

## NCE P-Channel Enhancement Mode Power MOSFET

### Description

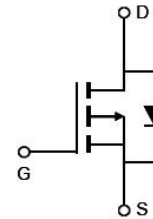
The NCE30P15S uses advanced trench technology to provide excellent  $R_{DS(ON)}$ . This device is suitable for use as a load switch or in PWM applications.

### General Features

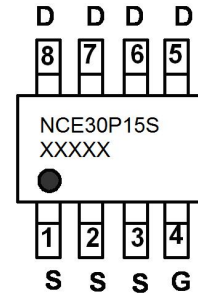
- $V_{DS} = -30V, I_D = -15A$   
 $R_{DS(ON)} < 10m\Omega @ V_{GS} = -10V$   
 $R_{DS(ON)} < 15m\Omega @ V_{GS} = -4.5V$
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

### Application

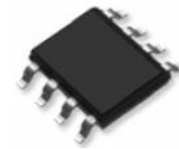
- PWM applications
- Load switch
- Uninterruptible power supply



Schematic diagram



Marking and pin assignment



SOP-8 top view

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE30P15S	NCE30P15S	SOP-8	Ø330mm	12mm	4000 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	$I_D$	-15	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	-60	A
Single pulse avalanche energy (Note 5)	$E_{AS}$	420	mJ
Maximum Power Dissipation	$P_D$	3.1	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	40	$^\circ C/W$
Thermal Resistance, Junction-to-Lead (Note 2)	$R_{\theta JL}$	24	$^\circ C/W$

### Electrical Characteristics ( $T_A = 25^\circ C$ 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	-	-	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</b> (Note 3)						
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	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-15A$	-	8.5	10	m $\Omega$
		$V_{GS}=-4.5V, I_D=-10A$	-	11.5	15	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-15A$	30	-	-	S
<b>Dynamic Characteristics</b> (Note4)						
Input Capacitance	$C_{ISS}$	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$	-	2900	-	PF
Output Capacitance	$C_{OSS}$		-	410	-	PF
Reverse Transfer Capacitance	$C_{RSS}$		-	280	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-10A,$ $V_{GS}=-10V, R_{GEN}=3\Omega$	-	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	$Q_g$	$V_{DS}=-15V, I_D=-10A, V_{GS}=-10V$	-	48	-	nC
Gate-Source Charge	$Q_{gs}$		-	12	-	nC
Gate-Drain Charge	$Q_{gd}$		-	14	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-2A$	-	-	-1.2	V

### Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec. The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to lead  $R_{\theta JL}$  and lead to ambient.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition:  $T_j=25^\circ C, V_{DD}=-15V, V_G=-10V, L=0.5mH, R_g=25\Omega$

