

## NCE P-Channel Enhancement Mode Power MOSFET

### Description

The NCE30P30G uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , This device is suitable for use as a load switch or in PWM applications.

### Application

- PWM applications
- Load switch
- Uninterruptible power supply

### General Features

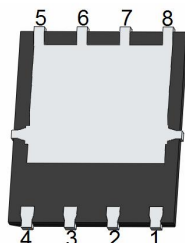
- $V_{DS} = -30V, I_D = -30A$
- $R_{DS(ON)} < 10m\Omega @ V_{GS} = -10V$
- $R_{DS(ON)} < 15m\Omega @ V_{GS} = -4.5V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

**100% UIS TESTED!**  
**100%  $\Delta V_{ds}$  TESTED!**

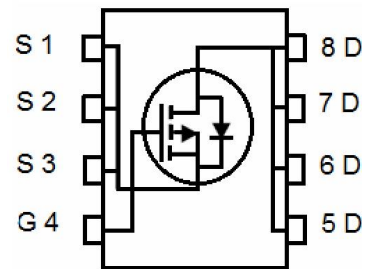
DFN 5X6-8L



Top View



Bottom View



Schematic Diagram

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
30P30G	NCE30P30G	DFN5X6-8L	Ø330mm	12mm	2500 units

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	-30	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	-160	A
Maximum Power Dissipation	$P_D$	80	W
Single pulse avalanche energy (Note 5)	$E_{AS}$	432	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

### Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.56	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	50	$^\circ C/W$

## Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-33	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.5	-2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-15A$	-	7.4	10	m $\Omega$
		$V_{GS}=-4.5V, I_D=-10A$	-	11	15	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-15A$	-	30	-	S
<b>Dynamic Characteristics (Note 4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$	-	3827	-	pF
Output Capacitance	$C_{oss}$		-	455	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	395	-	pF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-15A,$ $V_{GS}=-10V, R_{GEN}=3\Omega$	-	15	-	nS
Turn-on Rise Time	$t_r$		-	11	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	44	-	nS
Turn-Off Fall Time	$t_f$		-	21	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-15V, I_D=-15A, V_{GS}=-10V$	-	82	-	nC
Gate-Source Charge	$Q_{gs}$		-	8.5	-	nC
Gate-Drain Charge	$Q_{gd}$		-	15.5	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-30A$	-	-	-1.2	V

### Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The maximum allowed junction temperature of  $150^\circ\text{C}$ . The value in any given application depends on the user's specific board design, and the maximum temperature of  $150^\circ\text{C}$  may be used if the PCB allows it.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition :  $T_j=25^\circ\text{C}, V_{DD}=-15V, V_G=-10V, L=0.5mH, R_g=25\Omega$

