

NCE P-Channel Enhancement Mode Power MOSFET

Description

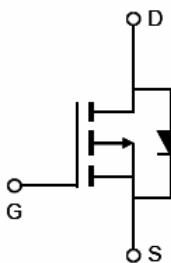
The NCE30P30G uses advanced trench technology to provide excellent $R_{DS(ON)}$. This device is suitable for use as a load switch or in PWM applications.

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 handing capability
- Lead free product is acquired
- Surface mount package

Application

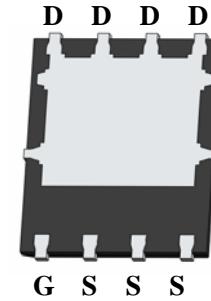
- PWM applications
- Load switch
- Uninterruptible power supply



Schematic diagram



Top View



Bottom View

100% UIS TESTED!

100% ΔV_{ds} TESTED!

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE30P30G	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}	± 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
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.56	°C/W
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Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=-250\mu\text{A}$	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}}=-30\text{V}, V_{\text{GS}}=0\text{V}$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{\text{GS}}=\pm20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_{\text{D}}=-250\mu\text{A}$	-1.0	-1.5	-2.2	V
Drain-Source On-State Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=-10\text{V}, I_{\text{D}}=-15\text{A}$	-	7.4	10	$\text{m}\Omega$
		$V_{\text{GS}}=-4.5\text{V}, I_{\text{D}}=-10\text{A}$	-	11	15	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{\text{DS}}=-5\text{V}, I_{\text{D}}=-15\text{A}$	30	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{\text{DS}}=-15\text{V}, V_{\text{GS}}=0\text{V}, F=1.0\text{MHz}$	-	4222	-	PF
Output Capacitance	C_{oss}		-	480.5	-	PF
Reverse Transfer Capacitance	C_{rss}		-	448.6	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=-15\text{V}, I_{\text{D}}=-15\text{A}, V_{\text{GS}}=-10\text{V}, R_{\text{GEN}}=3\Omega$	-	15	-	nS
Turn-on Rise Time	t_{r}		-	11	-	nS
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$		-	44	-	nS
Turn-Off Fall Time	t_{f}		-	21	-	nS
Total Gate Charge	Q_{g}	$V_{\text{DS}}=-15\text{V}, I_{\text{D}}=-15\text{A}, V_{\text{GS}}=-10\text{V}$	-	81.3	-	nC
Gate-Source Charge	Q_{gs}		-	13.8	-	nC
Gate-Drain Charge	Q_{gd}		-	8.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{\text{GS}}=0\text{V}, I_{\text{s}}=-30\text{A}$	-	-	-1.2	V

