

NCE P-Channel Enhancement Mode Power MOSFET

Description

The NCE16P40Q uses advanced trench technology to provide excellent $R_{DS(ON)}$. This device is suitable for use as a load switch or power management.

Application

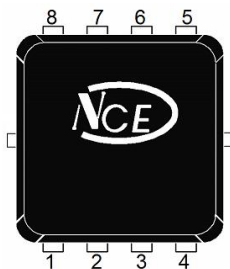
- Power management
- Load switch

100% UIS TESTED!
100% ΔV_{ds} TESTED!

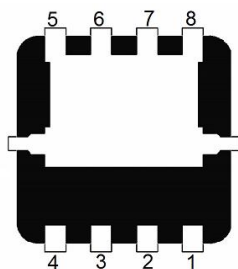
General Features

- $V_{DS} = -40V, I_D = -15A$
 $R_{DS(ON)} < 18m\Omega @ V_{GS} = -10V$
 $R_{DS(ON)} < 28m\Omega @ V_{GS} = -4.5V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

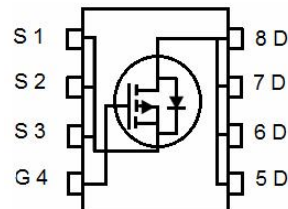
DFN 3.3X3.3-8L



Top View



Bottom View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE16P40Q	NCE16P40Q	DFN3.3X3.3-8L			

Absolute Maximum Ratings ($T_A = 25^\circ C$ 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	-15	A
Drain Current-Pulsed (Note 1)	I_{DM}	-60	A
Maximum Power Dissipation	P_D	25	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	5.0	$^\circ C/W$
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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 _{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	-1.0	-1.5	-2.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-15A	-	15.5	18	mΩ
	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-10A	-	21	28	
Forward Transconductance	g _{FS}	V _{DS} =-10V, I _D =-15A	-	25	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =-20V, V _{GS} =0V, F=1.0MHz	-	893	-	PF
Output Capacitance	C _{oss}		-	135	-	PF
Reverse Transfer Capacitance	C _{rss}		-	110	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-20V, R _L =1.5Ω, V _{GS} =-10V, R _{GEN} =3Ω	-	11	-	nS
Turn-on Rise Time	t _r		-	11	-	nS
Turn-Off Delay Time	t _{d(off)}		-	35	-	nS
Turn-Off Fall Time	t _f		-	15	-	nS
Total Gate Charge	Q _g	V _{DS} =-20V, I _D =-15A, V _{GS} =-10V	-	23	-	nC
Gate-Source Charge	Q _{gs}		-	2.2	-	nC
Gate-Drain Charge	Q _{gd}		-	6.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =-15A	-	-	-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 $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

