

NCE P-Channel Enhancement Mode Power MOSFET

Description

The NCE035P40GU 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

- Load switch
- Battery protection

100% UIS TESTED!

100% ΔV_{ds} TESTED!

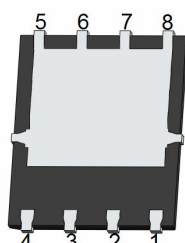
General Features

- $V_{DS} = -40V, I_D = -130A$
- $R_{DS(ON)} < 3.5m\Omega @ V_{GS} = -10V$
- $R_{DS(ON)} < 6.0m\Omega @ V_{GS} = -4.5V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

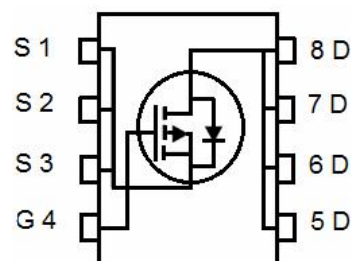
DFN 5X6-8L



Top View



Bottom View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
035P40GU	NCE035P40GU	DFN 5x6 -8L	-	-	-

Absolute Maximum Ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-130	A
Pulsed Drain Current	I_{DM}	-520	A
Maximum Power Dissipation	P_D	120	W
Single pulse avalanche energy (Note 5)	E_{AS}	650	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	1.04	$^\circ\text{C/W}$
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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	-40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-40V, 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	-1.2	-1.8	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-20A	-	2.8	3.5	mΩ
		V _{GS} =-4.5V, I _D =-20A	-	4.6	6.0	
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-20A	-	65	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =-20V, V _{GS} =0V, F=1.0MHz	-	7756	-	PF
Output Capacitance	C _{oss}		-	705	-	PF
Reverse Transfer Capacitance	C _{rss}		-	536	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-20V, R _{GEN} =3Ω V _{GS} =-10V, R _L =0.5Ω	-	12	-	nS
Turn-on Rise Time	t _r		-	25	-	nS
Turn-Off Delay Time	t _{d(off)}		-	310	-	nS
Turn-Off Fall Time	t _f		-	170	-	nS
Total Gate Charge	Q _g	V _{DS} =-20V, I _D =-20A, V _{GS} =-10V	-	158	-	nC
Gate-Source Charge	Q _{gs}		-	34	-	nC
Gate-Drain Charge	Q _{gd}		-	32	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =-20A	-	-	-1.2	V
Diode Forward Current (Note 2)	I _S		-	-	-130	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = -20A di/dt = 100A/μs(Note3)	-	130	-	nS
Reverse Recovery Charge	Q _{rr}		-	220	-	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
5. EAS condition: T_J=25°C, V_{DD}=-20V, V_G=-10V, L=0.5mH, R_g=25Ω

Typical Electrical and Thermal Characteristics (Curves)