## Typical Electrical and Thermal Characteristics

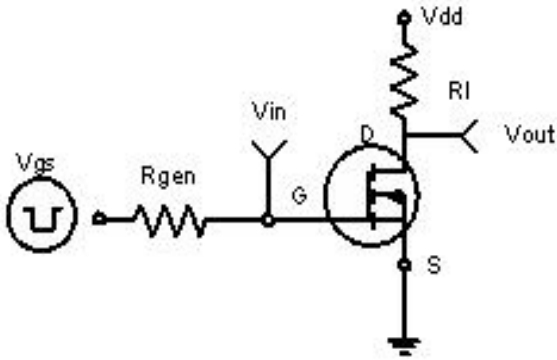


Figure 1 Switching Test Circuit

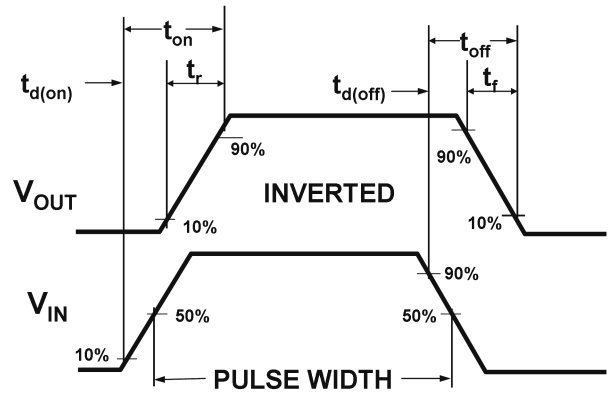


Figure 2 Switching Waveforms

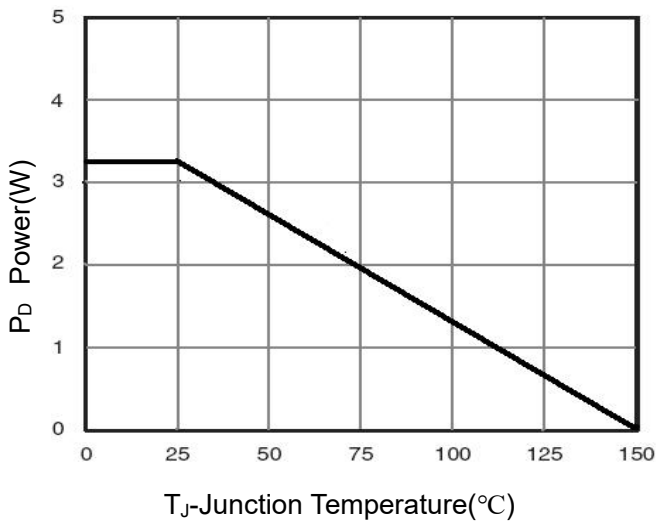


Figure 3 Power Dissipation

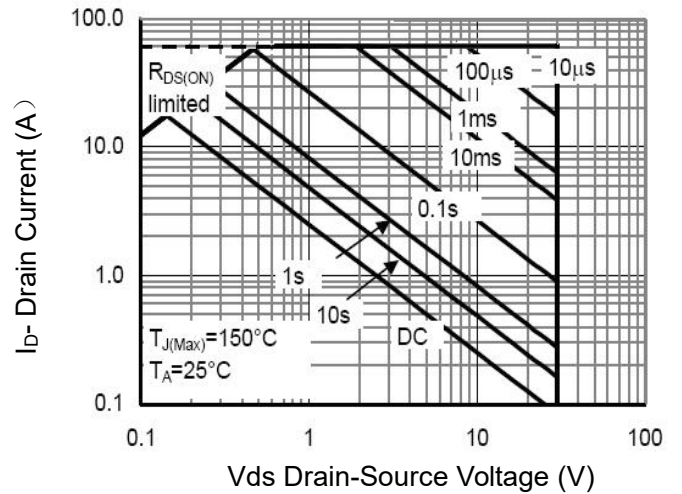