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

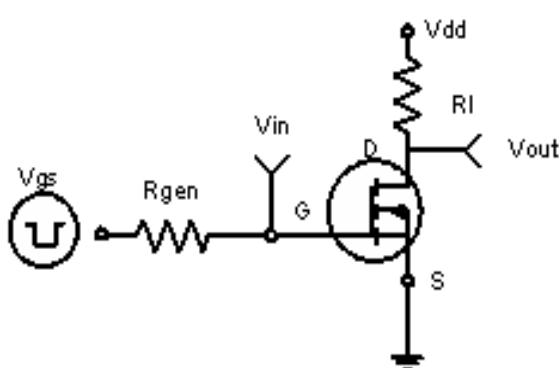


Figure 1 Switching Test Circuit

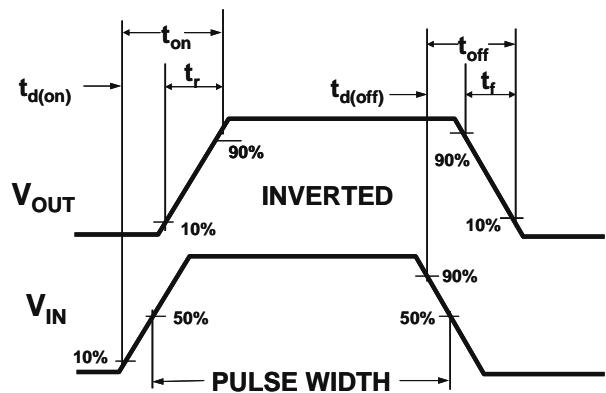


Figure 2 Switching Waveforms

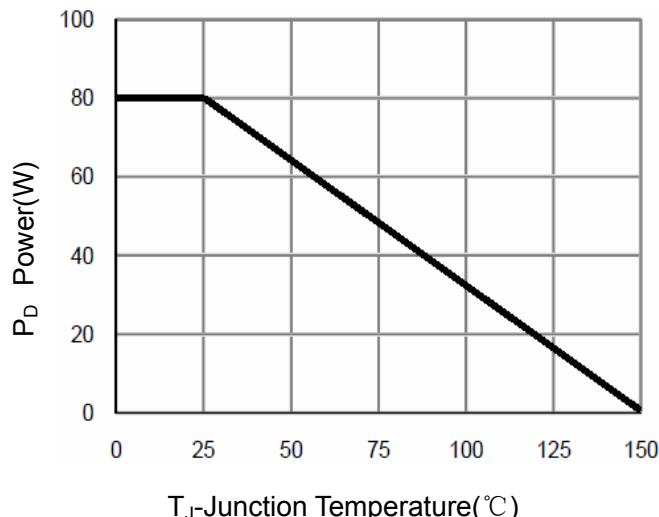


