
C_{lss}	Input Capacitance	V_{DS}=50V,V_{GS}=0V, F=1.0MHz	-	2479	-	pF
C_{oss}	Output Capacitance		-	96	-	pF
C_{rss}	Reverse Transfer Capacitance		-	79	-	pF
Switching Characteristics (Note 2)						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=50V,R_L=3.3Ω V_{GS}=10V,R_{GEN}=3Ω	-	9	-	nS
t_r	Turn-on Rise Time		-	9	-	nS
$t_{d(off)}$	Turn-Off Delay Time		-	32	-	nS
t_f	Turn-Off Fall Time		-	8	-	nS
Q_g	Total Gate Charge	V_{DS}=50V,I_D=15A, V_{GS}=10V	-	67.2	-	nC
Q_{gs}	Gate-Source Charge		-	9.4	-	nC
Q_{gd}	Gate-Drain Charge		-	15.5	-	nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS}=0V,I_S=15A	-	-	1.2	V
I_S	Diode Forward Current	-	-	-	36	A
t_{rr}	Reverse Recovery Time	TJ = 25°C, IF = 15A di/dt = 100A/μs	-	32	-	nS
Qrr	Reverse Recovery Charge		-	53	-	nC
t_{on}	Forward Turn-On Time	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. Guaranteed by design, not subject to production.
3. 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 TJ(MAX)=175°C. The SOA curve provides a single pulse rating.

Typical Electrical and Thermal Characteristics (Curves)