Figure 4 Safe Operation Area

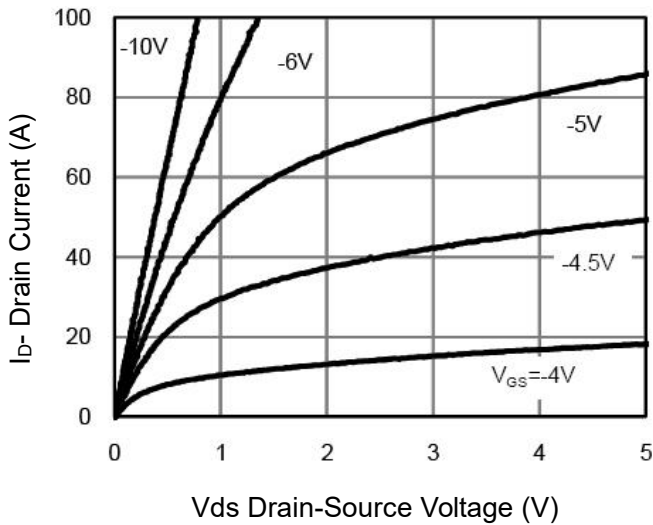


Figure 5 Output Characteristics

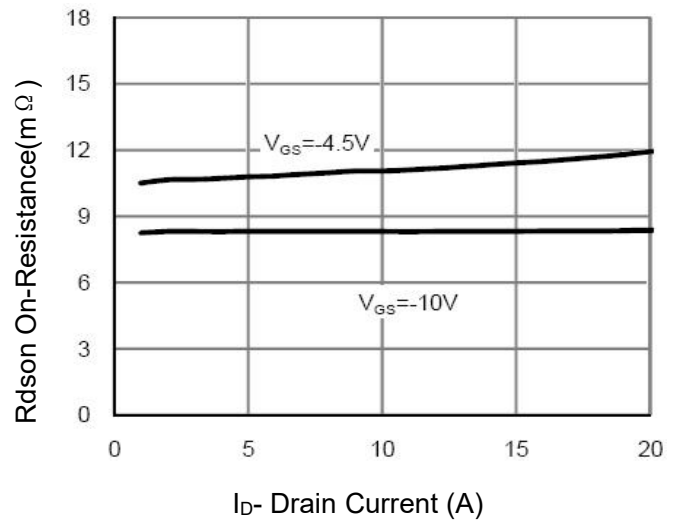


Figure 6 Drain-Source On-Resistance

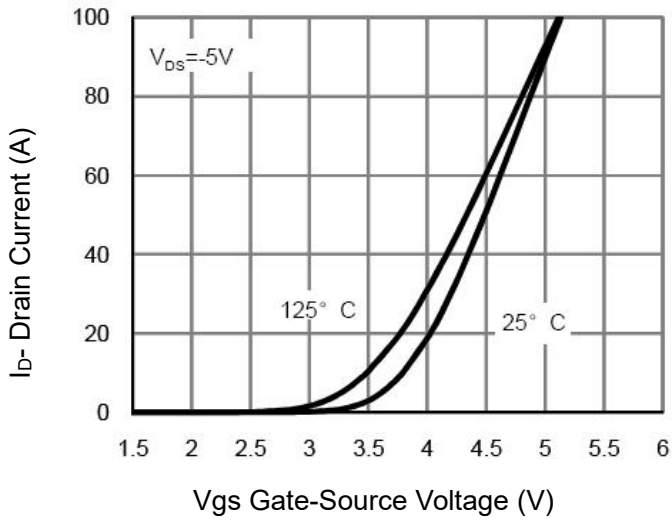


Figure 7 Transfer Characteristics

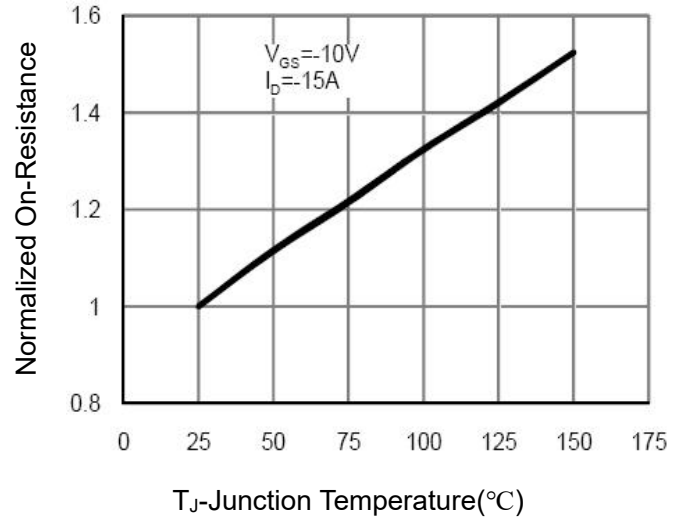