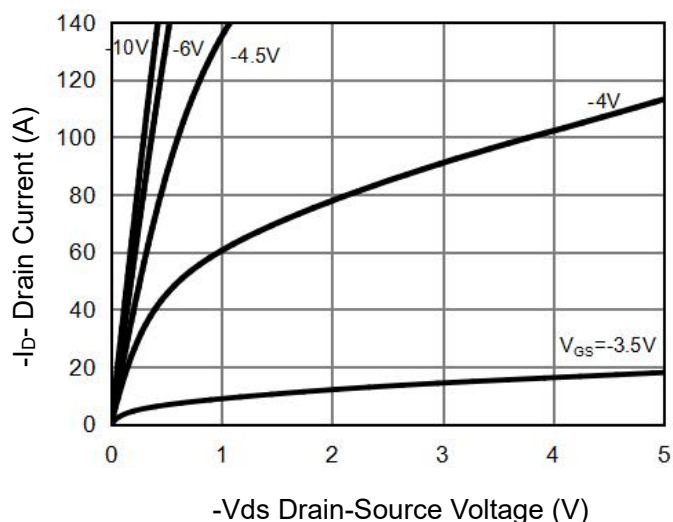


Figure 1 Output Characteristics

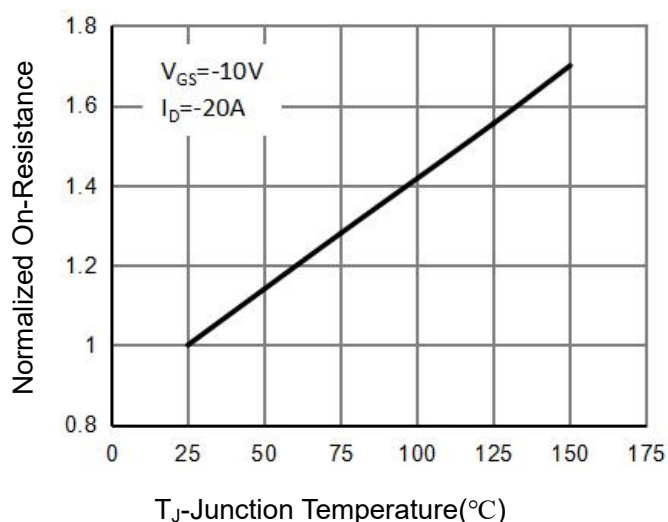


Figure 4 Rdson-Junction Temperature

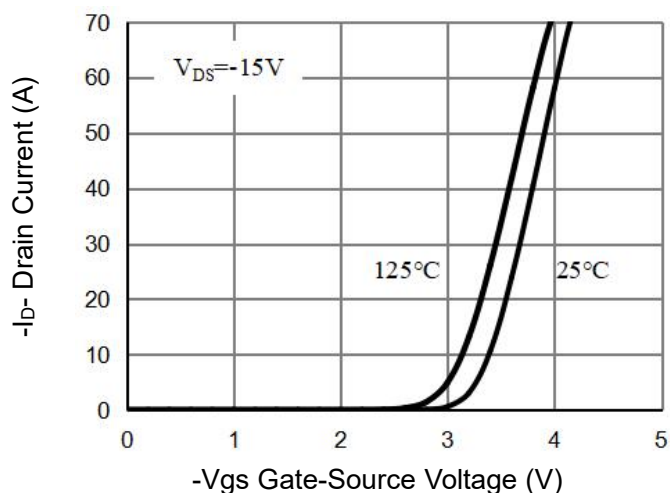


Figure 2 Transfer Characteristics