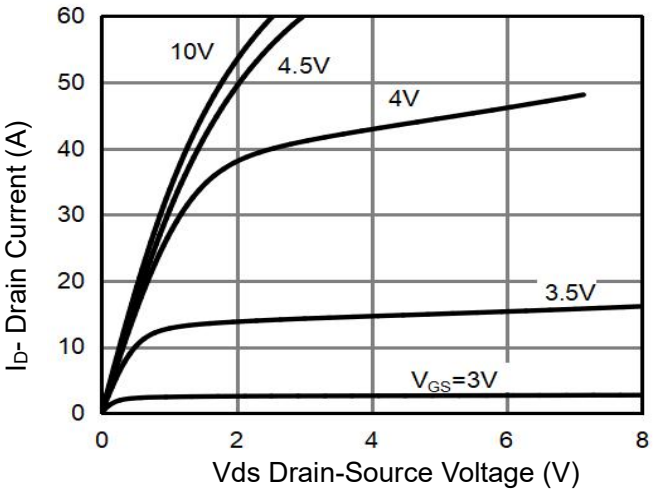


Figure 1 Output Characteristics

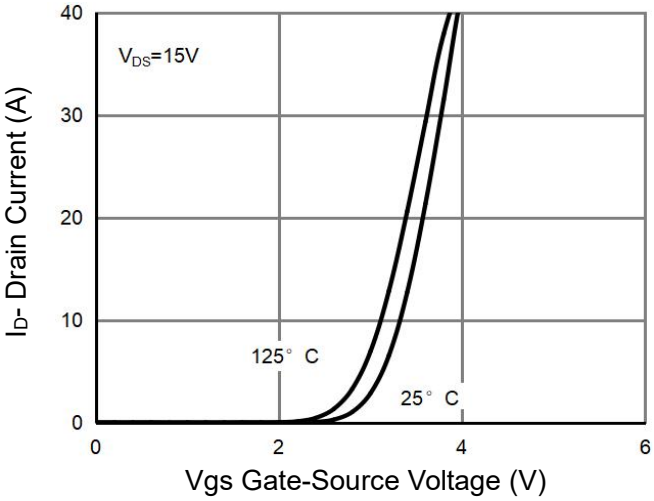


Figure 2 Transfer Characteristics

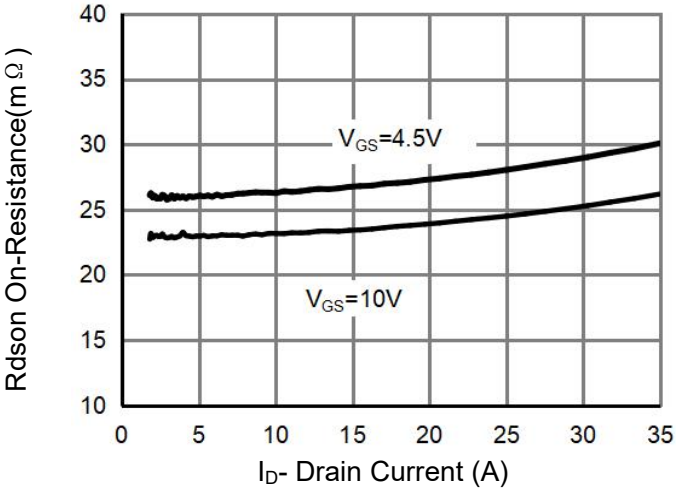


Figure 3 Rdson- Drain Current

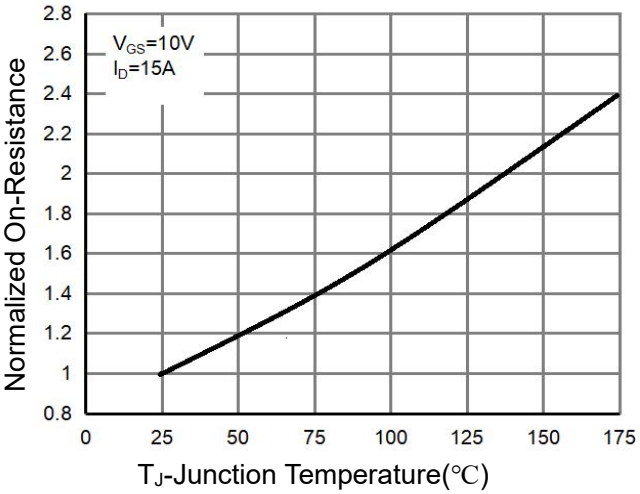


Figure 4 Rdson-JunctionTemperature

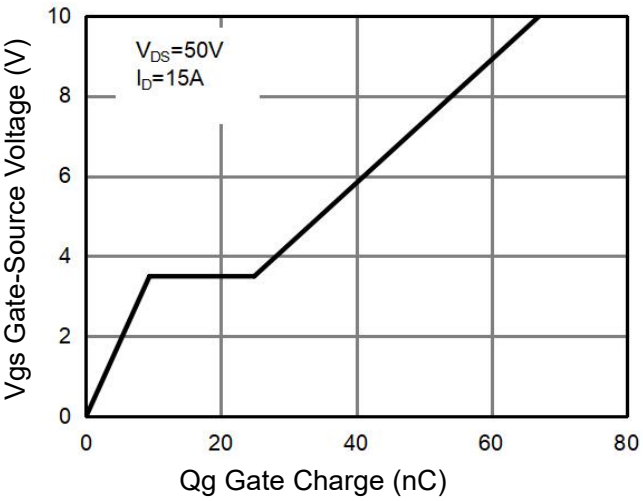