Figure 8 Drain-Source On-Resistance

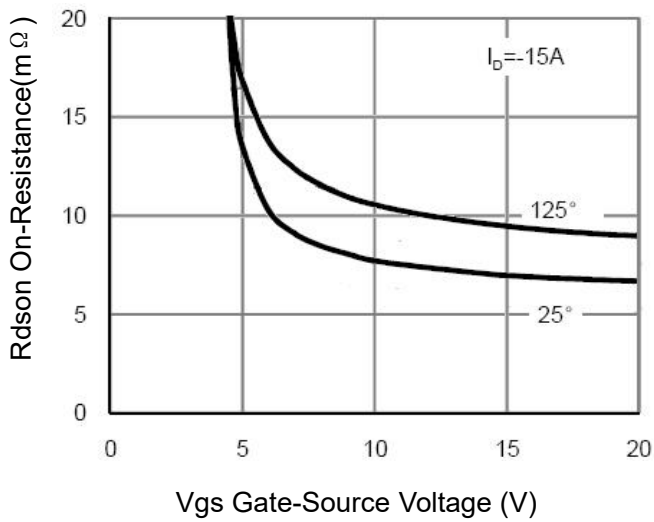


Figure 9 Rdson vs Vgs

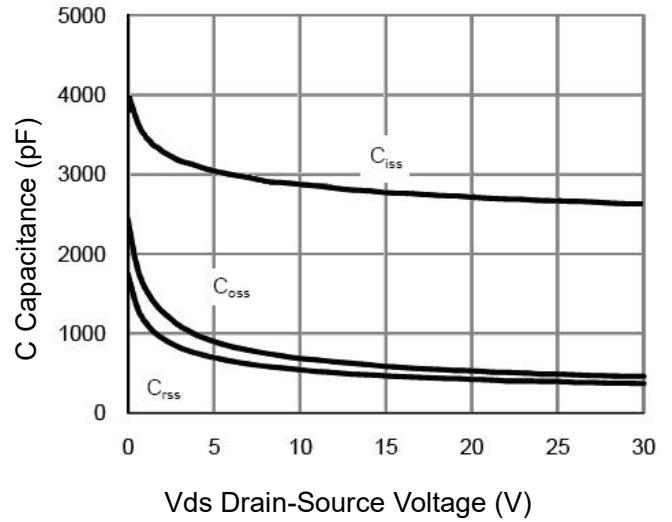


Figure 10 Capacitance vs Vds

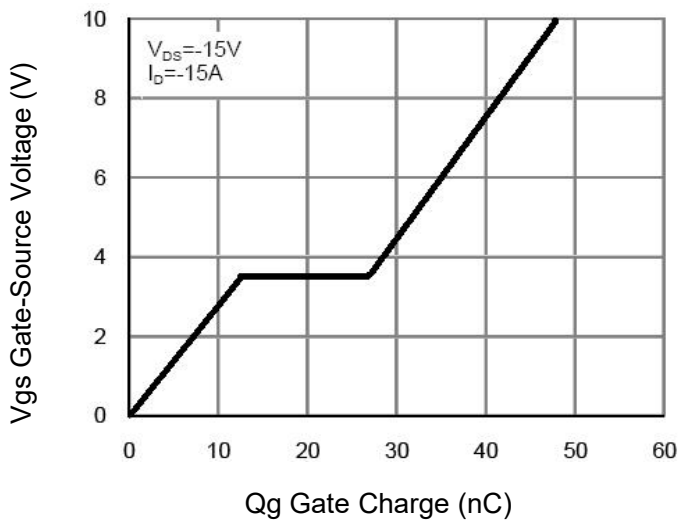


Figure 11 Gate Charge

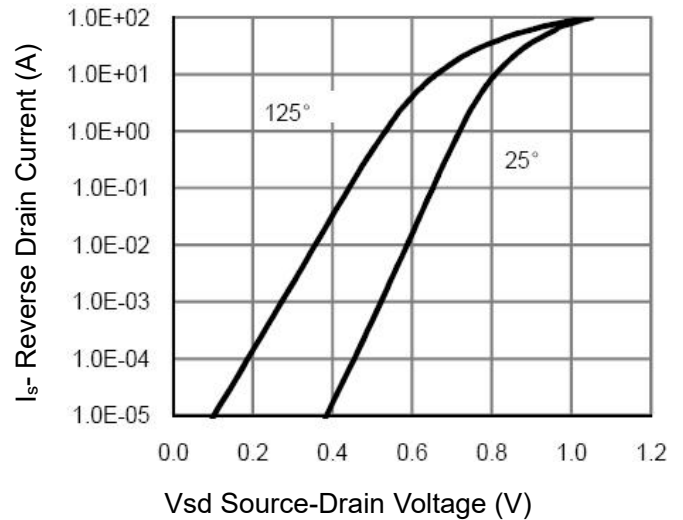