## Typical Electrical and Thermal Characteristics

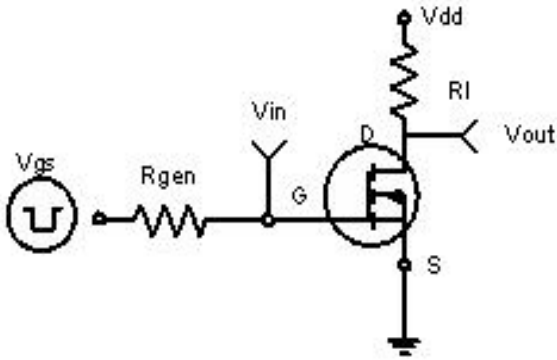


Figure 1 Switching Test Circuit

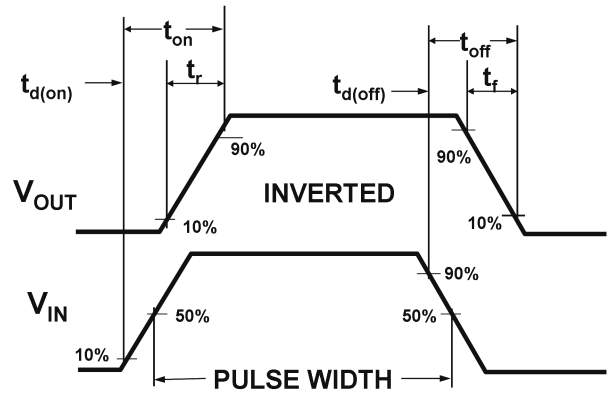


Figure 2 Switching Waveforms

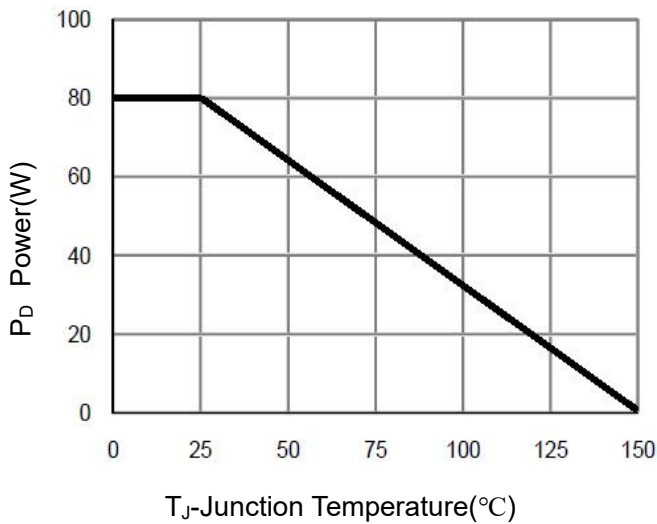


Figure 3 Power Dissipation

