

NCE P-Channel **Super Trench** Power MOSFET

Description

The NCEP30PT16G uses **Super Trench** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g . This device is ideal for high-frequency switching and synchronous rectification.

Application

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

General Features

- $V_{DS} = -30V, I_D = -160A$
 $R_{DS(ON)} = 2.3m\Omega$ (typical) @ $V_{GS} = -10V$
 $R_{DS(ON)} = 3.3m\Omega$ (typical) @ $V_{GS} = -4.5V$
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 150 °C operating temperature
- Pb-free lead plating
- 100% UIS tested

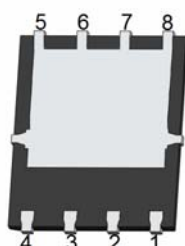
100% UIS TESTED!

100% ΔV_{ds} TESTED!

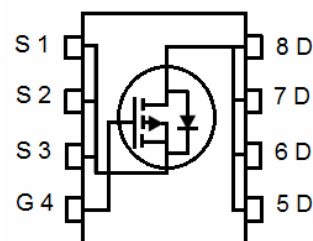
DFN 5X6



Top View



Bottom View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCEP30PT16G	NCEP30PT16G	DFN5X6-8L	-	-	-

Absolute Maximum Ratings ($T_C = 25^\circ C$ 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	-160	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	-112	A
Pulsed Drain Current	I_{DM}	-640	A
Maximum Power Dissipation	P_D	150	W
Derating factor		1.2	W/ $^\circ C$
Single pulse avalanche energy ^(Note 5)	E_{AS}	1076	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	0.83	$^\circ C/W$
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Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =-250μA	-30		-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-30V, 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	-2.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-80A	-	2.3	2.7	mΩ
		V _{GS} =-4.5V, I _D =-80A	-	3.3	4.0	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-80A	-	30	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =-15V, V _{GS} =0V, F=1.0MHz	-	7962	-	PF
Output Capacitance	C _{OSS}		-	2380	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	216	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-15V, I _D =-80A V _{GS} =-10V, R _G =1.6Ω	-	18	-	nS
Turn-on Rise Time	t _r		-	13	-	nS
Turn-Off Delay Time	t _{d(off)}		-	90	-	nS
Turn-Off Fall Time	t _f		-	25	-	nS
Total Gate Charge	Q _g	V _{DS} =-15V, I _D =-80A, V _{GS} =-10V	-	106.5	-	nC
Gate-Source Charge	Q _{gs}		-	15.7		nC
Gate-Drain Charge	Q _{gd}		-	16.9		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V, I _S =-80A	-		-1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	-160	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F =-80A	-		35	nS
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs ^(Note3)	-		85	nC

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
5. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=-15V, V_{GS}=-10V, L=0.5mH, R_g=25\Omega$