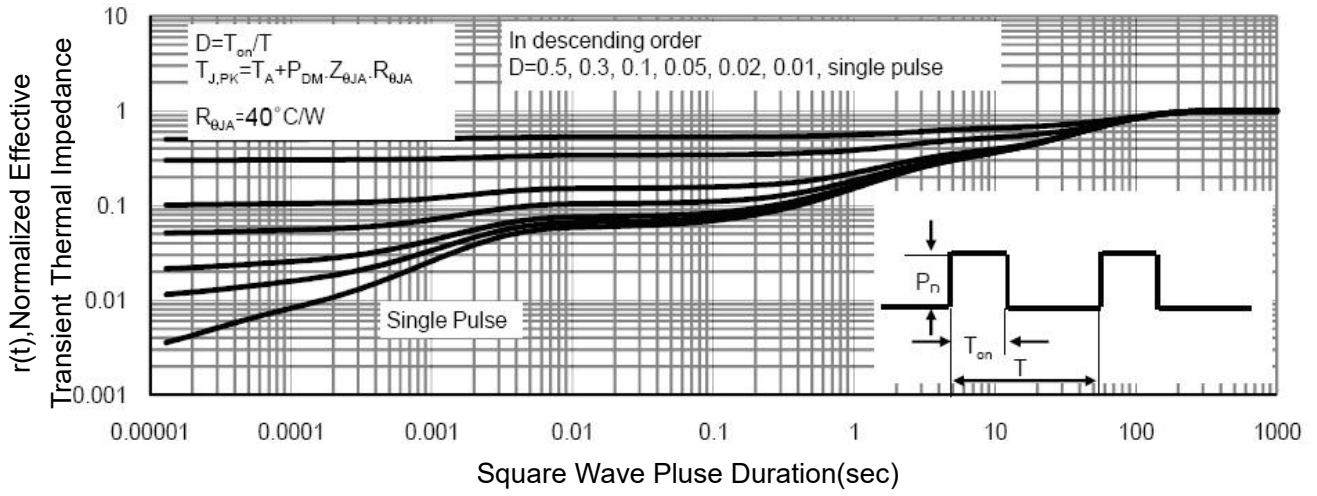
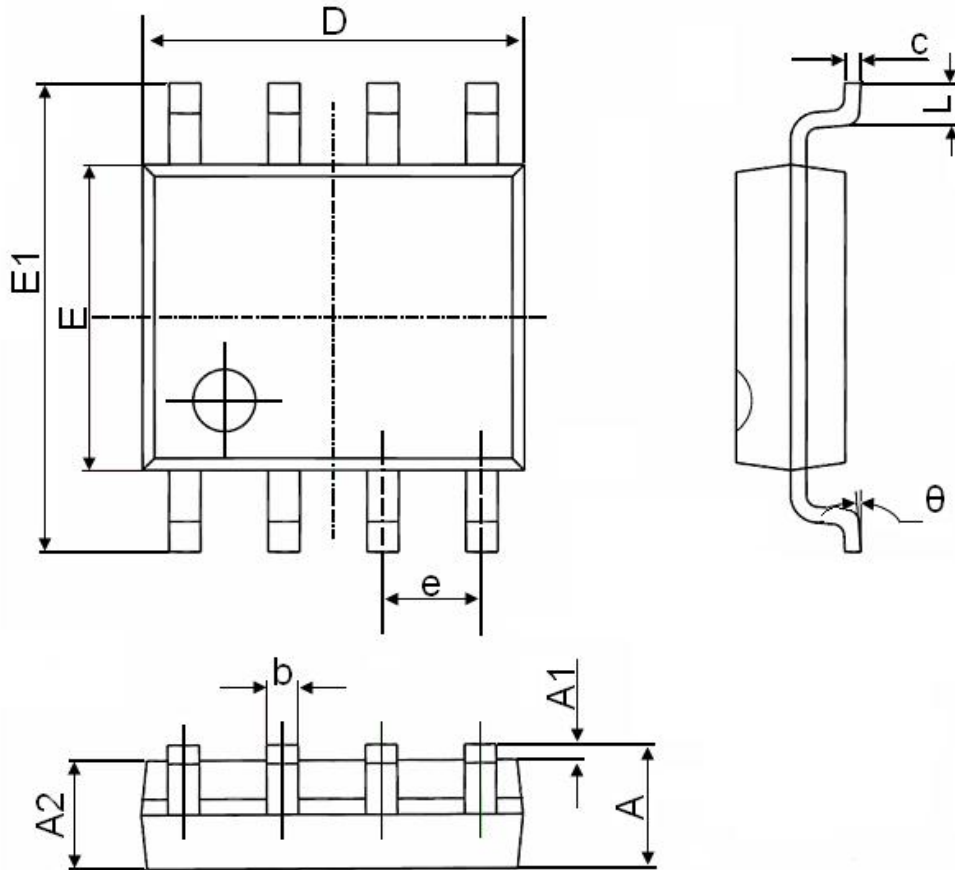


Figure 12 Source- Drain Diode Forward



**Figure 13 Normalized Maximum Transient Thermal Impedance**

## SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
$\theta$	0°	8°	0°	8°

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