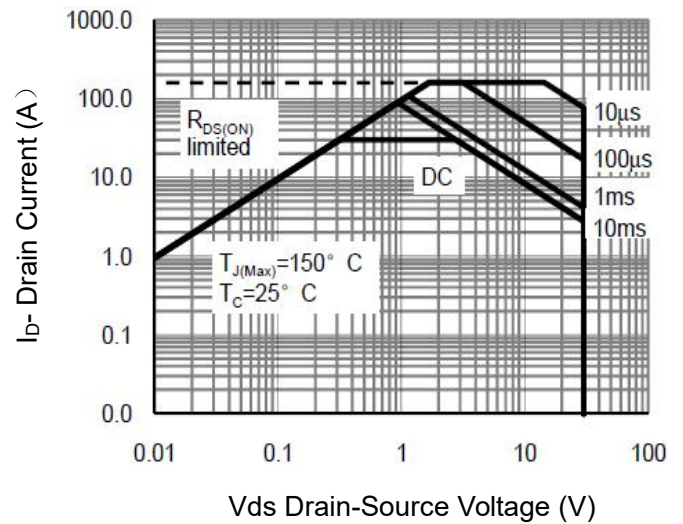


Figure 4 Safe Operation Area

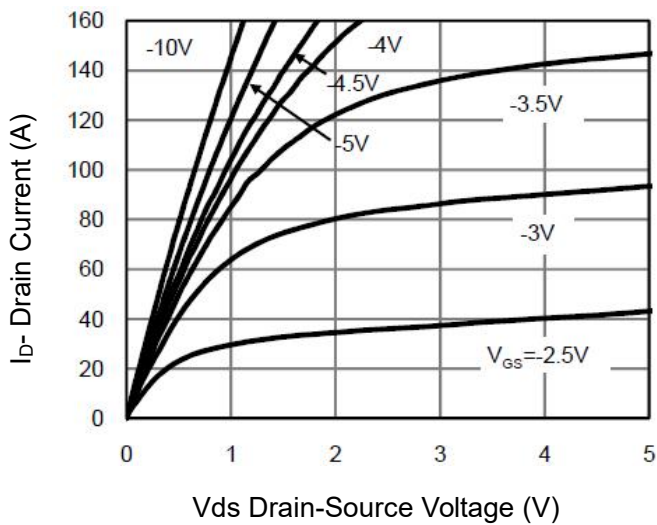


Figure 5 Output Characteristics

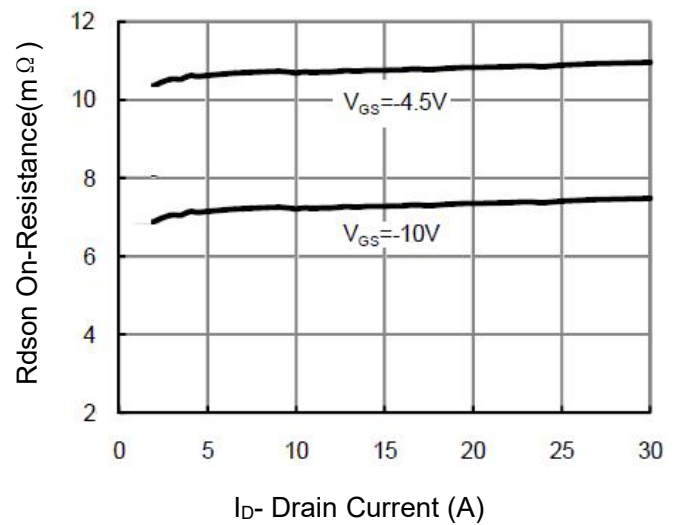
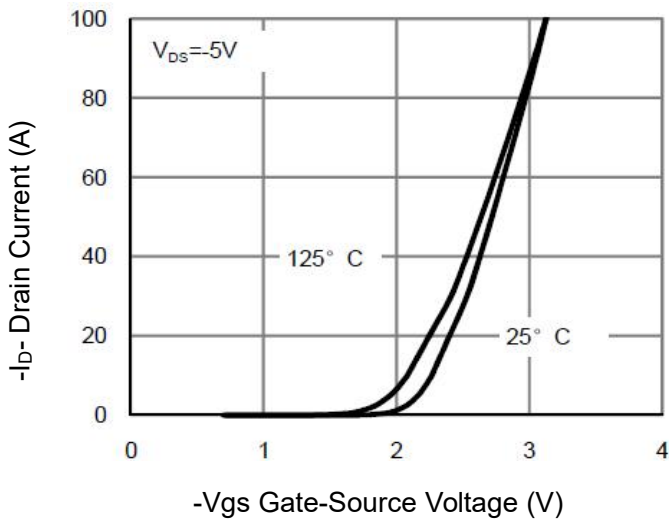
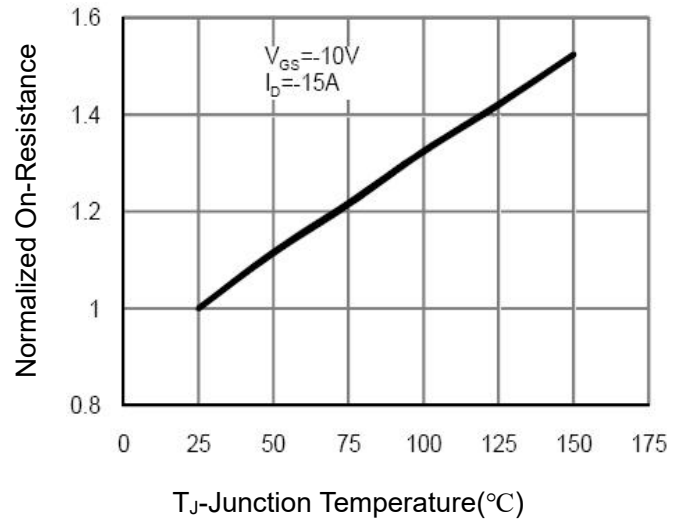