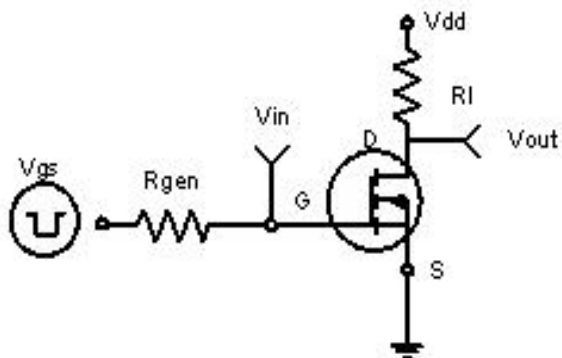


Figure 1 Switching Test Circuit

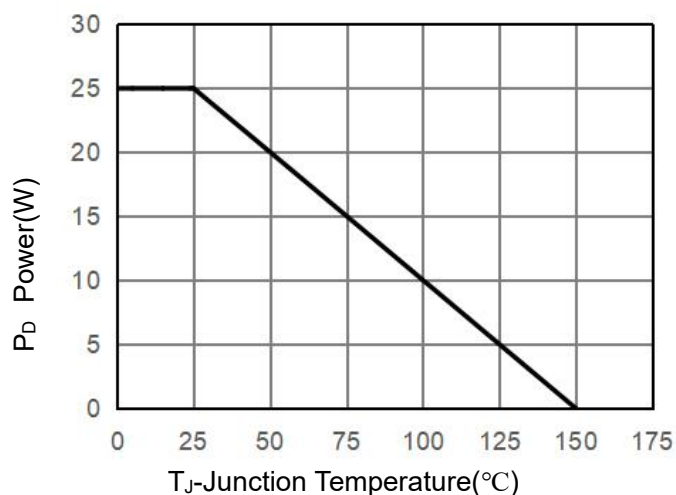


Figure 3 Power Dissipation

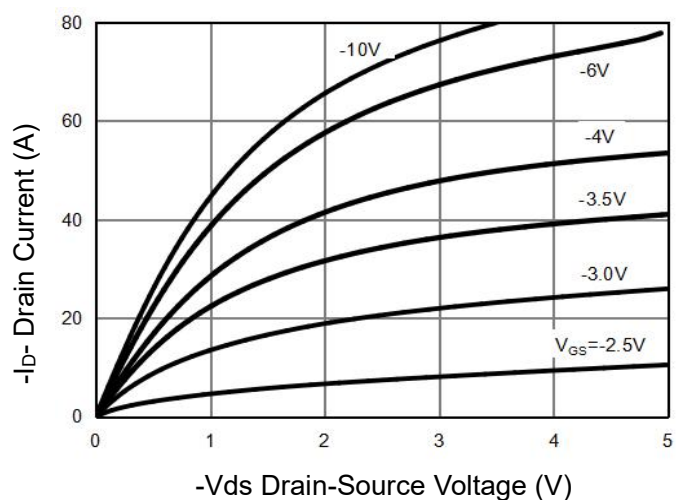


Figure 5 Output Characteristics

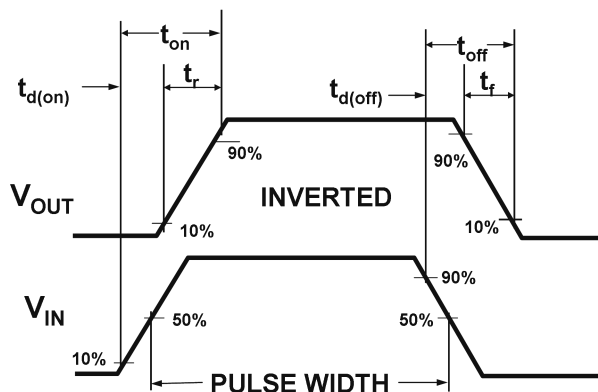


Figure 2 Switching Waveforms