Figure 3 Power Dissipation

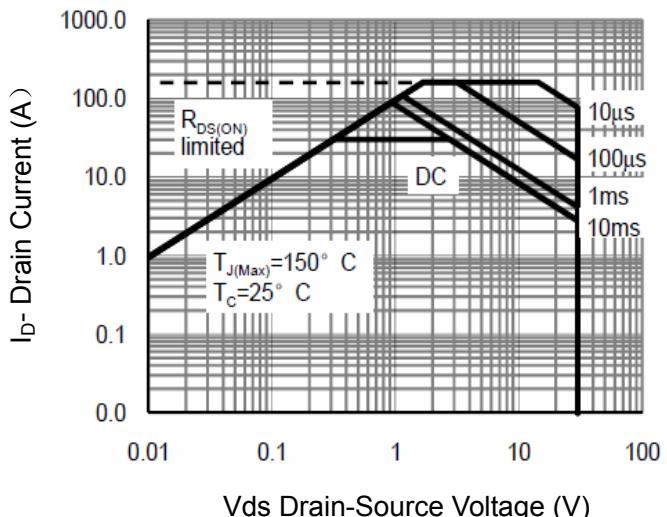


Figure 4 Safe Operation Area

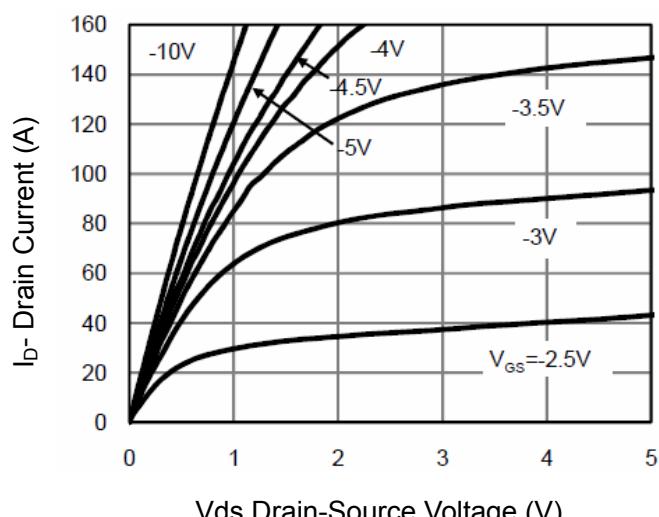


Figure 5 Output Characteristics

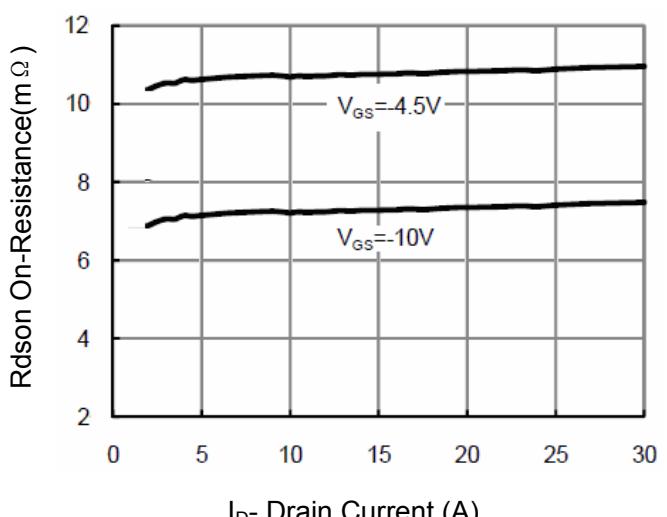
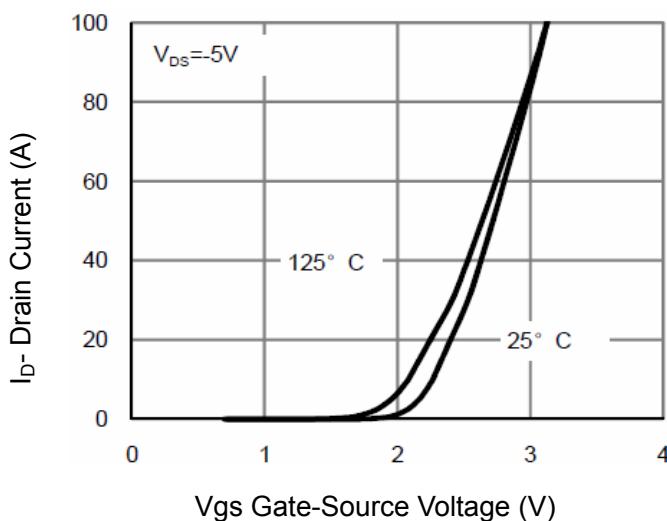