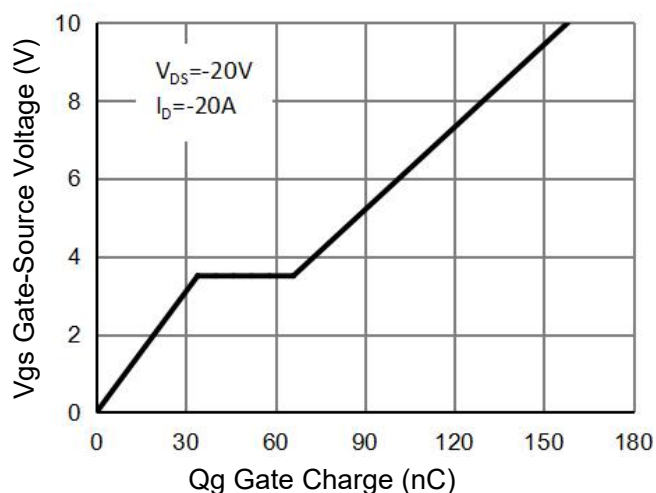


Figure 5 Gate Charge

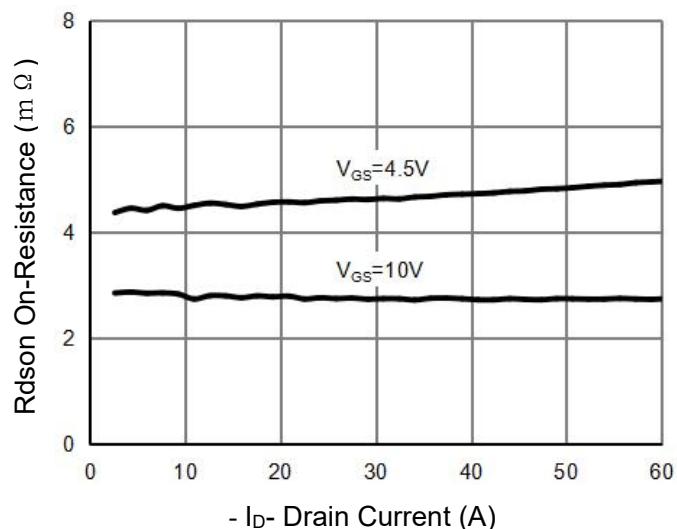


Figure 3 Rdson- Drain Current

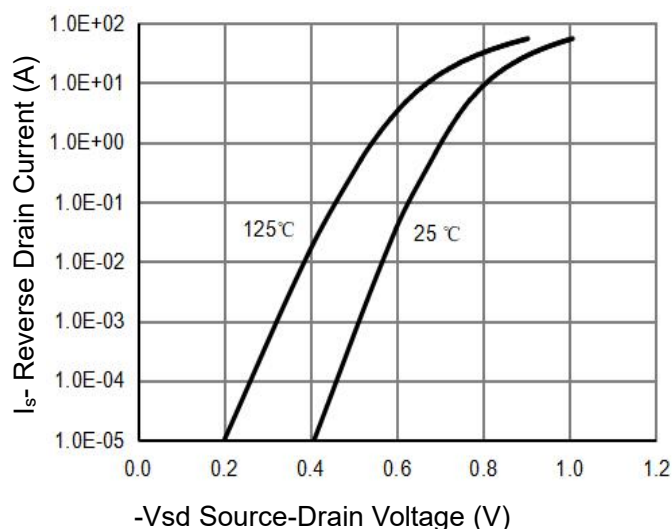
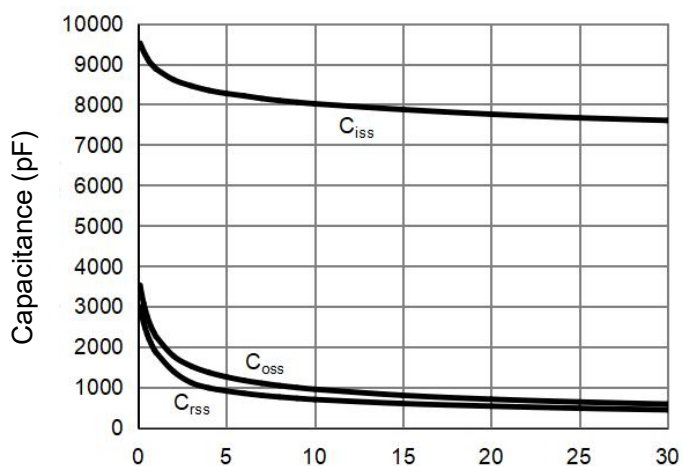
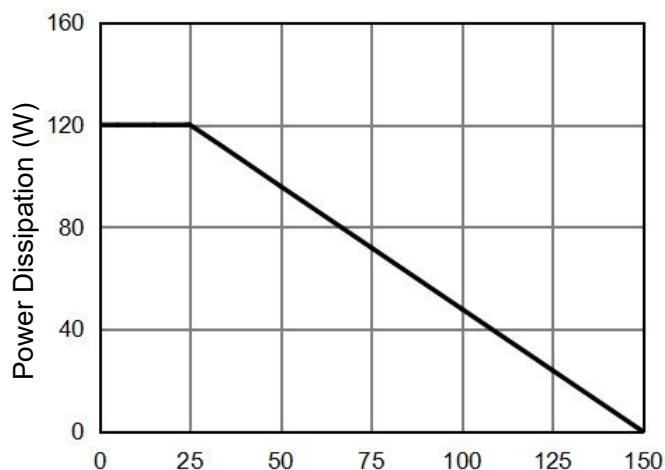