Figure 5 Gate Charge

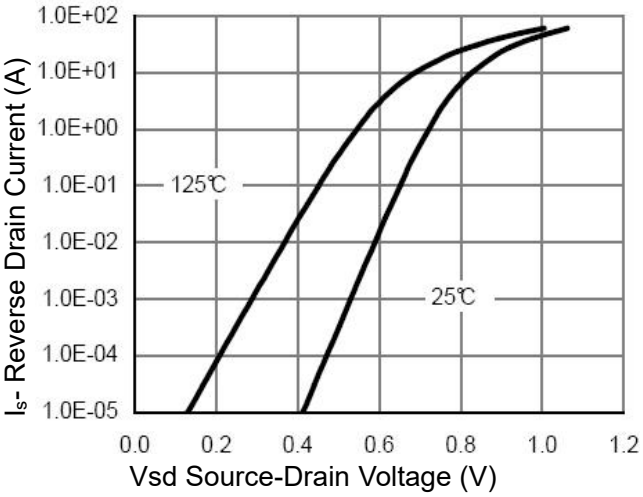


Figure 6 Source- Drain Diode Forward

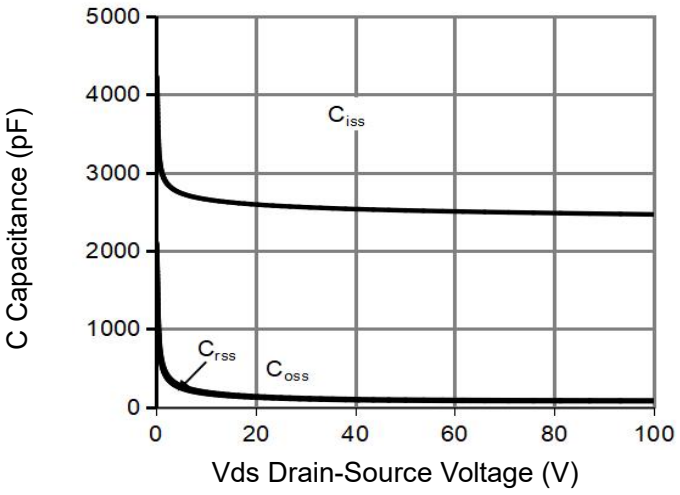


Figure 7 Capacitance vs Vds

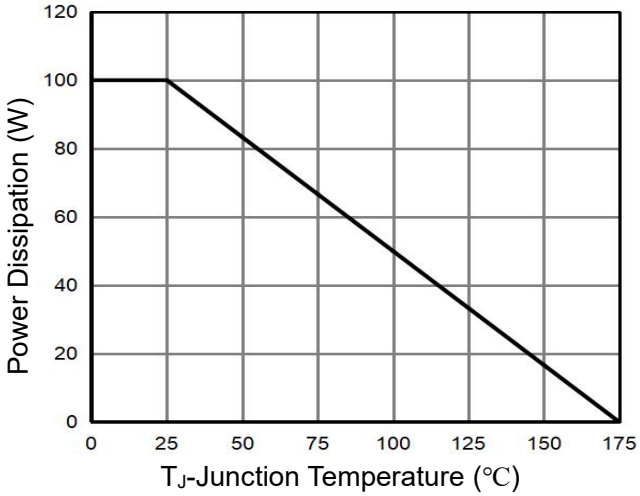


Figure 9 Power De-rating

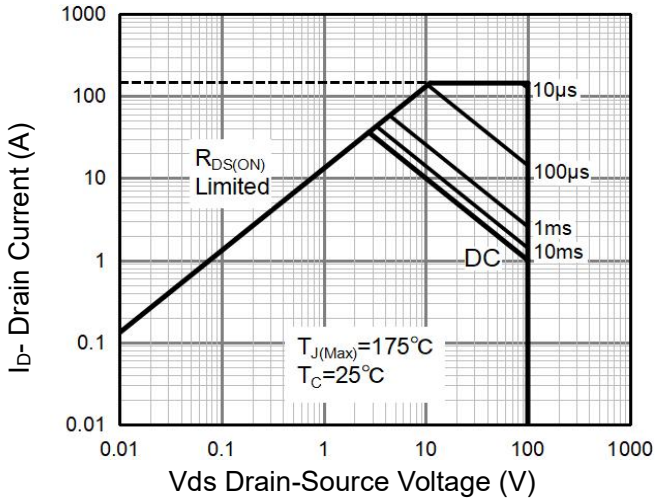


Figure 8 Safe Operation Area(Note3)