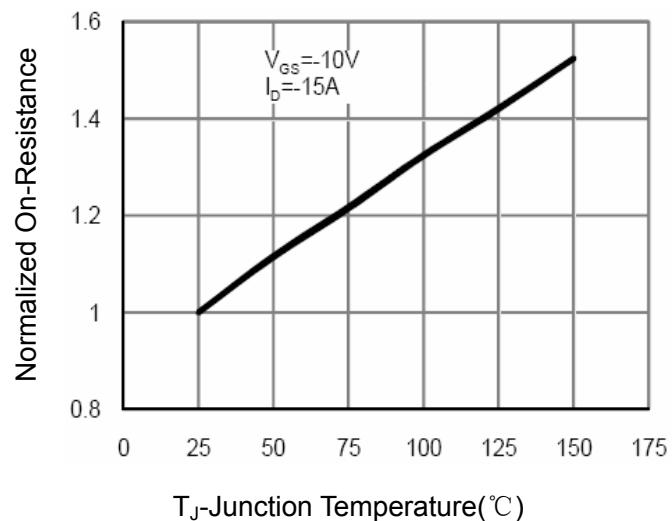
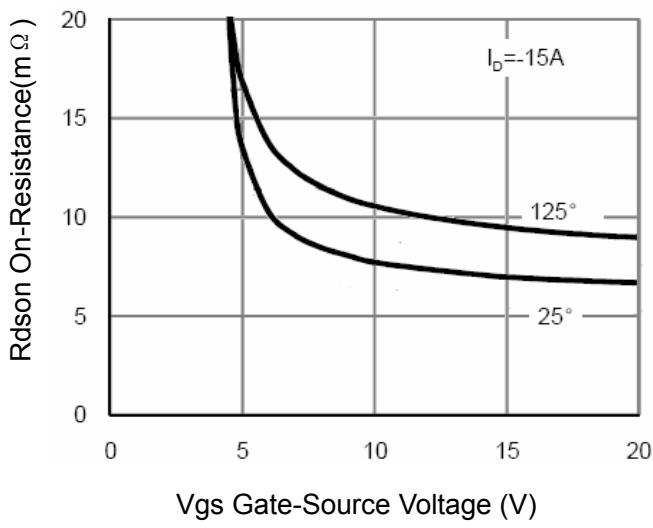
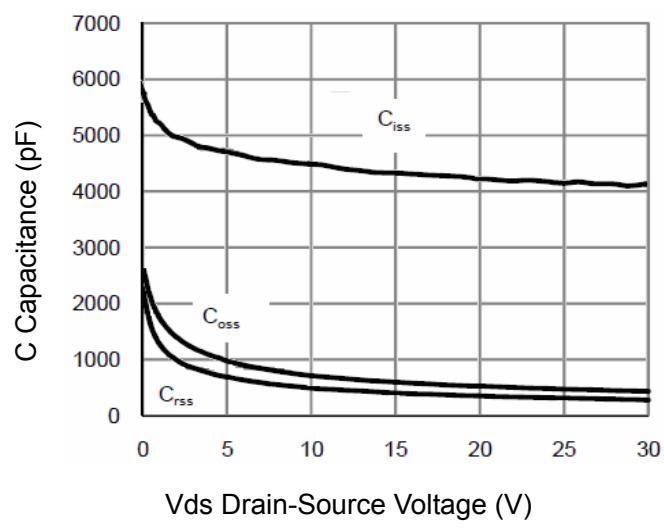
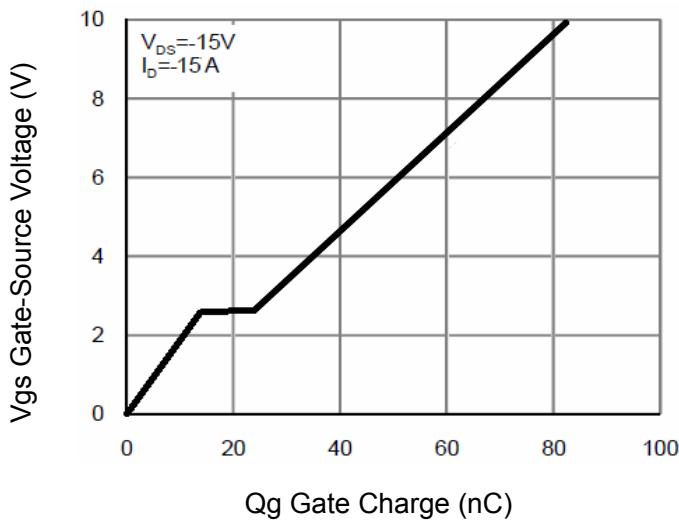
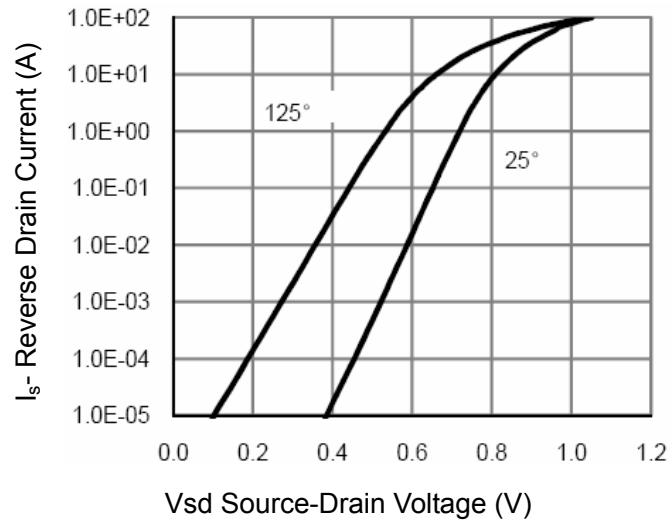
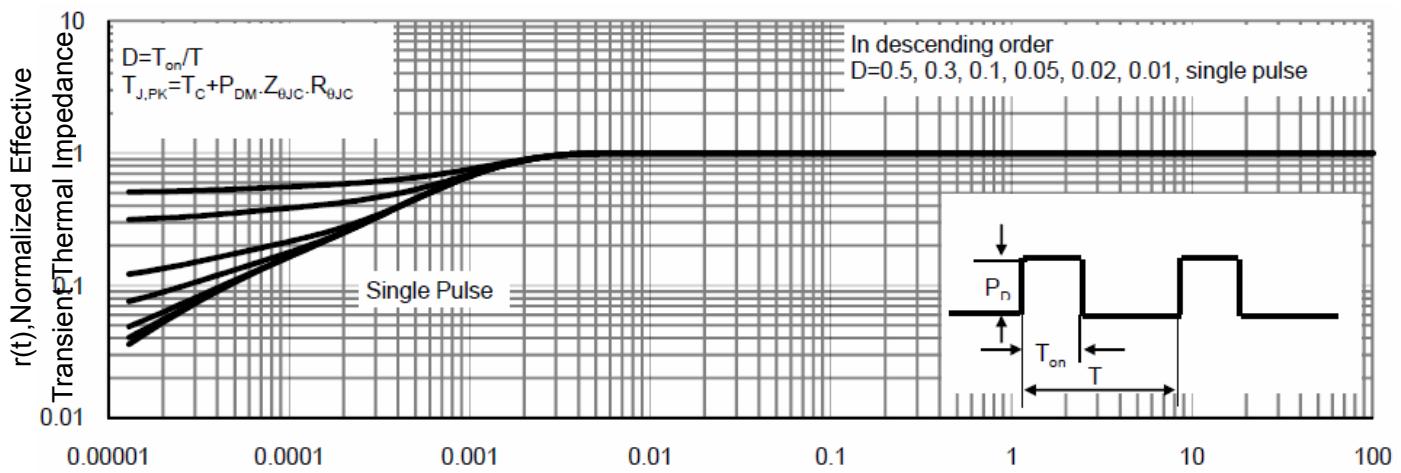