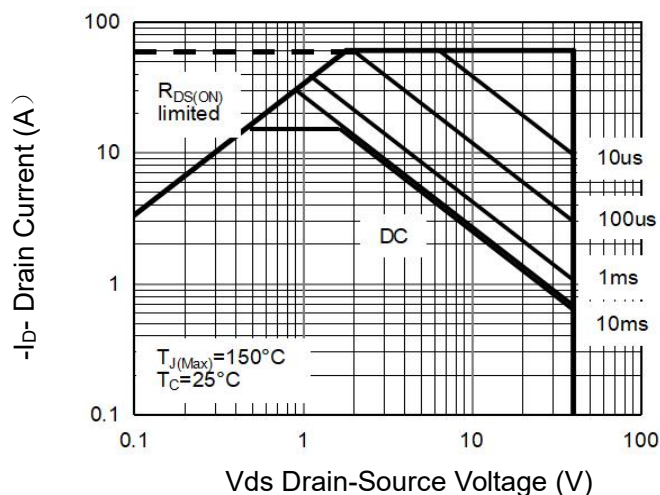


Figure 4 Safe Operation Area

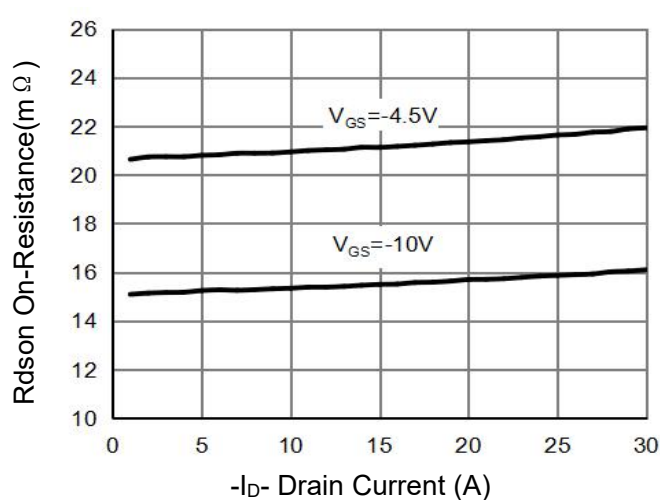


Figure 6 Drain-Source On-Resistance

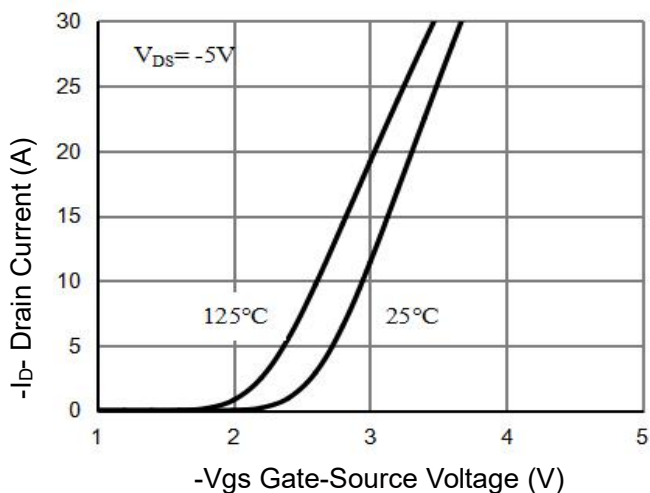


Figure 7 Transfer Characteristics

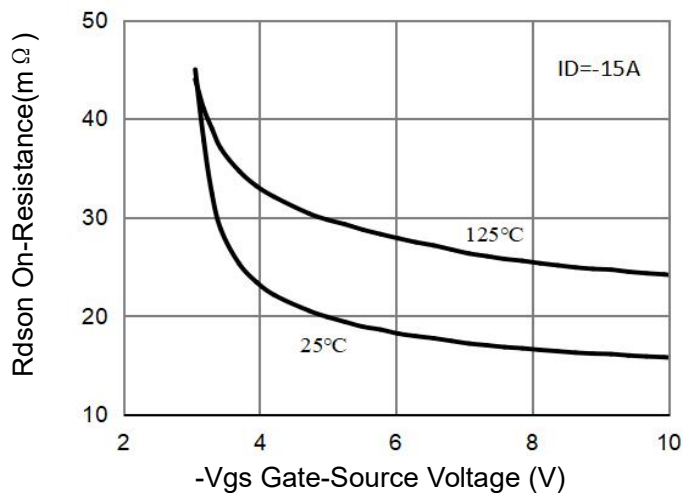


Figure 9 Rdson vs Vgs

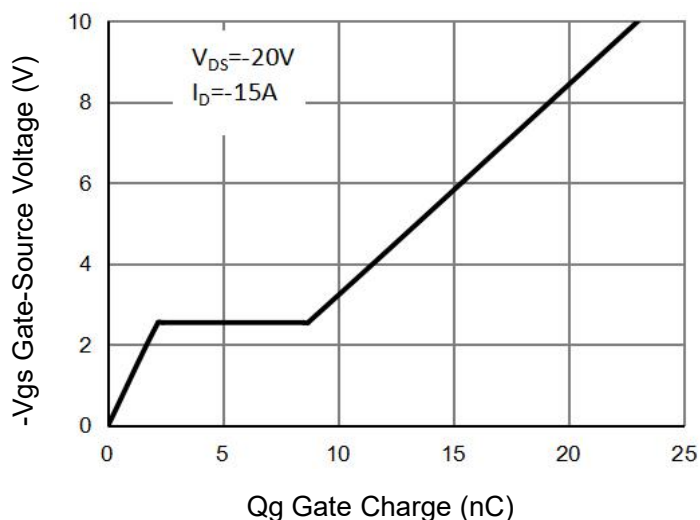