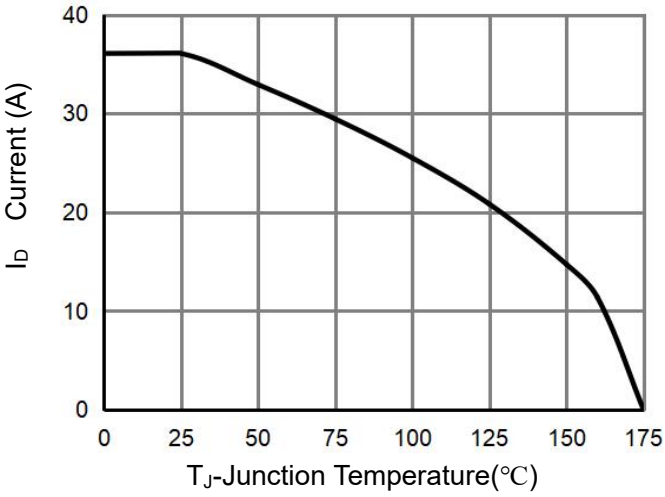


Figure 10ID Current- Junction Temperature

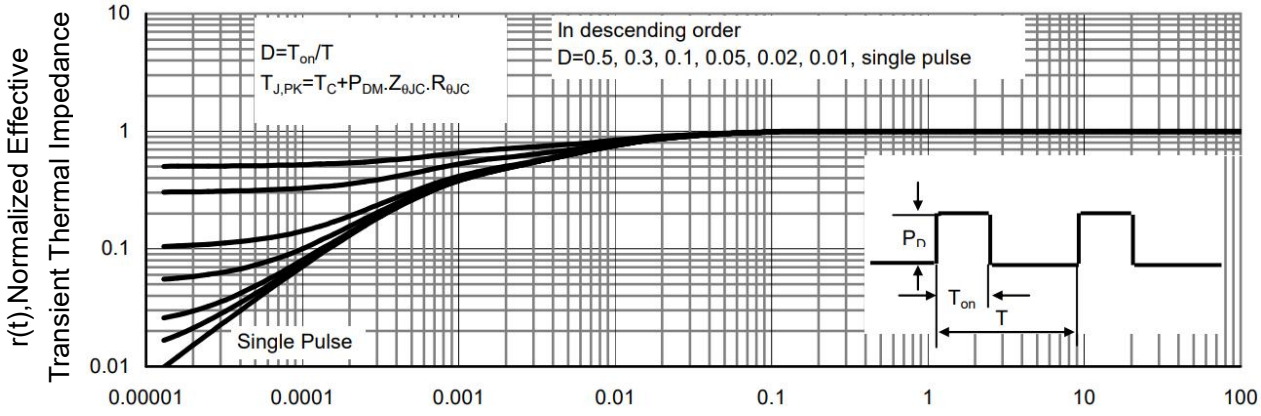
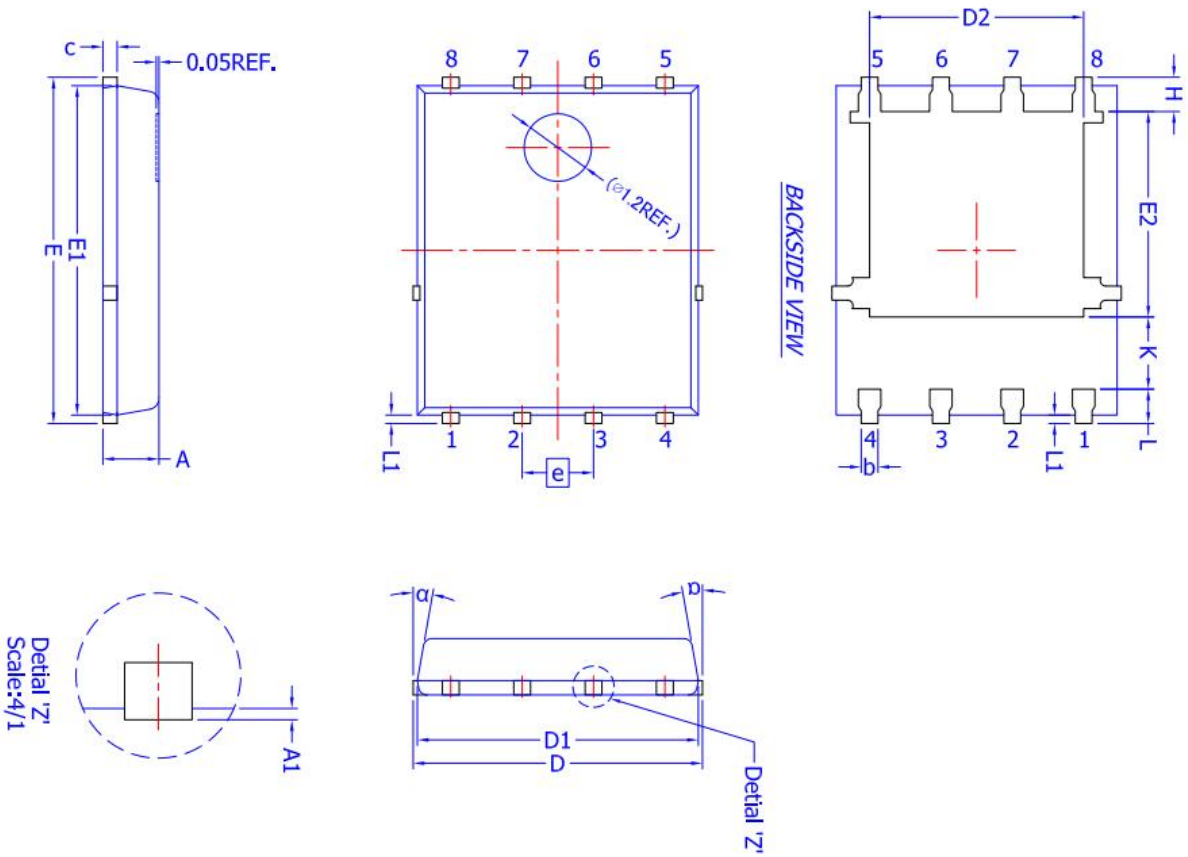


Figure 11 Normalized Maximum Transient Thermal Impedance

PDFN5X6-8L Package Information



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.30	0.40	0.50
c	0.20	0.25	0.30
D	5.15 BSC		
D1	5.00 BSC		
D2	3.76	3.81	3.86
E	6.15 BSC		
E1	5.80	5.85	5.90
E2	3.45	3.65	3.85
e	1.27 BSC		
H	0.51	0.61	0.71
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.08	0.15	0.23
α	10°	11°	12°

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