Typical Electrical and Thermal Characteristics

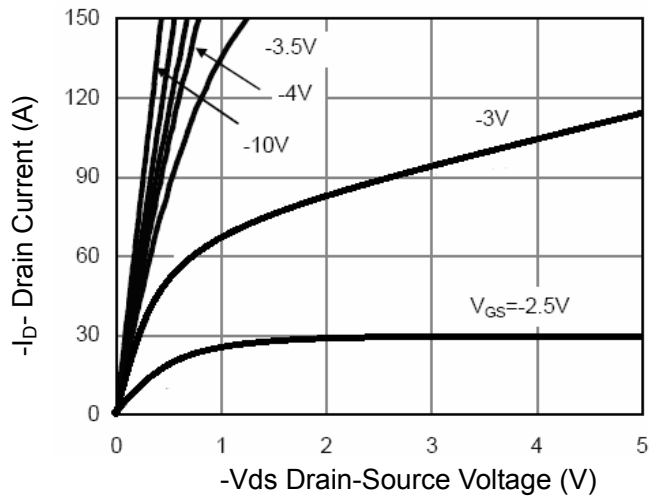


Figure 1 Output Characteristics

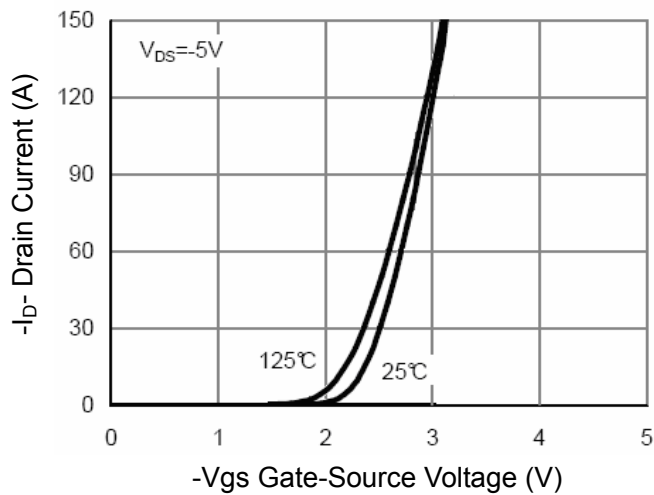


Figure 2 Transfer Characteristics

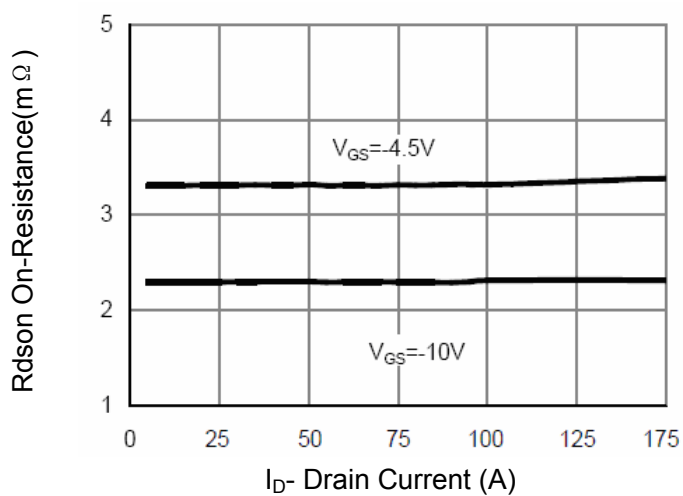