Figure 11 Gate Charge

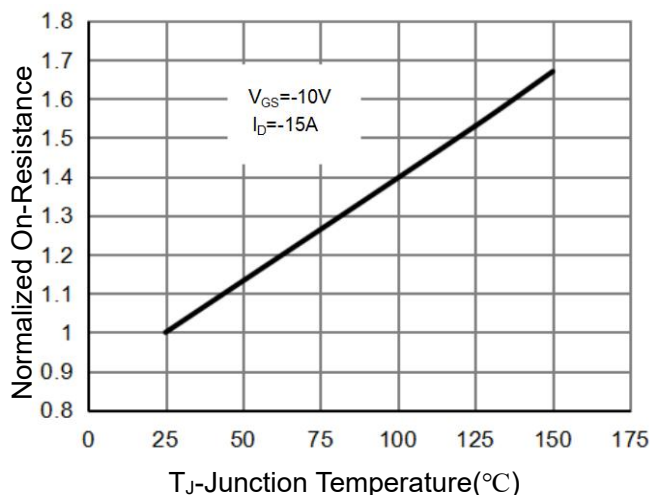


Figure 8 Drain-Source On-Resistance

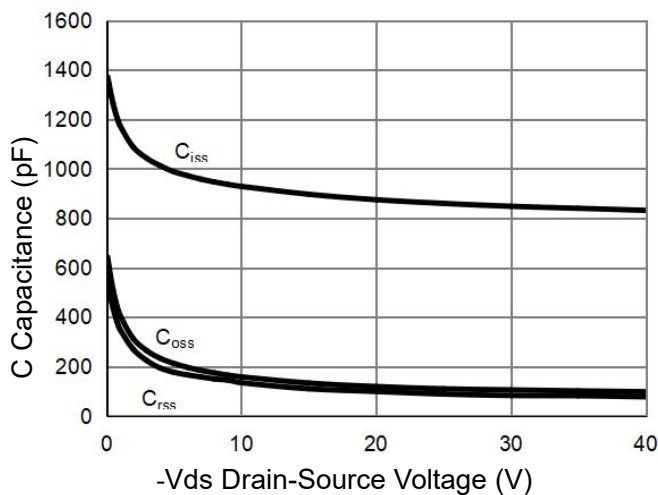


Figure 10 Capacitance vs Vds

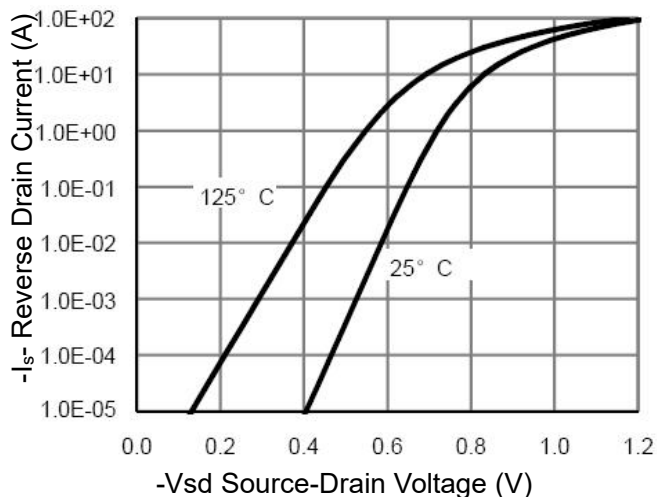


Figure 12 Source- Drain Diode Forward

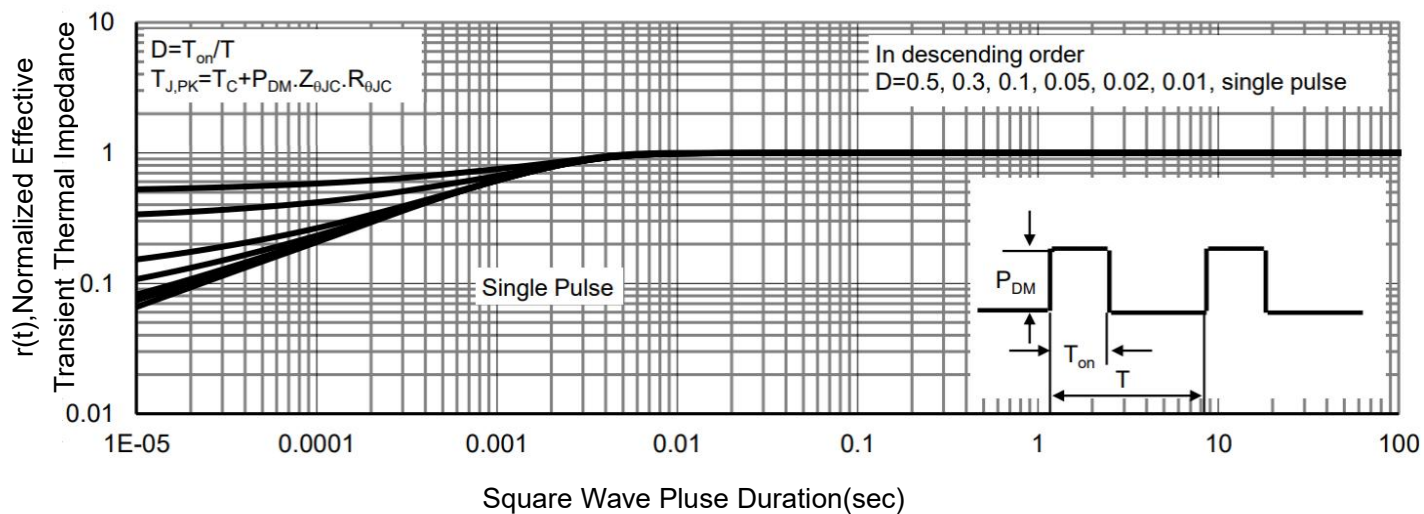