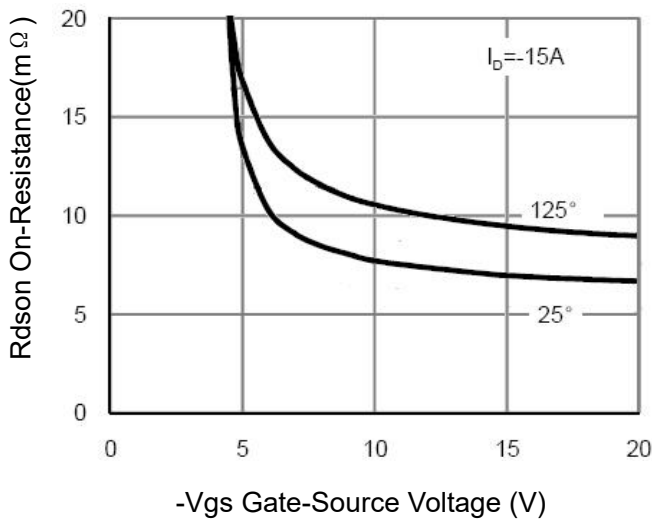
Figure 6 Drain-Source On-Resistance



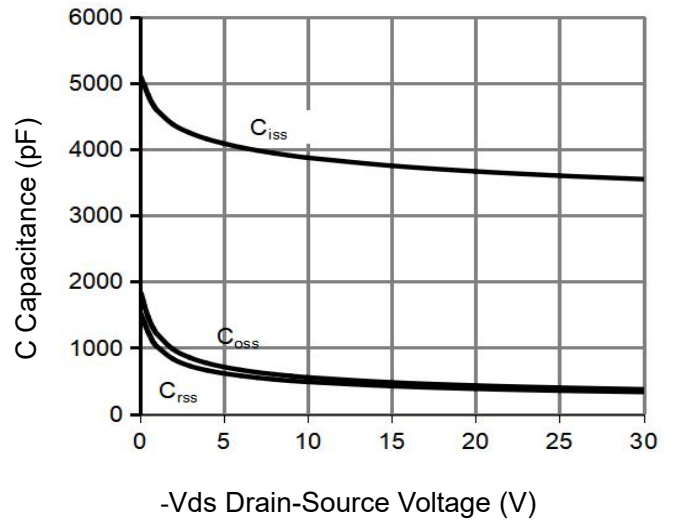
**Figure 7 Transfer Characteristics**



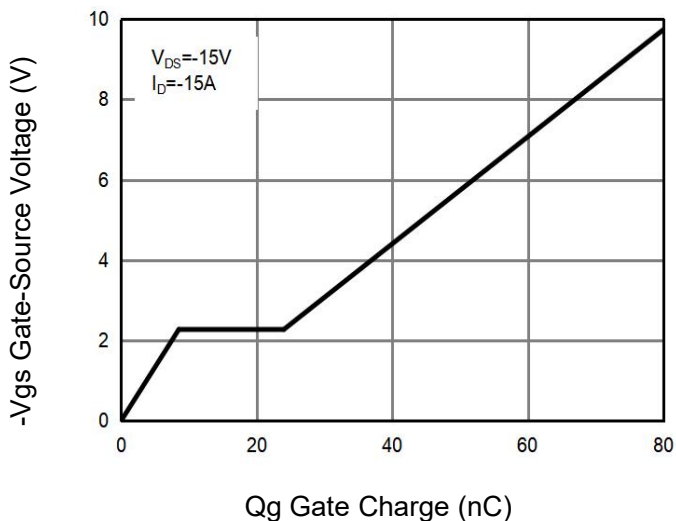
**Figure 8 Drain-Source On-Resistance**



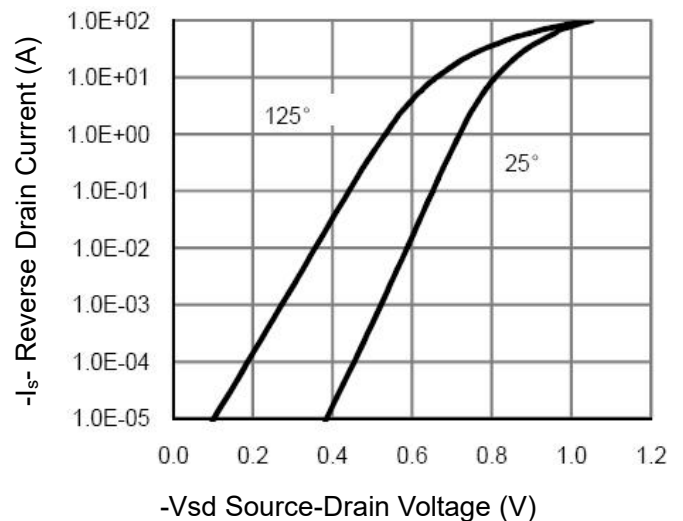
**Figure 9 Rdson vs Vgs**



**Figure 10 Capacitance vs Vds**



**Figure 11 Gate Charge**



**Figure 12 