Figure 3 Rdson- Drain Current

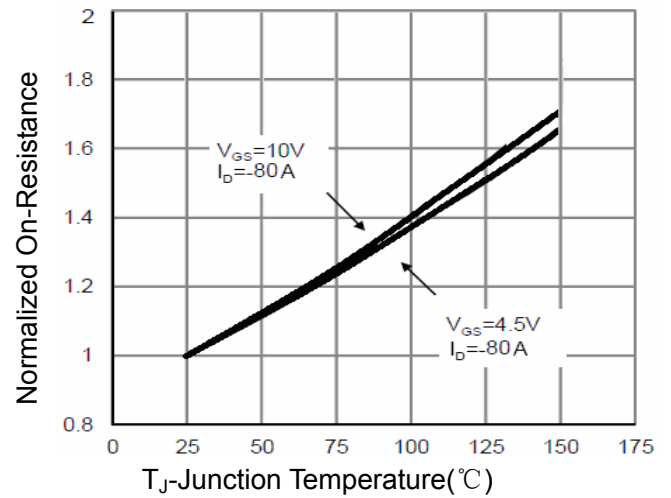


Figure 4 Rdson-Junction Temperature

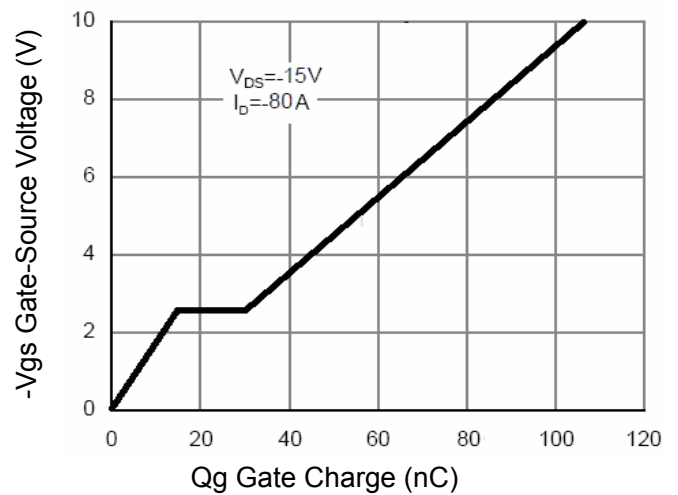


Figure 5 Gate Charge

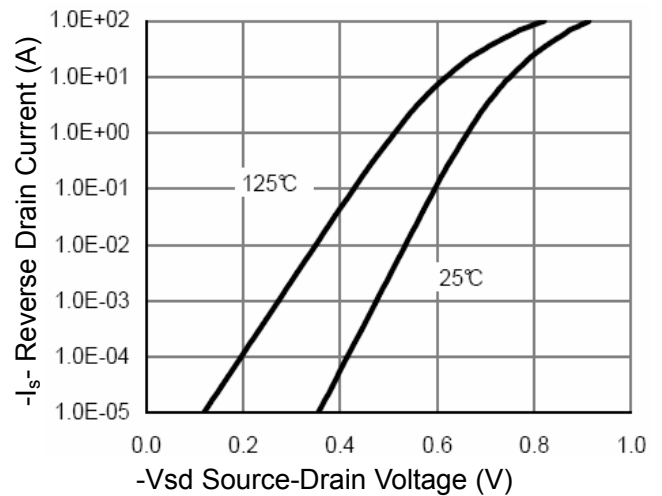


Figure 6 Source- Drain Diode Forward