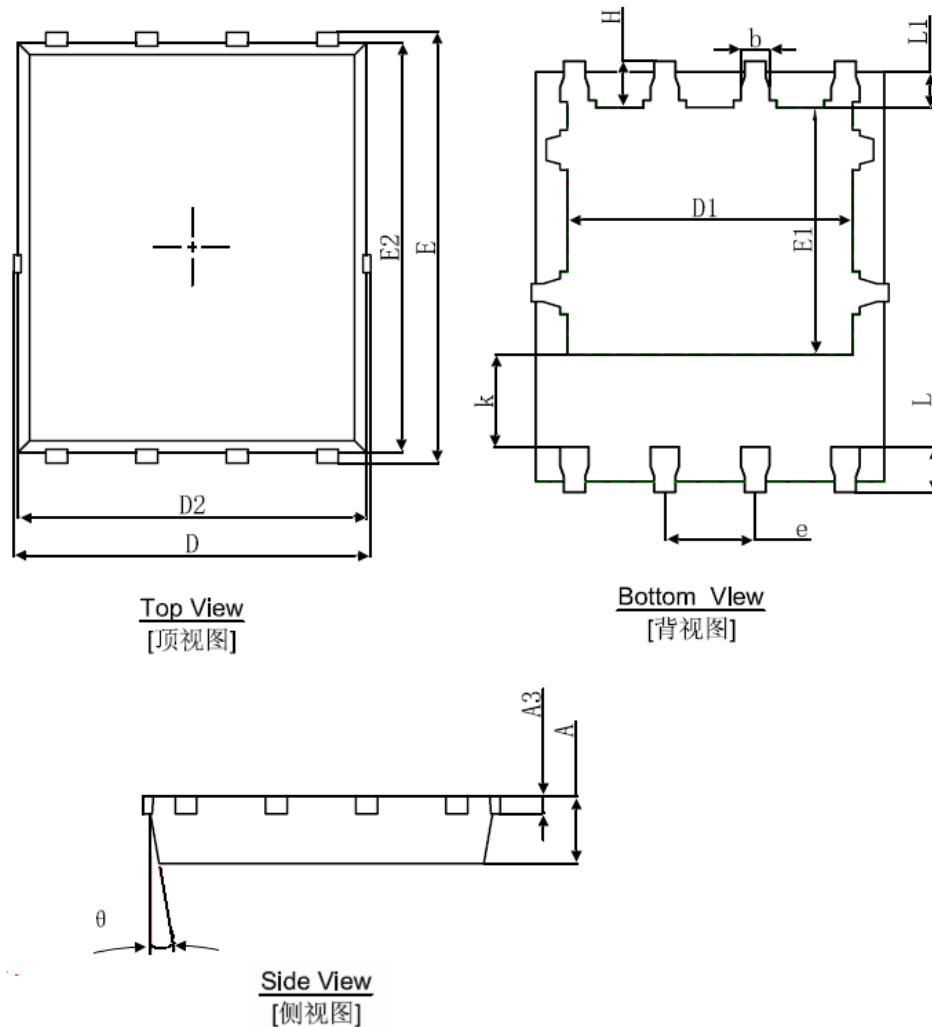
Figure 6 Drain-Source On-Resistance


Figure 7 Transfer Characteristics

Figure 8 Drain-Source On-Resistance

Figure 9 $R_{DS(on)}$ vs V_{GS}

Figure 10 Capacitance vs V_{DS}

Figure 11 Gate Charge

Figure 12 Source-Drain Diode Forward



Square Wave Pulse Duration(sec)

Figure 13 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
theta	8°	12°	8°	12°

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