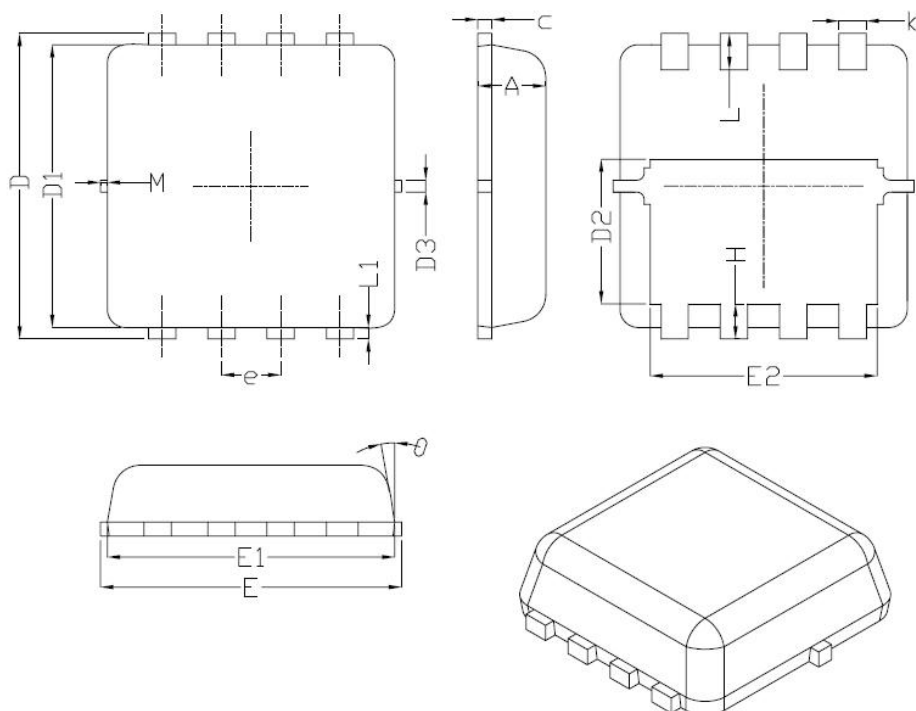


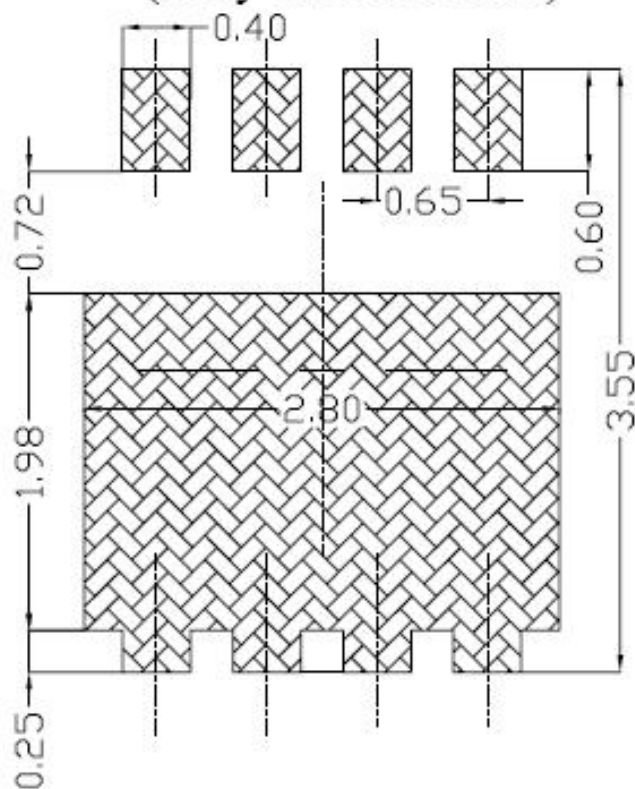
Figure 13 Normalized Maximum Transient Thermal Impedance

DFN3.3X3.3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°

Land Pattern (Only for Reference)



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