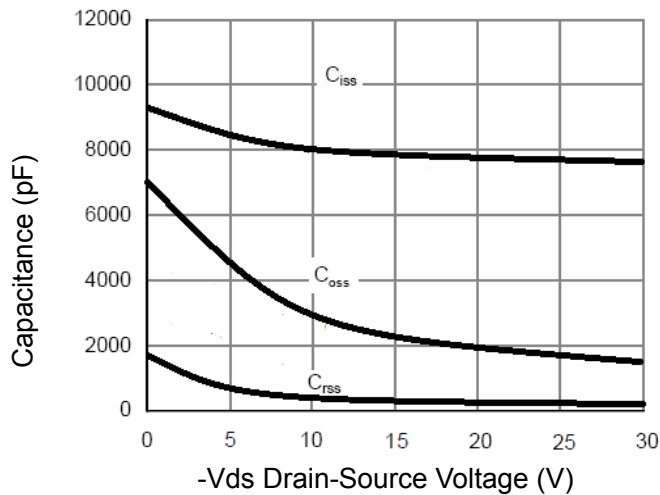


Figure 7 Capacitance vs Vds

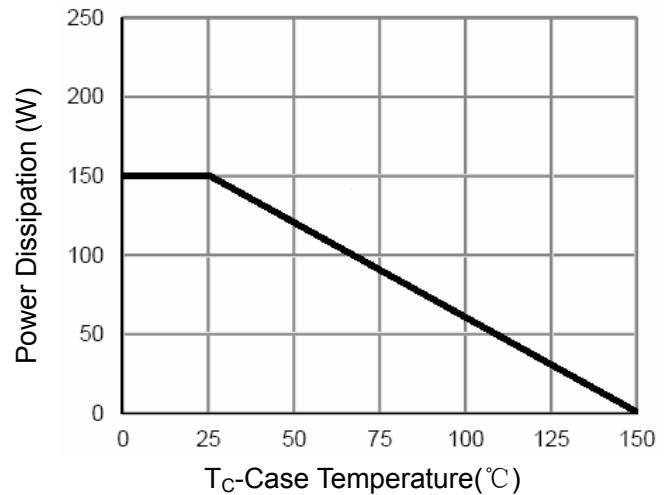


Figure 9 Power De-rating

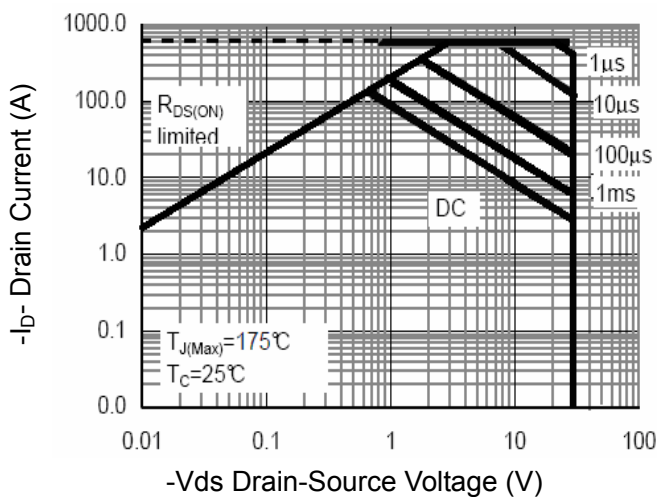


Figure 8 Safe Operation Area

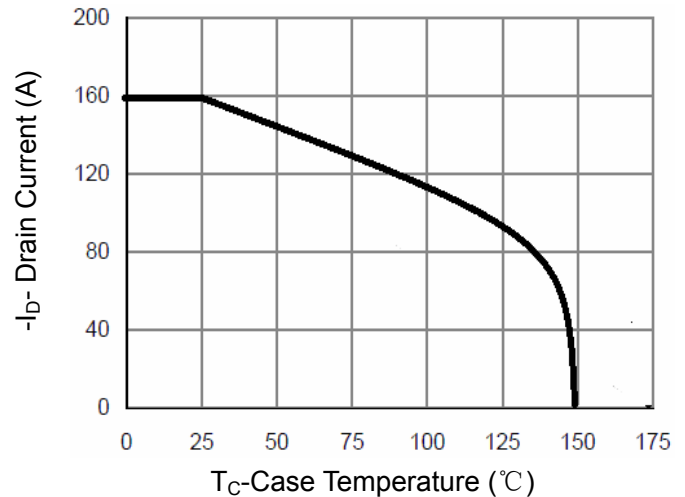


Figure 10 Current De-rating