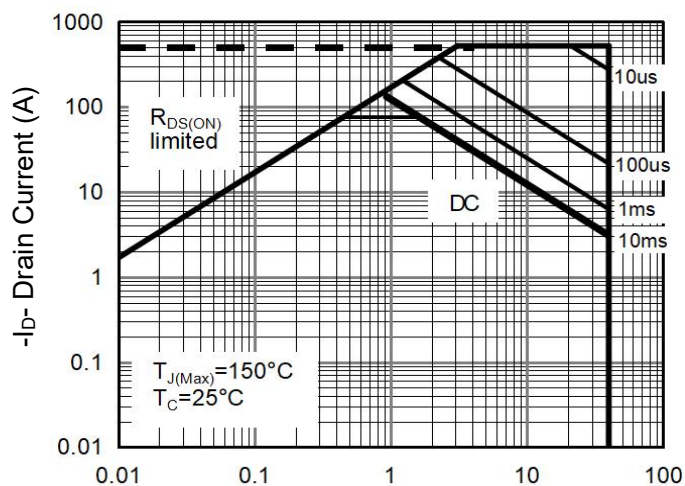
Figure 6 Source- Drain Diode Forward



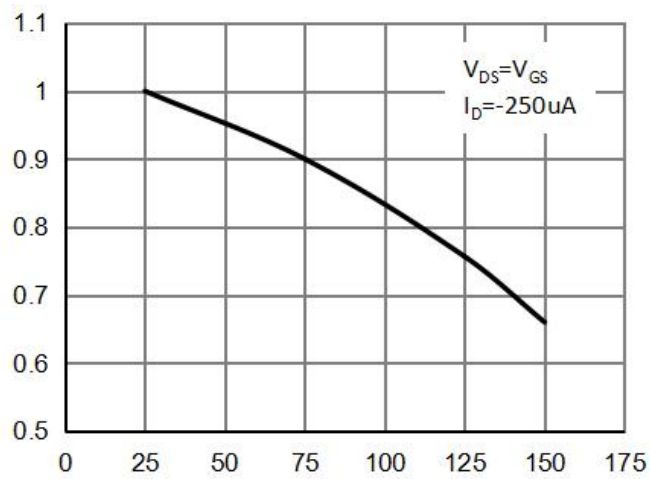
-Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