Source-Drain Diode Forward**

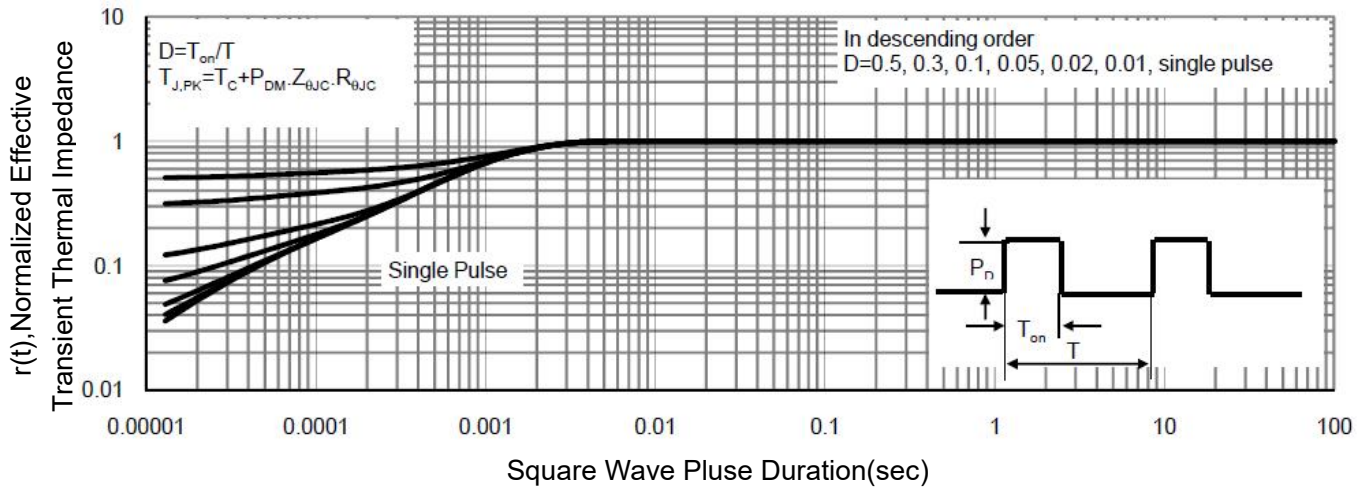
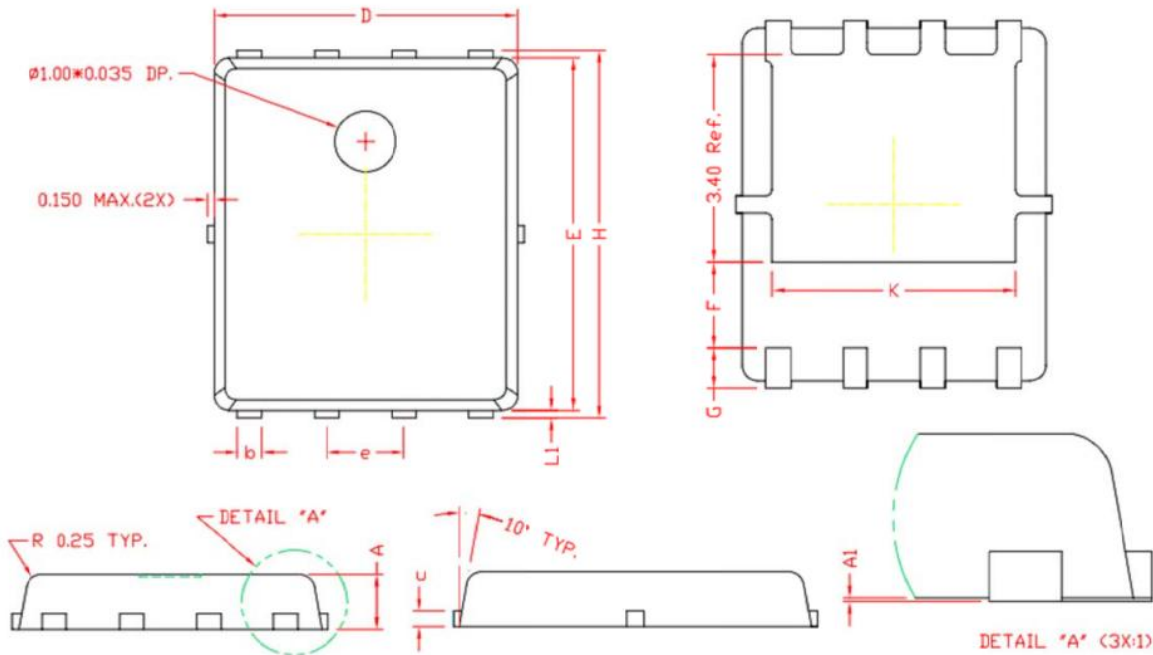


Figure 13 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0.00	0.03	0.05
b	0.35	0.42	0.49
c	0.254 REF.		
D	4.90	5.00	5.10
F	1.40 REF.		
E	5.70	5.80	5.90
e	1.27 BSC.		
H	5.95	6.08	6.20
L1	0.10	0.14	0.18
G	0.60 REF.		
K	4.00 REF.		

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