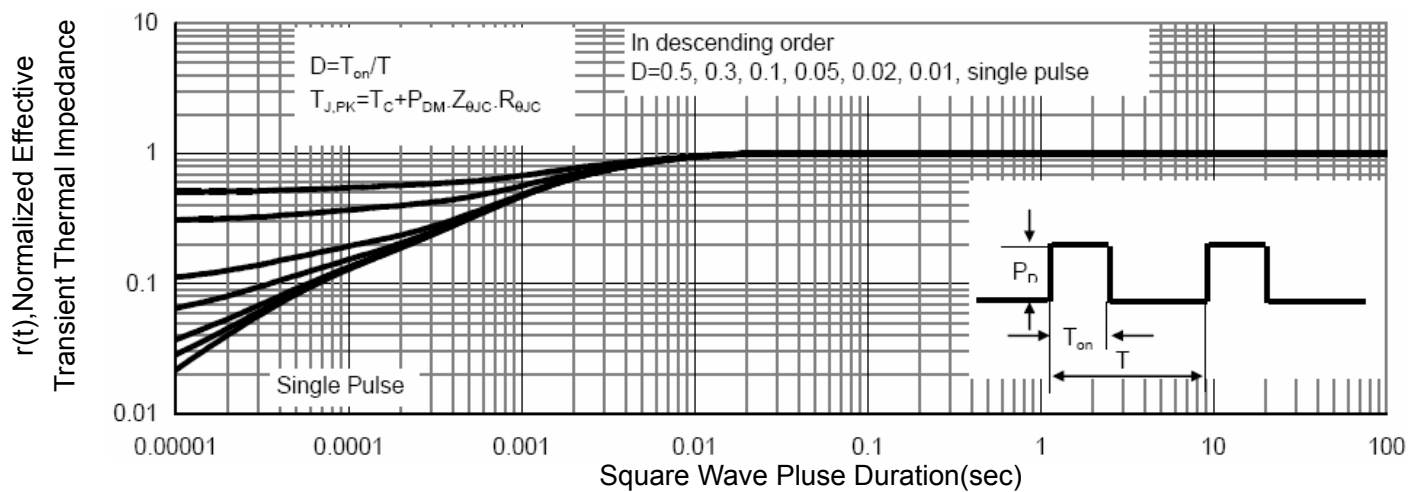
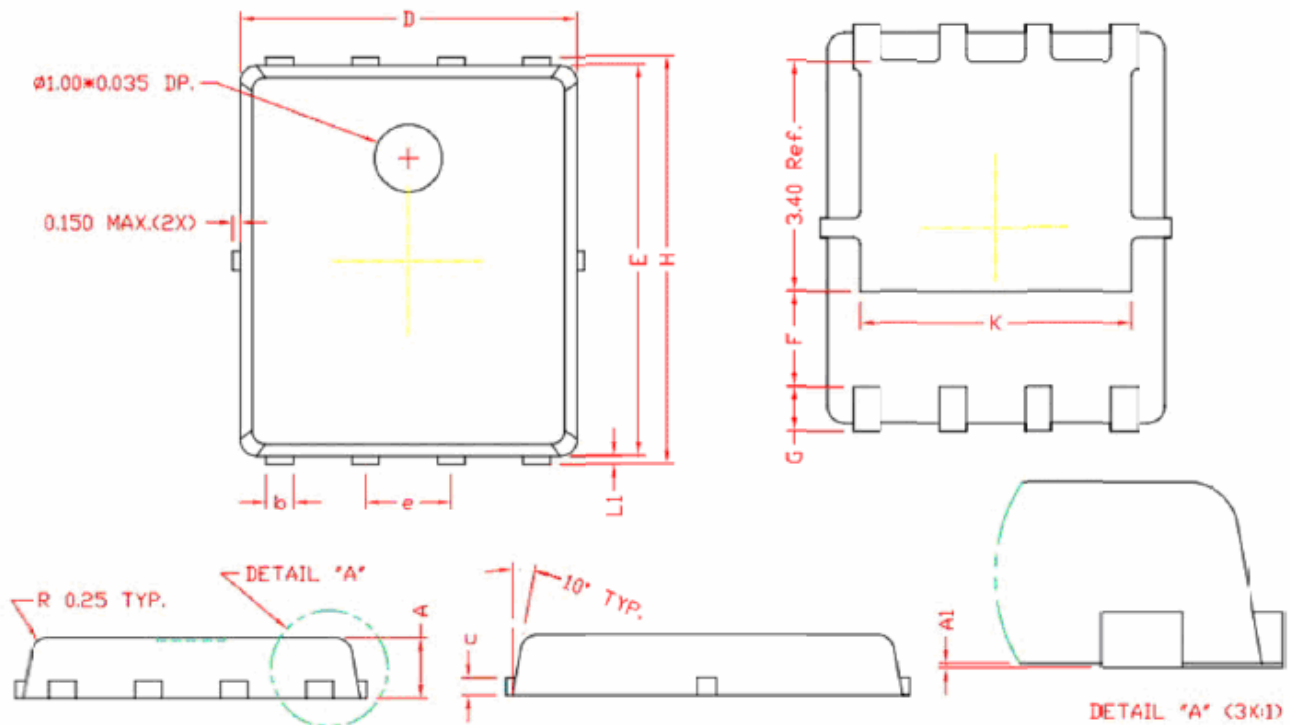


Figure 11 Normalized Maximum Transient Thermal Impedance

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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