TJ-Junction Temperature(°C)
Figure 9 Power De-rating



-Vds Drain-Source Voltage (V)
Figure 8 Safe Operation Area



TJ-Junction Temperature(°C)
Figure 10 VGS(th) vs Junction Temperature

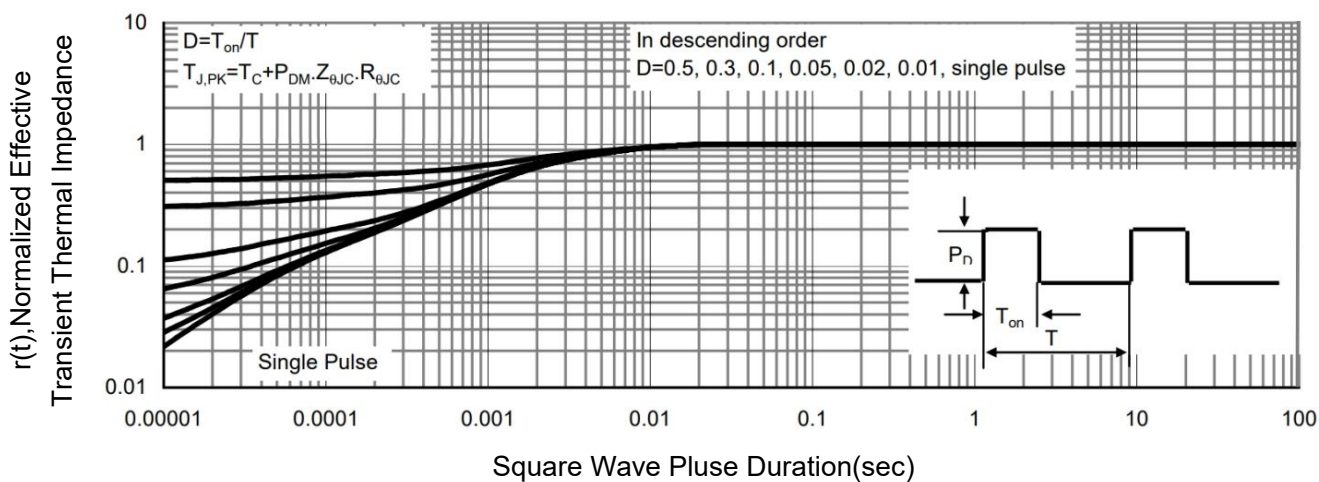
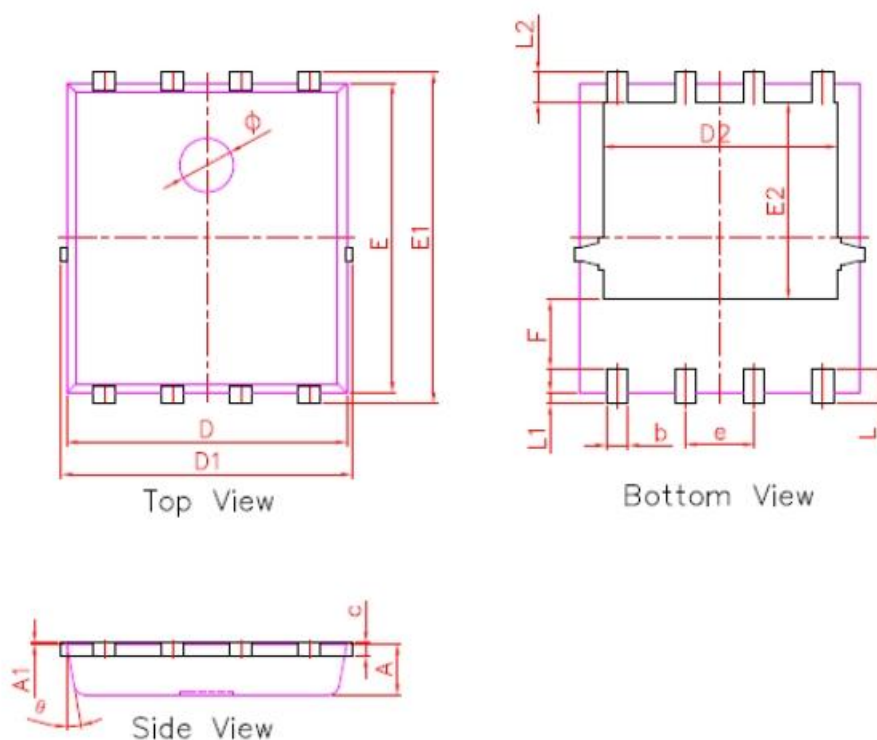


Figure 11 Normalized Maximum Transient Thermal Impedance

PDFN5X6-8L Package Information



PDFN5X6-8L			
DIM.	MIN.	NOM.	MAX.
A	0.90	0.95	1.00
A1	0.00	0.02	0.05
b	0.35	0.40	0.50
c	0.20	0.25	0.30
D	5.10	5.20	5.30
D1	5.10	5.40	5.50
D2	4.25	4.35	4.45
e	1.27 BSC		
E	5.70	5.75	5.80
E1	6.00	6.15	6.30
E2	3.57	3.67	3.77
F	1.18	1.28	1.38
L	0.55	0.65	0.75
L1	0.15	0.20	0.25
L2	0.45	0.55	0.65
Φ	0.90	1.00	1.10
Θ	8°	10°	12°
All dimensions in millimeters			

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